



THE UNIVERSITY *of* EDINBURGH

This thesis has been submitted in fulfilment of the requirements for a postgraduate degree (e.g. PhD, MPhil, DClinPsychol) at the University of Edinburgh. Please note the following terms and conditions of use:

This work is protected by copyright and other intellectual property rights, which are retained by the thesis author, unless otherwise stated.

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author.

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author.

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.

**What are the effects of IMF
agreements on government
health expenditure in low- and
middle-income countries?**

A quantitative cross-country study
across income groups and
agreement types

Andreas Ochs

2016

This thesis is submitted in fulfilment of the degree of Doctor of Philosophy
Global Public Health Unit
Social Policy
School of Social and Political Science
The University of Edinburgh

Abstract

Introduction The International Monetary Fund (IMF) is an international financial institution that acts as a lender of the last resort for countries experiencing balance of payments problems. Its loans to national authorities come with conditions, which typically include tighter control of public spending, though the nature and extent of conditions as well as the emphasis on social protection may vary according to the type of lending agreement. A subject of intense debate has been the effects of these loans on the capacity of health systems to meet health need. This study investigates the effects of IMF agreements on one crucial determinant of that capacity: government health expenditure (GHE). To do so, it evaluates: (i) the effects of IMF agreements on GHE across low- and middle-income countries; (ii) how these effects vary across different country income groups; and (iii) how these effects vary according to the type of agreement.

Methods The study employs a dataset that includes GHE for 127 countries for the years 1995-2012, estimates the effects of IMF agreements using the Fixed Effects estimator, controls for determinants of GHE and accounts for endogeneity using a Heckman-style selection model.

Results When controlling for endogeneity and important determinants of government health expenditure, the results suggest that, across all countries, agreements do not have a statistically significant effect on GHE. However, the effect differs according to country income group, with low-income countries experiencing increases in spending during agreement, lower-middle income countries seeing decreases in expenditure, for upper-middle income countries no effect on spending are observed. In addition, the effect differs according to agreement type: agreements with a social protection component are associated with increases in spending in low-income countries but have no statistically significant effects among middle-income countries. Agreement types with no social protection component are associated with decreases in spending among lower-middle income countries; and there is no statistically significant effect among low-income and upper-middle income countries.

Conclusions The results indicate that, contrary to claims in the existing literature, IMF agreements do not have a statistically significant effect on GHE (positive or negative). However, this aggregate finding obscures the effect of particular agreement types in particular contexts. In low-income countries, agreements with an emphasis on social protection are associated with increases in GHE. When agreements have no social protection component they are associated with decreases in GHE for lower-middle-income countries, but not in other countries. In such contexts, IMF agreements either fail to enhance, or actually reduce, the capacity of health systems to meet health need.

Acknowledgements

This thesis would not have been possible without the support and guidance of a number of individuals whose contributions I would like to acknowledge here. First and foremost, I would like to thank my supervisors Mark Hellowell and Paul Norris for their guidance, feedback and suggestions throughout this research. Particular thanks are due to Mark, who contributed to my professional development beyond research and trusted me to tutor on postgraduate Health Systems courses over the last three years. Jeff Collin has been of great support during the first year of this research and his feedback during this time helped shape the direction of my work. Vernon Gayle, Professor of Social Statistics, provided valuable suggestions and insights into modelling longitudinal data with selection problems. The University's librarians Caroline Stirling and Christine Love-Rodgers were extremely helpful with their feedback on the search strategies for my systematic literature reviews.

I would like to thank the College of Humanities and Social Science for the funding it generously provided for three years of my research; I would not have started this research without this financial support. Beyond this, I would like to acknowledge the School of Social and Political Science for providing additional funding, which enabled me to attend research training and conferences.

Finally, I would like to thank the numerous academics who provided valuable feedback on my work at the iHEA World Congress in Health Economics, and the General Conference of the European Consortium for Political Research. In particular, I would like to thank Claudio Politi, Health Economist at the WHO for his insights into the WHO's health expenditure database, and Damian Raess, Lecturer at the University of Geneva, for his detailed feedback on my conference paper.

List of Abbreviations

ACF	Autocorrelation Function
AIDS	Acquired Immune Deficiency Syndrome
ARIMA	Autoregressive Integrated Moving Average
BOP	Balance of Payments
CFF	Compensatory Financing Facility
DAH	Development Assistance to Health
ECF	Extended Credit Facility
EFF	Extended Fund Facility
ESAF	Enhanced Structural Adjustment Facility
ESF	Exogenous Shock Facility
FCL	Flexible Credit Line
FGLS	Feasible Generalised Least Square
Fund	International Monetary Fund
G-20	Group of Twenty
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GFS	Government Finance Statistics
GGE	General Government Expenditure
GHE	Government Health Expenditure
GHE/cap	Government Health Expenditure per capita
GHE/GDP	Government Health Expenditure as Percentage of GDP
GHE/GGE	Government Health Expenditure as Percentage of GGE
GLS	Generalised Least Square
GMM	Generalised Methods of Moments
GNI	Gross National Income
GNP	Gross National Product
HIV	Human Immunodeficiency Virus
IDA	International Development Association
IEO	Independent Evaluation Office
IFI	International Financial Institution

IMF	International Monetary Fund
IMR	Inverse Mills Ratio
L&MIC	Low- and middle-income countries
LIBOR	London Interbank Offered Rate
LIC	Low-income countries
LMIC	Lower-middle-income countries
LSDV	Least Square Dummy Variable
MDG	Millennium Development Goals
MENA	Middle East and North Africa
MLE	Maximum Likelihood Estimation
MONA	Monitoring of Fund Agreements
NHA	National Health Accounts
OECD	Organisation of Economic Co-operation and Development
OLS	Ordinary Least Square
OOP	Out-of-pocket payments
PACF	Partial Autocorrelation Function
PLL	Precautionary and Liquidity Line
PPP	Purchasing Power Parity
PRGF	Poverty Reduction and Growth Fund
PRGT	Poverty Reduction and Growth Trust
R ²	Coefficient of Determination
SAF	Structural Adjustment Facility
SARS	Severe Acute Respiratory Syndrome
SBA	Standby Agreement
SCF	Standby Credit Facility
SDG	Sustainable Development Goals
SE	Standard Error
Std. Dev.	Standard Deviation
TB	Tuberculosis
UHC	Universal Health Coverage
UMIC	Upper-middle-income countries
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNICEF	United Nations Children's Fund
WB	World Bank
WDI	World Development Indicators
WEO	World Economic Outlook
WHO	World Health Organisation
WTO	World Trade Organisation

Table of Contents

Abstract	iii
Acknowledgements	v
List of Abbreviations.....	vii
Table of Contents	xi
List of Tables.....	xviii
List of Figures	xxii
Part I	1
1 Introduction.....	3
1.1 Health Systems and Government Finance	6
1.2 The IMF, its Lending and Effects on Health Systems	8
1.2.1 The IMF, its Origins and Purpose	9
1.2.2 Lending, Conditionality and Social Protection	10
1.2.3 The IMF and Health Systems	13
1.2.4 Lending Facilities	15
1.2.5 Summary of IMF Lending and Health Systems	23
1.3 Aims and Objectives of this Study.....	24
1.4 Structure of this Study.....	25
2 Literature Review of the Effects of IMF Agreements on Health Systems	29
2.1 Search Methodology	30
2.1.1 Literature Sources.....	31

2.1.2	Search Terms	32
2.1.3	Inclusion and Exclusion Criteria and Search Process	33
2.1.4	Search Process	35
2.1.5	Limitations of this Literature Review Process	36
2.2	Results of the Review	37
2.2.1	Discursive Studies	40
2.2.2	Empirical Studies.....	42
2.3	Summary of the Literature Review, Gaps in the Literature and Research Questions	54
	Appendix to Chapter 2	59
	Part II	69
3	Identifying Determinants of Government Health Expenditure.....	71
3.1	Search Methodology	72
3.1.1	Literature Sources.....	72
3.1.2	Search Terms	73
3.1.3	Inclusion and Exclusion Criteria	74
3.1.4	Search Process	77
3.1.5	Limitations of this Literature Review.....	78
3.2	Determinants of Government Health Expenditure used in the Literature.....	79
3.2.1	National Income	84
3.2.2	Fiscal Space	85
3.2.3	Population Structure	86
3.2.4	Development Assistance.....	88
3.2.5	Disease Burden	88
3.2.6	Human Development	89

3.2.7	Supply of Health Care	90
3.2.8	Organisation of the Health Care System	91
3.2.9	Other Determinants	92
3.3	Summary of Determinants of Government Health Expenditure.....	93
Appendices to Chapter 3		97
4	Identifying Determinants of IMF Agreements	107
4.1	Search Methodology	108
4.1.1	Literature Sources.....	108
4.1.2	Search Terms	109
4.1.3	Inclusion and Exclusion Criteria	110
4.1.4	Search Process	112
4.1.5	Limitations of this Literature Review	113
4.2	Determinants of IMF agreements used in the Literature	113
4.2.1	Economic Determinants of IMF Agreements.....	120
4.2.2	Political Determinants of IMF Agreements	125
4.3	Summary of Determinants of IMF Agreements.....	130
Appendices to Chapter 4		133
5	Establishing the Dataset.....	173
5.1	The Dependent Variable: Government Health Expenditure	173
5.1.1	Sources of Government Health Expenditure Data	174
5.1.2	Measuring Government Health Expenditure.....	179
5.1.3	Summary of the Dependent Variable	181
5.2	Creating the IMF Agreement Indicator.....	182
5.3	Country Definition	184

5.3.1	Low- and Middle-Income Countries	184
5.3.2	Countries Recently Joining the IMF.....	185
5.3.3	Missing Health Expenditure Data.....	186
5.3.4	Country Definition Summary	186
5.4	Determinants of Government Health Expenditure and IMF Agreements.....	187
5.4.1	Determinants of Government Health Expenditure	188
5.4.2	Determinants of IMF Agreement	194
5.5	Summary of the Dataset and Notes on Data Quality	206
Appendices to Chapter 5		209
6	Statistical Methods.....	215
6.1	Modelling Government Health Expenditure	216
6.1.1	Stationarity.....	217
6.1.2	Choice of Estimator	220
6.1.3	Further Panel Specifications: Serial and Contemporaneous Correlation, Panel Heteroscedasticity	225
6.1.4	Summary of the Method to Model Government Health Expenditure	228
6.2	Dealing with the Selection Problem.....	230
6.2.1	Instrumental Variables Approach.....	230
6.2.2	Matching Approach	231
6.2.3	Selection Model Approach	232
6.3	Summary of the Chapter and Estimation Strategy	238
6.3.1	Summary of this Chapter.....	239
6.3.2	Estimation Strategy.....	239
Appendices to Chapter 6		243

Part III	247
7 Stylised Facts	249
7.1 Analysis of Agreement Dummies	249
7.1.1 Agreements and Lending Facilities Across Countries	250
7.1.2 Lending across Time	251
7.1.3 Summary of Agreement Dummy Analyses.....	253
7.2 Government Health Expenditure: Trajectories and Time Series Dynamics .	253
7.2.1 Aggregate Government Health Expenditure Levels and Trends.....	254
7.2.2 Country Level Health Expenditure Trends and Time Series Dynamics ...	258
7.3 Bivariate Analyses	262
7.3.1 Aggregate Bivariate Analyses	262
7.3.2 Individual Country Bivariate Analysis	269
7.3.3 Bivariate Regressions	273
7.4 Summary of Stylised Facts	279
Appendix to Chapter 7	283
8 The Average Effects of IMF Agreements on Government Health Expenditure	293
8.1 Accounting for Endogeneity: Fitting the Selection Equation	295
8.1.1 Outline of the Model Selection Process	295
8.1.2 Fitting the Selection Model	298
8.1.3 Summary of the Selection Equation	301
8.2 Results of the Effects of IMF Agreements on Government Health Expenditure	302
8.2.1 Modelling Government Health Expenditure	302
8.2.2 The Average Effect of IMF Agreements.....	308

8.3	Conclusions	316
	Appendix to Chapter 8	319
9	The Effects of Agreements on Government Health Expenditure by Agreement Cluster	323
9.1	Refitting the Selection Model	326
9.1.1	Fitting the Selection Model for Social Protection Agreements	328
9.1.2	Fitting the Selection Model for SBA/EFF Agreements.....	331
9.1.3	Summary of the Selection Models.....	334
9.2	Assessing the Effects of Different Agreement Clusters	334
9.2.1	Assessing the Effects of Social Protection Agreements	335
9.2.2	Assessing the Effects of SBA/EFF Agreements.....	336
9.2.3	Summary of the Findings by Agreement Cluster	338
9.3	Exploring the Role of Agreement Clusters and Income Groups.....	339
9.3.1	Assessing the Effects of Social Protection Agreements by Income Group.....	341
9.3.2	Assessing the Effects of SBA/EFF Agreements by Income Group	345
9.3.3	Comparing and Contrasting the Findings	349
9.4	Conclusions	352
	Appendix to Chapter 9	355
10	Discussion	356
10.1	The Main Findings of this Study	356
10.2	Interpretation of the Findings	358
10.3	Contributions of this Study	362
10.4	Implications for Universal Health Coverage and Recommendations for IMF Lending Policy.....	364
10.5	Limitations of this Study	367

10.5.1	Assumptions about Agreements	368
10.5.2	On the Income Groups	369
10.5.3	Government Health Expenditure as Indicator	370
11	Conclusions.....	373
11.1	Summary of the Study.....	374
11.2	Directions for Future Research	377
11.2.1	Detailed Knowledge about Agreements	377
11.2.2	Understanding Agreement Implementation	378
11.2.3	Going Beyond Health Spending: Understanding Effects on Health Systems 379	
11.2.4	The Role of Development Assistance	380
11.2.5	Understanding individual country trajectories	381
11.2.6	Understanding the Role of income group and agreement types.....	382
11.2.7	Determinants of IMF agreements.....	383
	References	385
	Declaration of own work.....	411

List of Tables

Table 1.1: Overview of Lending Facilities available from the IMF between 1995 and 2012 20

Table 2.1: Overview of Literature Sources 31

Table 2.2: Key Words used in Review 32

Table 2.3: Database and Website Search Results at Screening Steps 36

Table 2.4: Studies Included in the Literature Review 40

Table 3.1: Building Blocks and Keywords for Literature Search for Determinants of Government Health Expenditure 73

Table 3.2: Search Results by Database and Screening Stage, for Determinants of Government Health Expenditure 78

Table 3.3: Overview of Studies on Health Expenditure Determinants 81

Table 3.4: Overview of Determinants of Government Health Expenditure 83

Table 4.1: Building Blocks and Keywords for Literature Search for Determinants of IMF Agreements 109

Table 4.2: Search Results by Database and Screening Stage for Determinants of IMF Agreements 113

Table 4.3: Overview of Studies on IMF Agreement Determinants 115

Table 4.4: Determinants of IMF Agreements 119

Table 4.5: Overview of Economic Variables used in the Reviewed Studies 124

Table 4.6: Overview of Political Variables used in the Reviewed Studies 129

Table 5.1: Sources for Government Health Expenditure Data 174

Table 5.2: List of Low- and Middle-Income Countries joining the IMF after 1995 186

Table 5.3: Variables available to measure National Income 189

Table 5.4: Variables available to measure Fiscal Space 191

Table 5.5 Variables available to measure Population Structure 192

Table 5.6: Variables available to measure Supply of Health Care 193

Table 5.7: Descriptive Statistics of Variables selected as Determinants of Government Health Expenditure 193

Table 5.8: Variables available to measure National Income 195

Table 5.9: Variables available to measure International Reserves	196
Table 5.10: Variables available to measure Debt.....	197
Table 5.11: Variables available to measure Balance of Payments position.....	198
Table 5.12: Variables available to measure Inflation.....	199
Table 5.13: Variables available to measure Government Balance	199
Table 5.14: Variables available to measure Exchange Rates.....	201
Table 5.15: Variables available to measure IMF Activity	202
Table 5.16: Variables available to measure Democracy	203
Table 5.17: Descriptive statistics of variables selected as determinants of IMF agreements.....	205
Table 7.1: Frequency of Agreements by Income Group, Lending Facility and Lending Facility Cluster	250
Table 7.2: Years in Agreements by Income Group.....	253
Table 7.3: Overall Mean and Variation of Government Health Expenditure as Percentage of GDP, Per Capita and Percentage of GGE	255
Table 7.4: Bivariate Regression of Effect of IMF Agreements on HE/GDP (logged)	274
Table 7.5: Bivariate Regression of Effect of Social Protection Agreements on HE/GDP (logged)	275
Table 7.6: Bivariate Regression of Effect of SBA/EFF Agreements on HE/GDP (logged)	275
Table 7.7: Bivariate Regression of Effect of IMF Agreements on HE/cap (logged)	276
Table 7.8: Bivariate Regression of Effect of Social Protection Agreements on HE/cap (logged)	277
Table 7.9: Bivariate Regression of Effect of SBA/EFF Agreements on HE/cap (logged)	277
Table 7.10: Bivariate Regression of Effect of IMF Agreements on HE/GGE (logged)	278
Table 7.11: Bivariate Regression of Effect of Social Protection Agreements on HE/GGE (logged).....	278

Table 7.12: Bivariate Regression of Effect of SBA/EFF Agreements on HE/GGE (logged).....	279
Table 8.1: Variable Overview by Model.....	297
Table 8.2: Key Statistics of Selection Equation Models based on Probit Regression Model.....	298
Table 8.3: Results of Probit Regression for Selection Equation.	300
Table 8.4: Models for Government Health Expenditure as Percentage of GDP.....	303
Table 8.5: Models for Government Health Expenditure as Per Capita Spending....	305
Table 8.6: Models for Government Health Expenditure as Percentage of General Government Expenditure.....	307
Table 8.7: Comparison of R ² Values across Models.....	309
Table 8.8 Effects of IMF Agreements on Government Health Expenditure as Percentage of GDP	312
Table 8.9 Effects of IMF Agreements on Government Health Expenditure as per Capita Spending.....	314
Table 8.10 Effects of IMF Agreements on Government Health Expenditure as Percentage of Government Spending	315
Table 9.1: Frequencies of case-years by Agreement Clusters	325
Table 9.2: Key Statistics of Selection Equation Models for Social Protection Agreements based on Probit Regression Model.....	328
Table 9.3: Results of Probit Regression for Selection Equation of Social Protection Agreements.....	330
Table 9.4: Key Statistics of Selection Equation Models for SBA/EFF Agreements based on Probit Regression Model	331
Table 9.5: Results of Probit Regression for Selection Equation of SBA/EFF Agreements.....	333
Table 9.6: Effects of Social Protection Agreements on Government Health Expenditure.....	335
Table 9.7: Effects of SBA/EFF Agreements on Government Health Expenditure..	337
Table 9.8: Effects of Social Protection Agreements on logged HE/GDP across Income Groups	341

Table 9.9: Effects of Social Protection Agreements on logged HE/CAP across Income Groups	343
Table 9.10: Effects of Social Protection Agreements on logged HE/GGE across Income Groups	344
Table 9.11: Effects of SBA/EFF Agreements on logged HE/GDP across Income Groups	345
Table 9.12: Effects of SBA/EFF Agreements on logged HE/CAP across Income Groups	347
Table 9.13: Effects of SBA/EFF Agreements on logged HE/GGE across Income Groups	348
Table 9.14: IMF Agreement Dummy Coefficients for All Agreements, Social Protection and SBA/EFF Agreements by Income Group	349
Table 10.1: Overview of Results by Agreements and Income Groups.....	358

List of Figures

Figure 1.1: Overview of Facility Clusters 21

Figure 2.1: Flowchart of process to include literature 34

Figure 2.2: Flowchart of Screening Process..... 35

Figure 3.1: Flowchart of Process to include Literature 76

Figure 3.2: Flowchart of Screening Process..... 77

Figure 4.1: Flowchart of Process to include Literature 111

Figure 4.2: Flowchart of Screening Process..... 112

Figure 5.1: Flowchart of Country Definition 187

Figure 7.1: Number of Agreements per Year and by Lending Facility. 252

Figure 7.2: Government Health Expenditure as Percentage of GDP, Time Trend by
Income Group..... 256

Figure 7.3: Government Health Expenditure Per Capita in constant PPP, Time Trend
by and Income Group 256

Figure 7.4: Government Health Expenditure as Percentage of GGE, Time Trend by
Income Group..... 257

Figure 7.5: Timeline Plots and ACF Plots of Government Health Expenditure in Belize
and Lesotho 259

Figure 7.6: Timeline Plots and ACF Plots of Government Health Expenditure in Gabon
and Libya..... 259

Figure 7.7: Timeline Plots and ACF Plots of Government Health Expenditure in Haiti
and Lebanon 259

Figure 7.8: Timeline Plots and ACF Plots of Government Health Expenditure in
Belarus and Cabo Verde 260

Figure 7.9: Government Health Expenditure as Percentage of GDP, Time Trend across
all Countries and Agreements 263

Figure 7.10: Government Health Expenditure as Percentage of GDP, Time Trend
across all Countries, Social Protection Agreements..... 264

Figure 7.11: Government Health Expenditure as Percentage of GDP, Time Trend
across all Countries, SBA/EFF Agreements 264

Figure 7.12: Government Health Expenditure Per Capita, Time Trend across all Countries, all Agreements	265
Figure 7.13: Government Health Expenditure Per Capita, Time Trend across all Countries, Social Protection Agreements.....	266
Figure 7.14: Government Health Expenditure Per Capita, Time Trend across all Countries, SBA/EFF Agreements	267
Figure 7.15: Government Health Expenditure as Percentage of GGE, Time Trend across all Countries	268
Figure 7.16: Government Health Expenditure as Percentage of GGE, Time Trend across all Countries, Social Protection Agreements.....	268
Figure 7.17: Government Health Expenditure as Percentage of GGE, Time Trend across all Countries, SBA/EFF Agreements	269
Figure 7.18: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Congo.....	270
Figure 7.19: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Armenia	271
Figure 7.20: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Benin.....	272
Figure 7.21: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Sierra Leone.....	273
Figure 8.1: Scatter Plot of Linear Predictions from Established and Stripped Model	301

Part I

Background to this Study

1 Introduction

Over recent years a significant amount of research on health systems and health policy has been produced. Given that the formulation of health policy is largely considered to be in the domestic domain, as regulations and legal obligations around health systems remain at the level of national governments (Blank and Burau, 2014), a sizable share of this research has focussed on the national level of health policy. However, a large number and variety of transnational actors – such as international governmental organisations, civil society organisations including philanthropic organisations, as well as international meetings, such as the World Economic Forum or the G-20 – exist, which play a key role in the global discourse about health systems and health policy, influencing decisions through information, recommendations and other means (Kaasch, 2015).

This study focusses on one of these international organisations, the International Monetary Fund (the IMF, or the Fund), which is seen to be one of the key actors in global health governance (Cockerham and Cockerham, 2000). This organisation lends money in the form of loans to countries that are experiencing economic instability and/or face long-term constraints to economic growth. These loans come with strings attached, so-called conditionalities, policy prescriptions that

are designed to re-stabilise a country's economy but often require countries to reshape policies across a number of domains, including fiscal and monetary policy, and typically require stricter control of government expenditure as well as, in some cases, structural adjustments¹ (Dreher et al, 2015; IMF, 2013b; Stuckler and Basu, 2009; Vreeland, 2007). If and to what extent these conditionalities impact on health systems is subject to intense debate.

Critics of the role of the IMF in global health have argued that agreements can have disastrous effects on health systems. An early study by the United Nations Children's Fund (UNICEF) entitled "Adjustment with a Human Face", later published by Cornia et al (1987), argued that the conditionalities attached to agreements have undermined health systems by requiring governments to aggressively reduce public expenditure. Others, for instance Rowden (2009), have argued that the Fund's conditionalities and its primary focus on economic stability has caused cuts to social and health expenditure that hit the poor especially hard. Similarly, Goldsbrough et al (2007b) argued that budget targets have led to short-term public expenditure cuts, which are invidious to sustainable health systems due to their long-term consequences. In their assessment of evidence on the IMF's effects on health systems, Stuckler and Basu (2009: 771) conclude that "IMF programs have been significantly associated with weakened health care systems."

In contrast, some authors, many of whom are employed by or otherwise affiliated with the IMF, have asserted that agreements are in fact associated with *higher* government health expenditure. In a 2006 speech the then-managing director of the IMF, Rodrigo de Rato, claimed that "the Fund is ... strongly committed to making sure that countries have the fiscal space they need to expand social programs, especially in health" (IMF, 2006). In 2009 the IMF re-stated its commitment to social protection and assured that its policies prevent millions of people from falling into poverty (IMF, 2009b).

¹ Structural adjustment means the reform or adjustment of the structure of a country's economy through a number of policies. Feldstein et al (2003) describes structural policies as those that aim to reduce government-imposed distortions or create institutional features of market economies. These can include financial sector policies, liberalisation of trade, capital markets or the exchange rate system, privatisation or tax policies, as well as pricing or marketing policies, and those policies directed at poverty reduction and social safety-nets.

The IMF's global reach and worldwide lending activity imply that its actions have the potential to affect health systems globally and thus impact on the health and well-being of millions of people around the world. Understanding the effects of the Fund's actions is therefore of great importance to global health policy.

This is a particularly timely moment to be studying this issue, for two reasons. Firstly, in the wake of the 2008 financial crisis, the IMF received extra funding in the range of \$750 billion from the G-20 in order to enhance its lending capacity and respond to the crisis and to provide loan agreements to a large number of additional countries (IMF, 2009a; The Economist, 2009). This means that millions more people around the world are being exposed to the effects of Fund policies. Secondly, the recent Ebola outbreak in West Africa (Piot et al, 2014) reignited the debate around the effects of IMF agreements on health systems. Kentikelenis et al (2015a), for instance, suggest that the IMF might have contributed to the extent of the recent disease outbreak in Sierra Leone, Liberia and Guinea as a result of its lending policies and their impact on the health systems in these countries. The IMF countered that a link between its agreements and the outbreak cannot be established and that it is committed to extending spending on health systems (Gupta, 2015).

Despite the highly polarised debate on the effects of IMF activities on health systems, empirical studies assessing the effects of agreements on government health spending – an important indicator of the capacity of health systems to meet population health need in an equitable manner, and the widely recognised goal of universal health coverage (section 1.1; pg. 6) – are rare and their findings mixed (see literature review in chapter 2). The results of a recent study by Clements et al (2013) indicate that Fund agreements have significant positive effects on health spending in low-income countries, but no such impact in countries of higher income. Kentikelenis et al (2015b), in contrast, find that agreements have no impact on health expenditure in low-income countries in general.

This study aims to contribute to this debate by **evaluating the effects of specific kinds of IMF agreements on government health expenditure in specific economic contexts**. While the literature considers, though in a non-systematic way, that effects of agreements differ across countries' income groups, it does not

acknowledge that the IMF conducts lending through a number of different lending facilities that differ in their nature and extent of conditionality as well as the emphasis they place on social protection² (section 1.2.4; pg. 15). These differences in terms of conditionality and emphasis on social protection are likely to be associated with differences in the effects of IMF lending on government health expenditure. These differences should therefore be considered as an important determinant when trying to understand the effects of IMF agreements on government health expenditure. This current study seeks to contribute to, and expand, the debate around the effects of IMF lending on government health expenditure by assessing these effects systematically across each income group. Beyond this and unlike previous studies, this present study incorporates the fact that the Fund offers loans through *different agreement facilities* that vary in the nature and extent of conditionality and, in particular, the emphasis they place on social protection, and hypothesises that the differences between the lending facility types impact on the agreements' effects on government health expenditure. It therefore assesses the effects for each of the agreement types on government health expenditure.

The following sections establish in more detail a background to understanding the analytical framework of this study. In particular, the next section (1.1) offers a justification for using government health expenditure as indicator for this study. Section 1.2 develops the classification of lending agreement types into three clusters according to the agreements' level of conditionality and their emphasis on social protection, and outlines the anticipated effects of each such cluster on government health expenditure. The third section presents this study's aims and objectives in more detail. Section four outlines the structure of the study.

1.1 Health Systems and Government Finance

This section offers a justification of the selection of government health expenditure as an indicator of health system capacity. Health systems, defined as all activities with primary purpose to promote, restore or maintain health (WHO, 2000),

² Social protection thereby describes policies aimed at preventing or reducing poverty. See section 1.2.2 (pg. 10) for more details.

are an important component of broader societal efforts to promote and sustain the health of the population, and are essential to human welfare and sustained economic and social development in all countries (Hellowell and Ralston, 2015; WHO, 2010). The health *financing* system is one important component of every health system, as its organisation will contribute to achieving broader goals of health systems including gains in health outcomes and its capacity to meet population health needs in an equitable manner (Kutzin, 2013).

A widely accepted goal of health system financing is the idea of universal health coverage (UHC), which has, especially since the 2010 World Health Report (WHO, 2010), gained support from scholars and policy makers around the world (Kutzin et al, 2016; Yates, 2009). Financing systems that contribute to UHC goals are those which “are specifically designed to (i) provide all people with access to needed health services (including prevention, promotion, treatment and rehabilitation) of sufficient quality to be effective; [and] (ii) ensure that the use of the services does not expose the user to financial hardship” (WHO, 2010: 6). As no country has so far achieved the goal completely, UHC should be seen as a policy direction rather than a destination (Kutzin, 2013; Kutzin et al, 2016). While no generally accepted roadmap for achieving UHC exists, there is broad consensus that government financing needs to play a central role (WHO, 2010). This is because relying on other, market-based³ forms of financing health services, in particular direct payments, are unlikely to support progress towards UHC.

Direct payment of medical services requires people to pay for services at the point of need without any form of pre-payment or pooling of resources. Arranging health service financing in this way has two negative effects from an UHC perspective. Firstly, direct payments are unable to provide *all* people with access to the needed health services as it discourages a part of the population from the uptake of needed services because they are unable to afford them (Preker et al, 2004; WHO, 2010).

³ Regulating markets through voluntary or mandatory insurance is unlikely to help achieving the access and equity goals of UHC, as people will be unable to purchase insurance due to high risk of illness or too high levels of premiums (Cutler and Zeckhauser, 1998; Fuchs, 1996; Hellowell and Ralston, 2015; Olsen, 2009). As a result, not all people will have access to needed health services, leaving those who are unable to take out insurance exposed to potential financial hardship.

Secondly, direct payments risk exposing patients to financial hardship, because high costs from medical services can be associated with catastrophic health spending, which risk pushing people into poverty (van Doorslaer et al, 2007; WHO, 2010; Xu et al, 2007). Overall, direct payments cause both inefficiency and inequality and are therefore counter to the goals of UHC.

Similarly, market-based insurance is unable to provide the broad access to health-related goods and services that UHC calls for. This is because, like other markets, they allocate goods and services on the basis of ability and willingness to pay. Hence, a strong publicly financed health system is required in order to ensure that people have access to needed health services without being exposed to the risk of financial hardship (Hellowell and Ralston, 2015; Hurley, 2001). Government financing is therefore a key component of financing to progress towards UHC, and a useful measure of health financing to support the creation of a health system that secures equity of access and financial protection.

1.2 The IMF, its Lending and Effects on Health Systems

The IMF is an international financial organisation with the mission to support international monetary cooperation, maintain financial stability, foster international trade, ensure high employment, sustainable economic growth and reduce poverty (IMF, 2011; 2013b). This section argues that the impact of agreements on government health expenditure originates from the agreements' extent of conditionality and the emphasis on social protection. To do so, it is structured into four subsections. The first subsection begins by briefly outlining the origins and purpose of the Fund. Subsection 1.2.2 outlines in more detail the lending process and the development of conditionalities, as well as differences in the emphasis placed on social protection. Subsection 1.2.3 identifies pathways through which agreements' conditionalities and social protection elements impact on health systems, and health spending in particular. Subsection 1.2.4 shows that the IMF's lending is conducted through a number of different facilities. These can be classified into three clusters of agreements based on their nature of the conditionalities they include. It is explained how agreements in different clusters are expected to vary in their effects on government health expenditure.

1.2.1 The IMF, its Origins and Purpose

Faced with the challenges to finance the reconstruction of Europe after the end of the Second World War and aiming to create a new economic and global monetary system that would avoid another Great Depression derailing the economic community, economic delegates met in 1944 at the United Nations Monetary and Financial Conference in Bretton Woods, New Hampshire, United States to devise a new financial system designed to foster international trade, stabilise exchange rates and prevent balance of payment crises (Steil, 2013). This system established the IMF, the International Bank for Reconstruction and Development, today known as the World Bank, and the General Agreement on Tariffs and Trade (GATT), today known as the World Trade Organisation (WTO) (Bird, 1995; Eichengreen, 2008; IMF, 2013b; Stuckler and Basu, 2009; Vreeland, 2003; Vreeland, 2007; Woods, 2006).

Today the IMF is a truly global institution, boasting virtually universal membership of currently 188 countries from around the world⁴ (IMF, 2013b; Vreeland, 2007). Its purpose, outlined in Article 1 of the Articles of Agreement (IMF, 2011), is to ensure stability of the international monetary system of exchange rates and international payments which enables countries to interact financially (IMF, 2013b). This is executed through two main lines of work. Firstly, the Articles provide the IMF with a mandate to oversee the exchange rate policies of member countries to ensure the effective operation of the international monetary system. The IMF thereby assesses whether its members' economic policies and performance are consistent with the achievement of macroeconomic stability (IMF, 2013b; Wolff, 2014). With the end of fixed exchange rate system in the 1970s, the importance of this mandate has diminished, and the second task, that of financial assistance, which established the IMF as the world's "lender of the last resort", gained in prominence (Thirkell-White, 2005). While financial assistance was initially constructed to support Western countries, the 1960s saw a shift in the Fund's focus towards the developing world to support newly independent and economically ailing African countries. Between 2003 and 2012, 71 per cent of all lending activity was to low- and lower-middle-income countries (Bird,

⁴ Its members only exclude the two remaining full-fledged communist countries Cuba and North Korea and those countries too small to have ever had their own currency.

1995; Eichengreen, 2008; IMF, 2013e; Vreeland, 2003; Vreeland, 2007). The organisation of this lending activity is highly controversial, because, as noted, the IMF attaches conditions to its loans.

1.2.2 Lending, Conditionality and Social Protection

To fulfil its lending mandate, the Fund acts as an international credit union, pooling resources provided by its member states to support countries requesting the IMF's financial assistance when experiencing balance of payment⁵ needs (IMF, 2016e). The balance of payment is a statistical record of all economic transactions between a country and the rest of the world. It contains statistics on imports and exports of goods and services, financial transactions and the stock of foreign currencies. It is in balance when the sum of the current account, the capital account and changes in the country's foreign reserves equal zero. Imbalances cause macroeconomic instability as currencies appreciate or depreciate and price levels or interest rates fluctuate⁶ (Burda and Wyplosz, 2001; Pilbeam, 2013). Upon request the IMF makes resources available through a lending arrangement. In consultation with the respective country, the IMF specifies economic policies and measures for a country to implement in return for IMF credit (Gold, 1979; IMF, 2016e; Stiles, 1991). These are the conditionalities. While not originally a part of the IMF's lending architecture, they have become an almost⁷ universal part of IMF lending (Polak, 1991; Stone, 2008). The rationale for attaching conditions to loans is twofold. Firstly, they act as a mechanism for controlling moral hazard among country decision-makers and hence enhance the likelihood of the IMF receiving scheduled repayments. Secondly, as it is assumed that countries seeking IMF funds are undergoing a crisis, it is assumed that governments have followed "bad policies", which need to be corrected before a viable balance of payments position can be established (Gutián, 1981: 3; Paloni and Zanardi, 2006; Polak, 1991; Stuckler and

⁵ While the original focus of the IMF was on financial assistance in situations of short-term balance of payment problems, the IMF does now also provide assistance for long-term balance of payment problems (see 1.2.3; pg. 13).

⁶ An imbalance can for instance be seen in a current account deficit, which necessitates a capital inflow to maintain demand for the currency.

⁷ A notable exception to this rule are newly introduced facilities for specific purposes. See section 1.2.3 (pg. 13) for more detail.

Basu, 2009; Tarp, 1994; Taylor, 1991; Vreeland, 2003). Conditionalities attached to a loan agreement are spelt out in the “Letter of Intent” and the attached “Memorandum of Understanding” (IMF, 2016e), and contain those policies that the IMF deems appropriate to tackle the country’s balance of payment situation and restore economic stability and economic growth (Polak, 1991).

The policies that form conditionality of the IMF’s agreements have evolved over time. Traditionally the IMF has taken a monetary approach to the design of its macroeconomic stabilisation programmes. This approach is known as *financial programming* and it builds on the so-called Polak Model (Polak, 1957). Financial programming incorporates an assessment of the current economic situation of a country and how changes in policy will have effects on macroeconomic target variables (Easterly, 2006; Mikkelsen, 1998; Polak, 1957; 1991; 1997; Tarp, 1994). The core result of the Polak model is that control of *domestic private sector credit expansion* is the key to controlling the money supply and, in turn, external balance. In developing countries, it is assumed that most domestic private sector credit expansion is to government, and thus the focus of attention is on controlling the fiscal deficit. Over time and with changes in countries requesting IMF programmes, it has become apparent that the IMF’s exclusive policy focus on money supply is not sufficient to resolve country crises, because root causes of the crises were often seen to be more structural, requiring deeper reform efforts. In the 1970s, therefore, the IMF began to include fiscal and structural policies⁸ in its lending activities. This emphasis on structural policies, beyond the IMF’s initial mission, has attracted much criticism⁹ and caused the IMF to refocus its conditionality (Köhler, 2000). The Fund seems committed to further streamlining conditionalities particularly in relation to structural reforms (IMF, 2001a). For example, structural performance criteria have been abolished for some types of lending, and there is a general requirement in the guidance to ensure that structural reforms are focused on specific policy objectives and tailored to a country’s policies and economic conditions (IMF, 2015c).

⁸ See footnote 1 for examples of such structural policies.

⁹ See for instance Feldstein et al (2003) for details on the criticism.

Apart from changes in its approach to conditionality, the IMF has developed to take on an ever more explicit role in poverty reduction and social protection. For instance, in a speech Horst Köhler, IMF managing director from 2000-2004, argues that institutions of “the global economic system have a responsibility to ensure that globalization translates into a better life for all” (IMF, 2000a). Additionally, the IMF contributes to the debate in academia and amongst civil-society organisations on the effects of its lending activities on health, for instance by undertaking empirical research (Clements et al, 2013; Martin and Segura-Ubiergo, 2004) and seeking to explain and defend the Fund’s policies in the light of criticism of its alleged role in contributing to the Ebola crisis of 2014/2015 (Gupta, 2015). This broader commitment to development can be seen to impact the IMF’s lending activity, for instance, through the introduction of Poverty Reduction Strategy Papers in 1999 (IMF, 2015f; Paloni and Zanardi, 2006) and the stated emphasis on poverty reduction in its concessional lending facilities¹⁰. These agreements are said to contain policies specifically designed for countries to protect and increase social and health spending (see section 1.2.4.1 (pg. 16) for more details).

Social protection is thereby seen as policies that aim at reducing poverty or preventing people from falling into poverty in the first place. More specifically it is intended to relieve people of the burden of social risks. It includes both the provision of a minimum level of well-being but also the promotion of human and social potential (IEO, 2016). In relation to health this means to protect people against the risk of health and the financial burden that comes with the demand for health services.

Conditionalities and, in particular, the emphasis placed on social protection in conditionalities, likely have an impact on the effect of the agreements on government health expenditure. Before discussing this in more detail in section 1.2.4 (pg. 15), the following section briefly outlines the hypothesised pathways through which agreements impact on health systems.

¹⁰ For a definition of concessional lending facilities, see section 1.2.4 (pg. 15).

1.2.3 The IMF and Health Systems

Cockerham and Cockerham (2000) argue that the Fund is an important actor in global health governance in low- and middle-income countries, as the organisation of its lending process impacts on health systems and health in a number of ways. Musgrove (1997) suggests that almost every part of a country's economy can be affected by conditionalities, which – due to the intertwined nature of the economy and health and health systems – means that agreements can have a number of effects on health systems. This section, while not a formal literature review, provides a brief overview of the main pathways, as identified in the literature, through which agreements may impact on the demand for and supply of health-related goods and services.¹¹

Agreements are seen to impact on people's health and thereby increase demand for health care services. Specifically, conditionality might cause reductions in food subsidies and currency devaluation, which lead to increases in food prices and decreases in people's ability to buy food, thereby impacting on their nutritional status and health. Conditionalities can also reduce public investment in sanitation and education and thus lead to increases in diseases or reduced health outcomes due to lower health literacy (Breman and Shelton, 2007; Peabody, 1996; Pinststrup-Andersen, 1987).

A larger body of literature exists, that focusses on the impact of IMF agreements on health care supply. Within this literature, health *spending* is most commonly discussed. Government health expenditure is argued to decrease through conditionality on macroeconomic policy. These might, for instance, demand to cut budget deficits. Policy makers might feel they have limited fiscal space¹² and decide to rebalance the books by cutting government spending on health (Breman and Shelton, 2007; Goldsbrough et al, 2007b; Rowden, 2009). Conditionalities might also be set to limit the wage bill (Kentikelenis et al, 2015b). Health care is a highly labour

¹¹ Another body of literature exists that discusses pathways of agreements' indirect effects on health, for instance, through impacts on wages. For an overview see De Vogli and Birbeck (2005).

¹² See section 3.2.2 (pg. 85) for a definition of the term "fiscal space".

intensive activity, and requires a large share of spending to be allocated to the health care workforce. Reductions or limits to wages can put downward pressure on overall health spending but lead to problems in the recruitment and retention of an adequate workforce. While the IMF argues to have reduced the emphasis placed on this kind of conditionality, Ruckert and Labonté (2013) demonstrate that various agreements still include this feature.

Further, conditionalities might require structural reforms of an economy including the privatisation of state-run services (Stuckler and Basu, 2009). While changes have taken place in respect of this conditionality, the delivery or financing of health care systems might become privatised. While the effects of privatisation of health care services per se are debated, restructuring health systems financing through reductions in government provided services and an associated increase in private, out-of-pocket spending, might impact on health system accessibility and be counter to the goal of UHC (De Vogli and Birbeck, 2005; Lagarde and Palmer, 2011). Conditionalities to devalue currencies mean that in order to import the same amount of goods, more money needs to be spent. When fiscal space is limited and the available budget fixed, the same budget buys less goods. In the context of most developing countries where most pharmaceuticals and health technologies are being imported, less products can be purchased and are available for services provided through the health system (De Vogli and Birbeck, 2005; Musgrove, 1997; Peabody, 1996). While the IMF rarely sets explicit conditionality to restrict health spending and began introducing thresholds for minimum spending on health care towards the end of the 1990s (IMF, 1999; 2000b), Kentikelenis et al (2015b), however, argue that these targets can often be considered as spending ceilings, actually restricting, rather than increase spending.

Some authors argue that these thresholds were introduced as spending floors to prevent reductions in spending and are designed to increase expenditure on health care (Clements et al, 2013). This would particularly be true for concessional lending facilities, which emphasis poverty reduction and the protection and expansion of social and health spending. Another effect how IMF agreements might increase spending is to argue that IMF agreements are seen as seals of approval. This means that entering

into an IMF agreement will inspire confidence in countries and increase donors' willingness to provide aid, including development assistance to health.

From this overview it can be seen that the impact of agreements on health systems and particularly government health expenditure is linked to the agreements' design of conditionality and their emphasis on social protection. The following section shows that agreements differ systematically in respect to these dimensions, and offers a classification of lending facilities along their conditionality level and emphasis on social protection.

1.2.4 Lending Facilities

The Fund provides loans through a number of different types of lending instruments, so-called "facilities". Each of these specific facilities is used in a specific situation and has a dedicated framework of conditionality and emphasis on social protection. With these differences between the facility types, the effects on health systems and government health spending is expected to differ. This section develops this argument and derives a classification of the different lending facilities into a set of three facility clusters based on their conditionality and emphasis on social protection (1.2.4.3). This will be used to derive the effects of each cluster on government health expenditure (1.2.4.4). The section begins by outlining the different lending facilities and is organised to present first so-called concessional facilities¹³ (1.2.4.1) under the Poverty Reduction and Growth Trust (PRGT) framework, which come with concessional¹⁴ interest rates, and second non-concessional facilities (1.2.4.2) that offer market-related interest rates (Copelovitch, 2010b; IMF, 2001c; 2016e). For an overview of the facility types see Table 1.1 (pg. 20).

¹³ In order to receive loans through these agreements, countries need to be eligible for the Fund's Poverty Reduction and Growth Trust. These are lower income countries which have per capita GNI below the International Development Association (IDA) operational lending cut-off and do not have the capacity to access international financial markets (IMF, 2013a).

¹⁴ Interest rates are considered to be concessional when they are set at a value below the market rate. In 2009 the concessional interest rate has been set to zero percent until the end of 2016 (IMF, 2009c; 2016e). For the Rapid Credit Facility (see section 1.2.4.1) the interest rate has permanently been set to zero in July 2015 (IMF, 2016e).

1.2.4.1 Concessional Facilities

The IMF provides financing through concessional lending facilities since the 1980s. Most prominently lending was conducted through the Structural Adjustment Facility (SAF) and the Enhanced Structural Adjustment Facility (ESAF), available since the mid-1980s and designed to deal with longer-term structural reform in poorer countries (Bird and Mosley, 2004; IMF, 2004). In 1999 the Fund replaced these lending facilities with lending under the Poverty Reduction and Growth Fund (PRGF). These facilities, it was claimed, were more accommodating to higher public spending, poverty reduction and growth priorities as long as macroeconomic stability was maintained (IMF, 2009d). The lending architecture was again reformed in 2009, to create the Poverty Reduction and Growth Trust as new financing framework for concessional lending. Common to all facilities under the Trust is their emphasis on a stable and sustainable macroeconomic position that is consistent with strong and durable poverty reduction and growth. The IMF explicitly states that lending programmes through these facilities should safeguard, or, when appropriate, increase social spending (IMF, 2016a). In particular, financing requests should indicate how an IMF lending programme will advance the country's poverty reduction objectives and strategies in order to ensure that the lending programme is consistent with the country's strategies for poverty reduction. This can for instance include the establishment of social safety nets or the prioritisation of certain areas of public spending, for instance in health. This framework contains at present¹⁵ three facilities that are employed in different situations.

The most frequently¹⁶ used lending facility within the concessional lending framework is the Extended Credit Facility (ECF), which succeeded the Poverty Reduction and Growth Facility, and is employed in situations where countries experience protracted balance of payment problems, which reflect underlying macroeconomic imbalances. The resolution of these, to achieve a stable and sustainable macroeconomic situation, is expected over the medium to long term and

¹⁵ Between 2008 and 2010 the Exogenous Shock Facility was available, which is presented here as well.

¹⁶ See chapter 7 for frequencies of facility use.

programmes are designed to last 3-4 years. Agreements and policies are particularly linked to a country's poverty reduction strategy and to safeguarding social objectives. These agreements come with the traditional conditionality where the disbursement of loan tranches is linked to achievement of programme conditions. This can also include structural benchmarks to build up social safety nets (IMF, 2014d; 2016a).

The Standby Credit Facility (SCF) provides concessional financing to countries that experience actual or potential short-term balance of payment needs. The difficulties underlying the balance of payment needs are considered to be resolved within a shorter timeframe compared to situations where the ECF is used. The programmes aim to help countries in achieving a stable and sustainable macroeconomic position in the short-term and are designed to be aligned with a country's poverty reduction strategy. Similar to the ECF, programmes under the SCF come with traditional conditionality that may also include structural benchmarks to build up social safety nets (IMF, 2014b; 2016a; 2016h).

The Rapid Credit Facility (RCF) is designed as emergency support instrument for countries requiring rapid financing in order to meet urgent balance of payment needs resulting from situations including exogenous shocks, natural disasters, conflict or fragility. These situations are anticipated to be resolved quickly, and do thus not require a full IMF programme. These programmes are designed as one-off disbursements and do not come with traditional conditionality like the ECF or SCF; nevertheless, countries are expected to address economic policies that caused balance of payment difficulties, where appropriate (IMF, 2013c; 2014b; 2016a).

Between 2008 and 2010, the IMF also provided concessional lending through the Exogenous Shock Facility (ESF), which was designed to provide financing to countries facing balance of payment needs as result of sudden and exogenous shocks. These programmes came with no traditional conditionality but the expectation to adjust policies causing imbalances (IMF, 2016b).

1.2.4.2 Non-Concessional Facilities

Besides agreements through the PRGT, the IMF also offers financial assistance through non-concessional lending facilities, without explicit emphasis on social

protection. Five of these non-concessional lending facilities exist, that differ in their duration, purpose and conditionality.

The oldest and most commonly used facility is the Stand-by Agreement (SBA), which is designed for use in countries facing short-term actual or potential balance of payment problems and aims to restore sustainable growth. Agreements through this facility usually last between one and two years and carry traditional conditionality where disbursements require achieving programme targets, which are focussed on overcoming the economic problems that led to the balance of payment problem in the first place (IMF, 2016e; 2016g).

Lending through the Extended Fund Facility (EFF) is available for countries experiencing medium- and longer-term balance of payment problems, which reflect extensive distortions of structural origins. Aim of programmes through these facilities is to restore macroeconomic stability. These programmes come with traditional conditionality and a strong focus on structural reforms designed to address the underlying institutional and economic weaknesses (IMF, 2016c; 2016e).

Besides these two facilities the IMF also offers non-concessional lending with limited or no conditionalities. The Flexible Credit Line (FCL) is available to countries that meet a predefined set of quality criteria and show a track record of policy implementation. When countries do not meet the strict criteria of the FCL but still present a sound policy framework, loans under the Precautionary and Liquidity Line (PLL) are available. Aim of both facility types is to act as seal of approval and contribute to consolidate market confidence. The facilities do not carry traditional conditionality as it is assumed that the problems countries face can be resolved without substantial policy adjustments (IMF, 2016d; 2016e; 2016f).

Countries facing urgent balance of payment needs and require rapid financial support as a result of an emergency situation can apply for lending under the Rapid Financing Instruments (RFI). These loans carry no or limited conditionalities, but countries are expected to make efforts to resolve their balance of payment difficulties (IMF, 2016e).

Facility Name	Concessional	Duration	Purpose	Conditionality	Facility Cluster
Extended Credit Facility (ECF)	yes	3-4 years; extendable to 5 years	Facility to provide financial assistance to countries with protracted balance of payments problems, where the underlying macroeconomic imbalances are expected to expand over the medium or long term. Programme designed to be linked to countries' poverty reduction strategy and aim to safeguard social objectives.	Traditional ¹⁷ conditionality, with disbursements made conditional on achieving of conditions, concentrated on critical areas of the programme. Can include structural benchmarks to build up social safety nets.	Social protection
Standby Credit Facility (SCF)	yes	1-2 years	Facility to provide financial assistance to countries with short-term balance of payment needs. Aims to help countries to achieve stable and sustainable macroeconomic position in the short-term. Programme ought to be aligned to country's poverty reduction and growth objective. Can be precautionary.	Traditional conditionality, with disbursements made conditional on achieving of conditions, concentrated on critical areas of the programme. Can include structural benchmarks to build up social safety nets.	Social protection
Rapid Credit Facility (RCF)	yes	One-off disbursement	Facility for countries which provides rapid support for countries facing urgent balance of payment needs, but that do not require a full agreement. It aims to provide policy support and can help catalyse foreign aid. Programmes ought to support country's poverty reduction objectives.	No traditional conditionality, but economic policies should aim at addressing the underlying balance of payment difficulties.	Emergency
Exogenous Shock Facility (ESF) ¹⁸	yes	1-2 years	Facility designed to provide financing to countries facing balance of payment needs as a result of sudden and exogenous shocks.	No traditional conditionality, but adjustment focussed on the underlying shock.	Emergency
Precautionary and Liquidity Line (PLL)	no	6 months or 1-2 years	Facility for countries facing moderate vulnerabilities but to not require substantial policy adjustments associated with SBA. Aim to contribute to consolidate market confidence by showing that country has sound economic fundamentals and policies in place. Can be precautionary.	No traditional conditionality but countries need to have strong policy fundamentals; but standard below FCL. Pre-set qualification criteria need to be met.	Emergency

Facility Name	Concessional	Duration	Purpose	Conditionality	Facility Cluster
Flexible Credit Line (FCL)	no	1-2 years	Facility with strong emphasis on prevention to encourage countries to seek assistance before facing large crisis. Aims at inspiring market confidence when country has potential for crisis. Can be precautionary.	No traditional conditionality but countries need to have very strong policy fundamentals. Pre-set qualification criteria need to be met.	Emergency
Rapid Financing Instrument (RFI)	no	One-off disbursement	Facility for countries which provides rapid support for countries facing urgent balance of payment needs, but that do not require a full agreement.	Limited conditionality but countries need to make efforts to solve balance of payment difficulties. Prior Actions might be required.	Emergency
Extended Fund Facility (EFF)	no	3-4 years; extendable to 5 years	Facility for countries experiencing serious medium- and longer-term balance of payment needs that reflect extensive distortions often due to structural impediments. Aims to restore macroeconomic stability by providing a comprehensive programme of structural reforms to correct deep-rooted weaknesses over a longer timeframe.	Traditional conditionality, with disbursements made conditional on achieving of conditions, with strong focus on structural reforms to address institutional and economic weaknesses.	SBA/EFF
Standby Arrangement (SBA)	no	1-2 years; extendable to 3 years	Facility aimed at helping, mostly emerging and advanced market countries to address short-term balance of payment and external financing needs. Aims to restore sustainable growth. Can be precautionary.	Traditional conditionality, with disbursements made conditional on achieving of conditions, concentrated on economic policies adjustment needed to overcome the problems that led to seeking funding in the first place.	SBA/EFF

Table 1.1: Overview of Lending Facilities available from the IMF between 1995 and 2012

¹⁷ Traditional in this context describes a full package of conditionality traditionally used in IMF agreements. It is different from situations where there is no or limited conditionality as is the case in the newly introduced – and therefore non-traditional – lending facilities.

¹⁸ The Exogenous Shock Facility was superseded by the Standby Credit Facility in 2010.

1.2.4.3 Developing Facility Clusters

The previous sections showed that the IMF offers loans through a number of different lending facilities, which differ in their purpose, concessionality, conditionality and duration. This section develops a classification of these lending facilities and argues that the facilities can be grouped into three main clusters according to their degree of conditionality and emphasis on social protection, which reflects the concessionality.

Conditionality is considered an important feature of facilities in terms of their potential effects on health expenditure, because the nature and extent of conditionalities are likely to impact on a government’s policy decisions. Concessionality is another important dimension to distinguish between facilities and their effects. While concessionality is an important aspect of an agreement itself as it affects the financing and repayment conditions, it is for this analysis used to distinguish between agreements with varying extents of social protection. This is mainly because of the emphasis on social protection that comes with agreements offered under the concessional financing framework. As was outlined in the previous section, agreements that are part of these facilities ought to consider countries’ poverty reduction strategy, safeguard social objectives and protect or increase social spending. This particular focus is absent in non-concessional facilities and their agreements. Applying this logic of classification to the lending facilities, three clusters can be established, as presented in Figure 1.1.

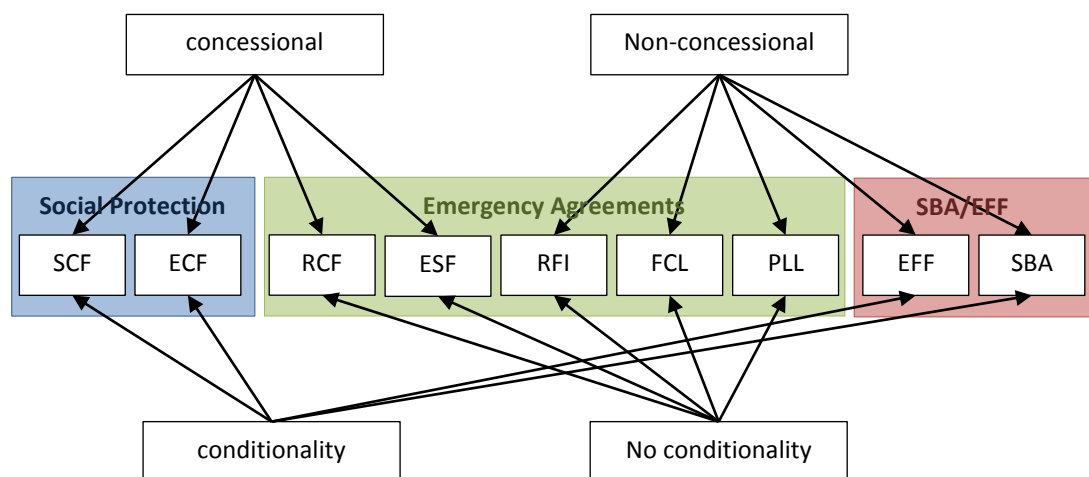


Figure 1.1: Overview of Facility Clusters

Firstly, facilities that provide concessional lending terms and thus have an emphasis on social protection while also attaching conditionality to the particular agreement. These include agreements under the Extended Credit Facility (ECF) – including those agreements that were initiated under the PRGF – as well as agreements under the Standby Credit Facility (SCF). These agreements shall be summarised under a facility cluster termed “social protection agreement”.¹⁹

Secondly, facilities that provide non-concessional lending terms and do thus not have the explicit emphasis on social protection attached to their agreements, and come with traditional conditionality, are arranged in one cluster, this includes the Extended Fund Facility (EFF) as well as the Standby Agreement (SBA). These agreements shall be summarised under a facility cluster “SBA/EFF agreement”.

Thirdly, facilities that do not attach traditional, but limited or no conditionality to their agreement are summarised into a separate cluster. The concessionality of these agreements is thereby considered only of secondary importance because these agreements are used when countries experience special circumstances that require urgent financial assistance and do not have a special emphasis on social protection. These facilities include agreements under the Rapid Credit Facility (RCF), Rapid Financing Instrument (RFI), Flexible Credit Line (FCL), Precautionary and Liquidity Line (PLL) and the Exogenous Shock Facility (ESF). These agreements shall be summarised under a facility cluster termed “emergency agreements”. In this context the classification of the ESF requires further clarification. Funding through this facility was available from 2008 to 2010 and IMF literature suggests that it was succeeded by the SCF (IMF, 2016b), a “social protection” agreement. However, this facility was used when a country experienced sudden and exogenous shocks and it did not carry traditional conditionality. Therefore, agreements under the ESF is for this study classified as emergency agreement.

In developing these three clusters, this study builds on and extends the classification offered by Dreher et al (2015). The authors divide lending facilities into

¹⁹ While not a lending facility offered during the study period (1995-2012), one case year of a Structural Adjustment Facility (SAF) is contained in the dataset (section 7.1.1; pg. 250). This is due to the nature of the SAF, considered a social protection agreement for this study.

two clusters. They group the SBA and the EFF facilities together and thereby separate these two from the agreements under the PRGF and later the PRGT. They justify this classification with the PRGF/PRGT focus to promote economic development in the poorest countries, which is not present in the SBA and EFF facilities.

1.2.4.4 Expected Effects of Facility Clusters on Government Health

Expenditure

The previous section has established three facility clusters based on the conditionality and emphasis on social protection of each of the agreements. This clustering is based on the assumption that agreements in each cluster have different expected effects on government health expenditure, that are outlined here. Agreements in the SBA/EFF cluster are classified to have conditionality but no special attention to social protection. Their effect on government health expenditure is therefore expected to be negative. This is because conditionality of these agreements is likely to have negative effects on health expenditure through the pathways outlined in section 1.2.3 (pg. 13). Agreements in the social protection cluster are seen to have conditionality and attention to social protection. While the conditionality element might be seen to have negative effects on government health expenditure similar to SBA/EFF agreements, it is argued that this effect is offset by the emphasis on social protection that might lead to increases in spending. Overall, it is therefore expected that these agreements are associated with an increase in spending. Finally, those facilities clustered as emergency agreements are seen to have no or only very limited conditionality attached to them. This means that no negative effect of conditionality on health expenditure is assumed and the agreements are therefore expected to have no effect on government health expenditure.

1.2.5 Summary of IMF Lending and Health Systems

This section set out to outline the IMF, its lending activities and effects on health systems. It was shown that IMF lending is seen to affect health systems capacity and in particular government health spending through conditionalities as well as social protection elements. It was argued that, contrary to the assumptions often made in the literature (see chapter 2 for a review), IMF lending facilities differ systematically in

terms of the nature and extent of conditionality and the degree to which they place emphasis on social protection²⁰. It was shown that, based on conditionality and social protection elements, lending facilities can be grouped into three clusters: (i) social protection agreements, that is, those with conditionalities and an emphasis on social protection, (ii) SBA/EFF agreements, that is, those with conditionalities but without emphasis on social protection, and (iii) emergency agreements, that is, those without conditionalities and no emphasis on social protection. Based on this, it is expected that social protection agreements have a positive effect on government health expenditure, SBA/EFF agreements are expected to have a negative effect and emergency agreements are assumed to have no effect. This study aims to understand if the effects of agreements differ according to cluster, and thus according to the nature and extent of conditionality and the emphasis on social protection.

1.3 Aims and Objectives of this Study

This study aims to contribute to the debate around the effects of IMF agreements on health systems by **evaluating the effects, across income groups and different agreement types of IMF agreements on government health expenditure**. The aim of this study incorporates a number of objectives. Specifically, the study intends to:

- (1) design a methodology for evaluating the effects of IMF agreements on government health expenditure using cross-country observational data;
- (2) deploy that methodology in order to evaluate the effects of IMF agreements on government health expenditure in low- and middle-income-countries;
- (3) evaluate the effects of IMF agreements across individual country income groups (low-income, lower-middle-income, upper-middle-income);
- (4) develop a classification of agreement types according to their extent of conditionality and emphasis on social protection.

²⁰ See footnote 2 (pg. 6) for a definition of social protection.

- (5) evaluate the effects of different types of IMF agreements in low- and middle-income-countries;
- (6) evaluate the effects of different types of IMF agreements across individual country income groups; and
- (7) assess the implications of the study's findings for universal health coverage in low- and middle-income-countries.

1.4 Structure of this Study

To achieve the aim and objectives, this study is arranged into three parts and a total of eleven chapters including this introductory chapter.

The first part of this study aims at establishing a background to this study and is structured into two chapters, including this introductory chapter.

Chapter 2 reviews the literature assessing the effects of IMF agreement on health and health systems in a systematic way. It shows that while a great number of studies exist discussing the effects of IMF agreements, only a small set of the literature evaluates the effects of IMF agreements on health expenditure using reliable methods. It is shown that two gaps exist in the current literature of those studies that evaluate the effects of agreements on health expenditure. Firstly, studies do not assess effects across country income groups in a systematic way. Secondly, the current literature does not account for the fact that the IMF lends through a number of different facilities, and thereby ignores that different agreements can have different effects on government health expenditure.

The second part sets up the study and its methodology. In order to model the effects of IMF agreements in a cross-country setting, a number of variables – determining IMF agreements and government health expenditure – need to be identified and their data sources discussed, before an appropriate methodology can be developed. To do so, this second part is structured into four chapters.

Chapter 3 operates from the premises that no strong theory of determinants of government health expenditure exists and conducts a literature review in a systematic way to identify the concepts most commonly used in the applied literature on government health expenditure in low- and middle-income countries. This review

identifies national income, fiscal space, the population age structure as well as supply of care as the most commonly used determinants.

Similar to chapter 3, no comprehensive theory exists justifying the use of a predefined set of determinants of IMF agreements. *Chapter 4* therefore conducts a review of the body of applied literature working with determinants of IMF agreements in order to identify concepts commonly used when modelling IMF agreements.

Chapter 5 presents the data and their sources used in this study. It shows that government health expenditure are best sourced from the WHO National Health Accounts dataset and should be measured as percentage of gross domestic product, per capita spending and as percentage of general government expenditure. It presents criteria to include countries into this study and identifies variables and datasets to operationalise the concepts of determinants of government health spending and IMF agreements identified in chapters 3 and 4.

Chapter 6 outlines the methods used to obtain reliable results of the effects of IMF agreements on government health expenditure. It is argued that two methodological challenges need to be addressed. Firstly, government health expenditure needs to be modelled in a panel data setting. It is shown that the Fixed Effects estimator with standard errors that allow for cross-sectional correlation and panel heteroscedasticity are the best model for this study. Additionally, time trends and serial correlation are controlled for. Secondly, agreement and non-agreement countries are likely systematically different making the agreement variable endogenous. To account for this, a Heckman-style selection model is fitted.

The third part of this study presents the results and is structured into five chapters.

Chapter 7 presents stylised facts about the key variables of this study, the variables modelling IMF agreements and government health expenditure. Additionally, simple bivariate analyses are conducted to gain first insights into the relationship between agreements and government health expenditure. It is shown that over the study period an almost constant number of countries is exposed to agreements. Government health expenditure levels increase over time and across all country groups, the levels of spending, however, differ between income groups. The bivariate

models of the effects of agreements on government health expenditure show that the impact of agreements is rather small, but varies between income groups.

Chapter 8 models the effects of IMF agreements on government health expenditure in a multivariate way and accounts for endogeneity. The effects of agreements are first modelled across all countries and then for each of the country income groups separately. The results suggest that across all countries, agreements do not have a statistically significant effect. This aggregate approach across all countries, however, hides differences in the effects between individual country income groups. For low-income countries agreements are associated with statistically significant increases, for lower-middle-income countries with statistically significant decreases and for upper-middle-income countries with no statistically significant changes in spending.

Chapter 9 advances the modelling by estimating the effects of agreements for the two main agreement clusters identified in chapter 1 separately. The results suggest that social protection agreements are associated with statistically significant increases in government health spending, but also that this effect only applies to low-income countries but not the other income groups. For agreements without the social protection component (SBA/EFF agreements) effects are found to be statistically significant negative for lower-middle income countries but not the other income groups. Overall, the results suggest that both a country's income grouping as well as the agreement types matter in terms of the effect of agreements on government health expenditure.

Chapter 10 summarises the main findings of this study suggesting that social protection agreements have positive effects on government health expenditure only in low-income countries. SBA/EFF agreements do have negative effects only for lower-middle income countries. Beyond this small set of country groups and in the aggregate, it was shown that agreements are not a major determinant of government health expenditure. It is argued that the differences in effects between agreement clusters likely reflect the differences in terms of emphasis on social protection and poverty reduction. Differences between income groups are harder to explain given the present data but might, especially for social protection agreements, be associated with the

effort to achieve the Millennium Goals. It is argued that social protection agreements have a small positive effect on government health expenditure, which is in line with the expectations about this agreement types. However, this effect is not consistent across all income groups, suggesting that the IMF only partly lives up to its claims about social protection. For SBA/EFF agreements it is argued that the reductions in lower-middle-income countries are associated with further tightening of budgets and might restrict movement towards UHC. Policy implications of these findings are briefly discussed before limitations of this study are acknowledged.

Chapter 11 concludes. It is argued that overall IMF agreements are not found to have a statistically significant effect on government health expenditure in low- and middle-income countries in general. This aggregate analysis, however, glosses over differential effects across country income groups and agreement types. This study suggests that as well as a specific country's income group, the lending facility through which it receives agreements is an important determinant of the effect of IMF agreements on government health expenditure. Doing so, this study adds to the understanding of the effects of IMF agreements, however, more research is needed in order to understand the mechanisms underlying the observed effects. The chapter draws out directions that appear fruitful for future research in the field.

2 Literature Review of the Effects of IMF Agreements on Health Systems

The objective of this chapter is to review the body of literature assessing effects of IMF agreements on health systems in a systematic way. Section 1.2.3 (pg. 13) summarised the main hypothesised pathways through which IMF agreements impact on health systems and health spending. How these potential impacts actually play out has not been discussed so far. This chapter aims to identify and review literature that empirically assesses the effects of IMF agreements on health systems.

When setting up this review the terms “health systems” and “agreement” need clarification. Health systems are understood as services performed in order to provide and finance health care services with the primary goal of these services being the improvement of the health of the population they serve (section 1.1; pg. 6).

When discussing IMF agreements, the term “structural adjustment programmes” is often used. This term can, however, have different meanings. While it can directly refer to agreements with the IMF and in particular those under the Structural Adjustment Facility (SAF), it is often used more generally and refers to

efforts to restructure, or “structurally adjust”, an economy in response to an economic or financial crisis. When used with this more general meaning, the term can refer to adjustment programmes offered by different organisations, such as the World Bank or regional development banks, or be a package of policies a country is pursuing by itself in order to combat economic imbalances without assistance from international organisations (often referred to as “home-grown” adjustment). With the interest of this study being on effects of *IMF* agreements, the review focuses on this organisation’s agreements and exclude other types of adjustment programmes. It is, however, worth noting that especially historically agreements by the IMF are often offered in conjunction with the World Bank and that literature on structural adjustments often considers IMF and World Bank agreements in conjunction. Studies discussing effects of such combinations of IMF and World Bank agreements are considered.

This chapter is structured as follows. The first section outlines the methodology developed to identify the literature in a systematic way. The second section presents the results of the review, before the third section summarises the findings of the chapter, draws out gaps in the literature and formulates objectives and research questions for this study.

2.1 Search Methodology

This section outlines the search methodology developed to obtain the relevant literature in a systematic way²¹. It starts by outlining the literature sources, presents the search terms used to identify studies for the review, then outlines inclusion and exclusion criteria before summarising the search process. The final section acknowledges limitations of the review.

²¹ This literature review was conducted in a systematic way, it is, however, not a systematic review in the strictest sense of the word (Higgins and Green, 2008). This is mostly because this review is not attempting to review all articles from all possible sources, as this would mean to review an impossibly large number of sources and consequentially articles beyond the scope of work for one single researcher. This review therefore focusses on the main and most relevant sources of articles. Beyond this, this review is systematic as it asks a defined question and follows an explicit search strategy with clear criteria for inclusion and exclusion of studies (White and Waddington, 2012).

2.1.1 Literature Sources

This literature review aims to include both peer-reviewed articles as well as relevant grey literature. To do so, the literature was obtained from a variety of sources including bibliographic databases and webpages. In order to identify literature from peer-reviewed articles published in academic journals, bibliographic databases were searched. Due to the interdisciplinary nature of the topic, the search included the largest and most comprehensive databases for both social sciences as well as medical literature: the Web of Knowledge, Scopus and PubMed. Additionally, the less traditional database for academic literature, Google Scholar, was searched.

Due to the topic's policy salience and importance to global health advocates, a number of civil society organisations contribute to the debate on the effects of IMF agreements on health systems. To capture this body of grey literature, additional searches were conducted on the webpages of the most important organisations in this field. These organisations were the Centre for Global Development, Action Aid, UNICEF, Save the Children, as well as Oxfam. Over the recent years the IMF has responded to its critics and conducted its own evaluation studies. In order to include relevant articles produced by the IMF and its evaluation branch, the Independent Evaluation Office (IEO), these webpages were searched as well.

As a final step, after obtaining literature through the two pathways mentioned above, reverse searches were conducted by scrutinising recent literature reviews (Breman and Shelton, 2007) and the reference lists of the identified literature in order to ensure the inclusion of all relevant material. Table 2.1 gives an overview of the literature sources.

Bibliographic Databases	Civil Society Organisations	IMF Sources
Web of Knowledge	Centre for Global Development	IMF
Scopus	Action Aid	Independent Evaluation Office
PubMed	UNICEF	
Google Scholar	Save the Children	
	Oxfam	

Table 2.1: Overview of Literature Sources

2.1.2 Search Terms

To search the literature sources, a number of key words, most relevant to the review, were defined. These key words were chosen to be broad in order to maximise yield and were selected around the three blocks of IMF agreements, health and health systems, and low- and middle-income countries (L&MIC). As was outlined in more detail above, the terms “adjustment” and “structural adjustment” were, while rather broad, included to capture studies that might refer to IMF agreements. Table 2.2 shows the search terms used.

IMF agreement	Health and Health Systems	L&MIC
IMF	Health care	Low?income
Fund	Health system	Middle?income
International Monetary Fund	Health care system	Low?and?middle income
Agreement	Health	LIC
Adjustment		MIC
Structural adjustment		LMIC
IMF agreement		Developing countr*

Table 2.2: Key Words used in Review

For bibliographic databases the search terms were used in various search fields, including title, abstract, topic and key words as well as Mesh terms, where available, key words were combined using logic operators. Terms within each block were combined using the “OR” operator, all blocks were linked using the “AND” operator. Combinations of individual terms were tested for each database to identify which would return the best results. When doing so, it appeared that terms around L&MIC were not leading to the right literature, which meant that this block was excluded from the final searches. For the Google Scholar search it appeared that using the term “health” would yield the most relevant results including literature on health care and health system topics. Appendix Note 2.1 (p. 59) shows the combinations of key words used for searching each of the databases.

Webpage searches were kept broader and only included one or two key words. For instance, searching the IMF and the IEO webpages, “health” was used as key word, for the civil society pages “IMF” was used as key word.

2.1.3 Inclusion and Exclusion Criteria and Search Process

To select studies from the obtained literature for inclusion in the review, studies were screened to meet a number of inclusion and exclusion criteria. Studies were included when they reported on L&MIC either as individual countries or as countries of these income groups in general. Studies were included when they reported effects on health or health systems. This criterion was kept rather broad to include various effects on health or health system. But studies were excluded when they reported on aspects that only have an indirect effect on health, such as wages or work conditions. Studies were included when they reported on IMF agreements, excluded when they reported on agreements with other international financial institutions, such as the World Bank, regional development banks, assessed “home-grown” structural adjustment²² programmes or reported on policies that are common to IMF agreements but are being assessed as an individual policy outside an agreement with the IMF. Studies were included when they reported on adjustment programmes conducted by the IMF in conjunction with the World Bank, because, especially historically, such arrangements are common. Studies were excluded when it was unclear which organisation sponsored the adjustment. Studies were also excluded when they were not written in English or German language or the full-text of the article was not available through the University of Edinburgh’s or the National Library of Scotland’s library services, either in electronic or hard-copy form. Finally, studies were excluded, when they were book reviews or editorials. Figure 2.1 gives an overview of the process.

²² “Home-grown” structural adjustment programmes are understood to be those that a country imposes on itself without the external pressures from international organisations such as the IMF (see also section 2; pg. 29).

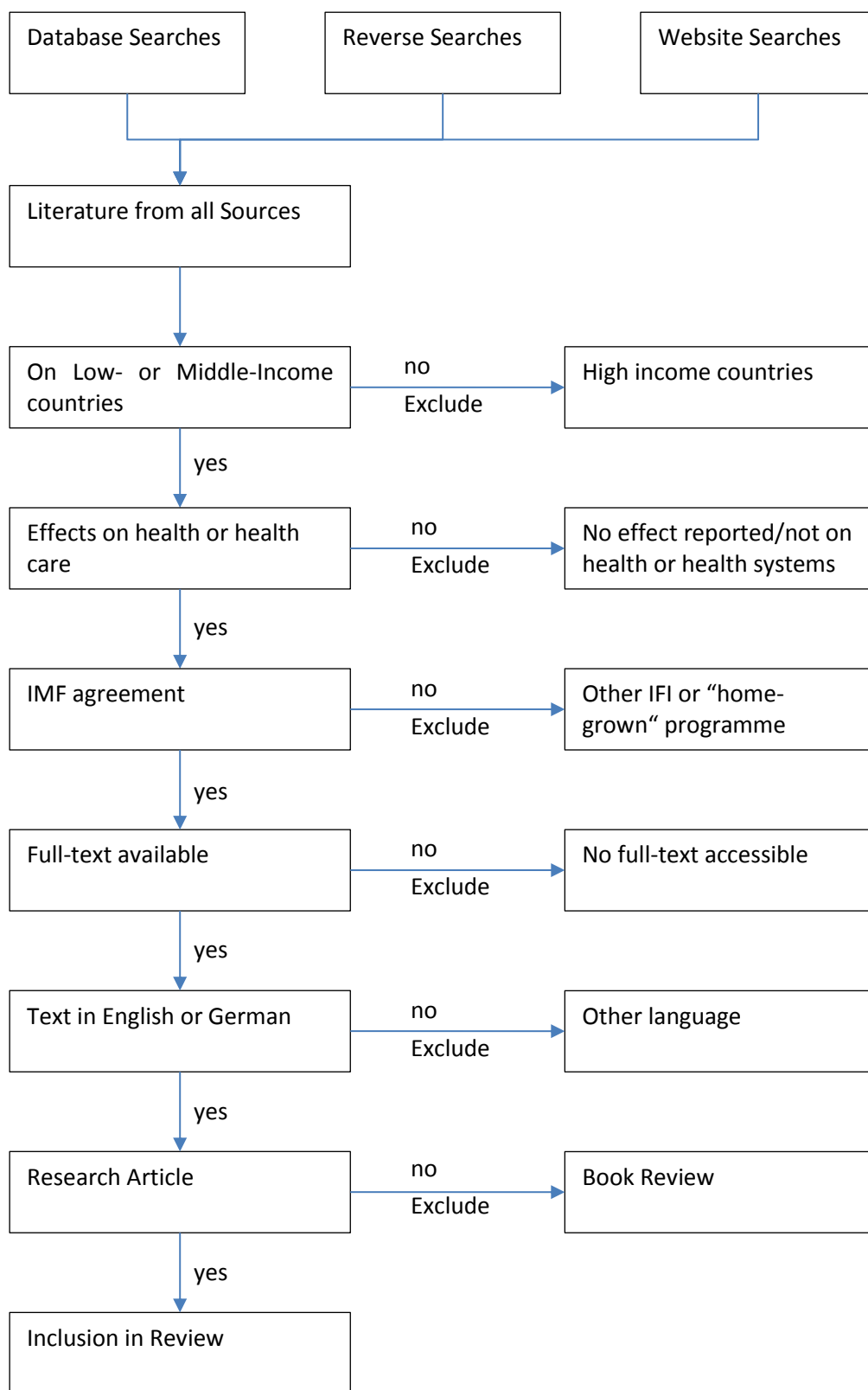


Figure 2.1: Flowchart of process to include literature

2.1.4 Search Process

The search process was performed in December 2015²³. Having completed the searches in all selected databases, relevant webpages and reverse searches, a total of 1805 studies, including duplicates, was included. The selected literature has then reviewed in more detail through three screening stages (see Figure 2.2).

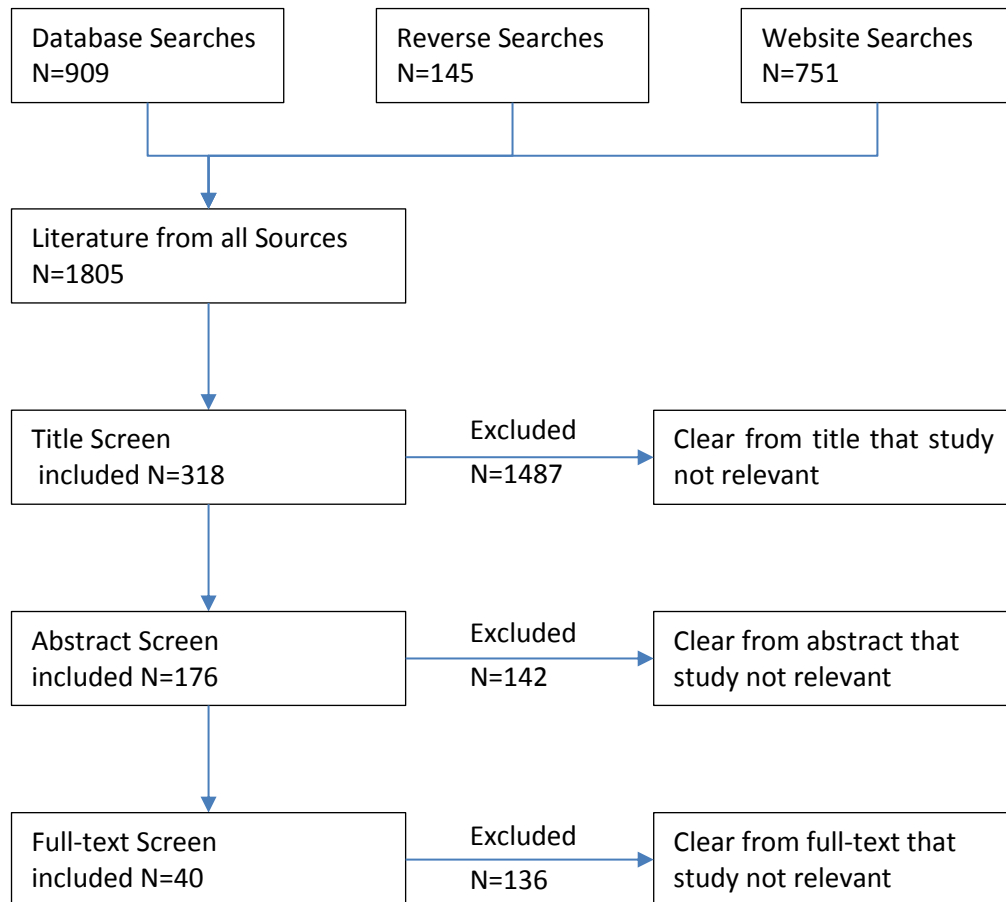


Figure 2.2: Flowchart of Screening Process

In the first stage, studies were excluded when it was immediately apparent from the title that the article was irrelevant. At this stage the number of studies was reduced to 318. The remaining studies were included or excluded based on the abstract. Where the abstract did not allow to clearly include or exclude an article, the full-text was skim-read to make a decision. This reduced the number of articles to 176. Full-texts of

²³ An initial literature review was conducted in 2013. Results presented here are based on the December 2015 review.

these articles were obtained and read to make a final decision about the article's inclusion into the review. Additionally, a small number of studies had to be excluded at this stage as full-texts were not available or the article was not written in English or German; mostly these were studies published in Spanish or French.²⁴

As outlined, the literature search was supplemented by scrutinising reference lists from the selected articles. This process largely confirmed that most studies had already be identified through the main search process, however, a small number of additional studies was identified. After final exclusions and removal of duplicates, a total of 40 studies was included (see Table 2.3).

Database/Web page	Articles included at stages			
	Initial Results	Title Screen	Abstract Screen	Full-text Screen ²⁵
Bibliographic Databases				
Web of Knowledge	82	71	43	
Scopus	125	30	16	
PubMed	486	116	71	40
Google Scholar	216 ²⁶	50	34	
All Databases	909	267	164	
Web Pages				
Centre for Global Development	38	5	1	
Action Aid	3	1	1	
UNICEF	472	10	0	
Save the Children	3	0	0	
Oxfam	0	0	0	
IMF	97	2	2	
IMF IEO	138	1	1	
All Web Pages	751	19	5	
Reverse Search	145	32	7	
All Sources	1805	318	176	
All Databases, duplicates removed				

Table 2.3: Database and Website Search Results at Screening Steps

2.1.5 Limitations of this Literature Review Process

The search strategy for this literature review was designed carefully and discussed with librarians at the University of Edinburgh. Nevertheless, some bias might have been introduced as not all available databases can be reviewed within the

²⁴ See Appendix Note 2.2 (p. 52) for a list of all studies obtained in full-text.

²⁵ Individual database sources cannot be identified at this stage.

²⁶ This search was cut-off when results started becoming irrelevant or repetitive. This was the case after 20 pages with 20 results each, or a total of 400 articles.

scope of this review. However, databases were selected based on their size and relevance to the subject, reducing potential bias. The review also included a number of webpages from civil society organisations. Some bias might have been introduced as not all organisations were included, however, the search focussed on the most prominent actors, reducing bias.

The selection process was conducted by only one person, which might lead to a bias in the included literature, however, given that this study is a PhD, this limitation cannot be mitigated. Not all literature found through searches could be included for a full-text review. The potential bias this might introduce was mitigated through backward searches to include studies cited in obtained articles and literature reviews.

Limiting the sample to studies that had accessible full-texts and were written in English or German does not seem to bias the final sample as only very few studies were excluded because of these criteria.

2.2 Results of the Review

Having completed the review process outlined above, a total of 40 studies have been identified to be included in this literature review. See Table 2.4 for an overview of the included studies. Due to the policy relevance of the topic, different stakeholders in the process contribute to the debate. Three groups of author affiliation can be identified. Studies are most commonly (62.5% of all studies) written by academic authors. Authors are classified as “academic” when the article lists at least the first author of the paper with an academic affiliation. One fifth of the studies are written by authors affiliated with international financial institutions, for example the IMF or the World Bank. The remaining studies (17.5%) are published by authors affiliated with civil society organisations, this is for instance the case for publications by the Centre for Global Development (Goldsbrough et al, 2007a) or by individual doctors, not affiliated with universities.

Studies are published between the years 1989 and 2015 with an almost equal spread across the time period²⁷. All studies cover a number of years of observation,

²⁷ The number of studies per year is too small to identify trends over time.

with the earliest observations dating back to the 1970s (Hopkins, 2006) and the latest data reported for 2013 (Kentikelenis et al, 2015a). Studies use different approaches to answer their questions on effects of IMF agreements on health and health systems. Most broadly these approaches can be clustered into case studies, in which authors investigate a small number of countries in depth, and cross-country studies in which authors assess effects across a number of countries of up to 140 countries (Clements et al, 2013). Countries in Sub-Saharan Africa are most commonly studied either as individual cases, for instance Ghana, Uganda or Zimbabwe, or as part of wider cross-country studies. A number of studies also look at countries in Latin America, with countries in Asia, and North Africa and the Middle East the least commonly studied.

Based on the approaches taken in the studies, two categories can be identified. One set of studies seems to present their understanding in a rather subjective way. These studies might draw on other literature and data, but seem to present an opinion or comment on the topic. For this study, these articles shall be referred to as “discursive” studies. It is important to note that this classification does not represent the methods used in the study and does not refer to discursive in the understanding of some of the social sciences meaning related to discourse analysis. The other group of studies focusses on a clearly defined set of research questions, which are investigated using data collected through interviews, documents or relevant datasets. These studies are classified as “empirical”. Empirical in this understanding does not reflect the methods used but conveys the idea that the studies employ a systematic approach to arriving at their conclusions. The presentation of the results is organised around the two categories of studies.

Author	Year	Affiliation	Years Covered	Countries
Discursive Studies				
Alubo	1990	academic	1980s	African countries
Anyinam	1989	academic	1980s	Ghana
Bhutta	2001	academic	1990s	Pakistan
Birn et al	2000	academic	1990s	Nicaragua
Buckley/Baker	2008	academic	1980s -2000s	Sub-Saharan Africa; case study of Tanzania, Uganda, Ghana
Cornia et al	1987	academic	1980s+	less developed countries
Cruickshank	2000	civil society	1991-1998	Nicaragua
Curtis	1998	academic	1990s	Nicaragua
Dejong	1995	civil society	1985-1991	Jordan
Ekouevi/Adepoju	1995	unclear	1980s	African countries
Gupta	2010	IMF	not clear	no clear definition
Gupta	2015	IMF	not clear	Sierra Leone, Guinea, Liberia (Ebola countries)
Homedes/Ugalde	2005	academic	1980s	Latin America; case study of Colombia and Chile
Hopkins	2006	academic	1970-2000	Malaysia, Thailand and Indonesia
Hossen/Westhues	2012	academic	1980-2010	Bangladesh
Ismail	2013	academic	1980-2003	Egypt and Tunisia
Ismi	2004	civil society	not clear	Sub-Saharan Africa; case study of Zimbabwe, Ghana, Cote d'Ivoire
Kanji et al	1991	academic	1980s	Sub-Saharan Africa
Kentikelenis et al	2015	academic	2004-2013	Sierra Leone, Guinea, Liberia (Ebola countries)
Loewenson	1993	civil society	1980s+	African countries
Logie/Woodroffe	1993	civil society	1980s-1990s	Zambia, Senegal, Zimbabwe
Lugalla	1995	academic	1980s	Tanzania
Tumwine	1992	academic	1980s+	Zimbabwe
Empirical Studies				
Benson	2001	academic	1995-1993	Tanzania
Clements et al	2013	IMF	1985-2009	140 Low-and-middle-income countries
Goldsbrough et al	2007	civil society	1998-2005	78 PRGT countries
Gupta et al	1998	IMF	1986-1996	66 countries with IMF agreements
Gupta et al	2000	IMF	1985-1997	65 developing countries
Gupta et al	2002	IMF	1999-2001	25 PRGT countries
Hajro/Joyce	2009	academic	1985-2000	82 developing countries
Handa/King	2003	IFI	1989-1996	Jamaica
Hoddie/Hartzell	2014	academic	1995-1998	100 L&MIC
Kentikelenis et al	2015	academic	1985-2009	63 low-income countries
Martin/Segura-Ubierno	2004	IMF	1985-2000	146 countries
Maynard et al	2012	academic	1990-2005	74 countries
Nooruddin/Simmons	2006	academic	1980-2000	73 countries

Author	Year	Affiliation	Years Covered	Countries
Oliver	2006	academic	1980-2000	Uruguay and Argentina
Pandolfelli et al	2014	academic	1990-2005	37 African countries
Stuckler et al	2008	academic	1991-2003	21 post-communist countries
Stuckler et al	2011	academic	1995-2006	119 aid recipient countries

Table 2.4: Studies Included in the Literature Review

2.2.1 Discursive Studies

The literature review process identified a total of 23 studies that were classified as discursive studies. Articles within this category were written by all three groups of authors, with those from academia being the most common group, two pieces are written by an IMF-affiliated author (Gupta, 2010; 2015) and five studies come from civil society authors (Cruikshank, 2000; Dejong, 1995; Ismi, 2004; Loewenson, 1993; Logie and Woodroffe, 1993). Studies are published between 1989 and 2015. It generally appears that studies report about certain decades rather than specific years or durations. The earliest observation period starts in 1970 (Hopkins, 2006) and the latest ends in 2013 (Kentikelenis et al, 2015a). The 1980s appear to be the most commonly investigated time period within this group of studies. Studies cover a number of world regions with Sub-Saharan Africa the most commonly studied region. Studies investigate effects either in all of Sub-Saharan Africa or selected country cases, such as Tanzania (Lugalla, 1995), Zimbabwe (Logie and Woodroffe, 1993; Tumwine, 1992), Senegal (Logie and Woodroffe, 1993) or Ghana (Anyinam, 1989). Four studies look at Latin America, as a whole as well as the cases of Nicaragua (Birn et al, 2000; Cruikshank, 2000; Curtis, 1998), or Colombia and Chile (Homedes and Ugalde, 2005). Other studied areas include Asia (Bhutta, 2001; Hopkins, 2006; Hossen and Westhues, 2012) as well as the Middle East and North Africa (Dejong, 1995; Ismail, 2013).

While the articles by Gupta (2010; 2015) and Kentikelenis et al (2015a) explicitly link their arguments to agreements with the IMF, the remaining studies report on “structural adjustment programmes” more generally. This term, as was outlined in more detail before (section 2.1.2; pg. 32), can have various meanings and the studies are not always explicit about their understanding of the term. Which exact agreement the studies refer to is often unclear especially when a rather broad brush approach is taken to study a whole decade of adjustment. A slightly different approach

is taken in three articles, which do not look at structural adjustment programme as a whole but at individual aspects of it, including decentralisation (Anyinam, 1989; Birn et al, 2000; Homedes and Ugalde, 2005) or privatisation (Homedes and Ugalde, 2005) of health care services.

Studies present the trajectory of events and agreements in different ways. While some articles outline the trajectory of the studied countries' development from the early 1960s – with progress made both economically and in terms of the health system – followed by economic decline in the 1980s and the demand for IMF assistance shortly after (Logie and Woodroffe, 1993; Tumwine, 1992), other studies present the situation that unfolded after the start of adjustment policies.

The studies generally follow a rather descriptive approach, using mostly anecdotal evidence, citations of other studies or descriptive statistics. For their assessment of the adjustment programmes the authors draw on a great number of indicators covering both changes to the health system as well as health outcomes. All studies cover more than a few of these indicators and their choice is generally not further justified. In terms of health system indicators studies most commonly report reductions in health spending along with changes to service provision, mostly due to lack in supplies and medicines but also due to understaffing as doctors would be sacked or provide care under private regimes for fees. Similarly, the introduction of user fees and the associated negative impact this has on access to care, is commonly discussed in the reviewed articles. Articles also frequently report negative effects on health outcomes, with increases in infant, child and maternal mortality, along with increases in HIV/AIDS, tuberculosis (TB) and suicide rates being commonly reported outcomes. While most studies paint an overwhelmingly negative picture of structural adjustment programmes, the study by Buckley and Baker (2008) suggests improvements in the impact on health beginning in the 2000s. The studies by Gupta (2010; 2015), an IMF-affiliated author, find positive effects particularly in health spending as well as health outcomes and child nutrition.

When considering this set of studies to assess the impact of IMF agreements on health and health care, it appears worth considering some of the shortcomings that seem common to this type of study. Firstly, while the studies aim to assess the effects

in countries undergoing agreements and structural adjustment programmes, the country selection appears to be rather arbitrary especially for studies considering all of Sub-Saharan Africa at once. Secondly, while it appears that the wide selection of various outcome variables offers a comprehensive overview of effects on the adjusting countries, their selection is not usually justified. This could suggest that the authors selected their variables merely to support their overall argument rather than to provide a comprehensive picture to capture the situation in a balanced way. Thirdly, studies do in general not seem to acknowledge the fact that adjustment policies are the consequence of crisis, which might have caused some of the observed outcomes in the first place. Overall it seems that this set of discursive studies may offer only limited objective insight into the effects of IMF agreements. Nevertheless, these studies appear important to the debate around the effects of IMF agreements on health and health systems as they are frequently cited and seem to inform the debate.

2.2.2 Empirical Studies

This section reports the findings of the 17 empirical studies obtained through the literature review process. Studies are written by all three author groups with authors of academic affiliation the most common authors, followed by IMF-affiliated writers; and one study being written by civil society authors. Nine studies aim to assess the impact of agreements on health expenditure, the remaining eight studies use a number of different dependent variables including health outcomes and health system organisation related indicators. The results will be presented for each of these subcategories in turn.

2.2.2.1 Studies on Health Expenditure

The literature review identified nine studies that use country-level health expenditure as dependent variable. This group of studies appears to be fairly homogenous in the way that all but one study asks research questions related to “what are the effects of IMF agreements on health expenditure”. The study by Stuckler et al (2011), investigates a related but slightly different research question by investigating the effects of aid to health on health expenditure as a result of agreements. Studies are written by all groups of stakeholders. With five out of the 9 studies, most are written by authors of the IMF (Clements et al, 2013; Gupta et al, 1998; Gupta et al, 2000;

Gupta et al, 2002; Martin and Segura-Ubiergo, 2004), three studies (Kentikelenis et al, 2015b; Nooruddin and Simmons, 2006; Stuckler et al, 2011) authored by academics and one study (Goldsbrough et al, 2007a) is written by civil society authors.

The reasons for using health expenditure as outcome variable are not always explicitly stated. Clements et al (2013) and Martin and Segura-Ubiergo (2004) argue that their studies contribute to literature on the IMF and its impact on health expenditure. Similarly, Stuckler et al (2011) argue to contribute to the debate around the IMF and aid displacement. Kentikelenis et al (2015b) argue that health expenditure is a useful indicator to measure the IMF's impact on health policy. Nooruddin and Simmons (2006) follow a similar approach in arguing that the IMF's impact on health and poverty has frequently been criticised and demands evaluation. Studies by Gupta et al (1998; 2000; 2002) seem to understand health expenditure as a proxy to assess the IMF's impact on poverty reduction, a goal it introduced in the 1980s. It is argued that the IMF sees public expenditure on social issues and health in particular as a way to reduce poverty as public health services benefit the poor and furthermore build human capital and enhance growth and equity. Goldsbrough et al (2007a) follow a similar approach in the way that they argue that health expenditure is important in making a health system function and provide a set of basic health interventions, which are benefiting the poor particularly.

All studies take a cross-country approach to analysing health expenditure in between 21 and 146 countries of low or low-and-middle income and observe this measure in these countries over a certain period of time and on average for roughly 15 years during the time periods between 1980 and 2009. While the inclusion of certain countries is not always explicitly stated, the studies by Gupta et al (1998; 2000; 2002) aim to provide an early analysis of Enhanced Structural Adjustment Facility (ESAF) or Poverty Reduction and Growth Facility (PRGF) agreements and thus include countries eligible for these types of agreements. The study by Goldsbrough et al (2007a) focusses on Poverty Reduction and Growth Trust (PRGT) countries. Stuckler et al (2011) focus on aid recipient countries without further specifying this. The reasons for a decision on a specific timeframe are not always explicitly discussed and seem mostly driven by data availability. The timeframes of the Gupta et al (1998;

2000; 2002) studies as well as the Goldsbrough et al (2007a) analysis are chosen to follow the introduction of ESAF and PRGF agreements.

Health expenditure is measured in a number of ways, with most studies employing more than one way of measuring spending. Most commonly spending is put in relation to general government expenditure. Other common ways of reporting expenditure on health are per capita spending and shares of GDP.

The approaches of assessing effects on health expenditure taken in this set of literature can be clustered into two categories: firstly, studies using descriptive statistics to investigate the bivariate relationship between IMF agreements and health expenditure. Secondly, studies using advanced multivariate techniques to understand this relationship. The following sections present the studies in of these categories.

2.2.2.1.1 Studies Using Descriptive Analyses

This section presents and discusses the results of the set of studies assessing the effect of IMF agreements on health expenditure using descriptive statistical methods. Studies are classified as using descriptive statistics when analyses are based on comparisons of means and do not use inferential or modelling techniques. This set of literature consists of four studies (Goldsbrough et al, 2007a; Gupta et al, 1998; Gupta et al, 2000; Gupta et al, 2002). Two general approaches are taken to assess the effect on health expenditure. The study by Goldsbrough et al (2007a) compares the health expenditure levels and trends over time for countries with IMF agreements with those without agreements. The studies by Gupta et al (1998; 2000; 2002) focus on countries with IMF agreements and compare the level of health expenditure the last year before the agreement and in the last year during the agreement for which data is available.

The study by Gupta et al (1998) sets out to evaluate the effect of the newly introduced ESAF lending facilities, with emphasis on poverty reduction. Assessing public sector health expenditure, measured as share of GDP, government expenditure and per capita, before and during the agreement, the authors find that expenditure generally increases during the time of agreements. They also report that increases are stronger for countries entering into an ESAF agreement compared to all other agreements. They find some differences between regions in the way that countries in

Sub-Saharan African countries see lower increases in expenditure while Asian countries see the strongest increases.

The study by Gupta et al (2000) aims to update the results of the previous study using the same approach. The authors find similar results in terms of increases of health expenditure during agreements and the differences between countries. They also argue that while health expenditure increases, spending on other and less poverty reducing areas of public outlay, particularly the military, decrease.

With the introduction of the PRGF lending instruments, replacing the ESAF in 1999, Gupta et al (2002) attempt a renewed assessment of the impacts on health expenditure and find that spending on health increases across all measures (share of GDP and government expenditure, per capita spending) in the first year after entering into an agreement.

The study by Goldsbrough et al (2007a) is part of a larger research effort trying to assess whether the IMF constrains health spending. This particular part of the study compares expenditure levels of countries with and without agreements. The authors find that while health expenditure increase slightly more in countries with agreements, especially in countries outside Sub-Saharan African countries, the differences in health expenditure changes are minor and vary between countries, which leads the authors to conclude that at best the impact of IMF agreements on health spending increases is minor.

In summary, it appears that the studies by the IMF authors are somewhat more positive about the impact of IMF agreements on spending levels than the study by civil society authors. While these differences could be explained by a number of factors including the differences in years and countries included in the analysis, it is important to note that while these results give an indication about the association between agreements and spending levels, they do not allow to infer causation.

While this is certainly true for all statistical analysis, inferring causation is particularly tricky when it comes to the relationship between agreements and health spending for two main reasons, also noted for instance by Goldstein and Montiel (1986) and outlined in more detail in section 6.2 (pg. 230). Firstly, health expenditure variation is not only caused by IMF agreements but by other factors such as the demand

and supply of health care as well as economic development. This means that when not controlling for these factors variation in expenditure levels will wrongly be attributed to the IMF agreement. Secondly, countries that enter into IMF agreements are likely to experience different economic conditions compared to countries that do not enter into agreements. These economic conditions are likely impacting on health expenditure levels in and by themselves. The multivariate studies discussed in the next section account for these issues.

2.2.2.1.2 Studies Using Multivariate Analyses

This section presents and discusses the results of studies that use multivariate methods to analyse the effects of IMF agreements on health expenditure. Studies are classified into this subgroup when they go beyond the use of descriptive statistics and model health expenditure. This approach appears to be a fairly recent addition to the literature with the earliest study dating back to 2004 (Martin and Segura-Ubiergo, 2004). Five studies fall into this category. Three of them are authored by academics (Kentikelenis et al, 2015b; Nooruddin and Simmons, 2006; Stuckler et al, 2011) and two come from authors affiliated with the IMF (Clements et al, 2013; Martin and Segura-Ubiergo, 2004).

Within this set of studies, two approaches and slightly different but overlapping research questions can be identified. Four of the studies aim to assess the impact of IMF agreements on health expenditure using regression models. In so far the studies follow a similar research question as the descriptive studies outlined above, they do however employ techniques that allow to remedy the shortcomings of the previous part of the literature in terms of selection effects. All studies acknowledge that health expenditure might be impacted by factors other than IMF agreements and therefore use a set of variables to control for these determinants of health expenditure levels. While the chosen variables vary between studies, levels and growth of GDP are the most commonly used variables in the models.

Additionally, studies generally²⁸ account for the possibility that the IMF agreement is endogenous²⁹ in the way that countries in IMF agreements are likely experiencing economic situations that are different from countries that do not enter into IMF agreements and that this difference between IMF and non-IMF countries might have an impact on the levels of health expenditure. The studies correct for selection differences between IMF and non-IMF countries using a selection model as a first stage of their estimation process (see 6.2; pg. 230). To do so, the models aim to predict times and countries with IMF agreements based on the values of a number of determinants of IMF agreements. It appears that all but one study (Clements et al, 2013) use a model similar to that presented by Martin and Segura-Ubiergo (2004)³⁰. The choice of variables appears reasonable and papers report high levels of correctly classified cases, which inspires confidence that selection bias is successfully corrected.

The study by Martin and Segura-Ubiergo (2004) uses a dataset of 146 developing countries observed between 1985 and 2000 and employs an ARIMA model to estimate the effects of agreements on public health expenditure measured as share of GDP, total government expenditure as well as per capita spending. While results vary slightly between the individual ways of measuring health expenditure, all results suggest a positive association between IMF agreements and health expenditure. With the strongest correlation found for expenditure measured as share of GDP. When dividing the country sample by the number of years a country is under an IMF agreement during the observation period, the authors find that results are not significant for countries that are under agreements for up to five years. While the reported results do not allow for closer analysis it appears that increases in spending are more likely for countries under agreements for a longer period. Overall, the authors report that the effects of agreements, though positive, are fairly small and also reasonably short lived.

The study by Nooruddin and Simmons (2006) adds to the debate of IMF effects on health expenditure by assessing the influence of democracy. The authors reason

²⁸ An exception to this is the study by Stuckler et al (2011), see below for more details.

²⁹ See chapter 6 (pg. 215) for an explanation of endogeneity.

³⁰ see also chapter 4 (pg. 107).

that democracies need to maintain support from individuals and one way of doing this is by providing social services, including health services. Dictatorships on the other hand will not need to maintain this support and will therefore have less incentive to maintain health spending. Using a panel dataset of 73 countries observed over the period of 1980 to 2000, they find that while democracies have higher levels of health expenditure measured as share of total government expenditure compared to dictatorships, agreements are associated with increases in spending in non-democracies and reductions in democracies.

A recent addition to this body of literature is the study by Clements et al (2013), IMF-affiliated authors, using a dataset covering 140 low- and middle-income countries, a period of 25 years (1985-2009) and both fixed-effects and Generalised Methods of Moments (GMM) estimators. They investigate the effects of agreements on health spending as share of GDP and share of total government expenditure. They find that for low-income countries agreements are associated with statistically significant increases in both spending measures. For middle income countries the authors report no statistically significant effects. While the authors do not seem to offer an explicit explanation for these differences they seem to suggest that low-income countries are mostly those that receive agreements under the PRGT, which the IMF claims consider poverty reduction in particular.

While not an exact replication of the Clements et al (2013) study, the paper by Kentikelenis et al (2015b) builds heavily on the previous study. In doing so it employs the same dataset and time period but restricts the country sample to 63 low-income countries. Adopting the definition of the selection model commonly used in this set of studies – rather than the one by Clements et al (2013) – and a slightly different set of health expenditure determinants, the authors find that across all low-income countries, agreements do not have a significant effect. Dividing the countries by region they find that spending increases in Sub-Saharan African countries but declines in other regions. The authors acknowledge that IMF policies and protection of social spending might play a role in the increases found in Sub-Saharan Africa, they argue however that given the extremely low levels of spending in the region the increases that are associated with agreements are not sufficient for health systems to provide an appropriate level of services.

While using health expenditure as outcome variable Stuckler et al (2011) are interested not in the direct effect of agreements on health expenditure but the extent to which IMF agreements influence the way international aid to health increases health expenditure. In so doing they interact with the literature on aid displacement. Building on the dataset employed by Lu et al (2010), including 119 aid recipient countries for the years 1995 to 2006, the authors use regression techniques to estimate the impact of aid flows on health expenditure. Running two separate regressions for IMF and non-IMF countries, they find that in IMF countries health expenditure increases by around 0.01 US Dollar for every Dollar of aid to health, while it increases by around 0.45 US Dollar in non-IMF countries. The authors seem to suggest that in IMF countries aid is displaced from the health system to potentially remedy macroeconomic imbalances more frequently than in other countries, the authors are, however, rather cautious about their findings not only due to rather low data quality (Easterly and Pfütze, 2008). It is also worth noting that the approach taken by Stuckler et al (2011) does not account for the fact that IMF and non-IMF countries are systematically different and that countries experiencing macroeconomic imbalances likely observed in IMF countries, might use aid for purposes other than those intended initially. In other words, the study does not allow to identify if countries in similar economic situations as IMF countries displace a comparable amount of aid, while not under agreements.

2.2.2.2 Studies on Health Outcomes and Health Systems

Another set of eight studies within the category of empirical studies exist. Out of these, seven are investigating effects on health outcomes and one is concerned with effects on the organisation of health systems. Most studies in this categories are authored by academic authors, with only one study (Handa and King, 2003) being written by an IFI-affiliated author. All studies cover a number of years with the earliest starting in 1980 and studies most commonly beginning their observation period in the 1990s. Observation periods commonly last till the 2000s with the latest data included dating to 2005. Most studies use a quantitative approach of some sort, while the study by Benson (2001) uses a mixed method approach. This body of literature appears to be less homogenous compared to the studies on health expenditure in a number of ways. These include the approaches taken in the individual studies. Studies employ both cross country approaches with between 21 and 100 countries as well as case

studies of one (Benson, 2001; Handa and King, 2003) or two (Oliver, 2006) countries. This section will present and discuss the identified studies in more detail, starting with studies investigating the effect on health outcomes before turning to the study assessing the impact on health system organisation.

Seven studies have been identified that assess the IMF's impact on health outcomes. A number of health outcomes are used in these studies. These include TB (Maynard et al, 2012; Stuckler et al, 2008), infant mortality rates (Hajro and Joyce, 2009; Oliver, 2006), under-five years mortality rates (Oliver, 2006), maternal mortality (Pandolfelli et al, 2014), loss in disability adjusted life years (Hoddie and Hartzell, 2014), and preschool children's weight for age and height (Handa and King, 2003). While the study by Handa and King (2003) uses micro-survey data, all other studies employ aggregate country-level data. All studies fit multivariate regression models, apart from the one by Oliver (2006), which relies on descriptive statistics. This section discusses the studies using cross-country approaches before turning to the two case-studies (Handa and King, 2003; Oliver, 2006) within this section.

The study by Hajro and Joyce (2009) employs a dataset of 82 developing countries observed during the period of 1985-2000, the authors are interested in investigating the impact of IMF agreements on infant mortality³¹ and aim to contribute to an assessment of the Structural Adjustment Facility (SAF) lending instruments introduced in 1986. The authors fit a multivariate regression model controlling for determinants of economic development and institutions. They do not seem to control for selection bias, which might reduce the reliability of the results. Having a particular interest in the concessional SAF the authors are also aiming to investigate the effects of non-concessional agreement types on the outcome. To do so, they include dummies for both agreement types into their models. They show that neither of the agreement types has a statistically significant effect on infant mortality. Since the authors do not provide a comparison of the effects of the agreement types on the outcome, the analysis does not allow for assessing differences in the effects between agreement types. Put

³¹ The focus of this study is on poverty and the authors argue that their selected outcome variable of infant mortality is an indicator of poverty, the study is included in this section as infant mortality can also be seen as health outcome.

differently, the analysis does not allow for evaluating whether concessional agreements have different effects compared to non-concessional agreements.

The study by Pandolfelli et al (2014) investigates the effects of IMF agreements on maternal mortality rates, one of the Millennium Development Goals (MDG), in 37 Sub-Saharan African countries. To do so, the authors run a regression model, controlling for determinants of maternal mortality and control for endogeneity using a selection model. Using data from 1990 to 2005, they find that IMF agreements are associated with statistically significant increases in maternal mortality, compared to countries without agreements. They suggest that cuts in health expenditure might be associated with the negative outcome but do not provide further analysis to support this claim.

The study by Hoddie and Hartzell (2014) employ a dataset of 100 low- and middle-income countries for the years 1985 to 1998 and aim to contribute to the debate of IMF agreements' impact on public health performance. The authors measure performance using disability adjusted life years from all-cause mortality as outcome variable. They are particularly interested in temporal trade-offs of IMF agreements by investigating whether agreements are associated with short-term reductions in health outcomes as part of the overall stabilisation efforts but long-term increases in the measured outcomes. To do so, they run two separate multivariate regressions controlling for determinants of mortality and selection bias using a selection model: One for countries entering into agreements between 1985 and 1989 and one for countries in agreements during 1995 and 1998. In both regressions the outcome variable of interest are disability adjusted life years in 1999. The authors expect that the relationship between countries in the early cohort and the 1999 outcome is positive to suggest that in the long-run agreements have a positive impact on public health performance. The relationship between the later cohort and the 1999 outcome is expected to be negative as health is assumed to be impacted negatively shortly after an agreement. The authors find that agreements have negative effects shortly after entering into them as well as in the long run as in both agreement cohorts are associated with increased loss of disability adjusted life years for all but the oldest age group (60+).

The study by Stuckler et al (2008) aims to assess the effect of IMF agreements on TB in 21 post-communist countries for a time period of 13 years with observations beginning in 1991 after the collapse of the Soviet Union. Using a number of TB indicators including incidence, prevalence and mortality, the authors aim to estimate the effects of IMF agreements using multivariate regression models to identify the difference between countries undergoing agreements and those not in agreements. TB is used as an outcome as it can be seen as indicator of societal health. Controlling for a number of covariates to capture the impact of economic and social development as well as determinants of TB, and using a selection model to account for systematic differences between IMF and non-IMF countries³², the authors find that countries in IMF agreements experience large increases in TB mortality. While not offering an explicit pathway of cause and effect, the authors hypothesise that conditionality attached to the IMF agreements has had negative effect on the affected country's TB control infrastructure.

The study by Maynard et al (2012) builds on the work by Stuckler et al (2008) outlined above. The study adds to the previous paper by extending the country coverage from 21 post-communist countries to 74 countries from further geographical regions. Additionally, they use a slightly longer dataset covering the years between 1990 and 2005. While using TB prevalence like Stuckler et al (2008), the authors see this indicator not so much as indicator of societal health but as proxy to the government's ability to run a health system. Similar to Stuckler et al (2008), the authors fit a multivariate regression model to estimate the differences in TB prevalence between IMF and non-IMF countries but use a slightly different set of control variables. Counter to Stuckler et al (2008), the authors do not seem to use a selection model to account for systematic differences between both country types, which might make the results unreliable. Maynard et al (2012) perform a number of regression models that while varying in significance generally, suggest that agreements are associated with increases in TB prevalence. The authors argue that in their preferred model, which also controls for public health expenditure, agreements lead to an

³² It is worth noting that the main analyses are conducted without using a selection model. Results reported with and without selection model do not change substantively.

increase in TB prevalence. This is taken as evidence to suggest that IMF agreements are associated with reductions in the government's capacity to providing essential health services to curtail TB spread.

The study by Oliver (2006) takes a different approach to estimating effects of agreements. Rather than conducting a cross-country analysis, the author employs a case-study approach and selects cases based on levels of economic development, racial and ethnic composition and economic as well as political progression before the onset of the agreements. Having matched the cases on preconditions, the differences in effect would be attributable to the agreements. While the individual matching variables are not reported, it is argued that the cases of Argentina and Uruguay would be comparable. Both countries are under agreements at similar periods but their implementation is different: Compared to Uruguay, Argentina experiences more rapid and severe implementation of its structural adjustment programme. This allows for the author to compare the effects of these different implementations. Following up a period of 20 years (1980 to 2000), Oliver (2006) finds that while infant and under five year mortalities are higher in Uruguay at the start of the observation period the country experiences faster reductions on these measures compared to Argentina. It is important to note that the descriptive nature of the findings should be, despite the efforts of matching, be treated with caution, as the study does not seem to account for continuous agreements that happened in both countries. Furthermore, lack of detail on the matching process does not allow for further assessment of the quality of the matching.

The study by Handa and King (2003) looks at the 1991-1992 agreement and structural adjustment happening in Jamaica. While there are other elements to this adjustment package, the authors are particularly interested in liberalisation of exchange rate happening in September 1991. The authors argue that the devaluation of the currency would have important implications on purchasing power of the population and restrict their ability to purchase food stuffs, most of which are imported to Jamaica. To measure this impact, the authors assess the trajectory of preschool children's weight for height and weight for age measures, which they argue are indicators of living conditions, but can also be treated as health outcomes. Using data from a series of household surveys the authors model both indicators controlling for child and parent characteristics as well as macroeconomic conditions. The results

suggest that weight for height, a short-term indicator, is lowest during the liberalisation, but higher before and after the reforms. The long-term indicator, weight for age, begins to decline six months after the reform and recovers after roughly two years. It appears that these results suggest that the liberalisation reform part of the agreement had negative impact on child health, however, this approach does not provide a counterfactual case which would assess the results in the case the liberalisation did not take place. This is to say, the country entered into the agreement as a result of economic imbalances that might in other ways have affected nutritional status of the children.

The study by Benson (2001) is interested in investigating impact of agreements on the organisation of health systems and the push to privatise health service delivery during an adjustment policy happening in Tanzania after 1986. It aims to assess the impact of this policy on the distribution of health care facilities and the effect on equity of access. Providing a descriptive analysis of the number and distribution of health care facilities in two Tanzanian districts, the author finds that while the total number of facilities increased, the additional facilities did not contribute much to enhancing accessibility of health care services in the districts. While newly opened government facilities were located in high-needs areas, most new private facilities have been opened in area of low medical need, often duplicating services already available.

2.3 Summary of the Literature Review, Gaps in the Literature and Research Questions

This chapter set out to conduct a review of the literature on the effects of IMF agreements on health systems in order to gain an understanding of the present state of the literature in the field and to draw out gaps for analysis in this study. Using a systematic approach to the literature search process, a total of 40 studies have been identified and included in this review (Appendix Note 2.3; pg. 66). The reviewed studies cover a great number of years with the earliest observations dating back to the 1970s and the latest data available from as recent as 2013. The coverage of countries is similarly varied as studies cover all geographical areas of low- and middle- income countries, with most studies investigating impacts in countries in Africa, followed by Latin America.

Studies are authored by three main stakeholders in the debate around effects of IMF agreements, and include the IMF itself, civil society organisations advocating global health, and authors from academia. While most studies are written by authors from academia, the IMF contributed a fair amount to the debate as one fifth of all studies are from IMF-affiliated authors. Due to interests of these authors in defending the IMF's practices it might be assumed that these studies paint a particularly positive picture of the effects. While the overall number of studies is fairly small, it appears that across all studies, those authored by the IMF are the only studies that report consistently positive results. It is worth mentioning that the same author group also reports, though less frequently, negative and mixed results. Authors from academia seem to report negative findings most frequently but also find mixed and neutral associations between the IMF and health systems.

The studies were classified into discursive and empirical studies based on the general approach taken in the respective study, with relatively more studies falling into the discursive category. Studies were classified as discursive when they seemed to report more of a standpoint or opinion on the topic rather than an objective investigation of the relationship between agreements and health systems. While these studies provide, maybe somewhat unsurprisingly, a rather negative picture of the association between agreements and health systems, it was argued that these studies might – due to their set up – provide little insight into the true relationship between the IMF and its impact on health systems.

Empirical studies investigated the effects of IMF agreements on various health system indicators. While this included a number of health outcomes from TB to different types of mortality and the loss of disability adjusted life years, studies most commonly investigated the effects on public health expenditure. While the review suggests that the effects of IMF agreements on health outcomes are generally seen to be rather negative, results on the relationship between IMF agreements and health spending seems to be somewhat more unsettled.

Looking at the most reliable set of these studies – those that model health expenditure in a multivariate way and account for the differences between IMF and non-IMF countries using appropriate techniques – the results generally appear mixed.

While the study by Nooruddin and Simmons (2006) reports different effects between democratic and non-democratic countries, the study by Clements et al (2013) find that low-income countries experience increases in spending countries of middle-income do not see changes in health expenditure in response to agreements. Kentikelenis et al (2015b) look at low-income countries exclusively, and report that this set of countries in general does not experience increases in spending but that increases are only found for a subset of Sub-Saharan African countries. While other factors³³ might explain the differences in the observed effects of IMF agreements, this comparison seems to suggest that the effects of agreements are not consistent across all countries. The current literature seems to offer both country income group as well as geographical region as explanatory factors for these differences in the effects of agreements. It seems more likely that a country's income group, rather than its geographical region, play a role in determining these effects. This is because it seems more likely that the IMF is treating countries of different income groups, due to their stage of development differently, which could explain the results. Similarly, the effects of agreements might differ by income group as this can be seen as proxy for the development of a country's health system. The current literature, however, does not seem to offer a systematic assessment of income groups. Clements et al (2013) compare low-income countries with middle-income countries, without considering lower-middle and upper-middle income countries separately. Kentikelenis et al (2015b) look only at low-income countries. This present study will therefore attempt to assess the effects of agreements for each income group systematically.

While a country's income group can be seen as a proxy for differential treatment by the IMF, it does ignore³⁴ that the IMF uses different agreement types in different crisis situations and for different sets of countries (see 1.2.4; pg. 15). While these are somewhat related to a country's income group, they are not an exact representation of this differential treatment. It therefore appears fruitful to assess the effects of agreements not only by income groups but also for each of the agreement

³³ These might, for instance, be differences in the employed datasets or variables or the observed years.

³⁴ The only exception to this is the study by Hajro and Joyce (2009), investigating effects on health outcomes, not health expenditure.

clusters identified in section 1.2.4.3 (pg. 21). To do so, the aim of this study is to assess the effects systematically across *income groups* and different *agreement types*. The aim of this study incorporates a number of objectives³⁵. Specifically, the study intends to:

- (1) design a methodology for evaluating the effects of IMF agreements on government health expenditure using cross-country observational data;
- (2) deploy that methodology in order to evaluate the effects of IMF agreements on government health expenditure in low- and middle-income-countries;
- (3) evaluate the effects of IMF agreements across individual country income groups (low-income, lower-middle-income, upper-middle-income);
- (4) develop a classification of agreement types according to their extent of conditionality and emphasis on social protection.
- (5) evaluate the effects of different types of IMF agreements in low- and middle-income-countries;
- (6) evaluate the effects of different types of IMF agreements across individual country income groups; and
- (7) assess the implications of the study's findings for universal health coverage in low- and middle-income-countries.

³⁵ These have previously been presented in chapter 1 (section 1.3; pg. 24)

Appendix to Chapter 2

Appendix Note 2.1: Key words used in Databases

Scopus

Best results were obtained with the following combination

(TITLE-ABS-KEY (imf OR "International Monetary Fund" OR "Structural Adjustment") AND TITLE-ABS-KEY (health OR health care OR health system OR health care system))

Web of Knowledge

Best results were obtained with the following combination

(IMF OR international monetary fund OR "structural Adjustment" OR "IMF agreement") AND TITLE: (health care or health system OR health care system OR health)

PubMed

Best results were obtained with the following combination

((IMF[All Fields] AND agreement[All Fields]) OR "structural adjustment"[All Fields] OR (International[All Fields] AND Monetary[All Fields] AND ("financial management"[MeSH Terms] OR ("financial"[All Fields] AND "management"[All Fields]) OR "financial management"[All Fields] OR "fund"[All Fields])) OR IMF[All Fields]) AND (("health"[MeSH Terms] OR "health"[All Fields]) OR (("health"[MeSH Terms] OR "health"[All Fields]) AND system[All Fields]) OR ("delivery of health care"[MeSH Terms] OR ("delivery"[All Fields] AND "health"[All Fields] AND "care"[All Fields]) OR "delivery of health care"[All Fields] OR ("health"[All Fields] AND "care"[All Fields]) OR "health care"[All Fields]) OR "delivery of health care"[MeSH Terms] OR "delivery of health care"[MeSH Terms])

Google Scholar

Best results were obtained with the following combination

IMF Health

Appendix Note 2.2: List of Studies Obtained in Full-text

- ActionAid International USA (2005) *Changing Course: Alternative approaches to achieve the Millennium Development Goals and fight HIV/AIDS*, Washington: Action Aid International USA.
- Alubo, S. O. (1990) 'Debt crisis, health and health services in Africa', *Social Science & Medicine*, vol. 31, no. 6, pp. 639-648.
- Ambrose, S. (2006) 'Preserving disorder: IMF policies and Kenya's health care crisis'. *Pambazuka News* [On-line], Available: <http://www.pambazuka.org/food-health/preserving-disorder-imf-policies-and-kenyas-health-care-crisis> [Accessed 15 Dec 2015].
- Anyinam, C. A. (1989) 'The social costs of the International Monetary Fund's adjustment programs for poverty: the case of health care development in Ghana', *International Journal of Health Services*, vol. 19, no. 3, pp. 531-547.
- Baker, B. K. (2010) 'The impact of the International Monetary Fund's macroeconomic policies on the AIDS pandemic', *International Journal of Health Services*, vol. 40, no. 2, pp. 347-63.
- Bassett, M. T., Bijlmakers, L. and Sanders, D. M. (1997) 'Professionalism, patient satisfaction and quality of health care: experience during Zimbabwe's structural adjustment programme', *Social Science & Medicine*, vol. 45, no. 12, pp. 1845-52.
- Batniji, R. (2009) 'Reviving the International Monetary Fund: concerns for the health of the poor', *International Journal of Health Services*, vol. 39, no. 4, pp. 783-7.
- Benson, J. S. (2001) 'The impact of privatization on access in Tanzania', *Social Science & Medicine*, vol. 52, no. 12, pp. 1903-15.
- Bhutta, Z. A. (2001) 'Structural adjustments and their impact on health and society: a perspective from Pakistan', *International Journal of Epidemiology*, vol. 30, no. 4, pp. 712-716.
- Bhutta, Z. A. (2002) 'Structural adjustment in health in Pakistan: defining the questions - Author's response', *International Journal of Epidemiology*, vol. 31, no. 2, pp. 510-511.
- Birn, A. E., Zimmerman, S. and Garfield, R. (2000) 'To decentralize or not to decentralize, is that the question? Nicaraguan health policy under structural adjustment in the 1990s', *International Journal of Health Services*, vol. 30, no. 1, pp. 111-128.
- Birungi, H. (1998) 'Injections and self-help: risk and trust in Ugandan health care', *Social Science and Medicine*, vol. 47, no. 10, pp. 1455-1462.
- Bond, P. and Dor, G. (2003) 'Uneven health outcomes and political resistance under residual neoliberalism in Africa', *International Journal of Health Services*, vol. 33, no. 3, pp. 607-30.
- Breman, A. and Shelton, C. (2001) *Structural adjustment and health: a literature review of the debate, its role-players and presented empirical evidence*. Working Paper Series Paper No. WG6, Geneva: Commission on Macroeconomics and Health.
- Breman, A. and Shelton, C. (2007) 'Structural Adjustment and Health', *Globalisation and Health*, Oxford: Oxford University Press.
- Buckley, R. P. and Baker, J. (2008) 'IMF policies and health in sub-Saharan Africa', *Global Health Governance: Crisis, Institutions And Political Economy*, Adrian Kay and Owain Williams, eds., London: Palgrave Macmillan.
- Buse, K. and Walt, G. (1997) 'An Unruly Melange? Coordinating External Resources To The Health Sector: A Review', *Social Science and Medicine*, vol. 45, no. 3, pp. 449-463.
- Centre for Economic Governance and AIDS in Africa (2009) *Evidence Of The Impact Of IMF Fiscal And Monetary Policies On The Capacity To Address HIV/AIDS And TB Crises In Kenya, Tanzania And Zambia*, Cape Town: Centre for Economic Governance and AIDS in Africa.
- Chaulet, P. (1998) 'After health sector reform, whither lung health?', *International Journal of Tuberculosis and Lung Diseases*, vol. 2, no. 5, pp. 349-59.
- Cheelo, C. and Goldsbrough, D. (2007) *Working Group on IMF Programs and Health Expenditures Background Paper*, Washington: Centre for Global Development
- Clegg, D. (1995) 'Structural Adjustment And Health - Mission Hospitals Are A Useful Model', *British Medical Journal*, vol. 311, no. 7008, pp. 809-809.
- Clements, B., Gupta, S. and Nozaki, M. (2013) 'What happens to social spending in IMF-supported programmes?', *Applied Economics*, vol. 45, no. 28, pp. 4022-4033.

- Collins, J. and Rau, B. (2009) *AIDS in the Context of Development. UNRISD Programme on Social Policy and Development, Paper No. 4*, Geneva: United Nations Research Institute for Social Development.
- Cornia, G. A., Jolly, R. and Stewart, F. (eds.) (1987) *Adjustment With A Human Face: Protecting The Vulnerable And Promoting Growth*, Oxford: Oxford University Press.
- Craig, D. and Porter, D. (2003) 'Poverty Reduction Strategy Papers: a new convergence', *World Development*, vol. 31, no. 1, pp. 53-69.
- Cruickshank, C. J. (2000) 'Report from Nicaragua: midwifery and structural adjustment', *Journal of Midwifery Women's Health*, vol. 45, no. 5, pp. 411-5.
- Cullinan, T. (2002) 'Structural adjustment and health sector reform in Africa', *Tropical Doctor*, vol. 32, no. 2, pp. 65-65.
- Curtis, E. (1998) 'Child health and the international monetary fund: the Nicaraguan experience', *Lancet*, vol. 352, no. 9140, pp. 1622-1624.
- De Renzio, P. and Goldsbrough, D. (2007) *IMF programs and health spending: Case study of Mozambique*, Washington DC: Center for Global Development.
- De Vogli, R. and Birbeck, G. L. (2005) 'Potential impact of adjustment policies on vulnerability of women and children to HIV/AIDS in sub-Saharan Africa', *Journal of Health, Population and Nutrition*, vol. 23, pp. 105-120.
- Dejong, J. (1995) 'Households, health and crises: coping with economic upheaval in Jordan, 1988-1991', *Journal of International Development*, vol. 7, no. 3, pp. 443-465.
- Dembele, D. M. (2005) 'The International Monetary Fund and World Bank in Africa: a "disastrous" record', *International Journal of Health Services*, vol. 35, no. 2, pp. 389-98.
- Drajem, M. (2001) 'International Monetary Fund and World Bank policies can hurt poor, study says', *International Journal of Health Services*, vol. 31, no. 2, pp. 439-40.
- Ekouevi, K. and Adepoju, A. (1995) 'Adjustment, social sectors, and demographic change in Sub-Saharan Africa', *Journal of International Development*, vol. 7, no. 1, pp. 47-59.
- Ekwempu, C. C., Maine, D., Olorukoba, M. B. (1990) 'Structural Adjustment and Health in Africa', *Lancet*, vol. 336, no. 8706, pp. 56-57.
- Escudero, J. C. (2003) 'The health crisis in Argentina', *International Journal of Health Services*, vol. 33, no. 1, pp. 129-36.
- Farmer, P. (2004) 'Political Violence and Public Health in Haiti', *New England Journal of Medicine*, vol. 350, no. 1483-1486.
- Figuroa, J. P. (1993) 'Structural adjustment--the impact on health', *West Indian Medical Journal*, vol. 42 Suppl 1, pp. 63-7.
- Gilmore, A., Fooks, G. and McKee, M. (2009) 'The international monetary fund and tobacco: A product like any other?', *International Journal of Health Services*, vol. 39, no. 4, pp. 789-793.
- Goldsbrough, D. (2007) *Does the IMF constrain health spending in poor countries? Evidence and an agenda for action*, Washington DC: Center for Global Development.
- Goldsbrough, D., Adovor, E. and Elberger, B. (2007) *What Has Happened to Health Spending and Fiscal Flexibility in Low Income Countries with IMF Programs?*, Washington DC: Center for Global Development.
- Goldsbrough, T. L. and Christiansen, K. (2007) *IMF programs and health spending: Case study of Rwanda*, Background Paper to the Working Group on IMF Programs and Health Expenditures. Overseas Development Institute, London and the Center for Global Development, Washington, DC.
- Gupta, S. (2010) 'Response of the International Monetary Fund to its critics', *International Journal of Health Services*, vol. 40, no. 2, pp. 323-6.
- Gupta, S. (2015) 'Response to "The International Monetary Fund and the Ebola outbreak"', *Lancet Global Health*, vol. 3, no. 2, pp. e78.
- Gupta, S., Clements, B., McDonald, C. (1998) 'The IMF and the Poor'. *IMF Pamphlet Series*, No. 52.
- Gupta, S., Dicks-Mireaux, L., Khemani, R. (2000) *Social issues in IMF-supported programs*, Washington: IMF.
- Gupta, S., Plant, M., Clements, B. (2002) *Is the PRGF Living Up to Expectations? An Assessment of Program Design*, Washington: IMF.

- Gupta, S., Verhoeven, M., Yamada, G. (1999) 'Education and Health Spending Continues Rise in Countries with IMF-Supported Programs', *IMF Survey*, vol. 28, no 5, pp. 79-80.
- Hajro, Z. and Joyce, J. P. (2009) 'A true test: do IMF programs hurt the poor?', *Applied Economics*, vol. 41, no. 3, pp. 295-306.
- Handa, S. and King, D. (2003) 'Adjustment with a Human Face? Evidence from Jamaica', *World Development*, vol. 31, no. 7, pp. 1125-1145.
- Hoddie, M. and Hartzell, C. A. (2014) 'Short-Term Pain, Long-Term Gain? The Effects of IMF Economic Reform Programs on Public Health Performance', *Social Science Quarterly*, vol. 95, no. 4, pp. 1022-1042.
- Hojman, D. E. (1996) 'Economic and other determinants of infant and child mortality in small developing countries: the case of Central America and the Caribbean', *Applied Economics*, vol. 28, no. 3, pp. 281-90.
- Homedes, N. and Ugalde, A. (2005) 'Why neoliberal health reforms have failed in Latin America', *Health Policy*, vol. 71, no. 1, pp. 83-96.
- Hopkins, S. (2006) 'Economic stability and health status: evidence from East Asia before and after the 1990s economic crisis', *Health Policy*, vol. 75, no. 3, pp. 347-357.
- Hossen, A. M. and Westhues, A. (2012) 'The Medicine That Might Kill the Patient: Structural Adjustment and Its Impacts on Health Care in Bangladesh', *Social Work in Public Health*, vol. 27, no. 3, pp. 213-228.
- Hossen, M. A. and Westhues, A. (2012) 'The medicine that might kill the patient: Structural Adjustment and its impacts on health care in Bangladesh', *Social Work in Public Health*, vol. 27, no. 3, pp. 213-28.
- Hyder, A. A. (2002) 'Structural adjustment in health in Pakistan: defining the questions', *International Journal of Epidemiology*, vol. 31, no. 2, pp. 509-509.
- Ibe, B. C. (1993) 'Low birth weight (LBW) and structural adjustment programme in Nigeria', *Journal of Tropical Paediatrics*, vol. 39, no. 5, pp. 312-3.
- IEO (2003) *The IMF and Aid to Sub-Saharan Africa*, Washington: IEO.
- IMF (2008) 'IMF casts doubts on TB study', *IMF Survey*, vol. 23 July 2008.
- Ismail, S. (2013) 'International financial institutions and health in Egypt and Tunisia: change or continuity?', *International Journal of Health Services*, vol. 43, no. 1, pp. 61-6.
- Ismi, A. and Coalition, H. I. (2004) *Impoverishing a continent: The World Bank and the IMF in Africa*. Ottawa: Canadian Centre for Policy Alternatives.
- Israr, S. M., Razum, O., Ndiforchu, V. (2000) 'Coping strategies of health personnel during economic crisis: A case study from Cameroon', *Tropical Medicine and International Health*, vol. 5, no. 4, pp. 288-292.
- Kanji, N. (1989) 'Charging for drugs in Africa: UNICEF'S 'Bamako Initiative'', *Health Policy and Planning*, vol. 4, pp. 110-120.
- Kanji, N. (1995) 'Gender, poverty and economic adjustment in Harare, Zimbabwe', *Environment and Urbanization*, vol. 7, no. 1, pp. 37-55.
- Kanji, N. and Harpham, T. (1992) 'From chronic emergency to development: an analysis of the health of the urban poor in Luanda, Angola', *International Journal of Health Services*, vol. 22, no. 2, pp. 349-63.
- Kanji, N., Kanji, N. and Manji, F. (1991) 'From development to sustained crisis: structural adjustment, equity and health', *Social Science & Medicine*, vol. 33, no. 9, pp. 985-93.
- Kentikelenis, A. E., Stubbs, T. H. and King, L. P. (2015) 'Structural adjustment and public spending on health: evidence from IMF programs in low-income countries', *Social Science & Medicine*, vol. 126, pp. 169-76.
- Kentikelenis, A., King, L., McKee, M. (2015) 'The International Monetary Fund and the Ebola outbreak', *The Lancet Global Health*, vol. 3, no. 2, pp. e69-e70.
- Kolko, G. (1999) 'Ravaging the poor: the International Monetary Fund indicted by its own data', *International Journal of Health Services*, vol. 29, no. 1, pp. 51-7.
- Kruger, N. (1997) 'Structural adjustment and the working poor in Zimbabwe: Studies on labour, women informal sector workers and health', *International Journal of African Historical Studies*, vol. 30, no. 3, pp. 664-666.

- Lancet (1990) 'Structural adjustment and health in Africa', *Lancet*, vol. 335, no. 8694, pp. 885-6.
- Lancet (1994) 'Structural adjustment too painful?', *Lancet*, vol. 344, no. 8934, pp. 1377-8.
- Laurell, A. C. (1991) 'Crisis, neoliberal health policy, and political processes in Mexico', *International Journal of Health Services*, vol. 21, no. 3, pp. 457-70.
- Laurell, A. C. (2001) 'Health reform in Mexico: the promotion of inequality', *International Journal of Health Services*, vol. 31, no. 2, pp. 291-321.
- Laurell, A. C. (2015) 'Three decades of neoliberalism in Mexico: the destruction of society', *International Journal of Health Services*, vol. 45, no. 2, pp. 246-64.
- Loewenson, R. (1993) 'Structural adjustment and health policy in Africa', *International Journal of Health Services*, vol. 23, no. 4, pp. 717-730.
- Logie, D. and Rowson, M. (1998) 'Poverty and Health: Debt Relief Could Help Achieve Human Rights Objectives', *Health and Human Rights*, vol. 3, no. 2, pp. 82-97.
- Logie, D. E. and Woodroffe, J. (1993) 'Structural adjustment: the wrong prescription for Africa?', *British Medical Journal*, vol. 307, no. 6895, pp. 41-4.
- Lopes, C. (1999) 'Are Structural Adjustment Programmes an Adequate Response to Globalisation?', *International Social Science Journal*, vol. 162, pp. 511-519.
- Lugalla, J. L. (1995) 'The impact of structural adjustment policies on women's and children's health in Tanzania', *Review of African Political Economy*, vol. 22, no. 63, pp. 43-53.
- Lurie, P., Hintzen, P. and Lowe, R. (1995) 'Socioeconomic obstacles to HIV prevention and treatment in developing countries: the roles of the International Monetary Fund and the World Bank', *AIDS*, vol. 9, no. 6, pp. 539-546.
- Marphatia, A. A. (2010) 'The Adverse Effects Of International Monetary Fund Programs On The Health And Education Workforce', *International Journal of Health Services*, vol. 40, no. 1, pp. 165-178.
- Martin, R. and Segura-Ubiergo, A. (2004) 'Social Spending in IMF-Supported Programs', *Public Economics*, no. 0504011.
- Maynard, G., Shircliff, E. J. and Restivo, M. (2012) 'IMF Structural Adjustment, Public Health Spending, and Tuberculosis: A Longitudinal Analysis of Prevalence Rates in Poor Countries', *International Journal of Sociology*, vol. 42, no. 2, pp. 5-27.
- Mburu, F. M. (1994) 'Whither community health workers in the age of structural adjustment?', *Social Science & Medicine*, vol. 39, no. 7, pp. 883-5.
- McCoy, D., Chopra, M., Loewenson, R. (2005) 'Expanding Access to Antiretroviral Therapy in Sub-Saharan Africa: Avoiding the Pitfalls and Dangers, Capitalizing on the Opportunities', *American Journal of Public Health*, vol. 95, no. 1, pp. 675-681.
- Murray, M. and King, G. (2008) 'The effects of international monetary fund loans on health outcomes', *Plos Medicine*, vol. 5, no. 7, pp. 1011-1013.
- Nooruddin, I. and Simmons, J. W. (2006) 'The politics of hard choices: IMF programs and government spending', *International Organization*, vol. 60, no. 04, pp. 1001-1033.
- Odulana, J. and Olomajeye (1999) 'The impact of government's alleviation of poverty program on the urban poor in Nigeria', *Journal for Black Studies*, vol. 29, no. 5, pp. 695-705.
- O'Keefe, E. and Scott-Samuel, A. (2010) 'Health impact assessment as an accountability mechanism for the International Monetary Fund: the case of sub-Saharan Africa', *International Journal of Health Services*, vol. 40, no. 2, pp. 339-45.
- Oliver, H. C. (2006) 'In the wake of structural adjustment programs - Exploring the relationship between domestic policies and health outcomes in Argentina and Uruguay', *Canadian Journal of Public Health- Revue Canadienne De Sante Publique*, vol. 97, no. 3, pp. 217-221.
- Ooms, G. and Hammonds, R. (2009) 'Scaling Up Global Social Health Protection: Prerequisite Reforms to The International Monetary Fund', *International Journal of Health Services*, vol. 39, no. 4, pp. 795-801.
- Ooms, G. and Schrecker, T. (2005) 'Expenditure ceilings, multilateral financial institutions, and the health of poor populations', *Lancet*, vol. 365, no. 9473, pp. 1821-1823.
- Oxfam (2003) *The IMF and the Millennium Development Goals: Failing To Deliver for Low-Income Countries*. Oxford: Oxfam.
- Palma-Solis, M. A., Diaz, C. A. D., Franco-Giraldo, A. (2009) 'State Downsizing as a Determinant of

- Infant Mortality and Achievement of Millennium Development Goal 4', *International Journal of Health Services*, vol. 39, no. 2, pp. 389-403.
- Pandolfelli, L. E., Shandra, J. and Tyagi, J. (2014) 'The International Monetary Fund, Structural Adjustment, And Women's Health: A Cross-National Analysis Of Maternal Mortality In Sub-Saharan Africa', *Sociological Quarterly*, vol. 55, no. 1, pp. 119-142.
- Peabody, J. W. (1996) 'Economic reform and health sector policy: Lessons from structural adjustment programs', *Social Science & Medicine*, vol. 43, no. 5, pp. 823-835.
- Pfeiffer, J. and Chapman, R. (2010) '*Anthropological Perspectives on Structural Adjustment and Public Health*', in Brenneis, D. and Ellison, P. T. (eds.) Annual Review of Anthropology, Volume 39.
- Podmore, W. (1995) 'Structural adjustment and health. Financial institutions must let go', *British Medical Journal*, vol. 311, no. 7008, pp. 809.
- Pongou, R., Salomon, J. A. and Ezzati, M. (2006) 'Health impacts of macroeconomic crises and policies: determinants of variation in childhood malnutrition trends in Cameroon', *International Journal of Epidemiology*, vol. 35, no. 3, pp. 648-56.
- Potts, D. (1998) 'Health and structural adjustment in rural and urban Zimbabwe', *Africa*, vol. 68, no. 1, pp. 147-148.
- Potts, D. (2001) 'Socio-economic stress, health and child nutritional status in Zimbabwe at a time of economic structural adjustment: a three-year longitudinal study', *Africa*, vol. 71, no. 3, pp. 529-531.
- Prasad, E., Rogoff, K., Wei, S.-J. (2003) *Effects of Financial Globalization on Developing Countries: Some Empirical Evidence*, Washington: IMF.
- Purohit, B. C. (2001) 'Private initiatives and policy options: Recent health system experience in India', *Health Policy and Planning*, vol. 16, no. 1, pp. 87-97.
- Rao, M., Nayar, K. R., Baru, R. V. (1995) 'Health And Structural Adjustment - Major Shifts At Policy Level', *Economic and Political Weekly*, vol. 30, no. 20, pp. 1156-1160.
- Ravindran, T. K. S. (2010) 'Privatisation in reproductive health services in Pakistan: Three case studies', *Reproductive Health Matters*, vol. 18, no. 36, pp. 13-24.
- Rowden, R. (2004) *Blocking Progress - How the Fight against HIV/AIDS is Being Undermined by the World Bank and International Monetary Fund*, Washington: ActionAid International USA.
- Rowden, R. (2008) 'Blocking Progress: The IMF and HIV/AIDS', *Global Social Policy*, vol. 8, no. 1, pp. 19-24.
- Rowden, R. (2010) 'International Monetary Fund Sacrifices Higher Growth, Employment, Spending, And Public Investment in Health Systems in Order to Keep Inflation Unnecessarily Low', *International Journal of Health Services*, vol. 40, no. 2, pp. 333-338.
- Rowden, R. (2010) '*Restrictive IMF Policies Undermine Efforts at Health Systems Strengthening (HSS)*'. Background Paper 50 to World Health Report 2010, WHO: Geneva.
- Rowden, R. (2010) 'Why health advocates must get involved in development economics: the case of the International Monetary Fund', *International Journal of Health Services*, vol. 40, no. 1, pp. 183-7.
- Ruckert, A. and Labone, R. (2013) 'The financial crisis and global health: the International Monetary Funds (IMF) policy response', *Health Promotion International*, vol. 28, no. 3, pp. 357-366.
- Sahn, D. and Bernier, R. (1995) 'Have structural adjustments led to health sector reform in Africa?', *Health policy*, vol. 32, no. 1-3, pp. 193-214.
- Sanders, D. and Sambo, A. (1991) 'AIDS in Africa: the implications of economic recession and structural adjustment', *Health Policy and Planning*, vol. 6, no. 2, pp. 157-165.
- Stewart, F. (1989) 'Recession, Structural Adjustment And Infant Health - The Need For A Human-Face', *Transactions of the Royal Society of Tropical Medicine and Hygiene*, vol. 83, no. 1, pp. 30-31.
- Streefland, P. (2005) 'Public health care under pressure in sub-Saharan Africa', *Health Policy*, vol. 71, no. 3, pp. 375-82.
- Stuckler, D. and Basu, S. (2009) 'The International Monetary Fund's effects on global health: before and after the 2008 financial crisis', *International Journal of Health Services*, vol. 39, no. 4, pp. 771-781.
- Stuckler, D., Basu, S. and McKee, M. (2011) 'International Monetary Fund and aid displacement', *International Journal of Health Services*, vol. 41, no. 1, pp. 67-76.
- Stuckler, D., Basu, S., Gilmore, A. (2010) 'An Evaluation of the International Monetary Fund's Claims about Public Health', *International Journal of Health Services*, vol. 40, no. 2, pp. 327-332.

- Stuckler, D., Basu, S., McKee, M. (2010) 'Responding to the economic crisis: a primer for public health professionals', *Journal of Public Health*, vol. 32, no. 3, pp. 298-306.
- Stuckler, D., King, L. and McKee, M. (2009) 'Mass privatisation and the post-communist mortality crisis', *Lancet*, vol. 39, no. 3, pp. 461-489.
- Stuckler, D., King, L. P. and Basu, S. (2008) 'International Monetary Fund programs and tuberculosis outcomes in post-communist countries', *PLoS Medicine*, vol. 5, no. 7, pp. e143.
- Stuckler, D., King, L. P. and Basu, S. (2008) 'International Monetary Fund programs and tuberculosis outcomes in post-communist countries', *PLoS Medicine*, vol. 5, no. 7, pp. e143.
- Tang, S. (2006) 'Commentary: economic crisis or structural adjustment--which is worse for child health in African countries?', *International Journal of Epidemiology*, vol. 35, no. 3, pp. 656-7.
- Tumwine, J. K. (1992) 'Zimbabwe Success Story In Education And Health - Will It Weather Economic Structural Adjustment', *Journal of the Royal Society of Health*, vol. 112, no. 6, pp. 286-290.
- van der Gaag, J. and Barham, T. (1998) 'Health and health expenditures in adjusting and non-adjusting countries', *Social Science & Medicine*, vol. 46, no. 8, pp. 995-1009.
- Wakhweya, A. M. (1995) 'Structural adjustment and health', *British Medical Journal*, vol. 311, no. 6997, pp. 71-2.
- Wood, A. (2006) 'IMF Macroeconomic Policies and Health Sector Budgets'. Amsterdam: Wemos Foundation.

Appendix Note 2.3: Study Overview

Author	Year	Affiliation	Years Covered	Countries	Study Type	Agreement	Method	Dependent Variable	Results Indicator
Alubo	1990	academic	1980s	African countries	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Anyinam	1989	academic	1980s	Ghana	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Bhutta	2001	academic	1990s	Pakistan	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Birn et al	2000	academic	1990s	Nicaragua	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Buckley/ Baker	2008	academic	1980s -2000s	Sub-Saharan Africa; case study of Tanzania, Uganda, Ghana	Discursive	SAP (WB + IMF)	anecdotal case report	various	mixed
Cornia et al	1987	academic	1980s+	less developed countries	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Cruickshank	2000	civil society	1991-1998	Nicaragua	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Curtis	1998	academic	1990s	Nicaragua	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Dejong	1995	civil society	1985-1991	Jordan	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Ekouevi/ Adepoju	1995	unclear	1980s	African countries	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Gupta	2010	IMF	not clear	no clear definition	Discursive	IMF agreements	anecdotal case report	various	neutral
Gupta	2015	IMF	not clear	Sierra Leone, Guinea, Liberia (Ebola countries)	Discursive	IMF agreements	anecdotal case report	various	positive
Homedes/ Ugalde	2005	academic	1980s	Latin America; case study of Colombia and Chile	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Hopkins	2006	academic	1970-2000	Malaysia, Thailand and Indonesia	Discursive	IMF agreement	anecdotal case report	various	negative
Hossen/ Westhues	2012	academic	1980-2010	Bangladesh	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Ismail	2013	academic	1980-2003	Egypt and Tunisia	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Ismi	2004	civil society	not clear	Sub-Saharan Africa; case study of Zimbabwe, Ghana, Cote d'Ivoire	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Kanji et al	1991	academic	1980s	Sub-Saharan Africa	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Kentikelenis et al	2015a	academic	2004-2013	Sierra Leone, Guinea, Liberia (Ebola countries)	Discursive	IMF agreements	anecdotal case report	various	negative

Author	Year	Affiliation	Years Covered	Countries	Study Type	Agreement	Method	Dependent Variable	Results Indicator
Loewenson	1993	civil society	1980s+	African countries	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Logie/ Woodroofe	1993	civil society	1980s, 1990s	Zambia, Senegal, Zimbabwe	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Lugalla	1995	academic	1980s	Tanzania	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Tumwine	1992	academic	1980s+	Zimbabwe	Discursive	SAP (WB + IMF)	anecdotal case report	various	negative
Benson	2001	academic	1995-1993	Tanzania	Empirical	SAP (WB + IMF)	descriptive analysis of clinic distribution	equity of access	neutral
Clements et al	2013	IMF	1985-2009	140 Low-and-middle-income countries	Empirical	IMF agreements	multivariate panel data regression with selection model	public health expenditure	mixed
Goldsbrough et al	2007	civil society	1998-2005	78 PRGT countries	Empirical	IMF agreements	descriptive statistics	public health expenditure	mixed
Gupta et al	1998	IMF	1986-1996	66 countries with IMF agreements	Empirical	IMF agreements	descriptive statistics	public health expenditure	positive
Gupta et al	2000	IMF	1985-1997	65 developing countries	Empirical	IMF agreements	descriptive statistics	public health expenditure	positive
Gupta et al	2002	IMF	1999-2001	25 PRGT countries	Empirical	IMF agreements	descriptive statistics	public health expenditure	positive
Hajro/Joyce	2009	academic	1985-2000	82 developing countries	Empirical	IMF agreements	multivariate panel data regression	infant mortality rates	neutral
Handa/King	2003	IFI	1989-1996	Jamaica	Empirical	SAP (WB + IMF)	multivariate panel data regression	preschool children's weight for height or wasting.	negative

Author	Year	Affiliation	Years Covered	Countries	Study Type	Agreement	Method	Dependent Variable	Results Indicator
Hoddie/Hartzell	2014	academic	1995-1998	100 low- and middle-income-countries	Empirical	IMF agreements	multivariate panel data regression with selection model	Public health performance in DALYs	negative
Kentikelenis et al	2015b	academic	1985-2009	63 low-income countries	Empirical	IMF agreements	multivariate panel data regression with selection model	public health expenditure	mixed
Martin/Segura-Ubierno	2004	IMF	1985-2000	146 countries	Empirical	IMF agreements	multivariate panel data regression with selection model	public health expenditure	positive
Maynard et al	2012	academic	1990-2005	74 countries	Empirical	IMF agreements	multivariate panel data regression	TB prevalence	negative
Nooruddin/Simmons	2006	academic	1980-2000	73 countries	Empirical	IMF agreements	multivariate panel data regression with selection model	public health expenditure	negative
Oliver	2006	academic	1980-2000	Uruguay and Argentina	Empirical	IMF agreements	case study with descriptive statistics	Infant under 5 Mortality Rate	mixed
Pandolfelli et al	2014	academic	1990-2005	37 African countries	Empirical	IMF agreements	multivariate panel data regression with selection model	maternal mortality	negative
Stuckler et al	2008	academic	1991-2003	21 post-communist countries	Empirical	IMF agreements	multivariate panel data regression with selection model	TB mortality	negative
Stuckler et al	2011	academic	1995-2006	119 aid recipient countries	Empirical	IMF agreements	multivariate panel data regression	public health expenditure	negative

Part II

Setting up the Study

3

Identifying Determinants of Government Health Expenditure

This study aims to estimate the effect of IMF agreements on country level government health expenditure. As government health expenditure can change due to factors other than the agreements themselves, these factors need to be controlled for in order to reliably attribute changes to agreements³⁶. To do so, determinants of government health expenditure need to be known. Gerdtham and Jönsson (2000) in relation to high-income countries and Xu et al (2011) in relation to low- and middle-income countries suggest that the macroeconomic theory of such determinants of government health expenditure is rather weak. This means that no agreed set of variables is readily available to be used for this study and no recent and comprehensive review identifying such determinants exists in the literature³⁷. While the main literature presented in chapter 2 included studies assessing the relationship between agreements

³⁶ See chapter 5 for a more detailed explanation.

³⁷ Xu et al (2011) could be seen as such a paper, it does however not appear to be a review conducted in a systematic way and the research strategy is not accessible.

and health expenditure, drawing on a number of these determinants, a wider body of literature exists that employs determinants to model government health expenditure. This chapter aims to identify relevant determinants of government health expenditure in low- and middle-income countries in a systematic way, which will be used as controls in this study. To do so, a literature review underpinned by a systematic search process³⁸ of studies quantitatively modelling government health expenditure is conducted. This chapter is structured into three parts. The first section outlines the methodology developed to identify the literature in a systematic way. The second section presents the determinants of government health expenditure identified through the literature review process. The third section offers a summary of the chapter drawing out the determinants of government health expenditure most commonly used in the empirical literature.

3.1 Search Methodology

This section outlines the search methodology developed to obtain the relevant literature in a systematic way³⁹. It starts by outlining the literature sources searched to obtain the relevant studies, then presents the search terms used to identify studies for the review. The third part of this section describes the inclusion and exclusion criteria applied to the search. The fourth part gives an overview of the search process. The final part acknowledges limitations of the review.

3.1.1 Literature Sources

The search aimed to include peer-reviewed articles as well as grey literature. It was obtained from a number of sources including bibliographic databases, internet search engines, references listed in the reviewed studies as well as the main literature review presented in chapter 2. The search of bibliographic databases was limited to the

³⁸ Similar to the review conducted in chapter 2, this review is also not a systematic review in the strictest sense. This is for the reasons outlined in more detail in footnote 21 (pg. 30) and the fact that this review additionally includes studies previously identified (chapter 2) to further enrich and complete the literature.

³⁹ This methodology is very similar to that presented in chapter 2, however, individual elements have been adjusted for the review in this chapter and the exact methodology is therefore described here.

largest and most relevant databases for social sciences, economics and health care and included the Web of Knowledge, Scopus and PubMed. Additionally, Google Scholar, the academic branch of the internet search engine “Google” was reviewed. Since the main literature review in chapter 2 also identified a number of articles that are relevant to this search, literature from that search was additionally included into the review process. After obtaining literature through the two main pathways, reverse searches were conducted by searching reference lists of previously identified literature. All sources were searched using the following search terms.

3.1.2 Search Terms

To identify the correct search terms for this review process, blocks were built and populated with suitable terms. Key words were selected around the four blocks of expenditure, public, determinants and low- and middle-income countries. See Table 3.1 for the individual key words.

Expenditure	Public	Determinant	L&MIC
Health spending*	Public	Determinant*	Low?income
Health expenditure*	government	Factor*	Middle?income
Health care expenditure*		Variable*	Low?and?middle income
Health care spending*			LIC
			MIC
			LMIC

Table 3.1: Building Blocks and Keywords for Literature Search for Determinants of Government Health Expenditure

Search terms were used in various search fields, including title, abstract, topic and key words as well as Mesh terms, where available, and combined using logic operators. Terms within each block were combined using the “OR” operator, all blocks were linked together using the “AND” operator. For each of the databases the combinations of blocks and individual key words was altered to identify the best combination of keywords and blocks to obtain the most promising set of results. It appeared that terms from the low- and middle-income countries block were not leading to the right literature so that it was excluded from the searches. It was generally difficult to identify the exact study type because keywords like “determinants” and the income grouping were rarely indexed. The search strategy was therefore to identify studies on health expenditure and exclude studies not relevant for this search, for

instance those on OECD countries, or Europe and also those that refer to catastrophic health expenditure⁴⁰. The latter was a common find, unless explicitly excluded. For the Google Scholar search, a broad search with only few key words generated the best results. Appendix Note 3.1 (pg. 97), shows the combinations of key words used for searching each of the databases.

3.1.3 Inclusion and Exclusion Criteria

To select studies from the obtained literature for inclusion in the review, studies were screened to meet a number of inclusion and exclusion criteria. Literature was included in the review when the study included countries of low- or middle-income⁴¹, either as a single country or a group of countries. Studies of countries of high-income or studies that reported results on both high and lower-income countries without distinguishing the results between income groups were excluded. Studies were included when they reported results for a set of determinants of government health spending. This has two elements. Firstly, studies were included when they identified or described a set of determinants of *health* spending, and excluded when they reported on other components of government spending. Secondly, studies were included when they reported these determinants in relation to *government* spending and excluded when they reported on private or total⁴² spending. Studies were also excluded when the article did not make clear whether the results related to government spending. When studies reported on determinants of government spending, they were only included when they reported on spending on general rather than on a certain sub-category of health spending. This means that, for instance, studies reporting on spending for HIV/AIDS were excluded from the review. Studies were also excluded when they were not written in the English or German language or the full-text of the article was not available through the University of Edinburgh's or the National Library of Scotland's library services, either in electronic or hard-copy form. Finally, studies

⁴⁰ Catastrophic health expenditure describes costs incurred from health care services that reach catastrophic proportions of a household's available income and push households into poverty (Xu et al, 2003).

⁴¹ A country was defined as low- or middle-income country following the definition of income groups as in section 5.3 (pg. 184).

⁴² Total spending is defined as the sum of public and private spending.

were excluded, when they were book reviews, editorials or general opinion pieces. Figure 3.1, below, shows the flowchart of the process of study inclusion and exclusion.

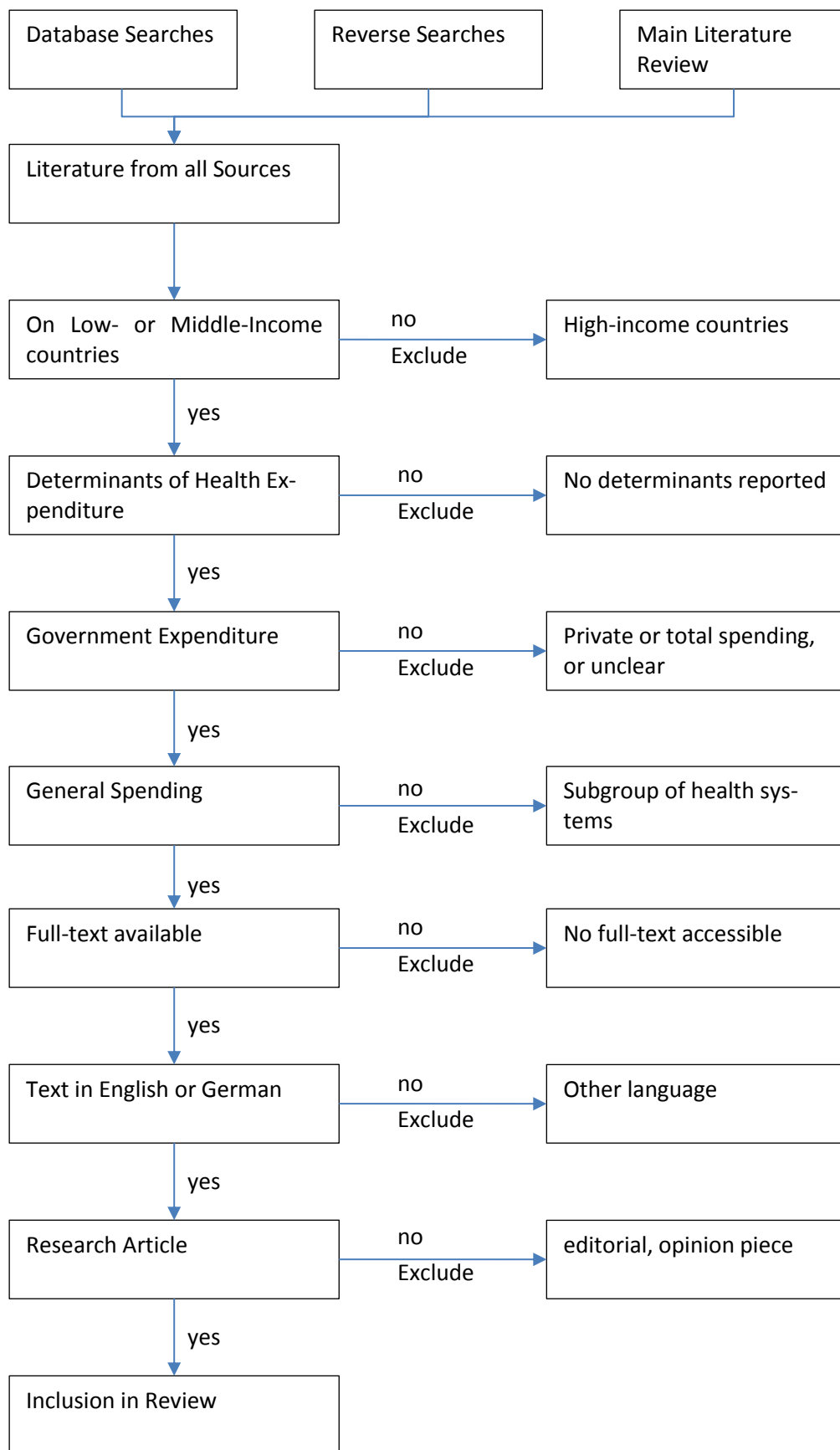


Figure 3.1: Flowchart of Process to include Literature

3.1.4 Search Process

The search was conducted in October 2015. Having searched all selected databases, reverse searches and included studies from the main literature review a total of 1710 studies, including duplicates, was obtained. The selected literature has then been reviewed in more detail through three screening stages (Figure 3.2).

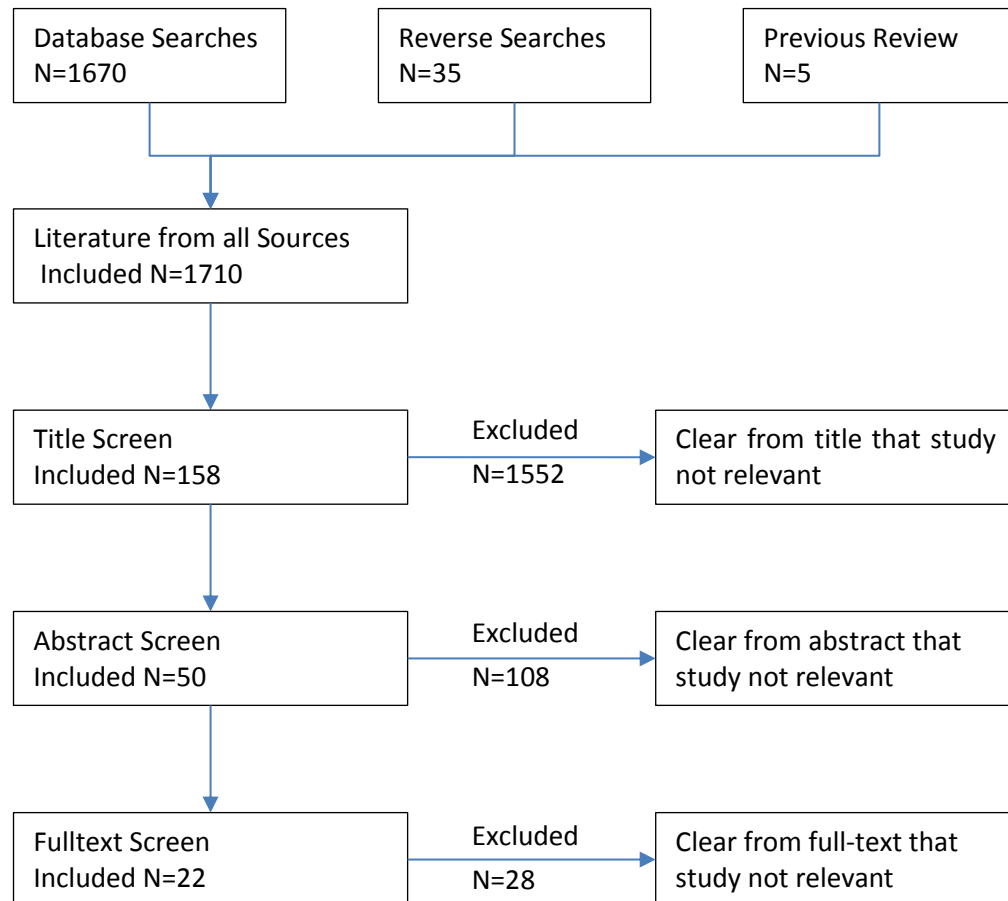


Figure 3.2: Flowchart of Screening Process

The first stage excluded studies when it was immediately apparent from the title that the article was irrelevant. At this stage the number of studies was reduced to 158. The remaining studies were included or excluded based on the abstract. Where the abstract did not allow to clearly include or exclude an article, the full-text was skim-read to make a decision. At this stage it was often difficult to include or exclude studies based on reporting government, rather than total or private, health expenditure. When in doubt studies were included in the full-text screening. This reduced the number of articles to 50. Full-texts of these articles were obtained and read to make a

final decision about the study’s inclusion into the review (See Appendix Note 3.2 (pg. 98) for the list of studies obtained in full-text).

Databases	Articles included at stages			
	Initial Results	Title Screen	Abstract Screen	Full-text Screen ⁴³
Web of Knowledge	794	34	11	
Scopus	148	5	3	
PubMed	561	57	13	
Google Scholar	167 ⁴⁴	35	7	
All Databases	1670	131	34	
Reverse Search	35	22	11	
Literature from Main Literature Review	5 ⁴⁵	5	5	
All Sources	1710	158	50	
All Literature, duplicates removed				22

Table 3.2: Search Results by Database and Screening Stage, for Determinants of Government Health Expenditure.

As outlined, the literature search was supplemented by a reverse search of reference lists from the selected articles as well as those articles obtained from the main literature review. This process largely confirmed that most studies had already been identified through the main search process, however, a small number of additional studies was identified. After final exclusions and removal of duplicates, a total of 22 studies was included (See Table 3.2).

3.1.5 Limitations of this Literature Review

The search strategy for this literature review was designed carefully. Nevertheless, some limitations need to be acknowledged. These and their mitigation are similar to those spelled out in more detail in section 2.1.5 (pg. 36) and range around the use of only the largest databases, the reviewing process completed by only one researcher as well as limiting the languages to German and English.

⁴³ Individual database sources cannot be identified at this stage.

⁴⁴ Review of article titles was concluded when hits become irrelevant, this was mostly the case as other forms of expenditure became subject of the studies. The search was concluded after the first 500 articles.

⁴⁵ There are additional studies examining the impact of IMF agreements on health expenditure (see 2.2.2.1; pg. 42), due to their descriptive nature (see 2.2.2.1.1; pg. 44), these studies are not included here as they do not provide information on determinants of health expenditure.

3.2 Determinants of Government Health Expenditure used in the Literature

The review process identified 22 studies that discuss or use determinants of government health expenditure in low- and middle-income countries. They do so in a number of settings and with different methods. This section outlines some of the key aspects of the studies in terms of country selection and approach to the subject. Each of the determinants of government health expenditure are presented in the following sections.

The studies identified through the literature review are both cross-country as well as single country studies. Most of the literature can be classified as cross-country studies, including up to 200 countries (Schieber and Maeda, 1999). Three studies are designed as single-country studies and look at China (Pan and Liu, 2012), India (Rahman, 2008) and Turkey (Kiymaz et al, 2006). While all studies on the IMF and health expenditure are time-series cross section studies observing a number of countries over time, the wider literature uses a number of data settings, using time series, cross-section (Murthy and Okunade, 2009) or time-series-cross-section data. The studies cover a number of years and different durations between 1985-2010.

Government health expenditure is measured in a number of ways, including spending per capita, percentage of GDP or percentage of government spending. Most studies rely on government health expenditure as a total, while the study by Liang and Mirelman (2014) employs sub-analysis of total and domestic expenditure and Lu et al (2010) rely on domestic expenditure exclusively. When studies examine domestic government expenditure this measures the amount of spending from government excluding funds from external organisations. While the wider literature on determinants of health expenditure uses a small number of ways to measure spending, the set of studies directly relating to the IMF generally uses more than one measure⁴⁶ of health expenditure as outcome, with the percentage of GDP and government

⁴⁶ An exception within the IMF and health expenditure literature is the study by Stuckler et al (2011), examining only per capita spending.

spending the most commonly used indicators. Table 3.3 outlines key information on each of the studies.

Across all studies a number of different determinants of government health expenditure are used. These can be grouped thematically into a smaller number of concepts. The following sections discuss the variables used in the studies in more detail and is structured to present the variables along concept group. Each section is organised to first outline the variables used to operationalise each of the categories, then present the findings for the indicator controlling for all other variables in the models before discussing the theory underlying the inclusion of the determinant. Table 3.4 gives an overview of the determinants employed in each of the studies, listing for each of the determinants the algebraic directions when controlling for all other variables in the model: + indicates that the study reports a statistically significant⁴⁷ positive relationship between the determinant and health expenditure as outcome variable. – indicates a statistically significant negative relationship. 0 indicates that no significant relationship was found and ~ is used when the results are mixed. When the study reports several results across a number of models, the directions are based on the results of the authors' main model.

⁴⁷ Statistical significance is asserted at the conventional 5% level of significance.

Study	Countries	Years	Dependent Variable
Devarajan et al (1999)	18 African countries	1971-1995	Government health spending (per capita)
Dieleman/Hanlon (2014)	119 countries	1995-2010	Government health spending as source (share of GDP)
Fan/Savedoff (2014)	126 countries	1995-2009	Government health spending (per capita) Out-of-Pocket (OOP) per capita (share of THE)
Farag et al (2009)	144 L&MIC	1995-2006	Government health spending (per capita)
Gbesemte/Gerdtham (1992)	30 countries	1984	Government health spending (per capita)
Jaunky/Khadaroo (2006)	28 African countries	1991-2000	Government health spending per capita
Kiyamaz et al (2006)	Turkey	1984–1998	Private, government and total health expenditure (per capita and share of GDP)
Liang/Mirelman (2014)	120 low-, middle- and high-income countries	1995-2010	Total government health spending (per capita) Domestic government health expenditure (per capita)
Lu et al (2010)	Developing countries	1995-2006	Government health spending as share of GDP (from source)
Murthy/Okunade (2009)	44 African Countries	2001	Government health spending (per capita)
Musgrove et al (2002)	191 countries	1997	Government health spending (per capita)
Nandakumar/Farag (2008)			
Pan/Liu (2012)	China (by province)	2002-2006	Government health spending (per capita)
Rahman (2008)	India (14 states)	1971-1991	Government health spending (per capita)
Reeves et al (2015)	89 LMIC	1995-2011	Government health spending (per capita)
Schieber/Maeda (1999)	200 countries	1994	Government health spending (share of total health spending)
Xu et al (2011)	143 countries (LIC, MIC, HIC)	1995-2008	Government health spending from domestic sources; Total health expenditure; OOP expenditure
Clements et al (2013)	140 developing countries	1985-2009	Health spending (share of GDP) Health spending (share of total government spending)
Kentikelenis et al (2015)	63 Low income countries	1985-2009	Health spending (share of GDP) Health spending (share of total government spending)
Martin/Segura-Ubiergo (2004)	146 countries	1985-2000	Health spending (share of GDP) Health spending (share of total government spending) Health spending (per capita)
Nooruddin/Simmons (2006)	92 countries	1990-2000	Health spending (share of total spending)
Stuckler et al (2011)	119 aid recipient countries	1995-2006	Health spending (per capita)

Table 3.3: Overview of Studies on Health Expenditure Determinants

Study	National Income		Fiscal Space		Population Structure		Development Assistance		Disease Burden		Human Development		Supply of Health Care		Health Care System		Other Determinants																				
	GDP/GNP	economic growth	Government expenditure	Government revenue	Government Balance	Debt	Debt Relief	Population size	Population growth	Age Structure of Population	Urban Population	Female Population	DAH to government	DAH to non-government	Overseas Development Aid	HIV	TB	other infectious diseases	Literacy Rate	Birth Rate	Maternal Mortality	Education Levels	Infant Mortality	Health Care Workers	Health Facilities	Health Technology &	Other health expenditure	Organisation of Health Care	Trade	Exchange Rate	Inflation	Democracy	Structure of Economy	Socio-political Structure	Budget Transfers		
Devarajan et al (1999)	+																																				
Dieleman/Hanlon (2014)	0	+	+				0						+										0														
Fan/Savedoff (2014)	+		+					+																													
Farag et al (2009)	+								+																												
Gbesemte/Gerdtham (1992)	+							0	0				+						0				+														
Jaunky/Khadaroo (2006)	+																																				
Kiyamaz et al (2006)	+						+																														
Liang/Mirelman (2014)	+				+		0				+																										
Lu et al (2010)	0		+			0						+		0																							
Murthy/Okunade (2009)	+							0					+							0			0														
Musgrove et al (2002)	+							0					+								0																
Nandakumar/Farag (2008)	+							+															+														
Pan/Liu (2012)			+				?	-	0		0									0			0	0													
Rahman (2008)	+						0		0										+		0		0	0													+

Study	National Income		Fiscal Space		Population Structure		Development Assistance	Disease Burden	Human Development	Supply of Health Care	Health Care System	Other Determinants																									
	GDP/GNP	economic growth	Government expenditure	Government revenue	Government Balance	Debt	Debt Relief	Population size	Population growth	Age Structure of Population	Urban Population	Female Population	DAH to government	DAH to non-government	Overseas Development Aid	HIV	TB	other infectious diseases	Literacy Rate	Birth Rate	Maternal Mortality	Education Levels	Infant Mortality	Health Care Workers	Health Facilities	Health Technology &	Other health expenditure	Organisation of Health Care	Trade	Exchange Rate	Inflation	Democracy	Structure of Economy	Socio-political Structure	Budget Transfers		
Reeves et al (2015)	+		+																																		
Schieber/Maeda (1999)	+																																				
Xu et al (2011)	+		+					0					+			0											0	?									
Clements et al (2013)	?							?	0																			?									
Kentikelenis et al (2015)	0	?			?			0	0					?														?	0	0							
Martin/Sigura-Ubiergo (2004)	?	?						?																					+								
Nooruddin/Simmons (2006)	0	?						0																													
Stuckler et al (2011)	+											+																									

Table 3.4: Overview of Determinants of Government Health Expenditure

3.2.1 National Income

Variables measuring national income of a country are the most commonly used determinants across the included studies. The indicator is typically operationalised to measure Gross Domestic Product (GDP) per capita, only Gbesemete and Gerdtham (1992) use Gross National Product (GNP) per capita. The study by Dieleman and Hanlon (2014) and most studies on the IMF and health expenditure additionally measure economic development as growth of GDP.

Most studies (Devarajan et al, 1999; Fan and Savedoff, 2014; Farag et al, 2009; Gbesemete and Gerdtham, 1992; Jaunky and Khadaroo, 2006; Kiymaz et al, 2006; Liang and Mirelman, 2014; Murthy and Okunade, 2009; Musgrove et al, 2002; Nandakumar and Farag, 2008; Rahman, 2008; Reeves et al, 2015; Schieber and Maeda, 1999; Stuckler et al, 2011; Xu et al, 2011) find a positive relationship between GDP/GNP and their measure of government health expenditure. Lu et al (2010) find no statistically significant relationship between national income and health expenditure. Clements et al (2013) find mixed results of the relationship between GDP and health expenditure. Dieleman and Hanlon (2014), including both GDP and its growth as determinants in their study, show that levels of GDP do not impact on health expenditure but that growth of GDP is positively correlated with health expenditure. Nooruddin and Simmons (2006) and Kentikelenis et al (2015b) find no relationship between GDP and health expenditure but mixed results for the association with growth.

Within the literature on government health expenditure in low- and middle-income countries similar to the wider literature there seems to be agreement that national income is an important determinant of levels of health expenditure (Fan and Savedoff, 2014; Liang and Mirelman, 2014). This research follows on from the seminal work by Newhouse (1977), who showed that national income is one of the main determinants of health expenditure. “It is well known that a strong relationship exists between national expenditures on health care and national income” (Parkin et al, 1987).

Smith and Hanson (2012) argue that a country’s economic development affects government income and hence the ability to finance and provide public services,

including those for health. Along similar lines, the so-called “Wagner’s Law” states that there is a causal relationship between national income and public expenditure, including health expenditure (Wagner, 1994), in the way that increases in national income are associated with increases in public expenditure. This means that increases in GDP will lead to increases in public (health) spending. On a similar note, Martin and Segura-Ubiergo (2004) argue that growth of national income is expected to be positively associated with health expenditure as this suggests that there are more resources available, which the government can allocate to health. Musgrove et al (2002) conclude that there is a positive relationship between GDP and health expenditure both in total as well as in terms of the public share of health spending. While Nandakumar and Farag (2008), point out that research on the association between health expenditure and national income in low- and middle-income countries is limited and the relationship between both variables not as clear. The literature reviewed here seems to suggest a generally positive relationship between national income and government health expenditure.

3.2.2 Fiscal Space

A number of studies use determinants of government health expenditure that can be grouped as indicators of fiscal space. Heller (2006) defines fiscal space as the “capacity of government to provide additional budgetary resources for a desired purpose without any prejudice to the sustainability of its financial position.” He suggests that fiscal space can be influenced by variation in government expenditure, revenue or borrowing (Powell-Jackson et al, 2012). The studies by Dieleman and Hanlon (2014); Fan and Savedoff (2014); Lu et al (2010); Xu et al (2011) operationalise the concept of fiscal space using government expenditure measured as share of GDP. The study by Pan and Liu (2012) operationalises the concept using an indicator of government revenue per capita. Reeves et al (2015) measure government revenue from different types of taxes (income tax and goods and services tax). Liang and Mirelman (2014) use an indicator of government gross debt per capita and Lu et al (2010) use debt relieve as share of GDP to operationalise the concept of fiscal

space⁴⁸. Within the IMF and health literature, the studies by Clements et al (2013) and Kentikelenis et al (2015b) are the only two considering fiscal space as a determinant of health expenditure levels by using government balance in their models.

The findings in the reviewed studies suggest that there is a positive association between increases in government expenditure as well as government revenue and levels of government health expenditure. Lu et al (2010) find no association between debt relief and health expenditure while Liang and Mirelman (2014) find that when controlling for all other determinants of health expenditure there is a positive association between debt levels and government health expenditure. Clements et al (2013) and Kentikelenis et al (2015b) find mixed results depending on country selection and measure of health expenditure.

The underlying assumptions for including these indicators of fiscal space as determinant of health expenditure is that health systems and health spending can be seen as priority within public spending, for which money will be made available when the government coffers allow to do so.

3.2.3 Population Structure

The structure of a country's population is another factor that is commonly used as determinant of government health expenditure in the reviewed studies and is operationalised in a number of ways but most commonly the age structure of the population is seen to be an important indicator.

Studies employing an indicator of the population's age structure operationalise this most commonly by measuring the share of the population that is older than 60 years (Fan and Savedoff, 2014; Rahman, 2008; Xu et al, 2011) or 65 years (Clements et al, 2013; Liang and Mirelman, 2014; Martin and Segura-Ubiergo, 2004; Murthy and Okunade, 2009; Nooruddin and Simmons, 2006; Pan and Liu, 2012). Alternative approaches are followed by Pan and Liu (2012), Gbesemete and Gerdtham (1992), Martin and Segura-Ubiergo (2004) and Nooruddin and Simmons (2006), who measure the share of people no older than 15 years. Kentikelenis et al (2015b) measures the

⁴⁸ Debt is considered within the realm of fiscal space as Heller (2006) suggests increased borrowing as one way to increase fiscal space.

dependency ratio, that is share of those over 65 and those under 14 compared to the rest of the population.

Different ways of operationalising population structure can be seen in the studies by Pan and Liu (2012), Gbesemete and Gerdtham (1992), Clements et al (2013) and Kentikelenis et al (2015b), that use the share of the population living in urban areas as indicator of the population structure. Pan and Liu (2012) additionally control for the share of females in the population. Dieleman and Hanlon (2014) use an indicator of the total size of the population and Kiyamaz et al (2006) use annual population growth as variable.

Indicators of the population age structures are included as determinants of health expenditure because it is believed that the demand for health care depends on the age of the individual. This means that the bulk of demand for health care, and therefore of costs from health care, is seen to be compounded among the very young and the old people. While there is considerable debate of the effects of aging on health expenditure within the literature on high-income countries (Garibaldi et al, 2010; Gray, 2005; Zweifel et al, 1999), the evidence from this reviewed literature on low- and middle-income countries seems to suggest that an increase in the share of the older population is generally not associated with increases in health expenditure, as only Fan and Savedoff (2014) find a positive relationship between both variables. Similarly, Gbesemete and Gerdtham (1992) find no relationship between the share of younger people and health expenditure. Pan and Liu (2012) find a positive relationship between young age and health expenditure when controlling for old age and other variables. Kentikelenis et al (2015b) and Nooruddin and Simmons (2006) find no relationship of health expenditure with the dependency ratio, while the remaining studies on the IMF and health expenditure report mixed findings.

Urban population is assumed to be an important determinant of health expenditure as it is assumed that the process of urbanisation is associated with an increase in overcrowded areas with inadequate sanitation facilities (Toor and Butt, 2005). Increases in population size can be seen to be associated with increases in health care spending as a larger number of people demanding health care is increasing overall health spending. Results suggest that there is no relationship between urbanisation and

health expenditure, only the study by Pan and Liu (2012) find that health expenditure decreases as urbanisation increases.

3.2.4 Development Assistance

Several studies (Dieleman and Hanlon, 2014; Farag et al, 2009; Gbesemete and Gerdtham, 1992; Liang and Mirelman, 2014; Lu et al, 2010; Murthy and Okunade, 2009; Stuckler et al, 2011; Xu et al, 2011) use a measure of development assistance as determinant of health expenditure. Studies either measure development assistance to health as share of GDP (Dieleman and Hanlon, 2014; Lu et al, 2010) or per capita (Farag et al, 2009; Gbesemete and Gerdtham, 1992; Liang and Mirelman, 2014; Murthy and Okunade, 2009; Stuckler et al, 2011; Xu et al, 2011). While studies generally do not make a distinction between the recipients of development assistance, Dieleman and Hanlon (2014) and Lu et al (2010) distinguish between the government and non-government organisations as recipients of development assistance. Kentikelenis et al (2015b) is the only study that employs a measure of general overseas development assistance, rather than development assistance to health.

The underlying idea of including development assistance as determinants is that inflow of development assistance provides additional resources to the government, increasing overall levels of health expenditure. The effect of external funds on health expenditure levels has attracted considerable attention as these additional funds might reduce government spending on health (Xu et al, 2011). The picture that emerges from the studies reviewed here suggests that increases in development assistance are generally associated with increases in health expenditure (Stuckler et al, 2011). Dieleman and Hanlon (2014) and Lu et al (2010) find that health spending decreases when assistance is made to government, but increases when it is made to non-government organisations. Farag et al (2009), not controlling for other determinants, find that development assistance increases spending.

3.2.5 Disease Burden

Another factor is the epidemiology or the disease burden present in a given country. A number of studies operationalise disease burden in different ways. Lu et al (2010) employ a measure of the HIV prevalence rate. Xu et al (2011) use the incidence

for tuberculosis per 100000 people as tracer of disease prevalence. Pan and Liu (2012) measure disease patterns along different dimensions including the reported morbidity and mortality from infectious diseases as well as the SARS outbreak in China in 2003. The study by Xu et al (2011) argue that disease patterns have a direct link to the amount and also the types of health care that are needed and demanded. This can be found for both communicable and non-communicable diseases. While that latter are more present in high-income countries, infectious diseases, such as HIV/AIDS, tuberculosis or malaria, should be considered a main issue in countries of lower income (Omran, 2005). This will in turn, so for instance outlined in Nandakumar and Farag (2008), increase health spending as the government will aim to provide more resources to deal with the increased demand and need in order to combat a certain disease. Evidence is rather mixed as studies looking at Tuberculosis (TB) (Xu et al, 2011), HIV/AIDS (Lu et al, 2010) or infectious diseases in general (Pan and Liu, 2012), do not find a statistically significant association with government health expenditure. Only the SARS outbreak (Pan and Liu, 2012) was found to have a significant positive association with health expenditure.

3.2.6 Human Development

Human development, defined as the “process of enlarging people’s choices” by the United Nations Development Programme (1990), captures factors that are critical to lead long and healthy lives, opportunities to be educated and to enjoy decent standards of living. This broad concept of human development has been operationalised in a number of ways in different studies. Two studies use indicators of education: Rahman (2008) operationalise this as literacy rate, arguing the rate is a structural indicator of demand for health care. Pan and Liu (2012) measure the proportion of the population with college or higher education degrees arguing that education levels can be seen as indicator of socioeconomic status which in turn is associated with disease burdens and demand for health care.

Gbesemete and Gerdtham (1992) use the indicator of crude birth rate – measuring the number of live births occurring per year – as it is believed that an increase in the population due to births will increase the costs of maintaining a given level of health.

The study by Murthy and Okunade (2009) employs maternal mortality, measuring the number of women dying during pregnancy, which is seen as an indicator of access to adequate sanitation, hygiene information and health care facilities. Devarajan et al (1999), use infant mortality, a related measure, capturing the number of deaths of children under the age of one, while affected by a number of factors beyond the health care system, it can be seen as an indicator of access to health care facilities.

The studies indicate that while higher education levels do not seem to be significantly associated with health expenditure, higher rates of literacy increase spending on health. Crude birth rate, maternal mortality and infant mortality are not found to be significantly associated with health expenditure levels.

3.2.7 Supply of Health Care

A number of studies uses determinants of government health expenditure that can be summarised in the category of supply of health care. Nandakumar and Farag (2008) argue that health care providers induce demand for health care in the way that they are critical in deciding on the type or duration of treatment that will be provided to patients. Higher numbers of care providers might therefore be associated with more health care provision, which in turn is associated with higher levels of health expenditure. This does not imply causation. Increases in the number of health care providers might address unmet needs. This means that the additional health care provider can now provide services to patients that have previously been under-served due to the absence of care providers.

The studies by Murthy and Okunade (2009), Pan and Liu (2012) and Rahman (2008) operationalise the concept of supply of health care using the numbers of doctors or health care professionals available to a certain population. Gbesemete and Gerdtham (1992) use the indicator of percentage of birth attended by health care workers as indicator of supply of health care. Pan and Liu (2012) and Rahman (2008) additionally control for health care facilities by measuring the number of hospital beds per 1000 population and the number of people per primary care centre.

Nandakumar and Farag (2008), tapping into a large literature, mostly on high-income countries, argue that the health technologies and pharmaceuticals present and

used in a country's health care system have a positive impact on health expenditure, because health technologies and patented pharmaceuticals are expensive to develop and these costs are represented in the price charged to obtain technology and pharmaceuticals.

The studies find that only the percentage of births attended by health care workers is statistically significantly associated with increasing health expenditure levels, all other indicators of supply of care do not seem to be associated with government health spending.

3.2.8 Organisation of the Health Care System

Researchers argue that the way a health care system is organised can affect the level of health expenditure in a given country (Blank and Burau, 2014). A small number of studies operationalise this concept in different ways.

The studies by Pan and Liu (2012) and Nandakumar and Farag (2008) draw on the concept of level of coverage. Nandakumar and Farag (2008) argue that higher levels of coverage provided from public funds are related to higher levels of public funding. Pan and Liu (2012) measure the share of urban employees that are covered by basic health insurance. Related to this is the approach by Xu et al (2011), who measure spending outside the realm of public funding and argue that there might be substitution effects between different types of health expenditure, such as between government health expenditure and out-of-pocket expenditure. This is to suggest that an increase in government health expenditure is seen to be associated with a decrease in out-of-pocket expenditure.

Xu et al (2011) and Nandakumar and Farag (2008) argue that the way the health system is financed and governed impacts on health spending. Particularly, Xu et al (2011) argue that the way health care resources are collected – through a social-insurance, tax based or mixed system – impacts the level of government health expenditure.

While Nandakumar and Farag (2008) argue that increases in coverage are associated with increases in spending, Pan and Liu (2012) find that increases in breadth of coverage are associated with decreases in spending. Xu et al (2011) find no relationship between changes in Out-of-Pocket Payments (OOP) and government

health spending. The authors find mixed effects of revenue collection methods on health expenditure.

3.2.9 Other Determinants

A small number of studies use a set of determinants that cannot be classified in other categories and are discussed here.

Liang and Mirelman (2014) argue that the size of the informal sector, measured as the economic output of agricultural compared to non-agricultural sector, is an important determinant of health expenditure. This study also has a particular focus on the importance of socio-political risks, measured as government stability, corruption levels, democratic accountability and ethnic tensions, as determinant of health expenditure. The authors find that the size of the informal sector has a negative association with health expenditure, regarding socio-political risks, the authors find mixed relationships with levels of health spending. Pan and Liu (2012), examining health expenditure across Chinese provinces, use transfers from the central to provincial governments as one determinant of provisional health expenditure levels. The authors report a positive association between transfers from central government and provincial spending levels.

The studies by Clements et al (2013) and Kentikelenis et al (2015b) use trade openness, operationalised as the sum of exports and imports of goods and services measured as a share of gross domestic product, as additional determinant. The underlying argument is that globalization, as measured in trade openness, might restrain government spending through increased budgetary pressure. As a consequence, governments may attempt to curtail the welfare state (Dreher, 2006). The related efficiency hypothesis suggests that governments reduce public spending to maintain competitiveness of companies (Nooruddin and Simmons, 2006). Alternatively, it can be argued that openness is associated with increases in social spending aimed at protecting citizens from the increased economic insecurities.

The paper by Martin and Segura-Ubiergo (2004) includes currency devaluation as one of the determinants of health expenditure, does, however, not provide any specific justification for including this variable.

Kentikelenis et al (2015b) include an indicator of inflation into their models of health expenditure and argue that inflation levels might impact on social and health expenditure in the way that high levels of inflation put downward pressures on health spending. The results show that inflation is not statistically significantly related to levels of health expenditure.

Democracy, as operationalised in the Polity IV dataset on a 0-10 scale, is a determinant used by Kentikelenis et al (2015b), Martin and Segura-Ubierno (2004) and Nooruddin and Simmons (2006). The underlying argument is that democratic countries might be more committed to increasing or maintaining levels of health expenditure as they are more responsible to their citizens (Huber et al, 2008).

3.3 Summary of Determinants of Government Health Expenditure

Aim of this study is to assess the impact of IMF agreements on government health expenditure. Since agreements are not the only factor influencing levels of health spending, these other factors need to be controlled for in order to reliably establish a relationship between IMF agreements and health expenditure. Theory on determinants of government expenditure is weak and currently no comprehensive overview of determinants used in the empirical literature exists. This chapter therefore set out to identify these determinants of government health expenditure by reviewing the literature in a systematic way. A total of 22 studies were identified and their determinants of government health expenditure extracted. The following paragraphs summarise the key findings of this literature review and draw out the implications for this study.

While a great number of different variables have been employed as determinants of government health expenditure, these can broadly be classified in eight categories of national income, fiscal space, population structure, development assistance, disease burden, human development, supply of care, and the organisation of the health system. Additionally, a small number of variables have been employed by a minority of the studies that cannot be allocated to any of the other categories. These include variables measuring trade openness, exchange rates, inflation, indicators of democracy, the structure of the economy and the socio-political context and, in one case, the transfer from national to state-level governments.

Not all variables, however, are employed by all studies and the frequency with which they are employed varies. National income can be seen to be the most important determinant as it is used by all but two studies. Most studies find a positive relationship between income and health expenditure levels. The second most commonly used determinant is the population structure of the population, which, as outlined above, is most commonly measured as age structure (the share of the older and/or younger population compared to the entire population). The role of development assistance, either directly to health or to a country in general, is considered by a number of studies. Fiscal space is another commonly used category. This is an important variable as it is assumed that money will be allocated to the health system when it is available to the government.

Comparing the general literature of studies modelling health expenditure and studies on health expenditure and the IMF, reveals similarities but also differences between the determinants both bodies of literature employ. Similar to both sets of studies on health expenditure is the fact that national income and growth are along with the age structure of the population commonly used determinants of health expenditure. Beyond this, the IMF literature seems to rely on a smaller set of determinants. The IMF literature does not consider variables to capture variation in the disease burden, state of human development, supply of care or the organisation of the health care system. However, the IMF literature introduces various new variables, that are not considered by the wider literature. These include, trade openness, exchange rates, inflation, and indicators of democracy.

In the context of this study, the selection of determinants of government health expenditure will follow the frequency with which each of the concepts is used in the overall body of the literature. This suggests that the health expenditure should be modelled as a function of a country's national income, its fiscal space, the age structure as well as the supply of medical care.

This list does, despite frequent use of this concept not contain the variables around overseas development assistance. This is for two main reasons. Firstly, most studies, for instance Lu et al (2010) and also Stuckler et al (2011), include this indicator out of special interest in the influence of this variable on health expenditure. Stuckler

et al (2011), for example, are interested in modelling the impact of development assistance to health on health expenditure. This special interest does not reflect the overall importance of this variable as a determinant of government health expenditure. Secondly, this study is interested in estimating the effect of IMF agreements on government health expenditure. As will be outlined in more detail in chapter 5, the variable employed as dependent variable in this study captures both money coming from the government as source as well as aid money from international sources channelled through the government. Including an indicator of development assistance to health would change the interpretation of the results. In most low- and middle-income countries development assistance to health is an important part of government health expenditure.

Appendices to Chapter 3

Appendix Note 3.1: Search Term Combinations: Determinants of Health Expenditure

Web of Knowledge

Best results were obtained with the following combination

TI=("health expenditure" OR "Health care expenditure" OR "Government health expenditure" OR "Health Expenditures" OR "Health Expenditures") NOT TI=(Europe OR OECD) NOT TO=(Europe OR OECD) NOT TO=catastr NOT TI=catastr**

Scopus

Best results were obtained with the following combination

ALL ("health expenditure" OR "Health care expenditure" OR "Government health expenditure" OR "Health Expenditures" OR "Health Expenditures") not ALL(europe OR oecd) not ALL (catastroph)*

PubMed

Best results were obtained with the following combination

(((((((financing, public[MeSH Terms]) OR financing, government[MeSH Terms]) OR expenditure, health[MeSH Terms]) OR expenditures, health[MeSH Terms])) AND (((developing countries[MeSH Terms]) AND "economics"[MeSH Subheading]))) NOT (catastroph)*

Google Scholar

Best results were obtained with the following combination

determinants health expenditure

Appendix Note 3.2: List of Studies Obtained in Full-text

- Anyanwu, J. C. and Erhijakpor, A. E. O. (2009) 'Health Expenditures and Health Outcomes in Africa', *African Development Review-Revue Africaine De Developpement*, vol. 21, no. 2, pp. 400-433.
- Bendavid, E. and Batniji, R. (2012) 'Does Development Assistance for Health Really Displace Government Health Spending? Reassessing the Evidence', *PLoS Medicine*, vol. 9, no. 5, pp. e1001214.
- Bennett, K. J., Dismuke, C. E. and Pumkam, C. (2010) 'Personal and contextual factors that contribute to a higher out-of-pocket to total income ratio', *Rural Remote Health*, vol. 10, no. 4, pp. 1547.
- Bennett, K. J., Powell, M. P. and Probst, J. C. (2010) 'Relative financial burden of health care expenditures', *Social Work in Public Health*, vol. 25, no. 1, pp. 6-16.
- Berman, P. (1999) 'What can the U.S. learn from national health accounting elsewhere?', *Health Care Finance Review*, vol. 21, no. 2, pp. 47-63.
- Bokhari, F. A. S., Gai, Y. and Gottret, P. (2007) 'Government health expenditures and health outcomes', *Health Economics*, vol. 16, no. 3, pp. 257-273.
- Carrion-i-Silvestre, J. L. (2005) 'Health care expenditure and GDP: are they broken stationary?' *Journal of Health Economics*, vol. 24, no. 5, pp. 839-54.
- de Ferranti, D. (1984) 'Strategies for paying for health services in developing countries', *World Health Statistics Quarterly*, vol. 37, no. 4, pp. 428-50.
- Devarajan, S., Rajkumar, S. A and Swaroop, V., (1999) What Does Aid to Africa Finance? - Policy Research Working Papers, Washington: World Bank.
- Dieleman, J. L. and Hanlon, M. (2014) 'Measuring The Displacement and Replacement of Government Health Expenditure', *Health Economics*, vol. 23, no. 2, pp. 129-140.
- Elgar, F. J. and Aitken, N. (2011) 'Income inequality, trust and homicide in 33 countries', *European Journal of Public Health*, vol. 21, no. 2, pp. 241-6.
- Evlo, K. and Carrin, G. (1992) 'Finance for health care: part of a broad canvas', *World Health Forum*, vol. 13, no. 2-3, pp. 165-70.
- Fan, V. Y. and Savedoff, W. D. (2014) 'The health financing transition: A conceptual framework and empirical evidence', *Social Science and Medicine*, vol. 105, pp. 112-121.
- Farag, M., Nandakumar, A. K., Wallack, S. S. (2009) 'Does funding from donors displace government spending for health in developing countries?', *Health Aff (Millwood)*, vol. 28, no. 4, pp. 1045-55.
- Gbesemete, K. P. and Gerdtham, U.-G. (1992) 'Determinants of health care expenditure in Africa: A cross-sectional study', *World Development*, vol. 20, no. 2, pp. 303-308.
- Gericke, C. A. (2005) 'Comparison of health care financing in Egypt and Cuba: lessons for health reform in Egypt', *East Mediterranean Health Journal*, vol. 11, no. 5-6, pp. 1073-86.
- Gilson, A. M., Maurer, M. A., Lebaron, V. T. (2013) 'Multivariate analysis of countries' government and health-care system influences on opioid availability for cancer pain relief and palliative care: more than a function of human development', *Palliative Medicine*, vol. 27, no. 2, pp. 105-14.
- Gupta, S., Clements, B., Guin-Siu, M. T. (2002) 'Debt relief and public health spending in heavily indebted poor countries', *Bulletin of the World Health Organization*, vol. 80, no. 2, pp. 151-7.
- Haines, A. (2015) 'Development Assistance for Health: Potential Contribution to the Post-2015 Agenda', *JAMA*, vol. 313, no. 23, pp. 2328-30.
- Hansen, P. and King, A. (1996) 'The determinants of health care expenditure: a cointegration approach', *Journal of Health Economics*, vol. 15, no. 1, pp. 127-137.
- Hopkins, S. (2010) 'Health expenditure comparisons: Low, middle and high income countries', *The Open Health Services and Policy Journal*, vol. 3, no. 1, pp. 111-117.
- Howard, L. M. (1991) 'Public and private donor financing for health in developing countries', *Infectious Disease Clinics of North America*, vol. 5, no. 2, pp. 221-34.
- Jaunky, V. C. and Khadaroo, A. J. (2006) Health care expenditure and GDP: an African perspective. *iHEA 2007 6th World Congress: Explorations in Health Economics Paper*.

- Jerant, A., Fiscella, K. and Franks, P. (2012) 'Health characteristics associated with gaining and losing private and public health insurance: a national study', *Medical Care*, vol. 50, no. 2, pp. 145-51.
- Kiyamaz, H., Akbulut, Y. and Demir, A. (2006) 'Tests of stationarity and cointegration of health care expenditure and gross domestic product', *The European Journal of Health Economics*, vol. 7, no. 4, pp. 285-289.
- Kulindwa, Y. J. and Nerima, E. (2012) 'Empirical analysis of health care expenditure and Ugandan economic growth', *European Journal of Economics, Finance and Administrative Sciences*, no. 53, pp. 81-93.
- Liang, L. L. and Mirelman, A. J. (2014) 'Why do some countries spend more for health? An assessment of sociopolitical determinants and international aid for government health expenditures', *Social Science and Medicine*, vol. 114, pp. 161-8.
- Lu, C., Schneider, M. T., Gubbins, P. (2010) 'Public financing of health in developing countries: a cross-national systematic analysis', *Lancet*, vol. 375, no. 9723, pp. 1375-1387.
- Lv, Z. and Zhu, H. (2014) 'Health Care Expenditure and GDP in African Countries: Evidence from Semiparametric Estimation with Panel Data', *Scientific World Journal*, vol. 2014, no. 905747, pp. 1-6.
- Mach, E. P. (1978) 'The financing of health systems in developing countries: discussion paper', *Social Science and Medicine*, vol. 12, no. 1c-2c, pp. 7-11.
- Murthy, V. N. and Okunade, A. A. (2009) 'The core determinants of health expenditure in the African context: Some econometric evidence for policy', *Health Policy*, vol. 91, no. 1, pp. 57-62.
- Musgrove, P., Zeramdini, R. and Carrin, G. (2002) 'Basic patterns in national health expenditure', *Bulletin of the World Health Organization*, vol. 80, no. 2, pp. 134-146.
- Nandakumar, A. K. and Farag, M. (2008) 'Determinants of National Health Expenditure', in Carrin, G., Buse, K., Heggenhougen, K. (eds.) *Health systems policy, finance, and organization*, Oxford: Academic Press.
- Pan, J. and Liu, G. G. (2012) 'The Determinants of Chinese Provincial Government Health Expenditures: Evidence From 2002-2006 Data', *Health Economics*, vol. 21, no. 7, pp. 757-777.
- Rahman, T. (2008) 'Determinants of public health expenditure: some evidence from Indian states', *Applied Economics Letters*, vol. 15, no. 11, pp. 853-857.
- Reeves, A., Gourtsoyannis, Y., Basu, S. (2015) 'Financing universal health coverage-effects of alternative tax structures on public health systems: cross-national modelling in 89 low-income and middle-income countries', *Lancet*, vol. 386, no. 9990, pp. 274-280.
- Ruger, J. P. and Kim, H. J. (2006) 'Global health inequalities: an international comparison', *Journal of Epidemiology & Community Health*, vol. 60, no. 11, pp. 928-36.
- Saksena, P., Xu, K., Elovainio, R. (2012) 'Utilization and expenditure at public and private facilities in 39 low-income countries', *Tropical Medicine and International Health*, vol. 17, no. 1, pp. 23-35.
- Santo, A. C. and Tanaka, O. Y. (2011) '[Health care financing, expenditure and supply in great urban centers in the state of Sao Paulo (Brazil)]', *Cien Saude Colet*, vol. 16, no. 3, pp. 1875-85.
- Schieber, G. and Maeda, A. (1999) 'Health care financing and delivery in developing countries', *Health Aff (Millwood)*, vol. 18, no. 3, pp. 193-205.
- Starfield, B. and Shi, L. (2002) 'Policy relevant determinants of health: an international perspective', *Health Policy*, vol. 60, no. 3, pp. 201-18.
- Tang, C. F. and Ch'ng, K. S. (2011) 'The Granger causality between health expenditure and income in Southeast Asia economies', *African Journal of Business Management*, vol. 5, no. 16, pp. 6814-6824.
- Toor, I. A. and Butt, M. S. (2005) 'Determinants of Health Care Expenditure in Pakistan', *Pakistan Economic and Social Review*, pp. 133-150.
- Torgerson, D. J., Maynard, A. K. and Gosden, T. (1998) 'International comparisons of health-care expenditure: a dismal science?', *QJM-Monthly Journal of the Association of Physicians*, vol. 91, no. 2, pp. 69-70.

Xu, K., Saksena, P. and Holly, A. (2011) *The Determinants of Health Expenditure: A Country-Level Panel Data Analysis*, Geneva: WHO.

Appendix Note 3.3: Study details: Health Expenditure Determinants

#	Study	Countries	Years	Dependent Variable	Determinants ⁴⁹	Research Question	Data Sources
1.	Devarajan et al (1999)	18 African countries	1971-1995	Government health expenditure (per capita)	<ul style="list-style-type: none"> - GDP (+) - aid to health sector (0) - aid to all sectors (0) - Grants (+) - Infant mortality (0) 	What are the effects of aid on government spending in African countries?	OECD ODA WDI GFS UN
2.	Dieleman and Hanlon (2014)	119 countries	1995-2010	Government health expenditure (share of GDP)	<ul style="list-style-type: none"> - Development assistance for health channelled to government (-) - Development assistance for health channelled to non-government (+) - Government expenditure per GDP (+) - GDP per capita (0) - Population size (0) - Growth of GDP (+) 	What is the relationship between government health expenditure and development assistance for health channelled to governments?	WHO IHME
3.	Fan and Savedoff (2014)	126 countries	1995-2009	government health expenditure (per capita), OOP per capita (share of THE)	<ul style="list-style-type: none"> - GDP per capita (+) - Proportion of general government expenditure per GDP (+) - Proportion of population 60+ (+) 	review the literature on the determinants of total health spending and out-of-pocket health spending. What determines health spending and its composition?	WHO
4.	Farag et al (2009)	144 low- and middle- countries	1995-2006	Government health spending, (per capita)	<ul style="list-style-type: none"> - Per capita donor funding for health (-) - GDP per capita (+) 	Does funding from donors displace government spending for health in developing countries?	WHO

⁴⁹ (+) suggests a statistically significant positive relationship of this determinant and HE, (-) a significant negative one and (0) no significant relationship

#	Study	Countries	Years	Dependent Variable	Determinants ⁴⁹	Research Question	Data Sources
5.	Gbesemte and Gerdtham (1992)	30 countries	1984	Government health spending (per capita)	<ul style="list-style-type: none"> - GNP per capita (+) - Urban population as share of total population (0) - Age structure, population under 15 (0) - % of births attended by health staff (+) - Crude birth rate (0) - Foreign aid per capita (+) 	What are the determinants of health expenditure in Africa?	UN, UNICEF, WDI
6.	Jaunky and Khadaroo (2006)	28 African countries	1991-2000	Government health expenditure (per capita)	<ul style="list-style-type: none"> - GDP per capita (+) 	What is the elasticity of health expenditure in African countries?	WDI
7.	Kiyamaz et al (2006)	Turkey	1984-1998	Private, government and total health expenditure (per capita, share of GDP)	<ul style="list-style-type: none"> - GDP per capita (+) - Population growth (+) 	What is the relationship between health expenditure and GDP?	OECD Health Data
8.	Liang and Mirelman (2014)	120 low-, middle- and high-income countries	1995-2010	Total Government health Expenditure (per capita) Domestic government health expenditure (per capita)	<ul style="list-style-type: none"> - GDP per capita (+) - Government gross debt per capita (+) - Size of informal sector (agriculture to non-agriculture output) (-) - Share of population over 65 (0) - Socio-political risk (of government stability, corruption, democratic accountability, ethnic tensions) (+,-,+,-,0) - Development assistance to health per capita (+) 	What determines government expenditure on health?	WHO NHA WDI Political Risk Services Dataset WEO IHME DAH

#	Study	Countries	Years	Dependent Variable	Determinants ⁴⁹	Research Question	Data Sources
9.	Lu et al (2010)	Developing countries	1995-2006	Government health expenditure (share of GDP) (from source, that is domestically financed)	<ul style="list-style-type: none"> - Development Assistance to Health to Government as share of GDP (-) - Development Assistance to Health to non-government as share of GDP (+) - Debt relief/GDP (0) - GDP per capita (0) - General Government Expenditure as share of GDP (+) - HIV prevalence (0) 	To what extent is health expenditure related to changes in certain determinants?	WHO/IMF IHME WDI WEO UNAIDS
10.	Murthy and Okunade (2009)	44 African Countries	2001	government health expenditure (per capita)	<ul style="list-style-type: none"> - Real GDP per-capita (+) - Persons per physician (0) - Percentage of population over 65 years (0) - Foreign aid real per-capita (+) - Maternal mortality per 1000 persons (0) 	identify and empirically test some of the theoretical determinants of health care expenditure	unclear
11.	Musgrove et al (2002)	191 countries	1997	Government health expenditure (per capita)	<ul style="list-style-type: none"> - GDP per capita (+) 	What are the basic patterns of health expenditure and how does GDP impact spending?	WHO
12.	Nandakumar and Farag (2008)				<ul style="list-style-type: none"> - National income - health sector infrastructure, physician behaviour, health technology - Population age structure - Disease burden - Organisation of health care system 	Narrative of determinants of national health expenditure	No data

#	Study	Countries	Years	Dependent Variable	Determinants ⁴⁹	Research Question	Data Sources
13.	Pan and Liu (2012)	China (by province)	2002-2006	government health expenditure (per capita)	<ul style="list-style-type: none"> - General budget revenue per capita (+) - Finance transfers from the central government per capita (+) - Percentage of population aged under 15 (+) - Percentage of population aged over 64 (0) - Reported morbidity of infectious diseases per 1000 (0) - Reported mortality of infectious diseases per 1000 (0) - SARS (+) - Beds per 1000 population in hospital & health central (0) - Health personnel per 1000 population (0) - Coverage rate of urban employee basic health Insurance (-) - Proportion of urban population (-) - Proportion of female population (0) - Proportion of college & higher level population (0) 	<p>What are the determinants of differences in provincial government health expenditure?</p> <p>Has expenditure fluctuated with the provincial public health status?</p>	National statistics
14.	Rahman (2008)	India (14 states)	1971-1991	Public health expenditure, (per capita)	<ul style="list-style-type: none"> - Per capita GDP (+) - Share of population over 60 years (0) - Literacy rate (+) - Population per primary care centre (0) - Population per doctor (0) 	<p>What are the determinants of health expenditure in Indian states?</p>	National or state surveys
15.	Reeves et al (2015)	89 LMIC	1995-2011	Government Health spending, (per capita)	<ul style="list-style-type: none"> - Tax revenue (all and types: income tax and goods and services tax) (+) - GDP (+) 	<p>What are the associations between alternative types of tax revenue and indicators designed to capture dimensions of the breadth, depth, and height of UHC</p>	WDI

#	Study	Countries	Years	Dependent Variable	Determinants ⁴⁹	Research Question	Data Sources
16.	Schieber and Maeda (1999)	200 countries	1994	Public share of health spending	- GDP per capita	What are the basic patterns of health expenditure and how does GDP impact spending?	WB
17.	Xu et al (2011)	143 countries (LIC, MIC, HIC)	1995-2008	Government health expenditure from domestic sources Total health expenditure Out-of-pocket expenditure	- GDP (+) - TB (0) - Population over 60 (0) - General government expenditure as share of GDP (+) - External Funds per capita (+) - OOP (0) - Social Insurance, Tax or mixed Health System (+,-,0)	What determines the trajectory of health expenditure in developing countries	WHO WDI

Studies from the IMF and health systems literature

#	Study	Countries	Years	Dependent Variable	Determinants ⁵⁰	Research Question	Data Sources
1.	Clements et al (2013)	140 developing countries	1985-2009	Health spending (share of GDP, share of total government spending)	- GDP per capita (~) - Government Balance (~) - Population over 65 (~) - Urbanisation (0) - Trade openness (~)	What are the effects of IMF agreements on health expenditure in low- and non-low-income countries? Account for selection	IMF HE dataset

⁵⁰ (+) suggests a statistically significant positive relationship of this determinant and HE, (-) a significant negative one and (0) no significant relationship

#	Study	Countries	Years	Dependent Variable	Determinants ⁵⁰	Research Question	Data Sources
2.	Kentikelenis et al (2015)	63 Low income countries	1985-2009	Health spending (share of GDP), share of total government spending)	<ul style="list-style-type: none"> - GDP per capita (0) - Government Balance (~) - Inflation (0) - Negative Growth (~) - Trade openness (+) - Dependency Ratio (0) - Democracy (0) - Overseas Development Assistance (~) 	What are the effects of IMF agreements on health spending? Account for selection	IMF, WDI, quality of government
3.	Martin and Segura-Ubierno, (2004)	146 countries	1985-2000	Health spending (share of GDP, share of total government spending, per capita)	<ul style="list-style-type: none"> - GDP per capita (~) - Currency devaluation (+) - Democracy (~) - Population age structure (~) - GDP growth (~) - Negative growth (~) 	What are the effects of IMF agreements on health spending? Account for selection	WEO, WDI, IMF HE
4.	Nooruddin and Simmons, (2006)	92 countries	1990-2000	Health spending (share of total spending)	<ul style="list-style-type: none"> - GDP per capita (0) - Democracy (+) - Population age structure (~) - GDP growth (~) 	What are the effects of IMF programmes on health spending? Special emphasis on the role of democracy Account for selection	IMF
5.	Stuckler et al (2011)	119 aid recipient countries	1995-2006	Health spending (per capita)	<ul style="list-style-type: none"> - GDP (+) - Development Assistance to Health (+) 	What are the effects of IMF agreements on aid (development assistance to health) displacement	WEO, WDI, IHME

4

Identifying Determinants of IMF Agreements

In the introduction (chapter 1) and in more detail in the chapter 6, it is outlined that assessing the effects of IMF agreements on government health expenditure poses methodological challenges. This is because countries with and without agreements are likely systematically different in the way that these differences impact on government health expenditure. These differences need to be taken into account when estimating effects of agreements on government health expenditure. To do so, this study uses a Heckman-style selection model (section 6.2; pg. 230). In order to be able to fit such a selection model, variables that capture these differences between countries and are associated with a country entering into an agreement (determinants of IMF agreements), need to be identified. Currently, no single strong and compelling theory outlining why countries enter into IMF agreements exists. Also, no comprehensive and up to date literature review summarising determinants used in the empirical literature exists⁵¹. The relevant determinants of IMF agreements are therefore identified using

⁵¹ An exception can be seen in the studies by Moser and Sturm (2011); Steinwand and Stone (2008); Sturm et al (2005). These studies, however, are somewhat outdated and their search process does not seem to be conducted in a systematic way.

empirical studies modelling IMF agreement participation. This literature broadly includes two sets of studies. Firstly, those that aim to identify determinants of IMF agreements and, secondly, those studies that set out to investigate the effects of IMF agreements on certain economic and social outcomes (such as growth, balance of payment position or health outcomes and expenditure) accounting for selection bias using determinants of IMF agreements. This chapter aims to identify this literature in a systematic way⁵² in order to identify the most relevant determinants and is structured into three parts. The first section outlines the methodology used to identify the relevant studies in a systematic way. The second part identifies and presents the determinants used in the literature. Part three summarises the findings and draws out the most commonly used determinants of IMF agreements.

4.1 Search Methodology

This section outlines the search methodology developed to obtain the relevant literature in a systematic way⁵³. It starts by outlining the literature sources searched to obtain the relevant studies, then presents the search terms used to identify studies for the review. The third part of this section describes the inclusion and exclusion criteria applied to the search. Part four gives an overview of the search process. The final part acknowledges limitations.

4.1.1 Literature Sources

The review aims to include peer-reviewed articles as well as grey literature. This literature was obtained from a number of sources including bibliographic databases, references listed of the reviewed studies, the main literature review presented in chapter 2. The search of bibliographic databases was limited to the largest and most relevant databases for social sciences and economics and included the Web

⁵² Similar to the reviews conducted in chapter 2 and 3, this review is also not a systematic review in the strictest sense. This is for the reasons outlined in more detail in footnote 21 (pg. 30) and the fact that it additionally includes studies previously identified (chapter 2) to further enrich and complete the literature.

⁵³ This methodology is very similar to those presented in chapters 2 and 3, however, individual elements have been adjusted for the review in this chapter and the methodology is therefore described here again.

of Knowledge and Scopus. Google Scholar was searched as less traditional source of academic literature. Three recent literature reviews (Moser and Sturm, 2011; Steinwand and Stone, 2008; Sturm et al, 2005) were screened for additional results. Since the main literature review also identified a number of articles that are relevant to this search, this literature was included in the review. After obtaining literature through these main pathways, reverse searches were conducted by hand searching reference lists of previously identified literature. All sources were searched using the following terms.

4.1.2 Search Terms

A number of key words were used to identify the relevant literature. Key words were selected around the three blocks of IMF agreement, determinants and low- and middle-income countries. See Table 4.1 below for the individual key words for each block.

IMF agreement	Determinant	L&MIC
IMF	Determinant*	Low?income
Fund	Factor*	Middle?income
International Monetary Fund	Variable*	Low?and?middle income
Agreement	Participat*	LIC
Adjustment		MIC
		LMIC

Table 4.1: Building Blocks and Keywords for Literature Search for Determinants of IMF Agreements

Search terms were used in various search fields, including title, abstract, topic and key words as well as Mesh terms, where available, and combined using logic operators. Terms within each block were combined using the “OR” operator, all blocks were linked together using the “AND” operator. For each of the databases the combinations of blocks and individual key words was altered to identify the best combination of keywords and blocks to obtain the most promising set of results. It appeared that terms around low- and middle-income countries were not leading to the right literature so that this block was excluded from the searches. See Appendix Note 4.1 (pg. 133) for the final combination of key words for each of the databases.

4.1.3 Inclusion and Exclusion Criteria

Studies were screened to meet a number of inclusion and exclusion criteria. Literature was included in the review when the study included countries of low- or middle-income⁵⁴, either as a single country or a group of countries. Consequently, studies of countries of high-income exclusively were excluded. Studies were included when they aimed to identify determinants of IMF agreements and excluded when they identified determinants of agreements with other international financial organisations such as the World Bank or regional development banks. Studies were included when they were concerned with determinants of IMF agreements, either through identifying determinants or using determinants in order to account for selection bias. Studies were excluded when they did not report any information on determinants of IMF agreements. Studies were also excluded when they were not written in English or German language or the full-text of the article was not available through the University of Edinburgh's or the National Library of Scotland's library services, either in electronic or hard-copy form. Finally, studies were excluded, when they were book reviews, editorials or general opinion pieces. Figure 4.1 shows the flowchart of the process of study inclusion and exclusion.

⁵⁴ A country was defined as low- or middle-income country following the definition of income groups outlined in section 5.3.1 (pg. 184).

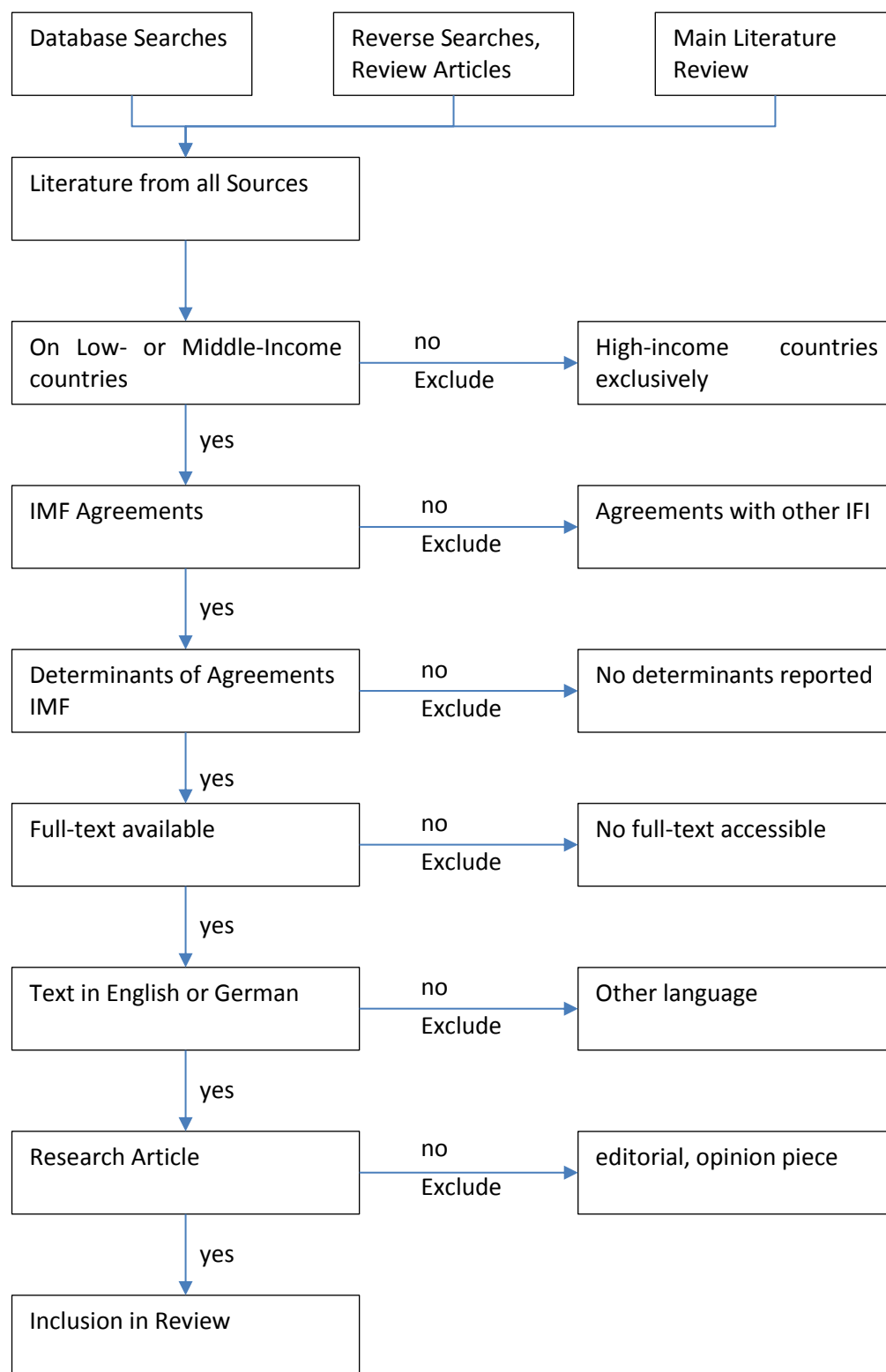


Figure 4.1: Flowchart of Process to include Literature

4.1.4 Search Process

The literature was searched in October 2015. Having performed the searches in all selected databases, reverse searches and included the studies from the main literature review a total of 1190 studies, including duplicates, was obtained. The selected literature has then reviewed in more detail through three screening stages (Figure 4.2).

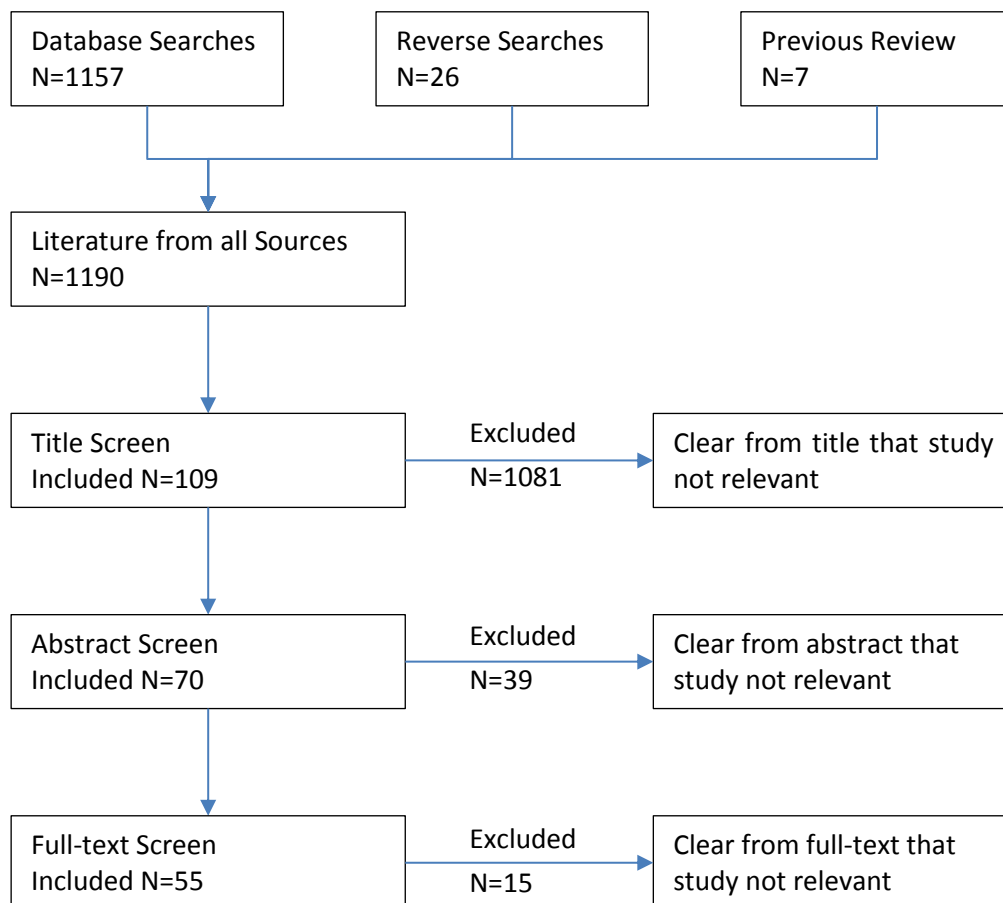


Figure 4.2: Flowchart of Screening Process

The first stage excluded studies when it was immediately apparent from the title that the article was irrelevant. At this stage the number of studies was reduced to 109. The remaining studies were included or excluded based on the abstract. Where the abstract did not allow to clearly include or exclude an article, the full-text was skim-read to make a decision. This reduced the number of articles to 70. Full-texts of these articles were obtained and read to make a final decision about the study's inclusion into the review (see Appendix Note 4.2; pg. 134 for list of studies). Table

4.2 below gives an overview of the studies identified at different stages and from different sources.

	Articles included at stages			
	Initial Results	Title Screen	Abstract Screen	Full-text Screen ⁵⁵
Databases				
Web of Knowledge	794	34	11	
Scopus	148	5	3	
Google Scholar	215 ⁵⁶	44	33	
All Databases	1157	83	47	
Hand Search	26	19	16	
Literature from Main Literature Review	7	7	7	
All Sources	1190	109	70	
All Literature, duplicates removed				55

Table 4.2: Search Results by Database and Screening Stage for Determinants of IMF Agreements.

4.1.5 Limitations of this Literature Review

The search strategy for this literature review was designed carefully. Nevertheless, some limitations need to be acknowledged. These and their mitigation are similar to those spelled out in more detail above (see section 2.1.5; pg. 36) and range around the use of only the largest databases, the reviewing process by only one researcher. The limitation to include only studies written in German or English and available in full-text from the aforementioned library sources, did not restrict the search as no study had to be excluded based on these criteria.

4.2 Determinants of IMF agreements used in the Literature

The review process identified 55 studies providing information on determinants of IMF agreements. All studies employed time-series-cross-section datasets. The time-series are generally quite long and cover up to 60 years (Fails and Woo, 2015). The selected countries are in general not restricted to one geographic area, apart from the studies by Biglaiser and DeRouen (2011) and Ortiz and Bejar (2013), focussing on Latin America, the study by Harrigan et al (2006), looking at the Middle

⁵⁵ Individual database sources cannot be identified at this stage

⁵⁶ Review of article titles was concluded when hits become irrelevant, this was mostly the case as the topics diverted from the IMF to other organisations. The search was concluded after the first 500 articles

East and North Africa, and the study by Pandolfelli et al (2014), studying African countries.

Agreements are treated as a dummy variable coded as 1 for times in agreements and 0 for times without agreements. Most studies consider all types of agreements, while a minority focusses on a subgroup of agreements. Jorra (2012), for instance, exclude Poverty Reduction and Growth Trust Agreements and focus only on Stand-By Agreements and Extended Fund Facilities. Table 4.3 gives an overview of the identified studies.

Study	Countries	Years	Agreements
Andersen et al (2006)	102 developing countries	1995-2000	SBA, EFF
Atoyán/Conway (2006)	95 countries	1993-2002	SBA, EFF, SAF, PRGT
Barro/Lee (2005)	130 countries	1975-2000	SBA, EFF
Bas/Stone (2014)	104 countries	1970-2008	all agreement
Bauer et al (2012)	142 countries	1976-2006	all agreements
Biglaiser/DeRouen (2011)	15 Latin American countries	1980-2003	SBA
Bird/Rowlands (2001)	95 countries	1974-1994	SBA, EFF, ESAF
Bird/Rowlands (2004)	L&MIC	1966-2000	SBA, EFF, ESAF
Bird/Rowlands (2009a)	88 L&MIC	1977-2000	SBA, EFF, SAF, ESAF, PRGT
Bird/Rowlands (2009b)	L&MIC	1973-2000	SBA, EFF, SAF, ESAF, PRGT
Bird et al (2015)	114 countries	1984-2008	all agreements
Breen (2013)	159 L&MIC	1983-2006	all agreements
Broz/Hawes (2006)	96 countries	1983-2002	all agreements
Cerutti (2007)	59 non-PRGT countries	1982-2005	SBA, EFF
Conway (1994)	74 developing countries	1976-1986	SBA, EFF
Copelovitch (2010)	47 countries	1984-2003	all agreements
Dreher (2006)	98 developing countries	1970-2000	all agreements
Dreher et al (2009)	197 countries	1951-2004	SBA, EFF, SAF, ESAF, PRGT
Edwards (2005)	106 developing countries	1979-1995	all agreements
Edwards/Santaella (1993)	48 countries	1954-1971	all agreements
Eichengreen et al (2006)	?	1990-2003	all agreements
Fails/Woo (2015)	115 countries	1946-2006	all agreements
Garuda (2000)	39 countries	1975-1991	all agreements
Gündüz (2009)	55 countries	1980-2004	SBA, PRGT, CFF, SAF/ESAF
Harrigan et al (2006)	11 MENA countries	1975-2000	SAF, ESAF, PRGT
Hutchison (2003)	67 L&MIC	1975-1997	SBA, EFF, SAF, ESAF, PRGT
Hutchison (2003)	Developing countries	1975-1997	EFF, SBA
Jensen (2004)	68 countries	1970-1998	all agreements

Study	Countries	Years	Agreements
Jorra (2012)	57 L&MIC	1975-2008	SBA, EFF PRGT
Joyce (1992)	45 countries	1980-1994	all agreements
Knight/Santaella (1997)	91 developing countries	1973-1991	EFF, SAF, ESAF
Moser/Sturm (2011)	165 countries	1990-2009	all agreements
Mukherjee/Singer (2010)	87 countries	1975-2002	all agreements
Ortiz/Bejar (2013)	17 Latin American countries	1980-2007	all agreements
Pop-Eleches (2009)	Latin American and Eastern Europe countries	1982-2001	all agreements
Presbitero/Zazzaro (2012)	56 countries	2008-2010	all agreements
Przeworski/Vreeland (2000)	79 countries	1970-1990	all agreements
Stone (2008)	96 countries	1990-2002	all agreements
Sturm et al (2005)	118 countries	1971-2000	all agreements
Thacker (1999)	78 countries	1985-1994	SBA, EFF
Trudel (2005)	unclear	1960-2000	all agreements
van der Veer/de Jong (2013)	49 MIC	1984-2004	EFF, SBA (no debt restructuring)
Veiga (2005)	10 countries	1957-1999	all agreements
Vreeland (2002)	110 countries	1961-1993	SBA, EFF, SAF, ESAF
Vreeland (2003)	135 countries	1951-1990	all SBA, EFF, SAF, ESAF
Vreeland (2004)	179 countries	1975-1996	all agreements
Vreeland (2005)	180 countries	1975-2000	all agreements
Williams (2012a)	unclear	1970-1999	all agreements
Clements et al (2013)	140 developing countries	1985-2009	all agreements
Hoddie/Hartzell (2014)	44 countries	1995-1998	all agreements
Kentikelenis et al (2015)	63 Low income countries	1985-2009	all agreements
Martin/Segura-Ubiergo (2004)	146 countries	1985-2000	all agreements
Nooruddin/Simmons (2006)	92 countries	1990-2000	all agreements
Pandolfelli (2014)	37 African countries	1990-2005	all agreements
Stuckler et al (2008)	21 post-communist countries	1992-2003	all agreements

Table 4.3: Overview of Studies on IMF Agreement Determinants

The reviewed studies consider a large number of variables as determinants of IMF agreements. While some trends seem to emerge, there does not seem to be a consensus about which variables are important determinants and also not in which way the variables influence IMF participation (Steinwand and Stone, 2008). The following sections discuss the variables used in the studies in more detail. The presentation will be divided into two main parts following the main distinction made in the literature between political and economic variables. Economic variables are generally those that measure the changes in economic performance or circumstances of a country. It is

hypothesised that countries are more likely to enter into agreements with the IMF when their economic performance or position vis-à-vis the rest of the world is deteriorating. Political variables are those that measure wider circumstances of a country that might increase or decrease the likelihood of entering into agreements, such as the characteristics of the domestic political economy, the importance of the country in the international political economy or the relations with the Fund itself.⁵⁷ To make the great number of variables presented in this study accessible, individual variables and determinants have been organised thematically and are aggregated into categories or concepts. Table 4.4 below gives an overview of the concepts used in the studies. Since the interest in the selection model is not in describing the relationship between agreements and individual determinants, but to be able to correctly classify countries into those in an agreement and those not in an agreement, no indication of the reported relationship is given. A list of all determinants used in the individual studies can be found in the Appendix Note 4.3 (pg. 138).

⁵⁷ While not necessarily and strictly “political”, variables around the involvement with the IMF are, in line with the literature (Steinwand and Stone, 2008), clustered with other political determinants.

	Economic Determinants															Political Determinants													
	National Income	International Reserves	Debt	Balance of Payments	Government Balance	Exchange Rates	inflation	Trade	investment	LIBOR	Debt rescheduling	commodity prices	non IMF Funding	domestic credit	Further economic variables	past agreement	years under agreements	other countries in agreements	IMF liquidity	IMF quota	IMF staff	Political regime	Elections/government change	political stability	governance	proximity to the US	proximity advanced economies	Exposure to Banks	further political determinants
Andersen et al (2006)		X	X	X																						X			
Atoyán/Conway (2006)	X			X																									
Barro/Lee (2005)	X	X																	X	X						X	X		
Bas/Stone (2014)		X	X	X	X				X								X	X				X	X						
Bauer et al (2012)	X	X				X										X	X						X						
Biglaiser/DeRouen (2011)	X	X				X	X										X					X				X			
Bird/Rowlands (2001)	X	X	X	X		X				X	X					X			X	X		X	X	X		X	X		X
Bird/Rowlands (2004)	X	X	X	X		X				X	X					X			X	X		X	X	X		X	X		X
Bird/Rowlands (2009a)	X	X	X	X		X	X				X			X	X														
Bird/Rowlands (2009b)	X	X	X	X		X				X	X					X			X	X		X	X	X		X	X		X
Bird et al (2015)	X	X	X	X								X				X							X			X	X		X
Breen (2013)	X	X	X	X		X													X	X		X				X	X		
Broz/Hawes (2006)		X	X					X								X										X		X	X
Cerutti (2007)	X	X		X	X	X	X			X						X			X	X									
Conway (1994)	X	X	X	X				X		X																			X
Copelovitch (2010)	X		X	X		X				X							X	X	X				X				X	X	X
Dreher (2006)			X																			X							
Dreher et al (2009)	X	X	X	X	X		X		X							X						X	X						X
Edwards (2005)	X	X	X					X						X															

	Economic Determinants													Political Determinants																
	National Income	International Reserves	Debt	Balance of Payments	Government Balance	Exchange Rates	inflation	Trade	investment	LIBOR	Debt rescheduling	commodity prices	non IMF Funding	domestic credit	Further economic variables	past agreement	years under agreements	other countries in agreements	IMF liquidity	IMF quota	IMF staff	Political regime	Elections/government change	political stability	governance	proximity to the US	proximity advanced economies	Exposure to Banks	further political determinants	
Edwards/Santaella (1993)	X			X		X		X														X		X						
Eichengreen et al (2006)	X	X	X			X		X						X													X			
Fails/Woo (2015)	X	X	X	X												X						X	X			X				
Garuda (2000)	X	X	X	X	X		X	X							X															
Gündüz (2009)	X	X		X				X				X			X												X			
Harrigan et al (2006)	X	X	X	X																		X	X						X	
Hutchison (2003)	X	X		X	X	X	X															X								
Hutchison (2004)		X	X		X	X										X													X	
Jensen (2004)	X	X	X		X		X		X						X	X						X								
Jorra (2012)	X	X	X																										X	
Joyce (1992)	X	X	X	X	X		X						X		X															
Knight/Santaella (1997)	X	X	X	X	X	X	X	X					X	X		X														
Moser/Sturm (2011)	X	X	X	X	X	X	X	X	X						X		X					X	X	X	X	X			X	
Mukherjee/Singer (2010)	X	X		X		X	X	X							X	X						X								
Ortiz/Bejar (2013)	X	X	X	X			X									X						X	X							
Pop-Eleches (2009)	X	X	X				X									X						X			X					
Presbitero/Zazzaro (2012)	X	X		X		X	X									X							X		X					
Przeworski/Vreeland (2000)		X	X		X			X	X								X	X				X	X							
Stone (2008)	X		X	X	X				X							X				X			X	X		X	X		X	

	Economic Determinants														Political Determinants														
	National Income	International Reserves	Debt	Balance of Payments	Government Balance	Exchange Rates	inflation	Trade	investment	LIBOR	Debt rescheduling	commodity prices	non IMF Funding	domestic credit	Further economic variables	past agreement	years under agreements	other countries in agreements	IMF liquidity	IMF quota	IMF staff	Political regime	Elections/government change	political stability	governance	proximity to the US	proximity advanced economies	Exposure to Banks	further political determinants
Sturm et al (2005)	X	X	X	X	X	X	X	X	X	X						X	X					X	X	X					X
Thacker (1999)	X	X	X	X	X			X			X				X							X				X			
Trudel (2005)	X	X		X	X	X		X								X						X							
van der Veer/de Jong (2013)	X	X	X			X		X					X													X			X
Veiga (2005)	X	X					X									X							X						X
Vreeland (2002)	X					X			X								X	X				X	X						
Vreeland (2003)		X	X	X	X				X								X	X				X	X						
Vreeland (2004)	X	X	X	X	X				X																				X
Vreeland (2005)	X	X	X	X												X										X			X
Williams (2012)	X	X	X			X	X	X				X				X	X	X					X	X					
Clements et al (2013)		X			X	X										X													
Hoddie (2014)	X																X					X		X					
Kentikelenis et al (2015)	X			X	X											X						X							
Martin/Segura-Ubierno (2004)	X			X	X											X						X							
Nooruddin/Simmons (2006)	X			X	X											X						X							
Pandolfelli (2014)	X		X																			X		X		X			
Stuckler et al (2008)	X								X			X		X			X					X		X					X
Frequency of Determinant	47	43	36	35	21	21	17	16	12	7	5	3	3	4	9	26	10	9	5	8	2	28	20	11	4	17	9	2	19

Table 4.4: Determinants of IMF Agreements

4.2.1 Economic Determinants of IMF Agreements

A number of different economic determinants are used in the studies. These can be aggregated into categories. These different categories are presented here. Due to the large number of studies within each category, only examples of variables will be given in the text. A full list of determinants can be found in Table 4.4 at the end of this section.

National income is the most commonly used concept. This is operationalised most commonly as an indicator of economic growth, as for instance in the studies by Breen (2013) or Jensen (2004). Another commonly used operationalisation of national income is the measure of GDP per capita, as for instance employed by Bird et al (2015) or Thacker (1999). Few studies (Mukherjee and Singer, 2010; Ortiz and Bejar, 2013), capture this concept through an “output loss” variables, which describes the difference between estimated and observed economic output. The underlying assumption of using national income as a predictor of participation in IMF agreements is that countries that experience relatively weak growth might be more likely to request a loan agreement.

The second most commonly used concept is the stock of **international reserves**. This indicator is operationalised across all studies as the stock of international reserves in relation to imports of goods and services per month. This gives an indication of the size of the international reserves relative to the size of imports. Studies using the indicator of international reserves in their models are for instance Harrigan et al (2006) or Williams (2012b). The underlying assumption is that countries with low stocks of international reserves relative to their imports are less able to meet difficulties in the balance of payments using reserves and might therefore be more likely to request IMF assistance.

Debt is another commonly used predictor of IMF agreements in the reviewed studies. The debt determinant is operationalised in a number of ways that can broadly be classified into debt stock, debt service and interest payment. Debt stock is either considered as a whole or, in some cases, subdivided into internal or external debt stocks. It is introduced into the models either as levels of debt stock, where it is

commonly scaled to exports or GDP, or change of debt stock. Debt service is generally measured as a debt service ratio, that is the ratio of a country's debt service payments to its export earnings. Pop-Eleches (2009) operationalises the debt indicator as interest payments as share of gross national income (GNI). Studies argue for the use of debt variables as it is assumed that a large level of debt compared to the size of the economy will increase the likelihood of requesting an agreement.

Most studies also include an indicator of a country's **balance of payment position** as determinant of IMF agreements. Balance of payment is an important economic indicator that comprises a statistical record of all economic transactions between a country and the rest of the world. The balance of payments traditionally includes the current account, capturing income flows, and the capital account detailing flows of assets and liabilities (Pilbeam, 2006). While a small number of studies operationalise this indicator by measuring a country's overall balance of payment (Bas and Stone, 2014; Harrigan et al, 2006), most studies use an indicator of the current account balance in their models (Bird et al, 2015; Joyce, 1992). Only Thacker (1999) operationalises the concept using the capital account balance. According to the IMF's Articles of Agreement, one of the purposes of the organisation is to "correct maladjustments in their balance of payments" (IMF, 2011) so that imbalances in balance of payments can be seen as an important predictor of entering into agreements.

Government balance is another frequently used determinant of IMF agreements. Government balance describes the difference between government expenditure and government revenue. While most studies measure government balance directly, a few studies measure only government expenditure (Joyce, 1992; Knight and Santaella, 1997) or government revenue (Sturm et al, 2005). This determinant is generally reported as a share of GDP. Negative government balances, or government deficits, are considered as determinant as it is assumed that higher deficits make countries more likely to enter into IMF agreements (Przeworski and Vreeland, 2000).

About the same amount of studies consider **exchange rates** as determinant of agreements. Most studies using this determinant measure the exchange rate to the US Dollar or changes thereof (Bird and Rowlands, 2001; Cerutti, 2007; Edwards, 2005).

Some studies (Breen, 2013; Copelovitch, 2010a) include a currency crisis dummy, which indicates if the currency has been devalued by more than 30%. It is argued that a strong depreciation of a country's currency is associated with an increased likelihood to enter into an agreement. A smaller amount of studies considers the exchange rate regime.⁵⁸ Bird and Rowlands (2009b) suggest that hard pegs of currencies can inspire confidence in a country's macroeconomic policy and therefore increase the willingness of the capital market to lend to a country so that agreements are not required.

Around a third of the studies include **inflation** as determinant of IMF agreements. It is argued that higher inflation might be associated with an increased likelihood of participation in IMF agreements.

Trade is considered as determinant by around one third of all studies. Trade variables are generally operationalised as either terms of trade (Conway, 1994; Sturm et al, 2005) or trade openness (Broz and Hawes, 2006). Trade is considered an important determinant of entering into IMF agreements as a worsening of the trade balance might worsen a country's external position and thus increase the likelihood of a country entering into an agreement.

Another determinant used by some studies is a variable measuring **investment**. This indicator is operationalised in a number of ways: while some studies (Sturm et al, 2005) capture investment as a total, scaled to GDP, Stuckler et al (2008) focus on foreign direct investment, scaled to GDP, and Bas and Stone (2014) measure domestic investment as a share of GDP. It is argued that a decline in investment indicates difficulties accessing national or international capital markets, which might increase the likelihood of entering into an agreement in order to secure finance.

A small number of studies include the **London Interbank Offered Rate (LIBOR)**, a world interest rate, in their models. This is generally measured as the change in LIBOR (Bird and Rowlands, 2001). The underlying assumption is that with increases in world interest rates loans become harder to finance for countries, which might lead them to turn to the IMF for funding.

⁵⁸ The exchange rate regime describes the way a country manages its currency in relation to those of other currencies. It can range from floating or fixed/pegged (Pilbeam, 2006).

Some studies also include an indicator of **debt rescheduling** (Bird and Rowlands, 2009b). This is usually operationalised in form of a dummy variable, which indicates whether or not a country has rescheduled a proportion of its debt either in a given year or in a following year. This is seen as a determinant of IMF agreements as rescheduling of debt usually requires IMF involvement. Debt rescheduling is different from debt, another category presented above, as it is not the level of debt or debt related interest payment that are important but the fact that debt has been rescheduled.

A small number of studies include **commodity prices** as determinant of agreements in their model. Studies operationalise this either as changes in oil prices (Gündüz, 2009) or other commodities, such as agricultural products (Bird et al, 2015). Williams (2012b) include a dummy for the 1974-79 oil crisis. Studies reason that higher commodity prices might impact on a country's economy by reducing economic growth, which might increase the likelihood of signing an agreement.

Individual studies include additional variables. Stuckler et al (2008) and Knight and Santaella (1997) include a measure of flows from non-Fund external funding, measured as share of GDP, as indicator and argue that the likelihood of entering into agreement increases as the flow of external debt decreases. The studies by Edwards (2005) and van der Veer and de Jong (2013) use an indicator of domestic credit, measuring the total amount of money available to a country, scaled to GDP. van der Veer and de Jong (2013) argue that a domestic credit-boom would increase the chances of a sudden stop in capital flows, which would increase the likelihood of entering into an agreement. Another small set of studies use further indicators that cannot be classified into any of the other categories and are, due to their low frequency of use, grouped into one "other variables" category. Table 4.5 lists the individual variables.

National income	
Crisis index (change in growth over previous years)	Foreign reserves in months of import
Real GDP	foreign reserves/GDP
Real GDP growth	Reserves in months of import
Real GDP per capita	reserves to debt
Negative growth year	Total reserves
output loss	
International reserves	Debt
% change in reserves/imports	% change in debt-service ratio
	Central government debt
	Change in debt/GDP
	Changes in debt-service ratio

Commitments for loans from private sources	Trade balance
Debt service as share of exports	Trade Balance/GDP
Debt service as share of GNP or GDP	World trade
Debt Service as share of Imports	Exchange rates
Debt to GNP or GDP	Real exchange rate change
External debt as share of GDP or GNI	Exchange rate regime (fixed vs flexible)
External debt service as share of exports	Currency crisis indicator (depreciation larger 30%/5%)
IMF debt as share of GDP	Change in real exchange rate
interest payments to GNP or GNI	Real exchange rate overvaluation
Real short-term debt per capita	Investment
Short term debt as share of total debt	Investment (in % of GDP)
Short Term debt as share of reserves	Real gross domestic investment (private and public) as a % of GDP
short-term debt scaled by total foreign debt	Net foreign assets ratio
Stock of international debt long-term	Non-fund financing flow, months of imports
World real rate of interest for that country	Net Foreign Direct Investment
Balance of payment position	LIBOR
Change in the current account	Real LIBOR
balance of payments as share of GDP	Changes in real Libor
Change in current account deficit	Debt rescheduling
Change in current account to GDP	Past rescheduling
current account balance as share of GDP	Current rescheduling
Current account balance to exports	Rescheduling next year
overall balance of payments in US Dollar	Default dummy
Overall balance of payments, % of GDP	Commodity prices
per capita overall balance of payments	Crude oil prices (and change thereof)
Fiscal balance as share of GDP	Agriculture prices
Inflation	Non-oil commodity prices
Inflation	Oil crisis: 1974–9 dummy
Consumer price index	Non-IMF Lending
Government balance	Lag of Dummy for Non-IMF Lending
Budget surplus as share of GDP	Domestic Credit
fiscal government budget surplus as share of GDP	Domestic Credit/GDP (and change thereof)
Government balance as share of GDP	Further economic variables
government budget deficit as percentage of GDP	OECD dummy
Government budget deficit to GDP ratio	Market pressure index
Government expenditure to GDP	Capital account restrictions
Government expenditure as share of GDP	Official arrears
Change in government revenues, % of GDP	Private arrears
Change in government expenditure, % of GDP	Currency crises worldwide
Trade	Percentage of labour force in agriculture
Change in terms of trade	Macroeconomic stability indicator
Export markets, % change	Central bank holdings of domestic assets
Growth of goods export	Gross fixed capital formation, % of GDP
Growth rate of the terms of trade	economic globalization
Terms of trade	systemic banking crisis
Terms of Trade Shock	Size of banking sector
	Money supply

Table 4.5: Overview of Economic Variables used in the Reviewed Studies

4.2.2 Political Determinants of IMF Agreements

Besides using economic indicators to determine whether or not a country participates in an IMF agreement, the literature has developed to incorporate political determinants into their models. Steinwand and Stone (2008), for instance, argue that politics affect IMF lending decisions at least as much as economic considerations do. These political variables can be seen to determine supply and demand of agreements and can loosely be arranged around three broad themes of the relationship with the Fund, national political economy and importance in the global political economy. Within these, a number of individual categories have been identified, which are presented here. A complete list of all variables can be found in Table 4.6, at the end of this section.

Almost all studies include in their models one or more indicators designed to capture a country's **relationship with the Fund**. Studies most commonly include an indicator of past IMF agreements into their models. A large body of literature exists discussing IMF lending in relationship to recidivism (Bird, 2007; Conway, 2007; Hutchison and Noy, 2004; Steinwand and Stone, 2008). It is argued that while IMF agreements are designed to provide financing for short-term balance of payment imbalances, a large number of countries have become regular clients of the IMF entering a sequence of agreements over time. It appears that countries with substantial previous exposure to IMF agreements are more likely to borrow from the IMF again (Steinwand and Stone, 2008). This construct is operationalised in different ways across the studies. A number of studies include a dummy of previous IMF agreements into their model to indicate whether or not a country had an agreement in the last or previous years (Bird and Rowlands, 2009a; Cerutti, 2007). Other studies include the number of years a country has been under agreements (Bas and Stone, 2014; Biglaiser and DeRouen, 2011; Williams, 2012b). A related argument, this time from the supply side, is made by studies that include the number of countries in agreements worldwide. It is argued that the IMF will not enter into new agreements with countries when the number of other countries currently in agreements is already high as its need to push additional loans is already satisfied (Steinwand and Stone, 2008). Related to this is the argument made by Bird and Rowlands (2001) and Cerutti (2007), who use an indicator of IMF liquidity and argue that the likelihood of entering into additional agreements

decreases with decreased IMF liquidity. Sturm et al (2005) argue that countries are more willing to enter into a new agreement when a great number of other countries is already in agreements as this would mean that the perceived cost of giving up sovereignty over policy decisions is lower.

Barro and Lee (2005), for instance, argue that the IMF's lending decisions are biased by interests of its own staff members. The authors include the number of IMF staff members from a certain country and this country's IMF quota as determinants of participation in agreements. It is argued that the likelihood of a country entering into an agreement increases when the IMF has more staff member from this particular country or the country's quota is larger (Bird and Rowlands, 2001; 2004; Breen, 2013; Stone, 2008).

Various studies include concepts that can be arranged around the theme of the countries' **national political economy**. The overarching idea is that a country's national political situation determines the demand for agreements. This has been operationalised in different ways. Most commonly this is measured using a democracy indicator. Two opposing views on the relationship between IMF agreements and the regime-type are made in the literature. One set of studies argues that democracies are accountable to the public and would therefore find it more difficult to accept unfavourable terms that come with IMF agreements, they would therefore negotiate harder with the IMF, which might reduce the likelihood of entering into an agreement. In other words, since autocracies are less accountable to the public they are more likely to enter into agreements (Huber et al, 2008; Przeworski and Vreeland, 2000). Another argument is put forward by, for instance, Edwards and Santaella (1993) who argue that IMF agreements can be used to justify unpopular policy choices and thereby avoid blame from the electorate. When entering into an agreement, policy choices are set not by the government but by the IMF. Following this argument, democracies might be more likely to enter into agreements as they can use them as a tool to push unfavourable policy options.

A related argument is made by studies including indicators of executive and legislative elections into their model. It is argued that governments might be more likely to enter into agreements shortly after an elections hoping that the negative

connotation of the programme will be forgotten by the electorate by the time of the next election (Przeworski and Vreeland, 2000). It is also argued that IMF agreements might be entered into just before an election as the additional money from the loan would help to fund the election campaign.

A number of studies consider the impact of a country's political stability. Related to the argument made before, that countries would use an agreement to justify unpopular decisions, some studies argue that IMF agreements can be used as a seal of approval for a certain political programme, this seal of approval would be more important when the political situation in a country is more unstable. Opposing this view some studies argue that the IMF might be less willing to enter into agreements with countries that are politically unstable as this instability might jeopardize the completion of the programme. Political stability is operationalised in a number of ways. Bird and Rowlands (2001), for instance, count the number of coups in a country. Edwards and Santaella (1993) consider the number of political assassinations. Sturm et al (2005) include political revolutions, guerrilla problems the number of government crisis and instability of government in their models. Related to this are two more sets of determinants that are included in some of the studies. It is argued that countries consider the political costs of entering into agreements. Sturm et al (2005) argue that countries that face high levels of social unrest, measured as number of riots, strikes or demonstrations before an agreement, might be associated with a higher likelihood of entering into IMF agreements as these countries would require outside assistance.

It is also argued that the IMF might be more interested in lending to countries with good governance, measured for instance by levels of corruption, the rule of law or the quality of bureaucracy (Moser and Sturm, 2011; Presbitero and Zazzaro, 2012).

A final set of concepts can be arranged around the theme of a country's importance in the **international political economy**. The arguments used to justify including these concepts into the models can generally be summarised in a way to say that the supply of agreements is higher and the IMF more likely to offer agreements to countries that are more important to the global political economy. This has been operationalised in a number of ways.

One strand of the literature argues that the IMF's lending decisions are influenced by economic interests of high-income countries. This argument is most often tested in relation to the influence of the United States, the largest contributor to the IMF's finances (IMF, 2015e). Thacker (1999), Barro and Lee (2005) or Pop-Eleches (2009) include variables of the countries' voting behaviour in the United Nations General Assembly in their model and argue that countries that vote more in line with the US interests are more likely to receive loans from the IMF. Eichengreen et al (2006) and Stone (2008) argue that there is a positive relationship between the amount of foreign aid a country receives from the US and its likelihood to receive loans from the IMF. While it generally seems accepted that the US has greater influence over the IMF's lending decisions than other high-income countries (Thacker, 1999), some studies include indicators of a country's proximity to these other high-income countries. Barro and Lee (2005), for instance, include an indicator of the political proximity and trade intensity of a country with France, Germany and the UK in their model.

Some studies argue that not only the direct interests of a country, but indirectly through the influence of commercial banks have an impact on the likelihood of the IMF entering into an agreement with a country. It is argued that commercial banks have a special political status to incentivise the IMF to financially support those countries with loans, that have higher debts at large commercial banks. While Copelovitch (2010a) measures this as exposure to international banks in general, Broz and Hawes (2006) includes exposure to US and German banks into their model.

A small number of studies employ a set of variables that cannot be classified into any of the other categories. These include the country's importance in the global economy based on their GDP. Sturm et al (2005) argue that a country's economic importance in terms of its GDP as a share of the global GDP is an important predictor of a country entering into an agreement. This is to suggest that a country's balance of payment imbalances are more of a risk to the global economy when the country has a larger GDP, the IMF would therefore be more likely to lend to these countries in order to avoid a spread of the crisis. Other studies use the importance of a country in the UN Security Council, its importance in terms of energy production or the frequency of military conflicts as determinants.

years under agreements	
Cumulative number of years a country has been under IMF agreements (sum total or last 5 years)	Recent change in government
Previous year agreement dummy	Regime duration
Past incomplete programs	Systemic transition
Current IMF program	Political stability
Past IMF agreements	Civil freedom
participation in next period	Coup frequency
Years since last loan	Political strikes
Non-compliance with IMF agreements	Political assassinations
Other IMF programs	social unrest
Years under current agreement	Freedom House index
Number of previous loans	political globalization
Amount drawn to agreed amount	Governance
other countries in agreements	quality of government indicator
Total number of other countries in the world currently under an IMF agreement	Quality of bureaucracy
IMF liquidity	Corruption
IMF liquidity	Institutional Weakness
IMF quota	Institutional Effort
Imminent quota review	repudiation of government contracts
IMF Quota	rule of law
IMF staff	Polity score
IMF delegation index	Proximity to the US
Share of IMF staff	Political proximity to US, based on similar votes in UN on key votes
Political regime Elections/government change	Change in proximity (as above) to previous year
Democracy/Autocracy indicator	Index of both
Democracy index	the intensity of trade with the United States
election year (executive and/or legislative)	Bilateral investment treaties US and Latin America
Electoral competitiveness	US export to country
Fragmentation of political system	U.S. Aid Recipient
Indicators of liberal governments	Amount of US economic aid/share of total aid
Political Orientation of the Government	US military aid
Ideology of government or president (liberal, socialist)	US Bank exposure
Imminent new government	share of a country's bilateral trade with the United States relative to the country's GDP
Lagged election (executive and/or legislative)	US direct investment
lead in elections (executive and/or legislative)	Index for political agreement with US
Leader tenure (in years)	Proximity to other advanced economies
Number of veto players	the political proximity to European countries
Military autocracy dummy	the intensity of trade with European countries
number of checks and balances	French Exports
Party autocracy dummy	Export to G5
Personalist autocracy dummy	Trade with G5 countries
Proximity to an Election Year	OECD Aid

Table 4.6: Overview of Political Variables used in the Reviewed Studies

4.3 Summary of Determinants of IMF Agreements

This chapter set out to identify determinants of IMF agreements used in the empirical literature. To do so, a literature review based on a systematic search strategy was conducted. A total of 55 studies were identified and their determinants of IMF agreements extracted. The following paragraphs summarises the key findings from the literature review and draw out implications for this study.

A great number of different variables have been employed as determinants of agreements. These can broadly be classified into two main themes. Determinants coming from economic variables and those that measure political circumstances of a country. Economic variables measure the level or change in economic performance and condition of a country. Political variables measure wider political circumstances of a country, either nationally or globally.

Various economic variables have been used to determine IMF agreements. While no common model of IMF participation has emerged from the literature, some variables are used more frequently than others. Overall, it appears that a countries national income, its stock or change in international reserves, its balance of payment position, inflation, government balance and exchange rate configuration are amongst the most commonly used indicators.

Similarly, a great set of political variables has been employed in studies in the attempt to determine when a country is entering into an IMF agreement. These variables can be classified into three main themes: (i) the country's relationship with the Fund, measured through the previous involvement in IMF agreements, its representation at the Fund through quotas and staff members. (ii) A country's role in the international political economy and its importance to stakeholders and economic powers, mostly the United States. (iii) A country's domestic political economy, measured though its regime type, proximity to elections and political stability as well as quality of governance.

Comparing the determinants used in the IMF and health expenditure literature with those used in the wider literature on IMF agreement determinants, some variation can be detected. Agreement seems to be reached about determinants of agreements within the literature assessing the relationship between IMF agreements and health

systems, particularly health spending. Apart from Clements et al (2013), all other studies follow the model proposed by Martin and Segura-Ubiergo (2004), which determines IMF agreements using variables to measure a country's current account balance, GDP growth and per capita GDP levels, its government balance, its government balance as well as a dummy to indicate if a country had an agreement in the previous year. The wider literature uses a much more varied set of determinants. In the context of this study, the selection of concepts of IMF agreement determinants will build on the model commonly used within the IMF and health expenditure literature but go beyond and include the most commonly used concepts within the general literature.

Categories and variables for inclusion in this study will be selected based on their importance in the overall literature, as judged by the frequency with which the variable is used. This means that the concepts of national income, international reserves, debt, balance of payment position, inflation, government balance, exchange rates, IMF activity and democracy/regime type will be considered as concepts to be potentially included in the selection model to determine IMF agreements. This allows for the comparison of the model that has seemingly been established in the health expenditure and IMF literature and the relative importance of the further variables. The next chapter presents, how these determinants can be operationalised using relevant datasets.

Appendices to Chapter 4

Appendix Note 4.1: Search Term Combinations: Determinants of IMF Agreements

Web of Knowledge

Best results were obtained with the following combination

(TS=(IMF OR "International Monetary Fund") OR TI=(IMF OR "International Monetary Fund")) AND (TI=(Determinant? OR participat?) OR TS=(Determinant? OR participat?))

Scopus

Best results were obtained with the following combination

ALL (IMF OR "International Monetary Fund") AND ALL (Determinant? OR participat?)

Google Scholar

Best results were obtained with the following combination

*IMF agreement determinant**

Appendix Note 4.2: List of Studies Obtained in Full-text

- Andersen, T. B., Harr, T. and Tarp, F. (2006) 'On US politics and IMF lending', *European Economic Review*, vol. 50, no. 7, pp. 1843-1862.
- Atoyan, R. and Conway, P. (2006) 'Evaluating the impact of IMF programs: A comparison of matching and instrumental-variable estimators', *Review of International Organizations*, vol. 1, no. 2, pp. 99-124.
- Barro, R. J. and Lee, J. W. (2005) 'IMF programs: Who is chosen and what are the effects?', *Journal of Monetary Economics*, vol. 52, no. 7, pp. 1245-1269.
- Bas, M. A. and Stone, R. W. (2014) 'Adverse selection and growth under IMF programs', *Review of International Organizations*, vol. 9, no. 1, pp. 1-28.
- Bauer, M. E., Cruz, C. and Graham, B. A. T. (2012) 'Democracies only: When do IMF agreements serve as a seal of approval?', *Review of International Organizations*, vol. 7, no. 1, pp. 33-58.
- Biglaiser, G. and DeRouen, K. (2011) 'How soon is now? The effects of the IMF on economic reforms in Latin America', *Review of International Organizations*, vol. 6, no. 2, pp. 189-213.
- Bird, G. (2007) 'The IMF: A Bird's Eye View of Its Role and Operations', *Journal of Economic Surveys*, vol. 21, no. 4, pp. 683-745.
- Bird, G., Mylonas, J. and Rowlands, D. (2015) 'The political economy of participation in IMF programs: a disaggregated empirical analysis', *Journal of Economic Policy Reform*, vol. 18, no. 3, pp. 221-243.
- Bird, G. and Rowlands, D. (2001) 'IMF lending: how is it affected by economic, political and institutional factors?', *The Journal of Policy Reform*, vol. 4, no. 3, pp. 243-270.
- Bird, G. and Rowlands, D. (2004) '9 The demand for IMF assistance', in Ranis, G., Vreeland, J. R. and Kosack, S. (eds.) *Globalization and the Nation State: The Impact of the IMF and the World Bank*, Abingdon: Routledge.
- Bird, G. and Rowlands, D. (2009a) 'Exchange Rate Regimes in Developing and Emerging Economies and the Incidence of IMF Programs', *World Development*, vol. 37, no. 12, pp. 1839-1848.
- Bird, G. and Rowlands, D. (2009b) 'a disaggregated empirical analysis of the determinants of IMF arrangements: does one model fit all?', *Journal of International Development*, vol. 21, no. 7, pp. 915-931.
- Breen, M. (2013) *The Politics of IMF Lending*, Basingstoke: Palgrave Macmillan.
- Broz, J. L. and Hawes, M. B. (2006) 'US domestic politics and international monetary fund policy', in G., D., Hawkins, D., Lake, D. (eds.) *Delegation and Agency in International Organizations* Cambridge: Cambridge University Press.
- Butkiewicz, J. L. and Yanikkaya, H. (2005) 'The effects of IMF and World Bank lending on long-run economic growth: An empirical analysis', *World Development*, vol. 33, no. 3, pp. 371-391.
- Cerutti, E. (2007) 'IMF Drawing Programs: Participation Determinants and Forecasting', *IMF Working Papers*, WP/07/152.
- Colleges, C. and Rowlands, D. (2012) 'IMF program participation: is political influence systematic or selective?', Working Paper 5th Annual Conference on The Political Economy of International Organizations.
- Conway, P. (1994) 'IMF lending programs - participation and impact', *Journal of Development Economics*, vol. 45, no. 2, pp. 365-391.
- Conway, P. (2004) 'Empirical implications of endogenous IMF conditionality', *Globalization and the Nation State: the Impact of the IMF and the World Bank*, in Ranis, G., Vreeland, J. R. and Kosack, S. (eds.) *Globalization and the Nation State: The Impact of the IMF and the World Bank*, Abingdon: Routledge.
- Conway, P. (2006) 'The International Monetary Fund in a time of crisis: A review of Stanley Fischer's IMF essays from a time of crisis: The international financial system. stabilization, and development', *Journal of Economic Literature*, vol. 44, no. 1, pp. 115-144.
- Conway, P. (2007) 'The revolving door: Duration and recidivism in IMF programs', *The Review of Economics and Statistics*, vol. 89, no. 2, pp. 205-220.
- Copelovitch, M. (2010) 'Master or servant? Common agency and the political economy of IMF lending', *International Studies Quarterly*, vol. 54, pp. 49-77.

- Dreher, A. (2004) 'A public choice perspective of IMF and World Bank lending and conditionality', *Public Choice*, vol. 119, no. 3-4, pp. 445-464.
- Dreher, A. (2006) 'IMF and economic growth: The effects of programs, loans, and compliance with conditionality', *World Development*, vol. 34, no. 5, pp. 769-788.
- Dreher, A., Sturm, J.-E. and Vreeland, J. R. (2009) 'Global horse trading: IMF loans for votes in the United Nations Security Council', *European Economic Review*, vol. 53, no. 7, pp. 742-757.
- Dreher, A. and Vaubel, R. (2004) 'Do IMF and IBRD Cause Moral Hazard and Political Business Cycles? Evidence from Panel Data', *Open Economies Review* vol. 15, no. 1, pp. 5-22.
- Edwards, M. S. (2005) 'Investor Responses to IMF Program Suspensions: Is Noncompliance Costly?', *Social Science Quarterly*, vol. 86, no. 4, pp. 857-873.
- Edwards, S. and Santaella, J. A. (1993) 'Devaluation Controversies in the Developing Countries: Lessons from the Bretton Woods Era', in Bordo, M. and Eichengreen, B. (eds.) *A Retrospective on the Bretton Woods System - Lessons for International Monetary Reform*, Chicago: Chicago University Press.
- Eichengreen, B., P. G. and A., M. (2006) 'Sudden Stops and IMF-Supported Programs', *IMF Working Paper* No. 12235.
- Elekdağ, S. (2006) 'How Does the Global Economic Environment Influence the Demand for IMF Resources?', *IMF Working Paper* WP/06/239.
- Evrensel, A. Y. and Kim, J. S. (2006) 'Macroeconomic policies and participation in IMF programs', *Economic Systems*, vol. 30, no. 3, pp. 264-281.
- Fails, M. D. and Woo, B. (2015) 'Unpacking Autocracy: Political Regimes and IMF Program Participation', *International Interactions*, vol. 41, no. 1, pp. 110-132.
- Garuda, G. (2000) 'The distributional effects of IMF programs: A cross-country analysis', *World Development*, vol. 28, no. 6, pp. 1031-1051.
- Gündüz, Y. B. (2009) 'Estimating Demand for IMF Financing by Low-Income Countries in Response to Shocks', *IMF Working Paper* WP/09/263.
- Harrigan, J., Wang, C. and El-Said, H. (2005) 'The politics of IMF and World Bank lending - Will it backfire in the Middle East and North Africa', in Paloni, A. and Zanardi, M. (eds.) *The IMF, World Bank and Policy Reform*, Abingdon: Routledge.
- Harrigan, J., Wang, C. G. and El-Said, H. (2006) 'The economic and political determinants of IMF and world bank lending in the Middle East and North Africa', *World Development*, vol. 34, no. 2, pp. 247-270.
- Hutchison, M. (2003) 'A cure worse than the disease? Currency crises and the output costs of IMF-supported stabilization programs', *Managing Currency Crises in Emerging Markets*, pp. 321-360.
- Hutchison, M. M. (2004) 'Selection bias and the output costs of IMF programs', *EPRU Working Paper Series*.
- Jensen, N. M. (2004) 'Crisis, Conditions, and Capital: The Effect of International Monetary Fund Agreements on Foreign Direct Investment Inflows', *Journal of Conflict Resolution*, vol. 48, no. 2, pp. 194-210.
- Jorra, M. (2012) 'The effect of IMF lending on the probability of sovereign debt crises', *Journal of International Money and Finance*, vol. 31, no. 4, pp. 709-725.
- Joyce, J. J. (1992) 'The economic characteristics of IMF program countries', *Economic Letters*, vol. 38, no. 2, pp. 237-242.
- Knight, M. and Santaella, J. A. (1997) 'Economic determinants of IMF financial arrangements', *Journal of Development Economics*, vol. 54, no. 2, pp. 405-436.
- Moser, C. and Sturm, J.-E. (2011) 'Explaining IMF lending decisions after the Cold War', *Review of International Organizations*, vol. 6, no. 3-4, pp. 307-340.
- Mukherjee, B. and Singer, D. A. (2010) 'International institutions and domestic compensation: The IMF and the politics of capital account liberalization', *American Journal of Political Science*, vol. 54, no. 1, pp. 45-60.

- Ortiz, D. G. and Bejar, S. (2013) 'Participation in IMF-sponsored economic programs and contentious collective action in Latin America, 1980-2007', *Conflict Management and Peace Science*, vol. 30, no. 5, pp. 492-515.
- Pop-Eleches, G. (2009) 'Public goods or political pandering: Evidence from IMF programs in Latin America and Eastern Europe', *International Studies Quarterly*, vol. 53, pp. 787-816.
- Presbitero, A. F. and Zazzaro, A. (2012) 'IMF Lending in Times of Crisis: Political Influences and Crisis Prevention', *World Development*, vol. 40, no. 10, pp. 1944-1969.
- Przeworski, A. and Vreeland, J. R. (2000) 'The effect of IMF programs on economic growth', *Journal of Development Economics*, vol. 62, no. 2, pp. 385-421.
- Reynaud, J. and Vauday, J. (2009) 'Geopolitics and international organizations: An empirical study on IMF facilities', *Journal of Development Economics*, vol. 89, no. 1, pp. 139-162.
- Steinwand, M. C. and Stone, R. W. (2008) 'The International Monetary Fund: A review of the recent evidence', *The Review of International Organizations*, vol. 3, no. 2, pp. 123-149.
- Stone, R. W. (2008) *The scope of IMF conditionality: How autonomous is the Fund?* University of Rochester.
- Sturm, J. E., Berger, H. and De Haan, J. (2005) 'Which variables explain decisions on IMF credit? An extreme bounds analysis', *Economics & Politics*, vol. 17, no. 2, pp. 177-213.
- Thacker, S. (1999) 'The high politics of IMF lending', *World Politics*, vol. 52, pp. 38-75.
- Trudel, R. (2005) 'Effects of exchange rate regime on IMF program participation', *Review of Policy Research*, vol. 22, no. 6, pp. 919-933.
- van der Laan, C. R., Cunha, A. M. and Alves, T. W. (2010) 'External financial liberalization and growth in emerging countries: a panel data estimation using a new index (1990-2004)', *Journal of Post Keynesian Economics*, vol. 33, no. 2, pp. 307-331.
- van der Veer, K. J. M. and de Jong, E. (2013) 'IMF-Supported Programmes: Stimulating Capital to Non-defaulting Countries', *World Economy*, vol. 36, no. 4, pp. 375-395.
- Veiga, F. (2005) 'Does IMF Support Accelerate Inflation Stabilization?', *Open Economies Review*, vol. 16, pp. 321-340.
- Vreeland, J. R. (2002) 'The effect of IMF programs on labor', *World Development*, vol. 30, no. 1, pp. 121-139.
- Vreeland, J. R. (2003) *The IMF and economic development*, Cambridge: Cambridge University Press.
- Vreeland, J. R. (2003) 'Why do governments and the IMF enter into agreements? Statistically selected cases', *International Political Science Review*, vol. 24, no. 3, pp. 321-343+397.
- Vreeland, J. R. (2004) 'Institutional determinants of IMF agreements', Working Paper UCLA International Institute.
- Vreeland, J. R. (2005) 'The international and domestic politics of IMF programs', Working Paper Reinventing Bretton Woods Committee and World Economic Forum Conference.
- Williams, L. K. (2012) 'Pick your poison: economic crises, international monetary fund loans and leader survival', *International Political Science Review*, vol. 33, no. 2, pp. 131-149.

Appendix Note 4.3: Study details: IMF Agreement Determinants

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
1.	Andersen et al (2006)	102 developing countries	1995-2000 (side model 1985-1994)	SBA, EFF	<ul style="list-style-type: none"> - Political proximity to US, based on similar votes in UN on key votes (+) - Change in proximity (as above) to previous year (+) - Index of both (+) - overall balance of payments (-) - per capita overall balance of payments (0) - current account (0) - current account balance as share of GDP (0) - debt (+) - debt to GNP (-) - interest payments to GNP (0) - International reserves to debt (0) 	<p>What is the US influence on IMF lending?</p> <p>Reflecting on Thacker (1999) paper</p>	<p>Thacker (1999) paper for side models; no info on other data sources for main model</p>
2.	Atoyán and Conway (2006)	95 countries	1993-2002	SBA, EFF, SAF, PRGT	<ul style="list-style-type: none"> - real per capita economic growth rate - ratios of fiscal balance to GDP - ratio of current-account balance to GDP 	<p>Do the effects of agreements differ depending on the estimation method? Addresses selection</p>	<p>WEO</p>

⁵⁹ (+) suggests a statistically significant positive relationship of being in an IMF agreement, (-) a significant negative one and (0) no significant relationship, (~) indicates mixed relationships, (*) indicates that no results are reported

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
3.	Barro and Lee (2005)	130 countries	1975-2000 (in 5 year blocks)	SBA, EFF	<ul style="list-style-type: none"> - ratio of foreign reserves to imports (-) - per capita GDP (0) squared (-) - total GDP (0) squared (-) - growth of GDP (-) - OECD dummy (0) - year dummy to control for external factors (*) - share of IMF quotas (0) and staff (0) - the political proximity to the United States (0) and the European countries (0) (based on the U.N. voting patterns) - the intensity of trade with the United States (+) and the European countries (0) 	What factors determine participation in IMF programmes?	IMF, Penn World Tables

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
4.	Bas and Stone (2014)	104 countries	1970-2008	Not clear, no differentiation made	<ul style="list-style-type: none"> - International reserves to imports of goods and services (+) - Central government overall surplus as a percentage of the GDP (0) - Total debt service (% of GNP) (+) - Real gross domestic investment (private and public) as a % of GDP (0) - Cumulative number of years a country has been under IMF agreements (0) - Total number of other countries in the world currently under an IMF agreement (excluding the given country itself) (0) - Dummy variable coded 1 if legislative elections were held in previous year (-) - Overall balance of payments in billions of US dollars (IFS) (-) - dictatorship (0) 	What factors determine participation in IMF programmes?	No info

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
5.	Bauer et al (2012)	142 countries	1976-2006	all agreements	<ul style="list-style-type: none"> - Previous year agreement dummy (+) - GDP (+) - GDP per capita (+) - Economic Growth (-) - Inflation (0) - Foreign reserves in months of import (-) - Number of countries under an IMF agreement (0) - Electoral competitiveness (0) 	What are the effect of IMF participation on FDI inflows? Addresses selection	WDI
6.	Biglaiser and DeRouen (2011)	15 Latin American Countries	1980-2003	SBA agreements	<ul style="list-style-type: none"> - Consumer price index (0) - Economic growth (-) - International reserves (-) - Trade (-) - Bilateral investment treaties US and Latin America (+) - Political Regime (+) - Ideology of president (-) - Years under agreement (+) 	What are the effects of IMF agreements on reform efforts? Addresses selection	Polity IV WDI

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
7.	Bird and Rowlands (2001)	95 countries	1974-1994	SBA, EFF, ESAF	<ul style="list-style-type: none"> - GNP per capita (0) - GDP growth (0) - Gross real GDP (0) - Reserves per import (-) - Changes in reserves (-) - Current account per GDP (-) - Real exchange rate change (+) - Debt-service ratio (+) - Changes in debt-service ratio (0) - Debt/GDP (-) - Arrears/debt (0) - Past rescheduling (+) - Imminent rescheduling (+) - Real LIBOR (0) - Changes in real Libor(+) - US export (-) - French Exports (0) - Socialist Regime (-) - Recent government change (0) - Civil freedom (0) - Coup frequency (+) - Past incomplete programs (0) - Imminent quota review (0) - IMF liquidity (0) - Imminent new government (-) - Past IMF agreements (+) 	What are the roles of economic and political and institutional factors in IMF lending?	IMF, World Bank, Europa Yearbook

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
8.	Bird and Rowlands (2004)	Unclear number of developing countries	1966-2000	SBA, EFF, ESAF	<ul style="list-style-type: none"> - GNP per capita (0) - GDP growth (0) - Gross real GDP (0) - Reserves per import (-) - Changes in reserves (-) - Current account per GDP (-) - Real exchange rate change (+) - Debt-service ratio (+) - Changes in debt-service ratio (0) - Debt/GDP (-) - Arrears/debt (0) - Past rescheduling (+) - Imminent rescheduling (+) - Real LIBOR (0) - Changes in real Libor(+) - US export (-) - French Exports (0) - Socialist Regime (-) - Recent government change (0) - Civil freedom (0) - Coup frequency (+) - Past incomplete programs (0) - Imminent quota review (0) - IMF liquidity (0) - Imminent new government (-) - Past IMF agreements (+) 	<p>What determines demand for IMF agreements?</p> <p>(same model as Bird/Rowlands (2001))</p>	No info

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
9.	Bird and Rowlands (2009b)	88 L&MIC	1977-2000	SBA, EFF, SAF, ESAF, PRGT	<ul style="list-style-type: none"> - GNP per capita (0) - GDP growth (-) - Reserve-to-import ratio (0) - % change in reserves/imports (0) - Current account balance/GDP (0) - % change in the current account (0) - Real exchange rate depreciation (0) - Debt service-to-exports ratio (0) - % change in debt-service ratio (0) - Public external debt/GDP ratio (0) - Current rescheduling (0) - Rescheduling in past years (0) - Inflation (0) - Fixed exchange rate regime (0) - Flexible exchange rate regime (0) - Market pressure index (+) - Current IMF program (+) - IMF program in prior year (+) 	Does one model fit to determine different IMF agreements?	WDI, IMF

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
10.	Bird and Rowlands (2009a)	Low and middle income countries	1973-2000	SBA, EFF, SAF, ESAF, PRGF	<ul style="list-style-type: none"> - GDP growth (-) - Current Account/GDP (0) - change reserves/imports (-) - Real depreciation (0) - Debt service/exports (0) - Current rescheduling (-) - Rescheduling next year (+) - Past IMF agreements (+) - Capital account restrictions (0) - Exchange rate regime (~) 	What role does Exchange Rate regime play in entering into an agreement	WDI Reinhart/Rogoff (2004)
11.	Bird et al (2015)	114 countries	1984-2008	All agreements (distinction between agreement types in sub-analysis)	<ul style="list-style-type: none"> - Past IMF programme - IMF debt as share of GDP - Crude oil prices - Agriculture prices (+) - Export to G5 (-) - UN voting proximity (+) - US economic aid (+) - Legislative election (+) - Executive elections (+) - Debt service to exports ratio (+) - Current account/GDP (+) - Reserves to months of imports (-) - Real per capita GDP growth (-) - Real per capita GDP (-) - Official arrears (-) - Private arrears (+) 	What factors determine whether or not countries have programs with the IMF?	No explicit info

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
12.	Breen (2013)	159 L&MIC	1983-2006	All agreements	<ul style="list-style-type: none"> - Trade with G5 countries (+) - International reserves in months of imports (-) - Current account balance (0) - External debt (0) - Debt service (0) - GDP per capita (0) - GDP growth rate (-) - IMF quota review (0) - IMF delegation index (0) - Financial crisis index (+) - US military aid (0) - Systemic transition (+) 	What are the determinants of IMF agreements?	WDI IMF USAID
13.	Broz and Hawes (2006)	96 countries	1983-2002	All agreements	<ul style="list-style-type: none"> - International Reserves (0) - Trade Openness (+) - Debt service (0) - Debt (-) - Prior agreement (+) - US Bank exposure (+) - UN voting (0) - German Bank exposure (+) 	What is the role of politics in IMF lending?	IMF IFS WB WDI

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
14.	Cerutti (2007)	59 developing, non-PRGT eligible countries	1982-2005 (quarterly basis)	SBA, EFF	<ul style="list-style-type: none"> - Real GDP growth (-) - CPI inflation (0) - fiscal government budget surplus (as a percentage of GDP) (0) - external current account balance (as proportion of GDP) (0) - net international reserves (as a proportion of months of imports) (-) - real effective exchange rate (0) - past programs (+) - member country quotas (0) - IMF liquidity (0) - real world interest rates based on LIBOR) (0) - real world GDP growth (-) - previous agreements (+) 	Which factors determine IMF lending?	WEO, IFS

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
15.	Conway (1994)	74 developing countries	1976-1986	SBA, EFF	<ul style="list-style-type: none"> - Ratio of foreign-exchange reserves to imports (-) - Measure of participation in next period (0) - Growth rate of real gross national product (0) - Ratio of current account to GNP (0) - World real rate of interest for that country (-) - Terms of trade (-) - Stock of international debt long-term (+) - Stock of international debt short-term (+) 	What are the determinants of participation in IMF programmes?	World Bank, IMF

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
16.	Copelovitch (2010)	47 countries	1984-2003	All agreements	<ul style="list-style-type: none"> - Exposure to international banks (0) - Years since last loan (0) - GDP (0) - GDP per capita (0) - GDP growth (-) - Current Account/GDP (-) - External debt/GDP (0) - External debt service/exports (0) - Short-term debt/reserves (+) - Currency crisis (0) - Veto players (0) - IMF liquidity ratio (0) - Currency crises worldwide (0) - LIBOR (%) (0) 	What determines IMF agreement?	No information
17.	Dreher (2006)	98 developing countries	1970-2000 (5 year averages)	All agreements	<ul style="list-style-type: none"> - Short-term debt (percent of total debt) (-) - Total debt service (in percent of GDP) (+) - Democracy, index (-) 	What are the effects of IMF on GDP? Accounts for selection	IMF Dreher (2002) World Bank

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
18.	Dreher et al (2009)	197 countries	1951-2004	SBA, EFF, SAF, ESAF, PRGT	<ul style="list-style-type: none"> - UN Security Council Membership (+) - Past IMF agreements (+) - GDP per capita (-) - Autocracy (0) - Investment (-) - Debt service (+) - number of checks and balances (+) - Budget surplus (+) - Lagged election (0) - Foreign reserves (+) - Growth in real GDP per capita (0) - Inflation (0) - Changes in international reserves (0) - Current account balance (0) 	Does UN Security Council membership impact on IMF agreement uptake?	IMF, UN, WB
19.	Edwards (2005)	106 developing countries	1979-1995	All agreements	<ul style="list-style-type: none"> - Debt (+) - Reserves (-) - Growth (-) - Terms of trade (0) - Change in net domestic credit (0) 	What are the effect of IMF agreements on portfolio investment inflows Addresses selection	

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
20.	Edwards and Santaella (1993)	48 countries	1954-1971	All agreements	<ul style="list-style-type: none"> - GDP per capita (-) - Change in real exchange rate (0) - Change in current account deficit (0) - Net foreign assets ratio (-) - Political strikes (0) - Political assassinations (0) - Frequency of coups (+) - Dictatorship (-) - Political ideology of ruling power (0) 	Devaluation and IMF agreements	IFS
21.	Eichengreen et al (2006)	unclear	1990-2003	All agreements	<ul style="list-style-type: none"> - US Aid (+) - Real Growth (0) - Trade Balance/GDP (+) - Debt Servicing/Exports (+) - Domestic Credit/GDP (0) - Change in Domestic Credit/GDP (0) - Debt/GDP (+) - Change in Debt (0) - Reserves/Imports (0) - Short Term debt/reserves (-) - Exchange rate regime (~) 	Effects of agreements on sudden stops. Fit selection model to account for bias	IMF WB

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
22.	Fails and Woo (2015)	115 countries	1946-2006	All agreements	<ul style="list-style-type: none"> - Total reserves in months of imports (-) - Total debt service (% of exports of goods, services, and income) (+) - Current account balance (+) - Negative growth year (+) - Previous IMF borrower (+) - Under IMF in previous year (+) - Party autocracy dummy (0) - Personalist autocracy dummy (0) - Military autocracy dummy (0) - Log GDP per capita (0) - Log of GDP (0) - Affinity to United States (+) - Regime duration (0) - Interactions of variables with autocracy variables (~) 	Do different regime (autocracy) types impact on participation in IMF agreements?	WB, IMF, various dedicated datasets for autocracy

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
23.	Garuda (2000)	39 countries	1975-1991	All agreement	<ul style="list-style-type: none"> - Current account balance to GDP ratio (0) - Percentage of labour force in agriculture (0) - Percentage of change in consumer prices (0) - Change in real GDP (0) - Government budget deficit to GDP ratio (0) - Foreign reserves to import ratio (-) - terms of trade index (-) - Real short-term debt (+) 	What are the effects of IMF agreements on gini coefficient? Accounts for selection	Deininger-Squire database on income distribution
24.	Gündüz (2009)	55 countries	1980–2004	SBA, PRGT, CFF, SAF, ESAF	<ul style="list-style-type: none"> - Current Account balance (-) - Reserves in months of import (-) - Macroeconomic stability indicator (+) - GDP growth (-) - Change in terms of trade (-) - Change in oil price (+) - World trade (-) - Non-oil commodity prices (0) - Growth of goods export (0) - Paris club dummy (+) 	What determines demand for IMF agreements?	IMF WB

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
25.	Harrigan et al (2006)	11 MENA countries	1975-2000	SAF, ESAF, PRGT	<ul style="list-style-type: none"> - Peace treaty with Israel (+) - GDP per capita (0) - GDP growth rate (0) - Debt service ratio of exports of goods and services (+) - Short-term debt as % of total debt (0) - Balance of payment position (0) - Changes in reserves (0) - Democracy index (0) - Legislative election year (0) 	What determines IMF agreements in the MENA region?	Freedom House, WDI, World Bank DPI database
26.	Hutchison (2003)	67 L&MIC	1975-1997	SBA, EFF, SAF, ESAF, PRGT	<ul style="list-style-type: none"> - Change in current account to GDP ratio (0) - Change in budget surplus to real GDP ratio (-) - Change in budget surplus to GDP ratio (+) - Inflation (0) - Real per capita GDP growth (0) - Foreign exchange reserves to imports ratio (-) - Real per capita GDP (0) - exchange rate overvaluation (0) - Currency crises dummy (+) - Africa dummy (-) - Asia dummy (-) - Latin America dummy (0) - Autocracy (0) - Post-1979 Dummy (0) 	Effect of IMF agreements on output growth Estimates selection model	Not so clear

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
27.	Hutchison (2004)	developing countries	1975-1997	EFF, SBA	<ul style="list-style-type: none"> - Debt to GDP Ratio (+) - Debt Service to Imports (-) - Change in budget surplus to GDP ratio (-) - Foreign Exchange to Imports Ratio (-) - Other IMF programs (0) - Currency crises dummy (+) - Asia Dummy (0) - Latin America dummy (0) - Capital Formation (0) 	What are the effects of IMF agreements on output growth? Use different matching techniques to account for selection	unclear
28.	Jensen (2004)	68 countries	1970-1998	All agreements	<ul style="list-style-type: none"> - Lag of IMF participation (+) - Political regime (0) - GDP per capita (0) - GDP growth (-) - Budget deficit (0) - Central government debt (+) - Market size (0) - Inflation (0) - Domestic investment (0) - Foreign reserves in months of import (-) 	What are the effects of IMF agreements on FDI inflows? Account for selection.	World Bank IMF
29.	Jorra (2012)	57 developing economies	1975-2008	SBA, EFF, PRGT	<ul style="list-style-type: none"> - GDP growth (+) - Reserves/imports (-) - UN voting (+) - Short term debt as share of total debt (+) - Debt service as share of exports (+) 	How does adoption of IMF programs affect sovereign risk. Fit selection model to account for selection bias	No info

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
30.	Joyce (1992)	45 countries	1980-1994	All agreements	<ul style="list-style-type: none"> - Central bank holdings of domestic assets (0) - Government expenditure to GDP (+) - Current account balance to exports (0) - Inflation (0) - International reserves to imports (-) - Per capita GDP (0) - Commitments for loans from private sources (0) - Total debt service to export (0) 	What are the determinants of IMF agreements	IMF World Bank

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
31.	Knight and Santaella (1997)	91 developing countries	1973-1991	EFF, SAF, ESAF	<ul style="list-style-type: none"> - Stock of international reserves in months of import (-) - External current account, percentage of GDP (-) - Consumer price index, percentage change (0) - External debt service percentage of exports (+) - External debt, percentage of GDP (+) - Non-fund financing flow, months of imports (+) - GDP per capita (-) - Terms of trade (+) - Export markets (-) - Gross fixed capital formation (-) - Overall balance of payments (-) - Real effective exchange rate (-) - GDP per capita, current USD (-) - Previous fund agreement (+) - Nominal depreciation exceeding 5% (+) - Government revenues (+) - government expenditure (-) - Two year change in real domestic credit (0) 	Which factors lead to IMF approval of financial agreements?	IMF WEO

32.	Moser and Sturm (2011)	165 countries	1990-2009	all agreements and divided for concessional / non-concessional agreements	<ul style="list-style-type: none"> - total reserves in months of imports (0) - real GDP growth (0) - GDP per capita (0) - investment as percentage of GDP (0) - debt service scaled to exports (0) - external debt scaled to Gross National Income, GNI (+) - external balance on goods and services scaled to GDP (0) - economic globalization (0) - terms of trade adjustment scaled by GDP (0) - government budget deficit as percentage of GDP (0) - short-term debt scaled by total foreign debt (0) - fixed exchange rate (0) - currency crisis (0) - de jure measure for financial openness (0) - years under IMF—last 5 years, moving average (0) - elections for the executive and legislative - political instability (0) - social unrest (0) - Freedom House index (0) - political globalization (0) 	Which economic and political factors affect a country's likelihood to sign an arrangement with the IMF? (extended version of Sturm et al, 2005) (also has a literature review part)	No info
-----	------------------------	---------------	-----------	---	---	---	---------

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
					<ul style="list-style-type: none"> - quality of government indicator (0) - temporary membership on the UN Security Council (0) - share in world GDP (0) - share of a country's bilateral trade with the United States relative to the country's GDP (0) - vote in line with the US in UN Security Council (0) 		
33.	Mukherjee and Singer (2010)	87 countries	1975-2002	all agreement	<ul style="list-style-type: none"> - Veto Players (0) - Reserves (-) - Inflation (0) - GDP per capita (-) - Current Account (0) - Output Loss (+) - Terms of Trade Shock (0) - systemic banking crisis (+) - Size of banking sector (0) - Previous IMF program (+) - GDP growth rate (0) 	What is the impact of IMF agreements on Capital Account Liberalization? Accounts for selection	World Bank and IMF

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
34.	Ortiz and Bejar (2013)	17 Latin American countries	1980-2007	all agreements	<ul style="list-style-type: none"> - GDP per capita (-) - output loss (0) - external debt/GDP (+) - balance of payments/GDP (0) - foreign reserves/GDP (0) - inflation (0) - election year (-) - veto players (+) - democracy (0) - IMF lagged (-) 	relationship between International Monetary Fund (IMF)-sponsored economic programs and contentious collective action in Latin America. Fits a selection model of IMF participation	World Bank and dedicated protest datasets
35.	Pop-Eleches (2009)	Latin American and Eastern Europe countries	1982-2001	All agreements	<ul style="list-style-type: none"> - Interest payments (+) - Reserves (-) - Inflation (0) - Government Orientation (0) - Quality of bureaucracy (0) - Regime (0) - GDP per capita (0) - IMF Programme history (+) 	Do political determinants play a role in IMF agreements?	IMF WB

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
36.	Presbitero and Zazzaro (2012)	56 countries	2008-2010	all agreements	<ul style="list-style-type: none"> - growth over previous years (0) - Current account balance (-) - International Reserves (-) - GDP per capita (0) - Growth (-) - Inflation (+) - Corruption (0) - GDP (0) - IMF quota (0) - Non-compliance (0) - election 18 months before the IMF loan (+) - earlier agreements (-) 	Is IMF lending affected by politico-economic interests of the Fund's main shareholders?	WDI, IMF, dedicated datasets

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
37.	Przeworski and Vreeland (2000)	79 countries	1970-1990	all agreement	<ul style="list-style-type: none"> - foreign reserves in terms of monthly import (0) - Deficit: surplus of government budget as a proportion of GDP (-) - Debt service as a proportion of GDP (+) - gross domestic investment private and public as a proportion of GDP (-) - sum of past years under agreements for a country (0) - number of other countries currently under IMF agreements (0) - Lagged election (+) - overall balance of trade in constant 1987 US\$ (-) - Regime type [Dictatorship/democracy] (0) 	What are the effect of IMF agreements on economic growth? Account for selection.	World Bank Penn World Tables ACLP World Political/Economic Database

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
38.	Stone (2008)	96 countries	1990-2002	All agreements	<ul style="list-style-type: none"> - Foreign Debt /GDP (+) - Current Account Deficit /GDP (0) - Budget Deficit /GDP (+) - Past Participation in IMF Programs (0) - GDP per capita (-) - Net Foreign Direct Investment (0) - Proximity to an Election Year (0) - Foreign Debt (+) - Institutional Weakness (-) - Institutional Effort (+) - U.S. Aid Recipient (0) - UN Voting (S-Score with U.S.) (0) - IMF Quota (0) - OECD Aid (0) 	Role of IMF conditionality Account for selection	IMF World Bank

39.	Sturm et al (2005)	118 countries	1971-2000	all agreements	<ul style="list-style-type: none"> - International reserves to imports (+) - Real GDP growth (+) - Debt service to exports (+) - Current Account Balance to GDP (+) - External debt/GDP (0) - Income per capita (+) - inflation (0) - Growth of the nominal exchange rate to USD (0) - government budget deficit/GDP (0) - growth rate of the terms of trade (0) - investment/GDP (+) - LIBOR (0) - government expenditure/GDP (0) - five-year moving average of a dummy indicating whether or not a country was under an agreement (+) - number of other countries in which the Fund is involved (0) - election years for the executive (0) - election years for the legislative (0) - repudiation of government contracts (+) 	<p>Which factors are associated with IMF lending activity?</p> <p>Includes literature review</p>	World Bank, Freedom House, IMF, dedicated datasets
-----	--------------------	---------------	-----------	----------------	---	--	--

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
					<ul style="list-style-type: none"> - rule of law (0) - corruption (0) - further indicators of liberal governments (0) - indicators of social unrest (0) 		
40.	Thacker (1999)	78 countries	1985-1994	SBA, EFF	<ul style="list-style-type: none"> - Balance of payment (-) - Current account (0) - Debt/GNP (0) - Debt service/GNP (+) - Reserves/debt (-) - GNP per capita (-) - Default dummy (+) - Money supply (0) - Budget deficit (0) - Trade Openness (0) - US exports to country (0) - US direct investment (0) - Index for political agreement with US (~) - Energy production (0) - Democracy indicator (0) 	What role do political determinants in IMF lending?	WB IMF

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
41.	Trudel (2005)	unclear	1960-2000	all agreement	<ul style="list-style-type: none"> - Reserves (-) - Per Capita Real GDP Growth (-) - Per Capita Real GDP (-) - Real GDP (+) - Real Trade (-) - Deficit/GDP (0) - Current Account/GDP (0) - Previous IMF Program (+) - Regime (0) - Fixed Exchange Rate (0) 	Does the effect of international reserves on IMF participation depend on the exchange rate regime?	WDI IMF
42.	van der Veer et al (2013)	49 middle-income-countries	1984-2004	EFF, SBA without debt restructuring	<ul style="list-style-type: none"> - US aid/share of total aid (+) - Real GDP growth (-) - Trade/GDP (0) - Debt servicing/exports (+) - Change in debt/GDP (0) - Reserves/imports (0) - Short-term debt/reserves (-) - Domestic credit/GDP (0) - Change in domestic credit (+) - Pegged Exchange rate (+) - UN voting (0) 	What are the effect of IMF agreements on FDI? Account for selection	World Bank, IMF
43.	Veiga (2005)	10 countries	Quarterly 1957-1999	All agreements	<ul style="list-style-type: none"> - Amount drawn to agreed amount (0) - IMF lagged (0) - Reserves (0) - Inflation (+) - Fragmentation of political system (+) - GDP growth (+) 	Does IMF support accelerate inflation stabilization?	IMF Political handbook Polity IV

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
44.	Vreeland (2002)	110 countries	1961-1993	SBA, EFF, SAF, ESAF	<ul style="list-style-type: none"> - Real GDP per capita (-) - Growth (-) - Years under current agreement (+) - Total number of other countries under agreements (0) - Lagged elections (+) - Regime [dictatorship/democracy] (0) - Exchange rate (0) - Investment (0) 	What are the effect of IMF programs on the labour share of income from manufacturing? Accounts for selection	World Bank Penn World Tables
45.	Vreeland (2003)	135 countries	1951-1990	SBA, EFF, SAF, ESAF	<ul style="list-style-type: none"> - Reserves (-) - Budget Balance (-) - Debt Service (+) - Investment (-) - Years under (0) - Number of other countries under agreements (+) - Lagged elections (+) - Balance of Payments (-) - Regime (0) 	What are the Effects of IMF agreements on Growth? How are governments selecting into IMF agreements	World Bank, IMF, Dedicated Datasets

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
46.	Vreeland (2004)	179 countries	1975-1996	all agreements	<ul style="list-style-type: none"> - Number of Veto players (~) - GDP per capita (-) - Foreign reserves (as a proportion of average monthly imports) (-) - Debt service (as a percentage of GNP) (+) - Investment (as a percentage of GDP) (-) - budget surplus as a percentage of GDP (0) - Current account balance (0) 	Do domestic institutions influence decisions to participate in IMF programs?	Unclear in detail
47.	Vreeland (2005)	180 countries	1975-2000	all agreements	<ul style="list-style-type: none"> - Per capita income (-) - Current account (% GDP) (0) - Foreign reserves (-) - Debt service (% exports) (0) - Past participation (0) - Number of veto players (0) - Change in alignment between country & US (0) 	Do international and domestic politics matter when countries take up IMF agreements?	Unclear in detail

#	Study	Countries	Years	Agreements	Determinants ⁵⁹	Research Question	Data Sources
48.	Williams (2012)	unclear	1970-1999	all agreements	<ul style="list-style-type: none"> - Political Stability (-) - Real effective exchange rate (0) - Foreign reserves (-) - Trade balance (0) - Government debt/GDP (0) - GDP growth (0) - Inflation (0) - Oil crisis: 1974–9 (+) - Leader tenure (in years) (-) - Previous IMF agreements (+) - Number of previous loans (0) - Other countries in agreements (0) 	What are the determinants of participation and duration of IMF agreements?	IMF, WDI Polity IV

Studies from the IMF and health systems review

#	Study	Countries	Years	Agreements	Determinants ⁶⁰	Research Question	Data Sources
1.	Clements et al (2013)	140 developing countries	1985-2009	All agreement	<ul style="list-style-type: none"> - Bilateral Exchange rate (0) - exchange rate regime (+) - Government Balance (0) - IMF programme in previous year (+) - International Reserves (0) 	What are the effects of IMF agreements on health expenditure in low- and non-low-income countries? Account for selection	IMF HE dataset
2.	Hoodie/Hartzell (2014)	44 countries	1985-1998	all agreement	<ul style="list-style-type: none"> - GDP per capita - Democracy 	what are the effects of IMF SAPs on the	IMF, Vreeland (2003),

⁶⁰ (+) suggests a statistically significant positive relationship of this determinant and HE, (-) a significant negative one and (0) no significant relationship

#	Study	Countries	Years	Agreements	Determinants ⁶⁰	Research Question	Data Sources
					<ul style="list-style-type: none"> - years under agreement - Regime durability 	public health performance? Account for selection	dedicated datasets
3.	Kentikelenis et al (2015)	63 Low income countries	1985-2009	all agreement	<ul style="list-style-type: none"> - Current account balance (0) - Democracy (0) - GDP growth (0) - GDP per capita (-) - Government balance (0) - IMF program (+) 	What are the effects of IMF agreements on health spending? Account for selection	IMF, WDI, quality of government
4.	Martin and Segura-Ubiergo (2004)	146 countries	1985-2000	all agreement	<ul style="list-style-type: none"> - Current account balance (0) - Democracy (-) - GDP growth (0) - GDP per capita (-) - Government balance (+) - IMF program (+) 	What are the effects of IMF agreements on health spending? Account for selection	WEO, WDI, IMF HE
5.	Nooruddin and Simmons (2006)	92 countries	1990-2000	all agreement	<ul style="list-style-type: none"> - Current account balance (-) - Democracy (0) - GDP growth (-) - GDP per capita (-) - Government balance (+) - IMF program (+) 	What are the effects of IMF programmes on health spending? Special emphasis on the role of democracy Account for selection	WEO, WDI, IMF HE
6.	Pandolfelli (2014)	37 African countries	1990-2005	all agreement	<ul style="list-style-type: none"> - GDP per capita - multilateral debt service - internal conflict - democracy - United States ally 	do IMF agreements impact on maternal mortality in SSA? Fit selection model to account for selection bias	Not clear

#	Study	Countries	Years	Agreements	Determinants ⁶⁰	Research Question	Data Sources
7.	Stuckler et al (2008)	21 post-communist countries	1985-2009	0/1 of agreement	<ul style="list-style-type: none"> - Change in Real GDP (0) - per Capita GDP (-) - Freedom House Democratization Index (-) - Military Conflict (-) - Percentage of Population Working Age (0) - Percentage of Urban Population (0) - Dummy for Non-IMF Lending (+) - Size of Largest Titular Nationality (+) - Number of Countries Participating in IMF Programs (0) - Foreign Direct Investment (0) 	What are the effect of IMF agreement on health outcomes? Account for selection	UNAIDS HIV Database, WHO Tuberculosis WHO Health For all WDI Freedom House

5

Establishing the Dataset

This chapter sets out to construct the dataset used for the analyses of this study and is structured along the four main data components needed for this study. The first section discusses data sources for country-level government health expenditure (GHE), the dependent variable of this study, along with ways to measure GHE. The second section presents the way IMF agreements are measured in this study. The third section justifies the inclusion and exclusion of countries for this study. Section four builds on the literature reviews conducted in chapters 3 and 4 and discusses variables and data sources used to operationalise the concepts commonly used to determine government health expenditure and IMF agreements. Section five summarises the chapter and briefly discusses data quality issues.

5.1 The Dependent Variable: Government Health Expenditure

Government health expenditure is one of the determinants of health system capacity and universal health coverage (UHC) and is considered the dependent variable for this study (see section 1.1; pg. 6). This section discusses first which of the available datasets are most suitable for this study, before secondly discussing which

ways of measuring GHE are most useful in the context of this study. The third part of this section summarises.

5.1.1 Sources of Government Health Expenditure Data

For the analysis of this study GHE is measured across countries and time. A small number of datasets are available that hold this type of data⁶¹, they include the WHO National Health Accounts (NHA) (WHO, 2013), the World Bank World Development Indicators (WDI) (World Bank, 2015), the IMF Government Finance Statistics (GFS) dataset (IMF, 2015d), and the IMF Health Expenditure Dataset (Clements et al, 2011)⁶². These datasets vary in the number of countries and years they cover, their completeness⁶³ as well as the way health expenditure is measured. The following sections outline key characteristics of each dataset before discussing their suitability for this study. Table 5.1 shows a summary of the datasets.

Source	Countries	Years	Completeness
WHO NHA	194	1995-2012	99%
WB WDI	216	1995-2012	86%
IMF GFS	160	1990-2012	23%
IMF Health Expenditure Dataset	145	1985-2009	66%

Table 5.1: Sources for Government Health Expenditure Data

5.1.1.1 WHO National Health Accounts

The National Health Accounts “constitute the systematic, comprehensive and consistent monitoring of resource flows in a country’s health system” (WHO, 2002) and trace financial resources flowing through the health system each year. They thereby offer detailed statistics on health expenditure measured at an annual interval for the years 1995 to 2012⁶⁴ and cover a total of 194 countries of all income groups.

⁶¹ An additional source of data could be seen in getting the data points directly from each country locally. It is however argued that this is, due to the large number of countries, beyond the scope of this study (see section 5.5; pg. 206).

⁶² An additional dataset is available from the OECD Health Statistics (OECD, 2015), which only holds data for member states of the OECD (a club of rich-world countries) and is thus not relevant for this study.

⁶³ Completeness is determined as the ratio of possible data points to available data points. 100% thereby describes the situation where data for all year and country data points is available.

⁶⁴ While later data are now available, at the time of analysis and writing, 2012 was the latest available year.

The NHA provide “evidence to monitor trends in health spending for all sectors, public and private, different health care activities, providers, diseases, population groups and regions in a country.” (WHO, 2013). Health spending is defined as “expenditure encompass[ing] all expenditures for activities whose primary purpose is to restore, improve, and maintain health for the nation and for individuals during a defined period of time” (WHO, 2013).

The available data is sub-classified in a number of ways. The main distinction is between “financing by source” and “financing by agents”. The former distinguishes the sources of the funds between public sources and those that come from the rest of the world. That is “the sum of sources channeled towards health by all non-resident institutional units that enter into transactions with resident units, or have other economic links with resident units, explicitly labelled or not to health, to be used as mean of payments of health goods and services by financing agents in the government or private sectors. Includes donations and in-kind resources.” (WHO, 2015). Classifying funds by financing agents allows for separating total expenditure on health, which are all funds mobilised by the system, into general government expenditure and private expenditure on health.

General government expenditure are “the sum of outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind by government entities, such as the Ministry of Health, other ministries, parastatal organizations, social security agencies, (without double-counting the government transfers to social security and to extra-budgetary funds). Includes transfer payments to households to offset medical care costs and extra-budgetary funds to finance health services and goods. The revenue base of these entities may comprise multiple sources, including external funds”. (WHO, 2015). Private expenditure are “the sum of outlays for health by private entities, such as households, commercial or mutual health insurance, non-profit institutions serving households, resident corporations and quasi-corporations with a health services delivery or financing function. It includes expenditures from all sources, so includes any donor funding passing through these ‘financing agents’” (WHO, 2015).

The WHO dataset collects the data from various sources, including the OECD Health Statistics dataset, national health accounts as reported by countries and other national and international reports, quantifying the specific categories of health expenditure, for instance from statistical yearbooks, reports of ministries or other expenditure reports (WHO, 2002). The quality of the data varies by year and country as not all data are based on complete data, but might be generated based only on partial documentation or be completely estimated. Where data are unavailable the WHO estimates these using extrapolation techniques, which may be based on variation of other macro-data (Musgrove et al, 2002; WHO, 2002). The NHA is arguably most commonly used in cross-country studies of health expenditure.

5.1.1.2 World Bank World Development Indicators

An alternative source of health expenditure data is found in the World Bank's WDI Dataset. The variables capture expenditure for "the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation" (World Bank, 2015). Data are available for 216 countries and territories, and the years 1995 to 2012⁶⁵. Similar to the above WHO NHA dataset, data are available for private and public government subgroupings of health expenditure. Data completeness is generally good as expenditure data is available for 86% of the 3888⁶⁶ data points. The World Bank's metadata (World Bank, 2015) indicate that the data are sourced from the WHO NHA dataset outlined above. Analyses comparing both datasets indicate that generally and for the data points available from both datasets, more than 95% of the variation in one dataset is explained using the other dataset, which suggests that both datasets are indeed very similar and hold pretty much the same data.

⁶⁵ Similar to the NHA, later data are now available, at the time of analysis and writing, 2012 was the latest available year.

⁶⁶ There are a total of 3888 case-years based on the number of years times the number of countries.

5.1.1.3 IMF Government Finance Statistics

A third source for government health expenditure data is the IMF GFS dataset. The variables in this dataset capture health expenditure as “government outlays on health including expenditure on services provided to individual persons and services provided on a collective basis. Collective health services are concerned with matters such as formulation and administration of government policy; setting and enforcement of standards for medical and paramedical personnel and for hospitals, clinics, surgeries, etc.; regulation and licensing of providers of health services; and applied research and experimental development into medical and health-related matters” (IMF, 2014c). Data coverage stretches across 160 countries and generally the years 1972 to 2012⁶⁷, however, the earliest available data point for health expenditure is for the year 1990. Despite covering a fairly long time period providing, in theory, 3680 data points⁶⁸, data availability seems rather poor as data are only available for roughly 23% of all cases.

5.1.1.4 IMF Health Expenditure Dataset

With the publication of the article by Clements et al (2013), a new health expenditure dataset has become publically available. The dataset covers 145 low- and middle-income countries for the years 1985-2009 and provides variables with information on “public health spending”. A more detailed explanation of “public” is not offered. Data are compiled from a number of sources, including databases of the “Asian Development Bank, Eurostat, the IMF (Government Finance Statistics), UNESCO, the World Bank, the World Health Organization, and IMF country desks” (Clements et al, 2011). While the dataset covers the longest stretch of data with a total of 3625 data points, roughly 34% of all data points are missing. Comparing the dataset with the WHO dataset suggests are fairly low level of similarity as only around 60% of the variation in one dataset is explained in the other (Lu et al, 2010).

⁶⁷ Similar to the NHA and WDI, later data are now available, at the time of analysis and writing, 2012 was the latest available year.

⁶⁸ There are a total of 3680 case-years based on the number of years (1995-2012) times the number of countries.

5.1.1.5 Choosing a Dataset

Based on the outline of the four datasets above, one dataset needs to be selected for this study. This decision about the most suitable dataset is based on the best data coverage, both in terms of years and countries as well as actually available data points. The IMF's lending activity has happened constantly over the last decades since its foundation in 1945 and has been available to all of its member countries. The dataset for health expenditure should therefore cover as many years and countries as possible.

While the IMF Health Expenditure Dataset covers the longest time period (1985-2009) it does so only for 145 countries and data coverage is rather limited as only 66% of all data points are actually available. Additionally, the dataset does not cover the latest years for the period after 2009⁶⁹. Furthermore, the description of the dataset is somewhat limited, suggesting only that the data represent "public health expenditure", without giving further details as to its precise meaning. Additionally, the sources of the individual data points are somewhat unclear.

The content of the health expenditure variables measured in the IMF GFS Dataset seems much clearer and the data stretch a long period of time (1990-2012) including the latest years. Data availability, however, is rather poor as data points are only available for around 23% of all cases. Using this dataset would, due to this low level of availability, suggest that all analyses could only be based on a rather small sample of countries and years.

The WHO NHA dataset offers the best availability as data is available for virtually all data points. Additionally, data cover a reasonably long period of time for a large number of countries. While the World Bank WDI dataset seemingly offers a greater scope of countries (216 vs 194) it is worth noting that no additional data points are available for the 22 countries and territories not covered in the WHO NHA dataset. This is likely because the World Bank sources its data from the WHO NHA dataset. Additionally, it was shown that both datasets have a high level of comparability. This

⁶⁹ E-mail communication with the IMF suggests that no updated version of this dataset is available.

suggests that when choosing either the WHO or the World Bank dataset, virtually the same data will be used.

Comparing all datasets, it appears that the WHO NHA offers the best choice for this study as it covers a large number of years and countries and provides data for virtually all cases. Additionally, the NHA seem to be the most established dataset as it is constantly employed in studies involving cross-country comparisons of health expenditure. Musgrove et al (2002) argue that the WHO NHA dataset is the only available and reasonably complete source of health expenditure, especially for non-OECD countries. It is worth noting that while the studies on health expenditure generally use the WHO dataset, especially the latest IMF and health expenditure studies (Clements et al, 2013; Kentikelenis et al, 2015b) rely on the IMF health expenditure dataset. However, Clements et al (2013) seems to be using this dataset as an IMF author and Kentikelenis et al (2015b) uses the dataset to replicate this study (see section 2.2.2.1.2; pg. 46). Given that the WHO dataset is generally the most established dataset with best coverage and availability, this study will rely on the WHO dataset to source the dependent variable.

5.1.2 Measuring Government Health Expenditure

Having established which dataset to draw the health expenditure data from, the way in which health expenditure should be measured is an important next step for discussion. While government health expenditure always represents the monetary value a government of a given country is dedicating to the publically financed health system in a given year, this value can be expressed in different ways, giving rise to different interpretations and potentially different conclusions (De Deken and Kittel, 2007). In order to choose the most adequate way(s) of measuring health expenditure for this study, this section outlines different ways of measurement, their underlying assumptions and suitability for this study. The options include measuring health expenditure in absolute terms, as percentage of GDP or government expenditure, spending per capita or the percentage of total health expenditure.

The most straightforward way of measuring health expenditure is by taking the absolute amount the government is spending on the health system in a given year. This gives an indication of how much money is, in absolute terms, dedicated to the

respective health system. In the context of a cross-country study this way of measuring health expenditure suffers from two main drawbacks. Firstly, health expenditure data will most genuinely be reported in a country's national currency. As countries use different currencies with different values attached to each, this does not allow for immediate comparisons across countries. This drawback can be overcome by converting the value into a common currency, for instance US Dollar, or by additionally accounting for differences in purchasing power between currencies, by converting the values into purchasing power adjusted international dollars (PPP\$). Secondly, this way of measuring health expenditure does not take into account a country's population size, which will hinder comparisons across countries.

One way of overcoming this problem is to put the absolute value spent in relation to country characteristics. Most commonly this is done by building a ratio of health expenditure to GDP, government spending or population size.

Assessing health spending as percentage of GDP will allow one to measure how much of a country's overall economic output is dedicated to the publically financed health system. While this allows for immediate international comparison, theory about the effects of IMF agreements (see section 1.2.3; pg. 13), indicates that changes in levels of GDP may be both a precondition of IMF agreements as well as a consequence in the way that GDP might be different before, during or after an agreement. This means that when health expenditure levels are put in relation to levels of GDP, the indicator might change as a consequence of changes in GDP rather than changes in health spending itself. For instance, when health spending remains constant but GDP increases/decreases, spending reported as share of GDP will decrease/increase. Nevertheless, health expenditure in relation to GDP is a commonly used indicator in cross-country studies and appears, despite its limitation, a useful indicator for this study.

Alternatively, health spending can be put in relation to the general government's overall expenditure. Using this indicator will allow one to judge the importance of public spending on health care in relation to other aspects of government funding, for instance, education or the military. Using this indicator is sensitive to changes in government expenditure. The previously outlined theory suggests that

levels of government expenditure might be different in the presence or absence of IMF agreements in the way that conditionality might directly or indirectly impact the size of government. Similar to the above indicator this suggests that changes in this indicator might be a result of changes in the size of government rather than changes in absolute levels of health spending. This indicator, however, gives an indication of the relative importance of the health sector within the total government sector and makes it a useful measure for this study.

Health expenditure can also be measured in absolute terms but related to the size of the population, which will give an indicator of spending per capita. This allows one to judge how much the government is on average dedicating to the health care needs of each of a country's residents. To enable cross-country comparability of this indicator values of spending needs to be converted into US Dollar or \$PPP accounting for purchasing power differences. As this indicator is not measured relative to other variables of macroeconomic performance, it is seemingly unaffected by changes in these indicators which might potentially be induced by IMF lending activity.

Finally, an estimate of the share of government health expenditure to total health expenditure can be considered. Total health expenditure is thereby defined as a country's total expenditure on health that includes spending from both government as well as private sources. This indicator seems important in the relation to this study as government health expenditure is seen to be an important component in achieving the goal of UHC (see section 1.1; pg. 6) and it can be argued that increases in government expenditure as share of total health expenditure can be seen as an indicator in achieving the goal of UHC. While it is argued that numbers of government health expenditure are reliable, certain doubt should be around the quality of estimates of private expenditure. This is because they are difficult to record as such, especially when statistical capacity is limited. It is therefore argued that the share of government health expenditure to total health expenditure should not be considered for this study.

5.1.3 Summary of the Dependent Variable

This section justified the data source of the dependent variable and its measurement. While a number of different datasets are reporting health expenditure data, it was argued that the WHO NHA dataset is considered the most suitable source

for this study as it provides the best data coverage. The section also discussed different ways of measuring health expenditure. It was argued that three commonly used indicators of government health expenditure are used in this study to provide a comprehensive overview of the effects. These include (i) health expenditure as percentage of GDP, a commonly used indicator that provides an indication of how much of a country's economy the government is dedicating to the health system; (ii) government health expenditure as percentage of general government expenses, which gives an indication of the importance of the health care sector compared to the overall government outlay; (iii) per capita spending is an indicator providing an absolute amount of spending per capita, to allow for international comparison, the indicator is measured in PPP.

5.2 Creating the IMF Agreement Indicator

This study aims to measure the impact of IMF agreements on government health expenditure. To do so, two measures of IMF agreements need to be constructed. Firstly, in line with the rest of the literature identifying the effects of agreements, this study relies on an on/off dummy to indicate the presence or absence of an agreement in a certain country at a given year. Secondly, the effects of different agreement clusters will be identified. To do so, an indicator for each of the agreement clusters will be established. This section outlines both the sources of data and the process followed to construct the variables.

Information about all agreements between the IMF and its member countries is available from the History of Lending Arrangements dataset, which is part of the IMF's Financial Data by Country Database and freely available on the internet (IMF, 2014a). This dataset holds, for all IMF member states and since May 1984 – amongst other information – the type of agreement as well as its start and end date. Information was downloaded for all IMF member countries and entered into a dataset for further processing. Aim of the data processing steps was to create one variable indicating 1 if a given country was in an agreement (independent of its type) in a specific year and 0 otherwise and (“on/off dummy”). To distinguish between agreement clusters (section 1.2.4.3; pg. 21), a set of variables was constructed. One variable to indicate 1 if a country is in a social protection agreement and 0 otherwise. One variable if the country

is in an SBA/EFF agreement, 0 otherwise and one variable if a country is in an emergency agreement, 0 otherwise. In doing so, two data characteristics need to be considered.

The first relates to the fact that some countries enter into a number of agreements consecutively. This means that the first agreement is followed immediately by a second. For the on/off dummy this was dealt with by assuming that these agreements are continuous and both agreements will be considered as one spell of time spent in agreements. For the facility dummy these will be treated as different spells and to be part of potentially different facility clusters.

The second aspect relates to the fact that agreement durations need to be converted into years as health expenditure data are measured on an annual basis. Analysis have shown that most agreements (95%) do start in months other than January and most (83%) also end in months other than December (Appendix Figure 5.1; pg. 213). Least agreements' first or last year's span an entire year from January to December. Only looking at the whole year would potentially introduce some bias as a country can be under an agreement for all year or only part of the year. For example, policy might be affected very little in a given year, when a country enters into an agreement in December compared to a country entering into an agreement in January. Building on this, the general logic is as follows: if an agreement starts in January, it will be assumed that policy for the rest of the year reflects efforts to meet IMF conditionality. If the agreement starts in December, only for December might policies have to take the agreement's conditionality into account, most of the year, it is assumed, is not under IMF influence⁷⁰. The same applies to the end of an agreement. When it ends in January, it is assumed that policies starting in February are free of agreement influence. When the agreement ends in December, most of the year is under agreement influence.

In order to model agreements correctly, start and end points need to be taken into account. It therefore seems important to break start and end times down into smaller units. For this analysis the logic of creating agreement indicators will therefore

⁷⁰ It might well be argued that countries change policies before entering into agreements and as response to crises but the interest of this study is in the effects of agreements themselves.

follow a logic that builds on but also extends that of Clements et al (2013), who “define the starting year of an IMF-supported programme as the year in which the programme was approved. If the approval date occurred in the second half of the year, the starting year for the programme is the following year. The end year is the year in which the programme expired.” Whilst somewhat arbitrary, the year will be cut into halves along a January to June and a July to December part. It is argued that:

- When IMF agreement starts in the first half of the year, the whole year is considered an IMF year.
- When IMF agreement starts in the second half of the year, the whole year is considered a non-IMF year and starts in the next year.
- When IMF agreement ends in first half of the year, the whole year is considered a non-IMF year and ends in the previous year.
- When IMF agreement ends in second half of the year, the whole year is considered an IMF year.

5.3 Country Definition

The IMF is an international organisation with almost universal membership of currently 188 member countries (see section 1.2.1; pg. 9). While the study is interested in the overall effect of IMF agreements on health expenditure, a number of countries are excluded from the study. This section presents the steps taken and the underlying reasoning to arrive at the definition of countries included in this study.

5.3.1 Low- and Middle-Income Countries

During the 18 years between 1995 and 2012, 61.2% of all Fund’s member states were receiving IMF agreements for at least one year. As will be shown in more detail later on (section 7.1.1; pg. 250), the proportion of countries receiving IMF loans was lowest for high income and highest for low-income countries⁷¹. Over the decades the IMF’s main lending activities have been in countries of low- and middle-income

⁷¹ The Bank divides countries according to their gross national income (GNI) per capita, measured in US dollars, into four income groupings of low-income, lower and upper middle-income as well as high-income economies (Perkins et al, 2006; Todaro and Smith, 2014; World Bank, 2014a; 2014b).

(section 1.2.1; pg. 9). While high-income countries in Europe have become borrowers from the IMF over the last years as a result of the 2008 financial crisis, with Greece, Ireland or Iceland receiving loans from the IMF, this is a fairly recent development and not reflective of the IMF's main lending activity. Indeed, the previously last high-income country to receive an agreement from the IMF was the United Kingdom until 1979 (IMF, 2016i; Stuckler and Basu, 2014).

This study is interested in examining the effect of these agreements and it is therefore argued that its analysis should focus on countries frequently receiving IMF loan agreements. The study will therefore focus on countries of middle- and low-income and exclude high-income countries (n=53) from the analysis.

To determine countries as low- and middle income this study employs the established classification method developed by the World Bank. GNI thresholds are revised annually to adjust for inflation. The cut-off for this study is determined based on the classification at the end of the study period using 2012 data, which defines countries as high-income countries, when they have per capita income of more than 12763 US dollar.

5.3.2 Countries Recently Joining the IMF

While a great number of countries joined the IMF shortly after its inauguration in December 1945, several countries have joined at later stages. A strong boost to IMF membership was, for instance, seen in 1992 when various former Eastern Bloc countries joined the IMF after the collapse of the Soviet Union (IMF, 2012a). It appears that joining the IMF is associated with either a previous regime change, say the shift from communism to some form of capitalism as is likely the case for former Soviet countries, or the establishing of a new nation, which broke away from a larger state, as was the case for South Sudan, which became independent in July 2011 and consequentially joined the IMF in April 2012 (IMF, 2012b).

Either way, it is likely that decisions to join the IMF are made after drastic changes in this specific country; these changes are likely associated with changes in policy priority during the time of transition. From a methodological point of view it will be argued that countries that have not been IMF member states during the entire

study period from 1995 to 2012, will not have had the same chances of entering an agreement as countries that joined the IMF before 1995. For example, a country that joined the Fund only in 2010 will not have had an agreement before that time. This does however not reflect its economic stability, but rather the inability to receive agreements due to non-membership. Therefore, for this study, all countries that were not IMF member states in 1995 will be excluded from analyses. Out of the set of low- and middle-income countries this means to exclude the six countries given in Table 5.2 below.

Country Name	Date of Membership
Palau	December 16, 1997
Timor-Leste (East Timor)	July 23, 2002
Montenegro	January 18, 2007
Kosovo	June 29, 2009
Tuvalu	June 24, 2010
South Sudan	April 18, 2012

Table 5.2: List of Low- and Middle-Income Countries joining the IMF after 1995
source IMF (2012a)

5.3.3 Missing Health Expenditure Data

This study relies on government health expenditure data reported in the WHO NHA dataset, the most suitable data source for this study (see section 5.1.1; pg. 174). Despite its high level of completeness, the database lacks individual data points. For a small number of countries, no health expenditure data are reported at all. Countries for which no expenditure data are reported in any year would be excluded from all analyses as health expenditure will be the dependent variable throughout this study. Thus, countries are excluded from the study, when data on the health expenditure variables are missing for the entire period. Countries are not excluded when only data for individual years are missing. This means to additionally Somalia and Zimbabwe. It is important to note that these countries are excluded here explicitly only for the reasons of missing data. This missingness means that they would be excluded from the analysis anyway as their dependent variables is unavailable.

5.3.4 Country Definition Summary

The analyses of this study will be based on a country set of 127 low- and middle-income countries, which have become IMF members before 1995 and for

which the WHO NHA database reports at least one data point between 1995 and 2012. Figure 5.1 shows a summary of all inclusion and exclusion steps and Appendix Table 5.2 (pg. 212) a full list of countries. The study is based on $N \times T = 2268$ case years, the product of $N = 127$ countries and $T = 18$ years.

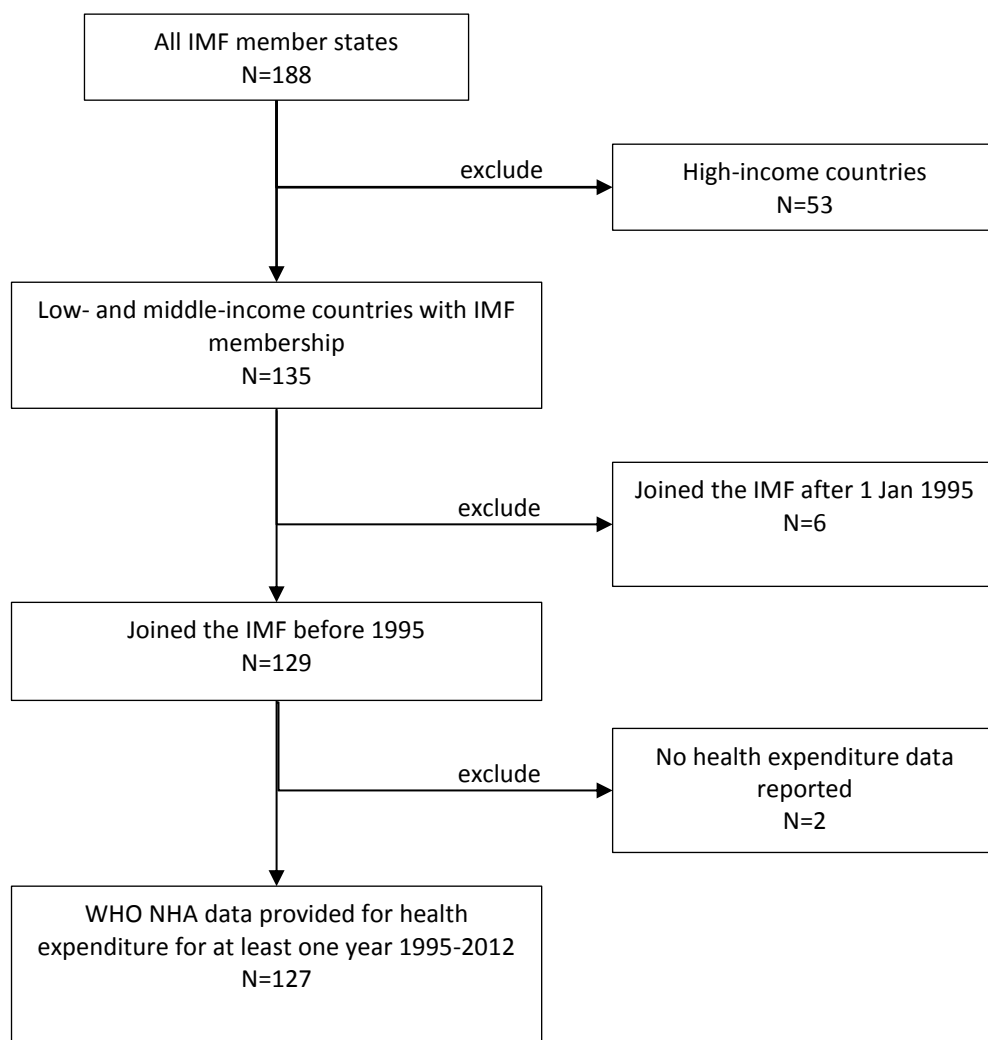


Figure 5.1: Flowchart of Country Definition

5.4 Determinants of Government Health Expenditure and IMF Agreements

The literature reviews in chapter 3 and 4 identified a set of concepts that are commonly used in the literature as determinants of government health expenditure and IMF agreements. This section builds on these chapters and identifies variables to measure the relevant concepts using the two most comprehensive and widely used

datasets for international macro-data, the World Development Indicators (WDI) dataset by the World Bank (2015) and the World Economic Outlook (WEO) by the IMF (2015g). When concepts are not available from these datasets, the Quality of Governance and Polity IV dataset will be used additionally. Aim is to identify variables that allow to measure the relevant concepts while also maintaining a high number of cases and the largest possible number of countries. In order to allow for meaningful comparison between the individual countries, the variables are selected to measure the concepts in international currencies, such as US Dollars or international (PPP) dollars, or relative to other variables such as GDP. The presentation is divided into two sections to first discuss and select relevant variables used to capture concepts related to determinants of government health expenditure and then those of IMF agreements.

5.4.1 Determinants of Government Health Expenditure

This section aims to select and present the variables to measure the most relevant and commonly used concepts to determine government health expenditure as identified in the literature review of chapter 3. It has been argued that studies most commonly use the concepts of national income, fiscal space, population structure and supply of health care as determinants of health expenditure. The variables to measure each of these concepts are discussed in turn.

5.4.1.1 National Income

National income is most commonly measured as GDP or GNI, where the former measures all production within a country while the latter attributes production to a country based on ownership (Perkins et al, 2006), or as economic growth. A number of relevant variables capturing GNI, GDP levels and growth rates are available from the WEO and the WDI dataset (Table 5.3). Variables measuring GNI are limited in their availability. Availability is higher for variables capturing GDP. When comparing between the datasets, it appears that the WEO dataset covers slightly more cases and countries. Analysis suggests a high level of correlation ($r=0.994$) between the \$PPP per capita GDP variables from both datasets. Considering that health expenditure ought to be measured in levels it seems somewhat unlikely that growth, which measures change rather than levels, can be considered an appropriate indicator for national income in the context of this analysis. Based on this reasoning, it seems

that national income will for this study be measured as per capita GDP in international dollars using the WEO dataset.

Variable Code	Variable Description	Valid Cases	Countries	% valid ⁷²
WDI Dataset				
NY.GDP.PCAP.KD	GDP per capita (constant 2005 US\$)	2221	126	97.2%
NY.GDP.PCAP.KD.ZG	GDP per capita growth (annual %)	2237	127	97.9%
NY.GDP.PCAP.PP.KD	GDP per capita, PPP (constant 2011 international \$)	2203	124	96.4%
NY.GDP.PCAP.PP.CD	GDP per capita, PPP (current international \$)	2200	124	96.2%
NY.GNP.PCAP.KD	GNI per capita (constant 2005 US\$)	1569	126	68.6%
NY.GNP.PCAP.PP.KD	GNI per capita, PPP (constant 2011 international \$)	1503	122	65.7%
WEO Dataset				
PPPPC	Gross domestic product based on purchasing-power-parity (PPP) per capita GDP (Current international dollar)	2241	127	98.0%
NGDP_RPCH	Gross domestic product, constant prices (Percent change)	2244	127	98.2%

Table 5.3: Variables available to measure National Income

5.4.1.2 Fiscal Space

Variables around the concept of fiscal space are considered in a number of studies to capture the availability of funds to be spent on the public health system (Heller, 2006; Powell-Jackson et al, 2012). This concept is generally measured using an indicator of government spending or revenue, less commonly the concept is operationalised using indicators of debt. A number of relevant variables can be obtained from the WDI and WEO datasets (see Table 5.4).

Indicators of debt are available from both datasets. The WDI dataset offers measures of central government debt, which capture “the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date” (World Bank, 2015). Availability, is however limited with more than 80% of the data points being missing. Availability is much higher for the external debt stock, which measures the “total external debt owed to non-residents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt” (World

⁷² Percentages are estimated based on a total of 2286 cases. This is the product of 18 years (1995-2012) times 127 countries, which covers all data points of the dataset.

Bank, 2015). The indicator is available as percentage of GNI or as percentage of exports of goods, services and primary income. The WEO dataset offers comprehensive coverage for debt indicators particularly for general government gross debt, which “consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future” (IMF, 2015g).

Indicators of government expenditure and revenue from the WDI dataset have somewhat limited data availability as around half of all data points are missing. Similar indicators from the WEO dataset have much better data coverage, with almost 90% of all data points available.

When considering fiscal space as a concept to capture determinants of government health expenditure, studies most commonly use an indicator of flows of government money, or less commonly, indicators of debt stock. It seems likely that government decisions to spend money on the health system are more influenced by the current flows of money into and out of the government coffers rather than a level of debt stocks. It will therefore be argued that for this study fiscal space will be measured using an indicator of flows of government money. Considering that the correlation between government revenue and government expenditure is reasonably high and considering both variables in one composite indicator in the form of government balance does not produce a large spread of values. Fiscal space should for this study be captured using a country’s government revenue.

Variable Code	Variable Description	Valid		
		Cases	Countries	% valid
WDI Dataset				
GC.DOD.TOTL.CN	Central government debt, total (current LCU)	452	58	19.8%
GC.DOD.TOTL.GD.ZS	Central government debt, total (% of GDP)	452	58	19.8%
DT.DOD.DECT.EX.ZS	External debt stocks (% of exports of goods, services and primary income)	1923	117	84.1%
DT.DOD.DECT.GN.ZS	External debt stocks (% of GNI)	2093	119	91.6%
GC.XPN.TOTL.GD.ZS	Expense (% of GDP)	1109	105	48.5%
GC.REV.XGRT.GD.ZS	Revenue, excluding grants (% of GDP)	1172	106	51.3%
WEO Dataset				
GGXWDN_NGDP	General government net debt (Percent of GDP)	821	56	35.9%
GGXWDG_NGDP	General government gross debt (Percent of GDP)	1861	124	81.4%
GGR_NGDP	General government revenue (Percent of GDP)	2052	127	89.8%
GGX_NGDP	General government total expenditure (Percent of GDP)	2035	127	89.0%

Table 5.4: Variables available to measure Fiscal Space

5.4.1.3 Population Structure

Population structure is another commonly used concept in the reviewed literature on determinants of government health expenditure. While the indicators employed to measure the concepts vary slightly, most studies measure the age structure within the population. This is based on the argument that health expenditure will be larger for younger and older people, so that a larger share of old and/or young people within the population will be associated with a higher level of health expenditure (section 3.2.3).

The WDI dataset provides a number of variables with very good data coverage to measure this concept (see Table 5.5). These include the percentage of the old or young population compared to the total population individually and also the percentages of the young and old population combined to the working age population⁷³ (age dependency ratio). Given the underlying argument of younger and older shares of the population having higher need and demand for health care services compared to the rest of the population, it seems that the variable capturing the age dependency ratio will be considered the most appropriate variable for this study.

⁷³ The working age population is defined as those people who are between 15 and 64 years of age.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
SP.POP.0014.TO.ZS	Population ages 0-14 (% of total)	2250	125	98.4%
SP.POP.1564.TO.ZS	Population ages 15-64 (% of total)	2250	125	98.4%
SP.POP.65UP.TO.ZS	Population ages 65 and above (% of total)	2250	125	98.4%
SP.POP.DPND	Age dependency ratio (% of working-age population)	2250	125	98.4%
SP.POP.DPND.OL	Age dependency ratio, old (% of working-age population)	2250	125	98.4%
SP.POP.DPND.YG	Age dependency ratio, young (% of working-age population)	2250	125	98.4%

Table 5.5 Variables available to measure Population Structure

5.4.1.4 Supply of Health Care

A smaller number of studies include indicators to measure the concept of supply of health care. These are generally variables that capture the availability of health care services, measured by the supply of health care workers or facilities. While the influence of health technologies plays a big role in debates about health expenditure increases in high-income countries (Sorenson et al, 2013) this is not reflected in studies of low- and middle-income countries.

The WDI dataset provides a small number of variables that allow one to capture this concept (see Table 5.6). Available variables capture the supply of health care providers measured as the number of physicians, community health workers or nurses as well as hospital beds per 1000 people, but also the coverage of antiretroviral therapy for people living with HIV as an indicator for technology and pharmaceutical use. While the indicators of health care workers and hospital beds are available for all or almost all countries, the number of valid cases is generally low and would mean to exclude more than 60% of all cases from the analysis when including hospital beds or the number of physicians into the models. Coverage of data on antiretroviral therapy is similarly limited as only about data for only half the data points is available.

Since no other dataset is available to provide better coverage of the data and the fact that the concept of supply of health care is of reduced importance compared to the other concepts presented before, it is argued that for this analysis no variable to capture the supply of health care shall be included. It seems that trading off around 60% of all cases for the inclusion of this concept does not seem reasonable.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
SH.MED.BEDS.ZS	Hospital beds (per 1000 people)	825	126	36.1%
SH.MED.CMHW.P3	Community health workers (per 1000 people)	152	61	6.6%
SH.MED.NUMW.P3	Nurses and midwives (per 1000 people)	393	127	17.2%
SH.MED.PHYS.ZS	Physicians (per 1000 people)	809	127	35.4%
SH.HIV.ARTC.ZS	Antiretroviral therapy coverage (% of people living with HIV)	1248	96	54.6%

Table 5.6: Variables available to measure Supply of Health Care

5.4.1.5 Summary of the Government Health Expenditure Variables

This section set out to identify variables to measure the concepts frequently used to determine government health expenditure. Employing the World Development Indicators and the World Economic Outlook datasets, relevant variables could be identified. To measure the concept of national income, a variable from the WEO dataset will be used, which measures Gross domestic product based on purchasing-power-parity per capita. While both government spending and debt variables are available from the datasets, it was argued that a variable measuring flows to government funds would be an appropriate way of measuring the concept of fiscal space for this study. A variable of general government revenue as percentage of GDP from the WEO is used. The concept of population structure will be measured using the age dependency ratio variable from the WDI dataset. While the concepts of supply of health care is used in some studies, it was argued that the commonly used datasets do not hold relevant variables to operationalise this concept without trading off a large number of cases. Table 5.7, shows the selected variables and their descriptive statistics.

mean	Overall			Between			Within		
	SD	min	max	SD	min	max	SD	min	max
Gross domestic product based on purchasing-power-parity (PPP) per capita GDP (Current international dollar)									
5379.55	4750.58	292.19	29587.54	4385.65	459.85	21145.94	1859.88	-4102.29	14565.75
General government Revenue (Percent of GDP)									
25.56	12.46	0	160.19	11.17	8.01	74.08	5.62	-5.53	135.89
Age dependency ratio (% of working-age population)									
71.59	18.26	34.50	114.00	17.29	41.48	107.56	6.07	47.10	101.43

Table 5.7: Descriptive Statistics of Variables selected as Determinants of Government Health Expenditure

5.4.2 Determinants of IMF Agreement

This section aims to discuss and present the variables used to measure the relevant and most commonly used concepts for determinants of IMF agreements as identified in chapter 4. It has been shown that while the IMF and health expenditure literature mostly relies on one specified model to predict IMF agreements, the wider literature concerned with modelling IMF agreements uses a broader set of concepts and variables to do so. This section identifies variables for the specified model used in the IMF and health expenditure literature as well as variables for an extended model based on other commonly used concepts in the wider literature. These concepts include national income, international reserves, debt, balance of payments, inflation, government balance, exchange rates, indicators of IMF activity as well as a regime indicator. This section is organised to present each of the concepts and their available variables in turn and highlights where variables relate to the pre-defined IMF and health expenditure model. Similar to the previous section, focus will be on variable definitions that allow for cross-country comparisons.

5.4.2.1 National Income

Most studies include one or more indicators of national income in their models. Most commonly this concept is operationalised using variables measuring a country's GDP, its GDP per capita or per capita growth. Less frequently studies use an indicator of negative growth or a crisis, defined as a larger scale change in growth to the previous year. The model commonly used in IMF and health expenditure studies includes a variable of GDP growth as well as per capita GDP. Both the WDI and the WEO dataset hold relevant variables (see Table 5.8).

The WEO dataset provides a variable measuring per capita spending in current PPP, the WDI dataset offers a variable in constant PPP. It appears that both dataset offer a comparable coverage of data points (2783 vs 2788), however the WDI dataset covers only 124 countries, compared to 127 from the WEO, which suggests to include the variable from the WEO dataset in the model.

Growth variables are also available from both datasets, while bivariate analyses show that there is a high level of correlation between both datasets ($r=0.9078$), it appears that the variable from the WDI dataset has a slightly higher level of coverage

(96.5% vs 95.6%). The growth variable from the WDI dataset will therefore be included in the models.

Variable Code	Variable Description	Valid Cases	Countries	% valid ⁷⁴
WDI Dataset				
NY.GDP.MKTP.PP.KD	GDP, PPP (constant 2011 international \$)	2783	124	95.3%
NY.GDP.MKTP.KD.ZG	GDP growth (annual %)	2820	127	96.5%
NY.GDP.PCAP.PP.KD	GDP per capita, PPP (constant 2011 international \$)	2783	124	95.3%
NY.GDP.PCAP.KD	GDP per capita (constant 2005 US\$)	2806	126	96.1%
NY.GDP.PCAP.KD.ZG	GDP per capita growth (annual %)	2820	127	96.5%
WEO Dataset				
NGDP_RPCH	Gross domestic product, constant prices (Percent change)	2793	127	95.6%
NGDPD	Gross domestic product, current prices (U.S. dollars)	2816	127	96.4%
NGDPDPC	Gross domestic product per capita, current prices (U.S. dollars)	2789	127	95.5%
PPPGDP	Gross domestic product based on purchasing-power-parity (PPP) valuation of country GDP (Current international dollar)	2817	127	96.4%
PPPPC	Gross domestic product based on purchasing-power-parity (PPP) per capita GDP (Current international dollar)	2788	127	95.4%

Table 5.8: Variables available to measure National Income

5.4.2.2 International Reserves

An indicator of international reserves is used in a large number of studies. While some studies measure the absolute level of reserves most put the stock of reserves in relation to another macroeconomic indicator, most commonly debt or imports. In the context of this study, it appears that the level of reserves related to macro-economic performance is a useful indicator. The WDI dataset has two such variables available (see Table 5.9). Reserves are measured in relation to a country's external debt stock or the months of imports that can be covered with the current stock of reserves. While reserves in relation to months of import has rather limited data coverage, which means that including this variable would exclude roughly 70% of all cases⁷⁵. Reserves as percentage of debt has good coverage. For this analysis, the

⁷⁴ Valid percentage are determined using a basis of 127 countries times 23 years. This allows for adding up to 5 lags to the data without losing cases (see chapter 6).

⁷⁵ Constructing the variable by hand using variables of total reserves and imports does not yield better results in terms of data coverage.

variable measuring reserves as percentage of total external debt will be included. This is also the measure included in the selection models used in the IMF and health expenditure literature.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
FI.RES.TOTL.DT.ZS	Total reserves (% of total external debt)	2586	119	88.5%
FI.RES.TOTL.MO	Total reserves in months of imports	915	119	31.3%

Table 5.9: Variables available to measure International Reserves

5.4.2.3 Debt

Debt is another commonly used concept in the literature on determinants of IMF agreements. The concept is commonly operationalised as the amount of interest payments, debt service and debt stocks. Both the WDI and the WEO datasets hold relevant variables (see Table 5.10).

Variables measuring interest payments are available from the WDI dataset, data availability is, with around 45%, for variables measuring interest payments as percentage of revenue or expenses, rather limited. Better availability is given for variables measuring interest payments on external debt (>80%). Various variables, with generally good data availability, are available measuring a country’s stock of debt in various ways. Debt stock variables, with good data coverage, are also available from the WEO dataset.

From a theoretical point of view it appears that a country might be more likely to enter into an IMF agreement when its external debt stock is too large in general or the amount of debt service is considerable given the other economic activities in a country. It therefore appears that variables measuring a country’s debt service compared to national income or those measuring a country’s external debt stock compared to national income can be seen the most relevant variables to be included in the models. Both variables shall be sourced from the WDI dataset.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
GC.XPN.INTP.RV.ZS	Interest payments (% of revenue)	1327	106	45.4%
GC.XPN.INTP.ZS	Interest payments (% of expense)	1274	105	43.6%
DT.INT.DECT.EX.ZS	Interest payments on external debt (% of exports of goods, services and primary income)	2394	119	82.0%
DT.INT.DECT.GN.ZS	Interest payments on external debt (% of GNI)	2599	119	89.0%
DT.TDS.DECT.EX.ZS	Total debt service (% of exports of goods, services and primary income)	2394	119	82.0%
DT.TDS.DECT.GN.ZS	Total debt service (% of GNI)	2594	119	88.8%
DT.TDS.MLAT.PG.ZS	Multilateral debt service (% of public and publicly guaranteed debt service)	2668	120	91.3%
GC.DOD.TOTL.CN	Central government debt, total (current LCU)	584	60	20.0%
GC.DOD.TOTL.GD.ZS	Central government debt, total (% of GDP)	584	60	20.0%
DT.TXR.DPPG.CD	Total amount of debt rescheduled (current US\$)	2695	120	92.3%
DT.DOD.DECT.CD.CG	Total change in external debt stocks (current US\$)	2680	120	91.7%
DT.DOD.DECT.EX.ZS	External debt stocks (% of exports of goods, services and primary income)	2394	119	82.0%
DT.DOD.DECT.GN.ZS	External debt stocks (% of GNI)	2607	119	89.3%
DT.DOD.DSTC.IR.ZS	Short-term debt (% of total reserves)	2585	119	88.5%
DT.DOD.DSTC.XP.ZS	Short-term debt (% of exports of goods, services and primary income)	869	114	29.8%
DT.DOD.DSTC.ZS	Short-term debt (% of total external debt)	2695	120	92.3%
WEO Dataset				
GGXWDN_NGDP	General government net debt (Percent of GDP)	885	56	30.3%
GGXWDG_NGDP	General government gross debt (Percent of GDP)	2003	124	68.6%

Table 5.10: Variables available to measure Debt

5.4.2.4 Balance of Payments Position

In line with the IMF's core tasks to assist countries in balance of payment crises, a number of studies use an indicator of the country's balance of payment position. While, as outlined above, balance of payment consists of several components, most studies measure the balance of payment position using variables of a country's current account balance.

This variable is available from both the WDI and the WEO dataset (see Table 5.11). Variables are available both in absolute terms measured in US Dollar as well as in relation to the country's GDP. To allow for international comparison focus shall be on the variable measuring current account balance as share of GDP. While availability of the variable from the WDI dataset is rather limited (31.6%), the variable from the

WEO is almost complete⁷⁶. Therefore, the current account balance as percentage of GDP variable from the WEO dataset shall be included in the models.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
BN.CAB.XOKA.CD	Current account balance (BoP, current US\$)	933	121	31.9%
BN.CAB.XOKA.GD.ZS	Current account balance (% of GDP)	923	121	31.6%
WEO Dataset				
BCA	Current account balance (U.S. dollars)	2799	127	95.8%
BCA_NGDPD	Current account balance (Percent of GDP)	2800	127	95.9%

Table 5.11: Variables available to measure Balance of Payments position

5.4.2.5 Inflation

Inflation is another commonly used indicator in the wider literature concerned with determinants of IMF agreements. This is either measured as inflation or a consumer price index. Both the WDI as well as the WEO datasets provide relevant variables with good data coverage (see Table 5.12).

The WDI dataset holds variables for the GDP deflator and the consumer prices. The former is an indicator of the “annual growth rate of the GDP implicit deflator [and] shows the rate of price change in the economy as a whole” (World Bank, 2015). The latter measures the “annual percentage change in the cost to the average consumer of acquiring a basket of goods and services” (World Bank, 2015). The WEO dataset provides a similar set of variables but also a distinction between consumer prices averaged over the year and those measured at the end of the period.

Bivariate analyses show a great degree of similarity between the WDI GDP deflator and the consumer price variable ($r=0.9915$) as well as between the WDI consumer price variable and the average consumer price variable from the WEO dataset ($r=0.9978$). Given the high degree of similarity between the deflator and the consumer price variable it appears that the decision should be made based on the best data availability. For this model, the WEO variable for the average consumer prices will be included.

⁷⁶ Bivariate analyses between the variables from both datasets show a high degree of similarity as $r=0.8841$.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
NY.GDP.DEFL.KD.ZG	Inflation, GDP deflator (annual %)	2820	127	96.5%
FP.CPI.TOTL.ZG	Inflation, consumer prices (annual %)	2486	120	85.1%
WEO Dataset				
NGDP_D	Gross domestic product, deflator (Index)	2806	127	96.1%
PCPIPCH	Inflation, average consumer prices (Percent change)	2778	127	95.1%
PCPIEPCH	Inflation, end of period consumer prices (Percent change)	2754	127	94.3%

Table 5.12: Variables available to measure Inflation

5.4.2.6 Government Balance

Various studies include an indicator of government balance into their models to determine a country entering into an IMF agreement. As discussed in more detail above, countries are seen to be more likely to enter into agreements when government expenditure and revenues are not balanced. Variables to measure this are available from both the WDI and the WEO dataset (see Table 5.13). As discussed in more detail above (see section 5.4.1.2) variables from the WEO dataset provide better data coverage but neither dataset provides a variable measuring government balance as the difference between government expenditure and revenue. To capture this indicator, such a variable will be constructed using the revenue and expenditure variables from the WEO dataset. This is also the variable used in the models of the IMF and health expenditure literature.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
GC.XPN.TOTL.GD.ZS	Expense (% of GDP)	1279	106	43.8%
GC.REV.XGRT.GD.ZS	Revenue, excluding grants (% of GDP)	1382	107	47.3%
WEO Dataset				
GGR_NGDP	General government revenue (Percent of GDP)	2338	127	80.0%
GGX_NGDP	General government total expenditure (Percent of GDP)	2318	127	79.4%
Author Estimation				
GGB_NGDP	General government balance (Percent of GDP)	2302	127	78.8%

Table 5.13: Variables available to measure Government Balance

5.4.2.7 Exchange Rates

A number of studies include an indicator of a country's local currency's exchange rate to another currency important in the global economy, mostly the US Dollar. Some studies do not measure the exchange rate directly but use an indicator of a currency crisis, which is generally defined as a drastic change in the exchange rate compared to the previous year. Fewer studies operationalise the concept of exchange rates by measuring a country's exchange rate regime.

From the WDI dataset two variables are available that allow to measure this concept (see Table 5.14). The real effective exchange rate is “the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs” (World Bank, 2015). The official exchange rate measures “the exchange rate determined by national authorities or the rate determined in the legally sanctioned exchange market” (World Bank, 2015). It is calculated as an annual average based on monthly averages of the local currency units relative to the US dollar. While the former variable has rather limited data availability (~40%), data availability for the official exchange rate variable is very good. This means that this variable will be selected for the model.

The official exchange rate variable presents the relation between a country's local currency and the US Dollar. While this allows for comparisons within countries (“how does the exchange rate change over time within the same country?”) it does not allow to compare between countries. To achieve this, a variable measuring the percentage change to the previous year will be estimated⁷⁷. This also allows for the construction of a currency crisis indicator that holds the value 1 when the drop in value is larger than -30%, and 0 otherwise.

An indicator of the exchange rate regime is not available from the WDI dataset. The IMF's Annual Report on Exchange Arrangements and Exchange Restriction (IMF, 2015a) provides such an indicator, however, this database is not available in a machine readable format for all years and the definitions of exchange rate regimes change over the years. It appears that studies including an indicator of exchange rate

⁷⁷ The percentage change to the previous year is estimated using the formula $(X/Lead.X-1)*100$.

regimes generally do so to answer specific research questions related to the impact of exchange rate regimes. It will therefore be argued that such a variable can be neglected for this study.

Based on the available variables and in line with the wider literature on determinants of IMF agreements the annual change of the official exchange rate will be seen as appropriate variable to measure the concept of exchange rates.

Variable Code	Variable Description	Valid Cases	Countries	% valid
WDI Dataset				
PX.REX.REER	Real effective exchange rate index (2010 = 100)	1200	53	41.1%
PA.NUS.FCRF	Official exchange rate (LCU per US\$, period average)	2804	126	96.0%
Author Estimation				
PA.NUS.FCRF.PERC	Annual Change of the Official exchange rate (percentage)	2677	126	91.6%
PA.NUS.FCRF.CRIS	Crisis Indicator if annual change in exchange rate >-30%	2677	126	91.6%

Table 5.14: Variables available to measure Exchange Rates

5.4.2.8 Indicators of IMF Activity

Almost all studies include at least one indicator of IMF activity as determinant of IMF agreements into their models. Most commonly this is done as an indicator of a country's previous involvement with the IMF or, less commonly, the IMF's global lending activity in other countries. Data for these variables can be constructed from the IMF agreement dataset presented earlier (see section 5.2). Since data is complete for all data points in this database all variables created from it will cover all years and countries. Guided by theory and the previous literature review a number of relevant variables have been created (see Table 5.15).

In detail, these variables are defined as follows. An indicator variable is constructed that is 1 when the country had an agreement in the year before the current, and 0 otherwise. This seems the most commonly used indicator of IMF activity. This is also the variable used in the IMF and health expenditure literature. An alternative definition of previous IMF agreements is constructed using the moving average over the previous 5 years (excluding the current year). This variable gives an indication of IMF activity during the last 5 years. A third variable was constructed that sums up the number of countries in agreements in the current year. This is an indicator of the IMF's global lending activity in a given year.

Variable Code	Variable Description	Valid Cases	Countries	% valid
Agreement Dataset				
Prev.year.IMF	Indicator of agreement in previous year	2921	127	100%
5yr.MA.IMF	Moving average of years in agreements during last 5 years	2921	127	100%
Other.IMF	Number of other countries in agreements	2921	127	100%

Table 5.15: Variables available to measure IMF Activity

5.4.2.9 Regime Indicator

A number of studies include various political variables into their models, one of the most commonly used and most accessible such indicators is an index of democracy. This variable is not available from the WDI or the WEO datasets but from three other sources, the Polity IV (Marshall et al, 2014), Freedom House (Freedom House, 2015) and the Quality of Governance (Quality of Governance, 2015) databases (see Table 5.16).

The Polity IV dataset holds two variables measuring democracy as well as a composite indicator combining both democracy indicators. Data availability is generally good but the dataset does not cover smaller countries, including this variable would mean to exclude 14 countries from the analyses.

Freedom House provides a variable of political rights, which captures the people's ability "to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate." (Quality of Governance, 2015). This variable covers all countries and almost all years included in the study.

While the Quality of Governance dataset provides a number of dedicated democracy variables constructed for specific studies, which are not updated beyond the date of the study publication, it also provides a comprehensive democracy variable constructed of the variables from Freedom House and the Polity IV dataset, by taking the average of relevant Freedom House variables, transformed to a scale 0-10, and the Polity variable, transformed to a scale 0-10. Additionally, missing cases from the

Polity variable are imputed⁷⁸. (Quality of Governance, 2015). The study by Hadenius and Teorell (2005) shows that this averaged index performs better than its constituent parts both in terms of reliability and validity (Quality of Governance, 2015). Based on this and the better data availability this combined indicator of democracy shall be included in this study.

Variable Code	Variable Description	Valid Cases	Countries	% valid
Democracy Datasets				
Polity2	Polity IV combined indicator of democracy	2509	113	86.2%
fh_pr	Freedom House indicator of political rights	2873	127	98.7%
fh_ipolity2	Quality of Governance imputed indicator of democracy	2873	127	98.7%

Table 5.16: Variables available to measure Democracy

5.4.2.10 Summary of IMF Agreement Determinants Variables

This section set out to identify variables to measure the concepts frequently used to determine countries entering into IMF agreements. Employing the World Development Indicators, the World Economic Outlook and the Quality of Governance datasets relevant variables could be identified. To measure the concept of national income, two variables have been selected. One from the WDI dataset measuring per capita growth in annual percentages and one from the WEO measuring per capita levels of GDP in PPP. The concept of reserves will be operationalised using a variable from the WDI dataset measuring the level of reserves as a percentage of total external debt. For the concept of debt, two variables have been selected from the WDI dataset, one measuring total debt services as percentage of a country's GNI and one variable measuring the stock of external debt as percentage of GNI. Balance of payments is operationalised using a variable from the WEO dataset measuring the current account balance as percentage of GDP. Inflation is measured as change in average consumer prices sourced from the WEO dataset. Based on data from the WEO dataset a variable for government balance as percentage of GDP was constructed. A variable of annual change of the exchange rate was constructed from the WDI dataset. Three variables to measure IMF activity were constructed, one is an indicator of the lagged agreement

⁷⁸ Values are imputed by regressing the Polity on the average Freedom House measure (Quality of Governance, 2015).

variable, a second variable measures the five year moving average of years in agreement and a third variable indicates the number of countries in agreements. As indicator of democracy a variable from the Quality of Governance dataset was selected. Table 5.17, below shows the selected variables and their descriptive statistics.

mean	Overall			Between			Within		
	SD	min	max	SD	min	max	SD	min	max
Gross domestic product based on purchasing-power-parity (PPP) per capita GDP (Current international dollar)									
4989.16	4548.85	242.93	29587.54	4103.43	486.78	20722.13	1977.40	-4068.88	15020.32
GDP per capita growth (annual %)									
2.13	7.01	-65.00	105.00	2.12	-3.15	12.35	6.71	-69.44	101.41
Total reserves (% of total external debt)									
56.36	179.19	0.01	3650.00	119.66	2.74	1016.44	131.69	-716.77	2923.63
Total debt service (% of GNI)									
4.92	7.04	0.00	135.00	4.23	0.08	34.77	5.72	-18.75	124.10
External debt stocks (% of GNI)									
72.28	91.15	0.24	1380.00	72.99	11.30	667.88	62.11	-564.80	902.77
Current account balance (% of GDP)									
-4.90	9.83	-90.83	51.10	6.37	-24.05	15.76	7.63	-78.88	39.63
Inflation, average consumer prices (% change)									
51.10	538.92	-26.32	23773.10	158.26	2.12	1517.51	514.62	-1464.28	22306.69
General government balance (% of GDP)									
-2.21	6.04	-46.23	122.19	3.12	-16.70	8.58	5.18	-35.20	113.28
Annual Change of the Official exchange rate (percentage)									
-6.29	29.08	-99.99	1225.14	9.86	-45.11	54.43	27.49	-104.91	1164.42
Indicator of agreement in previous year									
0.35	0.48	0.00	1.00	0.26	0.00	0.96	0.40	-0.60	1.31
Moving average of years in agreements during last 5 years									
0.34	0.36	0.00	1.00	0.26	0.00	0.89	0.25	-0.48	1.18
Number of other countries in agreements									
44.52	6.95	29.00	57.00	0.00	44.52	44.52	6.95	29.00	57.00
Democracy Indicator									
5.59	2.90	0.00	10.00	2.68	0.27	10.00	1.14	0.01	10.99

Table 5.17: Descriptive statistics of variables selected as determinants of IMF agreements

5.5 Summary of the Dataset and Notes on Data Quality

This chapter set out to present the dataset created for use in this study. It outlined which variables are used for this study and which datasets the variables are drawn from. It first presented different datasets that hold variables on government health expenditure. It was argued that amongst the datasets the WHO National Health Accounts Dataset would be the most suitable dataset for this study as it covers the most countries and provides a reasonably long observation period. The second section outlined the creation of IMF dummies. The third section provided a country definition. It was argued that the study will focus on low- and middle-income countries as these are seen to be the countries in which most of IMF lending activity happened over the last decades. Building on the previous literature reviews on determinants of health expenditure and IMF agreements, the chapter discussed, in section four, the variables available and suitable for the use in this study. It was argued that GDP per capita measured in PPP, Government revenue and the age dependency ratio are considered as determinants of health expenditure in this study. A number of variables will be considered as determinants of IMF agreements. These include GDP per capita, GDP growth, total reserves as percentage of total external debt, total debt service, external debt stocks, the current account balance, annual changes in inflation, government balance, change in official exchange rate, a democracy indicator as well as indicators of IMF activity.

Having identified the relevant variables, a note on the quality of the data employed should be made. The debate about data quality in relation to developing countries data is long-standing (Morgenstern, 1950; Yeats, 1990) but has recently re-emerged with the work by Jerven (2013; 2015), the emphasis on data to measure progress on the Sustainable Development Goals and the associated data revolution (Demombynes and Sandefur, 2014; United Nations, 2016).

Jerven (2013), using GDP data as example in his argument, claims that cross-country macro-data are of low quality for two reasons. Firstly, producing GDP and other macroeconomic data estimates is technically challenging and statistical offices in developing countries often lack the capacity to collect all necessary information and process them to provide accurate estimates. Data might therefore not be reported at all

or be of low accuracy. Secondly, cross-national datasets available from the World Bank or the IMF might not accurately reflect the national estimates due to various reasons. These include that organisations impute missing data points or even override existing national estimates.

These criticisms are directly relevant for this study. While Jerven (2013) argues that government expenditure data – used here as dependent variable – might be of better quality as their collection is easier, the government should know how much money it spends, the accuracy of the dependent variable might still be affected because the study places health expenditure estimates in relation to other macroeconomic indicators, including GDP, population and inflation rates. Also, while the health expenditure dataset from the WHO appears to be complete, a number of data points are imputed and might not reflect actual levels of expenditure.

Jerven (2013) argues that one solution to data quality issues related to data processing of international organisations might be to obtain data locally from the national statistics offices. While it would in theory be possible to obtain data for this study from the national authorities that produce them, this appears to be beyond the scope of this study as it would require obtaining health expenditure and other macroeconomic indicators from each of the 127 countries in this study. It is also worth noting that almost all cross-country studies working on comparable questions source their data from the same datasets of the WHO, World Bank and the IMF. This means that this study employs the best data currently available for this topic. However, data quality issues should be acknowledged when interpreting the data.

Appendices to Chapter 5

Appendix Table 5.1: List of Countries Included in This Study

Country name	included		
	L&MIC	Joined before 1995	WHO Data
Afghanistan	x	x	x
Albania	x	x	x
Algeria	x	x	x
Angola	x	x	x
Antigua and Barbuda			
Argentina	x	x	x
Armenia	x	x	x
Australia			
Austria			
Azerbaijan	x	x	x
Bahamas			
Bahrain			
Bangladesh	x	x	x
Barbados			
Belarus	x	x	x
Belgium			
Belize	x	x	x
Benin	x	x	x
Bhutan	x	x	x
Bolivia	x	x	x
Bosnia and Herzegovina	x	x	x
Botswana	x	x	x
Brazil	x	x	x
Brunei Darussalam			
Bulgaria	x	x	x
Burkina Faso	x	x	x
Burundi	x	x	x
Cabo Verde	x	x	x
Cambodia	x	x	x
Cameroon	x	x	x
Canada			
Central African Republic	x	x	x
Chad	x	x	x
Chile			
China	x	x	x
Colombia	x	x	x
Comoros	x	x	x
Congo, Democratic Republic	x	x	x
Congo, Republic of	x	x	x
Costa Rica	x	x	x
Cote d'Ivoire	x	x	x
Croatia			
Cyprus			

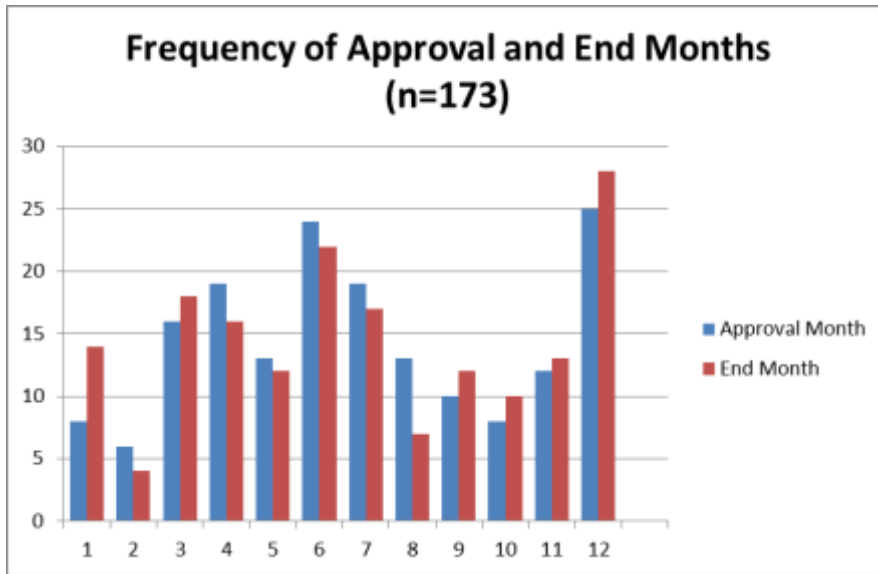
Czech Republic			
Denmark			
Djibouti	x	x	x
Dominica	x	x	x
Dominican Republic	x	x	x
Ecuador	x	x	x
Egypt	x	x	x
El Salvador	x	x	x
Equatorial Guinea			
Eritrea	x	x	x
Estonia			
Ethiopia	x	x	x
Fiji	x	x	x
Finland			
France			
Gabon	x	x	x
Gambia	x	x	x
Georgia	x	x	x
Germany			
Ghana	x	x	x
Greece			
Grenada	x	x	x
Guatemala	x	x	x
Guinea	x	x	x
Guinea-Bissau	x	x	x
Guyana	x	x	x
Haiti	x	x	x
Honduras	x	x	x
Hungary	x	x	x
Iceland			
India	x	x	x
Indonesia	x	x	x
Iran	x	x	x
Iraq	x	x	x
Ireland			
Israel			
Italy			
Jamaica	x	x	x
Japan			
Jordan	x	x	x
Kazakhstan	x	x	x
Kenya	x	x	x
Kiribati	x	x	x
Korea			
Kosovo	x		
Kuwait			
Kyrgyz Republic	x	x	x
Laos	x	x	x
Latvia			
Lebanon	x	x	x
Lesotho	x	x	x
Liberia	x	x	x
Libya	x	x	x
Lithuania			
Luxembourg			

Macedonia	x	x	x
Madagascar	x	x	x
Malawi	x	x	x
Malaysia	x	x	x
Maldives	x	x	x
Mali	x	x	x
Malta			
Marshall Islands	x	x	x
Mauritania	x	x	x
Mauritius	x	x	x
Mexico	x	x	x
Micronesia	x	x	x
Moldova	x	x	x
Mongolia	x	x	x
Montenegro	x		
Morocco	x	x	x
Mozambique	x	x	x
Myanmar	x	x	x
Namibia	x	x	x
Nepal	x	x	x
Netherlands			
New Zealand			
Nicaragua	x	x	x
Niger	x	x	x
Nigeria	x	x	x
Norway			
Oman			
Pakistan	x	x	x
Palau	x		
Panama	x	x	x
Papua New Guinea	x	x	x
Paraguay	x	x	x
Peru	x	x	x
Philippines	x	x	x
Poland			
Portugal			
Qatar			
Romania	x	x	x
Russia			
Rwanda	x	x	x
Samoa	x	x	x
San Marino			
Sao Tome & Principe	x	x	x
Saudi Arabia			
Senegal	x	x	x
Serbia	x	x	x
Seychelles	x	x	x
Sierra Leone	x	x	x
Singapore			
Slovakia			
Slovenia			
Solomon Islands	x	x	x
Somalia	x	x	
South Africa	x	x	x
South Sudan	x		

Spain			
Sri Lanka	x	x	x
St Kitts and Nevis			
St Lucia	x	x	x
St Vincent and the Grenadines	x	x	x
Sudan	x	x	x
Suriname	x	x	x
Swaziland	x	x	x
Sweden			
Switzerland			
Syria	x	x	x
Tajikistan	x	x	x
Tanzania	x	x	x
Thailand	x	x	x
Timor-Leste	x		
Togo	x	x	x
Tonga	x	x	x
Trinidad and Tobago			
Tunisia	x	x	x
Turkey	x	x	x
Turkmenistan	x	x	x
Tuvalu	x		
Uganda	x	x	x
Ukraine	x	x	x
United Arab Emirates			
United Kingdom			
United States			
Uruguay			
Uzbekistan	x	x	x
Vanuatu	x	x	x
Venezuela	x	x	x
Vietnam	x	x	x
Yemen	x	x	x
Zambia	x	x	x
Zimbabwe	x	x	
	135	129	127

Appendix Table 5.2: Countries in the Study

Appendix Figure 5.1: Begin and End of Agreements



Appendix Figure 5.2: Distribution of Approval and End Months

6

Statistical Methods

This study aims to evaluate the effects of IMF agreements on government health expenditure. To do so, the study exploits the fact that some countries are exposed to agreements at some times, while others are not and thereby aims to estimate the differences in government health expenditure, during times of Fund agreements compared to times with no agreement. This difference is commonly referred to as “programme effect” (Goldstein and Montiel, 1986) or “participation effect” (Atoyan and Conway, 2006). To be able to attribute this effect to the IMF agreements, one needs to be able to compare like with like. Ideally this means that a country in an agreement is compared to the same country in the same situation but without agreement. It is easy to see that this is not possible as one country cannot experience two agreement states simultaneously (Angrist and Pischke, 2009; Rubin, 2005). To overcome this “fundamental problem of causal inference” (Holland, 1986) in the natural experiment setting, a counterfactual needs to be created, which is comparable to the agreement country, with ideally the only difference being the difference in the agreement status (Morgan and Winship, 2007). When constructing counterfactuals for this study, two methodological challenges have to be dealt with.

Firstly, when modelling government health expenditure, factors that impact on this dependent variable need to be controlled for in order to be able to attribute the effects correctly to the agreement indicator, the explanatory variable of primary interest. A method needs to be identified to model data in the panel data structure of this study.

Secondly, the decision to enter into an agreement is based on certain economic and political circumstances (see section 4.3; pg. 130), which suggests that assignment into an agreement is not random. Countries entering into agreements will face certain constraints, while countries not entering into agreements will not face the same constraints. This means that countries with and those without agreements are systematically different and not immediately comparable. This difference in circumstances is likely to have an effect on the country's overall economic performance and also the decision to increase or decrease government health expenditure. This means that the agreement dummy is endogenous (Goldstein and Montiel, 1986; Vreeland, 2003). Since classical regression techniques assume exogeneity of all variables, a concept needs to be identified to address this problem of endogeneity and selection.

This chapter outlines a strategy to tackle these two challenges using appropriate techniques. To do so, the chapter is structured into three parts. The first section considers methods that are appropriate for modelling health expenditure data with the given data structure. The second section discusses methods appropriate to dealing with the selection problem at hand. Section three summarises the chapter and outlines the estimation strategy for this study.

6.1 Modelling Government Health Expenditure

Government health expenditure will be modelled using regression techniques. Regression is a computational tool that allows one to compare treatment and control cases, which have the same observed characteristics. It is based on the somewhat idealistic assumption that when all other things are equal the observed difference in the outcome must be due to differences in the variable of interest. To “make things equal” regression techniques control for, or hold constant, all other variables in the

model (Angrist and Pischke, 2015). It thus enables to identify the independent effect of a set of variables on the dependent variable (Greene, 2011). This means that the independent effect of IMF agreements on government health expenditure as dependent variable can be estimated holding additional independent variables, which are seen as its determinants, constant.

The most important distinction when choosing a regression method is the data type of the dependent variable. Given that the dependent variable in this study, government health expenditure, is continuous, linear regression – often described as the most useful tool in econometrics (Greene, 2011) – is seen as appropriate starting point for this study. Linear regression is a method to summarise the average value of a numerical outcome as defined by a linear function of predictors (Gelman and Hill, 2006). As with all regression models and in particular in the context of the panel dataset used in this study, a number of decisions about the correct specification need to be made. This section outlines and discusses different options and derives the most appropriate specification for this study. The first part discusses stationarity as important prerequisite for regression modelling. The part section presents the Fixed Effects estimator as the most appropriate estimator for this study. Part three discusses further specifications around issues of spatial and temporal dependence as well as panel heteroscedasticity. Part four offers a summary and presents the estimation strategy.

6.1.1 Stationarity

Time series and thus panel data theory relies on the assumption that the variables are stationary. Stationarity in time series most generally describes the status of no systematic change over time. The literature distinguishes between strict and weak stationarity. The former is given when the joint probability distribution is the same for all time points across the entire time series. The joint probability does therefore only depend on the length of time between two data points but not on time. Weak or covariance stationarity is given when both mean and covariance between two time points are constant throughout the entire time series and do thus not depend on time. While strict stationarity is harder to achieve, most of time series theory relies on the

data being covariance stationary (Bisgaard and Kulahci, 2011; Chatfield, 2004; Hamilton, 1994; Shumway and Stoffer, 2010).

A practical example related to this study can be used to illustrate the importance of stationarity. Assume that a health expenditure time series is non-stationary and it follows a positive/negative trend. Assume also that a country with this health expenditure time series is in an agreement towards the end of the observations and none at the beginning. Comparing periods with and without agreements would suggest that health expenditure is higher/lower during agreement times. While this might well be the case, the trending time series makes it hard to distinguish the effect of the IMF from that of the observed trend. This section outlines methods to identify stationarity, and deal with the non-stationary time series in this study.

Stationarity can be assessed using a number of methods. Most commonly these rely on the assessment of individual time series⁷⁹ and include visual examination of the time line plot, autocorrelation function (ACF) plots, as well as unit root tests of each time series.

The time line plot allows to visually inspect general trends over time. It gives some indication about stationarity when the values of the observations increase or decrease constantly over time. Chatfield (2004) and Becketti (2013) suggest to use time line plots in combination with ACF plots to assess stationarity. Autocorrelation denotes the correlation of one observation with another, later observation. The ACF measures how closely related two observations are across time. These correlations can be plotted in an ACF plot which shows the autocorrelation coefficients against the number of lags (Becketti, 2013; Chatfield, 2004; Cowpertwait and Metcalfe, 2009; Koop, 2000). A time series is deemed to be non-stationary when the correlations decay only slowly over time (Bisgaard and Kulahci, 2011). Unit root tests are an additional decision tool to distinguish time series. Unit root tests commonly test the null hypothesis of a time series having a unit roots, which is considered evidence of a time series being non-stationary. The alternative hypothesis is that there is no unit root and

⁷⁹ It is worth nothing that recently methods to assess stationarity specifically for panel data have become popular (Baltagi, 2008; Hadri, 2000). In empirical research, however, most methods rely on the assessment of individual time series.

the time series is stationary (Bisgaard and Kulahci, 2011; Patterson, 2011). While a great number of unit root tests have been developed (Patterson, 2011), the augmented Dickey-Fuller (Dickey and Fuller, 1979) and the Phillips-Perron test (Phillips and Perron, 1988), are the most commonly used tests (Maddala, 2001). They are however, due to the difficulty of distinguishing stationary and non-stationary time series, considered to be rather weak tests (DeJong et al, 1992; Schwert, 2002). This means that the obtained results might not be reliable.

The literature (Beckett, 2013; Bisgaard and Kulahci, 2011; Chatfield, 2004; Koop, 2000) suggests a number of ways of dealing with non-stationary time series. One option is to difference the time series till it is stationary. This means to subtract the value at time 1 from the value at time 2, so that $\Delta x_t = x_t - x_{t-1}$. Differencing changes the interpretation of the results from reporting levels of health expenditure (and their change) to reporting changes of health expenditure (or changes thereof) (Bisgaard and Kulahci, 2011). It comes with two main drawbacks. Firstly, the time series loses the information about its levels and therefore the ability to estimate long-term effects. Secondly, one time point will be lost, as the first difference of the first time period cannot be estimated. Another option is to control for the time trend. This is particularly useful in cases where there is a gradual increase in the data. This trend can be controlled for by including a function of the trend itself. While more complicated options and forms of the trend function are possible, the simplest function is to simply control for time. This assumes that with every one unit increase in time, the value of time series variable increases/decreases.

Chatfield (2004) suggests that it is often difficult to distinguish stationary time series processes with long memory⁸⁰ from non-stationary processes, especially when the time series are rather short as is the case for this study⁸¹. This means that a time series might be stationary but have a slow speed of adjustment. However, due to the

⁸⁰ Time series processes with long memories are those that revert to the mean only slowly and over a long period of time.

⁸¹ This time series is based on observations for 18 time points (years), this can be considered a long panel in comparative political science, especially compared to survey data, where there are only a few time points. However, the time series is not long when compared to financial data, where observations are made daily and for many years.

short period of observation the return of the time series to the mean cannot be observed, which makes the series appear non-stationary. Beck and Katz (2011), using examples of political science data, argue that the series might be very persistent but they are almost naturally bounded. This is because most outcomes of interest are taken as ratios, for instance social spending as proportion of the overall budget. The value can thus not trend above 100% or below 0%. The authors argue that a trend in spending might not persist forever, as high levels of spending might lead to reductions and low levels to an increase, so that in the long run the time series reaches equilibrium at a given mean and is thus stationary. This argument is applicable to the health expenditure variables used in this study. Measuring government health expenditure as percentage of general government expenditure or GDP, levels are naturally bounded between 0 and 100%. Further discussion is needed for the variable measuring expenditure as absolute spending per capita. Considering that over the recent years great emphasis has been placed on expanding health expenditure in developing countries, especially in relation to the Millennium Development Goals (Fryatt et al, 2010) and the emerging goals of universal health care (see section 1.1; pg. 6), it would be reasonable to expect that health expenditure trend upwards, not as a random variation, but as an upward trend, that is in the short- and long-term not mean stationary. As will be shown in more detail later on (chapter 7), most countries experience this trend over time, especially when measuring expenditure per capita. As was outlined before, the trend in the data can affect the data analysis for this project and needs to be controlled for. To do so, it appears that controlling for the trend using a time dummy is the best option in this study.

6.1.2 Choice of Estimator

When modelling panel data a number of estimators can be chosen, that vary in their assumptions about country-specific effects and their degree of data pooling. This section presents the most commonly used estimators and discusses their applicability to the present dataset. Options range from full pooling of all data points in a pooled regression where all data points are fully pooled, over Fixed Effects as well as Random Effects estimators, where data is partially pooled to no pooling of the data. Not pooling the data would mean to model each of the cross-sections (observations of all countries

in one year) or each of the time-series (all time points of one country), separately. These are however not considered useful options in the context of this study for both theoretical and data reasons⁸². The section therefore focusses on discussing pooled regression and fixed as well as random effects models.

6.1.2.1 Pooled Regression Model

The arguably simplest approach to dealing with a panel dataset is by pooling all data points. The pooled regression model could be specified as follows:

$$y_i = \alpha + \beta_1 IMF_i + \beta_2 X_i + \varepsilon_i \quad (6.1)$$

In equation (6.1) y_i describes the level of government health expenditure of each observation i . IMF_i describes the value of the IMF dummy of each observation i . X_i is a vector of determinants of government health expenditure as identified in chapter 5. α is the constant, β_1 is the regression coefficient for the IMF dummy, β_2 a vector of regression coefficients for the determinants of government health expenditure. ε_i is the idiosyncratic error of each observation i .

Each coefficient (β) reports the independent effect of the variable on the outcome, holding all other variables in the model constant. The interpretation of the coefficients depends on their level of measurement. For binary predictors the regression coefficient describes the difference between the averages of both groups. Applied to the model in this study the coefficient β_1 describes the difference in government health expenditure between countries in agreements and those without agreements. For continuous covariates the coefficient describes the effect of a one unit change on the outcome.

The regression equation will be solved using the Ordinary Least Square (OLS) estimator (Wooldridge, 2005). This estimator relies, amongst other things, on the assumption that there is no latent heterogeneity between the countries (Greene, 2011).

⁸² When modelling each cross-section separately, the number of observations would be limited to N=127, which is quite low and gives the results of effects for one particular year. When modelling each time series separately, the results give an indication about the effects of agreements in individual countries, but not the overall sample of low- and middle-income countries as in intended in this study. Also the low number of observations of each country (T=18) make this analysis rather low powered.

This means that the individual observations are not independent of each other but linked by country and the observed values differ between individual countries. In the presence of latent heterogeneity, the OLS estimator of the pooled regression model will yield inconsistent results.

6.1.2.2 Panel Data Estimators: Random Effects and Fixed Effects Estimator

Alternatives that model the country-specific effect can be seen in the Fixed Effects and Random Effects estimator, which make different assumptions about these effects. The model can be specified as follows for both estimators:

$$y_{it} = \alpha_i + \beta_1 IMF_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (6.2)$$

In equation (6.2) y_{it} describes the level of government health expenditure of each country i at time t . IMF_{it} describes the value of the IMF dummy of each country i at time t . X_{it} is a vector of determinants of government health expenditure. α_i is the constant, β_1 is the regression coefficient for the IMF dummy, β_2 a vector of regression coefficients for the determinants of health expenditure. ε_{it} is the idiosyncratic error of each country i at time t . ε_{it} is assumed to be uncorrelated with the independent variables and to be normally distributed with mean zero and variance σ . The constant can be decomposed in to two parts where $\alpha_i = \alpha + \mu_i$. Where μ_i is the unobserved country-specific effect. Assumptions that are made about μ_i differ between Fixed and Random Effects estimators (Baltagi, 2008; Hsiao, 2014; Wooldridge, 2005).

The Random Effects model assumes that the μ_i , capturing the unobserved country-specific effect, is random with a mean of 0 and a variance of σ_μ (see equation (6.3)).

$$\mu_i \sim N(0; \sigma_\mu) \quad (6.3)$$

It captures everything that is unmeasured and time-constant for each individual country. This means that intercepts vary for each country, suggesting that health expenditure levels are different for each country; the effect of the IMF however is seen to be the same across all countries. The random effects estimator assumes that the unobserved and time-constant effects captured in μ_i are independent of the independent variables X_{it} . If this assumption does not hold the model is mis-specified and the beta coefficients not correct (Baltagi, 2008). Random effects models can be estimated with

Generalised Least Squares (GLS) or Maximum Likelihood Estimation (MLE) (Cameron and Trivedi, 2009).⁸³

The Fixed Effects estimator assumes μ_i to be a systematic component without a stochastic element (that is, no distribution), also referred to as a fixed parameter. This estimator allows for μ_i to be correlated with X_{it} and controls for all omitted time-invariant variables. This is achieved by wiping out the country specific effect, which also means that the cross-sectional variation – between countries – is removed from the analysis and parameter estimates are based on the over-time variation in the independent variables. While the country-specific effect is still accounted for, it is not modelled explicitly. Fixed Effects models are estimated using the fixed, or within, estimator and can also be estimated using the so-called Least Square Dummy Variable (LSDV) estimator, by including a dummy variable for each of the countries into the pooled model estimated by OLS (Greene, 2011; Longhi and Nandi, 2015; Wooldridge, 2005).

6.1.2.3 Choosing the Right Estimator

When choosing the right estimator in the context of this study, decisions need to be made at two stages. Firstly, it needs to be investigated whether or not the data can be pooled. And secondly, if this is not the case and country specific effects exist in the data, it needs to be decided whether these effects are considered random or fixed. The decision at the two stages can be made building on both theoretical as well as data-driven arguments, using formal tests.

Turning first to the decision about country-specific effects. The absence of country-specific effects would suggest that there is no systematic difference between the individual countries. This would for instance and looking only at the health expenditure variable suggest that government health expenditure levels would be comparable between individual countries. As will be shown in more detail in chapter 7, this is however not the case, as some countries spend more money on health care

⁸³ An extension to the Random Effects model can be seen in the random coefficients or random slope model, where not only the intercept is country specific but also the slope. This means that the model allows for the effect of individual covariates to differ between countries (Gelman and Hill, 2006; Greene, 2011; Robson and Pevalin, 2016).

than others. It can easily be seen that country-specific effects exist when inspecting the dependent variable univariately. While it is likely that these effects still persist when modelling the variables, this can also be tested more formally using the Breusch-Pagan Lagrange Multiplier Test for Random Effects⁸⁴ (Breusch and Pagan, 1980). It tests the null hypothesis that the variation of the country-specific effects in the random effects model equals zero. This means that if the null hypothesis holds, there are no country specific effects in the model and the data can be pooled. If the test result is statistically significant the null hypothesis of no country specific effects will be rejected in favour of the existence of these effects and pooling of the data would ignore the county specific effect (Baltagi, 2011). Performing this test for the given models suggests highly statistically significant results in all models (see Appendix Table 6.1; pg. 243). A pooled regression model should therefore not be used for this study. As was noted above, the Fixed Effects estimator, controlling for country-specific effects, can also be estimated using the LSDV estimator, which is a pooled OLS model with a dummy for each of the countries in the model. While this would be an appropriate estimator for the data, it is argued that the inclusion of 126 dummies and the estimation of their effects, cannot be seen as efficient.

Having identified that the data cannot be pooled, the correct panel data estimator needs to be selected. This decision can again be made using both theory and data-driven arguments. Using a Random Effects estimator would allow to model an individual intercept for each of the countries, this means that the unobserved heterogeneity between countries' health expenditure would be modelled. At the same time the slope and thus the effect of IMF agreements is similar across all countries. The Fixed Effects estimator accounts for the unobserved heterogeneity of health spending, but does not model it explicitly. This study is primarily interested in investigating the average effects of IMF agreements on government health expenditure. This means there is no interest in estimating the unobserved

⁸⁴ It is worth pointing out that while the test is called a random effects test it only tests if unit-specific (in this case country-specific) and thus unit (country) specific heterogeneity exists; it does not test if effects are random (rather than fixed).

heterogeneity, it therefore does not have to be modelled. This suggests to use the Fixed Effects estimator.

Turning to the data argument, it was suggested that the random effects estimator only produces correct estimates, when the unobserved country-specific effects are uncorrelated with the independent variables. While this is a fairly strong assumption, it can be tested formally using the Hausman test (Hausman, 1978). The test is based on the assumption that in the absence of the correlation between country specific effect and the individual variables, both the random and the Fixed Effects estimators are correct. When there is a significant difference in the estimated coefficients, this assumption does not hold and a correlation should be expected, hence the random effects estimator is incorrect. The Hausman test tests the null hypothesis that there is no systematic difference between the estimates of the Fixed and the Random Effects estimator. Rejecting the null would suggest that the Random Effects estimator is incorrect and the Fixed Effects estimator should be chosen (Greene, 2011; Longhi and Nandi, 2015). Applying the test to the data suggests generally highly statistically significant results (Appendix Table 6.2; pg. 243) and that the Fixed Effects estimator should be chosen. For a small number of models, the results are not statistically significant, suggesting that both the Fixed or the Random Effects estimator can be used. In order to allow for comparison across the models, all models will be fitted using the Fixed Effects Estimator.

6.1.3 Further Panel Specifications: Serial and Contemporaneous Correlation, Panel Heteroscedasticity

So far the section discussed issues around stationarity and the use of different estimators to model panel data. A number of other aspects need to be considered when modelling panel data. These have to do with the fact that the data points in panel data sets are not independent of each other, but measured repeatedly for the same country. This makes it unlikely that the error term is normally distributed with the mean zero and a variance that is constant across all observations ($\varepsilon_{it} \sim N(0; \sigma)$). It is more likely, that the data contain autocorrelation, but also panel heteroscedasticity and cross-sectional dependence. In the presence of one or more of these characteristics in the model, the classic standard errors, which are used to draw inference and make

statements about “statistical significance” of a finding, are no longer correct (Cameron and Trivedi, 2009; Greene, 2011). To still obtain reliable results, the model needs to be adjusted to account for these characteristics in the data. This section builds on examples outlined by Beck and Katz (1995) to illustrate autocorrelation, cross-sectional dependent and panel heteroscedasticity as well as approaches to deal with these structures in this study.

6.1.3.1 Serial Correlation

It is likely that the past realisations of a variable impact its value in the future. For instance, the level of health expenditure in a country at one year is most likely very closely correlated to the spending level in the next year. Similarly, a country’s level of national income, measured in GDP, is likely related to its next year’s level of income. That is to suggest that there is a temporal dependency of the data points, which indicates that the data is auto-correlated and the error term of the model serially correlated. This can result from two main data generation processes underlying the data, the autoregressive and the moving-average process. For economic data an autoregressive process is most commonly assumed⁸⁵. Such a process can have different orders, which give an indication of how many past realisations have influence of the present (Baltagi, 2011).

Given the use of annual data, a first-order autoregressive process is most likely the underlying process, as the previous year’s value informs the current year’s value. This can, however be tested visually and more formally. Visual inspection of correlograms provides information on the order of the process. For an autoregressive process of order one the partial autocorrelation (PACF) function will show a correlation only for the first lag (Cowpertwait and Metcalfe, 2009). While this approach allows to inspect autocorrelation of the time series univariately, autocorrelation appears as serial correlation of the error term of the fitted model. This suggests that autocorrelation is present in the data, when the error terms are correlated between time periods. Wooldridge (2002) proposes a suitable test for linear panel data, where he suggests to test for the serial correlation under the null hypothesis of no serial

⁸⁵ Note that a moving average process can be modelled assuming a autoregressive process and vice versa.

correlation in the error term (Drukker, 2003). Using this test in combination with the visual inspection of the correlograms suggests a first-order autoregressive process in the data for this study (See Appendix Table 6.3 (pg. 243) for p-values of this test for each model).

While various approaches exist in the literature to deal with autocorrelation (Baltagi, 2011), this study will follow the arguably most commonly used method of dealing with autocorrelation by including the lagged dependent variable as additional right-hand side variable in the model (Beck and Katz, 2011).

6.1.3.2 Panel Heteroscedasticity and Contemporaneous Correlation

Turning next to panel heteroscedasticity and contemporaneous correlation. It is likely that two or more countries' experiences are similar because their economies are interlinked in one way or another or they are exposed to similar global trends. For instance, the trajectory of countries' health expenditure in the same region might be very similar as countries are at similar levels of development or receive similar commitments from international donors. This fact that countries experience similar realisations at the same time is termed contemporaneous or cross-sectional correlation.

Also, the extent to which the model fits the data might vary between countries. For instance, upper middle-income countries might have higher levels of health expenditure compared to countries of low-income. This suggests that the model shows panel heteroscedasticity. These examples show that panel heteroscedasticity and cross-sectional dependency likely exist in the dataset. Ignoring these structures would potentially lead to wrong results. For this study it is suggested to deal with these issues by choosing standard errors that relax the general assumptions of independence and allow for heteroscedasticity and spatial correlation.

The probably most commonly known specification of a standard error, which relaxes the independency assumption is the robust standard error, proposed by White (1980), which estimates standard errors based on a robust covariance matrix that allows for heteroscedasticity (Angrist and Pischke, 2009). An extension to this can be seen in the panel corrected standard errors, which are useful in situations where there is contemporaneous correlation as well as heteroscedasticity (Beck and Katz, 1995). This specification is commonly used in the quantitative political science literature and

applied especially in longer panels, as used in the context of this study. Panel corrected standard errors are only defined for OLS and can thus not be applied in this study. The procedure proposed by Driscoll and Kraay (1998) is available for both OLS and Fixed Effects estimators and allows for panel heteroscedasticity as well as contemporaneous correlation of the errors (Hoechle, 2007). Given the possibility of these characteristics in the data, this definition of the standard errors is seen to be the most appropriate methods for this study.

An alternative to the proposed approach can be seen in modelling the data using a feasible generalised least-square (FGLS) estimator, as introduced by Parks (1967) and applied by Kmenta (1986), which allows for heteroscedasticity, temporal and cross-sectional dependence of the data. This approach however is infeasible for datasets where the cross-sectional dimension is larger than the time component (Hoechle, 2007), as is the case for this study. Additionally, (Beck and Katz, 1995) show that this method produces unacceptably small standard errors and therefore misleading results on statistical significance.

6.1.4 Summary of the Method to Model Government Health Expenditure

This section set out to justify the methods chosen to model government health expenditure. It firstly discussed stationarity as an important precondition for modelling panel data, then turned to discussing different estimator options before considering autocorrelation, panel heteroscedasticity and cross-sectional dependence as further panel specifications. It was argued that while potentially not non-stationary in the strictest sense the present data exhibit a time trend as spending increases over time. It was suggested to account for this trend using a time dummy. Out of the different estimators available for the models, it was shown that country heterogeneity is present in the data. As there is no explicit interest in modelling this heterogeneity, it was argued that the Fixed Effects estimator is the best choice for this model. Using theoretical reasoning and appropriate tests it was shown that the data exhibit first order autocorrelation, panel heteroscedasticity and cross-sectional dependence. It was argued to account for autocorrelation using a lag of the dependent variable and adjust the standard errors for panel heteroscedasticity and cross-sectional dependence using Driscoll and Kraay standard errors.

It is worth noting that including a lag of the dependent variable turns a panel model into a “dynamic” panel model. A common problem with dynamic panel models estimated with Fixed Effects is the so-called Nickell bias. It was first described by Nickell (1981) and is caused by the correlation of the lagged dependent variable and the error term. The estimator is inconsistent when the number of units (in this study the number of countries; N) increases while the number of time-series observations (in this study the number of years observed; T) is limited. The magnitude of this bias decreases as the number of years observed increases but remains a concern as long as $T < N$. As a result the value of the t-statistic of the coefficient, used to estimate the p-value and thus the statistical significance of a variable, is biased upwards, which means that a result is more likely to be found to be statistically significant than it would be in the absence of the bias (Beck et al, 2014; Gaibulloev et al, 2014). The dataset of this study presents a situation, similar to most work in comparative politics, where $T < N$ ($N=127$ countries observed over $N=18$ years) so that the Nickell bias is a potential concern for the results.

Beck et al (2014) show that the size of the Nickell bias decreases as T increases and suggest that in a common study in comparative politics, such as this present study, the bias is negligible as it is fairly small. They also point out that the bias mostly affects the standard errors in such a way that results more easily turn statistically significant in the presence of the bias. The bias will thus not affect the estimated effect size of the IMF agreement but might turn results statistically significant, which would not be significant in the absence of the bias. Given the vastly non-statistically significant findings in this study (see chapters 8 and 9) this seems to be a minor problem⁸⁶.

Alternatively, the problem could be dealt with using a generalised methods of moments (GMM) procedure (Baltagi, 2008), which was arguably first described by Arellano and Bond (1991), and uses the orthogonality conditions between the lagged dependent variable and the error term as instruments. Fitting these types of models is difficult due to the high complexity of the GMM procedure and is therefore seen to be

⁸⁶ Assuming that the Nickell bias actually affected the results, it would change the results to suggest that social protection agreements do not have a statistically significant positive effect on government health expenditure in LIC, but no effect at all.

beyond the scope of this study. Furthermore, the literature in the field also commonly uses the fixed-effects estimator. Only one study (Clements et al, 2013) exists, that uses the GMM estimator and, comparing the results to the traditional fixed-effects estimator, shows that results are similar for both the GMM and the Fixed Effects estimator.

6.2 Dealing with the Selection Problem

While regression methods are capable of accounting for differences between individuals by controlling for these differences, they are not always capable of producing convincing estimates of effects when the variable of interest is endogenous, as is the case in this study, and other techniques need to be used (Angrist and Pischke, 2015). It is worth noting that while the use of the Fixed Effects estimator accounts for some of endogeneity, particularly when the underlying selection process is constant over time (Dustmann and Rochina-Barrachina, 2007), it does not account for all of it and other methods are needed to account for the remaining part (Vella, 1998). Broadly speaking three main methods to account for selection bias can be identified: instrumental variables, matching and selection models. For this project the use of a selection model is seen as the most appropriate method to account for the selection problem. To demonstrate this, the following sections briefly outline the methods of instrumental variables and matching to show why these are not considered for this study. After this, the selection model approach will be outlined in more detail and the modelling procedure for this study presented.

6.2.1 Instrumental Variables Approach

An instrumental variable approach to dealing with endogeneity and selection bias is commonly used in the field of economics (Angrist and Pischke, 2009). It is argued that in the presence of endogeneity the error term of a regression model is correlated with one or more of the independent variables. The instrumental variable approach deals with this situation by introducing a new variable, the instrumental variable, or instrument, that is correlated with the endogenous independent variable but not with the outcome variable (Angrist and Pischke, 2015; Cameron and Trivedi, 2009; Wooldridge, 2005). In the context of this study this means that factors that have

an impact on government health expenditure also have an impact on the independent variables in the model, particularly the IMF dummy variable. It is easy to see that, for instance, changes in health spending are a result of changes in economic conditions in a country, but that these changes in economic conditions have an impact on entering into an IMF agreement. When using an instrumental variable approach in this study an instrument would need to be identified, which is associated with the IMF dummy variable but not with the health expenditure variable. In other words, a factor would need to be found that affects a country entering into an IMF agreement, but does not have an impact on health spending. Due to the intertwined nature of economic and political circumstance and IMF agreements but also between economic and political circumstances and health spending, it is hard to see how such an instrument could be identified from the available dataset. It appears that the instrumental variable approach breaks down in this study as no valid instrument can be identified. The instrumental variables approach cannot be used in this study.

6.2.2 Matching Approach

Another method to reduce selection bias, traditionally used in the medical science literature, and increasingly gaining importance in applied econometrics and the evaluation of social programmes is the method of matching (Heckman and Navarro-Lozano, 2004; Kluve and Augurzky, 2004). The ideas underlying the matching approach are most closely linked to the principle of the like-with-like comparison. When two subjects are comparable and one was exposed to a treatment and the other was not, the difference in outcome of both is attributable to the intervention. In the presence of selection bias subjects in treatment and non-treatment group are not immediately comparable due to the systematic difference between those that receive the treatment and those that do not. The matching approach attempts to find pairs of subjects that are judged to be comparable based on a number of observables. Once cases are matched they are seen to be comparable and differences in their outcome can be attributed to the treatment.

While traditionally the process is done by matching units on their vector of observable covariates (Dehija and Wahba, 2002), an increasingly popular approach is the propensity score matching, introduced by Rosenbaum and Rubin (1983), who

argue that a balancing score can be created as a function of the observed covariates. This balancing score is called the propensity score and describes the propensity of a case to receive treatment. Treated and untreated cases are then matched on the propensity score.

Applied to the present study on the IMF, the idea would be to match countries that are under agreements with countries that are not under agreements but have a similar propensity of entering into an agreement based on a number of observable variables. These observables are likely to be a number of agreement determinants previously identified in the chapter 4. In the IMF literature, this approach is used in only two studies on effects of agreements on economic factors (Atoyán and Conway, 2006; Garuda, 2000), as it appears to suffer from two main faults that make its application difficult. Firstly, being able to match countries relies on the fact that there are countries in comparable economic conditions, with one country entering into an agreement and the other country not entering. It can be seen that this is likely the case for a smaller number of countries, however it should be assumed that most of the countries in agreements are not experiencing economic conditions similar to those countries not in agreements. This is shown by Atoyán and Conway (2006), who argue that using the matching approach meant to reduce the size of their sample as only a small subset of countries could be matched in this way. Secondly, matching is based on characteristics in observable variables only. This means that country characteristics that have not been observed or cannot be observed are not part of the matching process. It is however likely, that the decision to enter into agreements is at least partly due to unobservable characteristics (Vreeland, 2003). Taken these arguments together, it appears that matching is unlikely a useful approach to deal with endogeneity and selection bias in this study.

6.2.3 Selection Model Approach

A third approach to deal with selection bias – and the one proposed for this study, also commonly used in similar work in the field – is the adaptation of a selection model. The name originates from the idea that the studied sample is not randomly drawn but represents a selected sample, where certain cases deliberately participate whilst others do not. A number of different such sample selection models have been

described in the literature (Cameron and Trivedi, 2005). The most commonly used type of selection model is based on Heckman's (1979) seminal publication. He states that the selection problem can be considered a problem of specification error in the way that it represents an omitted variable problem. He argues that, as usual, estimation results are not reliable when variables are omitted from the model. While it is usually not possible to capture and observe this omitted variable, in the case of self-selection which introduces the problem of selection bias, it is sometimes possible to estimate the variable that, when omitted, will give rise to the specification error in the regression analysis. This means that the value of the omitted variables needs to be estimated and this estimated value then be included as additional independent variable into the main regression.

In relation to this study this means that participation in IMF agreements is seen as a result of self-selection⁸⁷ and thus correct estimation of the effects of agreements on government health expenditure not possible due to the omitted variable that explains selection. This variable, however, can be estimated by identifying variables that determine the participation of a country at a certain time in an IMF agreement. Doing so will allow to estimate the value of the omitted variable, which will then be included as additional variable in the main regression of health expenditure and IMF agreements (as was outlined in Section 6.1; pg. 216).

This reasoning supports the use of a Heckman-style⁸⁸ two-stage estimation process. In the first stage a model is estimated to predict the outcome of selection using its determinants. These predictions of the first stage regression will be used to create the Inverse-Mills-Ratio (IMR). This will then, in the second stage be included in the main regression as additional independent variable to model government health expenditure.

⁸⁷ Note that "self-selection" in this context is used as a technical term where some countries select to enter into agreements while others do not. It does not mean to suggest that countries self-select to be in an agreement.

⁸⁸ It should be noted that, the approach taken in this study – in line with the wider literature in the field – is referred to as Heckman-style as it is not an exact replication of the approach described by Heckman (1979). See Appendix Note 6.1; pg. 244.

6.2.3.1 Panel Data and the Selection Problem

As the approach suggested by Heckman is designed to work with cross-sectional data, its adaptability to the panel data structure of this study needs to be considered. Over the recent years a number of advanced and complex econometrical approaches to deal with selection in panel data settings have been developed in the theoretical literature; for an overview see for instance Semykina and Wooldridge (2010), Wooldridge (2002) or Dustmann and Rochina-Barrachina (2007). Implementing these methods in the present study is difficult for two main reasons. Firstly, common to all these models is the fact that they are not implemented in standard statistics software as is used for this study. Secondly, the models have a high degree of complexity which makes their implementation in software difficult. Extensive literature searches including relevant forums, such as “Statalist”⁸⁹, did not provide additional information. This shows that these methods are beyond the approaches currently available to empirical studies. Additionally, it appears that the methods do not seem to be applied in empirical studies. Extensive literature searches did not yield a single empirical study that employs these methods. Outside the realm of theoretical econometrics, the topic seems to have received only limited attention, as a discussion of the panel element to the selection equation is generally missing from empirical studies on effects of IMF agreements on health and health systems.

While an implementation of a full panel selection model does not seem possible for this study, the panel element of the selection equation deserves some more consideration as the additional dimension, capturing time, in the data brings new issues. The most important of these is the mechanism of selection. Following the argument put forward by Greene (2011), it is worth considering the traditional setting of selection bias, which arises from non-random selection into a certain programme. This selection mechanism operates once based on a number of characteristics. Once selection has been completed, the status does not change; no deselection and/or re-selection occurs. In the case of the present study, the selection mechanism is – as will be shown empirically in chapter 7 – a more complex one. This is because countries commonly become IMF countries at one point in time, remain in agreements for a

⁸⁹ Statalist is an expert online forum to discuss issues around Stata and statistics.

given period of time, before “deselecting” from the agreement and potentially re-select into agreements at a later point. Due to this continuous selection mechanism, a simple cross-sectional approach, where selection is determined and corrected for using information from one cross-section at the beginning of the panel does not seem to be the right approach. It appears that due to the dynamic nature of the selection mechanism the entire dataset with years and countries should be considered to estimate the selection equation. Two main approaches seem possible⁹⁰: (i) pooling of all data points across countries and years and (ii) estimation of the selection equation repeatedly for each of the cross-sections. These approaches should be considered in turn.

An approach to estimate selection repeatedly for each cross-section is for instance put forward by Wooldridge (1995) in his model for selection correction for panel data. This approach implies estimating individual models based on repeated cross-sections, this means that the probability of a country being in an agreement would be estimated separately for each year in the study. Put differently, for each year a single regression model would be run to estimate the probability of a country being in an agreement, using information only from this particular year. The alternative approach would be pooling all data points in one overall model. Probabilities of countries being in agreements will be estimated not only using information from a given year but using information from all countries and years. Given that the present dataset has only 127 observations for each cross-section, it seems likely that an analysis including all cross-sections is statistically more powerful compared to repeated models as the pooling of the data will increase the number of observations. The pooled approach to the selection equation can be seen as the most useful and will be chosen for this study.

6.2.3.2 Estimating the Selection Equation

Having discussed the conceptual issues behind dealing with selection bias for this study, this section outlines the process of estimating the selection equation. The first stage of the estimation process involves the estimation of a country’s probability

⁹⁰ A third approach could be seen in the modelling of the selection equation using a panel probit model.

of being in an IMF agreement at a given year based on a number of determinants. This probability will be used to create the Inverse Mills Ratio, which in turn will be used as additional variable in the main regression model in order to correct for selection bias. To identify the probability, a regression model will be utilised. While regression models generally can serve two purposes, that of identifying the influence of individual variables on the outcome, and that of predicting an outcome based on a number of variables, the focus of this regression model is on predicting the outcome of IMF agreements, using a number of covariates. The outcome variable of this model is the IMF agreement dummy, which is 1 in case a country is in a (specific) agreement at a given time, and 0 otherwise. This outcome will be predicted using a number of covariates, that act as determinants of IMF agreements (see chapter 5).

Given that the outcome variable of this model is binary (Agreement on/off), regression techniques for binary outcome variables need to be chosen. The two most prominent approaches for this type of outcome variable are logistic and probit regression⁹¹ (Cameron and Trivedi, 2009). Heckman (1979) argues that for the purpose of the selection model the error term should follow a normal distribution, an assumption that is made in probit models, not however in logistic regression. For the purpose of this study, a probit model will be chosen. The model will be solved using maximum likelihood estimation and takes the form of:

$$s_i = \gamma \mathbf{Z}_i + \xi_i \tag{6.4}$$

Where s_i is the agreement dummy of observation i , which can take the value of 1 when a observation is selected or 0 otherwise. \mathbf{Z}_i is a vector of determinants of the selection of observation i used to predict participation or selection. γ is the estimated coefficient of vector \mathbf{Z}_i . ξ_i is the idiosyncratic error.

As was discussed previously, the selection correction will be based on a pooling of all data points across years and countries. Similar to the linear regression model outlined before (section 6.1.3; pg. 225), it is likely that assumptions about individual distribution of the data points are violated. Correlation and

⁹¹ Other less commonly used approaches are the linear probability and the complementary log-log model (Greene, 2011).

heteroscedasticity are likely problems. To account for this, the model will be estimated using cluster-robust standard errors, which relax the independence assumption⁹². This can however be seen as a minor issue, as the focus of this regression model is on predicting the outcome rather than estimating the influence of individual coefficients.

When fitting the model, two aspects, the choice of variables in the model and the choice of lags of these variables, need to be considered. While a number of variables have been identified in the previous literature review as potential determinants of IMF agreements, the literature does not offer a commonly accepted model⁹³. Which variables provide the best determinants in this particular study using the given dataset cannot be determined theoretically but needs to be identified by fitting different models and varying the determinants included in these models.

A similar statement will be made about the number of lags in the model. Countries are seen to have IMF agreements based on a number of determinants, the trajectory of these determinants might play a role in the decision to enter into an agreement. For instance, the agreement might be a result of the deterioration of economic performance in the previous years. While a number of studies include one lag of the determinants into their models, to suggest that the agreement is a result of the previous year's performance, the study by Garuda (2000) includes three lags. Which lag structure is appropriate for the model cannot be determined theoretically but needs to be identified empirically using the given dataset.

So far it was argued that the choice of model will be based on the "best model". It was not discussed how the goodness of a model will be determined. The literature describes a number of specification and goodness of fit measures. These include a likelihood-ratio test, for nested model, or the use of the Bayesian or Akaike information criterion, for non-nested models, as well as pseudo R² values (Cameron and Trivedi, 2009; Harrell, 2015). Given the goal of this regression model to correctly predict involvement in IMF agreements, it seems that – in line with the empirical

⁹² Heteroscedasticity was considered as potential issue. However, testing for heteroscedasticity in the main model suggested that this is not a problem in the model (Harvey, 1976).

⁹³ It was argued that there seems to be an established model in the IMF and health expenditure literature, which can be used as benchmark for this study. However, other combinations of determinants are possible.

literature in the field – an estimate of the correct prediction is the most suitable measure of goodness of the model. In this approach the *actually* observed classification of the outcome is compared the *predicted* classification. The ideal model would be capable of classifying all cases with agreements observed in the data as such. The percentage of correctly classified cases can be estimated and the goal would be a high percentage of correctly classified cases (Pempel, 2000). The result of this classification percentage is sensitive to the cut-off point, at which a predicted probability is considered an “on” case. The literature suggests to set the cut-off point to the percent of cases with positive outcome (Harrell, 2015). This approach will be followed in this study.

Outside the realm of goodness of fit, an additional consideration – that of data availability – needs to be made when fitting the model. From a statistical as well as substantive point of view a high number of cases should be in the models. It will be argued that for this study, retaining a high number of cases in a model is seen as additional goal. This may mean that trade-offs need to be made when fitting the model. For instance, including an additional variable might increase the percentage of correctly classified cases, but at the same time reduce the number of cases in the model. The literature does not provide guidance on dealing with such trade-offs. A decision will need to be made based on the individual model at hand.

Once the best model for this study has been identified linear predictions can be made. Out of these predictions the Inverse Mills Ratio will be created. This means to estimate the ratio of the probability density function to the cumulative distribution function of a standard normal distribution of the linear predictions and is a monotone decreasing function of the probability that the observation is participating in an agreement. To obtain the results free of selection bias, the IMR will then be included as additional right-hand side variable in the main regression, which will be estimated as was suggested in section 6.1.

6.3 Summary of the Chapter and Estimation Strategy

This chapter set out to present the methods to reliably answer the research questions. This final section summarises the chapter and draws out an estimation strategy for this study.

6.3.1 Summary of this Chapter

To answer the research questions of this study two methodological challenges need to be dealt with. Firstly, a methodology was developed to create a counterfactual in the panel data setting of this study. Secondly, an approach was devised to deal with the problem of selection and endogeneity. Considering a number of alternatives, it was argued that a Heckman-style selection model is the most appropriate approach to deal with selection and endogeneity. To create a counterfactual and model health expenditure it was shown that a Fixed Effects estimator was the most appropriate choice. To account for the time trend in the data, a time dummy was introduced. Autocorrelation will be controlled for using a lag of the dependent variable as additional right hand side variable. To allow for panel heteroscedasticity and contemporaneous correlation Driscoll and Kraay standard errors will be estimated.

6.3.2 Estimation Strategy

This study follows a two-step estimation strategy. In the first step the selection equation will be estimated to obtain predictions of a country being in an IMF agreement. To do so, a pooled probit model is estimated using the IMF dummy as dependent variable that is being explained using a number of economic and political variables, which have been identified as determinants of IMF agreements. A number of different combinations of these determinants and lags of them will be empirically tested to identify the most suitable model for the study. A model will be deemed most suitable when it can classify a great number of cases correctly into agreement and non-agreement cases and at the same time not eliminate too many cases. The selection equation is fitted for all agreements as well as for each of the agreement clusters specifically.

For the second step, linear predictions of this model will be used to create the Inverse Mills Ratio that captures the probability of a country being in an agreement. The Inverse Mills Ratio will be included as additional right hand side variable in the main equation, which will model health expenditure and identify the unbiased effect of IMF agreements on health expenditure. This means to estimate the following regression using the Fixed Effects estimator:

$$HE_{it} = \alpha + \beta_0 HE_{it-1} + \beta_1 IMF_{it} + \beta_2 X_{it} + \beta_3 \lambda_{it} + \beta_4 t + \varepsilon_{it} \quad (6.5)$$

HE_{it} describes government health expenditure of country i at time period t . HE_{it-1} is included as a right-hand side variable as the lagged effect of HE_{it} to account for first order autocorrelation between the measures of health expenditure. IMF_{it} is the agreement “treatment” variable which indicates if country i is in an agreement at time t . X_{it} is a vector describing health expenditure determinants of country i at time t . λ_{it} is the Inverse-Mills-Ratio of country i at time t . t is the time dummy to control for trends in the dependent variable, α the constant and ε_{it} the error term. β_{0-4} are the regression coefficients, whereby β_1 is the coefficient of main interest for this study holding the effect of IMF agreements on government health expenditure.

This equation will be estimated for each of the government health expenditure variables (HE/GDP, HE/GGE, HE/cap). Government health expenditure can only take positive values and is in the case of the HE/GDP and HE/GGE variables, bounded from 0 to 100. Linear regression requires that the dependent variable is unbounded⁹⁴ (Wooldridge, 2005). The boundedness of the dependent variable will be removed by log-transforming the variables.

To answer the research questions outlined in chapter 1, individual models will be run, which include all countries as well as the sub-groups of different income groups. Additionally, different models will be estimated for the two main facility clusters, these models will again be divided by income groups.

In order to judge the goodness of fit of the models, the coefficient of determination (R^2) will be used as it represent the most commonly used measure for

⁹⁴ Unboundedness means that the variable can, theoretically, take any value between minus and plus infinity.

linear models. This measure describes the proportion of the variation of the dependent variable, government health expenditure, that is explained by the independent variables in the model (Verbeek, 2012). For panel data the R^2 value can be decomposed into a within and between value, reflecting the different dimensions of the data. The within R^2 explains the variation within countries over time. The between R^2 describes the explained variation between countries. Given that the interest of this study is in explaining differences within countries over time, the within R^2 value will be used as goodness of fit indicator.

Appendices to Chapter 6

Appendix Table 6.1: Breusch and Pagan LM test

	All countries	LIC	LMIC	UMIC
All Agreements				
HE/GDP	<0.001	<0.001	<0.001	<0.001
HE/CAP	<0.001	<0.001	<0.001	<0.001
HE/GGE	<0.001	<0.001	<0.001	<0.001
SBA/EFF Agreements				
HE/GDP	<0.001	<0.001	<0.001	<0.001
HE/CAP	<0.001	<0.001	<0.001	<0.001
HE/GGE	<0.001	<0.001	<0.001	<0.001
Social Protection Agreements				
HE/GDP	<0.001	<0.001	<0.001	<0.001
HE/CAP	<0.001	<0.001	<0.001	<0.001
HE/GGE	<0.001	<0.001	<0.001	<0.001

Appendix Table 6.2: Hausman Test

	All countries	LIC	LMIC	UMIC
All Agreements				
HE/GDP	<0.001	<0.001	<0.001	0.036
HE/CAP	<0.001	0.002	<0.001	0.007
HE/GGE	<0.001	0.142	<0.001	<0.001
SBA/EFF Agreements				
HE/GDP	<0.001	0.001	<0.001	0.140
HE/CAP	<0.001	0.014	<0.001	0.638
HE/GGE	<0.001	0.119	0.996	<0.001
Social Protection Agreements				
HE/GDP	<0.001	<0.001	<0.001	<0.001
HE/CAP	<0.001	0.700	<0.001	0.831
HE/GGE	<0.001	0.158	0.005	0.003

Appendix Table 6.3: Wooldridge test

	All countries	LIC	LMIC	UMIC
All Agreements				
HE/GDP	<0.001	<0.001	<0.001	<0.001
HE/CAP	<0.001	<0.001	<0.001	<0.001
HE/GGE	<0.001	<0.001	<0.001	<0.001
SBA/EFF Agreements				
HE/GDP	<0.001	0.001	<0.001	<0.001
HE/CAP	<0.001	0.001	<0.001	<0.001
HE/GGE	<0.001	0.004	<0.001	<0.001
Social Protection Agreements				
HE/GDP	<0.001	<0.001	<0.001	<0.001
HE/CAP	<0.001	<0.001	<0.001	<0.001
HE/GGE	<0.001	<0.001	<0.001	<0.001

Appendix Note 6.1: on Heckman-style selection model

The origins of the Heckman selection model go back to the empirical challenge of estimating wage equations. For instance, estimating the effect of education on wages for females. Wage as a variable is only observed for those females that are participating in the labour market, and therefore a selected sample, which is likely not representative of the entire sample of women. The decision to participate in the labour market might be affected by women's education. Heckman (1979) suggests to correct for the self-selection bias by estimating the probability of entering into the selected sample based on appropriate characteristics. Turn this probability into the IMR and include this IMR as additional variable into the main regression model. Given that the outcome of this regression model is only observed for the selected sample (for instance, women participating in the labour market), only observations in this sample will be part of the regression model.

In the context of the IMF agreement study this would mean that only countries in agreements would be included in the models. This means that only those cases for which the agreement dummy equals 1 are included in the model. The dummy variable therefore becomes a constant and drops out of the model. The effect of agreements on health expenditure can thus not be estimated.

For the case where the interest is in the effect of the intervention, an adaptation of this approach is proposed in the literature (see for instance Hamilton and Nickerson (2003), which has also been used in the study by Vreeland (2003). The intuition is as follows. First, estimate the selection equation across the complete sample. Second, estimate the regression equation for only the sub-sample of cases participating in the intervention (in this study, this would be the sub-sample of countries that have agreements) based on covariates and the IMR from the selection equation. Predict the outcome (in this study, government health expenditure) based on the covariates, excluding the IMR. Third, also estimate the regression equation for only the subsample of cases *not* participating in the intervention (countries not having agreements) based on covariates plus IMR. Again, predict the outcome as above. Fourth, estimate the effect of the intervention (in this case, IMF agreement) based on the difference between the predicted outcome of participating countries minus non-participating countries.

Atoyán and Conway (2006) show that this approach is similar to estimating the selection equation across the entire sample and then also estimating the main equation across the entire sample including the IMR into the model. The effect of the intervention can then be obtained from the point estimate of the intervention variable (in this case agreement dummy) and its standard error. This is the approach used in this study and the wider literature in the field.

Beyond this, the approach taken here seems to have advantages over the long approach presented above. Apart from the fact that the latter approach is easier to estimate as only one main regression needs to be estimated it also seems to remove one level of uncertainty. When predicting the outcome based on a regression, the predicted outcome will be presented as point estimate of the outcome, around which uncertainty exists in the form of the standard error of the prediction. When estimating the intervention effect as the difference of the two point estimates of the predicted outcomes,

the standard error of the prediction will not be considered further. This means that the level of uncertainty around the predicted outcome will not be part of the estimation of the intervention effect.

Part III

Results of the Study

7

Stylised Facts

This chapter is the first of the results part of this study. It aims to give a first insight into the distribution of IMF agreements, the main independent variable of this study, and government health expenditure, the study's dependent variable along with their bivariate relationship. To do so, the chapter is organised into four parts. The first part presents univariate analyses of the IMF agreement dummy variables, presenting their distribution and trends. The second part analyses the government health expenditure variable to draw out spending levels and trends over time, and to investigate time-series dynamics of the spending variables. The third part provides results of bivariate analyses of health expenditure and IMF dummies derived from aggregate level and individual country time series, as well as simple regression models. Part four concludes the chapter, suggesting that the effects of agreement on government health spending appear to be rather minor and not entirely one-directional.

7.1 Analysis of Agreement Dummies

This section provides an overview of the distribution of agreements across countries and their dynamics over time. To do so, the frequency of agreements overall,

specific lending facilities and the identified agreement clusters (see Section 1.2.3; pg. 13) are presented alongside their trends over time.

7.1.1 Agreements and Lending Facilities Across Countries

This section investigates the distribution of agreements, individual lending facilities and agreement clusters across countries. Chapter 5 outlined that this study is based on N=127 countries over the time of T=18 years from 1995 to 2012, or N*T=2286 case-years. 36.2% of the case-years are in agreements. 23.9% are in social protection agreements, 11.6% are in SBA/EFF agreements and 0.7% are in emergency agreements during this time. See Table 7.1 for frequencies.

Lending Facility Cluster/Lending Facility/<i>all Agreements</i>	LIC	LMIC	UMIC	Total
Social Protection Agreements	428	109	10	547
Standby Credit Facility (SCF)	0	4	0	4
Extended Credit Facility (ECF)	427	105	10	542
Structural Adjustment Facility (SAF)	1	0	0	1
SBA/EFF Agreements	33	155	77	265
Standby Arrangement (SBA)	16	117	62	195
Extended Fund Facility (EFF)	17	38	15	70
Emergency Agreements	5	1	10	16
Rapid Credit Facility (RCF)	0	0	0	0
Rapid Financing Instrument (RFI)	0	0	0	0
Exogenous Shock Facility (ESF)	5	1	0	6
Flexible Credit Line (FCL)	0	0	8	8
Precautionary and Liquidity Line (PLL)	0	0	2	2
<i>All agreements</i>	466	265	97	828
<i>no agreement</i>	444	653	361	1,458
Total	910	918	458	2,286

Table 7.1: Frequency of Agreements by Income Group, Lending Facility and Lending Facility Cluster

Comparing across income groups⁹⁵⁹⁶ it appears that frequencies of agreements vary with income. While more than half of the country-cases of low-income countries (LIC) are in agreements (51.2%), the share declines to 28.9% in lower-middle income (LMIC) countries and is lowest for upper-middle income countries (UMIC) (21.2%).

When looking in more detail at the individual lending facilities and agreement clusters, it can be seen that lending is conducted through various agreement types and all facility clusters. The newly established facilities under the emergency agreement cluster see only limited uptake with most of these agreements being entered into in UMIC. Social Protection Agreements are most commonly, but not exclusively, used in LIC and lending most commonly conducted through the ECF. Agreements under the SBA/EFF cluster are commonly, but not exclusively, used in LMIC, with the SBA the most commonly used facility.

7.1.2 Lending across Time

The distribution of agreements and lending facilities varies not only between countries, but also across time. On average there are 46 agreements in any given year, however, the frequency of agreements varies over time and seemingly in relation to global needs for finance. The Economist (2009) suggests that IMF lending appeared “unnecessary in a world flush with private capital”, which is in line with the steep decline of IMF lending between 2003 and 2008. With the advent of the financial crisis, which proved disastrous for many emerging economies, the IMF was again a much sought after lender and agreement numbers started to rise for the following two years (See also chapter 1).

⁹⁵ This study includes low- and middle-income countries. In line with the World Bank classification of countries (World Bank, 2014b) and thereby distinguishes countries into low-income, lower-middle and upper-middle income countries. While the study by (Clements et al, 2013) on the effects of IMF agreements on health expenditure does not distinguish between lower- and upper-middle income countries, this division is commonly used in academic research and a standard way of dividing the diverse set of middle-income countries (World Bank, 2014b). It is therefore also applied in this study.

⁹⁶ Note that a country’s income group is determined each year based on the World Bank’s annual definition. See Appendix Table 7.1 (pg. 283) for income group levels by country and year. Similar results are, however, obtained when using the countries’ income group in 1995.

While there is some variation in the frequency with which individual facilities are being used, it can generally be seen that throughout the years the Extended Credit Facility (as part of the social protection agreements cluster) and the Standby Agreement (as part of the SBA/EFF agreement cluster) are the main instruments for lending. Some fluctuation can be seen with the Extended Fund Facility, which appears to lose importance over the period from 1995 to 2005 but is more frequently used from 2010 onwards. The newly established emergency agreements (ESF, FCL and SCF) see a small take up after their introduction in 2009. See Figure 7.1.

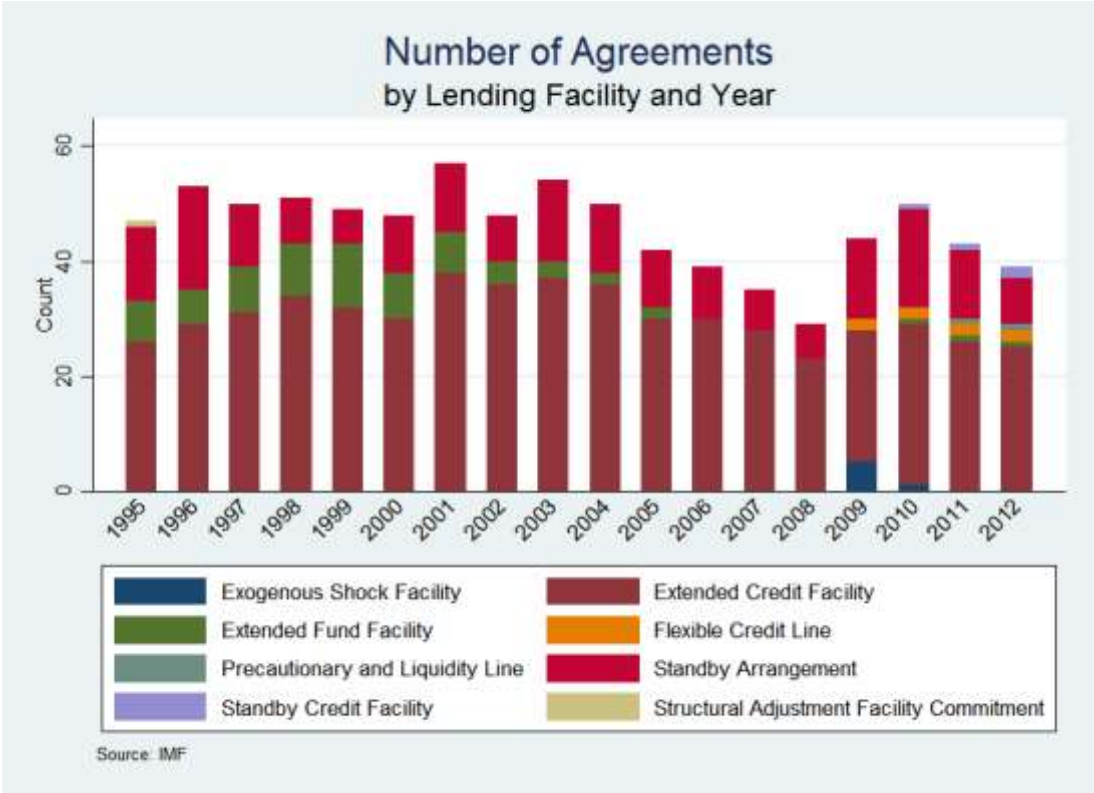


Figure 7.1: Number of Agreements per Year and by Lending Facility.

Turning from the aggregate level to the individual country level it can be seen that the amount of time countries in agreements varies between income groups. During the study period, countries received IMF agreements for between none and all 18 years. When dividing the countries along their income grouping the following picture emerges. With on average 10 years, low-income countries have the longest spells in agreements. Lower-middle income countries are in agreements on average 6.5 years and upper-middle income countries on average 3 years. It is worth noting that despite

differences across income groups, differences also exist within each of the income groups. See Table 7.2.

Years in Agreements	Income grouping			Total
	LIC	LMIC	UMIC	
Median	10	6.5	3	6
Min	0	0	0	0
Max	18	16	13	18

Table 7.2: Years in Agreements by Income Group

7.1.3 Summary of Agreement Dummy Analyses

Summing up this univariate analysis of agreements, a few key points emerge. The IMF is generally a constant lender of the last resort in the countries included in this study. This applies both across time as well as across countries. It can be shown that the IMF's lending activities are mostly constant across time with slight variation in response to changes in global economic performance. The IMF is a fairly constant lender in low-income countries, where individual countries are receiving loans throughout the entire study period. The IMF is less frequently lending to lower-middle income and least frequently lending to upper-middle income countries. Across the study period the Extended Credit Facility (a social protection agreement) and the Standby Agreement (a SBA/EFF agreement) are the most commonly used lending facilities. Newly introduced agreement types, especially those in the emergency agreement cluster, are used only rarely.

7.2 Government Health Expenditure: Trajectories and Time Series Dynamics

This section provides results of univariate analyses of the government health expenditure variables across time and countries and is organised into two parts. It first investigates levels and trends of government health expenditure across countries, before inspecting trends and time series dynamics of individual countries. Analyses are based on all three measures of government health expenditure, outlined in section 5.1.2 (pg. 179): (i) government health expenditure is measured as percentage of GDP (HE/GDP), providing an indicator of how much of the economy's output is dedicated to publically financed health care, (ii) government health expenditure as per capita spending in PPP Dollars (HE/cap) to provide an assessment of how much money in

absolute terms is on average dedicated to an individual within a country, and (iii) government health expenditure as percentage of general government health expenditure (HE/GGE), as indicator of the importance of health spending within the public sector.

7.2.1 Aggregate Government Health Expenditure Levels and Trends

This section reports levels and trends of government health expenditure as aggregate across the study countries as a whole and divided by income groups. To allow for immediate comparisons between the three health expenditure variables, results are presented alongside each other.

For all countries and the time period of 1995-2012, 2274 data points were available for the health expenditure as share of GDP as well as per capita variables are available. 2268 data points are available for the expenditure as share of government expenditure variable. Pooling all data across all countries and years it appears that the countries spent between as little as 0.01% (Iraq in 1997) and as much as 19.81% (Marshall Islands in 2000) and on average 3.01% (Std. Dev. 1.96%) of their GDP on publically financed health care. In terms of per capita spending this is between as little as 0.080 \$ PPP (Iraq in 1996) and as much as 1017.14 \$ PPP (Hungary in 2006) and on average 144.52 \$ PPP (Std. Dev. 159.43 \$ PPP). In relation to general government expenditure, this measures between 0.99% (Myanmar in 2005) and 34.41% (Solomon Islands in 2001) and on average 10.30% (Std. Dev. 4.31%).

Decomposing the standard deviation further into its components of within variation, which measures the variation within one country over time, and the between variation, which captures the variation of expenditure between individual countries (Cameron and Trivedi, 2009), suggests that government health expenditure is both time- and country variant and varies more between countries than it does over time within one country (see Table 7.3). This is likely to reflect the level of heterogeneity between all countries included in the study. To explore this further, the countries were divided into income groups.

Inspecting spending levels separately by income group shows that, across all measurements of government health expenditure, LIC spend least on health care

followed by LMIC and UMIC. The differences between LMIC and UMIC, however, are much smaller than that between LIC and LMIC/UMIC countries. The differences are most pronounced for the per capita measure where LIC spend only around a fifth of LMIC, and UMIC spend more than double the amount of LMIC (see Table 7.3).

Country Set	Mean	Std. Dev.			n	Countries
		Overall	Between	Within		
<i>Government Health Expenditure as Percentage of GDP [in %]</i>						
overall	3.01	1.96	1.83	0.71	2274	127
LIC	2.23	1.21	1.05	0.72	900	68
LMIC	3.52	2.47	2.06	0.7	916	85
UMIC	3.54	1.44	1.85	0.45	458	50
<i>Government Health Expenditure per Capita [in \$ PPP]</i>						
overall	144.52	159.43	150.49	53.98	2274	127
LIC	30.05	26.09	29.93	10.28	900	68
LMIC	147.99	93.55	98.13	36.55	916	85
UMIC	362.53	184.69	153.46	85.16	458	50
<i>Government Health Expenditure as Percentage of General Government Expenditure [in %]</i>						
overall	10.30	4.32	3.70	2.30	2268	127
LIC	9.55	4.39	3.59	2.74	900	68
LMIC	10.76	4.13	3.93	1.82	910	85
UMIC	10.87	4.32	4.37	1.46	458	50

Table 7.3: Overall Mean and Variation of Government Health Expenditure as Percentage of GDP, Per Capita and Percentage of GGE

(Data source: WHO NHA; N=127 countries)

These variations were explored further by looking at trends over time. Across all countries government health expenditure as percentage of GDP increased from 2.67% (Std. Dev. 1.75%) in 1995 to 3.48% (Std. Dev. 2.02%) in 2012; from 105.72\$ PPP (Std. Dev. 122.50) to 200.87\$ PPP (Std. Dev. 205.76) in per capita spending; and from 9.51% of GGE (Std. Dev. 3.73%) to 10.92% (Std. Dev. 4.69%) over the same time period. Dividing the countries into income groups reveals similar spending trends of GHE/GDP across time, with LIC spending least and UMIC/LMIC spending similar amounts of money.

Inspecting trends of health expenditure as percentage of GDP of the subgroups of income countries suggests that low-income countries have the lowest levels of spending, followed by lower-middle income countries and upper-middle income countries, which follow a rather similar trend over time, where LMIC sometimes spend more and sometimes less than UMIC (see Figure 7.2).

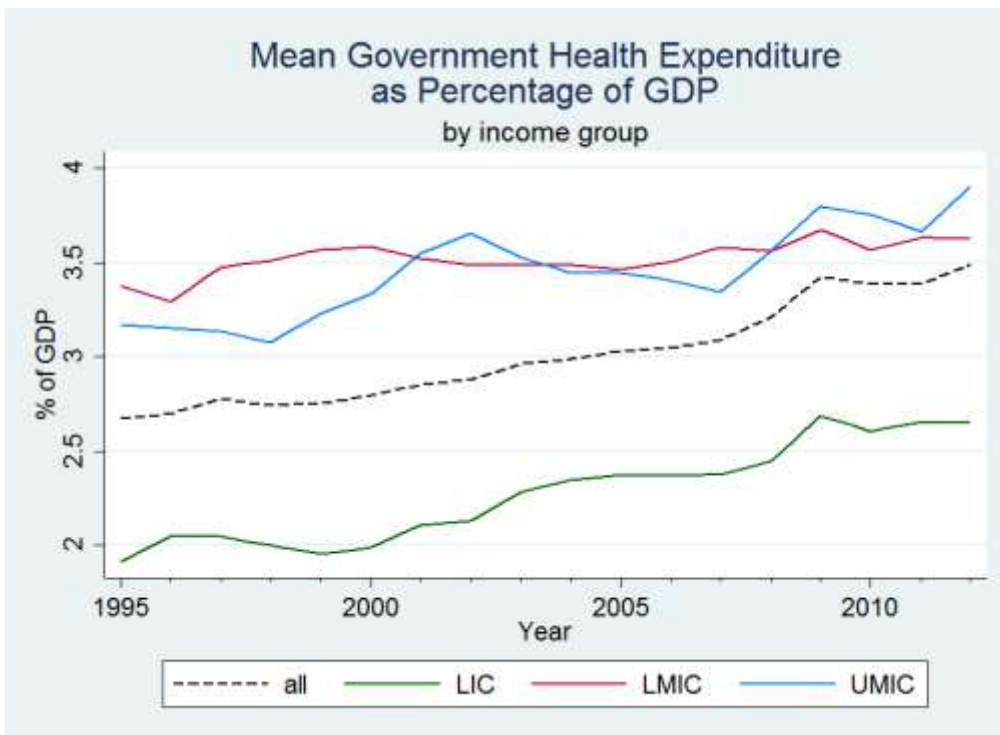


Figure 7.2: Government Health Expenditure as Percentage of GDP, Time Trend by Income Group (Data source: WHO NHA; N=127 countries)

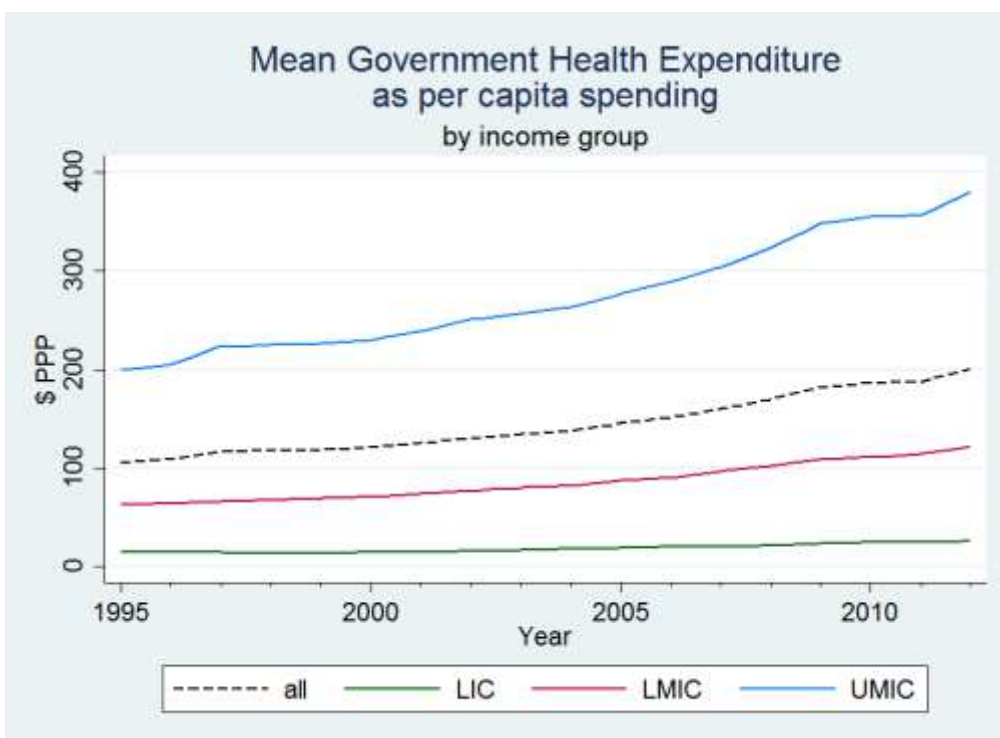


Figure 7.3: Government Health Expenditure Per Capita in constant PPP, Time Trend by and Income Group (Data source: WHO NHA; N=127 countries)

Looking at the timeline of spending per capita (Figure 7.3), it seems that spending increases across all income groups with expenditure per capita roughly doubling across the time period with LIC seeing slightly slower increases (see Figure 7.3).

Looking at the trends of health expenditure as percentage of GGE (Figure 7.4) reveals slightly different trends as trajectories differ between country groups. Other than for the previous two measures, where the trend almost approximated a linear relationship, the trends seem much bumpier and less one-directional. Looking at the different income groups it appears that low-income countries spend the lowest share of their government expenditure on health care and upper-middle income countries the largest. Low-income countries see a strong increase after 2002 when spending levels begin to overtake that of lower-middle income countries. Upper-middle income countries see an almost steady level of spending of around 10.5% of GGE from 1995 to 2007, after which health seems to become more important as the share of spending increases till 2012 to just above 12% of GGE.

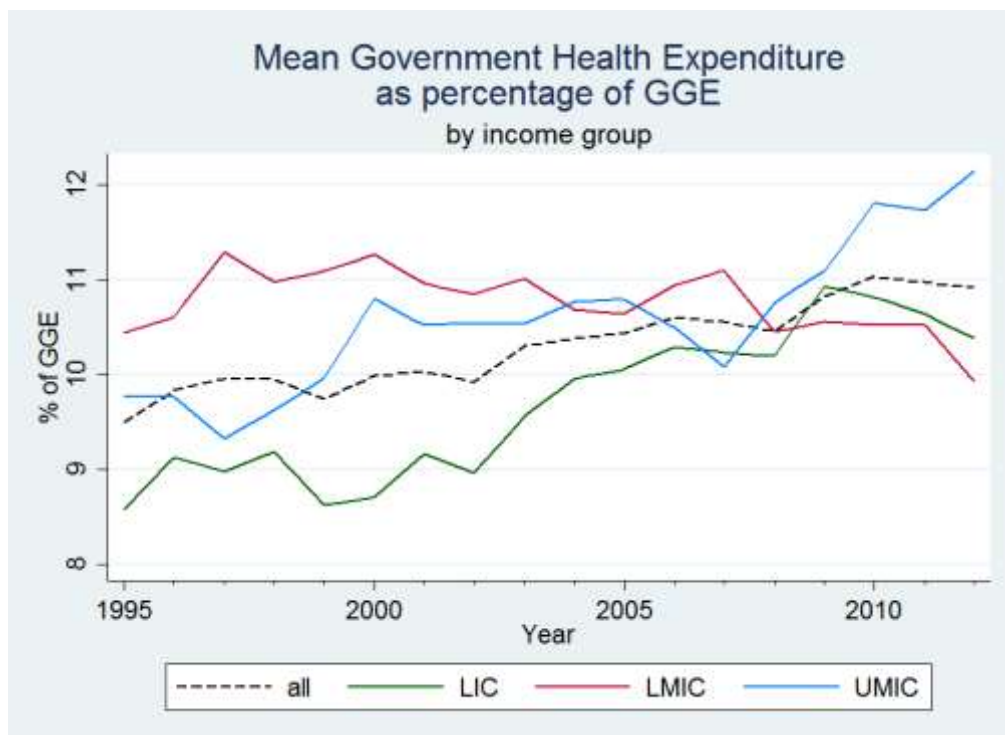


Figure 7.4: Government Health Expenditure as Percentage of GGE, Time Trend by Income Group (Data source: WHO NHA; N=127 countries)

7.2.2 Country Level Health Expenditure Trends and Time Series Dynamics

Following this exploration of aggregate levels of government health spending and their trends across time, the analysis turns to an analysis of trends in individual countries. The reason is twofold. Firstly, while previous aggregate level analyses suggest general differences in levels of government health expenditure between income groups, they do not allow for judgement of whether trends are similar across all countries. To better explore if individual country trajectories follow similar patterns, time series of each country are inspected. Secondly, inspecting individual time series and their properties allows to formally assess stationarity and the autocorrelation process generating each of the time series, two important properties when modelling panel data (chapter 6). This section inspects individual country time series and assesses time series dynamics more formally using ACF plots and unit root tests.

7.2.2.1 Individual Country Time Series

To assess individual country's health expenditure trajectories, timeline plots for all three measures of government health expenditure were produced for each of the 127 countries. Skimming through these timeline plots for visual inspection a number of observations can be made. Common to almost all countries and all three health expenditure variables is a high degree of fluctuation from one year to the next. Rarely do countries exhibit clear and uniform rates of growth throughout the time period. It seems that the amount of spending available to allocate to health in absolute terms and as share of an economy's output or importance to government overall fluctuate over time. Variations from one year to the other seem larger for spending as percentage of GDP and as percentage of GGE, compared to per capita expenditure.

Health expenditure trajectories vary between countries in a number of ways but a number of common overall trends can be identified. Countries most commonly experience increases in health expenditure over time and across all three ways of measuring spending. Countries with such trends include, for instance, Belize or Lesotho (Figure 7.5). A number of countries experience an overall stationary trend, despite fluctuation, over time. Examples of such country cases include Gabon or Libya (Figure 7.6). A small number of countries seem to experience negative trends on their

health expenditure trajectory, these include, for example, Haiti or Lebanon (Figure 7.7). In most countries all measures of health expenditure follow largely similar trajectories over time, where, the trends align almost perfectly (for instance in the case of Belize or Lesotho (Figure 7.7)). In other and much fewer cases, trends in health expenditure trajectories differ between the measures. This is for instance the case in Belarus or Cabo Verde (Figure 7.8). In both cases, though to varying extents, expenditure per capita seem to increase over time, while spending as share of GDP decreases and as share of GGE is almost stable.

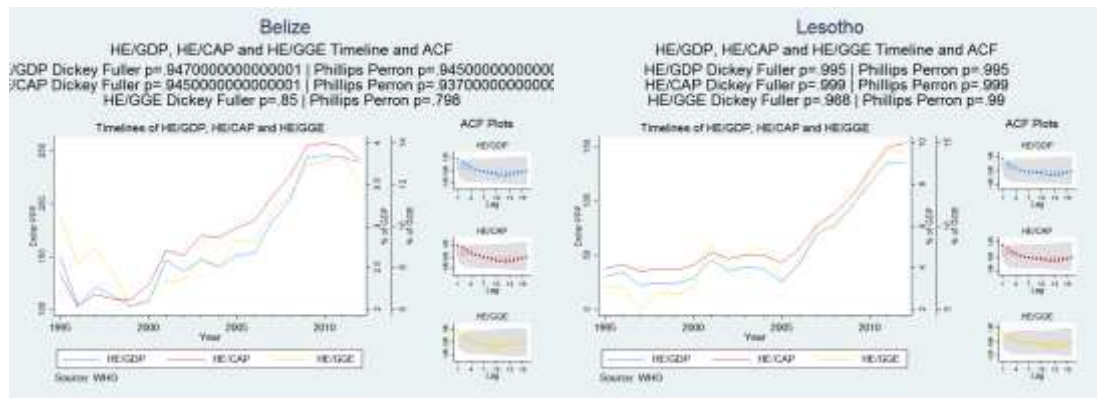


Figure 7.5: Timeline Plots and ACF Plots of Government Health Expenditure in Belize and Lesotho

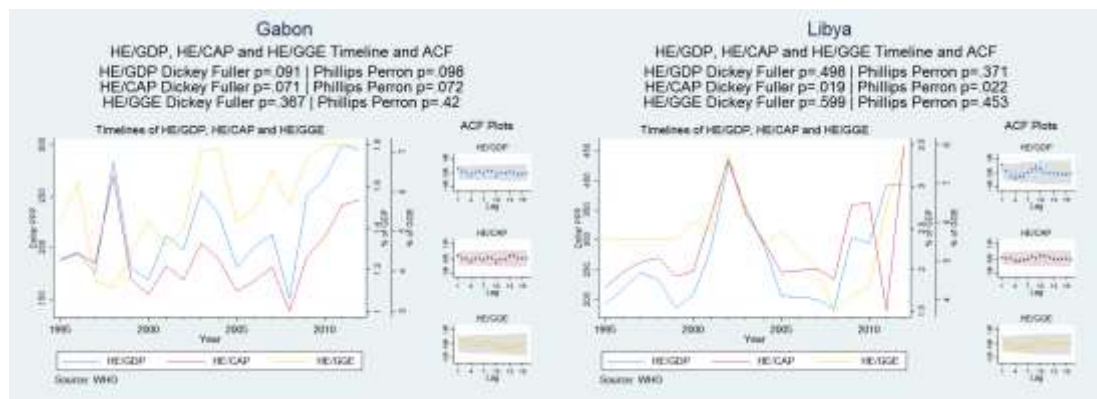


Figure 7.6: Timeline Plots and ACF Plots of Government Health Expenditure in Gabon and Libya

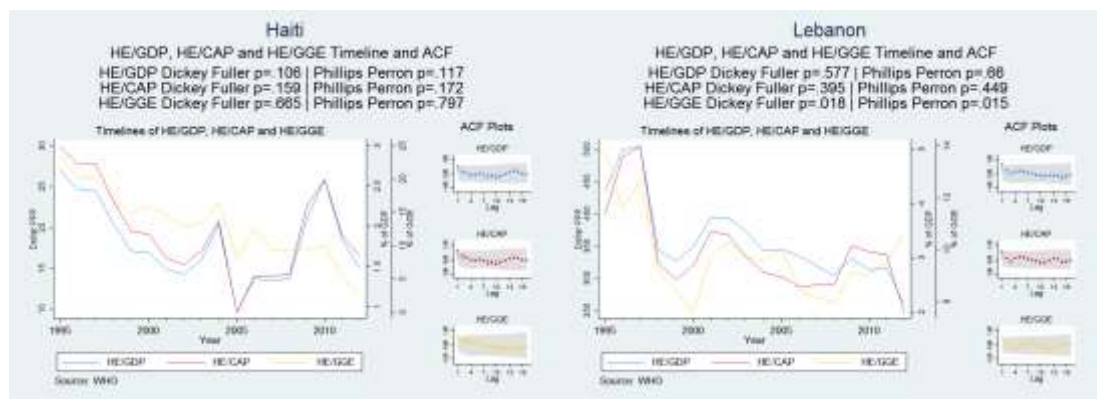


Figure 7.7: Timeline Plots and ACF Plots of Government Health Expenditure in Haiti and Lebanon

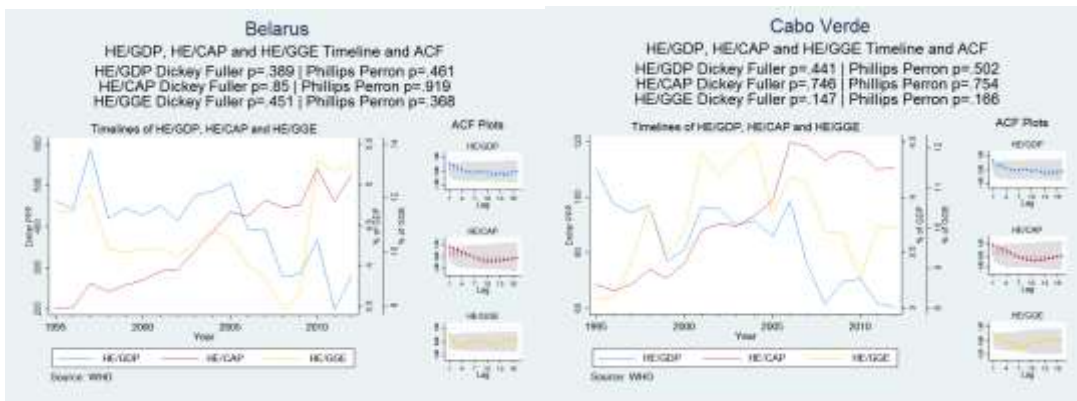


Figure 7.8: Timeline Plots and ACF Plots of Government Health Expenditure in Belarus and Cabo Verde

7.2.2.2 Time Series Dynamics

Time series and panel data theory relies on the assumption that the dependent variable is stationary (section 6.1.1; pg. 217). Inspecting the individual country time-series as above gives some indication about the time series dynamics. This section This section compliments these observations with results from more formal assessment through Autocorrelation Function (ACF) plots and unit root tests.

Chatfield (2004) and Becketti (2013) suggest to use time line plots in combination with ACF plots to assess stationarity. ACF plots show the autocorrelation coefficients against the number of lags. A time series is deemed to be non-stationary when the correlations decay only slowly over time (See 6.1.1; pg. 217).

Visually inspecting both the time line and the ACF plots to assess stationarity of each time series, looking for trends in the time line and slowly decaying ACF plots suggests a mix of stationary and non-stationary time series. Health expenditure per capita time series seem to exhibit more non-stationary processes than health expenditure measured as share of GGE and of GDP. Around 40 time lines of the per capita measure, 27 of the share of GGE and 20 time lines of the share of GDP measure can be considered non-stationary.

An additional decision tool to distinguish stationary and non-stationary time series are unit root tests. This analysis shall therefore be enriched using the two most

commonly used unit root tests, the augmented Dickey-Fuller and the Phillips-Perron test⁹⁷ (See 6.1.1; pg. 217).

When the Dickey-Fuller and Phillips-Perron unit root tests were performed to assess stationarity, both tests produce largely similar results suggesting that the individual country time-series contain both stationary and non-stationary expenditure trends (Probabilities range from $p < 0.001$ to $p = 0.998$) across all three health expenditure measures. Applying the conventional cut-off level for significance of $p = 0.05$ it appears that for the expenditure as share of GDP variable 13 countries using the Dickey-Fuller, (or 14 countries using the Phillips-Perron) test, for the health expenditure per capita variable 7 countries using the Dickey-Fuller (or 6 using the Phillips-Perron) test, and for the expenditure as share of GGE variable 16 countries using the Dickey-Fuller (or 14 countries using the Phillips-Perron) test, the null hypothesis can be rejected, implying that most time series would not contain a unit root and would therefore be non-stationary.

Taking all these approaches to assess stationarity of the expenditure time series together, it appears that overall the results regarding stationarity are not entirely congruent across the different methods. It is worth bearing in mind that visual inspections of both the timeline and the ACF plots are somewhat subjective and unit root tests are considered to be rather weak tests (DeJong et al, 1992; Schwert, 2002), which might explain some of the differences. Across all approaches, it can be concluded that a number of the time series are non-stationary. This is further supported when considering that over the recent years great emphasis has been placed on expanding government health expenditure in developing countries, especially in relation to the Millennium Development Goals (Fryatt et al, 2010). It would therefore be reasonable to expect that expenditure in these countries trend upwards. As was outlined in section 6.1.1 (pg. 217), this trend will be controlled for using a time dummy.

⁹⁷ Both tests test the null hypothesis of a time series having a unit roots, which is considered evidence of a time series being non-stationary. The alternative hypothesis is that there is no unit root and the time series is stationary (See 6.1.1; pg. 217).

7.3 Bivariate Analyses

Following the univariate analysis of the agreement variable (the main independent) and the government health expenditure variable (the dependent variable) in the previous two parts, indicative results of the relationship between government health expenditure and the presence and absence of IMF agreements based on bivariate analyses are presented. To do so, three different approaches are taken. In the first section, and following much of the descriptive literature on the IMF and health expenditure (see 2.2.2.1.1; pg. 44), aggregate time trends of health expenditure by IMF agreement are assessed. The second section looks at individual countries and assess the relationships between spending trends and IMF agreement times. In the last section, the bivariate relationship is assessed based on Fixed Effects regression, the estimator chosen for this study (see 6.1.2; pg. 220).

7.3.1 Aggregate Bivariate Analyses

A commonly used technique in the descriptive literature on IMF and health expenditure is to compare levels of health expenditure in countries with and without IMF agreements. This method is adopted as initial bivariate analysis step by dividing countries into agreement and non-agreement countries. As most countries experience both times in and out of agreements and countries that are in agreements for either the entire period or none of it are rare, countries are assigned to one or the other IMF agreement status group based on their status in the individual year. Section 5.2 (pg. 182) discussed that a year is considered an agreement year when at least half the year is spent in an agreement (half year definition). The sections below present the timeline plots of all agreements as well as the two main agreement clusters⁹⁸ (social protection and SBA/EFF agreements).

⁹⁸ A country is thereby considered a social-protection or SBA/EFF agreement country, when it is in a social protection or SBA/EFF agreement in a given year. It is considered a non-agreement country when it is not in any agreement, neither social protection nor SBA/EFF agreement. See also chapter 9.

Inspecting trends for all countries divided into agreement and non-agreement cases, spending is, similar to the overall health expenditure trends for all cases (see 7.2; pg. 253) increasing over time.

Looking first at government health **spending as percentage of GDP** for all agreements it appears that no large differences between agreement and non-agreement countries occur (See Figure 7.9), however non-agreement countries spend slightly more on health care with the differences decreasing over time and disappearing in 2006. After a strong decrease in spending in the agreement group in 2007 this group sees a renewed increase and overtakes the non-agreement group in 2010.

Generally similar trends appear when dividing countries by their income group. It appears that LIC with agreements have spending levels minorly higher compared to non-agreement countries in the same income group during most of the study period, with differences increasing slightly after 2003. LMIC have generally comparable trends but spending of agreement countries is slightly lower compared to non-agreement countries until 2009, when the levels of agreement countries increase to levels higher than that of non-agreement countries. Spending levels of agreement and non-agreement countries are very similar for UMIC (Appendix Figure 7.1).

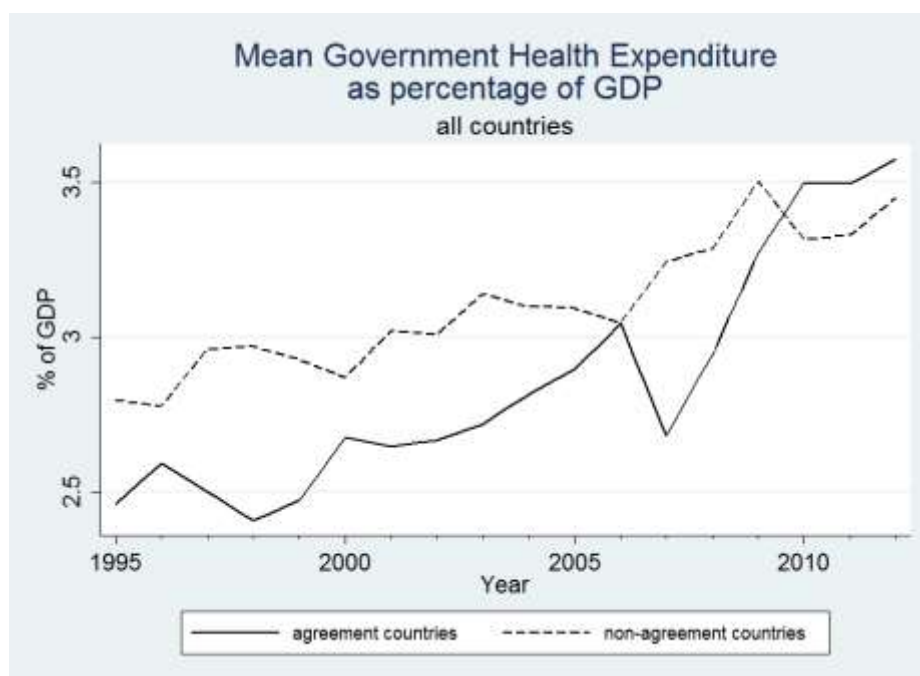


Figure 7.9: Government Health Expenditure as Percentage of GDP, Time Trend across all Countries and Agreements
(Data source: WHO NHA; N=127 countries)

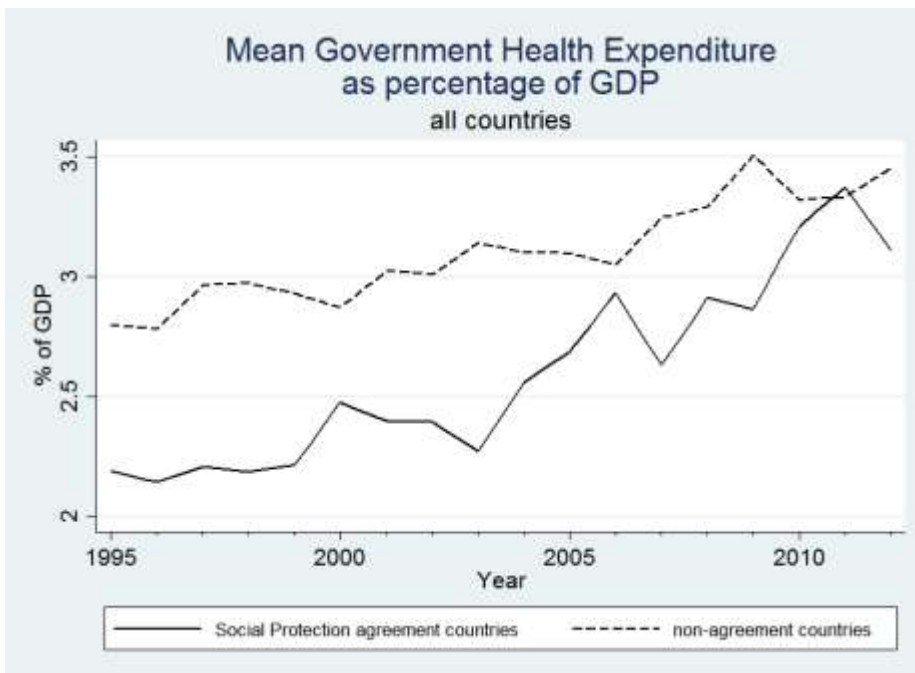


Figure 7.10: Government Health Expenditure as Percentage of GDP, Time Trend across all Countries, Social Protection Agreements
(Data source: WHO NHA; N=127 countries)

When looking at government health spending as percentage of GDP for the agreement cluster subgroups, generally similar trends appear in that health expenditure grows for both agreement and non-agreement countries.

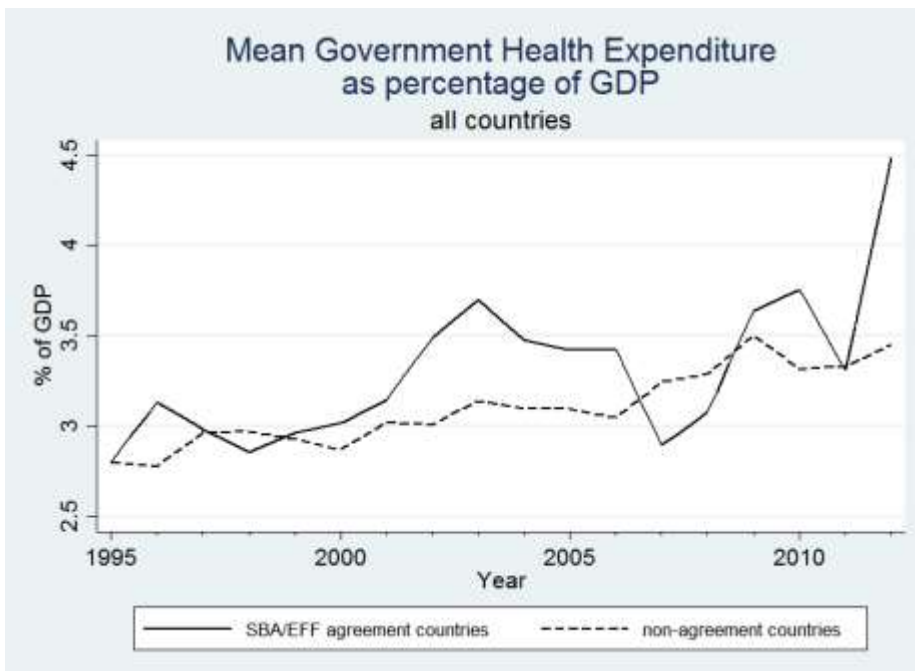


Figure 7.11: Government Health Expenditure as Percentage of GDP, Time Trend across all Countries, SBA/EFF Agreements
(Data source: WHO NHA; N=127 countries)

Inspecting the trends for social protection agreements it is shown that non-agreement countries spend slightly higher amount of money on health care compared to countries in social protection agreements. This difference, however, declines over time and disappears in 2011 (Figure 7.10). For SBA/EFF agreements generally no large difference between the two agreement states can be identified, though countries in agreement tend to spend slightly more (Figure 7.11).

Inspecting the trends for **spending per capita** reveals that the levels of spending are very similar for agreement and non-agreement countries. When all countries are included, non-agreement countries spend more across the entire time period agreement countries. The differences are largest in 2008 when agreement countries' spending sees a decrease, from which they recover quickly till 2010 (see Figure 7.12).

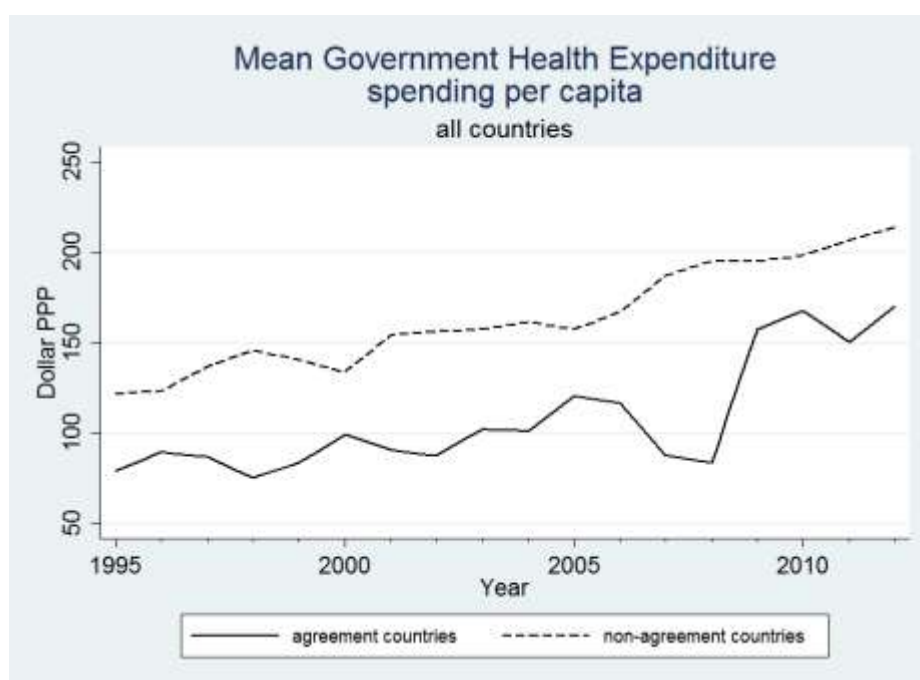


Figure 7.12: Government Health Expenditure Per Capita, Time Trend across all Countries, all Agreements
(Data source: WHO NHA; N=127 countries)

For the subgroup of low-income countries, a similar trend is observed, however agreement countries spend slightly more compared to non-agreement countries until 2011. For lower-middle income countries the trend is again similar, however, this time non-agreement countries have higher levels of spending compared to agreement countries until 2011. After this point the spending levels of agreement countries

increase steeply. For upper-middle income countries both subgroups (agreement and non-agreement) have very comparable levels of spending though the trends seem to be distorted somewhat after 2007, which might be result of countries with comparatively high levels of spending joining and leaving agreements (Appendix Figure 7.2).

Looking at government health spending per capita for the agreement cluster subgroups, generally similar trends of health expenditure growth appear.

For countries in social protection agreements, spending levels are lower compared to non-agreement countries (Figure 7.13). For the SBA/EFF agreement cluster, the difference is generally smaller, however, countries in SBA/EFF agreements generally spend more on health care compared to countries without agreements (Figure 7.14).

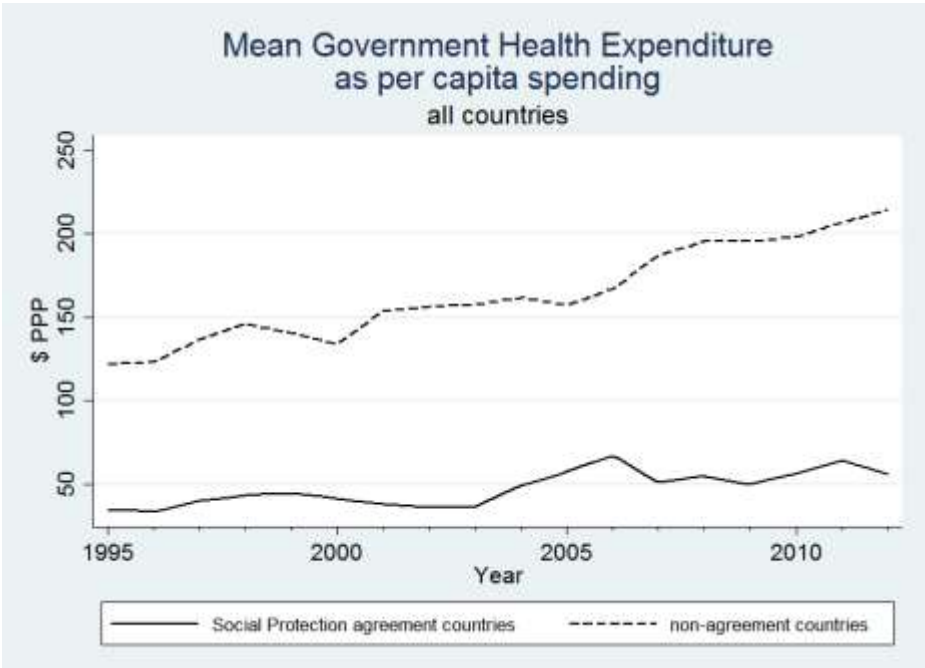


Figure 7.13: Government Health Expenditure Per Capita, Time Trend across all Countries, Social Protection Agreements (Data source: WHO NHA; N=127 countries)

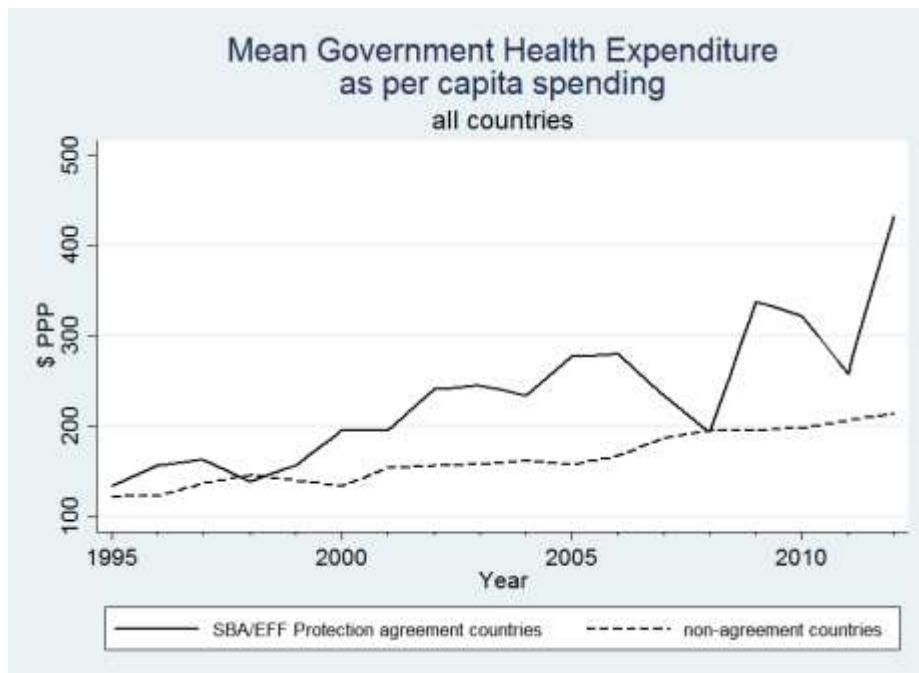


Figure 7.14: Government Health Expenditure Per Capita, Time Trend across all Countries, SBA/EFF Agreements
(Data source: WHO NHA; N=127 countries)

Looking lastly at **spending as percentage of GGE** reveals that expenditure does not differ much between agreement and non-agreement countries especially until 2002. After this period agreement countries see a stronger increase in spending and the differences between both country groups increase, but decrease again after 2010 (see Figure 7.15).

For LIC small differences between the agreement groups can be seen with agreement countries spending more than non-agreement countries. The difference widens from 2001 to 2008. During this period, agreement countries increase spending while spending in non-agreement countries decreases slightly. For both lower-middle and upper-middle income countries trends are similar for both agreement and non-agreement countries (Appendix Figure 7.3).

Looking at government health spending as percentage of general government expenditure for the agreement cluster subgroups, generally similar trends of health expenditure growth appear. For countries in social protection agreements, spending levels are roughly similar across time, though countries in social protection agreement have higher spending between 2004 and 2011 compared to countries without agreements (Figure 7.16). For the SBA/EFF agreement cluster, the differences are

generally small, however, countries in SBA/EFF agreements tend to spend more between 2002 and 2006 compared to countries without agreements (Figure 7.17).

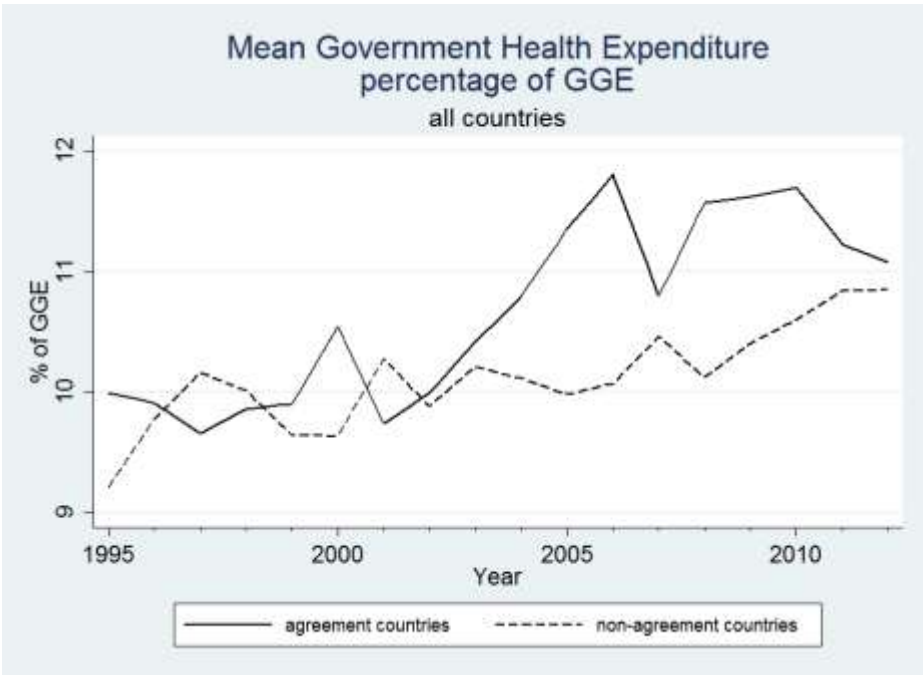


Figure 7.15: Government Health Expenditure as Percentage of GGE, Time Trend across all Countries (Data source: WHO NHA; N=127 countries)

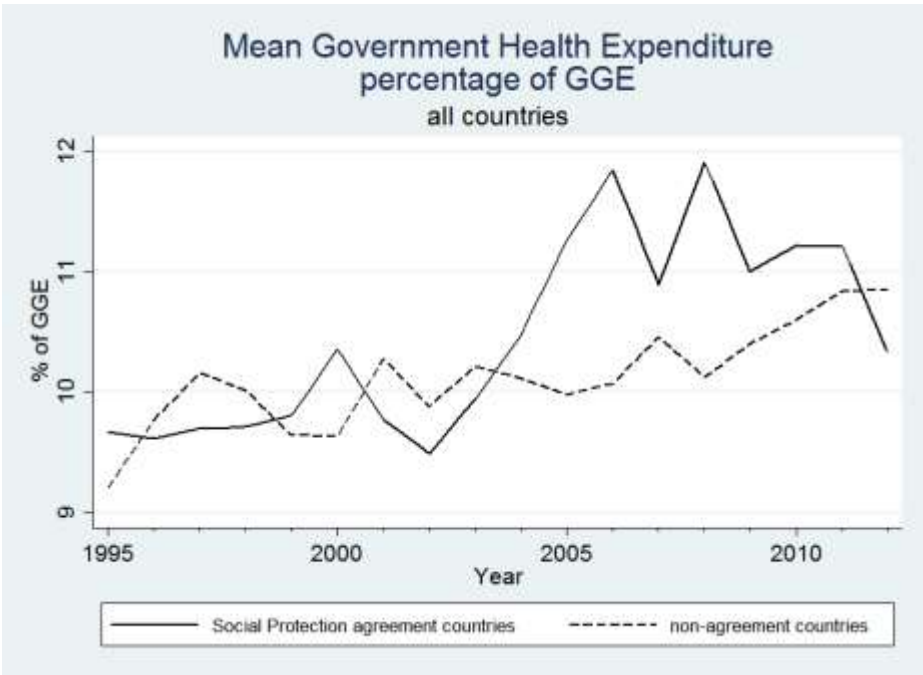


Figure 7.16: Government Health Expenditure as Percentage of GGE, Time Trend across all Countries, Social Protection Agreements (Data source: WHO NHA; N=127 countries)

Summing up the analysis of the impact of IMF agreements on health spending by comparing spending levels of IMF and non-IMF countries seems to suggest two main points. Firstly, spending levels of IMF and non-IMF countries do not seem to differ much across all expenditure measures when all countries are considered. Secondly, while spending is generally at comparable levels the graphs seem to suggest that low-income countries in agreements have slightly higher levels of spending in terms of their percentage of GDP as well as GGE. Although these trends appear from visual inspection of the graphs the differences are small and not consistent throughout the time period. It is worth noting that the results might be affected from individual countries joining and leaving the IMF sub-group every year so that the sample size in either of the sub-groups is not consistent during the observation period.

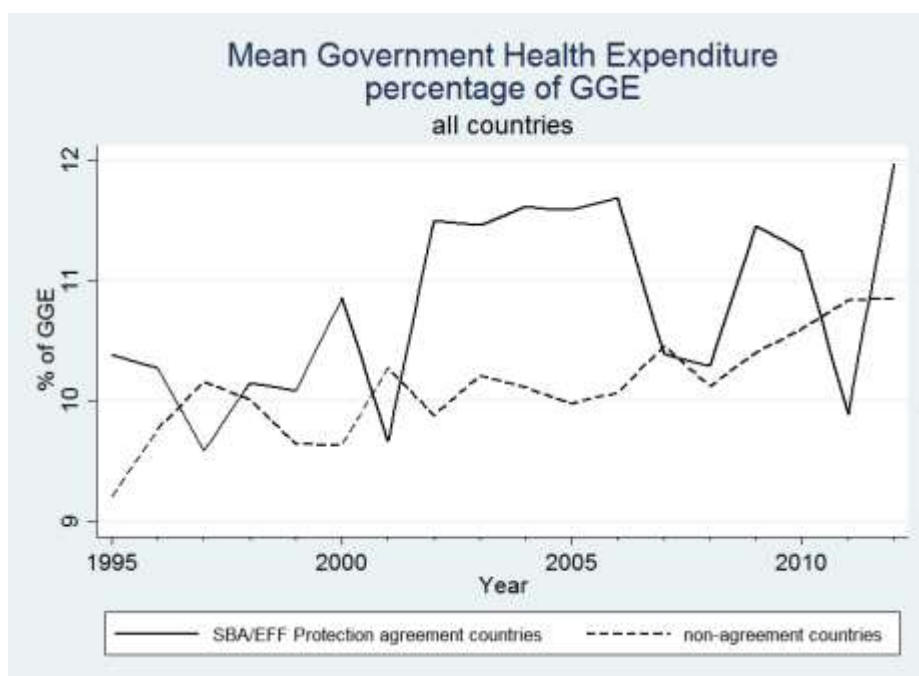


Figure 7.17: Government Health Expenditure as Percentage of GGE, Time Trend across all Countries, SBA/EFF Agreements
(Data source: WHO NHA; N=127 countries)

7.3.2 Individual Country Bivariate Analysis

While the aggregate level of analysis, is important to show differences between the agreement states, it does not allow to examine likely changes to trends in individual countries when entering or leaving agreements. This section therefore assesses the bivariate relationship for each country by visually inspecting the health expenditure trends at times of agreement starts and ends. If IMF agreements were associated with

decreases in health spending it would be expected that spending levels decrease after an agreement was entered into and would be lower at the end of an agreement compared to the start of an agreement. Also, it could be argued that health expenditure levels might increase again once agreements are over. To assess this systematically, health expenditure timelines were plotted for each country and indicators for agreement start and end were introduced using the half-year definition (section 5.2; pg. 182).

The visual inspection of the individual timelines offers a mixed picture as no clear and one-directional relationship between the start/end of agreements⁹⁹ and changes in health expenditure can be uncovered. Agreements start after previous increases as well as after decreases of health expenditure. Times in agreements have similarly mixed associations with health expenditure: while in some cases agreements seem to be associated with arguable breaks in previous trends by either increasing or slowing this trend. In other cases, no obvious change in trends can be observed.

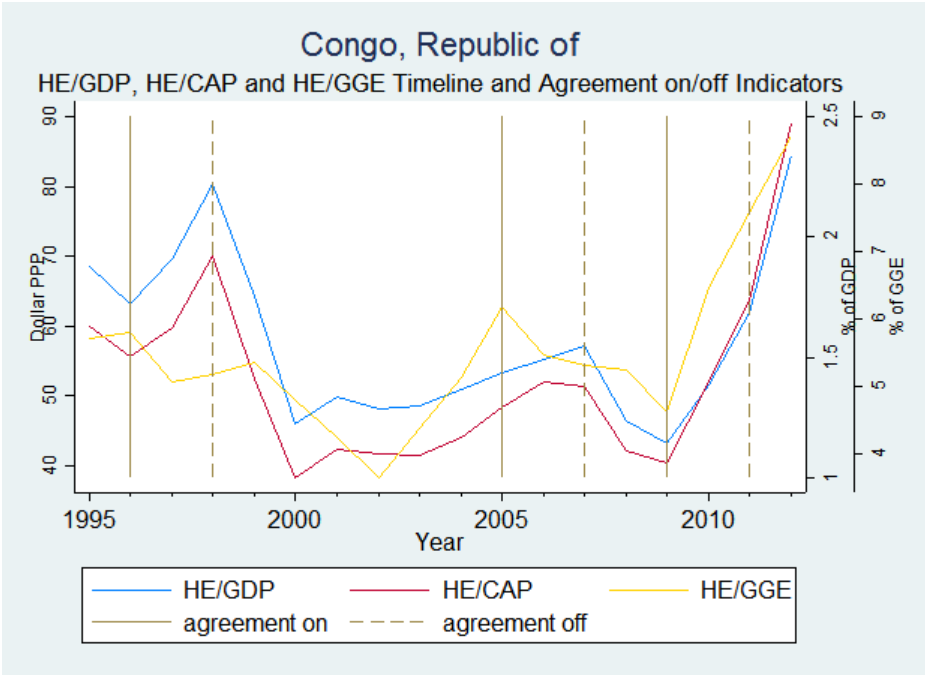


Figure 7.18: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Congo
(Data source: WHO NHA; N=127 countries)

⁹⁹ Both the general on/off indicator and agreement specific indicators were assessed.

Trends after agreements are various, too, as they can be associated with increases or decreases in health expenditure. While the combinations of these trends are different for individual countries the cases of Armenia, Sierra Leone, the Republic of Congo and Benin shall be used as examples to illustrate the associations.

The clearest relationship can be seen in the case of the Republic of Congo, where it appears that times during agreements are generally associated with increases of health expenditure, whilst times without agreements generally see decreases of health expenditure. This is, however, not the case after the end of the 2011 agreement which seems to be associated with an acceleration of the positive expenditure trend.

For the case of Armenia, it seems that health expenditure drops after the end of the 1995 Standby Arrangement. After the start of the Extended Credit Facility in 1996 expenditure trends seem to be reversed somewhat and spending is at roughly the same level at the end of the agreement as it was before its start. The 2001 Extended Credit Facility is associated with a strong increase in health expenditure both as percentage of GDP and per capita spending. Whilst health expenditure generally seems to drop at least partially during non-agreement periods, the relationship between health expenditure and agreements seems less clear cut.

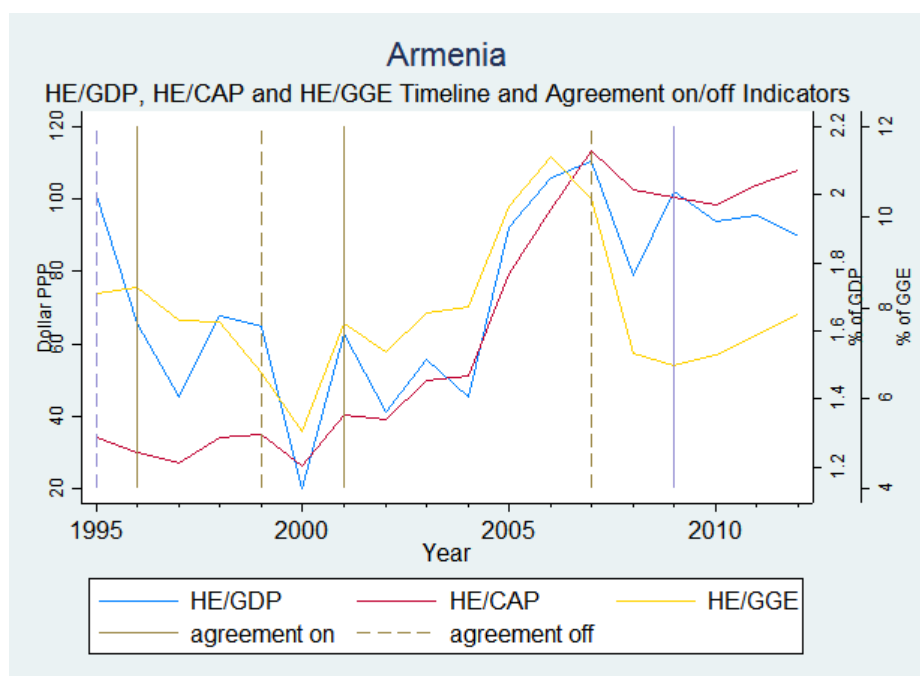


Figure 7.19: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Armenia
(Data source: WHO NHA; N=127 countries)

The trend of health expenditure in Benin seems to be somewhat positive during the 1997 to 2003 agreement, though large fluctuations during this time are present. The later 2006 agreement seems to be associated with a decrease in expenditure. Times without agreements are associated with both increases (2003-2006 and 2008-2010) and decreases (1995-1997) in health expenditure.

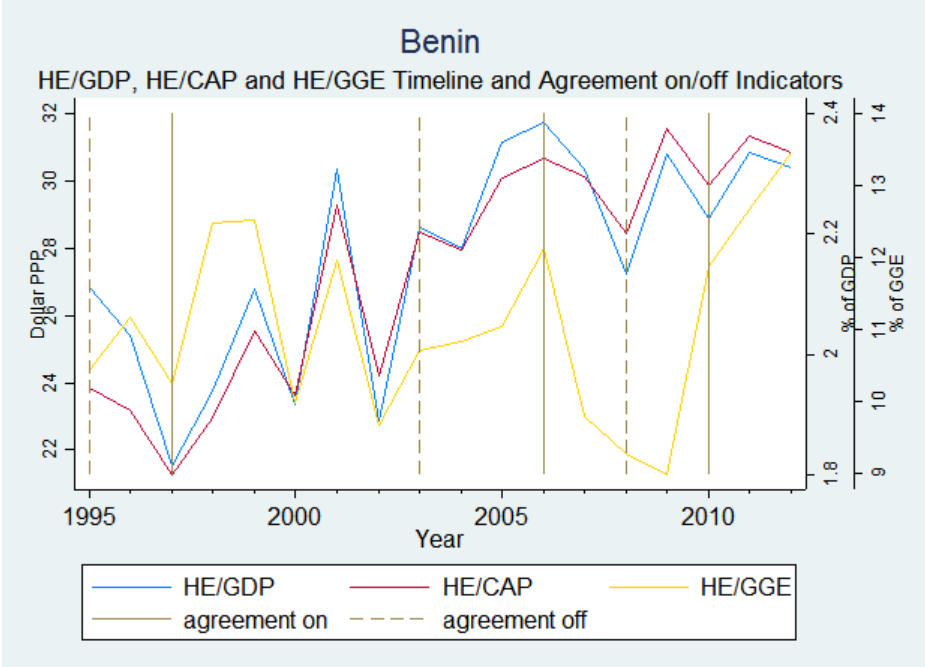


Figure 7.20: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Benin (Data source: WHO NHA; N=127 countries)

Finally, the case of Sierra Leone offers a similar picture, where health expenditure both increase and decrease in association with agreement and non-agreement times, again leaving no clear picture of possible effects of agreements on health expenditure trajectories.

This analysis indicates that links between agreements and health expenditure trends are far from clear cut and one-directional. It is worth noting that this might suggest that agreements’ experience depends on the country involved¹⁰⁰. However, this analysis is fairly simplistic, as it leaves out other factors that might explain fluctuations in government health expenditure.

¹⁰⁰ This was tested using a random slope model (see footnote 83; pg. 223) was fitted. The results did not suggest that effects vary by country, so that this approach was not taken forward.

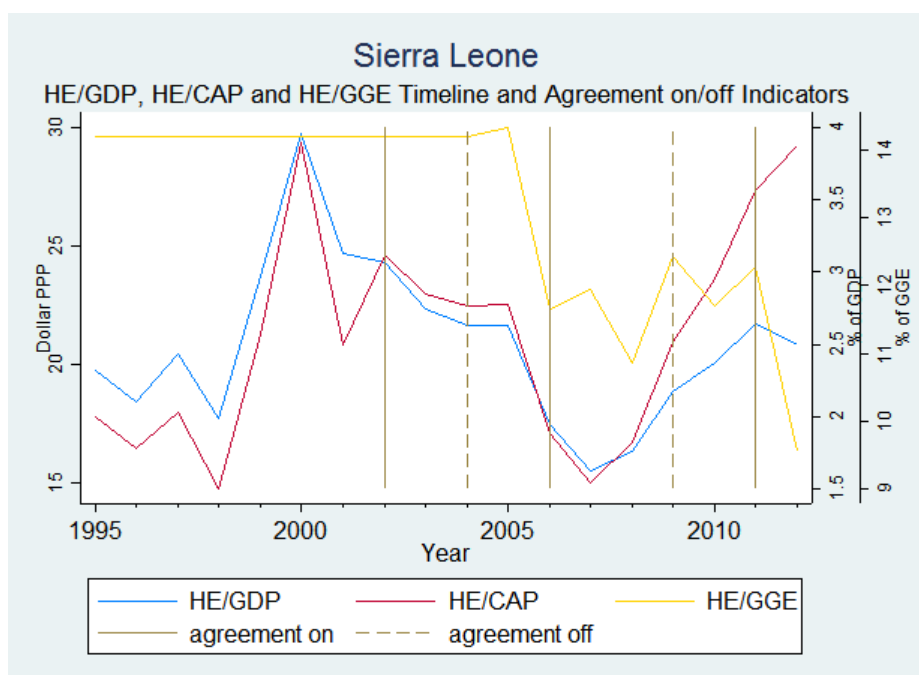


Figure 7.21: Trends of Government Health Expenditure and Times in and out of Agreements; Case of Sierra Leone
(Data source: WHO NHA; N=127 countries)

7.3.3 Bivariate Regressions

In this final section, a third approach to assessing the relationship between IMF agreements and health expenditure in a bivariate way is taken. To do so, association between health expenditure and agreements are assessed using regression models to estimate treatment and control differences (Angrist and Pischke, 2009). In relation to this study the exposure of a country to an IMF agreement in a given year can be seen as treatment, while those countries not receiving agreements in a given year can be seen as controls (chapter 6). Regressions are in this context used to estimate the difference in health spending comparing times with agreements and those without. Particular interest is therefore on the coefficient of the IMF agreement variable, which quantifies the increase or decrease of spending in presence of an agreement compared to no agreement. As was outlined in more detail before (see 6.1.2; pg. 220), different regression techniques can be performed and make different assumptions about the data. This section uses simple regression models, estimated using the Fixed Effects estimator, which acknowledges the country and year structure in the data and was identified as appropriate estimator for this study. Reported results are, based on the logged government health expenditure variables.

The model for this section takes the form of

$$y_{it} = \alpha + \beta IMF_{it} + \varepsilon_{it}, \quad (7.1)$$

where y_{it} is government health expenditure of country i at time t , IMF_{it} is the presence or absence of an IMF agreement in country i at time t and β measures the effect of IMF agreements on health expenditure and is common for all countries and years. ε_{it} is the idiosyncratic error term of country i at time t and α the constant (Cameron and Trivedi, 2009; Wooldridge, 2002). Regression results are presented for each of the government health expenditure variables and the country sub-groups, across all agreements as well as the two main agreement clusters.

Results for regressions of the **spending as percentage of GDP** variable including all agreements (Table 7.4) reveal that for the model with all countries agreements are associated with a minor and not statistically significant increase in spending (Model (1) in Table 7.4). This effect increases in the model for LIC and becomes statistically significant, suggesting that these countries see a statistically significant increase in spending during agreement compared to no agreement (Model (2) in Table 7.4). For LMIC the effect is negative and not statistically significant (Model (3) in Table 7.4). For UMIC the size of the effect increases compared to LMIC and becomes statistically significant (Model (4) in Table 7.4).

Across all models the results suggest that models explain only a very small proportion of the variation within countries (within R^2). The explanatory power, while still small is largest for LIC (0.013) followed by UMIC (0.011) and is smallest in the all countries model (<0.000).

	(1) all	(2) LIC	(3) LMIC	(4) UMIC
IMF Dummy	0.007 (0.013)	0.077** (0.023)	-0.019 (0.016)	-0.042** (0.012)
Constant	0.962*** (0.023)	0.668*** (0.026)	1.105*** (0.017)	1.189*** (0.015)
Within R^2	0.000	0.013	0.001	0.011
N	2262	872	909	458
Countries	127	67	85	50

Table 7.4: Bivariate Regression of Effect of IMF Agreements on HE/GDP (logged)

Driscoll/Kraay standard errors in parenthesis (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; for data source see chapter 5)

Results of the regression models for social protection agreements and spending as percentage of GDP suggest a similar pattern of the effects of IMF agreements in the way that when all countries are included, agreements have a slight – but not statistically significantly – positive effect on government health spending. For LIC the effect is statistically significant positive, for LMIC the effect is negative but not statistically significant and for UMIC the effect is statistically significant negative (Table 7.5)

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
Social Protection Dummy	0.028 (0.017)	0.111*** (0.025)	-0.051 (0.029)	-0.101** (0.035)
Constant	0.940*** (0.023)	0.613*** (0.036)	0.970*** (0.025)	1.142*** (0.015)
Within R ²	0.001	0.025	0.006	0.007
N	1955	514	727	714
Countries	126	30	46	50

Table 7.5: Bivariate Regression of Effect of Social Protection Agreements on HE/GDP (logged)
Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

The effects for SBA/EFF agreements suggest a slightly different pattern. When all countries are considered the effect of SBA/EFF agreements is statistically significant negative. For LIC and LMIC the effect is negative, but not statistically significantly so. For UMIC, the effect is statistically significant negative (Table 7.6).

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
SBA/EFF	-0.037* (0.015)	-0.066 (0.056)	-0.031 (0.020)	-0.040* (0.019)
Constant	1.006*** (0.019)	0.564*** (0.028)	0.949*** (0.022)	1.168*** (0.017)
Within R ²	0.003	0.001	0.002	0.006
N	1679	236	591	852
Countries	124	28	46	50

Table 7.6: Bivariate Regression of Effect of SBA/EFF Agreements on HE/GDP (logged)
Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

Comparing explanatory power of the models across agreement clusters suggest a slightly better fit for the individual agreement clusters compared to the models with all agreements.

Turning to the results of regressions using health **expenditure per capita** as dependent variables (Table 7.7), it appears that across all countries there is a negative but not statistically significant relationship between the IMF dummy and the outcome variable. This suggests that IMF agreements are associated with a slight but not significant decrease in spending (Model (1) in Table 7.7). For LIC the results suggest a positive and statistically significant association between the dummy and government health expenditure (Model (2) in Table 7.7). For LMIC and UMIC this relationship is negative and while the effect is slightly larger for UMIC it is not statistically significant in either country definition (Model (3) and (4) in Table 7.7). Inspecting the within R² values suggests again that the model explains only very little of the variation of growth and at most 0.5% in the model of UMIC.

	(1) all	(2) LIC	(3) LMIC	(4) UMIC
IMF Dummy	-0.013 (0.025)	0.060* (0.026)	-0.015 (0.034)	-0.047 (0.026)
Constant	4.302*** (0.063)	3.046*** (0.053)	4.760*** (0.045)	5.784*** (0.033)
Within R ²	0.001	0.004	0.000	0.005
N	2274	900	916	458
Countries	127	68	85	50

Table 7.7: Bivariate Regression of Effect of IMF Agreements on HE/cap (logged)
Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

Results of the regression models for social protection agreements and spending per capita suggest a roughly similar pattern of the effects of IMF agreements in the way that when all countries are included, agreements have a slight – but not statistically significantly – negative effect on government health spending. For LIC the effect is statistically significant positive, for LMIC and UMIC the effect is statistically significant negative (Table 7.8).

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
Social Protection Dummy	-0.013 (0.031)	0.119*** (0.029)	-0.141** (0.049)	-0.206* (0.087)
Constant	4.201*** (0.060)	2.628*** (0.070)	4.218*** (0.055)	5.362*** (0.058)
Within R ²	0.001	0.014	0.024	0.005
N	1989	541	727	721
Countries	127	31	46	50

Table 7.8: Bivariate Regression of Effect of Social Protection Agreements on HE/cap (logged)
Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

The effects for SBA/EFF agreements suggest a generally similar pattern. When all countries are considered the effect of SBA/EFF agreements is negative, but not statistically significantly so. For LIC and LMIC the effect is statistically significant negative. For UMIC, the effect is neutral (Table 7.9).

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
SBA/EFF	-0.063 (0.033)	-0.334*** (0.080)	-0.156** (0.047)	0.000 (0.045)
Constant	4.567*** (0.058)	2.465*** (0.059)	4.296*** (0.050)	5.391*** (0.065)
Within R ²	0.002	0.006	0.025	0.000
N	1712	261	592	859
Countries	125	29	46	50

Table 7.9: Bivariate Regression of Effect of SBA/EFF Agreements on HE/cap (logged)
Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

Inspecting the results for regressions of **health expenditure as percentage of GGE** reveals trends largely similar to those found for the HE/GDP variable (Table 7.10). Across all countries the relationship between IMF agreements and expenditure is positive and also statistically significant (Model (1) in Table 7.10). For LIC the relationship is also positive and highly statistically significant (Model (2) in Table 7.10). For LMIC and UMIC this relationship is negative and while the effect is slightly larger for UMIC it is not statistically significant in either country definition (Model (3) and (4) in Table 7.10). The models are again only capable of explaining a small fraction (1.6% at most) of the within variation in health expenditure.

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
IMF Dummy	0.031*	0.092***	-0.012	-0.017
	(0.013)	(0.022)	(0.015)	(0.024)
Constant	2.226***	2.089***	2.304***	2.315***
	(0.012)	(0.017)	(0.008)	(0.015)
Within R ²	0.003	0.016	0.001	0.002
N	2268	900	910	458
Countries	127	68	85	50

Table 7.10: Bivariate Regression of Effect of IMF Agreements on HE/GGE (logged)

Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

Results of the regression models for social protection agreements and spending as percentage of GGE suggest a similar pattern of the effects of IMF agreements in the way that when all countries are included, agreements have positive effect on health spending. For LIC the effect is statistically significant positive, for LMIC and UMIC the effect is statistically significant negative (Table 7.11).

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
Social Protection Dummy	0.070***	0.141***	-0.004	-0.006
	(0.017)	(0.025)	(0.024)	(0.039)
Constant	2.209***	2.083***	2.213***	2.300***
	(0.013)	(0.025)	(0.011)	(0.011)
Within R ²	0.009	0.031	0.000	0.000
N	1982	541	727	714
Countries	127	31	46	50

Table 7.11: Bivariate Regression of Effect of Social Protection Agreements on HE/GGE (logged)

Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

The effects for SBA/EFF agreements suggest a slightly different pattern. When all countries are considered the effect of SBA/EFF agreements is negative. For LIC the effect is slightly positive, for LMIC, the effect is statistically significantly negative and for UMIC, the effect is negative, but not statistically significant (Table 7.12).

	(1)	(2)	(3)	(4)
	all	LIC	LMIC	UMIC
SBA/EFF	-0.017 (0.011)	0.064 (0.065)	-0.041* (0.018)	-0.005 (0.014)
Constant	2.227*** (0.009)	1.984*** (0.019)	2.201*** (0.009)	2.318*** (0.011)
Within R ²	0.001	0.000	0.004	0.000
N	1706	261	593	852
Countries	125	29	46	50

Table 7.12: Bivariate Regression of Effect of SBA/EFF Agreements on HE/GGE (logged)
Driscoll/Kraay standard errors in parenthesis (* p < 0.05, ** p < 0.01, *** p < 0.001; for data source see chapter 5)

Summing up the results of the bivariate regression models suggests that while there are minor differences in the magnitude of the effect, results seem, by and large comparable across all three ways of measurement. It generally appears that for LIC IMF agreements are associated with significantly significant positive effects on health expenditure. For LMIC and UMIC the effects are generally negative and so to a larger extent in UMIC compared to LMIC. Statistical significance differs, however, between the individual measurement ways. Another finding from the regression models is that the models' ability to explain variation in health expenditure is across all models and health expenditure measures rather limited. This seems to suggest that, especially when not controlling for other variables, the impact of IMF agreements on health expenditure is limited.

7.4 Summary of Stylised Facts

This chapter set out to present analyses of the two main variables of this study, the agreement dummy and the government health expenditure variable. It also aimed to give first insights into the effects of IMF agreements on government health expenditure using bivariate analyses. To do so the chapter was structured into three parts, to explore the distributions of agreements and government health expenditure and then provide bivariate analysis of both variables.

The first part of the analysis, inspecting frequencies of lending revealed that over the study period and across all countries around 36% of the case-years were in agreements. The frequency of agreements varied between income groups and

decreases as income rises. A number of different lending facilities were used. Most commonly, however, lending was conducted through the Extended Credit Facility and the Standby Agreement. While lending activity varies over time, the IMF was found to be a constant lender.

The second part of this chapter provided a number of univariate analyses of the government health expenditure measures. It was shown that across all countries as well as within each of the country sub-groups expenditure increased over time. However, levels of spending differed between income groups. Low-income countries spend the smallest amount of money on health while upper-middle-income countries spend the largest amounts.

The third part offered three different analyses of the bivariate relationship between agreements and government health spending. The first analysis compared aggregate timelines for IMF and non-IMF countries. It appeared that there is generally very little difference between both sets of countries. This holds true for the analysis of all countries as well as the different income groups. It does however appear that low-income countries in agreements tend to have higher levels of spending compared to non-IMF countries in the same income group.

The second analysis inspected individual country timelines and changes in trends of spending when agreements start or end. While it was expected that spending decreases after an agreement starts, a number of different patterns were found that suggest various relationships between agreements and health spending trends. Overall, it appears that there is no one directional relationship between agreements and health spending.

The third analysis used Fixed-Effects regression models (section 6.1.2.3; pg. 223) to estimate the effects of agreements on health spending. While results varied slightly between the health expenditure measures it generally appears that for low-income countries IMF agreements appear to be associated with a growth of health expenditure, while countries of middle-income experience negative effects on health spending during agreement times. It is worth noting that neither of the models is capable of explaining a large proportion of the within variation of government health expenditure.

Taking all these results together suggests two main things. Firstly, that the effect of IMF agreements on health spending appears to be limited as differences between IMF and non-IMF countries in aggregate time series and the amount of variation explained in the relevant models are small. Secondly, the results also indicate that the effects vary between income groups.

Two shortcomings of these analyses, that might impact the results' reliability, are worth noting. Firstly, health expenditure is driven by factors other than IMF agreements. As was outlined in more detail previously, a number of determinants of government health expenditure have been identified that explain variation of spending. When modelling health expenditure, these factors need to be controlled for to draw conclusions about the impact of IMF agreements on health expenditure. Secondly, and also outlined in more detail before (section 6.2; pg. 230), countries in IMF agreements are likely systematically different from those not in agreements, due to a country's economic and political position, which resulted in entering into an agreement in the first place. It might be that these factors have an impact on health spending itself so that the results of the impact of agreements on health spending might be biased. This systematic difference between the two country sets needs to be taken into account when modelling the effects of IMF agreements on health expenditure. This suggests to employ more advanced methods to assess the effect of IMF agreements on health expenditure. This will be done in the next chapter.

Appendix to Chapter 7

Appendix Table 7.1 Countries' income group by year (L=Low-income; LM=Lower-middle-income; UM=Upper-middle-income country)

Country Name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Afghanistan	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Albania	L	LM	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	LM	UM
Algeria	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Angola	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	UM	UM
Argentina	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Armenia	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Azerbaijan	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM
Bangladesh	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Belarus	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM
Belize	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	LM	LM	LM	LM	UM
Benin	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Bhutan	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM
Bolivia	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Bosnia and Herzegovina	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Botswana	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Brazil	UM	UM	UM	UM	UM	UM	UM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM
Bulgaria	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM
Burkina Faso	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Burundi	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Cabo Verde	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Cambodia	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Cameroon	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM
Cent. African Republic	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Chad	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
China	L	L	LM	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM
Colombia	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Comoros	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Congo	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM
Costa Rica	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Côte d'Ivoire	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Dem. Rep. Congo	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Djibouti	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Dominica	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Dominican Republic	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Ecuador	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM
Egypt	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
El Salvador	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM

Country Name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Eritrea	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Ethiopia	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Fiji	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	LM	LM	UM
Gabon	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Georgia	L	LM	LM	LM	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Ghana	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM
Grenada	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Guatemala	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Guinea	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Guinea-Bissau	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Guyana	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Haiti	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Honduras	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Hungary	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
India	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM
Indonesia	LM	LM	LM	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Iran	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM
Iraq	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM
Jamaica	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM
Jordan	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM
Kazakhstan	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM
Kenya	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Kiribati	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Kyrgyz Republic	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Lao PDR	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM
Lebanon	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Lesotho	LM	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM
Liberia	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Libya	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Macedonia	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Madagascar	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Malawi	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Malaysia	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Maldives	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM
Mali	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Marshall Islands	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM
Mauritania	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	L	LM
Mauritius	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Mexico	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Micronesia	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Moldova	LM	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM
Mongolia	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM

Country Name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Morocco	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Mozambique	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Myanmar	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Namibia	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Nepal	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Nicaragua	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM
Niger	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Nigeria	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Pakistan	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Panama	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Papua New Guinea	LM	LM	LM	LM	LM	LM	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Paraguay	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Peru	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Philippines	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Romania	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM
Rwanda	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Samoa	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Senegal	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Serbia	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Seychelles	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Sierra Leone	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Solomon Islands	LM	LM	LM	L	L	L	L	L	L	L	L	L	L	LM	L	LM	LM	LM
South Africa	UM	UM	UM	LM	UM	UM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Sri Lanka	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
St. Lucia	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Vincent & Grenadines	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Sudan	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Suriname	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM	UM	UM
Swaziland	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Syrian Arab Republic	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
São Tomé & Príncipe	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM	LM
Tajikistan	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Tanzania	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Thailand	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM
The Gambia	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Togo	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Tonga	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM
Tunisia	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM	UM	UM
Turkey	LM	LM	UM	UM	LM	UM	LM	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Turkmenistan	LM	LM	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	UM
Uganda	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Ukraine	LM	LM	LM	LM	L	L	L	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM

Country Name	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Uzbekistan	LM	LM	LM	LM	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM
Vanuatu	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM	LM
Venezuela	LM	LM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
Vietnam	L	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM
Yemen	L	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM	LM
Zambia	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	LM	LM	LM

Appendix Table 7.2 Countries by year and Facility Type (SC=SCF; EC=ECF; ES=ESF; FC=FCL; PL=PLL; EF=EFF; SB=SBA; for details of facility types see 1.2.4; pg. 15)

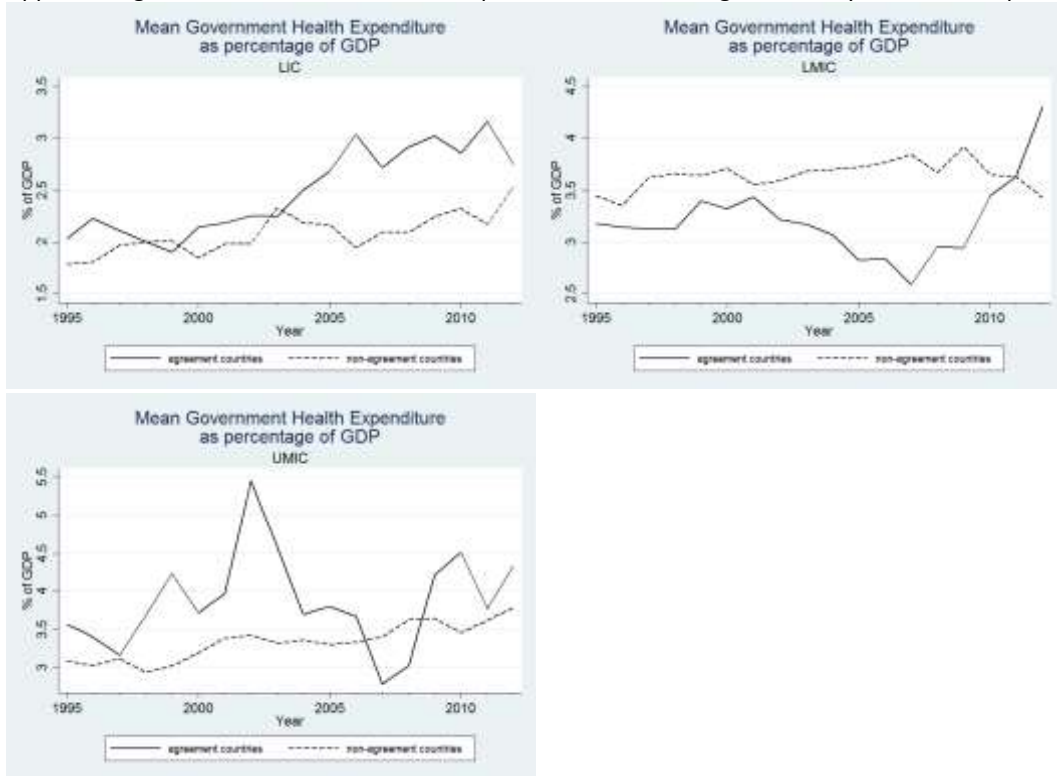
Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Afghanistan	--	--	--	--	--	--	--	--	--	--	--	EC	EC	EC	EC	EC	--	EC
Albania	EC	EC	--	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	--	--	--	--
Algeria	EF	EF	EF	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Angola	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SB	SB	--
Argentina	EF	SB	SB	EF	EF	SB	SB	SB	SB	SB	SB	--	--	--	--	--	--	--
Armenia	SB	EC	EC	EC	EC	--	EC	EC	EC	EC	EC	EC	EC	--	SB	EC	EC	EC
Azerbaijan	--	SB	EF	EF	EF	--	--	EC	EC	EC	EC	--	--	--	--	--	--	--
Bangladesh	--	--	--	--	--	--	--	--	EC	EC	EC	EC	--	--	--	--	--	EC
Belarus	--	SB	--	--	--	--	--	--	--	--	--	--	--	--	SB	--	--	--
Belize	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benin	EC	--	EC	EC	EC	EC	EC	EC	EC	--	--	EC	EC	EC	--	EC	EC	EC
Bhutan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bolivia	EC	EC	EC	EC	EC	EC	EC	--	SB	SB	SB	--	--	--	--	--	--	--
Bosnia & Herzegovina	--	--	--	SB	SB	SB	--	--	SB	--	--	--	--	--	--	SB	SB	SB
Botswana	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Brazil	--	--	--	--	SB	SB	SB	SB	SB	SB	--	--	--	--	--	--	--	--
Bulgaria	--	--	SB	--	EF	EF	EF	SB	SB	--	SB	SB	--	--	--	--	--	--
Burkina Faso	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Burundi	--	--	--	--	--	--	--	--	EC	EC	EC	EC	--	--	EC	EC	EC	EC
Cabo Verde	--	--	--	SB	SB	--	--	EC	EC	EC	EC	--	--	--	--	--	--	--
Cambodia	EC	EC	EC	--	--	EC	EC	EC	--	--	--	--	--	--	--	--	--	--
Cameroon	SB	SB	--	EC	EC	EC	EC	EC	EC	EC	--	EC	EC	EC	--	--	--	--
Cent. African Republic	--	--	--	--	EC	EC	EC	--	--	--	--	--	EC	EC	EC	EC	--	EC
Chad	--	EC	EC	EC	--	EC	EC	EC	EC	--	EC	EC	EC	--	--	--	--	--
China	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Colombia	--	--	--	--	--	EF	EF	EF	SB	SB	SB	SB	--	--	FC	FC	FC	FC
Comoros	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	EC	EC	EC
Congo	--	EC	EC	EC	--	--	--	--	--	--	EC	EC	EC	--	EC	EC	EC	--
Costa Rica	--	SB	--	--	--	--	--	--	--	--	--	--	--	--	SB	SB	--	--
Côte d'Ivoire	EC	EC	--	EC	EC	EC	--	EC	EC	EC	--	--	--	--	EC	EC	--	EC
Dem. Rep. Congo	--	--	--	--	--	--	--	EC	EC	EC	EC	--	--	--	--	EC	EC	EC
Djibouti	--	SB	SB	SB	--	EC	EC	EC	--	--	--	--	--	--	EC	EC	EC	--
Dominica	--	--	--	--	--	--	--	--	SB	EC	EC	EC	--	--	--	--	--	--
Dominican Republic	--	--	--	--	--	--	--	--	--	SB	SB	SB	SB	--	--	SB	SB	--
Ecuador	SB	--	--	--	--	SB	SB	--	SB	--	--	--	--	--	--	--	--	--
Egypt	EF	EF	SB	SB	--	--	--	--	--	--	--	--	--	--	--	--	--	--
El Salvador	--	SB	SB	--	SB	--	--	--	--	--	--	--	--	--	SB	SB	SB	SB

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Eritrea	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethiopia	SAF	--	EC	EC	EC	--	EC	EC	EC	EC	--	--	--	--	--	ES	--	--
Fiji	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gabon	--	EF	EF	EF	--	--	SB	--	--	SB	SB	--	SB	SB	SB	--	--	--
Georgia	SB	EC	EC	EC	EC	--	EC	EC	EC	EC	EC	EC	EC	--	SB	SB	--	SC
Ghana	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	--	--	--	EC	EC	EC
Grenada	--	--	--	--	--	--	--	--	--	--	--	EC	EC	EC	EC	EC	EC	EC
Guatemala	--	--	--	--	--	--	--	SB	SB	--	--	--	--	--	SB	SB	--	--
Guinea	EC	EC	EC	EC	EC	EC	EC	EC	EC	--	--	--	--	EC	EC	EC	--	EC
Guinea-Bissau	EC	EC	EC	EC	--	--	EC	EC	EC	--	--	--	--	--	--	EC	EC	EC
Guyana	EC	EC	EC	--	EC	EC	EC	--	EC	EC	EC	EC	--	--	--	--	--	--
Haiti	SB	--	EC	EC	EC	--	--	--	--	--	--	--	EC	EC	EC	--	EC	EC
Honduras	EC	EC	EC	--	EC	EC	EC	EC	--	EC	EC	EC	--	SB	--	--	SB	--
Hungary	--	SB	SB	--	--	--	--	--	--	--	--	--	--	--	SB	SB	--	--
India	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indonesia	--	--	--	SB	EF	EF	EF	EF	EF	--	--	--	--	--	--	--	--	--
Iran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iraq	--	--	--	--	--	--	--	--	--	--	--	SB	SB	SB	--	SB	SB	SB
Jamaica	EF	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SB	SB	--
Jordan	EF	EF	EF	EF	EF	EF	EF	--	SB	SB	--	--	--	--	--	--	--	--
Kazakhstan	SB	--	EF	EF	EF	EF	EF	--	--	--	--	--	--	--	--	--	--	--
Kenya	--	EC	EC	EC	--	--	EC	EC	EC	EC	EC	EC	EC	--	--	--	EC	EC
Kiribati	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kyrgyz Republic	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	--	ES	--	EC	EC
Lao PDR	EC	EC	--	--	--	--	EC	EC	EC	EC	--	--	--	--	--	--	--	--
Lebanon	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lesotho	SB	SB	SB	--	--	--	EC	EC	EC	EC	--	--	--	--	--	EC	EC	EC
Liberia	--	--	--	--	--	--	--	--	--	--	--	--	--	EC	EC	EC	EC	--
Libya	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Macedonia	SB	--	EC	EC	EC	--	EF	--	SB	SB	--	SB	SB	SB	--	--	PL	PL
Madagascar	--	--	EC	EC	EC	EC	EC	EC	EC	EC	--	--	EC	EC	EC	--	--	--
Malawi	--	EC	EC	EC	EC	--	EC	EC	EC	EC	--	EC	EC	EC	ES	EC	EC	EC
Malaysia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maldives	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SB	SB	SB
Mali	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Marshall Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mauritania	EC	EC	EC	EC	--	EC	EC	EC	--	EC	--	--	EC	EC	EC	EC	EC	EC
Mauritius	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mexico	SB	SB	--	--	--	SB	--	--	--	--	--	--	--	--	FC	FC	FC	FC
Micronesia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moldova	SB	EF	EF	EF	EF	--	EC	EC	EC	--	--	EC	EC	EC	--	EC	EC	EC

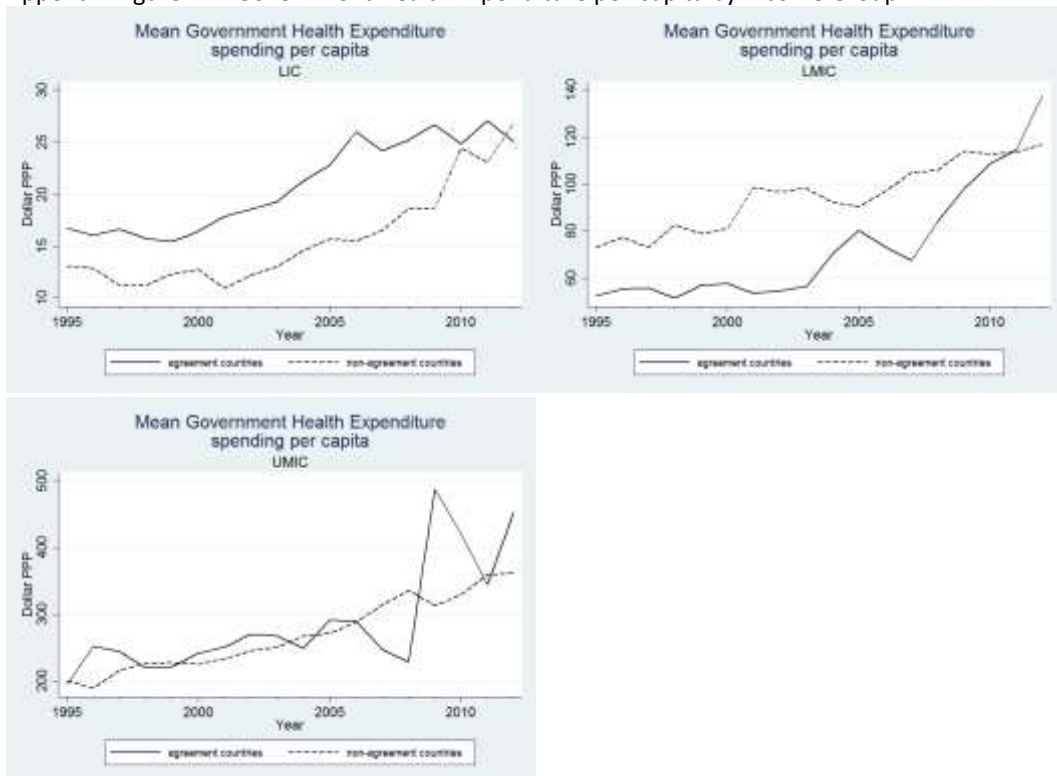
Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mongolia	EC	--	--	EC	EC	EC	--	EC	EC	EC	EC	--	--	--	SB	SB	--	--
Morocco	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mozambique	EC	EC	EC	EC	EC	EC	EC	EC	--	--	EC	EC	EC	--	ES	--	--	--
Myanmar	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Namibia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nepal	EC	--	--	--	--	--	--	--	--	EC	EC	EC	EC	--	--	--	--	--
Nicaragua	EC	EC	--	EC	EC	EC	EC	--	EC	EC	EC	EC	--	EC	EC	EC	EC	--
Niger	--	EC	EC	EC	EC	--	EC	EC	EC	--	EC	EC	EC	EC	EC	EC	--	EC
Nigeria	--	--	--	--	--	--	SB	--	--	--	--	--	--	--	--	--	--	--
Pakistan	EC	SB	SB	EF	EF	EF	SB	EC	EC	EC	--	--	--	--	SB	SB	SB	--
Panama	--	SB	--	EF	EF	SB	SB	--	--	--	--	--	--	--	--	--	--	--
Papua New Guinea	--	SB	SB	--	--	SB	SB	--	--	--	--	--	--	--	--	--	--	--
Paraguay	--	--	--	--	--	--	--	--	--	SB	SB	SB	SB	SB	--	--	--	--
Peru	EF	--	EF	EF	EF	EF	SB	SB	SB	SB	SB	SB	SB	SB	--	--	--	--
Philippines	EF	EF	EF	SB	SB	SB	--	--	--	--	--	--	--	--	--	--	--	--
Romania	SB	SB	SB	--	--	SB	--	SB	SB	--	SB	SB	--	--	SB	SB	SB	SB
Rwanda	--	--	--	EC	EC	EC	EC	--	EC	EC	EC	EC	EC	EC	EC	--	--	--
Samoa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Senegal	EC	EC	EC	EC	EC	EC	EC	--	EC	EC	EC	--	--	--	ES	--	--	--
Serbia	--	--	--	--	--	--	SB	EF	EF	EF	EF	--	--	--	SB	SB	--	SB
Seychelles	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SB	EF	EF	EF
Sierra Leone	EC	EC	EC	--	--	--	--	EC	EC	EC	--	EC	EC	EC	EC	--	EC	EC
Solomon Islands	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SC	SC	SC
South Africa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sri Lanka	EC	--	--	--	--	--	SB	SB	EF	EF	EF	--	--	--	--	SB	SB	SB
St. Lucia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vincent & Grenadines	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sudan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Suriname	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Swaziland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Syrian Arab Republic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
São Tomé & Príncipe	--	--	--	--	--	EC	EC	EC	--	--	--	EC	EC	EC	EC	EC	EC	--
Tajikistan	--	SB	--	EC	EC	EC	EC	--	EC	EC	EC	--	--	--	EC	EC	EC	--
Tanzania	--	--	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	--	--	ES	--	--	--
Thailand	--	--	--	SB	SB	--	--	--	--	--	--	--	--	--	--	--	--	--
The Gambia	--	--	--	EC	EC	EC	EC	--	EC	EC	EC	--	EC	EC	EC	EC	--	EC
Togo	EC	EC	EC	--	--	--	--	--	--	--	--	--	--	EC	EC	EC	EC	--
Tonga	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tunisia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Turkey	SB	--	--	--	--	SB	SB	SB	SB	SB	SB	SB	SB	--	--	--	--	--
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uganda	EC	EC	EC	EC	EC	EC	--	--	EC	EC	EC	--	--	--	--	--	--	--
Ukraine	SB	SB	--	SB	EF	EF	EF	EF	--	SB	--	--	--	--	SB	SB	SB	SB
Uzbekistan	--	SB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanuatu	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Venezuela	--	--	SB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vietnam	EC	EC	EC	--	--	--	EC	EC	EC	--	--	--	--	--	--	--	--	--
Yemen	--	SB	--	EC	EC	EC	EC	--	--	--	--	--	--	--	--	--	--	EC
Zambia	--	EC	EC	EC	EC	EC	EC	EC	--	EC	EC	EC	EC	EC	EC	EC	EC	--

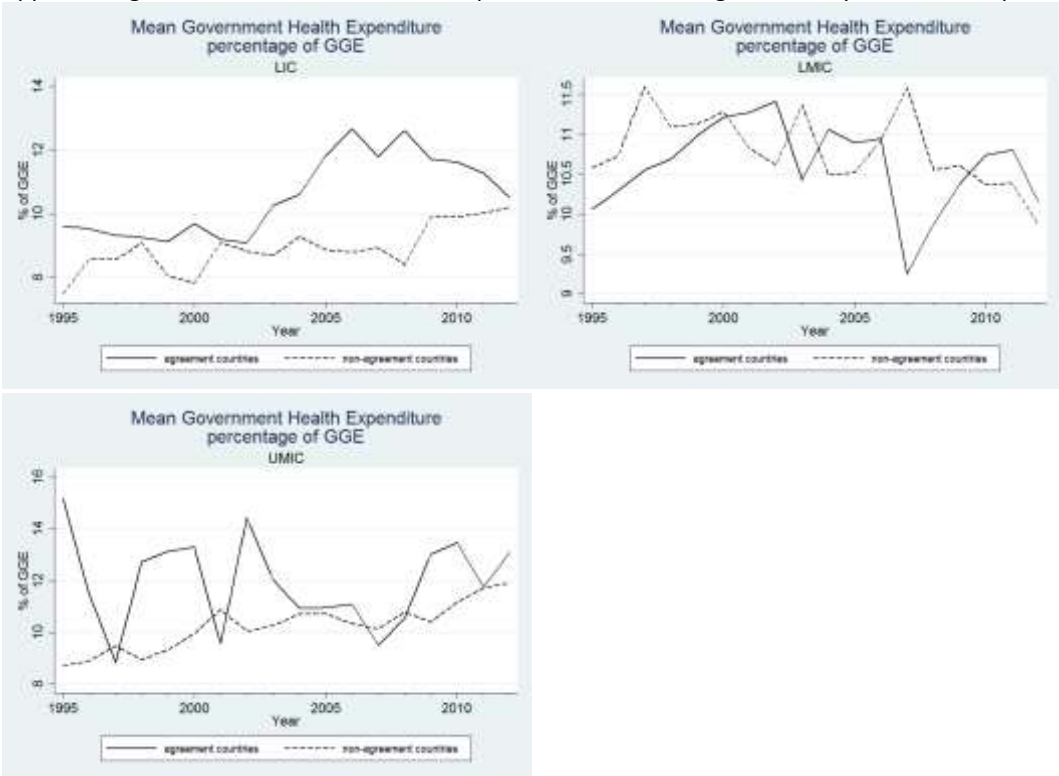
Appendix Figure 7.1: Government Health Expenditure as Percentage of GDP by Income Group



Appendix Figure 7.2: Government Health Expenditure per Capita by Income Group



Appendix Figure 7.3: Government Health Expenditure as Percentage of GGE by Income Group



8

The Average Effects of IMF Agreements on Government Health Expenditure

This chapter builds on the analyses conducted in chapter 7 and brings together all information needed to model the effects of IMF agreements on government health expenditure in a multivariate way. It aims to estimate the average effect of agreements on low- and middle-income countries, and the individual income groups (low-income (LIC), lower-middle-income (LMIC) and upper-middle-income (UMIC) countries). Government health expenditure is thereby seen to be determined by a number of characteristics present in each of the countries at a given time. IMF agreements are seen as one of these determinants in the way that they are seen as a treatment that some countries are exposed to at certain times. The aim is to estimate and identify the average size of the “treatment effect” of agreements. When modelling health expenditure as a function of the exposure to an agreement and other health expenditure determinants the problem arises that countries exposed to agreements are likely systematically different from countries without agreements (Vreeland (2002); Chapter 6; pg. 215). In chapter 6 it was argued that in order to reliably attribute effects to the

agreements, a two-stage estimation process to account for the selection bias is best suited for this study. In a first step a selection model is fitted, which models IMF agreements as a function of determinants of agreements (section 6.2; pg. 230), before, in a second step, government health expenditure itself is modelled (section 6.1; pg. 216) to identify the effects of agreements. The structure of this chapter follows this two stage process and it is divided into three parts.

In the first part, the process of fitting the selection model is presented. A number of previously identified economic and political variables¹⁰¹ (section 5.4.2; pg. 194) are used to identify the best model. It was argued that the aim of this model it to achieve the best possible classification of the outcome while at the same time retaining a high number of cases (section 6.2.3.2; pg. 235). Comparing different model definitions, it is shown that a model commonly used in the IMF and health expenditure literature (section 4.3; pg. 130) provides the best results in terms of classification. Fitting a parsimonious version of this established model provides comparable classification results and additionally includes more cases. It is suggested to base the selection model on this “stripped” definition.

The second part of this chapter presents the process and the results of modelling government health expenditure as a function of IMF agreements and other previously identified determinants of government health expenditure. Models are fitted for the three indicators of health expenditure, as percentage of GDP (HE/GDP), per capita (HE/cap) and percentage of general government expenditure (HE/GGE) (section 5.4.1.5; pg. 193), first across all low- and middle-income countries, and then for each of the income groups. To do so, the Fixed Effects estimator is used (section 6.1.2.3; pg. 223). Two sets of models are fitted. First, government health expenditure is modelled as a function of its determinants excluding the IMF agreement variable; the IMF variable is included in the second step. This allows to identify the impact of agreements on explaining variation in health expenditure and to identify the average effect of the agreements.

¹⁰¹ Political variables thereby also include those of IMF activity; compare footnote 57 (pg. 116).

Part three of this chapter concludes by arguing that the results suggest that the effect of agreements on government health expenditure is generally very small and no statistically significant impact of agreements can be identified across all countries. However, the effect is found to vary between country income groups. The results show a statistically significantly positive relationship between agreements and government health expenditure in low-income countries, a mostly statistically significantly negative relationship in lower-middle-income countries and a slight, but not statistically significantly, negative relationship for upper-middle-income countries.

8.1 Accounting for Endogeneity: Fitting the Selection Equation

It has previously been argued that the IMF variable is endogenous in the way that IMF agreements are seen as a response to economic crises and these crises by themselves impact on health expenditure decisions. This problem needs to be accounted for to correctly estimate the effects of IMF agreements. For the analysis of this study, a Heckman-style selection model approach was identified as the most appropriate technique to do so. Therefore, a selection equation needs to be estimated that predicts IMF agreements (see chapter 6). Possible variables to predict IMF agreements have been identified in chapter 5. When deciding on the correct specification of the selection equation, two questions need to be addressed, that can only be answered empirically by fitting different models to the dataset of this study. Firstly, which combination of variables provide the best predictions? Secondly, which lag structure provides the best predictions? An iterative process will be used to identify the best combination of lags and variables for the present study. This part presents the results of this process in three sections. The first section presents the different models that were fitted and the reasoning behind them. Section two presents the results of the fitted model, before the third summarises the findings.

8.1.1 Outline of the Model Selection Process

This section presents the approach taken to identify the best definition of the selection model for this study. In chapter 4, a literature review was conducted in a systematic way to identify the most commonly used determinants of IMF agreements in the field. Based on this, chapter 5 identified a list of variables that are available for

this study. From the literature review it has emerged that a defined set of variables commonly used in studies on the IMF and health expenditure (Established Model) exists, to be used in selection models. The wider literature of IMF determinants, however, employs a number of additional variables. To identify which combination of these variables is best for this study and the given dataset, a number of different models, with varying variable definitions, is estimated and their results compared to the Established Model, which features as benchmark model.

The goal of the selection equation is to be able to predict IMF agreements as accurately as possible. It is likely that the ability to correctly predict agreements is greatest when all available variables are added into the model. This will be referred to as “fully loaded” model, which includes all variables that have previously been identified as relevant and available for this study.

Another approach in predicting IMF agreements can be seen in using those variables that are, according to the IMF’s mission statement, the most important when deciding about entering into an agreement. This means to include variables measuring macroeconomic conditions such as the Balance of Payments position, international reserves and economic growth of the country under consideration.

The literature on determinants of IMF agreements suggests that economic determinants other than those directly related to the IMF’s mission statement play an important role in predicting IMF agreements (section 4.2.1; pg. 120). Another set of models will therefore be fitted to predict IMF agreements using a range of economic variables beyond those three determinants related to the IMF’s mission statement. This set of models includes the variables GDP per capita, GDP per capita growth, international reserves, debt stock, debt service, current account balance, inflation, government balance and change in the exchange rate.

Especially in that part of the literature that examines the IMF and health expenditure in particular, a model has been established that includes a number of variables that capture the country’s economic performance, political circumstances and the extent of previous involvement with the Fund. This model will be used in this study as “benchmark model”, to which the results of other models will be compared. This model contains the variables of GDP per capita, GDP growth, current account

balance, government balance, indicator of agreements in the previous year and the democracy indicator. Table 8.1 below shows an overview of the variables in each of the models.

Determinant	Fully Loaded Model	BOP, Reserves and Growth	Economic Variables	Established Model
Gross domestic product per capita	x		x	x
GDP per capita growth (annual %)	x	x	x	x
Total reserves (% of total external debt)	x	x	x	
Total debt service (% of GNI)	x		x	
External debt stocks (% of GNI)	x		x	
Current account balance (% of GDP)	x	x	x	x
Inflation, average consumer prices (% change)	x		x	
General government balance (% of GDP)	x		x	x
Annual Change of the Official exchange rate (%)	x		x	
Indicator of agreement in previous year	x			x
Moving average of years in agreements during last 5 years	x			
Number of other countries in agreements	x			
Democracy Indicator	x			x

Table 8.1: Variable Overview by Model

IMF agreements are generally seen as a result of changes in a country's performance or circumstances. Agreements are thus entered into *after* a deterioration of performance. This suggests that a lag structure should be considered when modelling IMF agreements. How long after this deterioration the agreement is entered into, is unclear and the literature provides little guidance. This study therefore attempts to solve the issue empirically by including different lengths of lags into the model to compare outcomes before deciding on the appropriate number of lags for this model. The maximum length of lags is set to five. This is for two reasons, firstly, the panel is relatively short (T=18 years) and secondly, IMF agreement status changes fairly frequently between "on" and "off" so that effects of long lag structures are likely confounded by other agreements.

8.1.2 Fitting the Selection Model

This section presents the key statistics of individual models and their lag structure, which were fitted using the methodology outlined in chapter 6 (pg. 215). Judgement about the goodness of the individual model is based on the percentage of correctly classified cases and the number of cases retained in the model. Table 8.2 provides an overview of the number of cases in the model and the percentage of correct classification for each of the models and their lag structure. Results of the Established Model are shown at the bottom of the table as benchmark. To make the table more accessible the results have been fitted with a colour gradient where a dark green colour represents a desired outcome of high percentage of correct classification or large number of observation, while a yellow colour represents a low percentage of correct classification or a small number of observations. Models with green colours in both the correctly classified and the observation dimension represent models with the desired outcome. Given that the aim of this model is to predict outcomes, the effect size of individual variables is of secondary importance and not shown here. The following paragraphs discuss the results of each model and the lag structure in order to derive the best model for this study.

		lags (0/5)	lags (0/4)	lags (0/3)	lags (0/2)	lags (0/1)	lags (0/0)
Fully Loaded Model	n	1309	1389	1465	1537	1605	1673
	%	82.43	82.58	81.91	81.72	81.99	81.47
BCA, Reserves and Growth	n	1912	1947	1977	2003	2021	2037
	%	59.68	58.86	58.93	57.81	55.62	52.68
Economic Variables	n	1315	1395	1471	1543	1611	1679
	%	66.54	65.45	64.85	62.35	61.7	61.11
Established Model	n	1492	1598	1685	1766	1843	1916
	%	84.05	83.17	82.79	82.33	82.20	82.10
Established Model	n	1916					
	%	82.10					

Table 8.2: Key Statistics of Selection Equation Models based on Probit Regression Model
n Number of cases in the model; % percentage of cases correctly classified; data source: Table 5.17 (pg. 205)

Inspecting first the results of the **Fully Loaded Model**, suggests that the models with different lag structures are capable to correctly classify between 82.58% and 81.47% of all cases in the model. Adding additional lags increases the

classification results slightly, however, the number of cases in the model decreases as the lags increase (1673 cases for the 0 lag model; 1309 cases for the 5/0 lag structure). Comparing the results to the Established Model suggests that all models fare worse in terms of number of cases in the model: while the models for a 5/0 and 4/0 lag structure offer slightly improved results in terms of classification (+0.33 and +0.48 percentage points respectively), this improvement needs to be traded off with a fairly large drop in cases in the model (-607 and -527 cases respectively). This suggests that overall the Fully Loaded Models do not provide better results than the Established Model and should therefore not be used for this study.

Turning to the **Current Account, Reserves and Growth Models**, reflecting the IMF's mission statement. The results suggest that models generally offer fairly low levels of correct classification of between 59.68% for 5/0 lags and 52.68% for 0 lags. Hence each model in this group provides correct classification that is more than 22 percentage points worse than that of the Established Model. While the models with lag structures 4/0 to 0 contains increasingly larger numbers of cases compared to the Established Model, it appears that this increase in numbers is traded off with a high level of reduced classification. This suggests that this set of models does not provide better results than the Established Model and should therefore not be used in the study.

The set of **Economic Variables Models** include additional economic variables compared to the models above. The results suggest that these additional variables increase classification results slightly by on average 6 percentage points, compared to the previous models. Overall classification results are still much below those of the Established Model. Including these additional variables further reduces the number of cases in the model. This means that the model with the largest number of cases contains 237 cases less than the Established Model and also offers worse classification results. This suggests that these models should not be used in this study as they provide worse classification and less cases compared to the Established Model.

Turning finally to the **Established Model** that has been refitted with different lag structures. The results suggest that the 5/0 to 1/0 lag structure models provide better classification results compared to the Established Model in its original lag structure. However, the number of cases in these models is lower compared to the Established

Model. It is argued that the minor benefits of around 1 percentage point in terms of classification should not be traded off for sizable reductions in case numbers. This suggests that the Established Model with its original lag structure should be used for this study.

Having systematically compared different model specifications it appears that the Established Model provides the best results for this study¹⁰². However, closer inspection of the regression results of the Established Model reveals that only the agreement in previous year, GDP and GDP growth variables are statistically significant determinants of agreements in this study (Model (1) in Table 8.3). The model will therefore be refitted to estimate a more parsimonious model (Stripped Model), including only these statistically significant variables and compare the obtained results to the Established Model.

	(1) Established Model	(2) Stripped Model
Indicator of agreement in previous year	5.469*** (0.000)	5.350*** (0.000)
GDP per capita growth (lagged)	0.983* (0.021)	0.991 (0.120)
Current account balance (lagged)	0.994 (0.161)	
Democracy Indicator	1.022 (0.113)	
per capita GDP	1.000*** (0.000)	1.000*** (0.000)
General government balance (lagged)	1.014 (0.057)	
Observations	1916	2199
McFadden R^2	0.310	0.299
AIC	1730.8	2046.4
BIC	1769.7	2069.1
p of Likelihood Ratio Test	0.000	0.000
% correctly classified	82.10	81.45

Table 8.3: Results of Probit Regression for Selection Equation.

Exponentiated Coefficients with p-values in parentheses;

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; for data source see Table 5.17 (pg. 205)

Comparing the Established Model and the Stripped Model suggests that the stripped version has a slightly lower correct classification rate (82.10% vs 81.45%) but

¹⁰² Other sets of models were additionally fitted but did not provide better results (results not shown here).

allows for inclusion of an additional 283 cases into the model. It seems that this trade-off is worthwhile as an additional number of cases are traded off for a slight reduction in classification success.

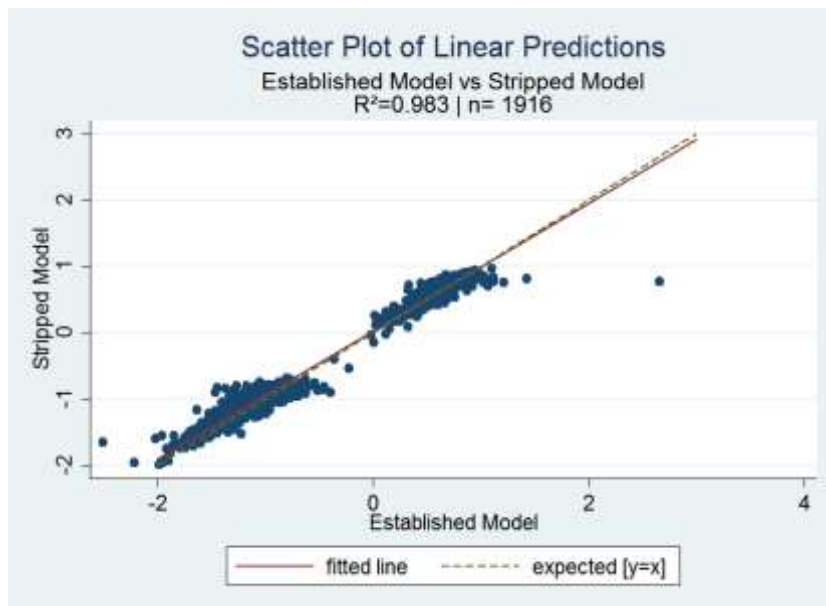


Figure 8.1: Scatter Plot of Linear Predictions from Established and Stripped Model

To ensure that the results of the Established Model and the Stripped Model are comparable, the linear predictions of both models were compared. The coefficient of determination (R^2) suggests 98.3% similarity between the predictions of both model. Plotting the results against each other shows that the predictions are fairly linear (Figure 8.1). This suggests that the Stripped Model provides results that are comparable to those obtained through the Established Model but include an additional 283 cases.

8.1.3 Summary of the Selection Equation

This section set out to fit the selection equation necessary to account for endogeneity in this study. To identify the best specification of the model in terms of its variables and lag structure, a number of models have been estimated and compared in relation to their classification results and retained cases. By and large the results suggest that the percentage of correct classification increases as the number of lags in the model increases; but this is at the expense of reducing the sample for which the model can be estimated. Comparing the results across all models shows that the Established Model offers the best results both in terms of correct classification and

retained cases. A parsimonious version of the Established Model was fitted, which offers comparable results in terms of classification and includes additional cases¹⁰³. Additional tests suggest that both models produce comparable results. This stripped version of the Established Model will therefore be used to create the Inverse Mills Ratio to be included in the main equation to account for endogeneity (section 6.2.3.2; pg. 235).

8.2 Results of the Effects of IMF Agreements on Government Health Expenditure

Having fitted the selection model, this second section of the chapter models government health expenditure. It is structured to first (section 8.2.1) model government health expenditure as a function of the previously identified determinants (GDP per capita, government revenue and age dependency ratio; section 5.4.1.5; pg. 193), before the IMF dummy as well as the Inverse Mills Ratio used to account for selection bias, are included in a second step (section 8.2.2). Doing so, the importance of IMF agreements in explaining the variation of government health expenditure can be assessed by comparing the coefficients of determination (R^2) of both models.

8.2.1 Modelling Government Health Expenditure

This section presents the results of modelling health expenditure as a function of its determinants without the IMF dummy and the Inverse Mills Ratio. This model takes the form of

$$HE_{it} = \alpha + \beta_1 HE_{it-1} + \beta_2 X_{it} + \beta_3 t + \varepsilon_{it} \quad (8.1)$$

Where HE_{it} is the level of government health expenditure in country i at time t . HE_{it-1} is the first lag of health expenditure of country i at time t , used to account for

¹⁰³ Theory and the literature review conducted in Chapter 4 indicate that a previous IMF agreement (measured as agreement in the previous year) is an important determinant of current agreements. It has, however, been suggested that due to the multi-year nature of IMF agreements an indicator of an agreement in the previous year might be confounded. In an alternative model, this dummy variable has therefore been removed, the IMR refitted and the main regression rerun. While the results show that the selection equation is less capable of classifying cases correctly, the results of the main equation remain unchanged. See Appendix to Chapter 8 for the regression output.

first order autocorrelation. X_{it} is the vector of determinants of health expenditure in country i at time t . t is the time dummy to account for time trends. α is the constant and ε_{it} is the idiosyncratic error of country i at time t . The model will be estimated using the Fixed Effects estimator with Driscoll-Kraay standard errors.

Results are presented for all countries and each of the income groups as well as each of the (logged) health expenditure variables: percentage of GDP (Table 8.4), per capita (Table 8.5) and percentage of government expenditure (Table 8.6), respectively. The following paragraphs provide an interpretation of the coefficients of the individual variables in the model.

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.674*** (0.031)	0.647*** (0.039)	0.630*** (0.029)	0.525*** (0.062)
GDP per capita (logged)	-0.098** (0.032)	-0.184* (0.076)	-0.094* (0.043)	-0.243** (0.070)
Government Revenue (% GDP)	0.002 (0.001)	0.001 (0.002)	0.002* (0.001)	0.004* (0.002)
Age Dependency Ratio	0.001 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.005* (0.002)
time	0.009*** (0.002)	0.013*** (0.003)	0.006** (0.002)	0.013*** (0.003)
Constant	0.802*** (0.222)	1.091* (0.487)	1.139** (0.336)	2.099** (0.609)
Within R ²	0.559	0.524	0.518	0.406
N	1893	731	760	402
Countries	124	64	80	47

Table 8.4: Models for Government Health Expenditure as Percentage of GDP
Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); dependent variable logged HE/GDP

Looking at the models for health expenditure as percentage of GDP it appears that the lagged health expenditure variables is strongly ($p<0.001$) and positively correlated with the dependent variable across all models. This is as expected as the preliminary analysis suggested a first order autocorrelation and the lagged dependent variable was introduced to capture this correlation between health expenditure in year t and year $t-1$.

The coefficients of the logged GDP per capita variable are negative and statistically significant for the models with all countries as well as the models for each of the income groups, when controlling for all other variables in the model. This means that for every logged unit increase in GDP there is a reduction in government health

expenditure. This is quite surprising as GDP is seen as the strongest driver of health expenditure (Xu et al, 2011), so that a statistically significant positive relationship would be expected. Looking only at the bivariate relationship between GDP and health expenditure, not controlling for other variables, a positive relationship between the two variables is found. This suggests that when controlling for the other variables in the model the effect of GDP on health expenditure has changed.

The relationship between government revenue and government health expenditure is positive but only statistically significant for the LMIC and UMIC models, when controlling for all other variables in the model. This means that for every one percentage point increase in government revenue as percentage of GDP, government health expenditure increases statistically significantly in LMIC and UMIC. This is in line with the expectations as it was assumed that with increases in fiscal space, measured in this study as government revenue, relatively more money will be dedicated to health care.

The age dependency ratio has a positive and statistically significant relationship with government health expenditure measured as percentage of GDP for UMIC. For the model with all countries as well as the LIC model the relationship is positive but not statistically significant. For LMIC the relationship is negative but not statistically significant. This suggests that when controlling for all other variables the age structure of a country's population has a statistically significant relationship with government health expenditure only for UMIC. This is not unexpected as, while the age structure is seen as important determinant of health expenditure as it is commonly used in relevant studies, most commonly the reported relationship is not statistically significant.

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.708*** (0.038)	0.735*** (0.050)	0.583*** (0.037)	0.495*** (0.050)
GDP per capita (logged)	0.219*** (0.047)	0.083 (0.093)	0.332*** (0.053)	0.410*** (0.113)
Government Revenue (% GDP)	0.003 (0.002)	0.002 (0.003)	0.003* (0.001)	0.006 (0.003)
Age Dependency Ratio	0.002 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.006* (0.002)
time	0.009** (0.003)	0.013** (0.005)	0.006** (0.002)	0.011* (0.004)
Constant	-0.561* (0.258)	0.006 (0.466)	-0.475 (0.340)	-1.234 (0.807)
Within R ²	0.771	0.711	0.733	0.649
N	1903	741	760	402
Countries	124	64	80	47

Table 8.5: Models for Government Health Expenditure as Per Capita Spending.

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); dependent variable logged HE/cap

The time control variable was introduced into the model to control for the upward trend in the data. For all models the variable is found to show a positive and statistically significant relationship with government health expenditure, which captures this trend. The coefficient is largest in LIC as well as UMIC and smallest in LMIC, which reflects the fact that the trends in health expenditure vary over time with income groups and are strongest for LIC/UMIC and weakest for LMIC (compare Chapter 7; pg. 249).

Turning to the models of logged government health expenditure as per capita spending, a very similar picture, with some differences, emerges. The lagged dependent variable, introduced to capture the first order auto-correlation in the data shows a strong and positive correlation with the dependent variable, confirming the presence of first order autocorrelation.

When controlling for all other variables, a strong positive and statistically significant correlation between logged per capita GDP and per capita government health expenditure is found for the models including all countries as well as the LMIC and UMIC countries. This suggests that for these models an increase in per capita GDP is associated with increases in government health expenditure. This is as expected as it was assumed that GDP is a strong predictor of government health expenditure. For LIC a slight positive, but not statistically significant relationship between per capita

GDP and per capita government health expenditure is found when controlling for all other variables. This suggests that for LIC per capita GDP is not a significant predictor of per capita government health expenditure.

Government revenue has a small positive relationship with per capita health expenditure, which is only significant in LMIC. This suggests that in these countries increases in government revenue as percentage of GDP are associated with statistically significant increases in per capita health spending.

The age dependency variable shows a statistically significant positive relationship with per capita government health expenditure in UMIC. This suggests that for UMIC the age dependency ratio is a statistically significant predictor of per capita government health expenditure when controlling for all other variables in the model. This relationship is also positive but not statistically significant for the model with all countries as well as that for LIC. For LMIC the relationship is slightly negative but not statistically significant. This suggests that for these models, the age structure as measured in the age dependency ratio variable is not a statistically significant predictor for per capita government health expenditure when controlling for all other variables in the model.

The time dummy, introduced to capture the time trend in the data is found to have a statistically significant positive relationship with per capita health spending in all models. This reflects the descriptive statistics presented in chapter 7 that show a positive trend in per capita spending across all countries (Figure 7.9; pg. 263).

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.645*** (0.056)	0.615*** (0.077)	0.642*** (0.035)	0.539*** (0.062)
GDP per capita (logged)	-0.077 (0.048)	-0.141 (0.110)	-0.010 (0.043)	-0.202** (0.066)
Government Revenue (% GDP)	-0.001 (0.001)	-0.001 (0.001)	-0.004*** (0.001)	-0.002 (0.002)
Age Dependency Ratio	0.003* (0.001)	0.003 (0.003)	-0.000 (0.001)	0.006* (0.003)
time	0.008*** (0.002)	0.009 (0.005)	0.003 (0.002)	0.014*** (0.003)
Constant	1.132** (0.396)	1.330* (0.642)	0.999** (0.312)	2.394*** (0.615)
Within R ²	0.437	0.405	0.450	0.341
N	1904	741	761	402
Countries	124	64	80	47

Table 8.6: Models for Government Health Expenditure as Percentage of General Government Expenditure

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); dependent variable logged HE/GGE

Turning to the models measuring government health expenditure as percentage of general government expenditure. Similar to the other two sets of models the lagged dependent variable is statistically significantly positively associated with the dependent variable capturing the first order autocorrelation observed in the dependent variable.

Logged per capita GDP has across all models a slightly negative relationship with health expenditure measured as percentage of government expenditure. Only for the model with UMIC this relationship is statistically significantly negative. This suggests that per capita GDP is, when controlling for all other variables in the model, only an important predictor of health spending in UMIC.

The government revenue variable shows a slight negative relationship with health expenditure measured as percentage of government expenditure across all models, which is only statistically significant in the LMIC model. This suggests that a one percentage point increase in government revenue as percentage of GDP is associated with a minor decrease in health spending. In other words, as government revenue increases government health spending as a share of government expenditure decreases, and this decrease is statistically significant. This suggests that an increase in government revenue is not per se associated with increased health spending as

percentage of all government spending, but that the additional government revenue is dedicated to areas of government expenditure other than health spending.

The age dependency ratio variable shows a positive association with health expenditure in all but the LMIC model, which is statistically significant in the model with all countries and the UMIC. This suggests that the age structure of the population is a significant predictor of health spending as percentage of government expenditure when all countries or only UMIC countries are considered. It is not a significant predictor in LIC and LMIC, when controlling for all other variables in the model.

The time dummy variable coefficient is positive across all models capturing an upward trend. Compared to the other sets of models for health expenditure variables this trend is, while still statistically significant for the model with all countries as well as the UMIC model, smaller. This likely reflects the much slower pace of growth of health expenditure as percentage of general government expenditure compared to the other ways of measurement, which was also shown in chapter 7.

8.2.2 The Average Effect of IMF Agreements

This section builds on the previous analysis of modelling health expenditure and includes the IMF dummy variable and the Inverse Mills Ratio as additional determinants into the model. The reason for this is twofold. Firstly, it allows to assess how much additional variation of health expenditure the agreement dummy help to explain. Secondly, it allows to directly assess the impact of IMF agreements on government health expenditure. The model now takes the form of

$$HE_{it} = \alpha + \beta_1 HE_{it-1} + \beta_2 IMF_{it} + \beta_3 X_{it} + \beta_4 t + \beta_5 \lambda_{it} + \varepsilon_{it} \quad (8.2)$$

Where IMF_{it} is the IMF agreement dummy at time t in country i and λ_{it} is the Inverse Mills Ratio in country i at time t .¹⁰⁴

The section is organised in two parts. The first compares the explanatory power of the models with and without the IMF variables. The second part presents the effect of IMF agreements on government health expenditure.

¹⁰⁴ See Section 8.2.1, pg. 302 for an explanation of the other variables in the model.

8.2.2.1 Explanatory Power of the Models

This section comments on the effect the IMF variables have on the explanatory power of the models. To do so, it presents an interpretation of the models' coefficient of determination (R^2). The core assumption underlying this study is that IMF agreements impact on health expenditure in a country so that differences in expenditure can be found for times with and without agreement. This suggests that it would be expected that by adding the IMF variables into the model the within R^2 measure, which allows to assess the variation of health expenditure within a country over time, increases. It is shown that including IMF variables into the models does in general not seem to have a large effect on explained variation in government health expenditure; in some models explanatory power seems to decrease slightly. Table 8.7 provides, an overview of the R^2 value before and after entering the IMF dummy and Inverse Mills Ratio as well as the estimated difference between the two R^2 values.

Model with...	All	LIC	LMIC	UMIC
Panel A: HE/GDP				
no IMF dummy	0.559	0.524	0.518	0.406
IMF dummy	0.556	0.524	0.523	0.396
<i>difference</i>	<i>-0.003</i>	<i>0.000</i>	<i>+0.005</i>	<i>-0.01</i>
Panel B: HE/cap				
no IMF dummy	0.771	0.711	0.733	0.649
IMF dummy	0.770	0.713	0.735	0.649
<i>difference</i>	<i>-0.001</i>	<i>+0.002</i>	<i>+0.002</i>	<i>0.000</i>
Panel C: HE/GGE				
no IMF dummy	0.437	0.405	0.450	0.341
IMF dummy	0.452	0.433	0.453	0.344
<i>difference</i>	<i>+0.015</i>	<i>+0.028</i>	<i>+0.003</i>	<i>+0.003</i>

Table 8.7: Comparison of R^2 Values across Models

Data source: models presented in sections 8.2.1 and 8.2.2.2

Looking first at models of health expenditure as a percentage of GDP (Panel A in Table 8.7). Before adding the IMF variable, the model for all countries explains 55.9% of the variation within the countries over time, the explained variability differs between the individual country groups. The income group specific models explain between 40.6%, for UMIC, and 52.4%, for LIC, of the variation of health expenditure within the countries. When the IMF agreement dummy as well as the Inverse Mills Ratio are added into the model the explained variation changes only marginally and at

most by -1 percentage points, for UMIC. When the additional determinants are added into the models with all countries as well as the model with UMICs the within R^2 decreases by 0.3 and 1 percentage points, respectively. For LMIC the additional variables increase the explanatory power of within variation by 0.5 percentage points. This suggests that using the IMF agreement dummy variable as additional explanatory variable of government health expenditure does not increase the explained proportion of the model significantly. Put differently, this means that the explanatory power of health expenditure is not much increased when additionally including the IMF dummy. IMF agreements, therefore, do not have a large impact on explaining the observed variation of health expenditure within countries over time.

Looking at the models explaining per capita health expenditure (Panel B in Table 8.7), before adding the IMF dummy, it appears that the models explain more variation of spending within countries compared to HE/GDP. The model including all countries is capable of explaining 77.1% of the within county variation. The explanatory power varies slightly between the models for individual income groups, with most variation being explained in the LMIC model (73.3%) and least in the UMIC model (64.9%). When adding the IMF dummy and the Inverse Mills Ratio into the model, a picture similar to that observed for the health expenditure as percentage of GDP emerges, as the additional explanatory power of these variables is minor. The variables increase the explained within component of variation by 0.2 percentage points in LIC and LMIC. For UMIC the additional variables do not increase the explanatory power at all. Across all countries the explanatory power decreases by 0.1 percentage points. This means that when measuring health expenditure as per capita spending, IMF agreements do not make a large contribution to the explanatory power of the model. The impact of the IMF dummy on explaining variation in government health expenditure per capita is minor.

Looking at the models for health spending as percentage of general government expenditure (Panel C in Table 8.7) suggests that these models generally explain the least amount of within variation of the dependent variable. The model including all countries, explains 43.7% of the within country variation. The model for UMIC explains the least variation (34.1%) and the model for LMIC explains the most variation (45.0%). While the additional explanatory power of the IMF dummy is still

small, it seems to have by and large the largest impact for this health expenditure measure compared to other two measures of government health expenditure. When considering all countries, adding in the IMF dummy increases the explanatory power by 1.5 percentage points. Across the individual income group models, the largest increase is seen in LIC, where an additional 2.8 percentage points are explained by the variables and smallest in LMIC and UMIC where an additional 0.3 percentage points are explained.

Comparing across the different ways of measuring health expenditure it appears that while the additional explanatory power of the IMF variable is generally rather small, it is largest when measuring health expenditure as percentage of government expenditure. Comparing across the different models for income groups does not seem to provide conclusive results as the change in explanatory power does not seem to vary systematically between the different country groups.

While the comparison of R^2 estimates seems methodologically simple and does not allow for making statements about the significance of the changes observed, this approach offers an easy to understand comparison between the models that exclude and include the IMF dummy as determinant of health expenditure. It should therefore be seen as indicative result of the importance of IMF agreements as additional determinant. Alternative approaches, that would make it possible to draw conclusions about the significance of the changes, such as Likelihood Ratio tests cannot be used for this study, as the models are not solved using Maximum Likelihood procedures.

8.2.2.2 Interpretation of Agreement Dummy Coefficient

This section provides an interpretation of the coefficients of the IMF agreement variable. As outlined above, an IMF agreement is for this analysis modelled as a dummy, that is either on (1) or off (0). This means that the agreement dummy is considered to be an indicator of the exposure to the “treatment” of the IMF. The estimated coefficient therefore describes the difference in health expenditure between no agreement and agreement and presents the estimated effect of changes in (logged) government health expenditure that is seen to be attributed to the agreement, when controlling for all other variables in the model. Across all models it appears that

including the IMF dummy as well as the Inverse Mills Ratio¹⁰⁵, to account for selection bias, does not change the effect size of the other determinants of health expenditure, as presented in section 8.2.1, much and direction and significance of the variables remains the same. Focus of this section is therefore exclusively on the IMF coefficient.

Turning first to the models for health expenditure as percentage of GDP (Table 8.8) and looking at the model including all countries (Model (1)), the IMF dummy is estimated at 0.006 (SE: 0.011), which suggests that, when all countries are included in the analysis, there is a slight, but not statistically significant, increase in government health expenditure as percentage of GDP for countries with agreements compared to cases with no agreements. This suggests that overall, IMF agreements do not have a statistically significant impact on government health expenditure as percentage of GDP. Dividing the countries into subgroups based on their income, different effects can be observed.

	(1) All	(2) LIC	(3) LMIC	(4) UMIC
lagged DV	0.672*** (0.031)	0.638*** (0.041)	0.632*** (0.028)	0.522*** (0.065)
Agreement Dummy	0.006 (0.011)	0.047** (0.018)	-0.030* (0.014)	-0.012 (0.010)
GDP per capita (logged)	-0.100** (0.033)	-0.165* (0.074)	-0.112* (0.046)	-0.232** (0.068)
Government Revenue (% GDP)	0.002 (0.001)	0.001 (0.002)	0.002* (0.001)	0.002 (0.002)
Age Dependency Ratio	0.001 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.005* (0.003)
time	0.009*** (0.002)	0.014*** (0.003)	0.007*** (0.002)	0.013*** (0.003)
Inverse Mills Ratio	0.004 (0.011)	0.012 (0.020)	-0.012 (0.010)	-0.001 (0.012)
Constant	0.796*** (0.234)	0.941 (0.486)	1.238** (0.369)	2.062** (0.613)
Within R ²	0.556	0.524	0.523	0.396
N	1882	726	756	400
Countries	123	64	79	47

Table 8.8 Effects of IMF Agreements on Government Health Expenditure as Percentage of GDP

¹⁰⁵ Theory indicates that the effects of IMF agreements on government health expenditure are endogenous (see section 6.2; pg. 230). This was corrected for using a selection model. Given that the IMR is not statistically significant in the fitted model, this variable could be removed. The tables presented in Appendix to Chapter 8 suggest that removing this variable has no effect on the results.

Driscoll/Kraay standard errors in parentheses; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 8.1.3 (pg. 301); dependent variable logged HE/GDP

Inspecting the model for LIC (Model (2); Table 8.8) it appears that the effect of the Agreement Dummy variable is statistically significant and suggests an increase in health spending by 0.047 units (SE 0.018). Exponentiating the coefficient suggests that cases with agreements have a 4.8% higher level of government health spending compared to cases without agreements.

For model for LMIC (Model (3); Table 8.8) the Agreement Dummy shows a decrease in spending for agreement cases compared to non-agreement cases by -0.030 units (SE 0.014) that is statistically significant at the conventional $p = 0.05$ level. This suggests that for LMIC IMF agreements are associated with decreases in government health spending as percentage of GDP. Exponentiating the coefficient suggests that cases with agreements have a 2.9% lower level of government spending compared to cases without agreements.

Looking at UMIC model (Model (4); Table 8.8), the Agreement Dummy shows a slight decrease of government health spending as percentage of GDP by 0.012 units (SE 0.010), which is not statistically significant and suggests that for UMICs IMF agreements are associated with a small but not statistically significant decrease of government health spending as percentage of GDP.

Turning next to the models of government health expenditure per capita (Table 8.9), suggests a picture similar to that observed for the models of health expenditure as percentage of GDP variable outlined above. When considering all countries (Model (1) Table 8.9), the IMF dummy variable is associated with a slight but not statistically significant increase in government spending of 0.008 units (SE 0.013). Dividing the countries up along their income groups reveals differences between the income groups.

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.706*** (0.039)	0.727*** (0.053)	0.589*** (0.037)	0.491*** (0.053)
Agreement Dummy	0.008 (0.013)	0.060** (0.019)	-0.041** (0.016)	-0.026 (0.013)
GDP per capita (logged)	0.225*** (0.049)	0.125 (0.096)	0.308*** (0.052)	0.414*** (0.109)
Government Revenue (% GDP)	0.003 (0.002)	0.002 (0.002)	0.003** (0.001)	0.007 (0.004)
Age Dependency Ratio	0.002 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.006* (0.003)
time	0.009*** (0.003)	0.013** (0.005)	0.007*** (0.002)	0.011* (0.004)
Inverse Mills Ratio	-0.004 (0.011)	0.008 (0.020)	-0.017 (0.011)	-0.012 (0.013)
Constant	-0.611* (0.280)	-0.277 (0.492)	-0.341 (0.363)	-1.187 (0.775)
Within R ²	0.770	0.713	0.735	0.649
N	1892	736	756	400
Countries	123	64	79	47

Table 8.9 Effects of IMF Agreements on Government Health Expenditure as per Capita Spending Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 8.1.3 (pg. 301); dependent variable logged HE/cap

Looking at the model for LIC (Model (2) Table 8.9) reveals that the IMF Agreement Dummy is associated with a statistically significant increase in per capita government health spending. This suggests that cases with agreements are found to have spending levels that are statistically significantly higher than those cases with no agreements. Exponentiating the point estimate of 0.060 (SE 0.019) suggests an increase of 6.2% for IMF agreement cases compared to non-agreement cases. Taking the average spending of LICs of 30.05\$ PPP, estimated earlier (see Table 7.3; pg. 255), this translates into an increase of 1.86 \$PPP per capita for cases in agreements compared to those without agreements.

Inspecting the model for LMIC (Model (3) Table 8.9) shows that for this set of countries IMF agreements have a negative effect on per capita government health expenditure as the point estimate of the agreement dummy equals to -0.041 (SE 0.016). For this group of countries, IMF agreements are associated with a decrease of 4% for IMF agreement cases compared to non-agreement cases. Taking the average spending of LMIC of 147.99 \$ PPP, estimated earlier (see Table 7.3; pg. 255), this translates

into a decrease of 5.92 \$PPP per capita for cases in agreements compared to those without agreements.

Looking at the model for UMIC (Model (4) Table 8.9) reveals a small negative but not statistically significant association of the agreement variable with the per capita spending variable. This suggests that for this group of countries agreements do not have a statistically significant impact on the levels of per capita government health expenditure.

Turning lastly to models of government health expenditure as percentage of general government expenditure (Table 8.10), a picture emerges that is mostly, but not entirely, comparable to the results presented for the previous two dependent variables. Looking first at the model including all countries (Model (1) Table 8.10), suggests a slight positive but not statistically significant increase in government spending as percentage of general government expenditure.

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.660*** (0.046)	0.633*** (0.064)	0.643*** (0.035)	0.539*** (0.061)
Agreement Dummy	0.011 (0.012)	0.049* (0.021)	-0.025 (0.015)	-0.022 (0.024)
GDP per capita (logged)	-0.077 (0.048)	-0.126 (0.111)	-0.021 (0.043)	-0.213** (0.070)
Government Revenue (% GDP)	-0.002 (0.001)	-0.001 (0.001)	-0.004** (0.001)	-0.001 (0.002)
Age Dependency Ratio	0.002* (0.001)	0.003 (0.003)	-0.000 (0.001)	0.005 (0.003)
time	0.007*** (0.002)	0.009* (0.004)	0.003 (0.002)	0.013*** (0.003)
Inverse Mills Ratio	-0.002 (0.013)	-0.006 (0.027)	-0.007 (0.012)	0.002 (0.021)
Constant	1.120** (0.393)	1.257 (0.666)	1.080*** (0.315)	2.544*** (0.662)
Within R ²	0.452	0.433	0.453	0.344
N	1893	736	757	400
Countries	123	64	79	47

Table 8.10 Effects of IMF Agreements on Government Health Expenditure as Percentage of Government Spending

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 8.1.3 (pg. 301); dependent variable logged HE/GGE

Dividing the countries by their income groups reveals a statistically significant increase in government health spending of 0.049 units (SE 0.021) for LICs. This

suggests that for this group of countries IMF agreements are associated with a 5.0% increase in government spending on health as a percentage of general government expenditure, compared to countries of the same income group without agreements.

The model for LMIC estimates a slight negative but not statistically significant effect of the IMF Agreement dummy with a point estimate of -0.025 units (SE 0.015). This suggests that countries in agreements have a slightly, but not statistically significantly lower level of government health spending measured as percentage of general government spending compared to those countries without agreements, when controlling for all other variables.

The model for UMIC also estimates a slight negative but not statistically significant effect for the IMF agreement dummy with a point estimated of -0.022 units (SE 0.024). This means that for UMIC agreements do on average not have a statistically significant effect on government health spending as measured as percentage of general government spending.

8.3 Conclusions

This chapter set out to identify the average effect of IMF agreements on health expenditure by modelling health expenditure as a function of its determinants and the IMF agreement dummy using the Fixed Effects estimator when accounting for endogeneity of agreements with a Heckman-style selection model. The presentation was divided into two main parts.

The first part outlined the process of fitting the selection equation and presented the results. A number of different models with various independent variables and lag structures were fitted. Including more lags of the independent variables did in general have a small positive effect on classification results but meant further reductions in the number of included cases. It was found that a variable definition that is commonly used in the IMF and health expenditure literature provides the best classification results for this study. A parsimonious version, including only statistically significant variables of this established model, was estimated. It was shown that this provides classification results similar to the established model, but increases the number of cases in the model.

Overall, the model is capable of classifying 81.45% of all case-years correctly into IMF and non-IMF case-years.

The second part of the chapter identified the average effect of IMF agreements on government health expenditure measured as percentage of GDP, per capita spending and as percentage of government expenditure. Inspecting the coefficient of the IMF agreement variable suggests that by and large similar results are obtained for all three measures of government health expenditure. Two main conclusions can be drawn from the results.

Firstly, treating IMF variables as additional determinant of health expenditure has very little impact on the ability of the model to explain variation in health expenditure within countries and across time. This suggests that IMF agreements do not appear to have a major influence in determining levels of health expenditure. It seems particularly noteworthy that including agreements as an additional explanatory variable into the model does generally not seem to have a big effect on the explained variation of expenditure levels within countries. This finding holds for both bivariate (compare Chapter 7; pg. 249) and multivariate relationships between IMF agreements and expenditure. This is somewhat surprising given that it was assumed that IMF agreements are a determinant of government health expenditure and thus help explain variation of health expenditure within a country over time.

Secondly, on average and across all countries IMF agreements do not have a statistically significant effect on government health expenditure. However, the results suggest that the effects vary with income groups. For LIC a statistically significant positive association between agreements and government health expenditure is found. This suggests that for this set of countries government health expenditure is statistically significantly higher during times of agreements compared to times without agreements. For LMIC a statistically significant negative association between agreements and government health expenditure is reported for the as percentage of GDP and per capita health expenditure variables. This suggests that for this set of countries health expenditure levels are statistically significantly lower during times of agreements compared to times without agreements. For UMIC, the results show a slight negative but not statistically significant relationship between agreements and

expenditure levels. This suggests that for this set of countries IMF agreements do not have a statistically significant effect on government health expenditure levels and the differences in spending levels during times of agreements and those without agreements are not statistically significantly different.

It is worth noting that the effect in LMIC and UMIC is somewhat counter-intuitive as the former group of countries experience statistically significantly negative effects from IMF agreements while the latter group does not. When combining both income groups into a common lower-middle and upper-middle income countries (LUMIC) group the effect is statistically significantly negative for HE/GDP and HE/CAP with an effect size similar to that of LMIC (see Appendix to Chapter 8). Taking these results together suggests that combining LMIC and UMIC into one group would obscure the potential differences between the income groups.

Comparing the results across the different country specifications suggests that averaging the results across all countries might gloss over differences in experiences between countries as the effects of IMF agreements on health expenditure are different for each of the country income groups. This means that the effects of IMF agreements on government health expenditure are likely not the same across all countries, but might vary between them. While the analyses so far suggest that income groupings are associated with different effects on health expenditure, it seems somewhat unlikely that a country's income level itself is causally associated with the estimated effect. It is more likely that the income grouping should rather be treated as a proxy for other underlying factors. While a number of explanations can be considered, one possibility is that the nature of IMF conditionalities agreed as part of loans differs between these different country groups. This will be explored further in the next chapter.

Appendix to Chapter 8

Appendix Table 8.1: Selection equation Results of Probit Regression for Selection Equation, comparing Stripped Model and Stripped model with no lag of IMF dummy

	(1) Stripped Model	(2) Stripped Model no L.IMF
Indicator of agreement in previous year	5.350*** (0.000)	
GDP per capita growth (lagged)	0.991 (0.120)	0.996 (0.451)
per capita GDP	1.000*** (0.000)	1.000*** (0.000)
Observations	2199	2199
McFadden R ²	0.299	0.037
AIC	2046.4	2803.0
BIC	2069.1	2820.1
p of Likelihood Ratio Test	0.000	0.000
% correctly classified	81.45	55.75

Exponentiated Coefficients with p-values in parentheses;

* p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7

Appendix Table 8.2: Effects of IMF Agreements on Government Health Expenditure as Percentage of GDP

	(1) All	(2) LIC	(3) LMIC	(4) UMIC
lagged DV	0.665*** (0.031)	0.635*** (0.040)	0.627*** (0.030)	0.484*** (0.068)
Agreement Dummy	0.005 (0.010)	0.043* (0.016)	-0.028* (0.012)	-0.013 (0.011)
GDP per capita (logged)	-0.047 (0.040)	-0.134 (0.076)	-0.025 (0.101)	0.071 (0.179)
Government Revenue (% GDP)	0.002 (0.001)	0.001 (0.002)	0.002* (0.001)	0.003* (0.001)
Age Dependency Ratio	0.001 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.007* (0.003)
time	0.010*** (0.002)	0.014*** (0.003)	0.007*** (0.002)	0.020*** (0.004)
Inverse Mills Ratio	-0.166** (0.054)	-0.283 (0.540)	-0.284 (0.262)	-0.417* (0.206)
Constant	0.588* (0.244)	1.021 (0.546)	0.864 (0.538)	-0.101 (1.400)
Within R ²	0.558	0.524	0.524	0.410
N	1882	726	756	400
Countries	123	64	79	47

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7; dependent variable logged HE/GDP

Appendix Table 8.3: Effects of IMF Agreements on Government Health Expenditure as Spending per Capita

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.702*** (0.038)	0.725*** (0.051)	0.585*** (0.039)	0.436*** (0.050)
Agreement Dummy	0.010 (0.011)	0.057** (0.018)	-0.037** (0.014)	-0.022 (0.014)
GDP per capita (logged)	0.267*** (0.057)	0.083 (0.099)	0.406** (0.135)	0.958*** (0.154)
Government Revenue (% GDP)	0.003 (0.002)	0.001 (0.003)	0.003* (0.001)	0.007* (0.003)
Age Dependency Ratio	0.002 (0.001)	0.003 (0.003)	-0.002 (0.001)	0.008* (0.003)
time	0.010*** (0.003)	0.013** (0.005)	0.008*** (0.002)	0.022*** (0.005)
Inverse Mills Ratio	-0.131 (0.068)	0.539 (0.438)	-0.312 (0.328)	-0.700*** (0.163)
Constant	-0.771** (0.292)	-0.500 (0.533)	-0.756 (0.584)	-4.880*** (1.154)
Within R ²	0.770	0.713	0.736	0.668
N	1892	736	756	400
Countries	123	64	79	47

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7; dependent variable logged HE/Cap

Appendix Table 8.4: Effects of IMF Agreements on Government Health Expenditure as Percentage of General Government Expenditure

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.661*** (0.047)	0.634*** (0.063)	0.643*** (0.035)	0.539*** (0.064)
Agreement Dummy	0.012 (0.011)	0.051* (0.020)	-0.022 (0.012)	-0.022 (0.020)
GDP per capita (logged)	-0.086 (0.050)	-0.154 (0.110)	-0.035 (0.080)	0.118 (0.154)
Government Revenue (% GDP)	-0.002 (0.001)	-0.001 (0.002)	-0.004** (0.001)	-0.001 (0.002)
Age Dependency Ratio	0.002* (0.001)	0.003 (0.003)	-0.000 (0.001)	0.006* (0.003)
time	0.007*** (0.002)	0.009* (0.004)	0.003 (0.002)	0.019*** (0.004)
Inverse Mills Ratio	0.025 (0.056)	0.277 (0.583)	0.028 (0.179)	-0.439* (0.174)
Constant	1.155** (0.389)	1.163 (0.757)	1.142* (0.463)	0.150 (1.172)
Within R ²	0.452	0.434	0.452	0.359
N	1893	736	757	400
Countries	123	64	79	47

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7; dependent variable logged HE/GGE

Appendix Table 8.5: Effects of IMF Agreements on Government Health Expenditure as Percentage of GDP, not correcting for endogeneity

	(1) All	(2) LIC	(3) LMIC	(4) UMIC
lagged DV	0.674*** (0.031)	0.639*** (0.040)	0.631*** (0.029)	0.520*** (0.064)
Agreement Dummy	0.006 (0.010)	0.045** (0.016)	-0.026* (0.012)	-0.012 (0.011)
GDP per capita (logged)	-0.095** (0.033)	-0.152* (0.075)	-0.110* (0.047)	-0.247** (0.072)
Government Revenue (% GDP)	0.002 (0.001)	0.001 (0.002)	0.002* (0.001)	0.004* (0.002)
Age Dependency Ratio	0.001 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.005 (0.002)
time	0.009*** (0.002)	0.013*** (0.003)	0.006*** (0.002)	0.013*** (0.003)
Constant	0.779** (0.237)	0.863 (0.495)	1.255*** (0.362)	2.172** (0.642)
Within R ²	0.559	0.529	0.521	0.407
N	1893	731	760	402
Countries	124	64	80	47

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7; dependent variable logged HE/GDP

Appendix Table 8.6: Effects of IMF Agreements on Government Health Expenditure per Capita Spending, not correcting for endogeneity

	(1) All	(2) LIC	(3) LMIC	(4) UMIC
lagged DV	0.708*** (0.038)	0.727*** (0.050)	0.586*** (0.037)	0.489*** (0.053)
Agreement Dummy	0.011 (0.011)	0.058** (0.017)	-0.035* (0.014)	-0.019 (0.013)
GDP per capita (logged)	0.225*** (0.048)	0.132 (0.094)	0.309*** (0.054)	0.408*** (0.113)
Government Revenue (% GDP)	0.003 (0.002)	0.001 (0.003)	0.003* (0.001)	0.006 (0.003)
Age Dependency Ratio	0.002 (0.001)	0.002 (0.003)	-0.002 (0.001)	0.005* (0.003)
time	0.009** (0.003)	0.013** (0.005)	0.006** (0.002)	0.011* (0.004)
Constant	-0.606* (0.281)	-0.316 (0.495)	-0.312 (0.363)	-1.131 (0.802)
Within R ²	0.771	0.715	0.736	0.650
N	1903	741	760	402
Countries	124	64	80	47

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7; dependent variable logged HE/cap

Appendix Table 8.7: Effects of IMF Agreements on Government Health Expenditure as Percentage of General Government Expenditure, not correcting for endogeneity

	(1)	(2)	(3)	(4)
	All	LIC	LMIC	UMIC
lagged DV	0.644*** (0.056)	0.607*** (0.077)	0.643*** (0.035)	0.540*** (0.062)
Agreement Dummy	0.017 (0.011)	0.061** (0.021)	-0.022 (0.012)	-0.022 (0.020)
GDP per capita (logged)	-0.069 (0.048)	-0.097 (0.113)	-0.022 (0.042)	-0.208** (0.066)
Government Revenue (% GDP)	-0.001 (0.001)	-0.001 (0.001)	-0.004** (0.001)	-0.002 (0.002)
Age Dependency Ratio	0.003* (0.001)	0.004 (0.002)	-0.000 (0.001)	0.005 (0.003)
time	0.008*** (0.002)	0.010* (0.005)	0.003 (0.002)	0.013*** (0.002)
Constant	1.072** (0.399)	1.037 (0.674)	1.093*** (0.315)	2.506*** (0.628)
Within R ²	0.437	0.413	0.452	0.344
N	1904	741	761	402
	124	64	80	47

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7; dependent variable logged HE/GGE

9

The Effects of Agreements on Government Health Expenditure by Agreement Cluster

Chapter 8 modelled the average effect of IMF agreements on government health expenditure using a dummy variable that is either “on” or “off”. The analysis is based on the assumption that all agreements are comparable and have similar effects. While this approach, as outlined in chapter 2, is in line with the latest literature in the field, in particular Clements et al (2013) and Kentikelenis et al (2015b), it can be seen as an oversimplification. As was outlined in detail in section 1.2.4 (pg. 15), the IMF has developed a number of different lending facilities that are used in different situations and that differ in their objectives, the conditionalities and emphasis on social protection attached to the loan agreements. While conditionalities are set individually in each agreement and are likely to vary between them, it was demonstrated that three general clusters of lending facilities can be identified along the dimensions of extent of conditionality and attention to social protection (section 1.2.4.3; pg. 21). These are: (i) social protection agreements, which have a special focus on poverty reduction and social protection. Facilities in this cluster include the Standby Credit Facility (SCF)

and the Extended Credit Facility and the Poverty Reduction and Growth Trust (ECF/PRGF); (ii) agreements that do not have this explicit emphasis on social protection but do contain conditionality elements (the Extended Fund Facility (EFF) and the Standby Agreement (SBA) are included in this cluster) and (iii) agreements that are employed in specific or emergency situation and come with very little or no conditionality, including lending through the Rapid Credit Facility (RCF), Exogenous Shock Facility (ESF), Flexible Credit Line (FCL), Rapid Financing Instrument (RFI) and Precautionary and Liquidity Line (PLL).

It was suggested in chapter 1 that these differences in the way agreements consider poverty reduction and the extent of conditionality attached to agreements may have an influence on the effects that IMF agreements have on government health spending. It was suggested that social protection agreements may have a positive effect on government health spending, SBA/EFF agreements have a negative effect, and emergency agreements have no effect (section 1.2.4.4; pg. 23). This chapter explores empirically if agreements in different clusters have indeed different effects on government health expenditure. In doing so, the analysis goes beyond the current literature in the field.

Focus of the analyses is thereby on the two main agreement clusters, social protection agreements and SBA/EFF agreements. Agreements in the emergency cluster are excluded for two reasons. Firstly, emergency agreements are a fairly new addition to the IMF's range of facilities and are only used in 16 case-years during the observation period. Secondly, theory (section 1.2.3; pg. 13) suggests that agreements will impact on health expenditure through the conditionality and policy prescriptions attached to the agreements. Emergency agreements come with only little or no conditionality at all and are not considered full-blown IMF programmes (see section 1.2.3; pg. 13). Therefore, it is expected that these agreements would have no effect on government health expenditure (section 1.2.4.4; pg. 23).

The analysis builds on the existing methodology outlined in chapter 6 and applied in chapter 8. It does however, model agreements of each agreement cluster separately. An agreement cluster is considered to be "on" when a case-year is under an agreement of this type. It is "off", when the case-year is not in an agreement. To

avoid confounding with other agreement clusters, case years are set to missing when they are in other agreement types. Table 9.1 shows the frequencies of case-years by agreement clusters.

	Social Protection Agreements	Structural Agreements
on	547	265
off	1,458	1,458
other agreement	281	563
Total	2,286	2,286
Included in model	2,005	1,723

Table 9.1: Frequencies of case-years by Agreement Clusters

When estimating effects for each of the different agreement clusters, the issue of selection needs to be addressed again. To account for this, a separate selection equation is fitted for each cluster.

This chapter is structured into four parts. The first part discusses the issue of selection in light of different agreement clusters and refits the selection models for the two agreement clusters. A number of different models are fitted to identify the best specification of the selection equation for each agreement cluster. The results suggest that a stripped version of the established model, also fitted in chapter 8, provides the best results for both agreement clusters.

Part two presents the results of the analysis of effects of each of the agreement clusters on government health expenditure. Models are fitted for each of the three indicators of government health expenditure (spending as percentage of GDP (HE/GDP), spending per capita (HE/cap), and spending as percentage of GGE (HE/GGE); section 5.1.2; pg. 179). The results of this analysis suggest that social protection agreements have positive effects on government health expenditure. SBA/EFF agreements have negative effects on government health expenditure.

Comparing these results with those obtained in the previous chapter leaves unclear whether agreement clusters or income group are the factor driving the observed differences. Part three of this chapter explores this further by estimating the results of each agreement cluster separately for each income group. The results suggest that social protection agreements do only maintain their statistically significant positive effect in low-income countries (LIC) but not in the other income groupings. The

negative effect of SBA/EFF agreements is only found in lower-middle-income countries (LMIC) but not in the other income groupings.

The last part concludes the chapter. It is argued that while differences in the agreement clusters appear to be important they do not explain all of the variation in the effects. Factors associated with the income grouping seem to be important as well.

9.1 Refitting the Selection Model

It has previously been argued that the IMF variable is endogenous (chapter 6). For this study a Heckman-style selection model was identified as the best approach to deal with this challenge. Chapter 8 fitted a selection equation to the sample of all data points in the study to account for selection effects between countries with and without agreements. Because different agreement types are used in different situations, the selection effects might vary between the agreement types. This is because different agreements are not only associated with different conditionalities but are also used in different situations. For instance, SBA/EFF agreements are used in situations where the IMF believes that the organisation of a country's economy requires adjustment to regain stability and growth. Emergency agreements on the other hand are used in rather different situations, where this unbalance is not present. This suggests that a selection model common to all agreement types might not be able to account for the differences between agreement and non-agreement conditions in each of the situations. To address this issue, a selection model will be fitted for each of the agreement clusters, before effects on government health expenditure are estimated for each cluster.

Similar to chapter 8, the best specification of the selection equation cannot be identified through theory but needs to be found in an empirical way. This section will therefore build on the approach followed in the previous chapter and fit a number of different models with varying variable definition and lag structures. The estimated models include the following definitions (Table 8.1 provides an overview of the models).

A fully fitted model with lag structure will be estimated, which includes all the variables that are available and relevant for this study. This is based on the reasoning that the best predictions and thus classification results can be obtained when the most

amount of data is available to perform the classification. Another set of models will be fitted, which follow the IMF's mission statement and include variables measuring Balance of Payments position, international reserves as well as economic growth. In line with the literature on determinants of IMF agreements which argues that economic variables are important determinants, a set of models with all economic variables will be estimated. This set of models therefore includes the variables of GDP per capita, GDP per capita growth, reserves, debt stock, debt service, current account balance, inflation, government balance and change in the exchange rate. Finally, the model that has been established in the IMF and health literature will be fitted ("Established Model"), which includes a number of variables that capture both the country's economic performance, political circumstances as well as the previous involvement with the Fund. Similar to the previous chapter, this model will be used as "benchmark" model to which the other models' results will be compared. In the previous chapter it was argued that a stripped version of this Established Model provides the best model choice for classifying agreements as it offers a large number of additional cases and only reduces classification results marginally. This Stripped Model is fitted as additional set of models.

The following two sections present and discuss the key results of the fitted models, first for social protection agreements (section 9.1.1) and then for SBA/EFF agreements (section 9.1.2), which are used to identify the best specification of the selection model for each of the agreement clusters. Similar to the previous chapter, judgement about goodness of the individual model will be based on the percentage of correctly classified cases and the number of cases retained in the model. Accordingly, only the number of cases in the model and the percentage of correct classification for each of the models and their lag structure are presented in Table 9.2 and Table 9.3. Results of the Established Model are shown at the bottom of each table as benchmark. To make the table more accessible, colour gradients are used, which show, similar to the previous chapter, a dark green colour for desired outcomes of high percentage of correct classification and large number of observation.

9.1.1 Fitting the Selection Model for Social Protection Agreements

This section presents the key statistics of individual models for the social protection agreements cluster and discusses the results of each model and their lag structure in order to derive the best model for this study. Table 9.2 summarizes the models’ key findings.

		Social Protection					
		lags (0/5)	lags (0/4)	lags (0/3)	lags (0/2)	lags (0/1)	lags (0/0)
Fully Loaded Model	n	1158	1223	1283	1344	1401	1462
	%	86.70	86.26	86.20	85.34	85.01	83.93
BCA, Reserves and Growth	n	1664	1691	1716	1737	1753	1767
	%	62.20	60.14	59.27	56.82	53.57	50.37
Economic Variables	n	1158	1223	1283	1344	1401	1462
	%	76.17	75.72	75.84	73.96	72.38	71.55
Established Model	n	1334	1423	1495	1560	1624	1686
	%	86.43	86.30	86.35	85.83	85.41	84.70
Established Stripped	n	1833	1855	1878	1893	1907	1920
	%	70.43	72.40	71.67	70.73	76.56	84.79
Established Model	n	1686					
	%	84.70					

Table 9.2: Key Statistics of Selection Equation Models for Social Protection Agreements based on Probit Regression Model
 n Number of cases in the model; % percentage of cases correctly classified; data source: Table 5.17 (pg. 205)

Looking first at the **Fully Loaded Model**, the results suggest that the best classification results are obtained when the model is fitted with a five-lag structure, as it is capable of classifying 86.70% of all cases correctly. While this would offer a classification results that is superior to that of the Established Model (84.70%), the model includes 528 cases less than the Established Model. This reduction in cases in the model does not seem to justify the small increases in classification. Reducing the lag structure increases the number of cases retained but simultaneously decreases the classification results in a way that the zero-lag model includes the largest number of cases of this model specification with the lowest number of correctly classified cases. Taken these results together, the Fully Loaded Model does not seem superior to the Established Model and should therefore not be used for this study.

Turning next to the model with **key economic variables** shows, compared to the Fully Loaded Model, good results in terms of the number of cases included in the models (between 1664 for the five-lag model to 1767 for the zero lag model). However, classification results are fairly poor, as they range between 50.37% and 62.20%. Choosing any of the models in this category over the Established Model would mean to accept a reduction in classification by over 20 percentage points for no large improvement in additional cases. So that this model specification should not be considered for this study.

Looking at the **Economic Variables Model**, the results suggest that the number of cases in each of the models is similar to those of the Fully Loaded Model. The classification results are however between 10 and 12 percentage points lower than those obtained from the Fully Loaded Model. This means that the Economic Variables models are inferior to the Established Model and should not be considered for this analysis.

The **Established Model** was additionally fitted with varying lag structure. The results suggest that an increase in the included lags leads to an increase in classification from 84.70% to 86.43% but at the same time reduces the number of cases included in the models from 1686 to 1334. This means that when choosing the model with five lags, an additional 1.7 percentage points in classification would need to be traded off by a reduction of 352 cases. Given the generally fairly small number of cases available this does not seem to be a reasonable trade-off for this study.

As last set of models the **Stripped Version** of the Established Model, as presented in chapter 8, was fitted. The results show that similar to the previous chapter, the classification results of the zero lag model are comparable to the Established Model, but includes an additional 234 cases. This means that the Stripped Version is considered superior to the Established Model.

Comparing across all models suggests that the stripped version of the Established Model is superior to the Established Model and would offer the best results for this study. In the previous chapter this stripped version of the Established Model was estimated as a model that only contains those variables of the Established Model that are statistically significant. Given that for this chapter the interest is no longer in

predicting all agreements but only the social protection agreements the sample has changed and it is possible that the significance of individual variables has changed as well. Table 9.3 compares the coefficients and their significance between the Established Model and the Stripped Model¹⁰⁶. It appears that for social protection agreements GDP growth is no longer a statistically significant variable, while Current Account Balance and General Government Balance are statistically significant predictor of social protection agreements (Model (1)). The Stripped Model therefore has no longer the value of being a stripped version of the Established Model containing only statistically significant variables (Model (2)). A new stripped model was estimated containing only the statistically significant variables of the Established Model fitted to the sample of social protection agreements (Model (3)).

	(1) Established Model	(2) Stripped Model, All Agreements	(3) Stripped Model, Social Protection
Indicator of agreement in previous year	5.205*** (0.000)	5.239*** (0.000)	5.318*** (0.000)
GDP per capita growth (lagged)	1.008 (0.381)	1.014 (0.078)	
Current account balance (lagged)	0.983*** (0.001)		0.982*** (0.000)
Democracy Indicator	1.022 (0.205)		
per capita GDP	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)
General government balance (lagged)	1.025** (0.008)		1.025** (0.005)
Observations	1686	1920	1718
McFadden R^2	0.431	0.418	0.436
AIC	1123.4	1337.2	1124.9
BIC	1161.4	1359.5	1152.1
p of Likelihood Tests	0.000	0.000	0.000
% of correctly classified	84.70	84.79	85.33

Table 9.3: Results of Probit Regression for Selection Equation of Social Protection Agreements. Exponentiated Coefficients with p-values in parentheses; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; data source: Table 5.17 (pg. 205)

The results of this stripped version suggest that this model's classification capabilities (85.33%) are superior to those of both the Established Model (84.70%) and the stripped model definition for all agreements (84.79%). However, this model reduces the number of cases in the model by 202 compared to the original Stripped

¹⁰⁶ Both models are considered with the 0 lag structure.

Version. These results would suggest to use the Stripped Model (Model (2)) to create the Inverse Mills Ratio to account for selection bias in the models for social protection agreements.

9.1.2 Fitting the Selection Model for SBA/EFF Agreements

This section presents the key results of the different sets of models and their lag structures for the cluster of SBA/EFF agreements. Table 9.4 shows the number of cases in each model and the classification results. The following paragraphs discuss the results of each model and the lag structure in order to identify the best.

		SBA/EFF Agreement					
		lags	lags	lags	lags	lags	lags
		(0/5)	(0/4)	(0/3)	(0/2)	(0/1)	(0/0)
Fully Loaded Model	n	977	1034	1086	1135	1179	1229
	%	82.50	81.24	80.57	80.26	77.69	78.03
BCA, Reserves and Growth	n	1388	1415	1437	1456	1468	1480
	%	50.79	49.82	49.83	49.18	47.34	44.86
Economic Variables	n	977	1034	1086	1135	1179	1229
	%	72.26	69.83	65.56	64.58	63.61	60.70
IMF Variables	n	1723	1723	1723	1723	1723	1723
	%	82.47	82.41	82.41	82.41	82.41	82.82
Established Model	n	1144	1225	1289	1347	1403	1453
	%	82.87	81.47	81.38	81.22	80.97	81.14
Established Stripped Main	n	1544	1571	1600	1614	1629	1641
	%	61.79	60.03	60.94	63.01	67.89	79.59
Established Model	n	1453					
	%	81.14					

Table 9.4: Key Statistics of Selection Equation Models for SBA/EFF Agreements based on Probit Regression Model
(n Number of cases in the model; % percentage of cases correctly classified; data source: Table 5.17 (pg. 205))

Inspecting the results of the **Fully Loaded Model**, suggests that the best classification results are obtained when the model is fitted with a five-lag structure, as it is capable of classifying 82.50% of all cases correctly. This offers a classification results that is superior to that of the Established Model (81.14%), however there are 476 less cases in the model, compared to the Established Model. This reduction in cases in the model does not seem to justify the small increases in classification. Reducing the lag structure increases the number of cases but simultaneously decreases

the classification results in a way that the zero-lag model includes the largest number of cases but also the lowest number of correctly classified cases. When considering both dimensions simultaneously, the Established Model is superior to all specifications of the Fully Loaded Model, so that this model should not be used.

Turning next to the model with **key economic variables** shows good results in terms of the number of cases included in the models from between 1388 for the five-lag model to 1480 for the zero lag model. However, classification results are fairly poor, as they range from between 44.86% and 50.79%. Choosing any of the models in this category over the Established Model would suggest to accept a reduction in classification by over 30 percentage points for no real addition in cases. Therefore these models should not be considered.

Looking at the **Economic Variables Model**, the results suggest that the number of cases in each of the models is comparable to those of the Fully Loaded Model. The classification results are however between 10 and 17 percentage points lower than those obtained from the Fully Loaded Model. This means that the Economic Variables models are inferior to the Established Model and should not be considered for this analysis.

The Established Model was additionally fitted with varying lag structure. The results suggest that an increase in the included lags leads to an increase in classification from 81.14% to 82.87% but at the same time reduces the number of cases included in the models from 1453 to 1144. This means that when choosing the model with five lags, an additional 1.3 percentage points in classification would need to be traded off by a reduction of 309 cases. Given the generally small number of cases available this does not seem to be a reasonable trade-off for this study.

As last set of models the stripped version of the Established Model, as presented in the previous chapter, was fitted. The results show that, counter to the two other sample definitions, the stripped model performs slightly worse in terms of classification results (79.59% compared to 81.14%) but includes an additional 188 cases in the models.

Comparing across all models suggests that the stripped version of the Established Model can be seen as superior to the Established Model as it provides just

slightly worse classification results but includes considerably more cases. As was outlined in the previous section, the variable definition of the stripped model is based on the statistical significance of the Established Model for all agreements. Statistical significance of the variables might have changed with the change in sample. Table 9.5 compares the coefficients and their significance between the Established Model (Model (1)) and the Stripped Model (Model (2)). It appears that for SBA/EFF agreements, democracy is an additional statistically significant predictor (Model (1)). The Stripped Model therefore has no longer the value of being a stripped version of the Established Model containing only statistically significant variables (Model (2)). A new stripped model was estimated containing only the statistically significant variables of the Established Model fitted to the sample of SBA/EFF agreements (Model (3)).

	(1) Established Model	(2) Stripped Model, all agreements	(3) Stripped Model, SBA/EFF
Indicator of agreement in previous year	4.657*** (0.000)	4.429*** (0.000)	4.363*** (0.000)
GDP per capita growth (lagged)	0.973** (0.003)	0.977*** (0.001)	0.975*** (0.000)
Current account balance (lagged)	1.010 (0.068)		
Democracy Indicator	1.075*** (0.000)		1.043** (0.009)
per capita GDP	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)
General government balance (lagged)	0.994 (0.554)		
Observations	1453	1641	1635
McFadden R^2	0.273	0.241	0.245
<i>AIC</i>	896.4	1104.0	1086.4
<i>BIC</i>	933.4	1125.6	1113.4
p of Likelihood Tests	0.000	0.000	0.000
% of correctly classified	81.14	79.59	79.82

Table 9.5: Results of Probit Regression for Selection Equation of SBA/EFF Agreements. Exponentiated Coefficients with p-values in parentheses (* p<0.05; ** p<0.01; *** p<0.001; data source: Table 5.17 (pg. 205)

The results of this stripped version suggest that this model's classification capabilities (79.82%) are superior to those of the stripped model definition for all agreements (79.59%) but inferior to the Established Model (81.14%). The new stripped version includes 6 cases less than the stripped version for all agreements but 188 more than the Established Model. Given the larger number of cases included in

the stripped versions, the Established Model seems inferior to the stripped versions. The difference between both stripped versions seems minor both in terms of cases and classification results. Given that all other models are based on the stripped version for all agreements (Model (2)), this model shall also be used to create the Inverse Mills Ratios for SBA/EFF agreements, as this allows for comparability between the models.

9.1.3 Summary of the Selection Models

This section set out to identify the best specification of the selection model for social protection and SBA/EFF agreements. Similar to the previous chapter such a decision was made along two dimensions, the definition of variables and their lag structure. A number of different model specifications were estimated and their results compared. While the classification results differ slightly between the agreement types, it was shown that a stripped version of the Established Model with no additional lag structure offers the best results for both of the agreement types without losing a large number of cases. Comparing the models' classification results suggests that the model is slightly more capable of correctly classifying social protection agreements compared to SBA/EFF agreements. However, the differences are small and even for SBA/EFF agreements good enough to trust that models are capable of accounting for endogeneity.

9.2 Assessing the Effects of Different Agreement Clusters

Having fitted the selection models, this section estimates the effects of IMF agreements on government health expenditure for the two main agreement clusters in separate models and for each of the three ways to measure government health expenditure (health expenditure as percentage of GDP (HE/GDP), health expenditure per capita (HE/cap) and health expenditure as percentage of government expenditure (HE/GGE)). The presentation of the results¹⁰⁷ is structured into three sections. The first section presents the results of regression models for the social protection agreements.

¹⁰⁷ Focus of these sections is on the respective agreement dummies; the results of the other covariates are comparable to those found in the analysis for all agreements (section 8.2.1; pg. 302).

The second section presents the regression results for SBA/EFF agreements. Section three summarises the findings.

9.2.1 Assessing the Effects of Social Protection Agreements

This section sets out to assess the effects of IMF agreements with social protection components on government health expenditure. To do so, it compares government health expenditure during times of social protection agreements with those with no agreements (reference category). Results are shown in Table 9.6.

	(1)	(2)	(3)
	HE/GDP	HE/CAP	HE/GGE
lagged DV	0.669*** (0.036)	0.714*** (0.040)	0.656*** (0.049)
Social Protection Agreement	0.024 (0.014)	0.038* (0.015)	0.040* (0.016)
GDP per capita (logged)	-0.108** (0.036)	0.217*** (0.059)	-0.075 (0.061)
Government Revenue (% GDP)	0.002 (0.001)	0.003 (0.002)	-0.001 (0.001)
Age Dependency Ratio	0.001 (0.001)	0.002 (0.001)	0.002* (0.001)
time	0.010*** (0.002)	0.009** (0.003)	0.007** (0.002)
Inverse Mills Ratio	-0.001 (0.011)	-0.001 (0.011)	-0.001 (0.013)
Constant	0.847** (0.252)	-0.612 (0.353)	1.085* (0.484)
Within R ²	0.559	0.768	0.453
N	1648	1658	1658
Countries	123	123	123

Table 9.6: Effects of Social Protection Agreements on Government Health Expenditure
 Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334); dependent variables logged

Looking first at the model for health expenditure as percentage of GDP (Model (1) in Table 9.6), the results show that social protection agreements are associated with a slight, but not statistically significant increase in government spending of 0.024 units (SE 0.014). This suggests that countries in social protection agreements, that are otherwise comparable to non-agreement countries, see slightly, but not statistically

significantly, higher levels of government health spending as percentage of GDP compared to those countries that do not have agreements.

Turning to the model for government health expenditure as per capita spending (Model (2) in Table 9.6), the results show that social protection agreements are associated with a statistically significant increase in spending per capita compared to no agreement of 0.038 units (SE 0.015). This suggests that at times of social protection agreements countries spend 3.97% more on government health expenditure compared to similar countries without agreements. Taking the average spending of countries (see Chapter 7), this translates into an increase in per capita government health spending of 5.74 \$.

Looking finally at the model for government health expenditure as percentage of general government expenditure (Model (3) in Table 9.6), the results show that social protection agreements are associated with statistically significant increases in spending compared to countries and times without agreements. This suggests that comparable countries that are in social protection agreements have 0.040 unit (SE 0.016) higher levels of government spending compared to countries without agreements.

Comparing across all three models of different government health expenditure measures it appears that, while in the case of government health expenditure as percentage of GDP not statistically significant, social protection agreements are associated with increases in spending compared to times and countries without agreements. This suggests that when countries are in a social protection agreement health spending is increased compared to those countries that are not undergoing an agreement.

9.2.2 Assessing the Effects of SBA/EFF Agreements

Having estimated the effects of social protection agreements, the analysis shall now turn to the effects of SBA/EFF agreements. To do so, the difference in government health expenditure between no agreement (reference category) and SBA/EFF agreements are estimated. Results are presented in Table 9.7.

	(1)	(2)	(3)
	HE/GDP	HE/CAP	HE/GGE
lagged DV	0.640*** (0.033)	0.694*** (0.038)	0.649*** (0.036)
SBA/EFF Agreement	-0.022* (0.010)	-0.033* (0.013)	-0.027 (0.016)
GDP per capita (logged)	-0.114** (0.034)	0.207*** (0.049)	-0.096** (0.031)
Government Revenue (% GDP)	0.004** (0.001)	0.006*** (0.002)	-0.002 (0.001)
Age Dependency Ratio	0.002 (0.001)	0.002 (0.001)	0.004** (0.001)
time	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)
Inverse Mills Ratio	-0.002 (0.010)	-0.008 (0.011)	-0.012 (0.012)
Constant	0.862** (0.267)	-0.511 (0.297)	1.235*** (0.302)
Within R ²	0.530	0.780	0.454
N	1406	1412	1413
Countries	121	121	121

Table 9.7: Effects of SBA/EFF Agreements on Government Health Expenditure
Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334); dependent variables logged

Looking first at the model for government health expenditure as percentage of GDP (Model (1) Table 9.7), the results show that SBA/EFF agreements are associated with a statistically significantly lower level of health expenditure compared to countries that are not in agreements, but otherwise comparable. This suggests that countries that are undergoing SBA/EFF agreements have government health expenditure levels that are by 0.022 units (SE 0.010) lower compared to countries with no agreements.

Turning to the model for government health expenditure as per capita spending (Model (2) in Table 9.7), the results show that SBA/EFF agreements are associated with a statistically significant decrease in spending per capita compared to no agreement. This suggests that at times of SBA/EFF agreements countries spend 3.36% less compared to similar countries without agreements. Taking the average spending of countries (see Chapter 7), this translates into a decrease of 4.86 \$ per capita.

Looking finally at the model for government health expenditure as percentage of general government expenditure (Model (3) in Table 9.7), the results show that SBA/EFF agreements are associated with a slight negative, -0.027 unit (SE 0.016), but not statistically significant effect on health expenditure compared to countries and times without agreements. This suggests that there is no statistically significant difference in government health expenditure between agreement and no-agreement times.

Comparing across all three government health expenditure measures, it appears that, while in the case of government health expenditure as percentage of general government expenditure not statistically significant, SBA/EFF agreements are associated with decreases in spending compared to times and countries without agreements. This suggests that when countries are in a SBA/EFF agreement health spending decreased compared to those countries that are not undergoing an agreement, when controlling for all other variables in the models.

9.2.3 Summary of the Findings by Agreement Cluster

This section set out to identify the effects of the two main clusters of lending facilities offered by the IMF. To do so, separate models were estimated to identify the effect of social protection agreements and the effects of SBA/EFF agreements on each of the measures of government health expenditure. The results suggest two main findings.

The regression models for social protection agreements suggest that government health expenditure increases during times of these agreements compared to times of no agreements. For the measures of health expenditure as percentage of general government expenditure and per capita spending, this effect was found to be statistically significant at the conventional 5% level. This suggests that government health expenditure is higher during agreements when it is measured as per capita spending or percentage of government expenditure. A similar effect in terms of direction, but not in terms of significance was found for the measure of government health expenditure as percentage of GDP.

The regression models of the SBA/EFF agreements show that spending decreases during times of these agreements compared to times of no agreements. These findings are statistically significant for the measures of government health expenditure as percentage of GDP as well as per capita spending. A similar trend in direction, that was however just not statistically significant, was found for government health expenditure as percentage of general government expenditure.

Overall, these results suggest that agreements with social protection component seem to be associated with an increase in spending compared to no agreements, while the effects of agreements without the social protection component (SBA/EFF agreements) are generally negative and these agreements are associated with reductions in spending. The next section discusses these findings in relation to the previous chapter and explores them further.

9.3 Exploring the Role of Agreement Clusters and Income Groups

This chapter set out to investigate the effects of different agreement clusters on government health expenditure. This is based on the assumption that agreement types differ in their conditionality and the extent to which they consider social protection and poverty reduction (section 1.2.4.4; pg. 23), which will have different effects on government health expenditure. To do so, analyses were conducted to estimate the effects of the social protection and the SBA/EFF agreements clusters. The results show that both agreement clusters have different effects on government health expenditure. For social protection agreements it was shown that agreements are associated with increases in government health spending, when compared to countries and times with no agreements. For SBA/EFF agreements it was shown that these agreements are associated with decreases in government health expenditure when compared to times and countries with no agreements.

Chapter 8 set out to investigate the average effects of IMF agreements on government health spending assuming that all agreements are comparable and have similar effects. The analysis showed that, while there are no effects across all countries in the study, the effects of agreements differ between country income groups. It was found that for LIC the relationship was positive in the way that agreements were associated with increases in spending. The effects of agreements on LMIC were found

to be statistically significant negative in the way that agreements are associated with decreases in government health expenditure. For UMIC it was found that agreements have a slight but not statistically significantly negative effect on government health spending.

This offers two different and competing explanations for the observed differences in the effects of agreements on government health expenditure and leaves unclear what the reasons underlying the observed differences are. The previous chapter suggested that the effects of agreements differ between country income groups in the way that countries experience different effects based on their income. The findings of this chapter suggest that the effects of agreements differ between agreement types. This means that the effects a country is experiencing might differ depending on the type of agreement the country is undergoing.

As was outlined in more detail before (see Section 1.2.3; pg. 13) agreement clusters differ in their conditionality and the extent they consider social protection. Conditionality of social protection agreements is seen to be linked to policies to safeguard spending linked to social protection, while this statement is not made for SBA/EFF agreements. It can therefore be argued that the effect that is found can be attributed to the differences in agreement types. It is harder to see how a country's income grouping can be a causal factor in explaining the observed differences by country groups.

While it was previously shown (Table 7.1; pg. 250) that social protection agreements are commonly used in low-income countries and SBA/EFF agreements are commonly used in middle-income countries and the distinction between income groups and agreement clusters might pick up much of the same effect, this distinction is not perfect. This allows to test the two competing claims (do income groups or agreement types matter?) empirically. To do so, the models for the two agreement clusters are refitted for each of the income groups separately. When the observed difference in effect is due to agreements rather than income groups the effect of agreements will be similar across all country income groups. This section is structured into three parts. The first part assesses effects of social protection agreements, the

second part assesses the effects of SBA/EFF agreements and the third section summarises the findings and compares and contrasts them.

9.3.1 Assessing the Effects of Social Protection Agreements by Income Group

This section empirically assesses the effects of social protection agreement on government health expenditure across the three income groups. The following paragraphs presents the results of the analysis for each of the government health expenditure measures.

9.3.1.1 Results of Government Health Expenditure as Percentage of GDP

Table 9.8 presents the results of the analysis of the effects of social protection agreements on government health expenditure as percentage of GDP.

	(1)	(2)	(3)
	LIC	LMIC	UMIC
lagged DV	0.634*** (0.044)	0.628*** (0.030)	0.520*** (0.091)
Agreement Dummy	0.046* (0.018)	0.000 (0.018)	-0.042 (0.063)
GDP per capita (logged)	-0.187* (0.079)	-0.111* (0.051)	-0.313*** (0.046)
Government Revenue (% GDP)	0.001 (0.002)	0.002 (0.001)	0.002 (0.002)
Age Dependency Ratio	0.002 (0.003)	-0.002 (0.001)	0.006 (0.003)
time	0.014*** (0.004)	0.008*** (0.002)	0.016*** (0.004)
Inverse Mills Ratio	0.010 (0.020)	-0.002 (0.013)	-0.011 (0.013)
Constant	1.069* (0.513)	1.220** (0.393)	2.702*** (0.368)
Within R ²	0.525	0.536	0.397
N	698	631	319
Countries	62	77	45

Table 9.8: Effects of Social Protection Agreements on logged HE/GDP across Income Groups
Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334)

For LIC (Model (1) of Table 9.8) the analysis shows that social protection agreements have a statistically significant positive effect on government health expenditure compared to no agreements, when controlling for all other variables in the model. This suggests that on average LIC in social protection agreements spend 0.046 units (SE 0.018) more on health care compared to LIC without agreements.

For LMIC (Model (2) of Table 9.8) the results show that there is no association between social protection agreements and government health expenditure as measured as percentage of GDP. This suggests that there is no (statically significant) difference in government health spending between countries and times of social protection agreements and countries without agreements, when controlling for all other variables in the model.

For UMIC (Model (3) of Table 9.8) the results show that there is a slight negative but not statistically significant association between social protection agreements and government health expenditure as measured as percentage of GDP. This suggests that there is no statically significant difference in government health spending between countries and times of social protection agreements and countries without agreements, when controlling for all other variables in the model.

9.3.1.2 Results of Government Health Expenditure per Capita

Table 9.9 presents the results of the analysis of the effects of social protection agreements on government health expenditure as per capita spending.

For LIC (Model (1) of Table 9.9) the analysis shows that social protection agreements have a statistically significant positive effect on government health expenditure compared to no agreements, when controlling for all other variables in the model. This suggests that on average LIC in social protection agreements spend 0.059 units (SE 0.019) more on health care compared to countries without agreements. Based on the average spending of LIC, this translates into an increase of \$1.83

For LMIC (Model (2) of Table 9.9) the results show that there is a minor positive but not statistically significant association between social protection agreements and government health expenditure per capita spending. This suggests that there is no statically significant difference in government health spending between

countries and times of social protection agreements and countries without agreements, when controlling for all other variables in the model.

	(1)	(2)	(3)
	LIC	LMIC	UMIC
lagged DV	0.730*** (0.055)	0.596*** (0.035)	0.499*** (0.070)
Agreement Dummy	0.059** (0.019)	0.001 (0.019)	-0.065 (0.059)
GDP per capita (logged)	0.108 (0.102)	0.305*** (0.054)	0.342 (0.181)
Government Revenue (% GDP)	0.002 (0.003)	0.003* (0.001)	0.006 (0.005)
Age Dependency Ratio	0.002 (0.003)	-0.002 (0.001)	0.006 (0.003)
time	0.013** (0.005)	0.008*** (0.002)	0.013 (0.007)
Inverse Mills Ratio	0.005 (0.020)	-0.002 (0.014)	-0.007 (0.014)
Constant	-0.187 (0.558)	-0.368 (0.371)	-0.666 (1.227)
Within R ²	0.714	0.750	0.602
N	708	631	319
Countries	62	77	45

Table 9.9: Effects of Social Protection Agreements on logged HE/CAP across Income Groups
Driscoll/Kraay standard errors in parentheses (* p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334)

For UMIC (Model (3) of Table 9.9) the results show that there is slight negative but not statistically significant association between social protection agreements and per capita government health expenditure. This suggests that there is no statically significant difference in government health spending between countries and times of social protection agreements and countries without agreements, when controlling for all other variables in the model.

9.3.1.3 Results of Government Health Expenditure as Percentage of General Government Expenditure

Table 9.10 presents the results of the analysis of the effects of social protection agreements on government health expenditure as percentage of government spending.

	(1)	(2)	(3)
	LIC	LMIC	UMIC
lagged DV	0.627*** (0.065)	0.646*** (0.035)	0.533*** (0.078)
Agreement Dummy	0.054* (0.021)	-0.006 (0.019)	0.028 (0.074)
GDP per capita (logged)	-0.135 (0.118)	-0.034 (0.049)	-0.156* (0.063)
Government Revenue (% GDP)	-0.001 (0.001)	-0.004** (0.001)	-0.001 (0.002)
Age Dependency Ratio	0.003 (0.003)	-0.000 (0.002)	0.009** (0.003)
time	0.009* (0.005)	0.004 (0.003)	0.015*** (0.004)
Inverse Mills Ratio	-0.009 (0.028)	-0.000 (0.012)	-0.006 (0.014)
Constant	1.281 (0.717)	1.169** (0.421)	1.815** (0.525)
Within R ²	0.433	0.461	0.343
N	708	631	319
Countries	62	77	45

Table 9.10: Effects of Social Protection Agreements on logged HE/GGE across Income Groups
Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source
Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334)

For LIC (Model (1) of Table 9.10) the analysis shows that social protection agreements have a statistically significant positive effect on government health expenditure compared to no agreements. This suggests that on average LIC in social protection agreements spend 0.061 units (SE 0.026) more on health care compared to countries without agreements.

For LMIC (Model (2) of Table 9.10) the results show that there is a slight negative but not statistically significant association between social protection agreements and government health expenditure as measured as percentage of general government expenditure. This suggests that there is no statically significant difference in government health spending between countries and times of social protection agreements and countries without agreements, when controlling for all other variables in the model.

For UMIC (Model (3) of Table 9.10) the results show that there is a slight positive but not statistically significant association between social protection

agreements and government health expenditure as percentage of general government expenditure. This suggests that there is no statically significant difference in government health spending between countries and times of social protection agreements and countries without agreements, when controlling for all other variables in the model.

9.3.2 Assessing the Effects of SBA/EFF Agreements by Income Group

This section empirically assesses the effects of SBA/EFF agreement on government health expenditure across the three income groups. Adopting the logic and structure of the previous section, the following paragraphs present the results of the analysis for each of the ways to measure government health expenditure.

9.3.2.1 Results of Government Health Expenditure as Percentage of GDP

Table 9.11 presents the results of the analysis of the effects of SBA/EFF agreements on government health expenditure as percentage of GDP.

	(1)	(2)	(3)
	LIC	LMIC	UMIC
lagged DV	0.542*** (0.043)	0.611*** (0.028)	0.520*** (0.066)
Agreement Dummy	-0.005 (0.061)	-0.042* (0.017)	-0.016 (0.012)
GDP per capita (logged)	-0.100 (0.091)	-0.145* (0.057)	-0.221** (0.068)
Government Revenue (% GDP)	0.005* (0.002)	0.003** (0.001)	0.002 (0.002)
Age Dependency Ratio	0.007* (0.003)	-0.002 (0.002)	0.004 (0.003)
time	0.018*** (0.004)	0.007** (0.002)	0.012*** (0.003)
Inverse Mills Ratio	-0.021 (0.025)	-0.009 (0.012)	-0.000 (0.014)
Constant	0.114 (0.657)	1.531*** (0.446)	2.024** (0.607)
Within R ²	0.447	0.506	0.382
N	370	653	383
Countries	61	77	47

Table 9.11: Effects of SBA/EFF Agreements on logged HE/GDP across Income Groups
 Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334)

For LIC (Model (1) of Table 9.11) the analysis shows that SBA/EFF agreements have a slight but not statistically significant negative effect on government health expenditure compared to no agreements, when controlling for all other variables in the model.

For LMIC (Model (2) of Table 9.11) the results show that there is a statistically significant negative association between SBA/EFF agreements and government health expenditure as measured as percentage of GDP, when controlling for all other variables in the model. This suggests that on average LMIC in SBA/EFF agreements spend 0.042 units (SE 0.017) more on health care compared to LMIC without agreements.

For UMIC (Model (3) of Table 9.11) the results show that there is a slight negative but not statistically significant association between SBA/EFF agreements and government health expenditure as measured as percentage of GDP. This suggests that there is no statically significant difference in government health spending between countries and times of SBA/EFF agreements and countries without agreements, when controlling for all other variables in the model.

9.3.2.2 Results of Government Health Expenditure per Capita

Table 9.12 presents the results of the analysis of the effects of SBA/EFF agreements on government health expenditure as per capita spending.

For LIC (Model (1) of Table 9.12) the analysis shows that SBA/EFF agreements have a slight but not statistically significant negative effect on government health expenditure compared to no agreements, when controlling for all other variables in the model. This suggests that there is no statically significant difference in government health spending between countries and times of SBA/EFF agreements and countries with no agreements.

For LMIC (Model (2) of Table 9.12) the results show that there is a statistically significant negative association between SBA/EFF agreements and government health expenditure as measured as per capita spending compared to countries without agreements, when controlling for all other variables in the model. This suggests that on average LMIC in SBA/EFF agreements spend 0.058 units (SE 0.019) more on

health care compared to LMIC without agreements. This translates into a reduction of government health spending by \$8.29 for countries in SBA/EFF agreements compared to countries without agreements.

	(1)	(2)	(3)
	LIC	LMIC	UMIC
lagged DV	0.739*** (0.050)	0.562*** (0.046)	0.493*** (0.054)
Agreement Dummy	-0.028 (0.072)	-0.058** (0.019)	-0.030 (0.015)
GDP per capita (logged)	0.137 (0.115)	0.289*** (0.051)	0.414*** (0.116)
Government Revenue (% GDP)	0.006* (0.002)	0.003** (0.001)	0.006 (0.004)
Age Dependency Ratio	0.008** (0.003)	-0.002 (0.002)	0.004 (0.003)
time	0.019*** (0.005)	0.007** (0.003)	0.009* (0.004)
Inverse Mills Ratio	0.003 (0.028)	-0.012 (0.013)	-0.020 (0.018)
Constant	-0.990 (0.677)	-0.034 (0.414)	-1.082 (0.842)
Within R ²	0.727	0.710	0.647
N	376	653	383
Countries	61	77	47

Table 9.12: Effects of SBA/EFF Agreements on logged HE/CAP across Income Groups
 Driscoll/Kraay standard errors in parentheses (* p<0.05; ** p<0.01; *** p<0.001; for data source see Table 5.17; pg. 205; Inverse Mills Ratio as described in section 9.1.3 (pg. 334)

For UMIC (Model (3) of Table 9.12) the results show that there is slight negative but not statistically significant association between SBA/EFF agreements and per capita government health expenditure. This suggests that there is no statically significant difference in government health spending between countries and times of SBA/EFF agreements and countries without agreements, when controlling for all other variables in the model.

9.3.2.3 Results of Government Health Expenditure as Percentage of General Government Expenditure

Table 9.13 presents the results of the analysis of the effects of SBA/EFF agreements on government health expenditure as percentage of government spending.

	(1)	(2)	(3)
	LIC	LMIC	UMIC
lagged DV	0.608*** (0.057)	0.628*** (0.036)	0.546*** (0.064)
Agreement Dummy	-0.058 (0.050)	-0.029 (0.018)	-0.019 (0.021)
GDP per capita (logged)	-0.168 (0.096)	0.008 (0.038)	-0.223** (0.074)
Government Revenue (% GDP)	-0.001 (0.003)	-0.004** (0.001)	-0.002 (0.002)
Age Dependency Ratio	0.007* (0.003)	-0.001 (0.001)	0.005 (0.003)
time	0.016*** (0.004)	0.002 (0.002)	0.014*** (0.003)
Inverse Mills Ratio	-0.031 (0.029)	-0.006 (0.012)	0.002 (0.027)
Constant	1.178 (0.723)	0.958** (0.286)	2.578*** (0.671)
Within R ²	0.427	0.446	0.352
N	376	654	383
Countries	61	77	47

Table 9.13: Effects of SBA/EFF Agreements on logged HE/GGE across Income Groups
Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001; for data source see
Table 5.7 (pg. 193); Inverse Mills Ratio as described in section 9.1.3 (pg. 334)

For LIC (Model (1) of Table 9.13) the analysis shows that SBA/EFF agreements have a slight but not statistically significant negative effect on government health expenditure compared to no agreements. This suggests that there is no statically significant difference in government health spending between countries and times of SBA/EFF agreements and countries without agreements, when controlling for all other variables in the model.

For LMIC (Model (2) of Table 9.13) the results show that there is a slight negative but not statistically significant association between SBA/EFF agreements and government health expenditure as measured as percentage of general government health expenditure. This suggests that there is no statically significant difference in government health spending between countries and times of SBA/EFF agreements and countries without agreements, when controlling for all other variables in the model.

For UMIC (Model (3) of Table 9.13) the results show that there is slight negative but not statistically significant association between SBA/EFF agreements and

government health expenditure as percentage of general government expenditure. This suggests that there is no statically significant difference in government health spending between countries and times of SBA/EFF agreements and countries without agreements, when controlling for all other variables in the model.

9.3.3 Comparing and Contrasting the Findings

This section set out to add to the analysis of the effects of IMF agreements on government health expenditure by investigating the effects of agreement clusters across income groups. This was done in order to identify if the observed differences in the effects can be attributed to differences in countries' income group or to differences in agreement types. Table 9.14 presents the IMF agreement dummy coefficients of all models. This section summarises, compares and contrasts the findings.

		[1] All	[2] LIC	[3] LMIC	[4] UMIC
[A] All Agreements	[i] HE/GDP	0.006 (0.011)	0.047** (0.018)	-0.030* (0.014)	-0.012 (0.010)
	[ii] HE/CAP	0.008 (0.013)	0.060** (0.019)	-0.041** (0.016)	-0.026 (0.013)
	[iii] HE/GGE	0.011 (0.012)	0.049* (0.021)	-0.025 (0.015)	-0.022 (0.024)
[B] Social Protection Agreements	[i] HE/GDP	0.024 (0.014)	0.046* (0.018)	0.000 (0.018)	-0.042 (0.063)
	[ii] HE/CAP	0.038* (0.015)	0.059** (0.019)	0.001 (0.019)	-0.065 (0.059)
	[iii] HE/GGE	0.040* (0.016)	0.054* (0.021)	-0.006 (0.019)	0.028 (0.074)
[C] SBA/EFF Agreements	[i] HE/GDP	-0.022* (0.010)	-0.005 (0.061)	-0.042* (0.017)	-0.016 (0.012)
	[ii] HE/CAP	-0.033* (0.013)	-0.028 (0.072)	-0.058** (0.019)	-0.030 (0.015)
	[iii] HE/GGE	-0.027 (0.016)	-0.058 (0.050)	-0.029 (0.018)	-0.019 (0.021)

Table 9.14: IMF Agreement Dummy Coefficients for All Agreements, Social Protection and SBA/EFF Agreements by Income Group

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001

Looking first at social protection agreements (Panel [B] in Table 9.14). The results for all countries suggest that across all three measures of government health

expenditure spending increases during times of agreements compared to no agreements. This association is statistically significant for spending per capita and spending as percentage of government expenditure. The effects vary when dividing the dataset by income group. LIC see a statistically significant increase in spending across all three measures when in agreements compared to times without agreements. For LMIC a slight positive, but not statistically significant effect is observed. For UMIC the effect is again not statistically significant, but the point estimate suggests a slight negative association of social protection agreements with government health expenditure compared to no agreements.

Comparing across the income groups within the Social Protection agreement cluster (Models [2] to [4] in Panel [B]) shows that, especially for HE/GDP and HE/CAP, the coefficients for LIC and UMIC countries are similar in size (though of opposite sign). However, the standard errors are much larger and the results not statistically significant for UMIC. For LMIC the effect size is very small and not statistically significant. This suggests that the effects vary between country income groups, and also that the variation between the countries in the UMIC group is much larger. It would appear that the effect of agreements is not uniform within this income group. It could be argued that the effects of agreements do indeed vary between different countries, but that the income grouping might not be a useful variable to classify countries in terms of the observed effects of agreements.

Turning next to the models for SBA/EFF agreements (Panel [C] in Table 9.14). For all countries, the results suggest slight decreases in government health expenditure across all three measures compared to times with no agreements. This association is statistically significant for spending per capita and spending as percentage of GDP. LIC see a minor, but not statistically significant, negative effect in spending across all three measures when in agreements compared to times without agreements. For LMIC a negative effect is observed that is statistically significant for measures of spending as percentage of GDP and per capita. For UMIC the effect is not statistically significant, but the point estimate suggests a slight negative association of SBA/EFF agreements with government health expenditure compared to no agreements.

Comparing across the income groups for the SBA/EFF agreement clusters (Models [2] to [4] in Panel [C]) shows that while the effect of these agreements is negative across all income groups, it is statistically significant only for LMIC (HE/GDP and HE/CAP). While this is somewhat counter-intuitive, combining the LMIC and UMIC countries together would obscure the differences in effect between income groups (see Appendix). The relatively wide standard errors and smaller effect size in the UMIC group suggests more variation between these countries.

Comparing these findings to the results of the previous chapter's analysis of all agreements (Panel [A] in Table 9.14), conclusions can be drawn about the role of income groups and the effects of the different agreement clusters.

For LIC (column [2] of Table 9.14) the positive effects observed when analysing all agreements (column [2], Panel [A] of Table 9.14) seem to be driven by the positive effects of social protection agreements, which are the main agreement cluster of LIC. When LIC receive funding through SBA/EFF agreements (column [2], Panel [C] of Table 9.14), they experience a slight but not statistically significant reduction in spending, which is also in line with the experience of other country income groups receiving SBA/EFF agreements. This suggests that the agreement type matters for LIC.

At the same time the effect of social protection agreements changes by income group. The statistically significant positive effect of these agreements observed for all countries and the model for LIC, disappears in LMIC and UMIC in the way that the point estimate becomes smaller and partly even negative (columns [3]-[4], Panel [B] of Table 9.14). This suggests that the positive effect of social protection agreements on government health expenditure only holds for LIC and not for other income groups.

Turning to SBA/EFF agreements the income group does seem play less of a role when it comes to the effects of this agreement cluster (column [2]-[4], Panel [C] of Table 9.14). The effects of SBA/EFF agreements are always slightly negative and for LMIC countries statistically significantly negative when expenditure is measured as percentage of GDP or in terms of per capita spending (column [4], Panel [C] of Table 9.14). This country group also seems to be driving the statistically negative

effect of this agreement cluster, when all countries are included in the analysis (column [1], Panel [C] of Table 9.14).

9.4 Conclusions

This chapter set out to estimate the effects of different agreement clusters on government health expenditure. The analysis thereby focussed on the two main agreement clusters that have previously been identified: the cluster of social protection agreements, which offer special attention to social spending and concessional financing terms, and the cluster of agreements, which does not include attention to social protection and poverty reduction and also not include concessional financing terms (SBA/EFF agreements). The chapter was structured into three parts. In part one, the selection equation was re-estimated for each agreement clusters. Part two estimated to overall effects of the different agreement types on the three measures of government health expenditure. Part three analysed the effects of each agreement cluster across income groups and compared and contrasted the findings obtained across all analyses.

To identify the best selection model specification a number of models were estimated and compared based on their percentage of correct classification and the number of cases retained. When refitting the selection model for each agreement clusters, slight differences in the importance of individual variables and the extent of correct classification were identified. Overall, however, it could be shown that for both a stripped version of the Established Model provides the best classification results while also retaining a large number of cases.

Having estimated the selection equation, the effects of each agreement cluster on government health expenditure were estimated for all three ways of measuring health spending. For social protection agreements it was found that countries in this type of agreement generally have higher levels of government health expenditure compared to countries without agreements. This finding was statistically significant when measuring health spending as percentage of general government expenditure as well as per capita spending. For SBA/EFF agreements the analyses showed that government health expenditure decreases in countries receiving loans through these agreements compared to countries without agreements. This finding was statistically significant when measuring health spending as percentage of GDP as well as for

spending per capita. These findings suggest that social protection agreements are associated with higher levels of government health expenditure, while SBA/EFF agreements seem to be associated with reductions in government spending.

To advance the analysis further, the third section of this chapter set out to investigate the effects of agreement clusters across income groups. This analysis allowed for an empirical assessment of the importance of income groups and agreement types. The results of this analysis allow to draw two main conclusions about the effects of IMF agreements on government health expenditure. Firstly, the positive effects of social protection agreements do only seem to be found in LIC, and not in any of the other income groups. Secondly, income groups seem to matter less for SBA/EFF agreements as the effect of these agreements is generally negative and varies less across the income groups.

Overall, this suggests that agreement types matter in their effects on government health expenditure. But, beyond this, also that other factors associated with income group are relevant in determining the effects of agreements on spending.

Appendix to Chapter 9

Appendix Table 9.1: IMF Agreement Dummy Coefficients for All Agreements, Social Protection and SBA/EFF Agreements by Income Group

		[1] All	[2] LIC	[3] LMIC	[4] UMIC	[5] LUMIC
[A] All Agreements	[i] HE/GDP	0.006 (0.011)	0.047** (0.018)	-0.030* (0.014)	-0.012 (0.010)	-0.028*** (0.008)
	[ii] HE/CAP	0.008 (0.013)	0.060** (0.019)	-0.041** (0.016)	-0.026 (0.013)	-0.040*** (0.010)
	[iii] HE/GGE	0.011 (0.012)	0.049* (0.021)	-0.025 (0.015)	-0.022 (0.024)	-0.022 (0.012)
[B] Social Protection Agreements	[i] HE/GDP	0.024 (0.014)	0.046* (0.018)	0.000 (0.018)	-0.042 (0.063)	-0.017 (0.014)
	[ii] HE/CAP	0.038* (0.015)	0.059** (0.019)	0.001 (0.019)	-0.065 (0.059)	-0.013 (0.017)
	[iii] HE/GGE	0.040* (0.016)	0.054* (0.021)	-0.006 (0.019)	0.028 (0.074)	-0.007 (0.017)
[C] SBA/EFF Agreements	[i] HE/GDP	-0.022* (0.010)	-0.005 (0.061)	-0.042* (0.017)	-0.016 (0.012)	-0.031** (0.010)
	[ii] HE/CAP	-0.033* (0.013)	-0.028 (0.072)	-0.058** (0.019)	-0.030 (0.015)	-0.047*** (0.013)
	[iii] HE/GGE	-0.027 (0.016)	-0.058 (0.050)	-0.029 (0.018)	-0.019 (0.021)	-0.025 (0.015)

Driscoll/Kraay standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001

10 Discussion

This chapter draws together the findings of chapters 7, 8 and 9, and discusses them in a number of ways. To do so, the chapter is structured into five parts. The first part summarises the study's main findings, focusing on the effects of IMF agreements and how these differ across income groups and between agreement clusters. The second part offers an interpretation of these findings in light of the expected findings outlined in chapter 1. The third part highlights the ways in which this study and its analyses builds on the existing literature. The fourth part outlines the implications of these analyses for universal health care (UHC), and makes specific recommendations for IMF decision-makers. The fifth part acknowledges the small number of limitations that remain despite careful study design and have not been acknowledged in previous chapters.

10.1 The Main Findings of this Study

This study demonstrated two main findings of the impact of IMF agreements on government health expenditure in low- and middle-income countries: Firstly, similar to the previous literature on the effects of IMF agreements on health expenditure, this study finds that in the aggregate of all countries and agreement types,

IMF agreements do not have a significant impact on government health expenditure. Secondly, when going beyond the aggregate and looking at individual country groups, this study reveals interesting effects, as it is found that the impact of agreements varies by the borrowing country's income status as well as the agreement cluster, which reflects the nature of the conditionalities included and the extent of social protection. An aggregated overview of the results of individual models is shown in Table 10.1.

In relation to the first finding, the analyses show that beyond this small number of country sets with statistically significant effects, agreements do not have a large nor statistically significant effect on government health expenditure. This has been shown in two ways. Firstly, analyses of chapter 7 show that the explanatory power of models with only the agreement dummy is very small, which suggests that agreements do not explain much variation in government health expenditure and can therefore be seen to have little impact on government health spending. Similarly, adding the agreement dummies into the models as additional determinant of government health expenditure (chapter 8) does not generally increase the ability to explain variation of health expenditure within countries and across time. The same conclusion can be reached when looking at the coefficients of IMF agreement dummies in the models. In models containing all agreements and countries, agreements do not appear to have a statistically significant effect on government health expenditure. The same applies to most models when cases are divided by income group and agreement type¹⁰⁸. Taking these results together it is reasonable to conclude that IMF agreements in the aggregate do not have a large significant impact on government health expenditure levels.

In relation to the second finding, the analyses conducted in chapters 8 and 9 provided evidence to suggest that the effects of agreements on government health expenditure are not monolithic in nature and more complex than has previously been estimated, as they vary between agreement clusters and also country income groups. The results show that agreement types which have an emphasis on social protection and poverty reduction are associated with an increase in government health spending in the way that spending is on average higher in periods in which agreements with emphasis on social protection are in place compared to periods with no agreements.

¹⁰⁸ The exception are those countries discusses in the next paragraphs.

This effect, however, is not consistent across all income groups. Low-income countries (LIC) experience a statistically significant increase in spending while the results for lower-middle-income countries (LMIC) are positive but of a smaller (and not statistically significant) magnitude. For upper-middle-income countries (UMIC) the effect is negative, but again, not statistically significant. This means that the positive effect of social protection agreements does not apply to countries of middle-income status¹⁰⁹.

For countries receiving agreements that do not have the explicit focus on social protection and poverty reduction – i.e. agreements of the SBA/EFF cluster – the results show a negative (and generally statistically significant) effect of these agreements on government health expenditure compared to countries not receiving agreements. This effect again varies between income groups. Only LMIC experience statistically significant negative effects. The effects of the other two income groups are negative but not statistically significant.

	All countries	LIC	LMIC	UMIC
All agreements	0	+*	-*	0
Social protection	+*	+*	0	0
SBA/EFF	-*	0	-*	0

Table 10.1: Overview of Results by Agreements and Income Groups
 0 signifies a non-statistically significant result; +* a statistically significant positive result; -* a statistically significant negative result; indicators are printed in italics when the obtained results vary in their significance (but not their direction) by measure of government health expenditure (see footnote 109); for a summary of the exact estimates for each model see Table 9.14 (pg. 349).

10.2 Interpretation of the Findings

This section offers an interpretation of the study’s results and the main findings. To do so, it looks first at the differences between agreement clusters and then explores possible explanations for the more nuanced differences by income groups. The interpretation will thus be attempted along two dimensions. Firstly, why are the effects of social protection agreements different from the effects of SBA/EFF agreements? Secondly, why do the effects vary between countries according to their income status?

¹⁰⁹ It is worth pointing out that while the effects are generally the same across all measures of government health expenditure (HE/GDP, HE/cap, HE/GGE), some differences can be observed. Where results are not similar in terms of significance, they are however similar in terms of direction and effect size.

The analyses suggest that the effects of IMF agreements with a social protection element are associated with increases in spending compared to no agreements. While the results do not provide any further input on the underlying reasons for these differences it appears that the IMF's claim of emphasis on social protection might be underlying the results observed for this agreement type and reflects the expected effects (section 1.2.4.4; pg. 23) that suggested that the emphasis on social protection would protect and increase social spending, including on health.

For SBA/EFF agreements, which do not come with the explicit emphasis on social protection, the results suggest a negative effect compared to no agreement, which is again in line with the expected results (section 1.2.4.4; pg. 23). For SBA/EFF agreements, this special emphasis on social protection is absent so that countries might turn to cutting health expenditure in order to achieve the goals and conditionalities set as part of the lending agreement with the IMF.

It was shown that these effects do not apply equally across all income groups. The study shows that IMF agreements with a social protection component are associated with an increase in government health expenditure only in the subgroup of LIC but not for countries in the other income groups (LMIC/UMIC). For SBA/EFF agreements the finding is only statistically significant negative for the subgroup of LMIC but not for countries in the other income groups. The following three questions still need to be addressed: (i) why are LIC in social protection agreements experiencing effects different from those of other countries receiving agreements from the same cluster? (ii) why are the effects of LIC in social protection agreements different from those of LIC in SBA/EFF agreements? (iii) why are LMIC in SBA/EFF agreements different from other income groups in SBA/EFF agreements? While it is difficult to derive definite answers from the data available for this study, a number of possible explanations emerge.

In terms of (i), it may be useful to consider what it is that sets LIC apart from other countries. Within the global health debate in relation to low-income countries,

the Millennium Development Goals (MDG)¹¹⁰ have taken a prominent role (Travis et al, 2004; WHO, 2005) and health policies have evolved to prioritise interventions that support the achievement of the goals related to health (Vassall and Martinez-Alvarez, 2012). In this discussion it is often highlighted that a “financing gap” exists between the resources necessary to achieve the MDG and the resources currently available in low-income countries (Fryatt et al, 2010; Gottret and Schieber, 2006). This means that a significant increase in health expenditure will be needed to deliver on the MDG. The IMF argues that policies in its agreements are designed to support the countries’ achievement of the MDG (IMF, 2015b). The poverty reduction strategies linked to IMF agreements might be associated with increases in government spending on health, which might explain the observed increases in LIC. The IMF (2015b) also states that it is committed to supporting the achievement of the MDG and to advocate for increases in development assistance to LIC. Since the data used for the analyses of this study include both spending that comes directly from the government and money that is channelled through the government as development assistance to health (see chapter 5; pg. 173), without distinguishing between both parts, it is left unclear if the observed increases are due to increases of the governments’ own commitment to health spending or if increases reflect an increase in development assistance to health.

Another way of exploring these differences in the effects of social protection agreements across income groups could be seen in the IMF’s differential treatment of low-income countries. The IMF continuously claims to provide special support and treatment for low-income countries (IMF, 2013d). The IMF’s definition of low-income countries is, however, somewhat broader (IMF, 2013a) and also includes some countries that are considered middle-income countries according to World Bank classification and are thus classified as LMIC or UMIC in this study (see section 1.2.4.1; pg. 16). Nevertheless, using the results of this study this differential treatment argument can be assessed tentatively. While the analysis across all agreements (Table 9.6) showed positive effects of IMF agreements for LIC and would therefore support the hypothesis of the IMF’s differential treatment of these countries, the analysis for

¹¹⁰ The Millennium Development Goals have now been replaced by the Sustainable Development Goals (SDG) (United Nations, 2016), however, for the study period the MDG were relevant.

SBA/EFF agreements (Table 9.14) showed that LIC do not see positive effects. This shows that only LIC receiving social protection agreements see positive effects, not all LIC. This suggests that a differential treatment of LIC *per se* cannot be found from the data.

A third approach to interpret the findings can be seen in trying to understand the differences in effects of social protection agreements by investigating special cases. While beyond the scope of this study the intuition of this approach shall be sketched out here. Special cases in this sense are those cases that are LMIC or UMIC but receive social protection agreements, which are designed more for the use of “poor countries” (IMF, 2013d). Investigating these cases in detail would likely require the incorporation of additional (most likely qualitative) data. A similar argument can be made when attempting to explain the effects of SBA/EFF agreements across income groupings, where it is difficult to understand why LMIC in particular experience negative effects and LIC and UMIC do not. See section 11.2.2 (pg. 378) for ideas on how to approach this in future research.

It is important to note that the obtained results and their substantive interpretation should be taken with caveats based on two statistical mechanisms underlying the analyses. Firstly, identifying a result as statistically significant is affected by two factors: the actual effect size estimated in the point estimate and the standard error as measure of precision of the estimate. The standard error in turn is affected by the sample size of the analysis. This means that statistical significance is more easily achieved in a large sample compared to a smaller one. Therefore, a result might appear statistically significant because the sample size is larger. To find out if this is the case in the present analysis, the number of case-years in the models for each income group will be compared.

For the models for social protection agreements it can indeed be seen (compare Table 9.8) that the sample of LICs (n=698) is larger compared to other income groups (LMICs n=631; UMICs n=319), which might explain the differences in terms of significance. However, it is rather unlikely that the differences are due to sample size alone as the point estimates are also different. For LMIC the point estimate is found to be very close to zero and negative for UMIC (-0.042), compared to the estimate of

0.046 for LIC. Variations in sample sizes should therefore not be seen as a possible explanation of the differences.

For SBA/EFF agreement models it appears (from Table 9.11) that the sample included in the analysis for LMIC is almost twice as large ($n=653$) as that for each of the other income groups (LIC $n=370$; UMIC $n=383$), which would suggest that the difference in significance might well be due to the differences in sample size. It is also worth noting that while different in significance all point estimates show a similar direction. While the actual effect size is still different (-0.005 for HE/GDP in LIC, compared to -0.042 for HE/GDP in LMIC and -0.016 for HE/GDP in UMIC) it might still be possible that the significance of the finding is a statistical result rather than one that reflects substantive differences between the countries.

As second caveat, it is worth noting that when performing a large number of tests, some produce false results. Given the conventional 5% level of significance chosen for this study, 5% of the obtained results in terms of statistical significance are found purely due to chance.

10.3 Contributions of this Study

This section highlights how this study fits into the literature aimed at understanding the impact of IMF agreements on health systems and health spending, reviewed in chapter 2. To do so, it compares this study's approach and results to other literature in the field. The focus is thereby on studies investigating the effects of agreements on government health expenditure (section 2.2.2.1; pg. 42). This present study builds on the literature in both a substantive and a methodological way.

This study adds to the literature in two substantive ways. Firstly, by systematically assessing the impact of IMF agreements on countries in different income groupings, and secondly by assessing the effects of different agreement types separately.

As was shown in the literature review in chapter 2, the current literature in the field assesses the impact on countries in different income groupings only in a non-systematic way. The study by Clements et al (2013) looks at LIC compared to middle-income countries but does not distinguish between different income levels within the

middle-income bracket (lower-middle and upper-middle income). The study by Kentikelenis et al (2015b) focusses on LIC only. This present study adds to these analyses by systematically assessing the impacts of IMF agreements on countries in different income groupings and distinguishes between countries of low-, lower-middle and upper-middle income. The results suggest that this division of the countries is indeed meaningful in the way that each of the three income groups experience different effects from IMF agreements. This study thereby confirms the findings of Clements et al (2013), who suggest that IMF agreements have positive effects in LIC. This study also shows that keeping middle-income countries as one group (as is done by Clements et al (2013)) glosses over differential effects and indeed hides the negative effects of agreements for LMIC. The study, reporting statistically significant positive effects of agreements in LIC, somewhat contradicts the findings of Kentikelenis et al (2015b), who find that agreements are associated with slight but not statistically significant increases in government health expenditure in this income group.

The results do, however, suggest that, while differences in the effects are found between income groups, this indicator might not be the best way of grouping countries and thereby differentiating the effects of IMF agreements, as the wide variation in the effects in some income groups suggests that the effect of agreements is not uniform across all countries.

The current literature in the field models IMF agreements as a simple dummy indicator that is either “on” or “off”, which is based on the assumption that all IMF agreements and also their effects on government health expenditure are similar. As was outlined before (see 1.2.3; pg. 13), not all agreements are structured similarly but are used in different situations and have different emphasis on social protection. The effects of agreements are therefore expected to vary with their type (see 1.2.4.4; pg. 23) and the on/off approach to modelling IMF agreements might therefore be an oversimplification, hiding important differences in the effects of agreements. This study is the first to address this issue and develops the on/off approach further by modelling the effects of different agreement types separately. Even though this approach is still fairly general and in an early stage, its results (presented in chapter 9) show the importance of differentiating between different agreement types as the

findings suggest that the effect of agreements on government health expenditure differs not only with income groups but also with agreement types.

This study makes methodological contributions in two main ways. Firstly, in order to fit the selection model necessary to account for endogeneity, due to the observational nature of this study (see chapter 6), a systematic review of the relevant literature was conducted in chapter 4. In chapter 8 and 9 the identified variables were used to systematically identify the best specification of the selection model. Using this systematic approach to identifying the best selection model, the study is capable of reliably accounting for selection bias. While the results of the different model definitions suggest that the model already established in the literature is indeed the best model, this study is the first to take a systematic approach to identifying the best specification of the selection model.

Secondly, the study identifies most commonly used determinants of government health expenditure in low- and middle-income countries through a literature review that was conducted in a systematic way. Doing so, the study is capable of controlling for the main determinants of government health expenditure, which inspires confidence that changes in government health expenditure levels are not due to changes in the determinants of spending and indeed represent effects of agreements. Thereby this study goes beyond the current literature in the field that does not seem to identify the determinants of health expenditure in a systematic way.

10.4 Implications for Universal Health Coverage and Recommendations for IMF Lending Policy

This section discusses implications of the findings for UHC and makes brief recommendations for the IMF's lending policy. Implications for UHC are drawn in the light of the impact of IMF agreements on health spending and the IMF's own claims about social protection. To do so, this section is structured along the main findings of this study (section 10.1; pg. 356) and looks first at the implications of the effects of agreements in general and then those specific to agreement types and income.

By and large IMF agreements do not have a large and statistically significant effect on government health expenditure. This is somewhat surprising given the large

amount of literature produced around the effects of IMF agreements on health and health spending in particular and the generally rather negative “reputation” of the IMF in the field of social protection. For debates around health care systems and universal health coverage this has two implications. Firstly, by and large the IMF does not appear to be a major (negative) determinant of government health spending. Secondly, the IMF is also not a major player in increasing and expanding health spending, which might have positive effects on health systems and the move towards UHC. Thus, the role of the IMF in health care financing appears to be minor.

The IMF continuously claims that its agreements, and particularly those of the PRGT, which are considered in this study under the social protection cluster, would protect and where possible expand social spending (see section 1.2.4.4; pg. 23). In general, the IMF declared its commitment to making poverty reduction and strengthening social safety nets including health care central to its agreements (Gupta et al, 1998). In relation to health spending as percentage of general government spending, the IMF states its effort and commitment to provide policy advice to shift public spending patterns in order to accommodate higher spending on health care and make it a priority among public expenditure (Gupta et al, 1998; IMF, 2001b). This study identifies a statistically significant positive effect of the social protection agreements and shows that an expansion of health expenditure is only found in the LIC subgroup but not in the other income groupings.

This increase in government health expenditure in LIC can be translated into numeric values relating to each health spending indicator. During times with social protection agreement LIC spend on average 0.10 percentage points of GDP, \$1.83 per capita, or 0.53 percentage points of general government expenditure more on government health expenditure compared to similar countries not undergoing an IMF agreement. While these increases are statistically significant, their substantive significance shall be discussed in light of the wider debates around government health expenditure.

While there is no guideline on spending levels in terms of percentage of GDP or general government expenditure, estimates exist for per capita spending levels. In 2009 the Taskforce on Innovative International Financing for Health Systems

published results of a detailed costing approach conducted to estimate a minimum spending on health necessary to provide a health care system that ensures that everyone has access to an essential set of health services including those for HIV, tuberculosis, malaria, and maternal and child health, as well as some preventive activities targeting non-communicable diseases. The Taskforce's study estimated that the bare minimum of spending is 44\$ per capita (WHO, 2012).

The average LIC in this study spends 30.05\$ PPP per capita (section 7.2; pg. 253) on health and therefore only about 68% of the recommended minimum. For this group of countries the 1.83\$ increase in spending that is associated with social protection agreements seems to make a contribution to achieving this minimum spending goal by increasing expenditure and thereby contributing to achieving UHC. It should therefore be argued that the IMF's social protection agreements appear to be making a small yet positive contribution to working towards UHC in LIC. Even with the Fund taking on the task of social protection and poverty reduction, it is worth nothing that it is not a development bank and its primary goal is to stabilise economies (section 1.2.1; pg. 9). Other global health actors such as the World Bank or international donor organisations should also help contribute to increasing spending in these countries.

However, the positive effects observed in LIC do not apply to countries of higher income, which suggests that social protection agreements have no positive effect in these countries. While these countries do spend more than the recommended minimum, health systems in the countries are also under financial pressure. The WHO (2012) points out that numerous middle-income countries face severe financial constraints that limit their capacity to increase the number and quality of health care services without further increases in spending. Wagstaff et al (2015) show that some countries in this income group perform rather poorly when it comes to achieving UHC. Given that LMIC and UMIC are also struggling for increases in spending but results suggest that agreements do not help to increase spending, it is difficult to see how the IMF fully lives up to its claims about social protection.

The results for the agreements, for which the IMF does not make explicit claims about poverty reduction (SBA/EFF agreements), suggest a slight decrease in spending

during agreements compared to no agreement. For LMIC under SBA/EFF agreements the results suggest that this decrease is statistically significant when country are compared to similar countries without agreements. The results translate into 0.15 percentage points reductions of spending as percentage of GDP or 8.29\$ less spending per capita. This suggests that for these countries IMF agreements might be linked to restrictions on their ability to maintain the level of health care services currently provided and hinder these countries in expanding their services further towards achieving UHC.

Given the findings and their interpretation, recommendations for IMF lending policy shall briefly be discussed. Making policy recommendations in the setting of this study is somewhat difficult due to the fact that little is known about the inner workings of the IMF and the precise way decisions are made about details of agreements in terms of conditionality or social protection elements. Nevertheless, one recommendation can be derived from the findings. The results show that the effects of agreements vary with agreement type and country income group. While LIC receiving social protection agreements see increases in spending, other countries experience no changes or even reductions in expenditure. While spending levels differ by income group (see section 7.2.1; pg. 254), countries of all income groups have to deal with fairly tight budgets and achievement of UHC would benefit from an expansion of government health expenditure. A policy recommendation can therefore be seen in the similar treatment of all countries in terms of the IMF's commitment to social protection and poverty reduction in a way that all countries experience similar effects in terms of government health expenditure and support for their progression towards UHC. This seems especially noteworthy, since the IMF has taken on poverty reduction as additional objective alongside economic stability.

10.5 Limitations of this Study

This study was carefully designed to ensure that the results are reliable. Despite best effort, some limitations remain, which have previously been discussed in the relevant chapters. This section discusses remaining limitations around the assumptions made when modelling agreements, the use of income groups and the use of government health expenditure as dependent variable.

10.5.1 Assumptions about Agreements

This study models IMF agreements in two ways. In chapter 8 all agreements can be either “on” or “off”. In chapter 9 the analysis distinguishes agreement clusters (social protection and SBA/EFF) that can, individually, be either “on” or “off”. Both ways of modelling agreements come with assumptions. In the first way it is assumed that all agreements are similar and therefore have similar effects. Agreements can either be “on” and have an effect, which is assumed to be the same across all agreements, or it can be “off” and have no effect. The second way of modelling agreements assumes that all agreements clustered as social protection agreements have the same effect that is different from “no agreement” and that is also different from agreements clustered as SBA/EFF agreements. Similarly, all SBA/EFF agreements are assumed to have similar effects, which are different from “no agreement” and different from social protection agreements. This can be a strong assumption to make for the analysis for two main reasons.

Firstly, while individual agreements have been clustered together in the belief that they are comparable in terms of their emphasis on social protection and conditionality (section 1.2.3; pg. 13), agreements within each cluster are likely different because specific contents are formulated along each country’s specific needs (IMF, 2016e). This means that every agreement can be seen as individual in terms of its conditionality but also in its effects on the economy in general and health expenditure in particular.

Secondly, once an agreement between a country and the IMF is in place, the specific implementation to achieve the conditions can vary between individual countries (Vreeland, 2007). For instance, to achieve a balanced household, countries could decide if they would cut spending on health care or the military or raise revenue. Even when agreements were similar their effects might still differ because they are implemented in different ways in different countries.

While this can be seen as a limitation and further research is needed (section 11.2; pg. 377), the approach taken in this study is in line with the literature, which models all agreements to be either “on” or “off”, indeed this study goes beyond the literature modelling different agreement clusters separately.

Chapter 9 analyses the results of IMF agreements on government expenditure for the two main agreement clusters. It has been argued that the selection process into the different clusters might be different compared to the overall selection process. To account for this in the selection methodology, a separate model was fitted for each of the clusters. While this is seen to be advantageous compared to a common selection model for all agreements (as was fitted for chapter 8, analysing all agreements in one model), this approach does not consider the interactions between different agreement types. This means that it does not allow for choice between the clusters. It only compares social protection agreement with no agreement, and separately SBA/EFF agreement with no agreement, but not possible choices between the agreements.

As this part of the analysis goes beyond the current state of the literature, no other studies are available that use methodology that can be adopted. Similarly, the wider literature does not seem to offer selection models that allow for more than two states. One possible way to develop this further could be in adapting methodologies common to discrete choice experiments, which goes back to the work by McFadden (1980). Applying this is, however, due to the complexity of the methodology, beyond the scope of this study.

10.5.2 On the Income Groups

This study divides countries based on country income groups. This is done for a number of reasons including the belief that the IMF treats countries differently based on their income group and that countries in different income groups are in different stages of their development, of which income groups are a proxy (Morse, 2004).

To assign the income group label to countries, this study relies on the commonly used World Bank classification (World Bank, 2013) and assigns these labels annually. This has limitations. Firstly, the assignment of income groups is somewhat arbitrary and the classification has been criticised as simplistic (Vázquez and Sumner, 2012). Secondly, assigning income groups annually means that countries might change their income group during agreements and the effects of agreements that started in one income group might then be attributed to another income group and might therefore bias the results of the analyses by income group. However, this change of income groups during times of agreements happens rarely (compare Appendix

Table 7.1 and Appendix Table 7.2) so that it is assumed that the biasing effect is minor. To completely eliminate the potential bias, future research might wish to assign income groups at the start of each agreement rather than annually.

The empirical analysis in this study seems to suggest that the effects of IMF agreements vary between countries within income groups, particularly within the upper-middle income group. Therefore, grouping countries based on their income might not be a useful way of distinguishing between effects of the IMF on government health expenditure in different countries. However, income groupings is commonly used in cross-country research to understand if effects differ between countries.

To identify the effects of IMF agreements on government health expenditure in different income groups, individual regressions were run for each income group. Doing so reduces the sample size to a few hundred data points for some regressions, which reduces statistical power and therefore increases the size of the standard errors around regression coefficients. This decreases precision and makes it harder to identify results as statistically significant. This approach however, is the only way to understanding effects in different income groups.

10.5.3 Government Health Expenditure as Indicator

This study uses government health expenditure as the dependent variable, which was chosen for a number of reasons. Government health expenditure is an appropriate indicator of UHC and the capacity of a health system to provide services in an equitable manner (section 1.1; pg. 6). It is a variable that has good data availability and allows for international comparability. Government health expenditure is also a commonly used indicator in the literature around the IMF's impact on health and health systems (chapter 2) and is likely the most commonly utilised indicator in cross-country studies in comparative politics or public policy. However, the use of expenditure data as the dependent variable in cross-country studies has been criticised in the literature (Castles, 1994; Clasen and Siegel, 2007; De Deken and Kittel, 2007; Siegel, 2007) for a number of reasons that are also applicable to this study to varying extents.

De Deken and Kittel (2007) and Castles (1994) argue that cross-country comparisons might be difficult to undertake due to the different definitions of social expenditure across different countries, making reported estimates not immediately comparable between countries as they might not measure the exact same thing¹¹¹. This is a minor issue for this study as data are sourced from the WHO, which ensures that the data is comparable across countries as it reports expenditure levels following a common methodology (WHO, 2015).

A more important issue is that of the interpretation of health expenditure or the changes in expenditure. Siegel (2007) argues that expenditure should not be seen as proxy for social rights and suggests that a change in spending does not equate a change in services¹¹². Changes in spending might not reflect a change in benefits by the same extent. Applied to this study this can be seen to be an issue in two ways. Firstly, an increase in spending does not necessarily reflect an increase in UHC as it leaves unclear what the additional money is spent on and who benefits from it. For instance, additional money can be spent on providing an additional service to a population that was not previously covered or it could be spend on providing a similar or more expensive but not more effective service to a population that already benefited from the offered service.

Secondly, when countries undergo agreements, they are often required to devalue their currency, which makes importing the same amount of goods more expensive. Given that a large share of drugs used in developing countries are often imported (Kremer, 2002) this means that countries will need to spend more money in order to buy the same amount of drugs. An increase in spending therefore only means that the same amount of drugs is purchased but at higher prices. This does not imply improvements of health system capacity. Looking at expenditure alone does not allow

¹¹¹ Castles (1994) also suggests that the definition of government expenditure might be misleading as some spending is seen to be private but nevertheless mandated and channelled through other bodies. For instance, social insurance or compulsory private health insurance. In low- and middle-income countries, this health insurance element, however is only a small fraction of overall spending, making this point a minor issue.

¹¹² Siegel (2007) also illustrates that a change in need for certain services might change expenditure but this does not reflect a result of a policy change. This issue can be seen as minor issue for this study as need and demand for health care services has been controlled for using relevant variables identified though the literature review.

for a decision to be made about the impact on health systems in general, as expenditure alone is not enough and should not be used in a simplistic way for arguments about policy outcomes (Castles, 1994).

While these limitations exist and further research (section 11.2; pg. 377) is needed in order to address these issues and to gain a better understanding of the impact of IMF agreements, government health expenditure is still seen as a valid dependent variable. Even though Esping-Andersen (1990: 21) points out that it is “difficult to imagine that anyone struggles for spending per se”, health expenditure has indeed become an established indicator to evaluate the IMF’s impact on health systems as various studies (chapter 2) employ this indicator and also because the IMF itself uses expenditure levels as a benchmark to evaluate and demonstrate the successes of its agreements. This means that while implications for UHC might be drawn only carefully, this study makes a contribution to the understanding of agreements on health expenditure, which is in itself an important indicator in the debate.

11

Conclusions

This study contributed to the literature on the influence of international organisations on health systems. It focussed on the role of the International Monetary Fund (IMF), a key player in global health governance. The Fund lends money to countries experiencing economic instability in the form of loans that come with conditionalities, policy prescriptions designed to re-stabilise a country's economy but often require countries to reshape policies in a number of domains, including fiscal and monetary policies and typically demand austerity through tighter control of government expenditure as well as, in some cases, structural adjustments of economies. These conditions have the potential to impact on national health systems in general and government health expenditure in particular.

The IMF's lending policies have sparked considerable debate in the global health field for many years. Opponents claim that the IMF has contributed to cuts in public health spending, weakened health systems and thereby facilitated the spread of infectious diseases. Proponents claim that the Fund is protecting social spending and is expanding social programmes, especially in health. Understanding the true effects of IMF agreements on health care systems is of great importance as they have the potential to affect the lives of millions of people around the world.

This study has aimed at contributing to this debate by evaluating the effects of IMF agreements on government health expenditure, an important determinant of health system capacity and universal health coverage, in low- and middle income countries. Specifically, it systematically assessed differences in effect between income groups and is the first study to acknowledge that the IMF lends through different facilities, which differ in their conditionality and emphasis on social protection. It therefore assesses the effects on government health expenditure for different lending agreement clusters. This final chapter summarises the study and draws out directions for future research.

11.1 Summary of the Study

This study was structured into three parts. Part one of the study established the background. Chapter one of this study established an understanding of the role of government health expenditure in relation to universal health care, and of the IMF and its lending activities. It was shown that the IMF provides loans through a number of different lending facilities and that these facilities can be categorised into three clusters along the facilities' extent of conditionality as well as their emphasis on social protection. Three such clusters have been identified that are expected to differ in terms of their effects on government health expenditure: (i) agreements with conditionality and social protection element (social protection agreements) are expected to have a positive effect on government health expenditure, (ii) agreements with conditionality but without social protection element (SBA/EFF agreements) are expected to be associated with reductions in spending, (iii) emergency agreements, those agreements with no conditionality nor social protection are expected to have no effect on government health expenditure.

In chapter two, a systematic review of the literature on the effects of IMF agreements on health and health systems showed that only few studies evaluate the effects of agreements on government health expenditure and that these studies do not consider effects in different country income groups systematically and also that these studies do not acknowledge potential differences in the effects between different lending facilities. This study therefore aimed to contribute to the literature by assessing the effects of agreements across individual income groups and the agreement clusters.

Part two of this work set up the study by developing a methodology to evaluate the effects of agreements in a cross-country setting. Chapters three and four review the literature in a systematic way to identify concepts of relevant determinants of IMF lending and government health expenditure. Building on this, chapter five identifies variables and data sources to be used in this study. Chapter six outlines the methods used to obtain reliable results of the effects of IMF agreements on government health expenditure. In doing so, two methodological challenges were addressed. Firstly, government health expenditure needs to be modelled in a panel data setting. It was shown that the Fixed Effects estimator with standard errors that allow for cross-sectional correlation and panel heteroscedasticity is the best model for this study. Additionally, time trends and serial correlation were controlled for. Secondly, agreement and non-agreement countries are likely systematically different so that the agreement variable is endogenous. To account for this, a Heckman-style selection model was fitted.

Part three of this study presented the results. Two main findings were identified. Firstly, the effects of IMF agreements vary both by country income group and across agreement clusters. It was shown that agreements from the social protection agreement cluster are associated with an increase in government health expenditure. This effect, however, does not apply across all income groups but only to low-income countries. For the other income groups, social protection agreements are not associated with statistically significant changes in government health expenditure. Agreements without the social protection element (SBA/EFF agreements) are associated with reductions in government health expenditure, when all countries are considered. When dividing the countries by income groups, the results suggest that the effect is only statistically significant negative for lower-middle income countries, but not other income groups. Secondly, in the aggregate and beyond a small number of country groupings, IMF agreements do not seem to have a large effect on government health expenditure.

A number of conclusions about the effects of IMF agreements on government health expenditure in low- and middle-income countries can be drawn from this study. The results for social protection agreements are in line with the expected effects of this agreement cluster and the IMF's claims about the emphasis of its agreements to protect

social spending and contribute to poverty reduction. However, the results also suggest that the IMF does not fully live up to its claims about poverty reduction and social protection. Because the positive effects of social protection agreements are only found in low-income countries, which suggests that only countries in this income group, but not countries of higher income, experience increases in government health spending during agreements. While low-income countries clearly spend the lowest amount of money on health, countries of higher income also have tight budgets and their health systems and path to achieving universal health coverage would benefit from increases in spending.

For agreements without the social protection element (SBA/EFF agreements) the effects of IMF agreements in lower-middle income countries translate into reductions of \$8.29. While lower-middle income countries spend more on health care than the recommended minimum, these countries struggle to provide a comprehensive set of health care services and to make progress towards UHC. Reducing spending by \$8.29 in such a setting means that health budgets become even tighter and that the IMF might restrict these countries ability to move towards achieving universal health coverage.

Summing up these findings it can be said that the results show that the effects of the IMF's lending activities on government health expenditure are not monolithic in nature and that considering the effects in the aggregate across all low- and middle-income countries glosses over important differences in effects. Rather, the effects of IMF lending on government health expenditure vary both by a country's income status and the lending facility that is employed by the IMF. This shows that not only a country's income status – as suggested by the previous literature – is important but also the way the IMF conducts lending and the lending facility it uses. When lending is conducted through agreements with a social protection component to them, the IMF's lending has positive effects on government health expenditure and by implication on health system capacity. This suggests that when the IMF is able to design its lending agreements correctly, it will be capable of having positive effects on global health. More research, however, is needed to understand the mechanisms underlying the effects.

11.2 Directions for Future Research

This final section discusses directions for future research on the topic. These relate to understanding more of the mechanisms underlying the effects of agreements on health expenditure through understanding more about agreements and understanding how agreements are implemented, the use of other health system indicators and the role of development assistance to health.

11.2.1 Detailed Knowledge about Agreements

It was argued that the assumptions made about agreements in quantitative studies on the effects of agreements, such as this study, are fairly general and this might gloss over differential effects of agreements. The current literature in the field models agreements as “on” or “off” and thereby implicitly assumes that all agreements are comparable and have similar effects (section 10.5.1; pg. 368). This study goes beyond this approach by modelling the effects of different agreement clusters separately. In doing so it bases the results on the assumption that effects vary between agreement clusters but not within each cluster. Since agreements are, however, individually negotiated between each country and the IMF, it is likely that even agreements within the same cluster are different in terms of their conditionality and emphasis on social protection.

Possible future research should therefore advance the understanding of the effects of IMF agreements by gaining more detailed knowledge about agreements. This could for instance be done by reviewing and analysing agreement documents, including letters of intent and review documents. These are available freely on the MONA Database (IMF, 2013e) for most agreements since 1999 (Vreeland, 2007). This would for instance allow for coding agreements individually according to their conditionality and their emphasis on social protection. Clustering similar agreements together and analysing their effects on government health expenditure will help to better understand the effects of agreements. Analyses similar to this study could then be conducted based on the more detailed clusters of agreements.

A fruitful starting point might be the group of UMIC countries. The reasoning for this suggestion is that the results of the models suggest larger variation between

countries of this income group, which might suggest that the agreements are different for countries within this income group. Having additional information about the agreements in terms of their conditionality might allow for a grouping of different agreement types.

11.2.2 Understanding Agreement Implementation

When modelling agreements as either “on” or “off” or based on clusters of similar agreements, as was done in this study, it is assumed that agreements are implemented in a similar fashion in all countries. This, however, does likely not hold for all agreements as individual countries implement the conditionality coming with their agreement through different policies. This important step between agreement and outcome is currently ignored in the literature and this study. It appears however that understanding what happens in individual countries during agreements and understanding how conditionalities are implemented is an important part of understanding the effects of agreements on government health expenditure, or any other measure that is used to judge the outcome of IMF agreements.

Possible future research should therefore aim at understanding the implementation of agreements in individual countries. This can be done in a number of ways. One possible approach to studying this would be by researching policy documents in order to understand how agreements and their conditionality are implemented. An alternative approach could be seen in gaining a deeper understanding about the dynamics around agreements and the implementation of the associated conditionalities by conducting interviews with stakeholders in the process. These could include members of the IMF working on missions in individual countries but also local policy makers involved in the lending process with the IMF and those in the departments of health. Given that these approaches are more involved as they require more in-depth engagement with individual agreements, it is likely that such a study cannot be designed as cross-country study involving a large number of countries. A case study approach of individual countries seems more likely to be the best option. While further research will be needed to make definite statements about the choice of country, this study can provide guidance to selecting appropriate cases for further investigation. This can, for instance, be done by choosing countries from country

groups that experience different outcomes from agreements. These might most easily be found from within the UMIC country group, for which the results suggest variation of the effects within this group.

11.2.3 Going Beyond Health Spending: Understanding Effects on Health

Systems

This study used government health expenditure as the dependent variable and reports effects of agreements on this indicator. This study finds that agreements are associated with increases in spending for some countries and decreases for others. While this is an important finding that extends the current understanding of the effects of IMF agreements, using government health expenditure as an indicator does not allow to make in-depth statements about the effects of agreements on health systems or universal health coverage. This study does therefore not allow to make detailed statements about the effects of agreements beyond government health expenditure. This would however be interesting to inform wider debates around IMF effects on universal health coverage and health systems. More specifically, two questions need to be answered: (i) does the increase in health expenditure associated with social protection agreements in LIC translate into improvements in the health system and universal health coverage? And (ii) does the decrease in government health expenditure associated with SBA/EFF agreements in LMIC translate into decreases in universal health coverage and other negative effects on health care systems?

To do so, the effect of agreements on more indicators need to be assessed. These indicators could include a number of different individual variables. One possibility would be to assess in more detail the effects of agreements in terms of equity of access. This could for instance be done by investigating the distributional effects of health expenditure and who is paying for health care services. This could be done by adopting the approach taken by O'Donnell et al (2008).

Alternatively, a more comprehensive approach to understanding the effects on health system and particularly the achievement of universal health coverage can be taken. While universal health coverage has been discussed as a concept for some time, methodology to actually measure the achievement of universal health coverage is in its infancy. The work of Wagstaff et al (2015), operationalises the concept by

measuring service coverage and financial protection. Following this approach to assess the effects of IMF agreements on universal health coverage would mean to use data over a certain time period and generate the universal health coverage indicator for each time point, most likely every year. Having done so, a methodology similar to the one used in this study could be followed, where the level of achieving universal coverage as measured with the indicator could be modelled over time and the effect of IMF agreements be estimated in presence or absence of these agreements. This approach is somewhat more “data hungry” as Wagstaff et al (2015) propose to estimate the universal health coverage indicator using various variables from household surveys. This would potentially mean to reduce the number of countries in such a study to those for which data is available and also to restrict the observations as surveys are likely not conducted annually.

11.2.4 The Role of Development Assistance

This study uses an indicator of government health expenditure from the WHO National Health Accounts dataset (section 5.1.1.1; pg. 174), which captures flows of health expenditure that come from the government as source. This measure thereby includes money that comes from external organisation and is channelled through the government (development assistance to health). This measure of government health expenditure is seen as appropriate in the context of this study as development assistance to health is an integral part of health systems of countries with lower-income. This approach, however, leaves unclear if, for instance, the increase in spending found in low-income countries under social protection agreements is due to an expansion of spending by the government itself or due to an increase in development assistance. Development assistance to health could play a role in explaining the increases in government spending as IMF agreements are often seen as “seal of approval” for donors (Bauer et al, 2012), providing confidence that a country’s economy is regaining strength. Donors might therefore be interested in increasing assistance to health in countries undergoing IMF agreements.

It appears useful to investigate these dynamics between government health expenditure and the share of development assistance further. While development assistance is generally difficult to measure due to the various organisations involved

and the different pathways taken to channel money to governments, one dataset published by the Institute of Health Metrics and Evaluation (IHME, 2016) appears promising as it aggregates all flows of development assistance to health onto a country level. This dataset can be used to estimate indicators to investigate changes in flows of development assistance to health as well as those of the share of development assistance of total government health expenditure. Having constructed these indicators, an analysis similar to the one offered in this study can be conducted to investigate changes in development assistance over time and in response to agreements. This will allow one to better understand the role of the IMF as seal of approval for organisations to allocate assistance to health.

11.2.5 Understanding individual country trajectories

This study offered a cross-country study of the effects of IMF agreements on government health expenditure across all low- and middle-income countries and estimated the effects across all countries as well as for different income groups and agreement types. While differences in effects between different groups of countries were observed, it also appears that individual countries have different experiences of agreements. Future research can exploit this and aim to understand country experiences in more depth.

One approach to understanding the effects of IMF agreements can be seen in conducting in-depth country studies assessing the trajectory of government health expenditure of only a small number of, or even just one country. Doing so will allow to study this particular country in more detail and enrich the analysis with additional qualitative information that might help gain deeper understanding of a country's experience. Synthetic controls (Abadie et al, 2014) is a relatively new, and increasingly popular, method that allows one to study individual country cases and thereby add qualitative information to quantitative data. This method was developed for research in comparative political research, where the effects of a certain policy that only a small number of countries, or only one country, experience ought to be compared to countries that do not experience similar policies. In particular, this method allows one to compare a country that has been exposed to IMF agreements for a period of time to a synthetic control, which is a constructed composite of non-IMF agreement countries,

which exhibit otherwise similar performance as the IMF country. Beyond the pure analysis of changes in government health expenditure, the analysis can be enriched with further qualitative information, such as agreement documents, to provide more context to the observed experience in the IMF country and therefore allow for a richer understanding of the effects of IMF agreements in the chosen country.

11.2.6 Understanding the Role of income group and agreement types

This study has shown that the effects of IMF agreements on government health expenditure vary both between income groups as well as agreement types (see Chapter 9). In doing so, this study has made contributions to the literature (compare section 10.3), however, future research can aim to explicitly compare (i) the role of the income group relative to the role of the agreement type and (ii) the effects of different agreement types compared to each other. To investigate this further, additional statistical methods can be used to advance the understanding of the effects of IMF agreements on government health expenditure. This can be done in two ways.

Firstly, future research can aim to understand the importance of agreement types compared to income groups in order to untangle if it is indeed the type of agreement that makes a difference to the effect on government health expenditure, or a less tangible element of a country's income group. This can for instance be done by performing analyses across the dataset of all countries in the study and introducing both an income group dummy, an agreement dummy as well as an interaction effect between the two. The obtained results can then for instance help inform if agreement type has an effect on top of income group.

Secondly, future research can aim to understand the differences in effects of agreement types by comparing the effects of different agreement types against each other. This can for instance help to understand if social protection agreements are systematically different in their effect compared to SBA/EFF agreements. Methodologically, research that aims at understanding this can achieve this by running regressions across all agreement types and introduce an agreement dummy into the models. Quasi Variances (Firth and De Menezes, 2004), which allow to compare the

effects of categorical variables against each other, can be used to evaluate the effects of agreement types when comparing between them. Results can then help inform if the effects of social protection agreements are systematically different from those of SBA/EFF agreements.

11.2.7 Determinants of IMF agreements

This study has systematically reviewed the determinants of IMF agreements described in the literature. Fitting models to predict IMF agreements using the most commonly used determinants identified through this literature review showed good model fit and classification performance. In doing robustness checks on these models and excluding the indicator of “previous IMF agreement”, the model performance reduced considerably, suggesting that a large part of model fit is mostly driven by the lag of the agreement dummy rather than actual measures of economic performance. This in turn means that the variables currently used to predict IMF agreements do not perform very well and identifying additional variables that explain why countries enter into IMF agreements should be explored in future work.

While not immediately related to the topic of IMF agreements’ effects on government health expenditure, it nevertheless appears useful to identify additional factors that explain why countries enter into IMF agreements. This can for instance be done by including additional variables of economic performance or the role of a country in the political economy and understanding the effect these variables have on classification performance of the models. However, the models in the literature already include a diverse array of variables so that it appears difficult to identify additional variables in this way. An alternative can be seen in identifying additional factors in a more qualitative way, for instance through interviews with stakeholders involved in the agreement process, such as country representatives and IMF officials.

References

- Abadie, A., Diamond, A. and Hainmueller, J. (2014) 'Comparative politics and the synthetic control method', *American Journal of Political Science*.
- Alubo, S. O. (1990) 'Debt crisis, health and health services in Africa', *Social Science & Medicine*, vol. 31, no. 6, pp. 639-648.
- Andersen, T. B., Harr, T. and Tarp, F. (2006) 'On US politics and IMF lending', *European Economic Review*, vol. 50, no. 7, pp. 1843-1862.
- Angrist, J. D. and Pischke, J.-S. (2009) *Mostly harmless econometrics: An empiricist's companion*, Princeton: Princeton University Press.
- Angrist, J. D. and Pischke, J.-S. (2015) *Mastering 'Metrics: The Path from Cause to Effect*, Princeton: Princeton University Press.
- Anyinam, C. A. (1989) 'The social costs of the International Monetary Fund's adjustment programs for poverty: the case of health care development in Ghana', *International Journal of Health Services*, vol. 19, no. 3, pp. 531-547.
- Arellano, M. and Bond, S. (1991) 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations', *The Review of Economic Studies*, vol. 58, no. 2, pp. 277-297.
- Atoyan, R. and Conway, P. (2006) 'Evaluating the impact of IMF programs: A comparison of matching and instrumental-variable estimators', *The Review of International Organizations*, vol. 1, no. 2, pp. 99-124.
- Baltagi, B. H. (2008) *Econometric analysis of panel data*, 4th edition, Chichester: J. Wiley & Sons, Inc.
- Baltagi, B. H. (2011) *Econometrics*, 5th edition, Berlin: Springer.
- Barro, R. J. and Lee, J. W. (2005) 'IMF programs: Who is chosen and what are the effects?', *Journal of Monetary Economics*, vol. 52, no. 7, pp. 1245-1269.
- Bas, M. A. and Stone, R. W. (2014) 'Adverse selection and growth under IMF programs', *Review of International Organizations*, vol. 9, no. 1, pp. 1-28.
- Bauer, M. E., Cruz, C. and Graham, B. A. T. (2012) 'Democracies only: When do IMF agreements serve as a seal of approval?', *The Review of International Organizations*, vol. 7, no. 1, pp. 33-58.

- Beck, N. and Katz, J. N. (1995) 'What to do (and not to do) with time-series cross-section data', *American Political Science Review*, vol. 89, no. 03, pp. 634-647.
- Beck, N. and Katz, J. N. (2011) 'Modeling dynamics in time-series-cross-section political economy data', *Annual Review of Political Science*, vol. 14, pp. 331-352.
- Beck, N. L., Katz, J. N. and Mignozzetti, U. G. (2014) 'Of Nickell Bias and its Cures: Comment on Gaibulloev, Sandler, and Sul', *Political Analysis*, vol. 22, no. 2, pp. 274-278.
- Beckett, S. (2013) *Introduction to Time Series Using Stata*, College Station: Stata Press.
- Benson, J. S. (2001) 'The impact of privatization on access in Tanzania', *Social Science and Medicine*, vol. 52, no. 12, pp. 1903-15.
- Bhutta, Z. A. (2001) 'Structural adjustments and their impact on health and society: a perspective from Pakistan', *International Journal of Epidemiology*, vol. 30, no. 4, pp. 712-716.
- Biglaiser, G. and DeRouen, K. (2011) 'How soon is now? The effects of the IMF on economic reforms in Latin America', *Review of International Organizations*, vol. 6, no. 2, pp. 189-213.
- Bird, G. (1995) *IMF lending to developing countries: Issues and evidence*, London: Routledge.
- Bird, G. (2007) 'The IMF: A Bird's Eye View of Its Role and Operations', *Journal of Economic Surveys*, vol. 21, no. 4, pp. 683-745.
- Bird, G. and Mosley, P. (2004) 'The Role of the IMF in developing countries', in Vines, D. and Gilbert, C. (eds.) *The IMF and its Critics - Reform of Global Financial Architecture*, Cambridge: Cambridge University Press.
- Bird, G., Mylonas, J. and Rowlands, D. (2015) 'The political economy of participation in IMF programs: a disaggregated empirical analysis', *Journal of Economic Policy Reform*, vol. 18, no. 3, pp. 221-243.
- Bird, G. and Rowlands, D. (2001) 'IMF lending: how is it affected by economic, political and institutional factors?', *The Journal of Policy Reform*, vol. 4, no. 3, pp. 243-270.

- Bird, G. and Rowlands, D. (2004) 'The demand for IMF assistance', in Ranis, G., Vreeland, J. R. and Kosack, S. (eds.) *Globalization and the Nation State: The Impact of the IMF and the World Bank*, Abingdon: Routledge.
- Bird, G. and Rowlands, D. (2009a) 'A disaggregated empirical analysis of the determinants of IMF arrangements: Does one model fit all?', *Journal of International Development*, vol. 21, no. 7, pp. 915-931.
- Bird, G. and Rowlands, D. (2009b) 'Exchange Rate Regimes in Developing and Emerging Economies and the Incidence of IMF Programs', *World Development*, vol. 37, no. 12, pp. 1839-1848.
- Birn, A. E., Zimmerman, S. and Garfield, R. (2000) 'To decentralize or not to decentralize, is that the question? Nicaraguan health policy under structural adjustment in the 1990s', *International Journal of Health Services*, vol. 30, no. 1, pp. 111-128.
- Bisgaard, S. and Kulahci, M. (2011) *Time series analysis and forecasting by example*, Hoboken: John Wiley & Sons, Inc.
- Blank, R. H. and Burau, V. (2014) *Comparative Health Policy*, 4th edition, Basingstoke: Palgrave MacMillan.
- Breen, M. (2013) *The Politics of IMF Lending*, Basingstoke: Palgrave Macmillan.
- Breman, A. and Shelton, C. (2007) 'Structural Adjustment Programs and Health', in Kawachi, I. and Wamala, S. P. (eds.) *Globalization and Health*, Oxford: Oxford University Press.
- Breusch, T. S. and Pagan, A. R. (1980) 'The Lagrange multiplier test and its applications to model specification in econometrics', *The Review of Economic Studies*, vol. 47, no. 1, pp. 239-253.
- Broz, J. L. and Hawes, M. B. (2006) 'US domestic politics and international monetary fund policy', in G., D., Hawkins, D., Lake, D. (eds.) *Delegation and Agency in International Organizations* Cambridge: Cambridge University Press.
- Buckley, R. P. and Baker, J. (2008) 'IMF policies and health in sub-Saharan Africa', in Kay, A. and Williams, O. (eds.) *Global health governance: Crisis, institutions and political economy*, London: Palgrave Macmillan.

- Burda, M. and Wyplosz, C. (2001) *Macroeconomics - a European Text*, 3rd edition, Oxford: Oxford University Press.
- Cameron, A. C. and Trivedi, P. K. (2005) *Microeconometrics: methods and applications*, Cambridge: Cambridge University Press.
- Cameron, A. C. and Trivedi, P. K. (2009) *Microeconometrics Using Stata*, College Station: Stata Press.
- Castles, F. G. (1994) 'Is expenditure enough? On the nature of the dependent variable in comparative public policy analysis', *The Journal of Commonwealth & Comparative Politics*, vol. 32, no. 3, pp. 349-363.
- Cerutti, E. (2007) 'IMF Drawing Programs: Participation Determinants and Forecasting', *IMF Working Papers*, vol. 07, no. 152, pp. 1-27.
- Chatfield, C. (2004) *The Analysis of Time Series: An Introduction*, 6th edition, London: Chapman & Hall/CRC.
- Clasen, J. and Siegel, N. A. (eds.) (2007) *Investigating welfare state change: the "dependent variable problem" in comparative analysis*, Northampton: Edward Elgar Publishing.
- Clements, B., Gupta, S. and Nozaki, M. (2011) *Database: IMF Staff Discussion Note: What happens to Social Spending in IMF-Supported Programs?* [Online]. Available: <http://www.imf.org/external/pubs/ft/sdn/2011/data/sdn1115.xls> [Accessed 20 August 2014].
- Clements, B., Gupta, S. and Nozaki, M. (2013) 'What happens to social spending in IMF-supported programmes?', *Applied Economics*, vol. 45, no. 28, pp. 4022-4033.
- Cockerham, G. and Cockerham, W. (2000) *Health and Globalization*, Cambridge: Polity Press.
- Conway, P. (1994) 'IMF lending programs - participation and impact', *Journal of Development Economics*, vol. 45, no. 2, pp. 365-391.
- Conway, P. (2007) 'The revolving door: Duration and recidivism in IMF programs', *The Review of Economics and Statistics*, vol. 89, no. 2, pp. 205-220.
- Copelovitch, M. (2010a) 'Master or servant? Common agency and the political economy of IMF lending', *International Studies Quarterly*, vol. 54, pp. 49-77.

- Copelovitch, M. S. (2010b) *The International Monetary Fund in the Global Economy: Banks, Bonds, And Bailouts*, Cambridge: Cambridge University Press.
- Cornia, G. A., Jolly, R. and Stewart, F. (eds.) (1987) *Adjustment With A Human Face: Protecting The Vulnerable And Promoting Growth*, Oxford: Oxford University Press.
- Cowpertwait, P. S. P. and Metcalfe, A. V. (2009) *Introductory Time Series with R*, New York: Springer.
- Cruickshank, C. J. (2000) 'Report from Nicaragua: Midwifery and structural adjustment', *Journal of Midwifery & Womens Health*, vol. 45, no. 5, pp. 411-415.
- Curtis, E. (1998) 'Child health and the international monetary fund: the Nicaraguan experience', *Lancet*, vol. 352, no. 9140, pp. 1622-1624.
- Cutler, D. M. and Zeckhauser, R. (1998) 'Adverse Selection in Health Insurance', in Garber, A. (ed.) *Frontiers in Health Policy Research*, Cambridge: MIT Press.
- De Deken, J. and Kittel, B. (2007) 'Social Expenditure Under Scrutiny: the Problems of Using Aggregate Spending Data for Assessing Welfare State Dynamics', in Clasen, J. and Siegel, N. A. (eds.) *Investigating Welfare State Change : The "Dependent Variable Problem" in Comparative Analysis*, Northampton: Edward Elgar Publishing.
- De Vogli, R. and Birbeck, G. L. (2005) 'Potential impact of adjustment policies on vulnerability of women and children to HIV/AIDS in sub-Saharan Africa', *Journal of Health, Population and Nutrition*, vol. 23, no. 2, pp. 105-120.
- Dehja, R. and Wahba, S. (2002) 'Propensity Score-Matching Methods For Nonexperimental Causal Studies', *The Review of Economics and Statistics*, vol. 84, no. 1, pp. 151-161.
- DeJong, D. N., Narkervis, J. C., Savin, N. E. (1992) 'The power problems of unit root tests in time series with autoregressive errors', *Journal of Econometrics*, vol. 53, pp. 323-343.
- Dejong, J. (1995) 'Households, health and crises: coping with economic upheaval in Jordan, 1988-1991', *Journal of International Development*, vol. 7, no. 3, pp. 443-465.

- Demombynes, G. and Sandefur, J. (2014) *Benefits and Costs of the Data for Development Targets for the Post-2015 Development Agenda - Post-2015 Consensus*, Copenhagen: Copenhagen Consensus Center.
- Devarajan, S., Swaroop, V. and Rajkumar, S. A. (1999) *What Does Aid to Africa Finance? - Policy Research Working Papers.*, Washington: World Bank.
- Dickey, D. A. and Fuller, W. A. (1979) 'Distribution of the estimators for autoregressive time series with a unit root', *Journal of the American Statistical Association*, vol. 74, no. 366a, pp. 427-431.
- Dieleman, J. L. and Hanlon, M. (2014) 'Measuring the displacement and replacement of government health expenditure', *Health Economics*, vol. 23, no. 2, pp. 129-140.
- Dreher, A. (2006) 'IMF and economic growth: The effects of programs, loans, and compliance with conditionality', *World Development*, vol. 34, no. 5, pp. 769-788.
- Dreher, A., Sturm, J.-E. and Vreeland, J. R. (2009) 'Global horse trading: IMF loans for votes in the United Nations Security Council', *European Economic Review*, vol. 53, no. 7, pp. 742-757.
- Dreher, A., Sturm, J.-E. and Vreeland, J. R. (2015) 'Politics and IMF Conditionality', *Journal of Conflict Resolution*, vol. 59, no. 1, pp. 120-148.
- Driscoll, J. C. and Kraay, A. C. (1998) 'Consistent covariance matrix estimation with spatially dependent panel data', *Review of Economics and Statistics*, vol. 80, no. 4, pp. 549-560.
- Drukker, D. M. (2003) 'Testing for serial correlation in linear panel-data models', *Stata Journal*, vol. 3, no. 2, pp. 168-177.
- Dustmann, C. and Rochina-Barrachina, M. E. (2007) 'Selection correction in panel data models: An application to the estimation of females' wage equations', *The Econometrics Journal*, vol. 10, no. 2, pp. 263-293.
- Easterly, W. (2006) 'An identity crisis? Examining IMF financial programming', *World Development*, vol. 34, no. 6, pp. 964-980.
- Easterly, W. and Pfitze, T. (2008) 'Where Does the Money Go? Best and Worst Practices in Foreign Aid', *The Journal of Economic Perspectives*, vol. 22, no. 2, pp. 29-52.

- Edwards, M. S. (2005) 'Investor Responses to IMF Program Suspensions: Is Noncompliance Costly?', *Social Science Quarterly*, vol. 86, no. 4, pp. 857-873.
- Edwards, S. and Santaella, J. A. (1993) 'Devaluation Controversies in the Developing Countries: Lessons from the Bretton Woods Era', in Bordo, M. and Eichengreen, B. (eds.) *A Retrospective on the Bretton Woods System - Lessons for International Monetary Reform*, Chicago: Chicago University Press.
- Eichengreen, B., P. G. and A., M. (2006) 'Sudden Stops and IMF-Supported Programs', *NBER Working Papers*, vol. 12235.
- Eichengreen, B. J. (2008) *Globalizing Capital: A History Of The International Monetary System*, 2nd edition, Princeton: Princeton University Press.
- Ekouevi, K. and Adepoju, A. (1995) 'Adjustment, social sectors, and demographic change in Sub-Saharan Africa', *J Int Dev*, vol. 7, no. 1, pp. 47-59.
- Esping-Andersen, G. (1990) *The three worlds of welfare capitalism*, Cambridge: Polity Press.
- Fails, M. D. and Woo, B. (2015) 'Unpacking Autocracy: Political Regimes and IMF Program Participation', *International Interactions*, vol. 41, no. 1, pp. 110-132.
- Fan, V. Y. and Savedoff, W. D. (2014) 'The health financing transition: A conceptual framework and empirical evidence', *Social Science and Medicine*, vol. 105, pp. 112-121.
- Farag, M., Nandakumar, A. K., Wallack, S. S. (2009) 'Does funding from donors displace government spending for health in developing countries?', *Health Affairs (Millwood)*, vol. 28, no. 4, pp. 1045-55.
- Feldstein, M., Geithner, T. F., Keating, P. (2003) 'IMF Structural Programs', in Feldstein, M. (ed.) *Economic and Financial Crises in Emerging Market Economies*, Chicago: Chicago University Press.
- Firth, D. and De Menezes, R. X. (2004) 'Quasi-Variations', *Biometrika*, vol. 91, no. 1, pp. 65-80.
- Freedom House (2015) *Freedom House Dataset*, Washington: Freedom House.

- Fryatt, R., Mills, A. and Nordstrom, A. (2010) 'Financing of health systems to achieve the health Millennium Development Goals in low-income countries', *The Lancet*, vol. 375, no. 9712, pp. 419-426.
- Fuchs, V. R. (1996) 'What Every Philosopher Should Know about Health Economics', *Proceedings of the American Philosophical Society*, vol. 140, no. 2, pp. 186-196.
- Gaibulloev, K., Sandler, T. and Sul, D. (2014) 'Dynamic Panel Analysis under Cross-Sectional Dependence', *Political Analysis*, vol. 22, no. 2, pp. 258-273.
- Garibaldi, P., Martins, J. O. and van Ours, J. (2010) *Ageing, health, and productivity: The economics of increased life expectancy*: Oxford University Press.
- Garuda, G. (2000) 'The distributional effects of IMF programs: a cross-country analysis', *World Development*, vol. 28, no. 6, pp. 1031-1051.
- Gbesemete, K. P. and Gerdtham, U.-G. (1992) 'Determinants of health care expenditure in Africa: A cross-sectional study', *World Development*, vol. 20, no. 2, pp. 303-308.
- Gelman, A. and Hill, J. (2006) *Data Analysis Using Regression and Multilevel/Hierarchical Models*, Cambridge: Cambridge University Press.
- Gerdtham, U.-G. and Jönsson, B. (2000) 'International comparisons of health expenditure: Theory, data and econometric analysis', in Anthony, J. C. and Joseph, P. N. (eds.) *Handbook of Health Economics*, Oxford: Elsevier.
- Gold, J. (1979) *Conditionality - Pamphlet Series No. 31*, Washington: IMF.
- Goldsbrough, D., Adovor, E. and Elberger, B. (2007a) *What Has Happened to Health Spending and Fiscal Flexibility in Low Income Countries with IMF Programs?*, Washington DC: Center for Global Development.
- Goldsbrough, D., Amoako, K. Y., Basu, A. (2007b) *Does the IMF constrain health spending in poor countries? Evidence and an agenda for action*, Washington DC: Center for Global Development.
- Goldstein, M. and Montiel, P. (1986) 'Evaluating Fund stabilization programs with multicountry data: Some methodological pitfalls', *IMF Staff Papers*, vol. 33, no. 2, pp. 304-344.
- Gottret, P. and Schieber, G. (2006) *Health Financing Revisited - A Practitioner's Guide*, Washington: World Bank.

- Gray, A. (2005) 'Population ageing and health care expenditure', *Ageing Horizons*, no. 2, pp. 15-20.
- Greene, W. H. (2011) *Econometric analysis*, 7th edition, Harlow: Pearson Education.
- Gutián, M. (1981) *Fund Conditionality: Evolution of Principles and Practices*, Washington: International Monetary Fund.
- Gündüz, Y. B. (2009) 'Estimating Demand for IMF Financing by Low-Income Countries in Response to Shocks', *IMF Working Paper*, vol. 09, no. 263.
- Gupta, S. (2010) 'Response of the International Monetary Fund to its critics', *International Journal of Health Services*, vol. 40, no. 2, pp. 323-326.
- Gupta, S. (2015) 'Response to "The International Monetary Fund and the Ebola outbreak"', *Lancet Global Health*, vol. 3, no. 2, pp. e78.
- Gupta, S., Clements, B., McDonald, C. (1998) 'The IMF and the Poor', *IMF Pamphlet Series*, no. 52.
- Gupta, S., Dicks-Mireaux, L., Khemani, R. (2000) *Social issues in IMF-supported programs*, Washington: International Monetary Fund.
- Gupta, S., Plant, M., Clements, B. (2002) *Is the PRGF Living Up to Expectations? An Assessment of Program Design*, Washington: IMF.
- Hadenius, A. and Teorell, J. (2005) 'Cultural and economic prerequisites of democracy: Reassessing recent evidence', *Studies in Comparative International Development*, vol. 39, no. 4, pp. 87-106.
- Hadri, K. (2000) 'Testing for stationarity in heterogeneous panel data', *The Econometrics Journal*, vol. 3, no. 2, pp. 148-161.
- Hajro, Z. and Joyce, J. P. (2009) 'A true test: do IMF programs hurt the poor?', *Applied Economics*, vol. 41, no. 3, pp. 295-306.
- Hamilton, B. H. and Nickerson, J. A. (2003) 'Correcting for Endogeneity in Strategic Management Research', *Strategic Organization*, vol. 1, no. 1, pp. 51-78.
- Hamilton, J. D. (1994) *Time Series Analysis*, Princeton: Princeton University Press.
- Handa, S. and King, D. (2003) 'Adjustment with a Human Face? Evidence from Jamaica', *World Development*, vol. 31, no. 7, pp. 1125-1145.
- Harrell, F. E. (2015) *Regression modeling strategies: with applications to linear models, logistic and ordinal regression, and survival analysis*, 2nd edition, Heidelberg: Springer.

- Harrigan, J., Wang, C. G. and El-Said, H. (2006) 'The economic and political determinants of IMF and world bank lending in the Middle East and North Africa', *World Development*, vol. 34, no. 2, pp. 247-270.
- Harvey, A. C. (1976) 'Estimating regression models with multiplicative heteroscedasticity', *Econometrica*, vol. 44, no. 3, pp. 461-465.
- Hausman, J. A. (1978) 'Specification tests in econometrics', *Econometrica*, vol. 46, no. 6, pp. 1251-1271.
- Heckman, J. and Navarro-Lozano, S. (2004) 'Using matching, instrumental variables, and control functions to estimate economic choice models', *Review of Economics and statistics*, vol. 86, no. 1, pp. 30-57.
- Heckman, J. J. (1979) 'Sample selection bias as a specification error', *Econometrica: Journal of the econometric society*, vol. 47, no. 1, pp. 153-161.
- Heller, P. S. (2006) 'The prospects of creating 'fiscal space' for the health sector', *Health Policy and Planning*, vol. 21, no. 2, pp. 75-79.
- Hellowell, M. and Ralston, M. (2015) 'The equity implications of health system change in the UK', in Smith, K. E., Bambra, C. and Hill, S. E. (eds.) *Health Inequalities: Critical Perspectives*, Oxford: Oxford University Press.
- Higgins, J. P. and Green, S. (2008) *Cochrane handbook for systematic reviews of interventions*, Chichester: John Wiley & Sons, Ltd.
- Hoddie, M. and Hartzell, C. A. (2014) 'Short-Term Pain, Long-Term Gain? The Effects of IMF Economic Reform Programs on Public Health Performance', *Social Science Quarterly*, vol. 95, no. 4, pp. 1022-1042.
- Hoechle, D. (2007) 'Robust standard errors for panel regressions with cross-sectional dependence', *The Stata Journal*, vol. 7, no. 3, pp. 281-312.
- Holland, P. W. (1986) 'Statistics and causal inference', *Journal of the American Statistical Association*, vol. 81, no. 396, pp. 945-960.
- Homedes, N. and Ugalde, A. (2005) 'Why neoliberal health reforms have failed in Latin America', *Health Policy*, vol. 71, no. 1, pp. 83-96.
- Hopkins, S. (2006) 'Economic stability and health status: evidence from East Asia before and after the 1990s economic crisis', *Health Policy*, vol. 75, no. 3, pp. 347-357.

- Hossen, M. A. and Westhues, A. (2012) 'The medicine that might kill the patient: Structural Adjustment and its impacts on health care in Bangladesh', *Social Work in Public Health*, vol. 27, no. 3, pp. 213-28.
- Hsiao, C. (2014) *Analysis of panel data*, 3rd edition, Cambridge Cambridge University Press.
- Huber, E., Mustillo, T. and Stephens, J. D. (2008) 'Politics and Social Spending in Latin America', *The Journal of Politics*, vol. 70, no. 2, pp. 420-436.
- Hurley, J. (2001) 'Ethics, economics, and public financing of health care', *Journal of Medical Ethics*, vol. 27, no. 4, pp. 234-239.
- Hutchison, M. (2003) 'A cure worse than the disease? Currency crises and the output costs of IMF-supported stabilization programs', *Managing currency crises in emerging markets*: University of Chicago Press.
- Hutchison, M. M. and Noy, I. (2004) 'Macroeconomic effects of IMF-sponsored programs in Latin America: output costs, program recidivism and the vicious cycle of failed stabilizations', *Journal of International Money and Finance*, vol. 22, no. 7, pp. 991-1014.
- IEO (2016) *The IMF and Social Protection - Draft Issues Paper for an Evaluation by the Independent Evaluation Office (IEO)*, Washington: IEO.
- IHME (2016) *Health Financing* [Online]. Available: <http://www.healthdata.org/health-financing> [Accessed 12 May 2016].
- IMF (1999) *Review of Social Issues and Policies in IMF-Supported Programs*, Washington: International Monetary Fund.
- IMF (2000a) *Concluding Remarks by Horst Köhler Chairman of the Executive Board and Managing Director of the International Monetary Fund at the Closing Joint Session Prague, September 27, 2000*, Washington: International Monetary Fund.
- IMF (2000b) *Social Policy Issues in IMF-Supported Programs: Follow-Up on the 1995 World Summit for Social Development*, Washington: International Monetary Fund.
- IMF (2001a) *Conditionality in Fund-Supported Programs*, Washington: International Monetary Fund.

- IMF (2001b) *IMF Lending to Poor Countries -How does the PRGF differ from the ESAF?* [Online]. Available:
<https://www.imf.org/external/np/exr/ib/2001/043001.htm> [Accessed 15 December 2015].
- IMF (2001c) *Structural Conditionality in Fund-Supported Programs*, Washington: International Monetary Fund.
- IMF (2004) *IMF Concessional Financing through the ESAF*, Washington: International Monetary Fund.
- IMF (2006) *Renewing the IMF's Commitment to Low-Income Countries - Speech by Rodrigo de Rato* [Online]. Available:
<http://www.imf.org/external/np/speeches/2006/073106.htm> [Accessed 10 January 2015].
- IMF (2009a) 'G-20 Reaffirms IMF's Central Role in Combating Crisis', *IMF Survey*, no. 3 April 2009.
- IMF (2009b) 'IMF Backs New Package To Support World's Poorest During Crisis', *IMF Survey*, no. 29 July 2009.
- IMF (2009c) *IMF Reforms Financial Facilities for Low-Income Countries [Public Information Notice No. 09/94]* [Online]. Available:
<https://www.imf.org/external/np/sec/pn/2009/pn0994.htm> [Accessed 10 October 2015].
- IMF (2009d) *Poverty Reduction and Growth Facility (PRGF)*, Washington: IMF.
- IMF (2011) *Articles of Agreement*, Washington: International Monetary Fund.
- IMF (2012a) *List of Members* [Online]. Available:
<https://www.imf.org/external/np/sec/memdir/memdate.htm> [Accessed 05 July 2014].
- IMF (2012b) *Republic of South Sudan becomes IMF's 188th Member Press Release No. 12/140* [Online]. Available:
<https://www.imf.org/external/np/sec/pr/2012/pr12140.htm> [Accessed 10 November 2014].
- IMF (2013a) *Eligibility to use the fund's facilities for concessional financing*, Washington: International Monetary Fund.
- IMF (2013b) *The IMF at a Glance*, Washington: International Monetary Fund.

- IMF (2013c) *IMF Rapid Credit Facility (RCF)*, Washington: International Monetary Fund.
- IMF (2013d) *IMF Support for Low-Income Countries*, Washington: International Monetary Fund.
- IMF (2013e) *Monitoring of Fund Arrangements (MONA)* [Online]. Available: <http://www.imf.org/external/np/pdr/mona/index.aspx> [Accessed 10 March 2013].
- IMF (2014a) *Financial Data by Country* [Online]. Available: <http://www.imf.org/external/np/fin/tad/exfin1.aspx> [Accessed 15 October 2014].
- IMF (2014b) *Financing the Fund's Concessional Lending to Low-Income Countries*, Washington: International Monetary Fund.
- IMF (2014c) *Government Finance Statistics Manual 2001* [Online]. Available: <https://www.imf.org/external/pubs/ft/gfs/manual/pdf/all.pdf> [Accessed 20 April 2014].
- IMF (2014d) *IMF Extended Credit Facility (ECF)*, Washington: International Monetary Fund.
- IMF (2015a) *AREAER Online* [Online]. Available: <http://www.elibrary.imf.org/page/AREAER/> [Accessed 17 October 2015].
- IMF (2015b) *The IMF and the Millennium Development Goals* Washington: International Monetary Fund.
- IMF (2015c) *IMF Conditionality*, Washington: International Monetary Fund.
- IMF (2015d) *IMF Government Finance Statistics (GFS)* [Online]. Available: <http://www.imf.org/external/pubs/ft/gfs/manual/aboutgfs.htm> [Accessed 20 April 2015].
- IMF (2015e) *IMF Members' Quotas and Voting Power, and IMF Board of Governors* [Online]. Available: <http://www.imf.org/external/np/sec/memdir/members.aspx> [Accessed 15 October 2015].
- IMF (2015f) *Poverty Reduction Strategies in IMF-supported Programs*, Washington: International Monetary Fund.

- IMF (2015g) *World Economic Outlook Database*, Washington: The International Monetary Fund.
- IMF (2016a) *2016 Handbook of IMF Facilities for Low-Income Countries*, Washington: International Monetary Fund.
- IMF (2016b) *IMF Exogenous Shocks Facility (ESF)*, Washington: International Monetary Fund.
- IMF (2016c) *IMF Extended Fund Facility (EFF)*, Washington: International Monetary Fund.
- IMF (2016d) *IMF Flexible Credit Line (FCL)*, Washington: International Monetary Fund.
- IMF (2016e) *IMF Lending*, Washington: International Monetary Fund.
- IMF (2016f) *IMF Precautionary and Liquidity Line (PLL)* Washington: International Monetary Fund.
- IMF (2016g) *IMF Standby Agreement (SBA)*, Washington: International Monetary Fund.
- IMF (2016h) *IMF Standby Credit Facility (SCF)*, Washington: International Monetary Fund.
- IMF (2016i) *United Kingdom: Financial Position in the Fund as of May 31, 2016* [Online]. Available: <http://www.imf.org/external/np/fin/tad/exfin2.aspx?memberKey1=1010&date1key=2016-07-08> [Accessed 1 June 2016].
- Ismail, S. (2013) 'International financial institutions and health in Egypt and Tunisia: change or continuity?', *International Journal of Health Services*, vol. 43, no. 1, pp. 61-6.
- Ismi, A. (2004) *Impoverishing a continent: The World Bank and the IMF in Africa*, Ottawa: Halifax Initiative Coalition.
- Jaunky, V. C. and Khadaroo, A. J. Health care expenditure and GDP: an African perspective. iHEA 2007 6th World Congress: Explorations in Health Economics Paper, 2006.
- Jensen, N. M. (2004) 'Crisis, Conditions, and Capital: The Effect of International Monetary Fund Agreements on Foreign Direct Investment Inflows', *Journal of Conflict Resolution*, vol. 48, no. 2, pp. 194-210.

- Jerven, M. (2013) *Poor Numbers: How We Are Misled by African Development Statistics and What to Do about It*, Ithaca: Cornell University Press.
- Jerven, M. (2015) *Africa: why economists get it wrong*, London: Zed Books.
- Jorra, M. (2012) 'The effect of IMF lending on the probability of sovereign debt crises', *Journal of International Money and Finance*, vol. 31, no. 4, pp. 709-725.
- Joyce, J. J. (1992) 'The economic characteristics of IMF program countries', *Economic Letters*, vol. 38, no. 2, pp. 237-242.
- Kaasch, A. (2015) *Shaping Global Health Policy: Global Social Policy Actors and Ideas about Health Care Systems*, Basingstoke: Palgrave Macmillan.
- Kanji, N., Kanji, N. and Manji, F. (1991) 'From development to sustained crisis: structural adjustment, equity and health', *Soc Sci Med*, vol. 33, no. 9, pp. 985-993.
- Kentikelenis, A., King, L., McKee, M. (2015a) 'The International Monetary Fund and the Ebola outbreak', *The Lancet Global Health*, vol. 3, no. 2, pp. e69-e70.
- Kentikelenis, A. E., Stubbs, T. H. and King, L. P. (2015b) 'Structural adjustment and public spending on health: Evidence from IMF programs in low-income countries', *Social Science & Medicine*, vol. 126, no. 0, pp. 169-176.
- Kiyamaz, H., Akbulut, Y. and Demir, A. (2006) 'Tests of stationarity and cointegration of health care expenditure and gross domestic product', *The European Journal of Health Economics*, vol. 7, no. 4, pp. 285-289.
- Kluve, J. and Augurzky, B. (2004) 'Assessing the Performance of Matching Algorithms When Selection into Treatment Is Strong', *IZA Discussion Papers*, no. 1301.
- Kmenta, J. (1986) *Elements of econometrics*, London: Collier Macmillan Publishers.
- Knight, M. and Santaella, J. A. (1997) 'Economic determinants of IMF financial arrangements', *Journal of Development Economics*, vol. 54, no. 2, pp. 405-436.
- Köhler, H. (2000) *Toward a More Focused IMF - Luncheon Address* [Online]. Available: <https://www.imf.org/external/np/speeches/2000/053000.htm> [Accessed 20 November 2014].
- Koop, G. (2000) *Analysis of Economic Data*, Chichester: Wiley & Sons, Inc.

- Kremer, M. (2002) 'Pharmaceuticals and the developing world', *The Journal of Economic Perspectives*, vol. 16, no. 4, pp. 67-90.
- Kutzin, J. (2013) 'Health financing for universal coverage and health system performance: concepts and implications for policy', *Bulletin of the World Health Organization*, vol. 91, no. 8, pp. 602-611.
- Kutzin, J., Yip, W. and Cashin, C. (2016) 'Alternative Financing Strategies for Universal Health Coverage', in Scheffler, R. (ed.) *World Scientific Handbook of Global Health Economics and Public Policy*, London: World Scientific.
- Lagarde, M. and Palmer, N. (2011) 'The impact of user fees on access to health services in low- and middle-income countries', *Cochrane Database of Systematic Reviews*, no. 4.
- Liang, L.-L. and Mirelman, A. J. (2014) 'Why do some countries spend more for health? An assessment of sociopolitical determinants and international aid for government health expenditures', *Social Science & Medicine*, vol. 114, pp. 161-168.
- Loewenson, R. (1993) 'Structural adjustment and health policy in Africa', *International Journal of Health Services*, vol. 23, no. 4, pp. 717-730.
- Logie, D. E. and Woodroffe, J. (1993) 'Structural adjustment: the wrong prescription for Africa?', *British Medical Journal*, vol. 307, no. 6895, pp. 41-4.
- Longhi, S. and Nandi, A. (2015) *A Practical Guide to Using Panel Data*, London: Sage.
- Lu, C., Schneider, M. T., Gubbins, P. (2010) 'Public financing of health in developing countries: a cross-national systematic analysis', *Lancet*, vol. 375, no. 9723, pp. 1375-87.
- Lugalla, J. L. (1995) 'The impact of structural adjustment policies on women's and children's health in Tanzania', *Review of African Political Economy*, vol. 22, no. 63, pp. 43-53.
- Maddala, G. S. (2001) *Introduction to Econometrics*, 3rd edition, Chichester: Wiley.
- Marshall, M., Gurr, T. and Keith, J. (2014) *Polity IV Project - Political Regime Characteristics and Transitions, 1800-2013*, Vienna: Center for Systemic Peace.

- Martin, R. and Segura-Ubiergo, A. (2004) *Social Spending in IMF-Supported Programs*, Washington: International Monetary Fund.
- Maynard, G., Shircliff, E. J. and Restivo, M. (2012) 'IMF Structural Adjustment, Public Health Spending, and Tuberculosis: A Longitudinal Analysis of Prevalence Rates in Poor Countries', *International Journal of Sociology*, vol. 42, no. 2, pp. 5-27.
- McFadden, D. (1980) 'Econometric Models for Probabilistic Choice Among Products', *The Journal of Business*, vol. 53, no. 3, pp. S13-S29.
- Mikkelsen, J. G. (1998) *A Model for Financial Programming (IMF Working Paper 98/80)*, Washington: IMF.
- Morgan, S. L. and Winship, C. (2007) *Counterfactuals and causal inference: Methods and principles for social research*, Cambridge: Cambridge University Press.
- Morgenstern, O. (1950) *On the Accuracy of Economic Observations*, Princeton: Princeton University Press.
- Morse, S. (2004) *Indices and Indicators in Development - an unhealthy Obsession with Numbers*, London: Earthscan.
- Moser, C. and Sturm, J.-E. (2011) 'Explaining IMF lending decisions after the Cold War', *Review of International Organizations*, vol. 6, no. 3-4, pp. 307-340.
- Mukherjee, B. and Singer, D. A. (2010) 'International institutions and domestic compensation: The IMF and the politics of capital account liberalization', *American Journal of Political Science*, vol. 54, no. 1, pp. 45-60.
- Murthy, V. N. and Okunade, A. A. (2009) 'The core determinants of health expenditure in the African context: Some econometric evidence for policy', *Health Policy*, vol. 91, no. 1, pp. 57-62.
- Musgrove, P. (1997) 'Economic crisis and health policy response', in Tapinos, G. P., Mason, A. and Bravo, J. (eds.) *Demographic responses to economic adjustment in Latin America*, Oxford: Clarendon Press.
- Musgrove, P., Zeramdini, R. and Carrin, G. (2002) 'Basic patterns in national health expenditure', *Bulletin of the World Health Organization*, vol. 80, no. 2, pp. 134-146.

- Nandakumar, A. K. and Farag, M. (2008) 'Determinants of National Health Expenditure', in Carrin, G., Buse, K., Heggenhougen, K. (eds.) *Health systems policy, finance, and organization*, Oxford: Academic Press.
- Newhouse, J. P. (1977) 'Medical-care expenditure: a cross-national survey', *Journal of Human Resources*, vol. 12, no. 1, pp. 115-125.
- Nickell, S. (1981) 'Biases in dynamic models with fixed effects', *Econometrica: Journal of the Econometric Society*, vol. 49, no. 6, pp. 1417-1426.
- Nooruddin, I. and Simmons, J. W. (2006) 'The politics of hard choices: IMF programs and government spending', *International Organization*, vol. 60, no. 04, pp. 1001-1033.
- O'Donnell, O., van Doorslaer, E., Rannan-Eliya, R. P. (2008) 'Who pays for health care in Asia?', *Journal of Health Economics*, vol. 27, no. 2, pp. 460-475.
- OECD (2015) *OECD Health Statistics* [Online]. Available: http://www.oecd-ilibrary.org/social-issues-migration-health/data/oecd-health-statistics_health-data-en;jsessionid=d5boca5pp8vt.x-oecd-live-02 [Accessed 20 April 2015].
- Oliver, H. C. (2006) 'In the wake of structural adjustment programs - Exploring the relationship between domestic policies and health outcomes in Argentina and Uruguay', *Canadian Journal of Public Health-Revue Canadienne De Sante Publique*, vol. 97, no. 3, pp. 217-221.
- Olsen, J. A. (2009) *Principles in health economics and policy*: Oxford University Press.
- Omran, A. R. (2005) 'The Epidemiologic Transition: A Theory of the Epidemiology of Population Change', *Milbank Quarterly*, vol. 83, no. 4, pp. 731-757.
- Ortiz, D. G. and Bejar, S. (2013) 'Participation in IMF-sponsored economic programs and contentious collective action in Latin America, 1980-2007', *Conflict Management and Peace Science*, vol. 30, no. 5, pp. 492-515.
- Paloni, A. and Zanardi, M. (2006) 'The IMF, World Bank and policy reform', in Paloni, A. and Zanardi, M. (eds.) *The IMF, World Bank and Policy Reform*, Abingdon: Routledge.
- Pan, J. and Liu, G. G. (2012) 'The determinants of chinese provincial government health expenditures: Evidence from 2002-2006 data', *Health Economics*, vol. 21, no. 7, pp. 757-777.

- Pandolfelli, L. E., Shandra, J. and Tyagi, J. (2014) 'The International Monetary Fund, Structural Adjustment, And Women's Health: A Cross-National Analysis Of Maternal Mortality In Sub-Saharan Africa', *Sociological Quarterly*, vol. 55, no. 1, pp. 119-142.
- Parkin, D., McGuire, A. and Yule, B. (1987) 'Aggregate health care expenditures and national income: is health care a luxury good?', *Journal of Health Economics*, vol. 6, no. 2, pp. 109-127.
- Parks, R. W. (1967) 'Efficient Estimation of a System of Regression Equations when Disturbances are Both Serially and Contemporaneously Correlated', *Journal of the American Statistical Association*, vol. 62, no. 318, pp. 500-509.
- Patterson, K. (2011) *Unit root tests in time series volume 1: key concepts and problems*, Basingstoke: Palgrave Macmillan.
- Peabody, J. W. (1996) 'Economic reform and health sector policy: Lessons from structural adjustment programs', *Social Science & Medicine*, vol. 43, no. 5, pp. 823-835.
- Pempel, F. C. (2000) *Logistic Regression: A Primer*, Thousand Oaks: Sage.
- Perkins, D. H., Radelet, S. and Lindauer, D. L. (2006) *Economics of Development*, 6th edition edition, New York: W. W. Norton & Company.
- Phillips, P. C. B. and Perron, P. (1988) 'Testing for a unit root in time series regression', *Biometrika*, vol. 75, no. 2, pp. 335-346.
- Pilbeam, K. (2006) *International Finance*, 3th edition, London: Palgrave Macmillan.
- Pilbeam, K. (2013) *International Finance*, 4th edition, London: Palgrave Macmillan.
- Pinstrup-Andersen, P. (1987) 'Nutrition Intervention', in Cornia, G. A., Jolly, R. and Stewart, F. (eds.) *Adjustment with a Human Face*, Oxford: Clarendon.
- Piot, P., Muyembe, J.-J. and Edmunds, W. J. (2014) 'Ebola in west Africa: from disease outbreak to humanitarian crisis', *The Lancet Infectious Diseases*, vol. 14, no. 11, pp. 1034-1035.
- Polak, J. (1957) 'Monetary Analysis of Income Formation and Payments Problems', *IMF Staff Papers*, vol. 6, no. 1 (November), pp. 1-50.
- Polak, J. (1991) *The changing nature of IMF conditionality*, Princeton: Princeton University Press.

- Polak, J. (1997) *The IMF Monetary Model at Forty (IMF Working Paper 97/49)*, Washington: International Monetary Fund.
- Pop-Eleches, G. (2009) 'Public goods or political pandering: Evidence from IMF programs in Latin America and Eastern Europe', *International Studies Quarterly*, vol. 53, pp. 787-816.
- Powell-Jackson, T., Hanson, K. and McIntyre, D. (2012) *Fiscal space for health a review of the literature working paper* London: LSHTM.
- Preker, A. S., Carrin, G., Dror, D. (2004) 'Rich-Poor Differences in Health Care Financing', in Preker, A. S. and Carrin, G. (eds.) *Health financing for poor people : resource mobilization and risk sharing* Washington: World Bank.
- Presbitero, A. F. and Zazzaro, A. (2012) 'IMF Lending in Times of Crisis: Political Influences and Crisis Prevention', *World Development*, vol. 40, no. 10, pp. 1944-1969.
- Przeworski, A. and Vreeland, J. R. (2000) 'The effect of IMF programs on economic growth', *Journal of Development Economics*, vol. 62, no. 2, pp. 385-421.
- Quality of Governance (2015) *The QoG Standard Dataset 2015 - Codebook*, Gothenburg: The QoG Institute.
- Rahman, T. (2008) 'Determinants of public health expenditure: some evidence from Indian states', *Applied Economics Letters*, vol. 15, no. 11, pp. 853-857.
- Reeves, A., Gourtsoyannis, Y., Basu, S. (2015) 'Financing universal health coverage-effects of alternative tax structures on public health systems: cross-national modelling in 89 low-income and middle-income countries', *Lancet*, vol. 386, no. 9990, pp. 274-280.
- Robson, K. and Pevalin, D. (2016) *Multilevel Modeling in Plain Language*, London: Sage.
- Rosenbaum, P. and Rubin, D. (1983) 'The central role of the propensity score in observational studies for causal effects', *Biometrika*, vol. 70, no. 1, pp. 41-55.
- Rowden, R. (2009) *The deadly ideas of neoliberalism: how the IMF has undermined public health and the fight against AIDS*, London: Zed Books.
- Rubin, D. B. (2005) 'Causal Inference Using Potential Outcomes: Design, Modeling, Decisions', *Journal of the American Statistical Association*, vol. 100, no. 469, pp. 322-331.

- Ruckert, A. and Labonté, R. (2013) 'The financial crisis and global health: the International Monetary Fund's (IMF) policy response', *Health Promotion International*, vol. 28, no. 3, pp. 357-366.
- Schieber, G. and Maeda, A. (1999) 'Health care financing and delivery in developing countries', *Health Affairs (Millwood)*, vol. 18, no. 3, pp. 193-205.
- Schwert, G. W. (2002) 'Tests for unit roots: A Monte Carlo investigation', *Journal of Business & Economic Statistics*, vol. 20, no. 1, pp. 5-17.
- Semykina, A. and Wooldridge, J. M. (2010) 'Estimating panel data models in the presence of endogeneity and selection', *Journal of Econometrics*, vol. 157, no. 2, pp. 375-380.
- Shumway, R. H. and Stoffer, D. S. (2010) *Time series analysis and its applications: with R examples*, 3rd edition, New York: Springer.
- Siegel, N. A. (2007) 'When (only) money matters : the pros and cons of expenditure analysis', in Clasen, J. and Siegel, N. A. (eds.) *Investigating welfare state change : the "dependent variable problem" in comparative analysis*, Northampton: Edward Elgar Publishing.
- Smith, R. D. and Hanson, K. (2012) 'What is a "health system"?', in Smith, R. D. and Hanson, K. (eds.) *Health systems in low-and middle-income countries: An economic and policy perspective*, Oxford: Oxford University Press.
- Sorenson, C., Drummond, M. and Bhuiyan Khan, B. (2013) 'Medical technology as a key driver of rising health expenditure: disentangling the relationship', *Clinico-Economics and Outcomes Research: CEOR*, vol. 5, pp. 223-234.
- Steil, B. (2013) *The battle of Bretton Woods: John Maynard Keynes, Harry Dexter White, and the making of a new world order*, Princeton: Princeton University Press.
- Steinwand, M. C. and Stone, R. W. (2008) 'The International Monetary Fund: A review of the recent evidence', *The Review of International Organizations*, vol. 3, no. 2, pp. 123-149.
- Stiles, K. W. (1991) *Negotiating Debt: The IMF Lending Process*, Boulder: Westview Press.
- Stone, R. W. (2008) 'The Scope of IMF Conditionality', *International Organization*, vol. 62, no. 4, pp. 589-620.

- Stuckler, D. and Basu, S. (2009) 'The International Monetary Fund's effects on global health: before and after the 2008 financial crisis', *International Journal of Health Services*, vol. 39, no. 4, pp. 771-781.
- Stuckler, D. and Basu, S. (2014) *The Body Economic: Eight experiments in economic recovery, from Iceland to Greece* London: Penguin.
- Stuckler, D., Basu, S. and McKee, M. (2011) 'International Monetary Fund and aid displacement', *International Journal of Health Services*, vol. 41, no. 1, pp. 67-76.
- Stuckler, D., King, L. P. and Basu, S. (2008) 'International Monetary Fund programs and tuberculosis outcomes in post-communist countries', *PLoS Med*, vol. 5, no. 7, pp. e143.
- Sturm, J. E., Berger, H. and De Haan, J. (2005) 'Which variables explain decisions on IMF credit? An extreme bounds analysis', *Economics & Politics*, vol. 17, no. 2, pp. 177-213.
- Tarp, F. (1994) *Stabilization and Structural Adjustment*, London: Routledge.
- Taskforce on Innovative International Financing for Health Systems (2009) *Constraints to Scaling Up Health Related MDGs: Costing and Financial Gap analysis (Background to the Working Group 1 report)*, Geneva: WHO.
- Taylor, L. (1991) *Varieties of Stabilization Experience - Towards Sensible Marcoeconomics in the Third World*, Oxford: Oxford University Press.
- Thacker, S. C. (1999) 'The High Politics of IMF Lending', *World Politics*, vol. 52, pp. 38-75.
- The Economist (2009) The International Monetary Fund - Back from the Dead (17th September), The Economist.
- Thirkell-White, B. 2005. *The IMF and the Politics of Financial Globalization*. Basingstoke: Palgrave Macmillan.
- Todaro, M. P. and Smith, S. C. (2014) *Economic Development*, 12th edition edition, Harlow: Pearson.
- Toor, I. A. and Butt, M. S. (2005) 'Determinants of Health Care Expenditure in Pakistan', *Pakistan Economic and Social Review*, vol. 43, no. 1, pp. 133-150.

- Travis, P., Bennett, S., Haines, A. (2004) 'Overcoming health-systems constraints to achieve the Millennium Development Goals', *The Lancet*, vol. 364, no. 9437, pp. 900-906.
- Trudel, R. (2005) 'Effects of exchange rate regime on IMF program participation', *Review of Policy Research*, vol. 22, no. 6, pp. 919-936.
- Tumwine, J. K. (1992) 'Zimbabwe Success Story In Education And Health - Will It Weather Economic Structural Adjustment', *Journal of the Royal Society of Health*, vol. 112, no. 6, pp. 286-290.
- United Nations (2016) *Data for Development* [Online]. Available: <http://www.sustainablegoals.org.uk/data-for-development/> [Accessed 10 March 2016].
- United Nations Development Programme (1990) *Human Development Report 1990*, New York: United Nations Development Programme.
- van der Veer, K. J. M. and de Jong, E. (2013) 'IMF-Supported Programmes: Stimulating Capital to Non-defaulting Countries', *World Economy*, vol. 36, no. 4, pp. 375-395.
- van Doorslaer, E., O'Donnell, O., Rannan-Eliya, R. P. (2007) 'Catastrophic payments for health care in Asia', *Health Economics*, vol. 16, no. 11, pp. 1159-84.
- Vassall, A. and Martinez-Alvarez, M. (2012) 'The Health System and External Financing', in Smith, R. D. and Hanson, K. (eds.) *Health Systems in Low- and Middle-Income Countries*, Oxford: Oxford University Press.
- Vázquez, S. T. and Sumner, A. (2012) 'Beyond Low and Middle Income Countries: What if There Were Five Clusters of Developing Countries?', No: 404, *IDS Working Paper*.
- Veiga, F. (2005) 'Does IMF Support Accelerate Inflation Stabilization?', *Open Economies Review*, vol. 16, no. 4, pp. 321-340.
- Vella, F. (1998) 'Estimating Models with Sample Selection Bias: A Survey', *The Journal of Human Resources*, vol. 33, no. 1, pp. 127-169.
- Verbeek, M. (2012) *A guide to modern econometrics*, 4th edition, Chichester: John Wiley & Sons.
- Vreeland, J. R. (2002) 'The Effect of IMF programs on Labor', *World Development*, vol. 30, no. 1, pp. 121-139.

- Vreeland, J. R. (2003) *The IMF and economic development*, Cambridge: Cambridge University Press.
- Vreeland, J. R. (2004) 'Institutional determinants of IMF agreements', *Working Paper UCLA International Institute*.
- Vreeland, J. R. (2005) 'The international and domestic politics of IMF programs', *Working Paper Reinventing Bretton Woods Committee and World Economic Forum Conference*.
- Vreeland, J. R. (2007) *The International Monetary Fund: politics of conditional lending*, Oxford: Routledge.
- Wagner, A. (1994) 'Three extracts on public finance ', in Musgrave, R. A. and Peacock, A. T. (eds.) *Classics in the Theory of Public Finance*, London: Palgrave Macmillan.
- Wagstaff, A., Cotlear, D., Eozenou, P. H.-V. (2015) *Measuring Progress Towards Universal Health Coverage With An Application to 24 Developing Countries* Washington: World Bank Group.
- White, H. (1980) 'A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity', *Econometrica*, vol. 48, no. 4, pp. 817-838.
- White, H. and Waddington, H. (2012) 'Why do we care about evidence synthesis? An introduction to the special issue on systematic reviews', *Journal of Development Effectiveness*, vol. 4, no. 3, pp. 351-358.
- WHO (2000) *The World Health Report 2000 – Health Systems: Improving Performance*, Geneva: WHO.
- WHO (2002) *National Health Accounts: Concepts, Data Sources and Methodology*, Geneva: WHO.
- WHO (2005) *Health and the Millennium Development Goals*, Geneva: WHO.
- WHO (2010) *The World Health Report 2010 – Health systems financing: the path to universal coverage*, Geneva: WHO.
- WHO (2012) *WHO Global Health Expenditure Atlas 2012*, Geneva: WHO.
- WHO (2013) *National health accounts* [Online]. Available: <http://www.who.int/nha/en/> [Accessed 20 November 2013].

- WHO (2015) *Indicator Code Book - National Health Accounts* [Online]. Available: <http://apps.who.int/nha/database/DocumentationCentre/GetFile/51036491/en> [Accessed 20 April 2015].
- Williams, L. K. (2012a) 'Pick your poison: economic crises, international monetary fund loans and leader survival', *International Political Science Review*, pp. 0192512111399006.
- Williams, L. K. (2012b) 'Pick your poison: economic crises, international monetary fund loans and leader survival', *International Political Science Review*, vol. 33, no. 2, pp. 131-149.
- Wolff, E. (2014) *Pillaging the world: the history and politics of the IMF*, Marburg: Tectum.
- Woods, N. (2006) *The globalizers: the IMF, the World Bank, and their borrowers*, Ithaca: Cornell University Press.
- Wooldridge, J. (1995) 'Selection correction for panel data models under conditional mean independence assumptions', *Journal of Econometrics*, vol. 68, no. 1, pp. 115-132.
- Wooldridge, J. M. (2002) *Econometric Analysis of Cross Section and Panel Data*, Cambridge: MIT Press.
- Wooldridge, J. M. (2005) *Introductory Econometrics - A Modern Approach*, 4th edition, Mason: South-Western.
- World Bank (2013) *How we Classify Countries* [Online]. Available: <http://data.worldbank.org/about/country-classifications> [Accessed 10 March 2013].
- World Bank (2014a) *How are the income group thresholds determined?* [Online]. Available: <https://datahelpdesk.worldbank.org/knowledgebase/articles/378833-how-are-the-income-group-thresholds-determined> [Accessed 14 October 2014].
- World Bank (2014b) *How does the World Bank classify countries* [Online]. Available: <https://datahelpdesk.worldbank.org/knowledgebase/articles/378834-how-does-the-world-bank-classify-countries> [Accessed 15 October 2014].
- World Bank (2015) 'World Development Indicators', World Bank.

- Xu, K., Evans, D. B., Carrin, G. (2007) 'Protecting households from catastrophic health spending', *Health affairs*, vol. 26, no. 4, pp. 972-983.
- Xu, K., Evans, D. B., Kawabata, K. (2003) 'Household catastrophic health expenditure: a multicountry analysis', *The Lancet*, vol. 362, no. 9378, pp. 111-117.
- Xu, K., Saksena, P. and Holly, A. (2011) *The determinants of health expenditure : A Country-Level Panel Data Analysis (World Health Organization Working Paper)*, Geneva: WHO.
- Yates, R. (2009) 'Universal health care and the removal of user fees', *The Lancet*, vol. 373, no. 9680, pp. 2078-2081.
- Yeats, A. J. (1990) 'On the accuracy of economic observations: Do sub-Saharan trade statistics mean anything?', *The World Bank Economic Review*, vol. 4, no. 2, pp. 135-156.
- Zweifel, P., Felder, S. and Meiers, M. (1999) 'Ageing of population and health care expenditure: a red herring?', *Health economics*, vol. 8, no. 6, pp. 485-496.

Declaration of own work

I hereby declare that this thesis

- a) is of my own composition,
- b) based on my own work,
- c) and has not been submitted for any other degree or professional qualification

Andreas Ochs

Edinburgh,
2 November 2016