

iscte

INSTITUTO
UNIVERSITÁRIO
DE LISBOA

Will It Really Be Different This Time? A Financial Crises Forecasting Model

David André Antunes Marques

Master in Economics

PhD Alexandra Maria do Nascimento Ferreira Lopes,
Associate Professor,
Iscte-Iul

PhD Luís Filipe Farias de Sousa Martins, Associate Professor
with Habilitation,
Iscte-Iul

November, 2021

Department of Economics

Department of Political Economy

**Will It Really Be Different This Time? A Financial
Crises Forecasting Model**

David André Antunes Marques

Master in Economics

PhD Alexandra Maria do Nascimento Ferreira Lopes,
Associate Professor,
Iscte-Iul

PhD Luís Filipe Farias de Sousa Martins, Associate Professor
with Habilitation,
Iscte-Iul

November, 2021

Para ti Pai, Mãe e Irmã

Acknowledgments

First of all, I am truly thankful to my both supervisors, Professor Alexandra Ferreira-Lopes and Professor Luís Martins, who guided me in this challenging academic journey, helping me to stay in the right path, and sharing with me their precious knowledge and experience. I'm very grateful for all your advice and your timely feedbacks who helped me to add value to all my research.

I Want to thank to my family, who always supporting me in all the occasions in my life, helping me to make the right decision, being always prepared to help me in whatever I need, namely this year, my first year of work. All their emotional support and patience were fundamental to help me to develop my dissertation. Father, thanks for all the patience, help and knowledge that you share with me. You will always be my hero. Mother, thanks for all the good time spend together, hope to repay all the love you have given me. Sister, thanks to always making me feel happy and make all my days better, hope you never lose this gift.

A grateful thanks to my godfather, Pedro Silva, who always encourage me to learn more and face up new challenges. Your guidance along my life taught me to enjoy the simplicity of life and enjoy the little things that life gave us. Hope to continue to learn more with you and spent time together, traveling, surfing, and debating ideas.

I want to thank to Ana e João, who I met at five years ago and since then we trace our journey together. Hope to continue to share our precious moments and face up all the challenges together. Being the youngest one, I promise to continue to keep all of you "alive".

Finally, a kiss to you, Avô Gordo and Tio Canica, hope to make you feel proud.

Cheers to all of you.

Resumo

Nesta Dissertação estudámos um modelo com diferentes variáveis com o intuito obter um modelo com maior taxa de acerto relativamente a crises financeiras. Para este estudo, usaram-se modelos logísticos binários para dados em painel. A análise feita contempla um horizonte temporal para concebido entre 1970 e 2019 para mais de 60 países do mundo. Cada modelo predicativo contempla variáveis de controlo específicas, de acordo com a natureza de cada tipo de crise. Com este estudo conclui-se que todos os modelos registaram bons sinais para cada tipo de crise e para diferentes países. O nosso modelo de crises monetárias consegue estimar de uma forma correta 9.55% das crises monetárias verificadas. Descobriu-se fortes indícios de que o regime de taxas de câmbio e o nível político de um país desempenham um papel fundamental para prever crises monetárias. O modelo de crises bancárias consegue estimar de uma forma correta 10.32% das crises bancárias verificadas. Graças ao estudo empírico desenvolvido, percebeu-se que o crescimento real do produto interno bruto, taxa bruta de débito e o débito das famílias são boas variáveis predicativas de crises bancárias. Por fim, o modelo de crise da dívida soberana consegue prever corretamente 8,47% das crises de dívida soberana. Devido ao estudo empírico realizado, destacamos a qualidade de regulação e a taxa de crescimento real do produto interno bruto como principais determinantes para prever dividas de crise soberana.

Palavras-chave: crises cambiais, crises bancárias, crises de dívida soberana, modelos de previsão, modelos de dados em painel logísticos binários

Classificação JEL: C33, F42, G15.

Abstract

In this dissertation, we studied a model with different variable with the aim to reach a model with higher accuracy to predict financial crisis. For this study, we used a binary logit panel data. Our research has a time range between 1970 and 2019 for more than 60 countries. According to the nature of each type of crisis, we selected different variables. We have found evidence that each model has good predictive signals once we estimate different situations of crisis in different countries. Our currency crises model can correctly estimate 9.55% of the currency crises. We find strong evidence that exchange rate type and political level plays an important role to predict currency crises. Our Banking Crises model can correctly predict 10.32% of the banking crises. Regarding our empirical studies, we find strong evidence that real gross domestic product growth rate general gross rate debt and household debt are good predictive variables of banking crises. Finally, our sovereign debt crisis can correctly predict 8,47% of the sovereign debt crises. Due to our empirical study, we highlight regulatory quality and real gross domestic product growth rate the key determinants to predict sovereign debt.

Keywords: currency crises, banking crises, sovereign debt crises, forecasting models, binary logistic panel models.

JEL Classification: C33, F42, G15.

Índice

Acknowledgments	iii
Resumo	v
Abstract	vi
List of Tables	xi
Chapter 1. Introduction	1
Chapter 2. Literature Review	3
2.1. Financial Crises - Definitions	3
2.1.1 Banking Crises	4
2.1.2 Currency Crises	4
2.1.3 Sovereign Debt Crises	5
2.2. Determinants of Financial Crises	5
2.2.1 Banking Crises	6
2.2.2 Currency Crises	7
2.2.3 Sovereign Debt Crises	8
2.3. Channels of Contagion	9
2.3.1 Probability of Spreading Contagion	11
Chapter 3. Methodological Approach	13
3.1. Data	13
3.2. Methodology	18
Chapter 4. Results	21
4.1. Currency Crises Model	21
4.2. Banking Crises Model	29
4.3. Sovereign Debt Model	35
Chapter 5. Robustness Test	43
5.1. Currency Crises Model	43
5.2. Banking Crises Model	44

5.3. Sovereign Debt Model	46
Chapter 6. Conclusion	49
References	51
Appendix	55

List of Tables

- Table 1 – Model 1 – Currency Crises
- Table 2 - Model 1 – Currency Crises – Logit Regression
- Table 3 - Model 1 – Currency Crises – Estat Classification
- Table 4 - Model 1 – Currency Crises – Hausman test
- Table 5 - Model 1 – Currency Crises – Random Effects
- Table 6 - Model 1 – Currency Crises – Portugal Values
- Table 7 – Model 1 – Currency Crises – Random effects until 1997
- Table 8 - Model 1 – Currency Crises – hypothetical scenarios
- Table 9 - Model 2 - Banking Crises
- Table 10 - Model 2 - Banking Crises – Logit Regression
- Table 11 - Model 2 - Banking Crises – Estat Classification
- Table 12 - Model 2 - Banking Crises – Hausman test
- Table 13 - Model 2 - Banking Crises – Fixed effects
- Table 14 - Model 2 - Banking Crises – Portugal Values
- Table 15 - Model 2 - Banking Crises – Fixed effects until 2006
- Table 16 - Model 2 - Banking Crises – hypothetical scenarios
- Table 17 - Model 3 – Sovereign debt Crises
- Table 18 - Model 3 – Sovereign debt Crises – Logit Regression
- Table 19 - Model 3 – Sovereign debt Crises – Estat Classification
- Table 20 - Model 3 – Sovereign debt Crises – Hausman test
- Table 21 - Model 3 – Sovereign debt Crises – Random Effects
- Table 22 - Model 3 – Sovereign debt Crises – Portugal Values
- Table 23 - Model 3 – Sovereign debt Crises – Random Effects until 2009
- Table 24 - Model 3 – Sovereign debt Crises -Hypothetical scenarios
- Table 25 – Model 1 - Currency Crises – Random Effects
- Table 26 - Model 1 - Currency Crises – Venezuela Values
- Table 27 - Model 2 - Banking Crises – Fixed effects
- Table 28 - Model 2 - Banking Crises – Uruguay Values
- Table 29 - Model 3 – Sovereign debt Crises – Random Effects
- Table 30 - Model 3 – Sovereign debt Crises – Argentina Values
- Table A1 – Literature Review on Determinants of Financial Crises
- Table A2.1. – Dataset 1 – Private Debt
- Table A2.2.- Dataset 2 – Public Debt
- Table A2.3 – Dataset 3- World Economic Outlook
- Table A2.4 – Dataset 4 – Fiscal Monitor

Table A2.5 – Dataset 5 – Historical Public Debt

Table A2.6 – Dataset 6 – Capital Account openness index

Table A2.7- Dataset 7 Public Finances in Modern History

Table A2.8 – Acronyms of variables

Table A2.9 – Variables Used for each Crises Model

Table A3 – Countries Used in the Analysis

Chapter 1

Introduction

Financial crises are a widely studied research topic, given the very significant externalities within and across countries. Understanding how a crisis could spread around the world, or even, how can we mitigate the risk of an occurrence of a crisis is an important tool for policy makers in order to be more prepared to face a crisis. It is a fact that we can not avoid crises, we can only set our path to be more well prepared against them. A financial crisis could spread into any country, with its negative effects harder for emerging countries, but all countries will suffer effects from the crisis, independent of their location, political level, or economic power. There are several ways to trigger a financial crisis. Financial crises can be of several types, change types across the time, or even occur jointly.

Since the creation of “value” that we have created the possibility of crises occurrence. Once we start to attribute value to things, we create a market of supply and demand, that when not well regulated or in an optimal point, can create some disturbances, which will have implications into the economy. Wrong policies decisions or behaviours of a country could lead to a higher probability of crises. Even with a growing research strand of literature about financial crises, additional research is needed, with many open questions to answer. Reinhart and Rogoff (2009) focus on the need to understand which are the main determinants of financial crises, in order to forecast them. The main conclusion from this work is that financial crises are very similar throughout time; financial crises tend to occur over the years with some recurrence, and sometimes each type of crisis occurs hand in hand with one or more. Along the years, different types of methodologies tried to test empirically the main determinants to forecast financial crises. This work has opened much research, being the base study of many new forecasting models. The ambition to contribute to a more resilient economy and contribute to fulfil the lack of literature in this thematic are some of the main interests of this dissertation.

The main goal of this dissertation is to understand which are the key determinants of each type of crises (currency, banking, sovereign debt), as well as to create three predictive models in order to be able to forecast each crisis. Through the years, the key determinants of each crisis can change, which makes it even more interesting to study this thematic. We create a logit panel data with random or fixed-type effects to each kind of crisis, covering more than 60 countries for a time range between 1970 and 2019. Our models include different crisis dummies (one to each model) as an independent variable, and different control variables. These control variables are chosen taking into consideration the nature of each crisis. Once we have different variables to each model, we will also have different

list of countries to each model. We decided to consider only countries who had the most data available for all years and all variables.

As a result, our currency crises model can correctly estimate 9.55% of the currency crises. We find strong evidence that exchange rate type and political level plays an important role to predict currency crises. Our Banking Crises model can correctly predict 10.32% of the banking crises. Regarding our empirical studies, we find strong evidence that real gdp growth rate and the debt variables (general gross rate debt and household debt) are good predictive variables of banking variables. Finally, our sovereign debt crisis can correctly predict 8,47% of the sovereign debt crises. Due to our empirical study, we highlight regulatory quality and real gdp growth rate the key determinants to predict sovereign debt.

This dissertation is structured as following: in section 2 we review the literature, shedding lights about each crisis definition and their determinants, and also the channels of contagion. In section 3 we describe the data and the methodology used in this dissertation. In section 4, we present our empirical findings and in section 5 we present the robustness analysis. Section 6 is for our final remarks and conclusions about our research.

Chapter 2

Literature Review

This section is divided as follows. Firstly, in section 2.1, we point out the definitions from the three types of crises. Then, in section 2.2, we emphasize some studies that analyse some interesting determinants to take in consideration of the three types of financial crises. Lastly, we discuss, in section 2.3, the literature about contagious effect and the main channels of contagion *ex-ante*, during and *ex-post* crises. An overview of the literature discussed and the classification of each type of crisis can also be found in table A1, in the appendix.

2.1 Financial Crisis – Definitions

Understanding the concept of Financial Crisis is not an easy assignment. In modern crises theory, the conception of Financial Crisis should address three aspects: Banking, Currency, and Sovereign Debt (Sachs, 1998). Thus, we can define Financial Crisis as a sudden event, usually triggered off by the collapse of financial institutions and a turmoil in the financial sector caused, for example, from a heavy debt holding or too much dependence on foreign capital. The different types of financial crises are rooted in similar weakness of economies, hence there are some cases in the economic history for twin-crises¹. Kaminsky and Reinhart (1999) examine this joint occurrence, finding strong evidence that banking and currency crises are closely linked. There is also some empirical evidence from triplet's crises where banking and debt crises are interrelated and, typically, preceded by a currency crisis (Babecký, 2014). However, each type of crisis could occur independently of the other. This closely linkage between each type of crisis, lead us to conclude that we need more than a simple definition of Financial Crisis to understand the mechanism behind them. Financial crises are often associated with periods of panic and marked by the lack of confidence from investors, which suggests the sale of assets or withdraw savings accounts. A sharp decline of asset prices, overvaluation of exchange rate, financial bubbles, and consecutive sovereign default might be some of the most common warning signals of financial crises. A financial crisis is a cyclical state, which cause economic, social, and political disaster. Thus, leading us to conclude that we should try to understand its main determinants to predict the next financial crisis to minimize the negative impact associated with it.

¹ Combination of two different types of financial crises.

2.1.1 Banking Crisis

The creation of money brings the need to develop a financial institution that accepts deposits from the public and creates credit. Confidence is the key word to a bank operate, otherwise, people would rather keep money at home than deposit it in a bank. Liquidity problems would lead banks to sell their assets to compensate the absence of deposits, which results in a fall of asset prices, with this cycle ending up with a bankruptcy. Additionally, the problem of an individual bank now-a-days can quickly spread up to the whole banking system (OECD, 2012). The literature offers several determinants for banking crises, most of them highlight important issues, such as, bank runs, losses in the banks, and bank liquidations, government intervention (Demirguc-Kunt and Detragiache, 1998; Kaminsky and Reinhart, 1999; Laeven and Valencia, 2012). Revisiting the past banking crises allows us to point out another important variable: price bubbles, an unpredictable incident, which usually preceded crises, where no one wants to believe that this time is not different.

2.1.2 Currency Crisis

Across the years, due to particular situations in economic history, such as different exchange rate regimes, we can split currency crises theories in three major generations of models. The first generation of models considers currency crises as a consequence of currency devaluation, induced by an expansionary monetary policy, to finance the excessive fiscal deficit in a country with fixed exchange rate (Krugman, 1979). The second generation of models defines currency crises because of shifts in investors' confidence (Pesenti and Tille, 2000), i.e., the investors' expectations/doubts about whether the Central Bank is willing to fix or not their exchange rate, could lead to currency crises. The third generation considers currency crises as a deterioration of balance sheets with fluctuations in asset prices (Chang and Velasco, 2000). Moreover, this third generation introduces the study of "contagion". In our analysis, we will consider currency crises as a sudden devaluation of exchange rate that triggers large losses of internal reserves (Berg, 2005). It is a fact that currency crises occur in countries independently from their regime, however, the flexible exchange rate should be more resilient to currency crises. The next generation of Currency Crises models/theories must include cryptocurrencies since there is an increasingly upsurge of studies about this thematic. Notoriously, cryptocurrencies are not yet statistical significance to explain currency crises in specific markets, such as in the Asian Financial Market (Handika *et al.*, 2019).

2.1.3 Sovereign Crisis

Sovereign debt crises are a recurring occurrence across the years. Tomz and Wright (2007) report, between 1820 and 2004, 250 sovereign defaults from 106 countries. Sovereign default is characterized as a missed paid scheduled debt service, during a grace period, specified in the debt contract. In other words when the Government of a country is unable to pay its bills. However, to achieve a situation of a sovereign debt crisis, a country must cross plenty of warning signals. One of the signals is the sovereign default, this occurrence initiates a period where investors become worried that a country cannot afford to pay bonds. Other threatening signal is a period of low available resources that usually are associate with cyclical downturn, when an economy faces low or negative economic growth (Tomz and Wright, 2007). As was evidenced by the recent European crises, political factors could also lead to a sovereign debt crisis. Turmoil political periods are more likely to “help” higher default rates and higher level and volatility of sovereign interest rate spreads (Cuadra and Sapriza, 2008). In conclusion, a sovereign crisis could be designated as a recurrent sovereign default over the years, as a consequence of several warning signals.

2.2 Determinants of Financial Crises

There are several studies trying to assess the main determinants of financial crises, since finding the determinants who minimize the false alarm of crises could lead countries to prepare themselves and adjust their behaviour to the following years. “This Time is Different”, the ironic title from the book of Reinhart and Rogoff (2009) focusses on the necessity to understand which of the main determinants of financial crises are in order to forecast them. The main conclusion from this book is that financial crises are very similar throughout time; financial crises tend to occur over the years, and sometimes each type of crisis occurs hand with a hand with another. Along the years, different types of methodologies tried to test empirically the main determinant to forecast financial crises. Schularick and Taylor (2012) made the distinction between two different eras, the Age of Money² (1870-1939) and the Age of Credit ³ (1945-2008) explaining the historical perspective that triggered this exchange. The authors revisit some historical event in the economic theory, to demonstrate the importance from credit aggregates to predict financial crises, arguing that most of the historical financial instabilities are preceded from a credit boom, most likely due to a shortcoming in the regulation of the financial system. Inekwe (2018) collected the data from Reinhart and Rogoff (2009, 2011) and Laeven and Valencia (2013) to estimate the determinants of financial crises. Using a Probit

² Period where credit is closely tied to money and a formal analysis could use money as a proxy of credit and not the other way round.

³ Current period, where credit plays an important role in the macroeconomic scenario.

model, their research covers 68 countries around the world and a period of analysis that ranges between 1950 and 2000. This research highlights money supply, market capitalization, government consumption, services value added, total reserve, business freedom, exchange rate, and bank liquidity as the main determinants to explain the turbulence in the economy during crises, ending up in a financial crisis. They perform the model to each type of crises, concluding that inflation is an essential variable of any type of crisis. More recently, Fouliard *et al.* (2020) compare the effectiveness from different models to forecast financial crises, adding a new approach, online machine learning. This new approach helps us to predict systemic financial crises 3 years ahead with lower “false alarms” of crises. However, as a standard methodology, there are a long path to go before any specific conclusion.

The rest of this sub-section is organised by “waves”⁴, focusing on the relevant determinants for each type of crises. There are always new approaches that complement the previous one, without excluding them; the word “waves” clarifies that intention to divide the relevant research by different type of methodologies. The following topics covers only two from the three “waves”. The first wave focuses on specific historic events, where there are only a reduced number of observations, which could potentially compromise the empirical studies. The second wave emerged with the surface of more recent crisis observations, providing new data and potentiating new econometric studies, namely with panel data. The third wave, which is develop in section 2.3., complements the previous ones, by adding the “channels” of propagation, implementing a cross country analysis.

2.2.1 Banking Crises

A panoply of studies has been done to assess the main determinants of banking crises over time. The main concern is achieving an approach with few “false alarms” from crises. Evidently, each approach can lead to different conclusions. Nevertheless, there are some recurrent drivers in the different approaches, suggesting the existence of fundamental determinants.

Representing the first wave, most authors revisited some historical events that triggered into a banking crisis, highlighting mainly, bubbles as a pre-banking crises evidence; the relevance of transparency and resilience from banks to relay confidence to depositors; and the important response from policy to prevent crises (Kindleberger, 1978 and Gorton, 1988). Over time, more banking crises were registered, providing the beginning of econometric studies using panel data. This wave focuses on empirical studies instead of an historical analysis. Furthermore, the second wave had in consideration the historical evidence. Reinhart and Rogoff (2013) cover all the main topics that emerge to a banking crisis. In their analysis, exchange rates, GDP, trade, capital inflows, housing prices, debt, and credit ratings appear as

⁴ Same approach as in Kauko (2014).

the determinants of banking crises in an empirical study from all over the world, more precisely, 66 countries, in an analysis between 1800 and 2008. This wide and solid research stimulated several studies with new approaches and in specific points in time. Kauko *et al.* (2014) sum up several studies until 2014 and divide them to significant and non-significant literature to explain the main determinants to developing and advanced countries. The authors used the amount of (private) debt/leverage, growth of debt, house prices, current account, real interest rate, monetary aggregates, and inflation as the main determinants to explain banking crises and concluding that credit booms are the origin for most banking crises.

More recently, Antunes *et al.* (2018) in their empirical research, using data from 22 European countries, for the period 1970-2012, using a dynamic panel probit model, estimate the probability of a banking crisis, concluding that dynamic components improve models and their performance to forecast banking crisis. The authors highlighted equity prices, house price growth, the credit-to-GDP gap, and the debt service ratio as the most useful determinant to predict banking crises. Jemovic and Marinkovic (2019), analysing 64 banking crises from 1977 to 2013, using a logit model, conclude that international reserves, M2-to-international reserves ratio, M2 multiplier, bank deposits, and bank reserves ratio have a positive impact in the performance of the predictor model. This paper explains the concern about past occurrence of financial crises to provide some insight about the main determinants from this type of crises.

2.2.2 Currency Crises

The origin of currency crises is often the same as banking crises, since the emergence from both in the same period (one lagging the other) is quite usual. Nevertheless, both crises diverge in some determinants. The sharp effect that was observed from previous currency crises triggered the early interest to study the determinants of currency crises in order to predict them. The literature has been growing over time, examining mainly the emerging economies, since the recent currency crises were registered there. In the first wave, Dornbush *et al.* (1995) theoretically focus on four currency crises to shed lights to the main determinants from this type of crisis. Revisiting each crisis, the authors try to find the cyclical turmoil in an economy, ending in a currency crisis. There are several evidences in the past historical crises that real exchange rate, GDP, and inflation play an important role to predict crises. The appearance of the Asian Crises in 1997 were a stimulus to understand empirically the main determinant to forecast currency crises, starting the second wave. Berg and Pattillo (1999) analyse three different approaches, namely the Kaminsky-Lizondo-Reinhart Signals Approach, the Frankel and Rose Panel Probit Model, and Sachs, Tornell and Velasco Cross-Country Regression, replicating them to examine the performance from each one to predict the Asian crisis. The signals approach provided by Kaminsky *et al.* (1997) had the better performance to replicate

the crisis out of the three. By adding new indicators such as, current account and M2/reserves, they achieve a better performance to predict crises. However, this model had still some flaws in order to be used to forecast currency crises, but represents a turning point, which triggered new studies to find the main determinants to predict this crisis. Budsayaplakorn *et al.* (2014) empirically examine the determinant of currency crises, developing the studies from Berg and Pattillo (1999) and Kaminsky *et al.* (1997). Using 17 indicators and focus on 5 emerging countries from the Southeast Asia for the period 1975 to 1997, they conclude that, in order to forecast currency crises, it is necessary to use not only macroeconomic drivers, but also political ones, highlighting international reserves, stock market indices, and GDP as the main indicators to anticipate currency crises. Chong and Yan (2018) analyse 16 emerging countries from all around the world, by using a panel data threshold model, from 1981 to 2001, to forecast currency crises. The result suggests the use of the fiscal deficit of a country, the differential between the domestic interest rate and the foreign interest rate, and the external illiquidity to predict crises. Candelon *et al.* (2014) focus on the relevance of taking crises dynamics in consideration, empirically testing the difference in the performance of a panel logit model with dynamic determinants and a panel logit model without them, concluding that the one with dynamic determinants has better performance to forecast. The determinants used in this analysis were the exchange rate, foreign reserves of a country, and the interest rate.

2.2.3 Sovereign Debt Crises

There are several reports of sovereign debt crises over time, providing better data to econometric studies, allowing a comparison with sundry sovereign crises. This growing data spurs the search for the key determinants of sovereign crises in order to predict them. In the first wave, the study from Oosterlinck (2013) revisited some historical sovereign debt crises, and some previous approaches to shed some light to some drivers of sovereign debt crises. He concludes that, in the long run, several countries tend to default on a regular basis, in other words, a common situation. By looking at historical events, the author suggests historical reputation, the importance of institutions, and the international relationships, as some important indicators to anticipate this type of crises. The vast and growing empirical studies over the years, triggered the second wave of research, Chakrabarti and Zeaiter (2014) evaluate some empirical studies until 2014, using an extreme bound analysis, divide all the studies in three categories (positive, negative, or insignificant effect on debt default) to each explanatory variable. The research covers 190 countries over 1970 and 2010. Excluding some literature using the extreme bound analysis, the authors indicate inflation, debt service, and advantage on exports earnings as pre-crisis indicators. Savona and Vezzoli (2015) examine the determinants of sovereign debt crises by using three different approaches (logit, stepwise

logit, noise to-signal ratio, and regression trees), to 66 countries from 1975 to 2010. The authors complete the previous studies by adding real GDP growth and US interest rates to the main determinants of this type of crisis. More recently, Bhattacharya and Inekwe (2021) explain the importance of institutions to trigger or not sovereign defaults. Using a Bayesian model averaging for 101 developing countries, between 1990 and 2015, the authors conclude that government effectiveness, regulatory quality, control of corruption, and trade openness reduce the probability of sovereign default. On the other hand, high level of external debt, high inflation, and current account balance contribute to increase the probability of sovereign default.

2.3 Channels of Contagion

In this section we analyse the third wave of research, the cross-country analysis. In other words, the literature around the financial contagion and its channels of propagation. The concept of contagion seems to be easily understandable; however, an erratic definition could lead to different conclusions. Over the years, several studies diverge in this definition of contagion. Forbes and Rigobon (2002) define contagion as a significant cross-market linkage after a shock in one country (or a group of countries). Instead, the authors use interdependence to study contagion. Contrary to this definition, some economists define contagion as a co-movement of financial markets, instead of the relationship between countries. (Chan-Lau *et al.*, 2004). The same word has different meanings; in our case, we will use the last one to define contagion.

Correa and Sapriza (2014) analyse the transmission channels between sovereign and banking crises, by revisiting some studies over the years. The authors discuss the effect of a sovereign crisis on a banking crisis, suggesting that the channel, by which sovereign turmoil can affect banks, is by banks holdings of sovereign debt. Sovereign debt stress could affect the lending activity by banks, which can spread this effect over other banks around the world. In other words, when sovereign debt distress affects the banking sector, a crisis is foreseeable in the future. Dungey and Gajurel (2014) using a Capital Assets Pricing Model (CAPM) analyse the contagion effect in advanced and emerging equity markets, during the global financial crisis. The authors find that the US equity market contagion effect is explicitly visible in the volatility transmitted from advanced to emerging equity markets during the crisis. Their research also discovered that the US financial market has less contagion effect to the others financial markets when compared to the US equity market, which suggests that global integration is not strongly related with a contagion effect. Gray (2014) investigate the co-movements of currency markets of Czech Republic, Poland, Hungary, Slovakia, and the Euro Area between 2006 and 2008 (daily data). First, the author verifies the correlation coefficient between pairs of currency in calm and turmoil periods and assesses if there is an increase of

exchange rate co-movement or not during the analysed period. Then, they verify the heterogeneity of variance across tranquil and turmoil periods. Finalizing with a co-spectrum analysis to conclude if there are contagion effects or not. The author concludes that, there was a strengthen of co-movements after the 2007 financial crisis in the countries in analysis, which indicates that changes in the structure of currency integration could lead to a negative impact of contagion effects. Luchtenberg and Vu (2015) focus on the 2007 financial crisis to explain the stock market contagion and its main channels of propagation. This study uses a Glosten-Jagannathan-Runkle generalized autoregressive conditional heteroskedasticity (GJR-GARCH) model, with a sample from 3 different regions, North America, Europe, and East Asia Pacific, from 2003 to 2009. The authors conclude that the level of exports, trade dependence, inflation, industrial production, interest rate, and investor's risk aversion are the main channels of propagation, in other words, increase the level of contagion.

2.3.1 Probability of Spreading Contagion

Several factors could lead to an increment in the probability of contagion propagation. Collins and Gavron (2006) measured the occurrence of contagion, over 42 countries, during nine financial events, between 1997 until 2002. The authors verify empirical evidence of stock market contagion across all the financial events suggested, stressing out the importance of not only study the big financial events but also to analyse the smaller ones. They conclude that for emerging markets, the more mature a market is, the less contagion effect it suffers. Haile and Pozo (2007) examine the currency crises contagion and its transmission channels, for 37 advanced and emerging market economies, between 1960 and 1998. Using a panel probit model, the author concludes that the probability of a currency crises happening is suddenly increased by a crisis elsewhere. This indicates that a contagion effect increases the probability from a currency crises occurrence, suggesting increasing in domestic credit expansion, increasing government budget deficits, increasing unemployment rate and high inflation rates as the main indicators to increase the probability of currency crises. Edwards (2009) investigates whether an increase in financial and trade openness tend to affect the probability of external crises. This study adopts a panel probit model divided in 5 regions (Latin America and the Caribbean, Asia, Africa, Middle East, and Eastern Europe), using a sample between 1990 to 2000 which include, for example, the Argentina, Mexico and Uruguay crises. The author indicates current account and fiscal imbalances, contagion⁵, international reserves holdings, and the exchange rate regime as possible determinants of external crises, concluding that the strategy of "Financial Liberalization First" led to an increase in the

⁵ Measured by capital flow contractions in each country's "reference group".

probability of external crises. The result also suggests, that relaxing capital controls, increments the likelihood of a country to register a sudden stop. Horváth *et al.* (2018) analyse financial contagion, more accurately, the effect of an unexpected negative event in the US stock market on Croatia, the Czech Republic, Estonia, Hungary, Poland, and Romania stock markets, using a quantile regression between 1998 and 2014. The authors conclude that, regardless the monetary policies adopted by countries, a contagion effect is observable, which suggests that independently from the monetary policies of the country, the probability of contagious effect remains constant. Additionally, the probability of contagion is stronger during a crisis period.

Chapter 3

Methodological Approach

Throughout this section, all the databases and variables used in the empirical model will be explained in detail, starting by the explanation of the dependent variables and thoroughly evaluate the control variable. Each model has their own dependent variable as well as independent variables. The choice of each variable is based on economic theory, supported by the literature. A list of variables used for each model can be found in table A2.

3.1. Data

Crisis dummies (dummy_crises 1, 2, 3) – As already mentioned before, we will have one model to each type of crisis. Thus, to each country we had distinguished between any of the 3 crises (currency crises (1), banking crises (2), and sovereign crises (3)) in a specific year (1 if yes, 0 if no). One of our main goals is to understand when a crisis will occur somehow in the future, so our dependent variable is the crisis dummy. The dependent variable will reflect the possibility of crisis, or not, based on the control variables. We will develop the work of Carmen M. Reinhart, Duca *et al.* (2017), and Laeven and Valencia (2018), using their databases for the crises' dummies.

Then, we will split the main regressors into two main groups, economics and political variables. The power of institutions and their repercussions in the economy, namely in terms of investments, savings, and innovations has considerably grown in the previous years in the literature (e.g., Acemoglu, 2013). Thus, there was an increase in the need of new research in this field, in order to fulfil some gaps in the literature. We have gathered data from two main sources, the International Monetary Fund (IMF), and the World Bank (WB). We also used a research made by Monty G. Marshall named Polity IV, and the database from Carmen Reinhart. Firstly, we will be going into detail in the political variables, starting by analysing the database from Worldwide Governance Indicators from the World Bank, adding the variables Country Risk Level from OECD. Then, we will finish with the explanation of the economic variables.

Worldwide Governance Indicators – this database from the World Bank, was developed by Kaufmann *et al.*, (2010), including six variables with a time range between 1996 – 2019. The variables use percentile rank among all countries (0 – lowest 100 – highest). We will adopt the definition (in quotation marks) suggested by the World Bank to each variable:

- **Voice and Accountability** (voice_acc) – “Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media”,
- **Political Stability and Absence of Violence/Terrorism** (stability) – “measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism”,
- **Government Effectiveness** (govt_effect) – “reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies”;
- **Regulatory Quality** (regulatory_qual) – “reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development”,
- **Rule of Law** (rule_law) – “reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence”.
- **Control of Corruption** (corruption) – “reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests”.

Country Risk Level (risk_level) – Following the OECD definition, country risk level, as the name suggests, measures the risk in a country in situation of *force majeure* (e.g., war, revolution, earthquakes, etc.). This variable is ranged from 1 (lower risk) to 7 (higher risk). The OECD database (Historical Risk Classification) register 145 countries for a period from 1999 to 2019. This data, does not include countries with very small income and countries with high income (for OECD and Euro Zone countries).

Polity2 (polity2) – this indicator taken from the Polity IV Project (Marshall *et al.*, 2018), measures the political regime characteristics and transitions of a country, ranged them from +10 (full democracy) to -10 (full autocracy). This variable cover 163 countries between the period of 1800-2017.

The safety and the confidence of a citizen in a country reflects the political quality, if a citizen does not trust in their country, he/she will not keep his/her savings in banks, compromising the banks liquidity, being an issue to banking and currency crises. Adding to this, the quality and the stability of a government has a heavier impact on the economy. The

threshold that split the developed and the underdeveloped countries is the institutions. The power of institutions makes it possible that neighbour countries have different realities.

Lastly, we will present the main economic variables used in our econometrical analysis, based on the theoretical and empirical literature to find out the determinants of each crisis. We have used the dataset of the International Monetary Fund, which includes 17 variables for 191 countries, for the period between 1800 and 2019.

In the next paragraphs we present the datasets from the IMF with each variable, detailing their measurement, their type, as well as the respective explanation.

World Economic Outlook – The data available from this dataset is from 1980 to 2019, for a total of 5 variables; The variables are: real GDP Growth rate, (annual percentage change), inflation rate, computed as the average consumer price (annual percentage change), the unemployment rate (percent), the current account balance as a percent of GDP (percentage of GDP) and the general government net lending /borrowing (percentage of GDP). These 5 variables have several implications in the policies adopted by a country (for example, the decision to have more unemployment or more inflation, i.e., the Phillips's curve, will have different impacts, depending on the current situation of each country). The decision between expansionary and contractionary policies is based on some of these variables.

Africa Regional Economic Outlook – This dataset completes our database, including African Countries. The dataset includes two main variables between 2004 and 2019, real GDP growth (annual percentage change), government debt (percentage of GDP). This last variable, as it was expressed in the literature review, will have an important role of anticipating sovereign debt crises.

Assessing Reserve Adequacy – has only one variable, where the available data is from 2000 to 2019. Reserve/(Imports/12) (unit).

Historical Public Debt – The variable at study is debt (in percentage of GDP). Consists in one variable for the period from 1800 to 2019, that reflect the historical debt of each country. This variable is often associated with sovereign debt crises; however, it can stimulate other type of crises.

Global Debt Database – which includes two main datasets, the Public Debt and the Private Debt. The first one, includes data from 1950 to 2019 for two variables, general public debt (percentage of GDP) and public sector Debt (percentage of GDP). On the other hand, Private Debt covers data from 1950 to 2019 for two variables, household debt (percentage of GDP) and private debt.

Capital Flows in Developing Economies – we take a total of 2 variables from this database for the period of 1995 to 2014. The variables are equity liabilities (millions of USD) and debt forgiveness (millions of USD). The recurrent debt default could be a warning signal of future sovereign debt crises and may have impact on the banking system. In the other hand,

liabilities, as it was expressed by the literature, play an important role to forecast crises, being strongly correlated with them.

Capital Account Openness Index – We take one variable from this database, for the period between 2000 and 2013, which is the overall openness index (all asset categories) (units) reflects the openness degree of a country. The globalization of a country and their openness, could make a country more competitive, benefiting also from the competitive advantages from the other countries. Although, this globalization, if not sustainable, in situation of crisis, could spread, quickly, into a World crisis.

Public Finance in Modern History – This dataset completes our database for the period between 1800 and 2012. From that dataset we take the variable, real GDP growth rate (percentage).

Due to the fact that we want to increase our probability of predicting a successful forecasting model, we must use a complete model supported by the literature. Hence, we add some other variables from other sources, as we can see below.

Income Level (inc_level) – The level of income from each country could be estimated. Considering the dataset from the World Economic Outlook and using GDP *per capita* in current prices (USD), we scale our data into 4 levels (1 – low level of income, 2 - lower-middle level of income, 3 – upper-middle level of income, 4 - high level of income). The income level is related with the duration of crisis. Thus, knowing the income level of each country will help understand not only the duration of a crises, but also, can provide a better forecast analysis.

Capital Control Index (capital_control) – The data were taken from the databases of Carmen Reinhart⁶ covering 185 countries between 1946 and 2016. This variable is a dummy variable, when is 0 means unified market (no capital control), 1 it means dual/multiple/parallel rates, hence some form of capital control.

Type of Exchange Rate Regime (exchange_type) – Also in the databases of Carmen Reinhart, this variable is spilt into 6 different classifications code of countries, ranged from 1 to 6: 1 includes no separate legal tender, pre-announced peg or currency board arrangement, pre-announced horizontal band that is narrower than or equal to +/- 2%, de facto peg; 2 includes pre-announced crawling peg, pre-announced crawling band that is narrower than or equal to +/- 2%, de facto crawling peg, de facto crawling band that is narrower than or equal to +/-2%; 3 includes de facto crawling band that is narrower than or equal to +/-5%, moving band that is narrower than or equal to +/- 2% (i.e., allows for both appreciation and depreciation over time), managed floating; 4 includes freely floating; 5 includes freely falling; and 6 includes dual market in which parallel market data is missing.

⁶ Please see <http://www.carmenreinhardt.com/data/browse-by-topic/>

The joint analysis of capital control and type of exchange rate regime, provide a successful estimation model to forecast crises. The conjugation of the type of capital control and the type of exchange rate regime in a country has several implications on the economy of a country, for example, the capital control could limit the foreign capital in and out of the domestic economy, as such, the type of exchange rate could stimulate the investment in a country due to their currency. The management of these two variables will be reflected in the monetary policy of a country.

House Prices Index (House_prices) – The variable is real house prices index for the period between 1960 and 2019 from the OECD. The real house prices index is given by the ratio between nominal house prices index and the consumers' expenditure deflator. This variable has a growing importance in the explanation of banking crises, as it was, due to the fact that an expressive increase in the house prices index, i.e, price bubbles, showed some signals of a potential financial crisis.

3.2 Methodology

We used panel data in our analysis⁷. This type of data refers to multi-dimensional data that usually involves measurements over time and provides the study of dynamic relationships and casual effects. The process of forecasting attributes probabilities of occurrence to a certain event. In our specific case, our analysis is based on binary choice model due to the dependent variable, being a binary dummy variable. Our probabilistic model has the general form of:

$$Prob (Y = 1|x) = F (x, \beta) \quad (3.1)$$

$$Prob (Y = 0|x) = 1 - F (x, \beta) \quad (3.2)$$

Where x is the set of explanatory variables and β is the parameter vector that reflects how changes in x affect the conditional probability of success, $Y=1$. The choice for the function F will depend on the restrictions used in the estimation of the probabilistic model. The probit and logistic estimations suit well our analysis, providing a binary variable Y and giving a latent continuous real-valued Y' (produce a probability between 0 and 1).

In probit regressions, the errors have normal distributions, which means that the model uses a cumulative normal distributions function, the dependent variable take the form of binary outcome. The model becomes:

$$Prob (Y = 1|X) = \Phi (X'\beta) \quad (3.3)$$

⁷ For more details about Panel Data methods see, Baltagi (2013).

where,

$$\Phi^{-1}(p_i) = \sum_{k=0}^{k=n} \beta_k X_{ik} \quad (3.4)$$

In the logistic regression, the errors follow a standard logistic distribution, this is, the model is based on the cumulative logistic distribution. This analysis can be explained by the odds ratio $O(p)$. The following model explain the odds when the success probability is achieved, $Y=1$, with the probability p :

$$O(p) = \frac{p}{1-p} \quad (3.5)$$

and in natural log of the odds:

$$\log\left(\frac{p}{1-p}\right) = X'\beta \quad (3.6)$$

where,

$$\log\left(\frac{p}{1-p}\right) = \sum_{k=0}^{k=n} \beta_k X_{ik} \quad (3.7)$$

The log linearization gives us the following general logit model:

$$Prob (Y = 1 |X) = \frac{\exp(X'\beta)}{1+\exp(X'\beta)} = \frac{1}{1+\exp(-X'\beta)} \quad (3.8)$$

After a brief description of each approach, on our general chosen model as above, it is important to mention that the preference between adopting a logit model or a probit model is just a preference choice, once both will achieve similar results. Previously, the logit model was preferred over the probit model, as a consequence of their easy interpretation and calculation, contrary to the probit model. Currently, all softwares are capable to estimate both models without any significant differences (Stašević, 2018).

To settle down our final list of covariates, we adopt a bottom-up maximum likelihood-type estimation strategy. This analysis provides the individual specific analysis, which refers to the unobserved effects that may be correlated, in panel data, with the observed explanatory variable. This correlation can be shown in the following linear model:

$$Y_{it} = \alpha_i + X'_{it}\beta + \epsilon_{it}, i = 1, \dots, n \text{ and } t = 1, \dots, T \quad (3.9)$$

where α_i is the unobserved individual level effect that is fixed or random and ϵ_{it} is the standard idiosyncratic error term, n the number of cross-sections (in our case, countries) and

T the time periods (in years). Thus, the composite error is given by $u_{it} = \alpha_i + \epsilon_{it}$. Adopting our panel logit model, we reach the following model:

$$Prob(Y_{it} = 1|X_{it}) = \frac{1}{1 + \exp(-\alpha_i - X_{it}'\beta)} \quad (3.10)$$

The value of α_i will depend on the used effect in the model. In the fixed effects model, α_i is constant over time, the model allows individual-specific to be correlated with independent variables. In contrast, in the random effect model, α_i is not correlated with independent variable, α_i is i.i.d. $N(0, \sigma_\alpha^2)$. In order to adopt the proper approach we use the Hausman test. This analysis looks into the correlation between the errors and covariates. The absence of correlation between them corresponds to random effects. On the other hand, if there is correlation between the two, the preferred model is the fixed effect. Furthermore, we can adopt, by default, a model with random effects if we want to keep all the observations. The fixed effects exclude regressors once they are time-invariant, reducing our sample.

Lastly, in order to reach the most effective covariates we applied a bottom-up estimation technique. This method is based on split off the whole work into smaller components (covariates). Then add them one by one until find the best covariates to fit in the model a whole. This technique improves the model by choosing the best covariates that fit better in the model.

Chapter 4

Results

The main aim of this research is to understand the key determinants that stimulate each type of crisis. Therefore, we have made 3 different models: for currency, banking and sovereign debt crises. Each of them is split in 2 main areas, the political and the economic. These 2 main areas have, for a long time, being studied jointly. It is a fact, that we cannot make a political decision without thinking in their economic impact. Recently, this jointly appreciation have been studied, and as mentioned in the literature review, we cannot ignore political variables and their impact once we are building a crisis model. Inside each model, a different list of variables is included. As expected, due to the nature of each crisis, there are variables that are more related with each specific crisis. There are several variables that fit well in each model, however, giving all the literature and some primary empirical studies, we chose the most accurate variables that can be a possible determinant of each type of crisis. Depending on the selected variables, each model will have their own panel data with different countries, from our database, hence, to avoid problems in our analysis, we keep only countries with data available, focusing only on countries with more data available, in order to create 3 models with the higher possible predictability. All models are based on Binary Logit Panel Data and include individual effects analysis. There are slightly differences between both models. By using some criteria's as LR test, Macfaden R^2 , analysis out of sample can help us to choose between both models. Due to some limitation of Stata, our choice, is to adopt a logit regression. The limitation imposed by Stata, not applying fixed effects to a probit regression, stands out the logit regression as the analysis that we must focus on. Adding to this, the fact that there are more literature around logit models support the choose of a logit model.

4.1 Currency Crises Model

The currency crises model includes a sample with 62 countries between the years of 1970 and 2019. The list of countries can be found in table A3 in the Appendix. Our response variable "dummy_crises1" takes one of the two values: 1 if a country in period t had a crisis; 0 otherwise. Our model includes the five most accurate determinants, according to a mix analysis between literature and a bottom-up estimation analysis applied to 22 variables. The found relevant variables are: polity level, exchange type, real GDP growth rate (in %), inflation and Equity

Securities Liabilities (Millions of US Dollars). The covariates' correlation matrix from model 1 can be found in the next table:

Table 1. Model 1: Currency Crises

Variables	Polity_level	Exchange_type	real_gdp	inflation	Equity_securities
Polity_level	1.0000				
exchange_type	-0.0814	1.0000			
real_gdp	-0.0534	-0.1453	1.0000		
inflation	-0.0134	0.1543	-0.0437	1.0000	
Equity_securities	0.1376	0.0603	-0.0203	-0.0402	1.0000

After choosing the key determinants for our model, we started our analysis with the basic Logit Model. All the details of each model will be approached in the respective subsection of each model.

As it is shown in Table 2, the obtained result for the Logit Regression without individual effects, suggest that three variables (polity_level, exchange_type and real_gdp) are statistically significant at the 1% significance level, one variable (Equity_securities) is statistically significant at 5% significance level, and one variable (inflation) is statistically significant at the 10% significance level. Due to the Likelihood ratio chi-square of 150.80 and a p-value of 0.000, we can tell that our model as a whole, fits significantly better than a model with no predictors. Therefore, all the chosen variables seem to be good predictors of currency crises. By looking for the coefficients, we can understand the impact of each variable to the probability of an occurrence of a currency crisis. By interpreting those coefficients, we can say that higher rates of real GDP growth lower the probability of having a currency crisis. In economic terms, the richer a country becomes, the higher the probability of stability in financial marker a country has, decreasing the probability of having a currency crisis. As it was proved by Budsayaplakorn *et al.* (2014), there is a necessity to include political variables, not only to predict currency crises, but also to explain them. The political level of a country is positively correlated with the probability of having a currency crisis. This variable indicates that democracies are more vulnerable to currency crises, being economically open increase the risk provided by the world economy, stimulating the risk in financial markets. Thus, the probability of currency crises occurring increases as the country achieve close to a full democracy. Exchange rates play an important role to explain crises, however. This variable is positively correlated with currency crises. Free exchange rate regime is more likely open to have currency crises. Inflation, which reflects the annual percentage change of consumer prices. The higher the inflation rate, the higher the loss of purchasing power from consumers, which will be reflected in consumption in

the short run, and savings in the medium/long run. Hence, consumption decreases, businesses will no longer be able to afford higher wages, creating a snowball effect contracting even more the economy. On the government side, a bond that needs to be paid in a currency that is worth less, has a higher probability of defaulting. In conclusion, higher inflation rates increase the probability of having a currency crisis. Chong and Yan (2018) find evidence that the increment of external liabilities characterize the transition from a tranquil state to a turmoil one, which are associated with crises periods. Our evidence regarding real GDP is supporting the results provided by Dornbush *et al.* (1995) that is discussed in the literature review.

Table 2. Model 1: Currency Crises – Logit Regression

Variables	(1) Logit
Polity_level	.0774854*** (.0207767)
exchange_type	.6781388*** (.085019)
real_gdp	-.0737652*** (.0186065)
inflation	.0096586* (.0054574)
Equity_securities	-.000011** (4.92e-06)
_cons	-4.394562*** (.2778682)
Observations	2 073
standard errors in parentheses	
*** p<0.01, ** p<0.05, *p<0.1	
Prob > chi2 = 0.0000	

In order to understand the overall performance of our model, we start by looking into the test Estat Classification. The result can be shown in Table 3. Stata by default uses a cut off of .5. The overall rate of corrected classification is estimated to be 92.86%, however, we must look into sensitivity and specific values to understand, the distribution of “true” values, in case of sensitivity, and the normal weight group, in case of specified. Our result indicates that only 9.55% of the observed crisis in the data were identified by the model as currency crisis by having an estimated probability greater than 0.5 (in the data we have 157 crises from which only 15 of them the model correctly identified as one). On the other hand, 99.69% of the cases

were correctly identified as a non-crisis situation (in the data we have 1916 non-crisis from which 1910 of them the model correctly identified as one).

As it is discussed in the Methodology, we can adopt a Logit model with random or fixed effects. In order to choose between them, we have applied the Hausman test to our Logit Regression. The results of the Hausman test can be found in Table 4. Given the result of the Hausman test at the 1%, 5% and 10% level, a Logit model with random effects would be more suitable than fixed effects.

Table 3. Model 1: Currency Crises – Estat Classification

```
. estat classification
```

Logistic model for dummy_crises1

Classified	True		Total
	D	~D	
+	15	6	21
-	142	1910	2052
Total	157	1916	2073

Classified + if predicted Pr(D) >= .5
True D defined as dummy_crises1 != 0

Sensitivity	Pr(+ D)	9.55%
Specificity	Pr(- ~D)	99.69%
Positive predictive value	Pr(D +)	71.43%
Negative predictive value	Pr(~D -)	93.08%
False + rate for true ~D	Pr(+ ~D)	0.31%
False - rate for true D	Pr(- D)	90.45%
False + rate for classified +	Pr(~D +)	28.57%
False - rate for classified -	Pr(D -)	6.92%
Correctly classified		92.86%

By the results, we can say that our model is valid by looking at the likelihood-ratio test for rho (p-value = 0.0000) in table 5. The null hypothesis means that the random effects have a variance equal to zero, in other words, the inexistence of individual random effects. Our finding suggests that we do not reject the null hypothesis, once p-value is higher than 0.05, meaning that there are indeed specific random country-effects in the model. Those values suggest that a model with random effects is more suitable than a model with fixed effects.

Table 4. Model 1: Currency Crises – Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
polity_level	.0275382	.0754278	-.0478896	.0644374
exchange_type	.6083983	.6595957	-.0511974	.1025701
real_gdp	-.1616613	-.1484	-.0132613	.0178093
inflation	.0039411	.0033978	.0005433	.0004003
lequity_se~s	-.169915	-.0514145	-.1185005	.0761151

b = consistent under Ho and Ha; obtained from xtlogit
 B = inconsistent under Ha, efficient under Ho; obtained from xtlogit

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2(5)} &= (b-B)' [(V_b-V_B)^{-1}] (b-B) \\ &= 3.80 \\ \text{Prob>chi2} &= 0.5783 \end{aligned}$$

Whilst 2 of the covariates (exchange_type, real_gdp) remain statistically significant at 1% significance level, there are 2 other covariates (Polity_level, inflation) now significant at 5% significance level. The covariate Equity_securities is now, not statistically significant. In addition, all the covariates maintain the same signs as in the logit model without individual effects, however, there are marginal differences once compared with Logit Model without individual effects, as it is represented in the Table 5.

Looking to the result into a whole, without specifying a country or a continent, and without simulating to a hypothetical hypothesis, giving the current situation (until 2019), when we replace, in our model, the coefficient of each variable, we can understand the probability of a currency crisis happen, at world scale. By this approach we obtain a probability of 1.5%. To understand the range of values from the probability of a currency crises occurring, in our logit model, we replace the values of each variable with the values from 95% confidence interval, in table 5. With 95% of confidence level, the probability of a currency crises occurring is between a range of 1.3% and 1.7%. Giving the current world situation, with a global real gdp growth rate of 2.84%, and a global inflation of 3.18% unless an external shock stirs the world economy, compromising it in an economic and political way, if ceteris paribus, there is no relevant warning signals. The fact that a world currency crisis situation is not a usual occurrence could also explain the obtained values. If we have a common currency, the probability of a global currency crisis will tend to increase.

Table 5. Model 1: Currency Crises -Random Effects

Variables	(1)		
	Random Effect	95% Confidence interval	
Polity_level	.0671821** (.0272607)	.0137522	.120612
exchange_type	.6953888*** (.0957314)	.5077587	.883019
real_gdp	-.0917544*** (.0212156)	-.1333361	-.0501727
inflation	.0051246** (.0023595)	.0005	.0097491
Equity_securities	-9.14e-06 (5.63e-06)	-.0000202	1.90e-06
_cons	-4.678792*** (.3501835)	-5.365139	-3.992445
Observations	2 073	2 073	2 073

standard errors in parentheses
*** p<0.01, ** p<0.05, *p<0.1
Prob > chi2 = 0.0000

Specifying our model to Portugal, which has the values for the respective variables in Table 6, in order to predict the probability of a currency crises happening, we can say with 95% confidence that the probability of a currency crises occurring is between 2% and 18%. Using the coefficients values, the probability of a currency crises occurring is 7%. Even registering a negative real gdp growth rate, the remaining covariates have more “weight” in our model, and the joint result decreases the probability of a currency crises. If, for example, we have a positive and higher level of inflation, and increase the negative value of Equity securities liabilities, the probability of currency crisis increases, ceteris paribus. By the obtained values from the probability of a currency crises occurring we conclude that our model is a good predictive model, once the results coincide with what happen in 2020.

Table 6: Currency Crises – Portugal Values 2020

(1)	
Portugal	values
Polity_level	10
exchange_type	1
real_gdp	-7.6
inflation	-0.1

Applying our model to predict a past currency crisis, we revisit the Asian 1997 crisis. Philippines was in a currency crisis between 1997 and 1998. By this, we will first test the fit of this model (to 1997) and then evaluate the predictive accuracy from the model. Starting by restricting our sample until 1997, in order to test the fittest of our model. Remember that we have a currency model at world scale. However, giving all the repercussions from this crisis, we believe in a significant result. In order to verify the fittest of our model, we will now apply our restricted model until 1997 to Philippines (values from 1997), those values can be seen in table 7. By replace the values from Philippines in our model and multiply them with the coefficient of our model we obtain a probability of currency crisis of 4%. Despite the Asian crisis start in 1997, we find evidence of non-crisis situation. The repercussions of crisis were felt only in 1998, the year the crisis began in Philippines. Thus, in order to predict 1998 currency crisis in Philippines, we kept our sample until 1997, and use the values of Philippines in 1998 (values can be seen in table 7). Adding the Philippines 1998 values into our model, we forecast a probability of a currency crisis of 25%. This leap in values could be explained by the change in exchange type, real gdp growth Rate and inflation. Philippines in 1997 had a more restrictive exchange rate type (type 1 – explanation could be seen in the methodology), and in 1998 Philippines switch to a more flexible exchange rate type (type 3 - explanation could be seen in the methodology). The real gdp growth rate went from 5.2% to -0.6%. The lower the real gdp growth rate, the higher the probability of occurrence of a currency crisis. The variable inflation went from 5.6% to 9.2%, these variables already had compromising values and further aggravated.

Table 7. Model 1: Currency Crises – Random effects until 1997

Variables	(1) Random Effect	95% Confidence interval		Philippines 1997 values	Philippines 1998 values
Polity_level	.1889583** (.0732776)	.045338	.332578	8	8
exchange_type	1.041248*** (.2746908)	.502866	1.579632	1	3
real_gdp	.0303998 (.0747838)	-.1769733	.1161738	5.2	-0.6
inflation	.0020547 (.0031773)	-.0041727	.0082822	5.6	9.2
Equity_securities	.0003318** (.0001626)	-.0006506	-.0000131	-406	264
_cons	5.670772*** (1.197098)	-8.017041	-3.324504		
Observations	244	244	244		

standard errors in parentheses
 *** p<0.01, ** p<0.05, *p<0.1

The obtained value is not sufficient to consider as a currency crisis. The fact that we are restricting our model, by reducing our sample, could bias the forecasting model. We already understood that if we decrease some variables, we will obtain higher probability of currency crisis. In order to obtain a significant probability of crisis (higher than 50%), we will create two hypothetical scenarios to reach the probability of currency crisis. The value of each variable is presented in Table 9. In scenario 1, we will only replace the value from exchange rate type, keeping our sample until 1997. In scenario 2, we will replace the values from polity level and exchange rate type, keeping our sample until 1997. See the value in table 7 and 8.

Starting with scenario 1, by replacing the values in our logit model, we forecast a probability of a currency crisis of 73%, suggesting a currency crisis situation. The fact that we create a hypothetical situation where Philippines has an even more flexible exchange rate type (from type 3 to type 5), scale up the probability of occurrence of a currency crisis. In this scenario, ceteris paribus, the change in the type of exchange rate will be reflected in the probability of currency crisis.

In scenario 2, supposing that Philippines is a fully democracy (went from polity level 8 to polity level 10) and have a more flexible exchange rate type (went from type 3 to type 4), ceteris paribus, if we replace those values in our model, we obtain a probability of occurrence of currency crisis of 58%. As long as a country become a fully democracy, higher probability of currency crisis is achieved. With this analysis, we conclude that the variables polity level and exchange rate type have a preponderous role to forecast currency crisis. When we increase those values, the model automatically suggests situation of currency crisis (higher than 0.5)

Table 8. Model 1: Currency Crises – Hypothetical Scenarios

	Scenario 1	Scenario 2
Polity_level	8	10
exchange_type	5	4
real_gdp	-0.6	-0.6
inflation	9.2	9.2
Equity_securities	264	264
Probability of Currency Crisis	73%	58%

4.2 Banking Crises Model

The sample of Banking Crises model includes 67 countries between the years 1970 and 2019. The list of countries can be found a Table 6, in the Appendix A3. Our response variable “dummy_crises2” is a binary variable that takes one of the two values; 1 if a country had a banking crisis; 0 otherwise. Our model includes 5 variables: inflation (average consumer price, annual % change), real GDP growth rate (in %), general government gross debt (% of GDP), unemployment rate (%) and household debt, loans and debt securities (% of GDP). According to a bottom-up estimation analysis between 22 variables, the result suggested those mentioned variables above. The correlation matrix for model 2 can be found in Table 9.

Table 9. Model 2: Banking Crises

Variables	Inflation	Real_gdp	Debt_GDP	Unemployment_rate	Household_debt
inflation	1.0000				
Real_gdp	-0.0600	1.0000			
Debt_GDP	0.1156	0.0261	1.0000		
Unemployment_rate	0.3435	-0.0936	0.0626	1.0000	
Household_debt	0.0303	0.0182	0.0477	-0.0407	1.0000

After choosing the key determinants for our model, we started our analysis with the basic Logit Model. All the details of this model will be discussed in the next paragraphs.

The obtained results regarding Logit model without individual effects, indicate that 2 of the variables (inflation, real_gdp) are statistically significant at 1% significance level, 2 of them (debt_GDP and unemployment rate) are statistically significant at 10% significance level and 1 of them (household debt) is statistically significant at 5%. By looking to signs of each variable we can conclude about their correlation with our dependent variable; As expressed in the literature, currency and banking crises are usually hand in a hand; i.e., it is quite usual for both to emerge in the same period. This suggests that both have similar determinants. Inflation is positively correlated with banking crises, as mentioned in the previous subsection, the higher the inflation rate, the higher the loss of purchasing power from consumers, which will be reflected in consumption in the short run, and savings in the medium/long run. This effect will be reflected in the economy. In conclusion, the higher the inflation rate, the higher the probability of a banking crisis. The covariate, real GDP growth are negatively related with banking crises. This variable expresses the wellness of an economy, the higher wellness is,

the higher the economy's health of a country is. Real GDP growth measures the economic growth of GDP from one period to another. Hence, the higher the value of both variables are, the less the probability of banking crises is. The variables general government gross debt and household debt are measures as percentage of gdp, so it is expected that both variables have similar behaviours. In fact, both are positively correlated with the dependent variable, which means that, the higher those values, the higher the probability of banking crisis. The unemployment rate is positively related with the dependent variable. In a situation of crisis, unemployment rate tends to be higher, during a recession, companies face increased costs, stagnant or falling revenues and increased pressure to service their debts. In order to reduce their costs they start to fire their employers. The high unemployment rate values mean high probability of banking crisis. Our finding regarding real GDP growth is supported by the following literature: Reinhart and Rogoff (2013) and Kauko *et al.* (2014). The following Table show the result regarding the Logit model.

Table 10. Model 2: Banking Crises – Logit Regression

Variables	(1) Logit
inflation	.0291917*** (.0085806)
Real_gdp	-.2239883*** (.0376135)
Debt_GDP	.0052885* (.0027941)
Unemployment_rate	.0408447* (.0254936)
Household_debt	.0076002** (.0037019)
_cons	-2.322765*** (.4176766)
Observations	763
standard errors in parentheses	
*** p<0.01, ** p<0.05, *p<0.1	
Prob > chi2 = 0.0000	

By looking into the Estat Classification test in Table 11, we obtained an overall rate of corrected classification with 84.14%. Our result indicates that 10.32% of the observed crisis in the data were identified by the model as banking crisis by having an estimated probability greater than 0.5 (in the data we have 126 crises from which only 13 of them the model correctly identified as one). On the other hand, 98.74% of the cases were correctly identified as a non-crisis situation (in the data we have 637 non-crisis from which 629 of them the model correctly identified as one).

Table 11. Model 2: Banking Crises – Estat Classification

Logistic model for dummy_crises2

Classified	True		Total
	D	~D	
+	13	8	21
-	113	629	742
Total	126	637	763

Classified + if predicted Pr(D) >= .5
True D defined as dummy_crises2 != 0

Sensitivity	Pr(+ D)	10.32%
Specificity	Pr(- ~D)	98.74%
Positive predictive value	Pr(D +)	61.90%
Negative predictive value	Pr(~D -)	84.77%
False + rate for true ~D	Pr(+ ~D)	1.26%
False - rate for true D	Pr(- D)	89.68%
False + rate for classified +	Pr(~D +)	38.10%
False - rate for classified -	Pr(D -)	15.23%
Correctly classified		84.14%

Following the same pattern, to decide between fixed or random effects, we applied the Hausman test to our regression. Those results can be found in the Table 12. Results suggests that the logit model with fixed effects is more suitable than the random effects. The p-value is lower than 5%, which indicates that reject the null. Thus, our final regression is based on a logit model with fixed effects. Remembering that applying fixed effects, we are ignoring countries that stay constant over the analysed period of the regression.

Table 12. Model 2: Banking Crises - Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
inflation	.0859962	.0457363	.0402599	.0145045
real_gdp	-.2584462	-.2414976	-.0169486	.0195942
Debt_GDP	-.0067504	.0025786	-.009329	.0024386
Unemployment	.1416461	.06444	.0772061	.0330282
household_t	.0218329	.0111287	.0107042	.0060796

b = consistent under Ho and Ha; obtained from xtlogit
B = inconsistent under Ha, efficient under Ho; obtained from xtlogit

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2(5)} &= (b-B)' [(V_b-V_B)^{-1}] (b-B) \\ &= 27.79 \\ \text{Prob>chi2} &= 0.0000 \end{aligned}$$

By applying fixed effects to our logit model, the results prove that our model is valid (p-value = 0.0000). The variables inflation rate; and real GDP growth rate; are still significant at .10%, 5%, and 1% significance level, keeping the same correlations within the dependent variable. The variables unemployment rate and household debt are now only significant at 5% significance level; the current account balance is now non-significant.

Table 13. Model 2: Banking Crises -Fixed Effects

Variables	(1)	95% Confidence interval	
	Fixed Effects		
inflation	.0859962*** (.0199628)	.0468698	.1251226
Real_gdp	-.2584462*** (.045667)	-.3479518	-.1689406
Debt_GDP	-.0067504 (.0046554)	-.0158747	.002374
Unemployment_rate	.1416461** (.0502105)	.0432353	.2400569
Household_debt	.0218329** (.0081002)	.0059568	.0377089
Observations	676	676	676

standard errors in parentheses
 *** p<0.01, ** p<0.05, *p<0.1
 Prob > chi2 = 0.0000

Looking to the result into a whole, without specifying a country or a continent, and without simulating to a hypothetical hypothesis, giving the current situation (until 2019), when we replace, in our model, the coefficient of each variable we can understand the probability of a Banking crisis happen at world scale. By this approach we obtain a probability of 52%. Replacing the values of each variable with the values from 95% confidence interval, in table 13, we obtain the range of values from the probability of a banking crises occurring, in our logit model with fixed effects. With 95% of confidence level, we will achieve a range of values between 52% and 53% of a banking crisis happen. The obtained value means that we have a considerable probability of a world banking crisis happen. The 2009 financial crisis stimulate several banking crises across the world let some repercussion along the years. The overall debts levels are higher than during the previous crisis and tend to get worse. The necessity of countries to make loans to stimulate their growth it is been for years the adopted solutions. This solution is not healthy to the economy. Once our banking model reflects the debt and the household debt of a country, it is expectable, giving the current situations, higher probability of a banking crisis.

By replace the Portugal values (see in table 14) in our model (until 2019), in order to forecast the probability of banking crisis in Portugal to 2020, we obtain a probability of banking crisis of 99%. As expected, the higher values of debt bias the probability of banking crisis. In spite of there are several indicators that suggest a banking crisis in Portugal, the country is yet in a banking crisis situation. The low growth rate along the years, create a necessity to incur into constant loans, which create un unsustainable economy. Our model suggests a banking crisis, which has not yet occurred, however this scenario could happen in the near future.

Table 14: Banking Crises – Portugal Values 2020

Portugal	(1) values
inflation	-0.1
Real_gdp	-7.6
Debt_GDP	157
Unemployment_rate	7.2
Household_debt	126

In order to try to predict a banking crisis, we revisit the subprime mortgage crisis, caused by a several number of variables, i.e., high level of debt, inappropriate government regulation, house price appreciation, which triggered off a banking crisis, which resulted in a global financial crisis. Using the U.S.A values in our model, restricted until 2006, we obtain the results in table 15. By forecasting our model, applying it to USA in 2007, in order to verify the predictive accuracy off our model, we change the values from each variable from our model, and obtain a probability of occurrence of banking crisis with 94%. These values suggest a banking crisis period, proving the lived situation in U.S.A. The higher level of debt and the low real gdp growth rate contribute to a higher probability of banking crisis. The trade-off between inflation and unemployment rate makes low levels of unemployment rate cause inflation, it much has an equilibrium between both. In case of the U.S.A the equilibrium was respected.

The crisis in U.S.A began in 2007 and aggravate in 2008, in order to prove that we replace the variables values in our model, to U.S.A values to 2008. We obtain a probability of occurrence of Banking crisis with 98%, indicating a banking crisis situation (higher than 50%). In 2008 U.S.A obtained an even worse scenario, where all the variables increased in a negative way. The key determinant from this shift in values were the negative value from real gdp growth rate (went from 1.9% to -0.1%). Once the debt variables were measure as a percentage of gdp, it is expectable to have similar behaviour between both. We conclude that our banking crisis model can predict correctly Banking Crises situations.

Table 15: Banking Crises – fixed effects until 2006

Variables	(1) Fixed Effect	95% Confidence interval		U.S.A values 2007	U.S.A values 2008
inflation	.0869851*** (.0237403)	.0404549	.1335153	2.9	3.8
Real_gdp	-.3455041*** (.0660154)	-.4748919	-.2161163	1.9	-0.1
Debt_GDP	-.0034572 (.0076012)	-.0183554	.0114409	64.77	73.79
Unemployment_rate	.2581912** (.0752241)	.1107547	.4056277	4.6	5.8
Household_debt	.0222935 (.0162021)	-.009462	.0540491	98.63	96.11
Observations	397	397	397		

standard errors in parentheses

*** p<0.01, ** p<0.05, *p<0.1

Prob > chi2 = 0.0000

In order to analyse the importance of the value real gdp growth rate to predict a banking crisis model, we create 2 hypothetical scenarios when we try to reach a probability lower than 50%. For this analysis we will use our model with the sample restricted until 2006 and use U.S.A values to 2008 in both scenarios (1 and 2). In both scenarios we will only replace the value of real gdp growth rate. The value can be seen in table 16. In scenario 1, we will assume a real gdp growth rate of 8%, ceteris paribus. In scenario 2, we will assume an even better real gdp growth rate, 12%.

Table 16. Model 2: Banking Crises – Hypothetical Scenarios

	Scenario 1	Scenario 2
inflation	3.8	3.8
Real_gdp	8	12
Debt_GDP	73.79	73.79
Unemployment_rate	5.8	5.8
Household_debt	96.11	96.11
Probability of banking crisis	66%	41%

By replacing the values of scenario 1 in our banking crisis model, we obtain a probability of occurrence of banking crisis with 66%. Though a decrease in the probability of occurrence in banking crisis, the high levels of debt, namely, household debt, meant that is still registered values of banking crisis situation. Replicating the scenario 2 in our banking crisis model, we

obtain a probability of occurrence of banking crisis with 41%. Even though is a high probability being not sufficient to consider as a banking crisis situation. We can conclude that the level of real gdp growth rate play an important role to predict banking crisis. Our finding regarding real GDP growth is supported by the following literature: Reinhart and Rogoff (2013).

4.3 Sovereign Debt Crises Model

The sample of our sovereign debt crises includes 75 countries between 1970 and 2019. The list of countries can be found in Table A3 in the Appendix. Our response variable “dummy_crises3” is a binary variable that takes one of the two values; 1 if a country had a crisis; 0 otherwise. Our estimation model includes 5 variables: regulatory quality (in %), political level, real gdp growth rate (in %), historical public debt (% of GDP) and household debt (% of GDP). The decision between the chosen variables was made taking into consideration the literature review and a bottom-up estimation analysis, that was applied to 22 variables. The correlation matrix can be found in the next table.

Table 17. Model 3: Sovereign Debt Crises

Variables	Regulatory_ qual	Polity_ level	Real_ gdp	Historical_ d ebt	Household_ d ebt
Regulatory_ qual	1.0000				
Polity_ level	0.5805	1.0000			
Real_ gdp	-0.1134	-0.0534	1.0000		
Historical_ d ebt	-0.0657	-0.0219	-0.0269	1.0000	
Household_ d ebt	0.7207	0.3906	-0.2304	0.1334	1.0000

Once chosen the fifth most accurate covariate to estimate our model, we start our analysis with the basic logit model. The next paragraphs describe in detail the final model chosen.

According to our results, that can be found in Table 18, all of the variables have statistical significance. Besides real gdp growth rate, which is significant at 10%, all the remaining variables are significant at least 5% significance level. Looking into the correlations between the variables and the dependent variable, three of the covariates (polity_level, historical debt, household_debt) are positively correlated with the dependent variable, whereas two of covaritates (regulatory_qual, real_gdp) are negatively correlated with the dependent variable; The higher their values (covariates positively correlated), the higher the probability of a sovereign debt crisis to occur. In economic terms, starting by the analysis of political; full democracy countries are more likely to face sovereign debt crises; The importance of institutions and their political sense are evident, not only to forecast crises but also to prevent

them. The variables historical debt and household debt could be interpreted jointly. The higher the values of debt, the higher the probability of sovereign debt crisis. Our findings regarding this debt variables (household debt and historical public debt) are supported by the following literature: Savona and Vezzoli (2015). The remaining variables, regulatory quality and real gdp growth rate have a negative correlation with the dependent variable. The higher those values, the lower the probability of occurrence of sovereign debt crises. As long as a country become richer, become more resilient to face up a sovereign debt crisis. Regulatory quality reflects the ability of the government to formulate and implement policies. If there is a good regulatory quality, it is expectable to have a country more stable, which contribute to a reduction in the probability of occurrence of sovereign debt crises.

Table 18. Model 3: Sovereign Debt Crises – Logit Model

Variables	(1) Logit
Regulatory_qual	-.0878682*** (.0128393)
Polity_level	.1303459** (.0417822)
Real_gdp	-.0511098* (.0270926)
Historical_debt	.0136097*** (.003016)
Household_debt	.0265987** (.0094927)
_cons	-.6933093*** (.3455028)
Observations	1 019
standard errors in parentheses	
*** p<0.01, ** p<0.05, *p<0.1	
Prob > chi2 = 0.0000	

By looking into the Estat Classification test in Table 19, we obtained an overall rate of corrected classification with 93.92%. Our result indicates that 8.47% of the observed crisis in the data were identified by the model as sovereign debt crisis by having an estimated probability greater than 0.5 (in the data we have 59 crises from which 5 of them the model correctly identified as one). On the other hand, 99.17% of the cases were correctly identified as a non-crisis situation (in the data we have 960 non-crises from which 952 of them the model correctly identified as one).

Table 19. Model 3: Sovereign Debt Crises – Estat Classification

Logistic model for dummy_crises3

Classified	True		Total
	D	~D	
+	5	8	13
-	54	952	1006
Total	59	960	1019

Classified + if predicted Pr(D) >= .5
True D defined as dummy_crises3 != 0

Sensitivity	Pr(+ D)	8.47%
Specificity	Pr(- ~D)	99.17%
Positive predictive value	Pr(D +)	38.46%
Negative predictive value	Pr(~D -)	94.63%
False + rate for true ~D	Pr(+ ~D)	0.83%
False - rate for true D	Pr(- D)	91.53%
False + rate for classified +	Pr(~D +)	61.54%
False - rate for classified -	Pr(D -)	5.37%
Correctly classified		93.92%

Then, to choose between the logit model with random or fixed effects we have applied the Hausman test. The results are presented in Table 20. Regarding the Hausman test, at a significance of 1%, 5%, and 10% we do not reject the null hypothesis and adopt a logit model with random effects. We conclude that, logit model with random effects, is more suitable than a logit model with fixed effects.

By the results, we can say that our model is valid by looking at the likelihood-ratio test for rho (p-value = 0.0000) in table 21. The null hypothesis means that the random effects have a variance equal to zero, in other words, the inexistence of individual random effects. Obtaining a p-value equal to zero, suggests that we do not reject the null hypothesis, meaning that there are indeed specific random country-effects in the model. From the previous Hausman test, we find these effects as of random type.

Table 20. Model 3: Sovereign Debt Crises – Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
regulatory~1	-.055558	-.0756304	.0200724	.0266459
polity_level	-.5634276	.0272728	-.5907004	.2366684
real_gdp	-.0315529	-.0513994	.0198464	.
historical~t	.0240849	.0248594	-.0007745	.0067466
household~t	.0065667	.020955	-.0143883	.0163228

b = consistent under Ho and Ha; obtained from xtlogit
 B = inconsistent under Ha, efficient under Ho; obtained from xtlogit

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2(5)} &= (b-B)' [(V_b-V_B)^{-1}] (b-B) \\ &= 4.43 \\ \text{Prob>chi2} &= 0.4891 \end{aligned}$$

We can conclude that there are 2 statistically significant variables at 1%,5% and 10% significance level (regulatory_qual, historical_debt) all of them keeping the coefficient signs. The variables political level, real gdp growth rate and household debt have no longer statistical significance. Those results can be seen in the Table 21.

Table 21. Model 3: Sovereign Debt Crises – Random Effects

Variables	(1)		
	Random Effects	95% Confidence interval	
Regulatory_qual	-.0756304*** (.022027)	-.1188025	-.0324582
Polity_level	.0272728 (.1015082)	-.1716795	.2262252
Real_gdp	-.0513994 (.042312)	-.1343293	.0315306
Historical_debt	.0248594*** (.0065711)	.0119803	.0377385
Household_debt	.020955 (.016152)	-.0107023	.0526123
_cons	-2.850356** (1.081252)	-4.969571	-.7311406
Observations	1 019	1 019	1 019

standard errors in parentheses
 *** p<0.01, ** p<0.05, *p<0.1
 Prob > chi2 = 0.0000

Looking to the result into a whole, without specifying a country or a continent, and without simulating to a hypothetical hypothesis, giving the current situation (until 2019), when we

replace in our model, the coefficient of each variable we can understand the probability of a Sovereign debt crisis happen at world scale. By this approach we obtain a probability of 6%. The obtained value means that we do not have a considerable probability of a world sovereign debt crisis happen. A sovereign debt crisis in a world scale is not usual to happen. We often associate sovereign debt crisis to countries, depending on their levels of debt, and the political situation the probability of this type of crisis happen increase or decrease. Portugal in 2020, for the chosen covariates, registered the following values:

Table 22: *Sovereign debt Crises – Portugal Values 2020*

Portugal	(1) values
Regulatory_qual	75.481
Polity_level	10
Real_gdp	-7.6
Historical_debt	133
Household_debt	126

In 2020, Portugal did not experience a sovereign debt crisis. Even with high values of debt and a negative real gdp growth rate it was not enough to register a situation of crisis. We can conclude that the regulatory quality of a country will have high impact to predict a sovereign debt crisis once it was the only variable who registered a stable value. To prove that Portugal was not in a sovereign debt crisis, we will forecast to 2020, the probability of sovereign debt crisis. Replacing the values of Portugal to 2020, in our model (until 2019), we obtain a probability of a sovereign debt crisis happen of 12%. The result indicate that Portugal is not yet in a sovereign debt situation (probability is lower than 50%).

In order to try to predict a sovereign debt crisis, we revisit the Portugal sovereign debt crisis starting in 2010. Since 2000, Portugal has not registered a real gdp growth rate higher than 2%, being in most of the years below the European average, causing instabilities in the country. Adding to this, the 2007 subprime mortgage crisis, increased even more the instability lived in the country. The financial crisis who starts in U.S.A rapidly spread into the world and aggravate potential crisis situation. Starting to restrict our model until 2009, we will now forecast the probability of sovereign debt crises to Portugal in 2010, in order to verify the predictive accuracy off our model. By changing the values from each variable from our model (values can be seen in table 23) we obtain a probability of occurrence of sovereign debt crisis with only 2%. This value suggests a situation of non-crisis. Our model did not obtain enough values (higher than 0.5) to identify this crisis. The Portugal 2010 sovereign debt was stimulated by an external shock in our mode, it is a fact that Portugal could have better covariates values, however the values were not a warning signal of crisis. Due to this external shock, Portugal's

debt increase, creating a situation of an even worse real gdp growth rate (values can be seen in table 23). Despite not identifying it as a crisis, it is expectable to have higher probability of sovereign debt happen. Forecasting our model (restricted until 2009), by replacing the values to Portugal in 2011 in our model, we obtain a probability of sovereign debt crisis of 7%. Owing to the negative externalities triggered off by the external shock, the probability of sovereign debt crisis increased, as we had already expected. Replicating the same pattern to 2012, our model obtains a probability of sovereign debt crisis of 8%. Using our model, the obtained values along the years was not enough to identify as a sovereign debt crisis. The fact that Portugal has a good regulatory quality offset the remaining values. Our findings suggest that regulatory quality and real gdp growth rate plays and important role to predict sovereign debt crisis. In order to prove our findings, we will create 3 hypothetical scenarios (1,2 and 3), using the same model (until 2009), and the same county (Portugal in 2011). In scenario 1, we will only change the value of regulatory quality; In scenario 2, we will only change the value of real gdp growth rate; and in scenario 3 we will change the values of regulatory quality and real gdp growth rate. In all scenarios we will try to achieve a situation of sovereign debt crisis.

Table 23: Sovereign debt Crises – random effects until 2009

Variables	(1) Random Effect	95% Confidence interval		Portugal values 2010	Portugal values 2011	Portugal values 2012
Regulatory_qual	-.1537016*** (.0423642)	-.2367339	-.0706694	75.12	71.56	75.83
Polity_level	.2514502 (.1992522)	-.1390768	.6419773	10	10	10
Real_gdp	-.1818181** (.0849331)	-.3482839	-.0153522	1.9	-1.8	-4
Historical_debt	.0238247* (.0127635)	-.0011913	.0488407	96.18	111.39	126
Household_debt	.0463794 * (.0274993)	-.0075183	.1002771	90.67	90.47	90.47
_cons	-1.290427 (1.761016)	-4.741954	2.161101			
Observations	613	613	613			

standard errors in parentheses

*** p<0.01, ** p<0.05, *p<0.1

Prob > chi2 = 0.0000

Starting with the analysis of scenario 1 (values can be seen in table 24), replacing each value in our model, we obtain a probability of sovereign debt crisis of 61%. Our model could have identified the lived sovereign debt crisis in 2010 in Portugal if Portugal had a bad regulatory quality if ceteris paribus. As we have already mentioned and discussed along this research, the power of institutions is increasingly impacting the economy. The switch from a

“good regulatory government” to a “bad regulatory government” was enough to our model identify this situation as a sovereign debt crisis.

In scenario 2, by replacing each value in our model, we obtain a probability of sovereign debt crisis of 67%. Real gdp growth rate is one determinant key to understand the economy of a country. A negative value of real gdp growth rate means that the size of the economy has become smaller than before. Even with a good regulatory quality, a country with a low value of real gdp growth rate could also be able to achieve a sovereign debt crisis. In both scenarios (1 and 2) we use unusual situations in the economy. In scenario 3, we provide a more tangible situation. By having an average regulatory quality and a bad real gdp growth rate, the probability of a sovereign debt crisis will increase. Replacing the values of scenario 3 in our model we obtain a probability of sovereign debt crisis of 56%. Our findings suggest that regulatory quality and real gdp growth are good predictive variables.

Table 24. Model 3: Sovereign debt Crises – Hypothetical Scenarios

	Scenario 1	Scenario 2	Scenario 3
Regulatory_qual	45	75.12	58
Polity_level	10	10	10
Real_gdp	1.9	-25	-8
Historical_debt	96.18	96.18	96.18
Household_debt	90.67	90.67	90.67
Probability of sovereign debt Crisis	61%	67%	56%

Chapter 5

Robustness Analyses

Our robustness analysis will replicate the same model, but this time to different crises. In order to evaluate the performance of our predictive model we will predict each type of past crises with the respective model and see if our model could forecast them. The conclusions about the performance of each model and all the remaining details will be discussed in the next subsections.

5.1 Currency Crisis

Starting with currency model, we will try to forecast the 2016 Venezuela currency crisis. This crisis was the consequence of several socioeconomic and political crisis lived in the country along the years. Inflation stood out as one of the main causes of this crisis, reaching for several consecutive years double-digit annual inflation rates. By restricting our sample until 2015, in order to try to forecast the currency crisis lived in 2016 and 2017 for Venezuela, we obtain the following results (Table 25):

Table 25. Model 1: Currency Crises - Random Effects

Variables	(1) Random Effect	95% Confidence interval	
Polity_level	.0671821** (.0272607)	.0137522	.120612
exchange_type	.6953888*** (.0957314)	.5077587	.883019
real_gdp	-.0917544*** (.0212156)	-.1333361	-.0501727
inflation	.0051246** (.0023595)	.0005	.0097491
Equity_securities	-9.14e-06* (5.63e-06)	-.0000202	1.90e-06
_cons	-4.678792*** (.3501835)	-5.365139	-3.992445
Observations	2 073	2 073	2 073

standard errors in parentheses
 *** p<0.01, ** p<0.05, *p<0.1
 Prob > chi2 = 0.0000

We can see that our model is valid (p-value: 0.0000) and all variables included in our sample are statistically significant. By analysing the coefficients correlation in Table 25, with our dependent variable, we conclude that all the signs remain equal. Using the Venezuela variables values to 2016 (see Table 26) in our currency model, we forecast a probability of currency crises of 87%. This result indicates a situation of currency crises (higher than 50%). Using the same approach to Venezuela in 2017, we obtain a probability of currency crises of 99, which also indicate a situation of currency crisis. The change in political level (went from a democracy, level 4, to an autocracy, level -3) and the increase in inflation had several repercussions in the economy, which cause an increase of the probability of currency crisis. Comparing these results with the Philippines currency crisis in 1999, we can see several differences in the variables. In Venezuela, we have a worse real gdp growth rate, and higher levels of inflation. As we have already discussed, the richer a country is the less probability to have a currency crisis, The higher the levels of inflation, the higher the probability of crises. We verify with both variables, for Venezuela, warning signals of currency crises. In political terms, Venezuela register some instabilities when comparing with Philippines. Regarding our findings, it was expectable to achieve a probability of currency crisis giving all these fluctuations in values. We can conclude that our model is able to correctly forecast this currency crisis.

Table 26. Model 1: Currency Crises – Venezuela Values

	Venezuela values 2016	Venezuela values 2017	Philippines 1997 values	Philippines 1998 values
Polity_level	4	-3	8	8
exchange_type	5	5	1	3
real_gdp	-16.5	-14	5.2	-0.6
inflation	254.4	1087.5	5.6	9.2
Equity_securities	0	-23.357	-406	264
Probability of Currency Crisis	87%	99%	4%	25%

5.2 Banking Crisis

Our Banking model will be used to try to forecast the Banking crisis lived in the Uruguay in 2002. We will restrict our sample until 2001 and forecast the probability of Banking Crisis to 2002 and 2003 in Uruguay. It is expectable to achieve a probability of crises higher than 50%. The fact that Uruguay registers high levels of inflation and unemployment rate (table 28) to 2002 and 2003 suggest a situation of Banking Crises. Adding to this, Uruguay, in 2002, register a negative real gdp growth rate, which shown the percentage that the economy shrank when

compared with the previous year. The 2002 Uruguay banking crisis was caused by a contraction in Uruguay's economy (felt in inflation, unemployment rate and real gdp growth rate). The country's economy in 2002 lived with an over-dependence on Argentina, i.e., tourism, loans. The crisis in Argentina in 2001, create negative externalities in Uruguay causing a Banking crisis. There were five financial institutions who left insolvent. By restricting our sample until 2001, we obtain the result in Table 27. We can see that our model is valid (p-value: 0.0000) and three variables (inflation, real_gdp, unemployment_rate) included in our sample are still statistically significant and two of them are now not statistically significant. In order to forecast the 2002 crisis, we use the values of Uruguay to 2002 (can be seen in Table 28). Our model finds strong evidence of crisis, obtaining a probability of banking crises of 99%.

Table 27. Model 2: Banking Crises - Fixed Effects

Variables	(1)	95% Confidence interval	
	Fixed Effect		
inflation	.0718035** (.0260006)	.0208432	.1227638
Real_gdp	-.390399*** (.0767356)	-.540798	-.24
Debt_GDP	-.0080133 (.0128584)	-.0332154	.0171888
Unemployment_rate	.2856732*** (.0845593)	.11994	.4514064
Household_debt	.0860241*** (.0265277)	.0340309	.1380173
Observations	301	301	301

standard errors in parentheses
 *** p<0.01, ** p<0.05, *p<0.1
 Prob > chi2 = 0.0000

Using the same approach to 2003, we obtain a probability of banking crises of 99%. The fact that the variables inflation and unemployment rate increased, counter-balanced the fact that there was an improvement in the real gdp growth rate, however It was not enough to reduce the probability of banking crises. We can conclude that our banking crises could correctly forecast this banking crises, once the probability were higher than 50%.

When compared with the U.S.A 2007 banking crises, we can understand the importance of household debt. U.S.A, when compared with Uruguay register low levels of inflation; better values of real gdp growth rate, however, they are still prejudicial to the economy; and low levels of unemployment rate. By this comparation, a lower probability of Banking crises happen is expectable, however the fact that U.S.A have higher household debt cause similar values of the probability of banking crisis (values in Table 28).

Table 28. Model 2: Banking Crises –Uruguay Values

	Uruguay values 2002	Uruguay values 2003	U.S.A values 2007	U.S.A values 2008
inflation	14	19.4	2.9	3.8
Real_gdp	-7.1	2.3	1.9	-0.1
Debt_GDP	95.268	105.6	64.77	73.79
Unemployment_rate	16.8	17.2	4.6	5.8
Household_debt	10.244	10.471	98.63	96.11
Probability of banking Crisis	99%	99%	94%	98%

5.3 Sovereign Debt Crisis

We will revisit the 2014 Argentina sovereign debt crisis, in order to evaluate the performance of our predictive model. The 2014 Argentina sovereign debt crisis was caused by successive sovereign debt crisis between 2005 and 2014. The weaknesses of their political institutions were the main issue in this country. This political instability lived in the country create negative externalities to the economy. Argentina in 2014 lived a period with high levels of inflation, unemployment rate, and high levels of debt. Toward try to forecast this sovereign debt crisis, we restrict our sample until 2013 and use the values of each variable (Table 30) in our sovereign debt model to forecast the crisis. By restrict our model until 2013 we obtain the following result (Table 29)

Table 29. Model 3: Sovereign debt Crises - Random Effects

Variables	(1) Random Effect	95% Confidence interval	
Regulatory_qual	-.1087865*** (.0274791)	-.1626445	-.0549285
Polity_level	.141042 (.1259989)	-.1059112	.3879953
Real_gdp	-.0162846 (.0434142)	-.1013748	.0688056
Historical_debt	.0265019*** (.0075842)	.0116371	.0413667
Household_debt	.0414028** (.0183203)	.0054957	.07731
_cons	-2.657153** (1.179608)	-4.969143	-.3451629
Observations	885	885	885

standard errors in parentheses
 *** p<0.01, ** p<0.05, *p<0.1
 Prob > chi2 = 0.0000

We can see that our model is valid (p-value: 0.0000) and three variables (regulatory_qual, Historical_debt, Household_debt) included in our sample are still statistically significant and two of them are now not statistically significant. In order to evaluate the performance of our model, we forecast the probability of sovereign debt crisis to 2014 and evaluate the repercussions of sovereign debt in 2015. By use the values of Argentina to 2014 in our model, we obtain a probability of sovereign debt crises of 20%. Regarding our result we can not consider this situation as a sovereign debt crisis situation. Even with a low regulatory quality, the fact that Argentine, to historical debt and household debt register low values, bias our predictive model. For example, if instead of having a household debt of 5.72 have a household debt of 50, our model predict a probability of sovereign debt crises of 60%, which is enough to consider as a sovereign debt crises (higher than 50%). Applying the same approach to Argentina values in 2015, our model obtains a probability of sovereign debt crises of 15%. The increase in the real gdp growth rate (went from -2.5% to 2.7%); and in regulatory quality (went from 12.5 to 17.31) creates a more stable situation when we use our model.

Table 30. Model 3: Sovereign debt Crises – Argentina values

	Argentina values 2014	Argentina values 2015	Hypothetical scenario	Portugal values 2010	Portugal values 2011
Regulatory_qual	12.5	17.31	12.5	75.12	71.56
Polity_level	8	9	8	10	10
Real_gdp	-2.5	2.7	-2.5	1.9	-1.8
Historical_debt	43.59	52.13	43.59	96.18	111.39
Household_debt	5.72	6.35	50	90.67	90.47
Probability of sovereign debt Crisis	20%	15%	60%	2%	7%

By comparing with the 2010 Portugal sovereign debt crisis, we are understanding the importance of the regulatory quality, and the importance of debt variables to forecast this type of crises. Even with high levels of historical debt and household debt Portugal registerer low probability of sovereign debt crisis when compared with Argentina. The fact that Portugal has a good regulatory quality counter-balanced our model. The balance between all these variables could bias our model into a wrong way.

Chapter 6

Conclusion

All the negative repercussions that a financial crisis have in a country aware policymakers and researchers. There is an increasing importance in understanding how a crisis spreads, which are the key pre-announcements or pre-crisis warning signals and the key determinants to forecast them. We live in a world that is constantly becoming more globalized, which increases the probability of one crisis that starts in some country, quickly spreading into other countries. The contagion of crisis is more effective than ever. In the understanding all these main points, we could reduce the risk of a crisis happening.

In our study we built three different models to understand which are the key determinants between 1970 and 2019 to predict currency, banking, and sovereign debt crises, as well as to create three different crisis models to predict each type of crisis. Our database included several determinants, from which we have chosen the most accurate, taken into account the economic meaning and statistical and econometric analysis. We also included dummy variables one for each type of crisis, which represent our dependent variables. Two of our models (currency model and sovereign debt model) are based on a binary logit model with random effects and the banking model is based on a binary logit model with fixed effects.

Firstly, our models cover the period between 1970 and 2019 and more than 60 countries around the world. In all 3 models, we have found statistical significance through the model as a whole. Depending on the dummy crisis variable in analysis, each control variables will have different behaviours, the value and sign of the coefficients indicate the relation with the variable in analysis. Each model has shown good predictive signals once we estimate different situations of crisis in different countries. According to the economic sense, creating hypothetical situations, each model match perfectly with situations of crisis, although, as we know, a situation of crisis does not always start as the textbooks suggest. Our currency crises model can correctly estimate 9.55% of the currency crises. We find strong evidence that exchange rate type and political level plays an important role to predict currency crises. The probability of currency crises occurring increases as the country achieve close to a full democracy. In the other hand free exchange rate regime is more likely open to have currency crises. When we try our hypothetical situation the fluctuation in these variables create a higher increase in the probability of crisis. Our Banking Crises model can correctly predict 10.32% of the banking crises. Regarding our empirical studies, we find strong evidence that real gdp and the debt variables (general gross rate debt and household debt) are good predictive variables.

The richer a country is, the lower the probability of a crisis happen. In other hand, the higher the level of debt of a country, the higher the probability of a crisis happen. When we try our hypothetical situation (create a non-crisis situation, once we have already forecast one) the fluctuation in these variables create a reduction in the probability of crisis. Finally, our sovereign debt crisis can correctly predict 8,47% of the sovereign debt crises. Due to our empirical study, we highlight regulatory quality and real gdp growth rate the key determinants to predict sovereign debt. The equilibrium of both variables could be enough to bias our model. A country with low level of regulatory quality but with high levels of real gdp growth rate could be enough to bias our model to a non-crisis situation. The opposite is also true. When we create our hypothetical situation the fluctuation in these variables create a higher increase in the probability of crisis.

As a conclusion, we reach in all models signals of crisis, and create hypothetical scenarios of crisis in order to verify the effectiveness of our models. In our work, we focus in discovering which determinants could estimate each type of crisis, as we understand by all the referenced literature, along the years, several determinants were underlined by several authors, we live in a world of constant changes, so we must adapt our model to the situation that we live in. This topic is still open for more research and can be investigated in more detail in the future, as we understand it will not be different this time, somehow in the future, maybe closer than we think, we will face a financial crisis.

References

- Antunes, A., Bonfim, D., Monteiro, N., Rodrigues, P.M.M., (2018) Forecasting Banking Crises with Dynamic Panel Probit Models, *International Journal of Forecasting*, 34, pp.249-275
- Babecky, J., Havranek, T., Mateju, J., Rusnak, M., Smidkova, K., and Vasicek B. (2014). Banking, Debt and Currency Crises in Developed Countries: Stylized Facts and Early Warning Indicators, *Journal of Financial Stability*, 15,1-17.
- Berg, A. and Pattillo, C. (1995). Are Currency Crises Predictable? A test. *IMF Working Paper*,154
- Berg, A., et al. (2005). "Assessing Early Warning Systems: How Have They Worked in Practice?" *IMF Staff Papers*, vol. 52, no. 3, 2005, pp. 462–502.
- Bhattacharya, M., and Inekwe, J., (2021) Convergence in Sovereign Debt Defaults: Quantifying the Roles of Institutions, *Oxford Bulletin of Economics and Statistics*, 0305-9049
- Budsayaplakorn, S., Dibooglu, S., Mathur, I., (2014) Can Macroeconomic Indicators Predict a Currency Crisis? Evidence from Selected Southeast Asian Countries. *Emerging Markets Finance and Trade*, 46:6, 5-21
- Candelon, B., Dumitrescu, E.I., Hurlin, C., (2014) Currency Crisis Early Warning Systems: Why They Should be Dynamic. *International Journal of Forecasting*, 30, pp. 1016-1029
- Chakrabarti A., Zeaiter H., (2014). The determinants of Sovereign Default: A Sensitivity Analysis. *International Review of Economics and Finance*, 33, pp. 300-318
- Chan-Lau, J. A., Mathieson, D. J., and Yao, J. Y. (2004). Extreme Contagion in Equity Markets, *IMF Staff Papers*, vol. 51(2), pages 1-8.
- Chang, R. and Velasco, A. (2000). Financial Fragility and the Exchange Rate Regime. *Journal of Economic Theory*, vol. 92, pp.1-34
- Chong, T., T., L., Yan, I., K., (2018). Forecasting Currency Crises with Threshold Models. *International Economics*, 156, pp. 156-174
- Collins, D., and Gavron, S., (2006). Measuring Equity Market Contagion in Multiple Financial Events, *Applied Financial Economics*, 15:8, pp. 531-538
- Correa, R. and Sapriza, H. (2014). Sovereign Debt Crises. *FRB International Finance Discussion Paper 1104*.
- Cuadra, S., and Sapriza, H. (2008). Sovereign Default, Interest Rates and Political Uncertainty in Emerging Markets. *Journal of International Economics*. Vol.76, pp. 78-88
- Demirguc-Kunt, A. and Detragiache, E. (1998). The Determinants of Banking Crises in Developing and Developed Countries. *International Monetary Fund Staff Papers* 45(1): 81-109.
- Dornbusch, R., Goldfajn, I., Valdés, R.O. (1995). Currency Crises and Collapses. *Brookings Papers on Economic Activity*, 2
- Dungey, M., Gajurel, D., (2014). Equity Market Contagion During the Global Financial Crisis: Evidence from the World's Eight Largest Economies, *Economic System*, Vol. 38, pp. 161-177
- Dungey, M., Jacobs, J., and Lestano L. (2015). The Internalisation of Financial Crises: Banking and Currency Crises 1883 – 2008, *The North American Journal of Economics and Finance*, 32, 29-47.
- Edwards, S. (2009). Sequencing of Reforms, Financial Globalization, and Macroeconomic Vulnerability, *Journal of the Japanese and International Economies*, 23(2), 131-148.
- Forbes, K., and Rigobon, R., (2002). No Contagion, Only Interdependence: Measuring Stock Market Comovements, *The Journal of Finance*, vol. 57, No.5
- Fouliard, J., Howell, M., Rey, H., (2020). Answering the Queen: Machine Learning and Financial Crises. *NBER Working Paper Series*, No. 28302

- Gray, D. (2014). Central European foreign exchange markets: a cross-spectral analysis of the 2007 financial crisis, *The European Journal of Finance*, 20:6, pp. 550-567
- Gorton, G. (1988). Banking Panics and Business Cycles. *Oxford Economic Papers*, vol. 40, no. 4, 1988, pp. 751–781.
- Haile, F., and Pozo, S., (2008). Currency Crisis Contagion and the Identification of Transmission Channels, *International Review of Economics and Finance*, Vol. 17, pp. 572-588
- Handika, R., Soepriyanto, G., Havidz, S. A. H., (2019). Are Cryptocurrencies contagious to Asian Financial Markets? *Research in International Business and Finance*, vol. 50, pp.416-429
- Horváth, R., Lyócsa, Š., and Baumöhl (2018). Stock Market Contagion in Central and Eastern Europe: Unexpected Volatility and Extreme Co-Exceedance, *The European Journal of Finance*, 24:5, 391-412
- Inekwe, J. (2018). Financial crises and the extreme bounds of predictors. *Empirical Economics* 55(4): 2047-2067.
- Jemovic, M., and Marinkovic, S., (2019). Determinants of Financial Crises – An Early Warning System Based on Panel Logit Regression, *Int Fin Econ Journal*, pp.1–15
- Kaminsky, G. L., Lizondo, S., Reinhart C. M., (1999). Leading Indicators of Currency Crises. *Policy Research Working Paper*, 1852
- Kaminsky, G. L., and Reinhart, C. M. (1999). The Twin Crises: The Causes of Banking and Balance-of-Payments Problems. *The American Economic Review*, vol. 89, no. 3, 1999, pp. 473–500.
- Kauko, K., (2014). How to Foresee Banking Crises? A survey of the empirical literature. *Economic System*, 38, pp. 289-308
- Kindleberger C. P. (1978). Manias, Panics, and Crashes: A History of Financial Crises. *New York: Basic Books*.
- Krugman, P. (1979). A Model of Balance-of-Payments Crises. *Journal of Money, Credit and Banking*, vol. 11, no. 3, 1979, pp. 311–325.
- Laeven, L. A., and Valencia, F. V. (2013). Systemic Banking Crises Database. *IMF Economic Review*, 61(2), 225–270.
- Luchtenberg, K. F., and Vu, Q. V. (2015). The 2008 Financial Crisis: Stock Market Contagion and Its Determinants, *Research in International Business and Finance*, 33, 178-203.
- OECD (2012). “Financial Contagion in the Era of Globalised Banking?”, *OECD Economics Department Policy Notes*, No. 14.
- Oosterlinck, K. (2013). Sovereign debt Defaults: Insights from History. *Oxford Review of Economic Policy*, Vol. 29, Number 4, pp. 697–714
- Pesenti, P. and Tille, C. (2000). The Economics of Currency Crises and Contagion: An Introduction. *FRBNY Economic Policy Review*
- Radelet, S. and Sachs, D. J. (1998). The East Asian Financial Crisis: Diagnosis, Remedies, Prospects. *Brookings Papers on Economic Activity* 29(1): 1-90.
- Reinhart, Carmen M., and Kenneth S. Rogoff. (2009). This Time Is Different: Eight Centuries of Financial Folly. *New Jersey: Princeton University Press*
- Reinhart, C. M. and Rogoff, K. S., (2011). From Financial Crash to Debt Crisis. *American Economic Review* 101(5): 1676-1706.
- Reinhart, C. M. and Rogoff, K. S., (2013). Banking crises: An equal opportunity menace. *Journal of Banking and Finance* 37(11): 4557-4573.
- Savona, R., Vezzoli, M., (2015). Fitting and Forecasting Sovereign Defaults using Multiple Risk Signals. *Oxford Bulletin of Economics and Statistics*, 77

- Schularick, M., and Taylor, A. M., (2012). Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008. *American Economic Review*, 102(2), pp. 1029-1061
- Tomz, M. and Wright, M. L. J. (2007). Do Countries Default in "Bad Times"? *Journal of the European Economic Association* 5 (2-3): 352-360.

Appendixes

A.1 Literature Review on Determinants of Financial Crises								
Author	Title	Year	Countries	Period of Analysis	Variables	Model	Method	Resume
Financial Crises								
Fouillard and Rey (2020)	Answering the queen: Machine Learning and Financial Crises	2019	France, Germany, Italy, Spain, Sweden, United Kingdom, United States of America.	1985-2019	GDP, GDP per person employed, GDP per capita, GDP per hour worked, Unemployment rate, Consumer Price Index, General Government Debt, Golden rule (gap of real long term interest rate to real GDP), Political Uncertainty Index, Oil price index, Consumption, Investment, Multifactor Productivity, Total credit (to households, to private non-financial sector, to non-financial firms), Debt Service Ratios (household, non-financial corporations, private non-financial sector), Household Debt, General Government Debt, Banking credit to private sector, Bank assets, Bank equity, Interest rates, slope of the yield curve, M3, Loans for House purchase, Residential real estate prices, Price-to-income ratio, Price-to-rent ratio, rent price index, house price forecasts, Share prices, Financial Conditions Index, Risk Appetite Index, oil price, Equity holdings, Financial assets, VXO, Global Factor in Asset Prices, Cross-border flows, Real effective exchange rate, Dollar, Real effective exchange rate, Current account, Shipping indicator, export growth, import growth, terms of trade, growth of Foreign Exchange Reserves, External Debt, Total Liquidity, Domestic Liquidity, Policy Liquidity.	General Additive Model, Random Forest, Support Vector Machine, Dynamic Probit	Panel logit models, Bayesian Model Averaging	Being a "meta-statistic" approach, allows to track which models have the better performance to predict crises over time in a given country. Data suggest different determinants to predict crises to each country, obviously there are common factors between them. Financial stress, interest rates and liquidity have relevance to explain and predict financial crises.
Inekwe (2019)	Financial crises and the extreme bounds of predictors	2019	All around the world	1950-2000	The real gross domestic product per capita, Market capitalization of listed companies, Money and quasi money as % of GDP, Liquid liabilities as % of GDP, Real interest rate, Household final consumption expenditure, etc., General government final consumption expenditure, Military expenditure, Imports of goods and services, Exports of goods, and services, Manufacturing, value added, External debt stocks, Total debt service, Stocks traded, total value, Total reserves minus gold (current US\$), Risk premium on lending, Inflation, consumer prices, Gross fixed capital formation, Portfolio investment, bonds, Gross savings, Domestic credit provided by financial sector, Net domestic credit, Quality of government, Regulation of credit, labor and business, Competition, Net income from abroad, Foreign direct investment, net inflows, Business freedom, Real effective exchange rate index, Political institutional quality, Economic institutional quality, Personal remittances received, Volatility of real effective exchange rate, Stock return, Volatility of stock return, Labor force participation rate, total Economic globalization, Deposit interest rate, Tax revenue, Bank capital to assets ratio, Bank liquid reserves to bank assets ratio, Bank nonperforming loans to total gross loans, Real gross domestic product per capita	Extreme Bound Analyses		The author highlight market capitalization, regulation, political institutional quality, remittance, service sector value added, business freedom, government consumption, and export and import of goods and services as key determinants to predict financial crises.
Laeve and Valencia (2013)	Systemic Banking Crises Database	2013	All around the world	1970-2011	Fiscal balance/GDP, public debt/GDP, inflation, net foreign assets, deposits/GDP, GDP growth, current account/GDP, share of government owned banks, credit booms, capitalization, monetary policy index, fiscal policy index, house prices	Database correlations		There are several differences between advanced, emerging and developing economies at macroeconomic policies and output losses during a financial crisis. Monetary and fiscal policies are exhaustively used during banking crises in advanced economies when compared to the other crises, resulting in higher output losses.
Reinhart and Rogoff (2009)	His time is Different: Eight Centuries of Financial Folly	2009	All around the world	800-2007	External and domestic debt, trade, GNP, inflation, exchange rates, interest rates, and commodity prices	Theoretical Research		This time isn't different, is utopic think in a world without crises. Notoriously, even some policy makers and investors are tightly convinced in the contrary. Home prices and bubbles are strong evidence from Crises. Sovereign Default is a common factor along the years, as well as inflation and many other macroeconomic indicators. The idea behind the Sarcastic title is to warn about the utopic idea of avoid crises, however, it is possible to predict their occurrence to reduce the associated risks.
Reinhart and Rogoff (2011)	From Financial Crash to Debt Crisis	2011	All around the world	800-2009	External and domestic debt, trade, GNP, inflation, exchange rates, interest rates, and commodity prices	Multinomial logit, single lag of a three-year backward-looking moving average		Domestic Banking Crises can be explained by systemic banking crises, and used to shed lights about sovereign default. External (public and private) debt plays an important role to explain Banking Crises, being an important factor to predict them. Nevertheless, had no direct impact to explain the probability of default. The data suggest that Banking Crises increase the likelihood of a sovereign default.
Schularick and Taylor (2012)	Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008	2012	United States of America, Canada, Australia, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom	1870-2008	Bank Loans, M0, M1, M2, M3, real output, inflation, investment, credit, asset prices, stock market indices	Logit model		There are several differences crises dynamics in two distinct eras, "Age of Money" and "Age of Credit". After Great Depression and WW2, credit earn importance in society, adding to this the liberalization form the market also increment that importance. This research provide evidence about the importance of credit to predict financial Crises, namely with credit booms.
Banking Crises								
Antunes et al. (2019)	Forecasting banking crises with dynamic panel probit models	2019	Austria, Bulgaria, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Latvia, Netherlands, Portugal, Sweden, Slovakia, Slovenia, UK	1970-2012	Crises Dummy; Equity price index; Debt service ratio; Credit to GDP gap; House price index	Dynamics Panel Probit Model		Systemic Banking Crises isn't as common as it seems, they are rare and have a large magnitude, however they are very costly and have higher negative impact to the economy of a country. The performance of dynamic models to warn about a crisis could be improved by putting more "weight" in specific values from variables, namely, equity prices, house price growth, credit to GDP and debt service ratio.
Gorton (1988)	Banking Panics and Business Cycles	1988	Unknown	1879-1973	Rate of Return, Capital Loss, Consumption, demand deposits	Survey		Panic is associate with Banking Crises, being a cyclical process usually appearing before the beginning of a Banking Crisis. The evidence from previous events suggest that panic is a period which result from the society expectation of economic instability. Currency-deposit ratio, risk and liabilities

						are strongly correlated with the emerging of Banking Crises.	
Jemovic and Markovic (2019)	Determinants of financial crises—An early warning system based on panel logit regression	Argentina, Austria, Belgium, Brazil, Bulgaria, Burundi, Cameroon, Chile, Republic of Congo, Croatia, Czech Republic, Dominican Republic, Ecuador, France, Germany, Greece, Guinea-Bissau, Hungary, Iceland, Indonesia, Ireland, Italy, Jamaica, Jordan	977-2013	1	balance-to-GDP ratio, M2 multiplier, domestic credit to private sector-to-GDP ratio, total bank deposits, bank reserves ratio, export volume, import volume, real exchange rate, international (FX) reserves, ratio of M2 to international reserves, industrial production, real interest rate, inflation, lending-to-deposit rate ratio, and deposit insurance system	Panel Logit Model	"The selection of the key determinants of each type of crisis or the study them in a whole has a preponderous role to establish a resilient forecasting model. Obviously, each type of crisis has their main indicator. Using a Panel Logistic model, the authors obtained better performance in a model with dynamic variables, highlighting deposit insurance system, international reserves, M2-to-international reserves ratio, M2 multiplier, bank deposits, and bank reserves ratio as the main determinants of Banking Crises."
Kauko (2014)	How to foresee banking crises? A survey of the empirical literature	Unknown	005-2013	2	Amount of private debt/leverage, Growth of private debt; House Prices; Current Account; Real Interest Rate; Monetary aggregate relative to GDP; Inflation;	Survey	Analysing the previous Banking Crises, most of them are often preceded by a credit-driven boom period. The ending of this period marks the beginning from the worst phase of crises. The rapid growth of the loan stock is usually associate with the period of credit boom.
Kruidberg (1978)	Manias, Panics and Crashes: A History of Financial Crises	Unknown	Not Specified	Not Specified	Asset prices, M2, Money Supply, Growth of private debt, Amount of private Debt	Theoretical Research	Irrational speculation leads to overvalued asset prices when collapsed results in turmoil periods in the economic system. The technological instability also represents issues to the economic system promoting the irrational fluctuation of assets prices, creating some excessive appreciation of asset prices which result in periods of panic.
Reinhart and Rogoff (2013)	Financial and Sovereign Debt Crises: Some Lessons Learned and Those Forgotten	All Around the World	800-2008	1	Income level, consumption, government spending, interest rate, government tax revenue, financial liberalization, the degree of capital mobility, international financial contagion, real equity prices, GDP growth, housing prices	Survey	Focus on Banking Crises, the authors mention Credit boom and asset price bubble as the main factors to predict this type of crises. The duration and the frequency of Banking Crises are similar across Developed Countries and Middle-income countries.
Currency Crises							
Berg and Pattilo (1999)	Are currency crises predictable? A test	Thailand, Korea, Indonesia, Malaysia, Zimbabwe, Taiwan, Colombia, Philippines, Brazil, Turkey, Venezuela, Pakistan, South Africa, Jordan, India, Sri Lanka, Chile, Bolivia, Argentina, Mexico, Peru, Uruguay, Israel	997	1	Real Exchange Rate deviation, Current Account, Reserve Growth, Export Growth, M2/Reserves, M2/Reserves Growth	Survey	High Domestic Credit growth, overvalued real exchange rate and high ratio of M2 to reserves plays an important role in order to predict currency crisis. The contagion effect is an important indicator to evaluate the timing of crises.
Budsa-yaplakom et al. (2014)	Can Macroeconomic Indicators Predict a Currency Crisis? Evidence from Selected Southeast Asian Countries	Thailand, Malaysia, Indonesia, Korea, Philippines	975-1997	1	International Reserves, Imports, Exports, Terms of Trade, Deviations of the real exchange rate from a deterministic time trend, Real interest rate differential on domestic and foreign deposits, Excess real M1 balances, M2, Ratio of domestic credit to GDP, Real interest rate on deposits, Ratio of nominal lending to deposit rates, Ratio of broad money to gross international reserves, Index of output, Index of equity prices, The ratio of current account to GDP, Ratio of M2 to reserves, Real lending rate/real deposit rate	Multivariate Probit Model	The international reserves, stock indices, and GDP are the most useful determinants to anticipate crises. Corruption, and "bad" institutions brings uncertainty to society which result in contraction situations of output, incrementing the probability of crises.
Candelon (2014)	Can early warning systems: Why they should be dynamic	Argentina, Brazil, Chile, Colombia, Ecuador, Indonesia, Malaysia, Mexico, Peru, Philippines, South Africa, South Korea, Thailand, Turkey, Uruguay, Venezuela	985-2011	1	*One-year growth rate of international reserves, One-year growth rate of imports, One-year growth rate of exports, Ratio of M2 to foreign reserves, One-year growth rate of M2 to foreign reserves, Domestic credit over GDP, One-year growth rate of domestic credit over GDP, Real interest rate, Real exchange rate overvaluation	Panel Logit model and Panel Logit model with Dynamics	Predicting crises reduce the risk associated with them. Obviously, crises bring costs but once predicted they have less impact. Dynamic variables improve the forecasting results and reduce the false warning signals. The one-year growth rate of international reserves, the one-year growth rate of imports, the one-year growth rate of exports and the one-year growth rate of M2 to foreign reserves reveals an effectiveness predictive power.
Chong and Yan (2018)	Forecasting currency crises with threshold models	Argentina, Brazil, Chile, China, Colombia, Hong Kong, Indonesia, South Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand, Uruguay and Venezuela	981-2001	1	Ratio of fiscal deficit to GDP; Ratio of short term external liabilities to foreign exchange reserves; lending rate differential; real exchange rate appreciation index; Ratio of domestic credit to GDP	Panel Data model	The combination of a notorious increment in the short-term external liabilities with a widening interest rate characterize the transition from tranquil state to a turmoil one, which are associate with crises periods. Through this variable, policymakers have guidelines to formulate regulatory policies to achieve a less riskier economy impacts from crises, in specific currency crisis.
Dornbusch et al. (1995)	Exchange Rate Crises and Collapses	Argentina, Australia, Brazil, Colombia, Indonesia, Malaysia, Indonesia, New Zealand, Nigeria, Philippines, South Africa, Taiwan, Turkey, Venezuela	977-1992	1	real exchange rate, GDP and inflation	Literature Review	Banking Crisis are often associate with overvaluation of exchange rate. Flexible rate regimes could lead to a minimization of overvaluation risks. Policymakers have an important role to advise about the economic situation and the better strategy of exchange rate.
Kaminsky, Lizondo and Reinhart (1997)	Leading Indicators of currency crises	Argentina, Bolivia, Brazil, Chile, Colombia, Denmark, Finland, Indonesia, Israel, Malaysia, Mexico, Norway, Peru, Philippines, Spain, Sweden, Thailand, Turkey, Uruguay, Venezuela	970-1995	1	International Reserves, Imports, Exports, Terms of Trade, Deviations of the real exchange rate from a deterministic time trend, Real interest rate differential on domestic and foreign deposits, Excess real M1 balances, M2, Ratio of domestic credit to GDP, Real interest rate on deposits, Ratio of nominal lending to deposit rates, Ratio of broad money to gross international reserves, Index of output, Index of equity prices.	Signal Approach	The behaviour of International Reserves, Real Exchange Rate, domestic credit, credit to the public sector and domestic inflation seems to be the most useful variables to anticipate currency crisis. Political and institutional uncertainties are also representative situations of the beginning of crises.
Sovereign Debt Crises							
Chakrabarti and Zeaiter (2014)	The determinants of sovereign default: A sensitivity analysis	All Around the World	970-2010	1	Reserves/debt, Total external debt/GDP, Reserves/imports, Openness index, Total debt service/exports, Inflation Rate, Money supply growth, Real interest rate, Imports/GDP, Exports/GDP, GDP growth rate, Total external debt/exports, GDP per Capita, Real Effective exchange Rate, Current Account/GDP	Extreme Bound Analysis	"Credit worthiness, growth, leverage on export earnings, debt service, and inflation are the main variables to explain the sovereign defaults. The successive sovereign defaults promote sovereign crisis. This evidence suggests to policymakers the intention to reduce sovereign debt. There are several variables namely, openness, central bank liabilities, interest payments, cost of borrowing, imports, exports, per capita GNP, and government stability, that are strongly sensitive to small variations in sovereign debt increasing the probability of sovereign default."
Bhattacharya and Inekwe (2021)	Overconvergence in Sovereign Debt Defaults: Quantifying the Roles of Institutions	All around the world	990-2015	1	Control of corruption, Government effectiveness, Political stability and absence of Violence/terrorism; Regulatory quality; Access to external debt stock; External debt stocks to GNI; External debt Stocks; Trade openness; Current Account; Consumer Price Index, Real default	Robust Clustering algorithm/approach	Sovereign defaults are a recurrent situation in developing countries and also in emerging markets. Institutions and the economic situation of countries shed lights to the future of sovereign debt. Moreover, institutionalism has an important role to the fulfillment of the debt obligation. The poor institutional condition, the higher is the probability of sovereign default.
Oosterlinck (2013)	Overconvergence in Sovereign Debt Defaults: Insights from history	Unknown	Unknown	Unknown	Sovereign debts, sovereign defaults, Reputations, Reputation Lending, Institutions, International Relations, Odious Debt, State Succession	Literature Review	The evidence shown by the historical event suggest that sovereign default are a common situation all over the world. Countries reputation, institutions and international relations plays an important role to forecast Sovereign debt.
Savona and Vezzoli (2015)	Forecasting Sovereign Debt Crises	Ireland, Greece, Portugal, Spain, Mexico, Venezuela, Indonesia, Korea, Sierra Leone, Sri	975-2010	1	Short term debt reserves, Default history (n° of past defaults), US treasury bill rates, Real GDP variations, exchange rate over-valuation	Signal approach, logit panel and stepwise logit panel	The main determinants to predict the past and future Sovereign Debt crises are, Short-term debt to reserves, US Treasury Bill rate, Real GDP Growth, Exchange Rate undervaluation and default historic. A sharp decrease of GDP growth are associate with the beginning of Sovereign Debt Crises.

	Defaults using Multiple Risk Signals	Lanka, Thailand, Argentina, Brasil, Moldova, Pakistan, Philippines, Ukraine, Ecuador, Hungary Latvia, Pakistan, Jamaica			
--	--------------------------------------	---	--	--	--

Table A2.1. Dataset 1 - Private Debt

Dataset 1 - Private Debt	Variable 1 - Private debt, loans and debt securities (Percent of GDP)	Variable 2 - Household debt, loans and debt securities (Percent of GDP)	Variable 3 - Nonfinancial corporate debt, loans and debt securities (Percent of GDP)	Variable 4 - Private debt, all instruments (Percent of GDP)	Variable 5 - Household debt, all instruments (Percent of GDP)	Variable 6 - Nonfinancial corporate debt, all instruments (Percent of GDP)
Countries and Regions	Available Time Period	Available Time Period	Available Time Period	Available Time Period	Available Time Period	Available Time Period
Afghanistan	1960 - 2019	2006 - 2019	2006 - 2019			
Albania	2003 - 2019	2003 - 2019	2003 - 2019			
Algeria	1995 - 2019	2001 - 2016	2001 - 2016			
Argentina	1950 - 2019	1994 - 2019	1994 - 2019			
Australia	1953 - 2019	1977 - 2019	1977 - 2019			
Austria	1950 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Azerbaijan	1992 - 2019					
Bahamas, The	1995 - 2019					
Bahrain	1965 - 2015					
Bangladesh	1974 - 2019	2004 - 2019	2001 - 2019			
Belgium	1970 - 2019	1980 - 2019	1980 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Benin	1960 - 2019					
Bhutan	1983 - 2019					
Botswana	1972 - 2019					
Brazil	1993 - 2019	1994 - 2019	1994 - 2019	2009 - 2015	2009 - 2015	2009 - 2015
Bulgaria	1991 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Burkina Faso	1960 - 2019					
Burundi	1964 - 2019					
Cabo Verde	1976 - 2019					
Cambodia	1993 - 2019					
Cameroon	1960 - 2019	2001 - 2019	2001 - 2019			
Canada	1954 - 2019	1969 - 2019	1969 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Central African	1960 - 2019	2001 - 2019	2001 - 2019			
Chad	1960 - 2019	2001 - 2019	2001 - 2019			
Chile	1983 - 2019	2002 - 2019	2002 - 2019	2003 - 2019	2003 - 2019	2003 - 2019
China, People's	1985 - 2019	2006 - 2019	2006 - 2019			
Colombia	1996 - 2019	1996 - 2019	1996 - 2019	2015 - 2016	2015 - 2016	2015 - 2016
Comoros	1982 - 2019					
Congo, Dem. Rep.	1963 - 2019	2001 - 2019	2001 - 2019			
Congo, Republic	1960 - 2019					
Costa Rica	1996 - 2019	2001 - 2019	2001 - 2019			
Croatia	1994 - 2019	2001 - 2019	2001 - 2019	2001 - 2019	2001 - 2019	2001 - 2019
Cyprus	1960 - 2016	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Czech Republic	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Côte d'Ivoire	1960 - 2019					
Denmark	1951 - 2019	1994 - 2019	1994 - 2019	1994 - 2019	1994 - 2019	1994 - 2019
Djibouti	1984 - 2019					
Dominica	1975 - 2019					
Dominican	1991 - 2019					
Ecuador	1950 - 2019					
Egypt	1950 - 2019					
El Salvador	1950 - 2019	2001 - 2019	2001 - 2019			
Eritrea	1995 - 2014					
Estonia	1992 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Ethiopia	1960 - 2008					
FYR Macedonia	2005 - 2019	2005 - 2019	2005 - 2019			
Finland	1970 - 2019	1970 - 2019	1970 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
France	1969 - 2019	1977 - 2019	1977 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Gambia, The	1964 - 2019					
Georgia	1995 - 2019					
Germany	1951 - 2019	1970 - 2019	1970 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Ghana	1955 - 2019					
Greece	1960 - 2019	1994 - 2019	1994 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Grenada	1970 - 2019					
Guatemala	1950 - 2019					
Guinea	1989 - 2016					
Guinea-Bissau	1990 - 2019					
Guyana	1960 - 2019					
Haiti	1955 - 2019					
Honduras	1951 - 2019	2001 - 2019	2001 - 2019			
Hong Kong SAR	1978 - 2019	1990 - 2019	1990 - 2019			
Hungary	1969 - 2019	1964 - 2019	1969 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Iceland	1951 - 2019	1970 - 2016	1970 - 2019	2003 - 2016	2003 - 2016	2003 - 2016
India	1951 - 2019	1998 - 2019	1998 - 2019			
Indonesia	1980 - 2019	2001 - 2019	2001 - 2019			

Iran	1955 - 2016					
Iraq	2004 - 2019					
Ireland	1971 - 2019	2002 - 2019	2002 - 2019	2001 - 2019	2001 - 2019	2001 - 2019
Israel	1992 - 2019	1992 - 2019	1992 - 2019	2010 - 2016	2010 - 2016	2010 - 2016
Italy	1951 - 2019	1950 - 2019	1950 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Jamaica	1953 - 2016					
Japan	1964 - 2019	1964 - 2019	1964 - 2019	1994 - 2019	1994 - 2019	1994 - 2019
Jordan	1954 - 2016					
Kazakhstan	1995 - 2019	2003 - 2019	2003 - 2019			
Kenya	1961 - 2019					
Korea, Republic of	1962 - 2019	1962 - 2019	1962 - 2019	2008 - 2019	2008 - 2019	2008 - 2019
Kuwait	1962 - 2019					
Kyrgyz Republic	1995 - 2019					
Lao P.D.R.	1989 - 2010					
Latvia	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Lebanon	1964 - 2019					
Lesotho	1973 - 2019	2001 - 2019	2002 - 2019			
Liberia	1974 - 2015					
Lithuania	1993 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Luxembourg	1999 - 2019	2002 - 2019	2002 - 2019	1999 - 2019	1999 - 2019	1999 - 2019
Madagascar	1962 - 2019					
Malawi	1965 - 2016					
Malaysia	1955 - 2016	2006 - 2016	2006 - 2016			
Maldives	1976 - 2019					
Mali	1960 - 2019					
Malta	1960 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Mauritania	1962 - 2012					
Mauritius	2007 - 2019	2007 - 2019	2007 - 2019	2007 - 2019	2007 - 2019	2007 - 2019
Mexico	1980 - 2019	1994 - 2019	1994 - 2019	2003 - 2016	2003 - 2016	2003 - 2016
Micronesia Fed.	1995 - 2019					
Moldova	1991 - 2019					
Mongolia	1991 - 2019					
Morocco	1958 - 2019	2001 - 2019	2001 - 2019			
Mozambique	1988 - 2019					
Myanmar	1960 - 2019	2001 - 2019	2001 - 2019			
Nepal	1960 - 2019	2002 - 2019	2002 - 2019			
Netherlands	1961 - 2019	1990 - 2019	1990 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
New Zealand	1960 - 2019	1990 - 2019	1990 - 2019			
Nicaragua	1951 - 2019	2001 - 2019	2001 - 2019			
Niger	1960 - 2019					
Nigeria	1951 - 2019					
Norway	1953 - 2019	1975 - 2019	1975 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Oman	1972 - 2016					
Pakistan	1951 - 2019	2006 - 2019	2006 - 2019			
Papua New Guinea	1973 - 2019					
Paraguay	1952 - 2019					
Peru	1951 - 2016	2001 - 2019	2001 - 2019			
Philippines	1951 - 2019					
Poland	1992 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Portugal	1951 - 2019	1979 - 2019	1979 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Qatar	1966 - 2019					
Romania	1996 - 2019	2001 - 2019	2001 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Russian Federation	1993 - 2019	1998 - 2019	1998 - 2019	2011 - 2019	2011 - 2019	2011 - 2019
Rwanda	1964 - 2019					
Saint Lucia	1975 - 2019					
Saint Vincent and the Grenadines	1975 - 2019					
Samoa	1963 - 2019	1995 - 2019	1995 - 2019			
Saudi Arabia	1962 - 2019	1998 - 2019	1998 - 2019			
Senegal	1960 - 2019					
Serbia	1997 - 2019					
Sierra Leone	1960 - 2019	2001 - 2019	2001 - 2019			
Singapore	1963 - 2019	1991 - 2019	1991 - 2019			
Slovak Republic	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Slovenia	1991 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Solomon Islands	1978 - 2019	2001 - 2019	2001 - 2019			
South Africa	1965 - 2019	2008 - 2019	2008 - 2019			
South Sudan	2011 - 2019					
Spain	1970 - 2019	1980 - 2019	1980 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Sri Lanka	1951 - 2016	2001 - 2016	2001 - 2016			
Sudan	1960 - 2019					
Sweden	1961 - 2019	1950 - 2019	1950 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Switzerland	1951 - 2019	1999 - 2019	1999 - 2019	1999 - 2016	1999 - 2016	1999 - 2016
São Tomé and Príncipe	1995 - 2019	2006 - 2019	2006 - 2019			
Tajikistan	1998 - 2019	2001 - 2019	2001 - 2019			
Tanzania	1961 - 2019					
Thailand	1951 - 2019	2003 - 2019	2003 - 2019			
Timor-Leste	2002 - 2019					
Togo	1960 - 2019					
Tonga	1974 - 2019					
Trinidad and Tobago	1951 - 2019					
Turkey	1986 - 2019	1986 - 2019	1986 - 2019	2010 - 2019	2010 - 2019	2010 - 2019
Uganda	1960 - 2019					

Ukraine	1995 - 2019	1995 - 2019	1995 - 2019			
United Arab Kingdom	1973 - 2019	2008 - 2019	2008 - 2019			
United States	1963 - 2019	1966 - 2019	1966 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Uruguay	1951 - 2019	1950 - 2019	1950 - 2019	1950 - 2019	1950 - 2019	1950 - 2019
Vanuatu	1976 - 2019	2001 - 2019	2001 - 2019			
Venezuela	1951 - 2015					
Vietnam	1992 - 2019					
Yemen	1990 - 2019					
Zambia	1965 - 2019					
Zimbabwe	1979 - 2005					

T
able
A2.2.
Dataset
2 -
Public
Debt

Dataset 2 - Public Debt	Variable 1 - Central Government Debt(Percent of GDP)	Variable 2 - General Government Debt (Percent of GDP)	Variable 3 - Nonfinancial PublicSector Debt (Percent of GDP)	Variable 4 - PublicSector Debt (Percent of Available Time Period)
Countries and Regions	Available Time Period	Available Time Period	Available Time Period	Available Time Period
Alghanistan	2002 - 2019			
Albania	1994 - 2019	1994 - 2019		
Algeria	1970 - 2019			
Angola	1995 - 2019			
Antigua and Barbuda	1990 - 2019			
Argentina	1950 - 2019			
Armenia	1996 - 2019			
Australia	1950 - 2019	1989 - 2019		
Austria	1950 - 2019	1970 - 2019		
Azerbaijan	1994 - 2019			
Bahamas, The	1968 - 2019			
Bahrain	1974 - 2019			
Bangladesh	1973 - 2019			
Barbados	1970 - 2019			
Belarus	1994 - 2019	2004 - 2019		
Belgium	1950 - 2019	1970 - 2019		
Belize	1976 - 2019			
Benin	1970 - 2019			
Bhutan	1982 - 2019			
Bolivia	1970 - 2019		1998 - 2019	
Bosnia and Herzegovina	1998 - 2019	1998 - 2019		
Botswana	1972 - 2019			
Brazil	1950 - 2019	2001 - 2019	2000 - 2019	
Brunei Darussalam	2001 - 2019			
Bulgaria	1981 - 2019	1997 - 2019		
Burkina Faso	1970 - 2019			
Burundi	1964 - 2019			
Cabo Verde	1981 - 2019			
Cambodia		1995 - 2019		
Cameroon	1970 - 2019		2015 - 2019	
Canada	1990 - 2019	1950 - 2019		
Central African Republic	1970 - 2019			
Chad	1970 - 2019			
Chile	1950 - 2019	1990 - 2019		
China, People's Republic of		1995 - 2019		
Colombia	1950 - 2019	1996 - 2019		
Comoros	1984 - 2019			
Congo, Dem. Rep. of the		1970 - 2019		
Congo, Republic of	1970 - 2019			
Costa Rica	1950 - 2019	2009 - 2019		
Croatia	1993 - 2019	1997 - 2019		
Cyprus	2000 - 2019	1970 - 2019		
Czech Republic	1993 - 2019	1995 - 2019	2005 - 2016	2005 - 2016
Côte d'Ivoire	1970 - 2019			
Denmark	1950 - 2019	1970 - 2019		
Djibouti	1995 - 2019			
Dominica	1975 - 2019			
Dominican Republic	2000 - 2019		1970 - 2019	
Ecuador	1990 - 2019		1950 - 2019	
Egypt	1954 - 1962	1970 - 2019		
El Salvador	1951 - 2019	1991 - 20117		
Equatorial Guinea	1980 - 2019			
Eritrea	1995 - 2019			
Estonia	2000 - 2019	1995 - 2019		
Eswatini	1970 - 2019			
Ethiopia		1970 - 2019		
FYR Macedonia	1994 - 2019	1994 - 2019		2002 - 2019
Fiji	1970 - 2019			
Finland	1950 - 2019	1960 - 2019		
France	1950 - 2019	1978 - 2019		
Gabon	1970 - 2019			
Gambia, The	1973 - 2019			
Georgia		1995 - 2019		
Germany	1961 - 2019	1950 - 2019		
Ghana	1962 - 2019			
Greece	1950 - 2019	1960 - 2019		
Grenada	1970 - 2019			

Guatemala	1950 - 2019			
Guinea	1990 - 2019			
Guinea-Bissau	1986 - 2019			
Guyana	1963 - 2019			
Haiti	1970 - 2019			
Honduras	1950 - 2016	1990 - 2019	1980 - 2016	1980 - 2016
Hong Kong SAR	2001 - 2016			
Hungary	1989 - 2019	1989 - 2019		
Iceland	1972 - 2019	1950 - 2019		
India	1950 - 2019	1991 - 2019		
Indonesia	1972 - 2019	2000 - 2019		2010 - 2019
Iran	1970 - 2019			
Iraq	2004 - 2019			
Ireland	1950 - 2019	1979 - 2019		
Israel	1983 - 2019	1983 - 2019		
Italy	1950 - 2019	1950 - 2019		
Jamaica	1963 - 2019			
Japan	1969 - 2019	1955 - 2019		
Jordan	1969 - 2019			
Kazakhstan	2000 - 2019	1993 - 2019		
Kenya	1963 - 2019			
Kiribati	1988 - 2019	1988 - 2019		
Korea, Republic of	1960 - 2019	2011 - 2016	2011 - 2016	
Kosovo	2009 - 2019	2009 - 2019		
Kuwait	1987 - 2019			
Kyrgyz Republic	1994 - 2019	1994 - 2019		
Lao P.D.R.	1976 - 2019			
Latvia	1995 - 2019	1995 - 2019		
Lebanon	1970 - 2019			
Lesotho	1970 - 2019			
Liberia	1973 - 2019			
Libya	1973 - 2019			
Lithuania	1995 - 2019	1995 - 2019		
Luxembourg	1970 - 2019	1980 - 2019		
Madagascar	1970 - 2019			
Malawi	1970 - 2019			
Malaysia	1950 - 2019	1990 - 2019	1995 - 2019	
Maldives	1976 - 2019			
Mali	1970 - 2019			
Malta	1965 - 2019	1995 - 2019		
Marshall Islands		1997 - 2019		
Mauritania	1970 - 2019			
Mauritius		1970 - 2019		2003 - 2019
Mexico	1950 - 2019			1950 - 2019
Micronesia, Fed. States of		1995 - 2019		
Moldova	1995 - 2019	1995 - 2019		
Mongolia	1992 - 2019	2013 - 2019		
Montenegro	2002 - 2019	2002 - 2019		
Morocco	1965 - 2019			
Mozambique	1999 - 2019			
Myanmar	1970 - 2019			
Namibia	1989 - 2019			
Nauru		2009 - 2019		
Nepal	1970 - 2019			
Netherlands		1950 - 2019		
New Zealand	1950 - 2019			
Nicaragua	1997 - 2019	1997 - 2019		1970 - 2019
Niger	1970 - 2019			
Nigeria	1968 - 2019	2011 - 2019		
Norway	1950 - 2019	1970 - 2019		
Oman	1972 - 2019			
Pakistan	1951 - 2019			
Panama		1950 - 2019	1950 - 2016	
Papua New Guinea	1970 - 2019			
Paraguay	1970 - 2019			1990 - 2019
Peru	1999 - 2016	1999 - 2019	1999 - 2019	2000 - 2016
Philippines		1950 - 2019		
Poland	1986 - 2019	1990 - 2019		
Portugal	1950 - 2019	1970 - 2019	2007 - 2016	
Qatar	1990 - 2019			
Romania	1995 - 2019	1995 - 2019		
Russian Federation	1992 - 2019	1998 - 2019		
Rwanda	1970 - 2019			
Saint Kitts and Nevis	1984 - 2019	1996 - 2019		
Saint Lucia	1981 - 2019			
Saint Vincent and the Grenadines	1970 - 2019	1990 - 2019		
Samoa	1970 - 2019			
San Marino	2004 - 2019			
Saudi Arabia	1989 - 2019			
Senegal	1970 - 2019			
Serbia	2003 - 2019	2000 - 2019		
Seychelles	1972 - 2019			
Sierra Leone	1970 - 2019			
Singapore	1963 - 2019			
Slovak Republic	2006 - 2019	1993 - 2019		
Slovenia	1993 - 2019	1995 - 2019		
Solomon Islands	1978 - 2019			
South Africa	1950 - 2019			
South Sudan, Republic of	2012 - 2019			
Spain	1950 - 2019	1980 - 2019		
Sri Lanka	1951 - 2019			
Sudan	1992 - 2019			
Suriname	1971 - 2019			
Sweden	1950 - 2019	1970 - 2019	2006 - 2016	2006 - 2016

eliza	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1990 - 1980 - 2019	980 - 019	1996 - 2019	1996 - 2019
erin	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1991 - 1980 - 2019	980 - 019	1996 - 2019	1996 - 2019
hutan	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	2005 - 1980 - 2019	980 - 019	1981 - 2019	1981 - 2019
olivia	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	2000 - 1980 - 2019	980 - 019	1981 - 2019	1981 - 2019
osnia and herzegovina	995 - 019	2019	1996 - 1996 - 2019	1996 - 2019	1996 - 2019	1996 - 2019	996 - 019	996 - 019	2019	1995 - 1996 - 2019	998 - 019	1998 - 2019	1996 - 2019
otomara	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1991 - 1980 - 2019	980 - 019	1996 - 2019	1996 - 2019
razi	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1991 - 1980 - 2019	980 - 019	1996 - 2019	1996 - 2019
ruhi Danarusan	986 - 019	2019	1985 - 1985 - 2019	1985 - 2019	1985 - 2019	1985 - 2019	985 - 019	985 - 019	2019	2011 - 1985 - 2019	985 - 019	1985 - 2019	1985 - 2019
ulgaria	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1989 - 1980 - 2019	980 - 019	1998 - 2019	1998 - 2019
urkina Faso	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1989 - 1980 - 2019	980 - 019	1998 - 2019	1998 - 2019
urundi	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1989 - 1980 - 2019	980 - 019	1998 - 2019	1998 - 2019
abo Verde	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1994 - 2019	1994 - 2019
ambodia	988 - 019	2019	1986 - 1986 - 2019	1986 - 2019	1986 - 2019	1986 - 2019	988 - 019	986 - 019	2019	1980 - 1980 - 2019	982 - 019	1996 - 2019	1996 - 2019
ameroon	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	2000 - 2019	2000 - 2019
anada	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1980 - 2019	1980 - 2019
entral African republic	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1988 - 2019	1988 - 2019
had	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1995 - 2019	1995 - 2019
hile	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1990 - 2019	1990 - 2019
hina, People's republic of	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	997 - 019	1982 - 2019	1982 - 2019
olombia	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1982 - 2019	1982 - 2019
omoros	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1984 - 2019	1984 - 2019
ongo, Dem. Rep. of the	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1996 - 2019	1996 - 2019
ongo, Republic of	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1989 - 2019	1989 - 2019
osta Rica	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1990 - 2019	1990 - 2019
roania	993 - 019	2019	1992 - 1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	2019	1991 - 1992 - 2019	992 - 019	1992 - 2019	1992 - 2019
ypus	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1982 - 1980 - 2019	980 - 019	1995 - 2019	1995 - 2019
zech Republic	996 - 019	2019	1995 - 1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	996 - 019	995 - 019	2019	1995 - 1995 - 2019	993 - 019	1995 - 2019	1995 - 2019
ôte d'Ivoire	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1980 - 1980 - 2019	980 - 019	1997 - 2019	1997 - 2019
ermark	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1981 - 1980 - 2019	980 - 019	1980 - 2019	1980 - 2019
iboud	991 - 019	2019	1990 - 1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	2019	1990 - 1990 - 2019	990 - 019	1990 - 2019	1990 - 2019
ominica	980 - 019	2019	1981 - 1981 - 2019	1981 - 2019	1981 - 2019	1981 - 2019	981 - 019	981 - 019	2019	1981 - 1981 - 2019	014 - 019	1990 - 2019	1990 - 2019
ominican Republic	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1991 - 1980 - 2019	980 - 019	1997 - 2019	1997 - 2019
cuador	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1988 - 1980 - 2019	980 - 019	1995 - 2019	1995 - 2019
gypt	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1990 - 1980 - 2019	980 - 019	1999 - 2019	1999 - 2019
i Salvador	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	1988 - 1980 - 2019	980 - 019	1990 - 2019	1990 - 2019

	019					019	019		019		
irbat	981 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1990 - 2019	1990 - 2019
orea, Republic of	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1995 - 2019	1995 - 2019
osovo	001 - 019	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019	000 - 019	000 - 019	2012 - 2019	000 - 019	2000 - 2019	2000 - 2019
uwait	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1990 - 2019	1990 - 2019
ytaryz Republic	983 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	2019	992 - 019	1995 - 2019	1995 - 2019
ao P.D.R.	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	2000 - 2019	2000 - 2019
avia	983 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	2019	992 - 019	1998 - 2019	1998 - 2019
ebanon	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1990 - 2019	1990 - 2019
esaho	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1982 - 2019	1982 - 2019
iberia	001 - 019	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019	000 - 019	000 - 019		000 - 019	2000 - 2019	2000 - 2019
bya	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1990 - 2019	1990 - 2019
thuania	986 - 019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	995 - 019	995 - 019	2019	993 - 019	1995 - 2019	1995 - 2019
uemboung	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	995 - 019	1995 - 2019	1995 - 2019
acao SAR	002 - 019	2001 - 2019	2001 - 2019	2001 - 2019	2001 - 2019	001 - 019	001 - 019	2019	002 - 019	2001 - 2019	2001 - 2019
adagascar	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1980 - 2019	1980 - 2019
atawi	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	2002 - 2019	2002 - 2019
abyssia	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1990 - 2019	1990 - 2019
aldres	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1990 - 2019	1990 - 2019
ali	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	2000 - 2019	2000 - 2019
aita	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	995 - 019	2000 - 2019	2000 - 2019
arshall Islands	988 - 019	1997 - 2019	1997 - 2019	1997 - 2019	1997 - 2019	997 - 019	997 - 019		995 - 019	1997 - 2019	1997 - 2019
auritania	991 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019		990 - 019	2004 - 2019	2004 - 2019
auritius	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	2000 - 2019	2000 - 2019
exico	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1990 - 2019	1990 - 2019
icronesia - Fed. States of	986 - 019	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019	995 - 019	995 - 019		995 - 019	1995 - 2019	1995 - 2019
oldova	991 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	2019	990 - 019	1995 - 2019	1995 - 2019
ongolia	980 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	2019	980 - 019	1981 - 2019	1981 - 2019
ontenegro	001 - 019	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019	000 - 019	000 - 019		001 - 019	2002 - 2019	2002 - 2019
orocco	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1990 - 2019	1990 - 2019
ozambique	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1980 - 2019	1980 - 2019
yanmar	988 - 019	1998 - 2019	1998 - 2019	1998 - 2019	1998 - 2019	998 - 019	998 - 019	2019	998 - 019	1987 - 2019	1987 - 2019
ambia	991 - 019	1989 - 2019	1989 - 2019	1989 - 2019	1989 - 2019	989 - 019	989 - 019		990 - 019	1990 - 2019	1990 - 2019
auru	005 - 019	2004 - 2019	2004 - 2019	2004 - 2019	2004 - 2019	004 - 019	004 - 019		008 - 019	2009 - 2019	2009 - 2019
epal	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	2000 - 2019	2000 - 2019
etherlands	981 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1980 - 2019	1980 - 2019
ew Zealand	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2019	980 - 019	1985 - 2019	1985 - 2019

icaragua	980 - 019	1994 - 2019	1994 - 2019	1994 - 2019	1980 - 2019	984 - 019	984 - 019	1980 - 2019	980 - 019	2000 - 2019	2000 - 2019
iger	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1995 - 2019	1995 - 2019
igeria	991 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	2010 - 2019	980 - 019	1990 - 2019	1990 - 2019
onway	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1980 - 2019	1980 - 2019
man	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1990 - 2019	1990 - 2019
akistan	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1983 - 2019	980 - 019	1993 - 2019	1993 - 2019
astu	001 - 019	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019	000 - 019	000 - 019	2000 - 2019	000 - 019	2000 - 2019	2000 - 2019
aracama	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1984 - 2019	1984 - 2019
apia New Guinea	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1983 - 2019	980 - 019	1983 - 2019	1983 - 2019
araguay	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1983 - 2019	980 - 019	1980 - 2019	1980 - 2019
eru	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2000 - 2019	2000 - 2019
hilippines	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1985 - 2019	980 - 019	1989 - 2019	1989 - 2019
oland	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1990 - 2019	980 - 019	1995 - 2019	1995 - 2019
ortugal	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1986 - 2019	1986 - 2019
uerto Rico	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2014 - 2019	2014 - 2019
atar	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1990 - 2019	1990 - 2019
omana	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1985 - 2019	980 - 019	1990 - 2019	1990 - 2019
ussian Federation	991 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	1992 - 2019	992 - 019	1998 - 2019	1998 - 2019
wards	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1992 - 2019	1992 - 2019
aint Kitts and Nevis	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	014 - 019	1980 - 2019	1980 - 2019
aint Lucia	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	014 - 019	1985 - 2019	1985 - 2019
aint Vincent and the Grenadines	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	014 - 019	1980 - 2019	1980 - 2019
amao	980 - 019	1998 - 2019	1998 - 2019	1998 - 2019	1980 - 2019	998 - 019	998 - 019	1980 - 2019	980 - 019	1992 - 2019	1992 - 2019
an Marino	998 - 019	2008 - 2019	2008 - 2019	2008 - 2019	2004 - 2019	008 - 019	008 - 019	2001 - 2019	2001 - 019	2004 - 2019	2004 - 2019
audi Arabia	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1998 - 2019	980 - 019	1991 - 2019	1991 - 2019
enejal	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1994 - 2019	1994 - 2019
erbia	998 - 019	1997 - 2019	1997 - 2019	1997 - 2019	1997 - 2019	997 - 019	997 - 019	1997 - 2019	997 - 019	2000 - 2019	2000 - 2019
eychelles	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1995 - 2019	980 - 019	1983 - 2019	1983 - 2019
ierra Leone	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2000 - 2019	2000 - 2019
ingsapore	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1990 - 2019	1990 - 2019
lovak Republic	994 - 019	1993 - 2019	1993 - 2019	1993 - 2019	1993 - 2019	993 - 019	993 - 019	1993 - 2019	993 - 019	1995 - 2019	1995 - 2019
lovenia	993 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	1992 - 2019	992 - 019	1995 - 2019	1995 - 2019
olomon Islands	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1980 - 2019	1980 - 2019
omalis	012 - 019				2011 - 2019				013 - 019		
outh Africa	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2000 - 2019	2000 - 2019
outh	012 - 019	2011 - 2019	2011 - 2019	2011 - 2019	2011 - 2019	011 - 019	011 - 019	2011 - 2019	011 - 019	2011 - 2019	2011 - 2019

Sudan, Republic of	019					019	019		019		
Pain	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1980 - 2019
ri Lanka	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1990 - 2019	980 - 019	1990 - 2019
udan	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1981 - 2019	980 - 019	1990 - 2019
uriname	980 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	1994 - 2019	990 - 019	1990 - 2019
weden	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1980 - 2019
witzerland	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1983 - 2019
ytia	980 - 019	1980 - 2010	1980 - 2010	1980 - 2010	1980 - 2010	1980 - 2010	980 - 010	980 - 010	1997 - 2010	980 - 010	1990 - 2019
ão Tomé and Príncipe	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2000 - 2019
awan Province of China	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	984 - 019	1980 - 2019
akistan	993 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	2011 - 1999	992 - 019	1998 - 2019
anzania	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1991 - 2019
hailand	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	2001 - 2019	980 - 019	1995 - 2019
imor-Leste	001 - 019	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019	000 - 019	000 - 019		000 - 019	2000 - 2019
ogo	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1989 - 2019
onga	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1999 - 2019
rindad and Tobago	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1988 - 2019
urisia	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1990 - 2019	980 - 019	1991 - 2019
urkey	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2000 - 2019
urkmenistan	993 - 019	1991 - 2019	1991 - 2019	1991 - 2019	1992 - 2019	1992 - 2019	991 - 019	991 - 019		992 - 019	1997 - 2019
uvulu	001 - 019	2002 - 2019	2002 - 2019	2002 - 2019	2000 - 2019	2000 - 2019	002 - 019	002 - 019		001 - 019	2004 - 2019
ganda	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1997 - 2019
kraine	992 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	1995 - 2019	992 - 019	1995 - 2019
ited Arab Emirates	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1991 - 2019
ited Kingdom	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	1980 - 2019
ited States	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	980 - 019	2001 - 2019
ugary	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1983 - 2019	012 - 019	1999 - 2019
zbekistan	992 - 019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019		992 - 019	1992 - 2019
anzania	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	1991 - 2019
enezuela	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1999 - 2019	980 - 019	1988 - 2019
ietnam	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1990 - 2019	980 - 019	1998 - 2019
emen	991 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019		990 - 019	1990 - 2019
ambia	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019		980 - 019	2000 - 2019
imbabwe	999 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019		980 - 019	2005 - 2019
frica (Region)	991 - 019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019		980 - 019	2000 - 2019

Asia and Pacific	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	997 - 019	1995 - 2019	1995 - 2019
Australia and New Zealand	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1988 - 2019	1988 - 2019
Caribbean	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1997 - 2019	1997 - 2019
Central America	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1995 - 2019	1995 - 2019
Central Asia and the Caucasus	983 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	2002 - 2019	2002 - 2019
East Asia	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	997 - 019	1982 - 2019	1982 - 2019
Eastern Europe	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1998 - 2019	1998 - 2019
Europe	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1998 - 2019	1998 - 2019
EU Middle East Region	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1991 - 2019	1991 - 2019
North Africa	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1999 - 2019	1999 - 2019
North America	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	2001 - 2019	2001 - 2019
Pacific Islands	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1992 - 2019	1992 - 2019
South America	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1996 - 2019	1996 - 2019
South Asia	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1993 - 2019	1993 - 2019
Southeast Asia	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1995 - 2019	1995 - 2019
Sub-Saharan Africa (Region)	991 - 019	2019	1990 - 1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	980 - 019	2000 - 2019	2000 - 2019
Western Europe	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1991 - 2019	1991 - 2019
Western Hemisphere (Region)	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	2001 - 2019	2001 - 2019
SEAN-5	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1995 - 2019	1995 - 2019
Advanced economies	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	2001 - 2019	2001 - 2019
Commonwealth of Independent States	993 - 019	2019	1992 - 1992 - 2019	1992 - 2019	1992 - 2019	992 - 019	992 - 019	992 - 019	1998 - 2019	1998 - 2019
Merging and developing Asia	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	997 - 019	1993 - 2019	1993 - 2019
Merging and developing Europe	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	2000 - 2019	2000 - 2019
Merging market and developing economies	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1999 - 2019	1999 - 2019
EURO area	992 - 019	2019	1991 - 1991 - 2019	1991 - 2019	1991 - 2019	991 - 019	991 - 019	997 - 019	1991 - 2019	1991 - 2019
European Union	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1991 - 2019	1991 - 2019
Latin America and the Caribbean	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1996 - 2019	1996 - 2019
Major advanced economies (G7)	980 - 019	2019	1980 - 1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	2001 - 2019	2001 - 2019

iddle East and North Africa	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1999 - 2019	1999 - 2019
iddle East, North Africa, Afghanistan, and Pakistan	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	980 - 019	1999 - 2019	1999 - 2019
ther advances of economics	980 - 019	1980 - 2019	1980 - 2019	1980 - 2019	980 - 019	980 - 019	1980 - 2019	984 - 019	1995 - 2019
ub-Saharan Africa	991 - 019	1990 - 2019	1990 - 2019	1990 - 2019	990 - 019	990 - 019	980 - 019	2000 - 2019	2000 - 2019
orld	980 - 019	1980 - 2019	1980 - 2019		980 - 019	980 - 019			

Dataset 4 - Fiscal Monitor				
Countries and Regions	Variable 1 - Net lending/borrowing (also referred as overall balance) (% of GDP)	Variable 2 - Primary net lending/borrowing (also referred as primary balance) (% of GDP)	Variable 3 - Grossdebt position (% of GDP)	Variable 4 - Net debt (% ofGDP)
Countries and Regions	Available Time Period	Available Time Period	Available Time Period	Available Time Period
Algeria	1990 - 2019	1990 - 2019	991 - 019	1991 - 2019
Angola	1996 - 2019	1996 - 2019	000 - 019	
Argentina	1993 - 2019	1993 - 2019	1992 - 2019	
Australia	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Austria	1990 - 2019	1990 - 2019	1990 - 2019	1995 - 2019
Azerbaijan	1994 - 2019	1994 - 2019	1995 - 2019	
Bangladesh	1990 - 2019	1990 - 2019	2003 - 2019	
Belarus	2001 - 2019	2001 - 2019	2004 - 2019	
Belgium	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Benin	1990 - 2019	1990 - 2019	1999 - 2019	
Bolivia	1990 - 2019	1990 - 2019	2000 - 2019	
Brazil	1996 - 2019	1996 - 2019	2000 - 2019	1996 - 2019
Burkina Faso	1990 - 2019	1990 - 2019	2002 - 2019	
Cambodia	1996 - 2019	1996 - 2019	1996 - 2019	
Cameroon	2000 - 2019	2000 - 2019	1998 - 2019	
Canada	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019

Chad	1995 - 2019	1995 - 2019	1999 - 2019	
Chile	1990 - 2019	1990 - 2019	1991 - 2019	1991 - 2019
China, People's Republic of	1990 - 2019	1990 - 2019	1995 - 2019	1990 - 2019
Colombia	1990 - 2019	1990 - 2019	1996 - 2019	2000 - 2019
Congo, Dem. Rep. of the	1996 - 2019	1996 - 2019	2000 - 2019	
Congo, Republic of	1990 - 2019	1990 - 2019	1991 - 2019	
Croatia	1992 - 2019	1992 - 2019	1998 - 2019	2002 - 2019
Cyprus	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Czech Republic	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Côte d'Ivoire	1997 - 2019	1997 - 2019	1998 - 2019	
Denmark	1990 - 2019	1990 - 2019	1992 - 2019	1990 - 2019
Dominican Republic	1997 - 2019	1997 - 2019	1997 - 2019	1997 - 2019
Ecuador	1995 - 2019	1995 - 2019	2001 - 2019	2001 - 2019
Egypt	1999 - 2019	1999 - 2019	1998 - 2019	2006 - 2019
Estonia	1995 - 2019	1995 - 2019	1995 - 2019	2000 - 2019
Ethiopia	1990 - 2019	1990 - 2019	1992 - 2019	
Finland	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
France	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Germany	1991 - 2019	1991 - 2019	1991 - 2019	1990 - 2019
Ghana	1990 - 2019	1990 - 2019	1990 - 2019	
Greece	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Guinea	1990 - 2019	1990 - 2019	1990 - 2019	
Haiti	1997 - 2019	1997 - 2019	1997 - 2019	
Honduras	1990 - 2019	1990 - 2019	1990 - 2019	
Hong Kong SAR	1990 - 2019	1990 - 2019	2001 - 2019	1990 - 2019
Hungary	1995 - 2019	1995 - 2019	1995 - 2019	2000 - 2019
Iceland	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
India	1990 - 2019	1990 - 2019	1991 - 2019	1996 - 2019
Indonesia	1993 - 2019	1993 - 2019	2000 - 2019	2004 - 2019
Iran	1990 - 2019	1990 - 2019	1996 - 2019	
Ireland	1990 - 2019	1990 - 2019	1990 - 2019	1997 - 2019

Israel	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019
Italy	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Japan	1990 - 2019	1990 - 2019	1990 - 2019	1994 - 2019
Kazakhstan	2002 - 2019	2002 - 2019	2002 - 2019	
Kenya	1990 - 2019	1990 - 2019	1998 - 2019	2002 - 2019
Korea, Republic of	1995 - 2019	1995 - 2019	1990 - 2019	1995 - 2019
Kuwait	1990 - 2019	1990 - 2019	1991 - 2019	
Kyrgyz Republic	1995 - 2019	1995 - 2019	2000 - 2019	2014 - 2019
Lao P.D.R.	2000 - 2019	2000 - 2019	2001 - 2019	
Latvia	1998 - 2019	1998 - 2019	1998 - 2019	2003 - 2019
Libya	1990 - 2019	1990 - 2019		
Lithuania	1995 - 2019	1995 - 2019	1998 - 2019	2005 - 2019
Luxembourg	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Madagascar	1990 - 2019	1990 - 2019	1990 - 2019	
Malaysia	1990 - 2019	1990 - 2019	1990 - 2019	1991 - 2019
Mali	2000 - 2019	2000 - 2019	2000 - 2019	
Malta	2000 - 2019	2000 - 2019	1995 - 2019	2000 - 2019
Mexico	1990 - 2019	1990 - 2019	1996 - 2019	1997 - 2019
Moldova	1995 - 2019	1995 - 2019	1995 - 2019	
Mongolia	1990 - 2019	1990 - 2019		
Morocco	1990 - 2019	1990 - 2019	1990 - 2019	2000 - 2019
Mozambique	1990 - 2019	1990 - 2019	1999 - 2019	
Myanmar	1997 - 2019	1997 - 2019	1998 - 2019	
Nepal	2000 - 2019	2000 - 2019	2000 - 2019	
Netherlands	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
New Zealand	1990 - 2019	1990 - 2019	1990 - 2019	2005 - 2019
Nicaragua	2000 - 2019	2000 - 2019	1997 - 2019	
Niger	1995 - 2019	1995 - 2019	1995 - 2019	
Nigeria	1990 - 2019	1990 - 2019	1990 - 2019	
Norway	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Oman	1990 - 2019	1990 - 2019	1990 - 2019	
Pakistan	1993 - 2019	1993 - 2019	1994 - 2019	
Papua New Guinea	1990 - 2019	1990 - 2019	1994 - 2019	

Peru	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019
Philippines	1990 - 2019	1990 - 2019	1993 - 2019	1990 - 2019
Poland	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Portugal	1990 - 2019	1990 - 2019	1990 - 2019	1995 - 2019
Qatar	1990 - 2019	1990 - 2019	1990 - 2019	
Russian Federation	1998 - 2019	1998 - 2019	1999 - 2019	1999 - 2019
Rwanda	1992 - 2019	1992 - 2019	1995 - 2019	
Saudi Arabia	1991 - 2019	1991 - 2019	1992 - 2019	
Senegal	1994 - 2019	1994 - 2019	1996 - 2019	
Singapore	1990 - 2019		1990 - 2019	1995 - 2019
Slovak Republic	1995 - 2019	1995 - 2019	1995 - 2019	1995 - 2019
Slovenia	1995 - 2019	1995 - 2019	1995 - 2019	1996 - 2019
South Africa	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019
Spain	1990 - 2019	1990 - 2019	1990 - 2019	2000 - 2019
Sri Lanka	1990 - 2019	1990 - 2019	1990 - 2019	
Sudan	1990 - 2019	1990 - 2019	1992 - 2019	
Sweden	1990 - 2019	1990 - 2019	1993 - 2019	1993 - 2019
Switzerland	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
Tajikistan	1998 - 2019	1998 - 2019	1998 - 2019	
Tanzania	1991 - 2019	1991 - 2019	2001 - 2019	
Thailand	1995 - 2019	1995 - 2019	1996 - 2019	1995 - 2019
Turkey	2000 - 2019	2000 - 2019	2000 - 2019	2000 - 2019
Uganda	1997 - 2019	1997 - 2019	1998 - 2019	
Ukraine	1995 - 2019	1995 - 2019	1998 - 2019	2003 - 2019
United Arab Emirates	1992 - 2019	1992 - 2019	1999 - 2019	
United Kingdom	1990 - 2019	1990 - 2019	1990 - 2019	1990 - 2019
United States	2001 - 2019	2001 - 2019	2001 - 2019	2001 - 2019
Uruguay	1999 - 2019	1999 - 2019	2001 - 2019	2000 - 2019
Uzbekistan	1992 - 2019	1992 - 2019	1998 - 2019	
Venezuela	1990 - 2019	1990 - 2019	1998 - 2019	
Vietnam	1998 - 2019	1998 - 2019	2000 - 2019	
Yemen	1990 - 2019	1990 - 2019	1999 - 2019	

Zambia	2000 - 2019	2000 - 2019	2000 - 2019	
Zimbabwe	2005 - 2019	2005 - 2019	2005 - 2019	
Advanced G-20	1991 - 2019	1991 - 2019	1991 - 2019	1990 - 2019
Advanced economies	1991 - 2019	1991 - 2019	1991 - 2019	1990 - 2019
Emerging G-20	1993 - 2019	1993 - 2019	1999 - 2019	1990 - 2019
Emerging Market and Middle-Income Economies	1993 - 2019	1993 - 2019	1998 - 2019	1990 - 2019
Emerging and Middle-Income Asia	1990 - 2019	1990 - 2019	1995 - 2019	1990 - 2019
Emerging and Middle-Income Europe	1998 - 2019	1998 - 2019	1999 - 2019	1995 - 2019
Emerging and Middle-Income Latin America	1993 - 2019	1993 - 2019	1999 - 2019	1994 - 2019
Emerging and Middle-Income Middle East and North Africa and Pakistan	1990 - 2019	1990 - 2019	1997 - 2019	2000 - 2019
Euro area	1991 - 2019	1991 - 2019	1996 - 2019	1995 - 2019
Low-Income Developing Asia	1990 - 2019	1990 - 2019	2003 - 2019	
Low-Income Developing Countries	1990 - 2019	1990 - 2019	1997 - 2019	2002 - 2019
Low-Income Developing Latin America	1990 - 2019	1990 - 2019	1997 - 2019	
Low-Income Developing Oil Producers	1990 - 2019	1990 - 2019	1990 - 2019	
Low-Income Developing Others	1990 - 2019	1990 - 2019	1998 - 2019	
Low-Income Developing Sub-Saharan Africa	1991 - 2019	1991 - 2019	1995 - 2019	2002 - 2019

Table A2.5. Dataset 5 – Historical Public Debt	
Dataset 7 – Historical Public Debt	Variable 1 – Debt (% of GDP)
Countries and Regions	Available Time Period
Afghanistan	2002 – 2015
Albania	1994 – 2015
Algeria	1970 – 2015
Angola	1995 – 2015
Anguilla	2000 – 2015
Antigua and Barbuda	1998 – 2015
Argentina	1970 – 2015
Armenia	1993 – 2015
Australia	1901 – 2015
Austria	1880 – 2015
Azerbaijan	1993 – 2015
Bahamas, The	1968 – 2015
Bahrain	1974 – 2015
Bangladesh	1974 – 2015
Barbados	1970 – 2015
Belarus	1994 – 2015
Belgium	1880 – 2015
Belize	1976 – 2015
Benin	1970 – 2015
Bhutan	1982 – 2015
Bolivia	1970 – 2015
Bosnia and Herzegovina	1998 – 2015
Botswana	1972 – 2015
Brazil	1978 – 2015

Brunei Darussalam	2001 – 2015
Bulgaria	1992 – 2015
Burkina Faso	1976 – 2015
Burundi	1964 – 2015
Cabo Verde	1981 – 2015
Cambodia	1996 – 2015
Cameroon	1970 – 2015
Canada	1870 – 2015
Central African Republic	1970 – 2015
Chad	1970 – 2015
Chile	1970 – 2015
China, People's Republic of	1984 – 2015
Colombia	1958 – 2015
Comoros	1982 – 2015
Congo, Dem. Rep. of the	1970 – 2015
Congo, Republic of	1970 – 2015
Costa Rica	1950 – 2015
Croatia	1994 – 2015
Cyprus	1970 – 2015
Czech Republic	1993 – 2015
Côte d'Ivoire	1979 – 2015
Denmark	1880 – 2015
Djibouti	1993 – 2015
Dominica	1975 – 2015
Dominican Republic	1950 – 2015
Ecuador	1939 – 2015
Egypt	1929 – 2015
El Salvador	1939 – 2015
Equatorial Guinea	1980 – 2015
Eritrea	1995 – 2015
Estonia	1995 – 2015
Eswatini	1970 – 2015
Ethiopia	1970 – 2015
FYR Macedonia	1995 – 2015
Fiji	1970 – 2015
Finland	1914 – 2015
France	1880 – 2015
Gabon	1970 – 2015
Gambia, The	1979 – 2015
Georgia	1995 – 2015
Germany	1880 – 2015
Ghana	1962 – 2015
Greece	1884 – 2015
Grenada	1970 – 2015
Guatemala	1923 – 2015
Guinea	1990 – 2015
Guinea-Bissau	1986 – 2015
Guyana	1963 – 2015
Haiti	1953 – 2015
Honduras	1926 – 2015
Hong Kong SAR	2001 – 2015
Hungary	1928 – 2015
Iceland	1951 – 2015
India	1948 – 2015
Indonesia	1976 – 2015
Iran	1970 – 2015
Iraq	2004 – 2015
Ireland	1929 – 2015
Israel	1972 – 2015
Italy	1861 – 2015
Jamaica	1963 – 2015
Japan	1875 – 2015
Jordan	1969 – 2015

Kazakhstan	1993 – 2015
Kenya	1961 – 2015
Kiribati	1988 – 2015
Korea, Republic of	1958 – 2015
Kosovo	2006 – 2015
Kuwait	1971 – 2015
Kyrgyz Republic	1995 – 2015
Lao P.D.R.	1989 – 2015
Latvia	1994 – 2015
Lebanon	1970 – 2015
Lesotho	1973 – 2015
Liberia	1973 – 2015
Libya	1973 – 2015
Lithuania	1994 – 2015
Luxembourg	1974 – 2015
Madagascar	1971 – 2015
Malawi	1970 – 2015
Malaysia	1953 – 2015
Maldives	1978 – 2015
Mali	1970 – 2015
Malta	1965 – 2015
Marshall Islands	1997 – 2015
Mauritania	1977 – 2015
Mauritius	1970 – 2015
Mexico	1914 – 2015
Micronesia, Fed. States of	1995 – 2015
Moldova	1995 – 2015
Mongolia	1992 – 2007
Montenegro	2002 – 2015
Morocco	1965 – 2015
Mozambique	1999 – 2015
Myanmar	1970 – 2015
Namibia	1993 – 2015
Nepal	1970 – 2015
Netherlands	1814 – 2015
New Zealand	1860 – 2015
Nicaragua	1970 – 2015
Niger	1970 – 2015
Nigeria	1968 – 2015
Norway	1880 – 2015
Oman	1973 – 2015
Pakistan	1951 – 2015
Panama	1953 – 2015
Papua New Guinea	1973 – 2015
Paraguay	1970 – 2015
Peru	1918 – 2015
Philippines	1948 – 2015
Poland	1986 – 2015
Portugal	1851 – 2015
Puerto Rico	2006 – 2015
Qatar	1990 – 2015
Romania	1990 – 2015
Russian Federation	1992 – 2015
Rwanda	1970 – 2015
Saint Kitts and Nevis	1984 – 2015
Saint Lucia	1981 – 2015
Saint Vincent and the Grenadines	1975 – 2015
Samoa	1970 – 2015
San Marino	2004 – 2015
Saudi Arabia	1991 – 2015
Senegal	1970 – 2015
Serbia	2000 – 2015
Seychelles	1973 – 2015
Sierra Leone	1970 – 2015

Singapore	1963 – 2015
Slovak Republic	1992 – 2015
Slovenia	1993 – 2015
Solomon Islands	1980 – 2015
South Africa	1914 – 2015
South Sudan, Republic of	2012 – 2015
Spain	1880 – 2015
Sri Lanka	1951 – 2015
Sudan	1992 – 2015
Suriname	1971 – 2015
Sweden	1800 – 2015
Switzerland	1899 – 2015
Syria	1970 – 2015
São Tomé and Príncipe	1995 – 2015
Taiwan Province of China	1997 – 2015
Tajikistan	1998 – 2015
Tanzania	1970 – 2015
Thailand	1954 – 2015
Togo	1975 – 2015
Tonga	1985 – 1993
Trinidad and Tobago	1963 – 2015
Tunisia	1970 – 2015
Turkey	1936 – 2015
Turkmenistan	1997 – 2015
Tuvalu	2005 – 2015
Uganda	1970 – 2015
Ukraine	1992 – 2015
United Arab Emirates	1973 – 2015
United Kingdom	1800 – 2015
United States	1800 – 2015
Uruguay	1970 – 2015
Uzbekistan	1998 – 2015
Vanuatu	1981 – 2015
Venezuela	1920 – 2015
Vietnam	1992 – 2015
Yemen	1992 – 2015
Zambia	1970 – 2015
Zimbabwe	1964 – 2015
Eastern Caribbean Currency Union	1990 – 2015
Euro area	1995 – 2015
G-20 Advanced	1800 – 2015
G-20 Emerging	1880 – 2015
Low Income	1926 – 2015

Table A2.6. Dataset 6 – Capital Account Openness Index

at asset 9 -	aria ble 1	aria ble 2 -Open	aria ble 3 -	aria ble 4 -	aria ble 5 -	aria ble 6 -	aria ble 7 -	aria ble 8 -	aria ble 9 -	aria ble 10 -	aria ble 11 -	aria ble 12 -	aria ble 13 -	aria ble 14 -	aria ble 15 -	aria ble 16 -	aria ble 17 -	aria ble 18 -
ness of Capital Inflows Index (1=full liberalized) (all asset categories) (Units)	ness of Capital Inflows Index (1=full liberalized) (Units)	ness of Capital Outflows Index (1=full liberalized) (Units)	ness of Financial Openness Index (equity, bond, money market, collective investment, 1=fully liberalized) (Units)	ness of Non-resident Openness Index (1=fully liberalized) (Units)	ness of Resident Openness Index (1=fully liberalized) (Units)	ness of Openness Index (1=fully liberalized) (Units)	ness of Openness Index (1=fully liberalized) (Units)	ness of Openness Index (1=fully liberalized) (Units)	ness of Money market Collect investment openness index (1=full liberalized) (Units)	ness of Derivative investment openness index (1=full liberalized) (Units)	ness of Commercial credit openness index (1=full liberalized) (Units)	ness of Financial investment openness index (1=full liberalized) (Units)	ness of Direct investment openness index (1=full liberalized) (Units)	ness of Indirect investment openness index (1=full liberalized) (Units)	ness of Real estate capital transaction openness index (1=full liberalized) (Units)	ness of Personal capital transaction openness index (1=full liberalized) (Units)		
o	vail	vaila	vaila	liabile	vail	vail	vail	vail	vail	vaila	vaila	vaila	vaila	vail	vaila	vaila	vailab	vaila
nt	ble	le	le	e	ble	ble	ble	ble	ble	le	le	le	le	ble	le	le	e Time	le
an		010	010	0 - 2011	010	010	010	010	010	010	010	010	010	010	010	010	010	010
ria	000	009	009	9 - 2013	009	009	000	000	000	009	000	000	000	000	000	000	000	000
ria	010	010	010	0 - 2013	010	010	010	010	010	010	010	010	010	010	010	010	010	010

ak		013	013		013				013	013	013	013	013	013	013	013	013
lo	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
em		013	013		013				013	013	013	013	013	013	013	013	013
of	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
rm		013	013		013				013	013	013	013	013	013	013	013	013
ou	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
h		013	013		013				013	013	013	013	013	013	013	013	013
pa	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
n		013	013		013				013	013	013	013	013	013	013	013	013
ri	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
an		013	013		013				013	013	013	013	013	013	013	013	013
ud	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
n		013	013		013				013	013	013	013	013	013	013	013	013
uri	006	006 -	006 -	6 - 2013	006 -	006	006	006	006 -	006 -	006 -	006 -	006 -	006 -	006 -	006 -	006 -
a		013	013		013				013	013	013	013	013	013	013	013	013
w	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
de		013	013		013				013	013	013	013	013	013	013	013	013
wi	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
zer		013	013		013				013	013	013	013	013	013	013	013	013
yn	009	010 -	010 -	0 - 2013	010 -	010	009	009	009 -	009 -	009 -	009 -	009 -	009 -	009 -	009 -	009 -
		013	013		013				013	013	013	013	013	013	013	013	013
aj	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ist		013	013		013				013	013	013	013	013	013	013	013	013
an	005	005 -	005 -	5 - 2013	005 -	005	005	005	005 -	005 -	005 -	005 -	005 -	005 -	005 -	005 -	005 -
ari		013	013		013				013	013	013	013	013	013	013	013	013
ha	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
lan		013	013		013				013	013	013	013	013	013	013	013	013
og	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
		013	013		013				013	013	013	013	013	013	013	013	013
on	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
a		013	013		013				013	013	013	013	013	013	013	013	013
ri	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
id		013	013		013				013	013	013	013	013	013	013	013	013
un	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
sla		013	013		013				013	013	013	013	013	013	013	013	013
ur	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ey		013	013		013				013	013	013	013	013	013	013	013	013
ga	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
da		013	013		013				013	013	013	013	013	013	013	013	013
kr	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ine		013	013		013				013	013	013	013	013	013	013	013	013
ni	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ed		013	013		013				013	013	013	013	013	013	013	013	013
ni	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ed		013	013		013				013	013	013	013	013	013	013	013	013
ni	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ed		013	013		013				013	013	013	013	013	013	013	013	013
nu	000	011 -	011 -	1 - 2013	011 -	011	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ua		013	013		013				013	013	013	013	013	013	013	013	013
zb	010	010 -	010 -	0 - 2013	010 -	010	010	010	010 -	010 -	010 -	010 -	010 -	010 -	010 -	010 -	010 -
ks		013	013		013				013	013	013	013	013	013	013	013	013
en	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
zu		013	013		013				013	013	013	013	013	013	013	013	013
ie	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
na		013	013		013				013	013	013	013	013	013	013	013	013
e	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
e		013	013		013				013	013	013	013	013	013	013	013	013
a	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
bi		013	013		013				013	013	013	013	013	013	013	013	013
im	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
ab		013	013		013				013	013	013	013	013	013	013	013	013
ro	000	000 -	000 -	0 - 2013	000 -	000	000	000	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -	000 -
te		013	013		013				013	013	013	013	013	013	013	013	013

Dat	Variable 1 - Government revenue, percent of GDP (% of)	Variable 2 - Government expenditure, percent of	Variable 3 - Government primary expenditure, percent of GDP (% of)	Variable 4 - Interest paid on public debt, percent of GDP (% of)	Variable 5 - Government primary balance, percent of GDP (%)	Variable 6 - Gross public debt, percent of GDP (% of GDP)	Variable 7 - Real GDP growth rate,	Variable 8 - Real long-term government bond
Count	Available Time	Available Time Period	Available Time Period	Available Time Period	Available Time Period	Available Time	Available	Available
Algha	2002 - 2011	2002 - 2011	2005 - 2011	2005 - 2011	2005 - 2011	2011	2002 -	1997 -
Albani	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	2011	2002 -	1997 -

Algeria	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
Angola	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	2004 - 2009
Argentina	1864 - 2011	1864 - 2011	1865 - 2011	1865 - 2011	1865 - 2011	2011	1865	2011	1864	1993 - 1996
Armenia	1996 - 2011	1996 - 2011	1996 - 2011	1996 - 2011	1996 - 2011	2011	1996	2011	1996	
Australia	1901 - 2011	1901 - 2011	1916 - 2011	1916 - 2011	1916 - 2011	2011	1916	2011	1901	1947 - 2010
Austria	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	1880 - 2010
Azerbaijan	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
Bahrain	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
Bangladesh	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	2011	1980	2011	1980	
Belarus	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	2011	1998	2011	1998	2009 - 2010
Belgium	1835 - 2011	1835 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1835	1880 - 2010
Benin	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
Bhutan	1981 - 2011	1981 - 2011	1981 - 2011	1981 - 2011	1981 - 2011	2011	1981	2011	1981	
Bolivia	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	2011	1950	2011	1950	
Bosnia and Herzegovina	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	2011	1998	2011	1998	1998 - 2010
Botswana	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
Brazil	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	
Brunei	1985 - 2011	1985 - 2011	1985 - 2011	1985 - 2011	1985 - 2011	2011	1985	2011	1985	
Bulgaria	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	
Burkina Faso	1985 - 2011	1985 - 2011	1985 - 2011	1985 - 2011	1985 - 2011	2011	1985	2011	1985	
Burundi	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	2011	1992	2011	1992	
Cape Verde	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2011	2002	2011	2002	
Cambodia	1996 - 2011	1996 - 2011	1996 - 2011	1996 - 2011	1996 - 2011	2011	1996	2011	1996	
Cameroon	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
Canada	1870 - 2011	1870 - 2011	1870 - 2011	1870 - 2011	1870 - 2011	2011	1870	2011	1870	1880 - 2010
Central African Republic	1968 - 2011	1968 - 2011	1968 - 2011	1968 - 2011	1968 - 2011	2011	1968	2011	1968	
Chad	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	
Chile	1810 - 2011	1810 - 2011	1810 - 2011	1810 - 2011	1810 - 2011	2011	1810	2011	1810	
China, People's Republic of	1982 - 2011	1982 - 2011	1982 - 2011	1982 - 2011	1982 - 2011	2011	1982	2011	1982	
Colombia	1905 - 2011	1905 - 2011	1905 - 2011	1905 - 2011	1905 - 2011	2011	1905	2011	1905	
Comoros	1984 - 2011	1984 - 2011	1984 - 2011	1984 - 2011	1984 - 2011	2011	1984	2011	1984	
Congo, Dem. Rep.	1996 - 2011	1996 - 2011	1996 - 2011	1996 - 2011	1996 - 2011	2011	1996	2011	1996	
Congo, Republic of	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
Costa Rica	1956 - 2011	1956 - 2011	1956 - 2011	1956 - 2011	1956 - 2011	2011	1956	2011	1956	
Croatia	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2011	2002	2011	2002	2006 - 2010
Cyprus	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	2000 - 2010
Czech Republic	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	1999 - 2010
Côte d'Ivoire	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	2011	1997	2011	1997	
Denmark	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	1880 - 2010
Djibouti	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	2011	1991	2011	1991	
Dominican Republic	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	2011	1950	2011	1950	
Egypt	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2011	2002	2011	2002	
Equatorial Guinea	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	2011	1980	2011	1980	
Eritrea	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	2011	1992	2011	1992	
Estonia	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	
Eswatini	1981 - 2011	1981 - 2011	1981 - 2011	1981 - 2011	1981 - 2011	2011	1981	2011	1981	
Ethiopia	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	2011	1980	2011	1980	
FYR Macedonia	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	2011	1998	2011	1998	
Fiji	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	2011	1992	2011	1992	
Finland	1882 - 2011	1882 - 2011	1882 - 2011	1882 - 2011	1882 - 2011	2011	1882	2011	1882	1960 - 2010
France	1870 - 2011	1870 - 2011	1870 - 2011	1870 - 2011	1870 - 2011	2011	1870	2011	1870	1880 - 2010
Gabon	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
Gambia, The	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
Georgia	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
Germany	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	1880 - 2010
Ghana	1962 - 2011	1962 - 2011	1962 - 2011	1962 - 2011	1962 - 2011	2011	1962	2011	1962	
Greece	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	1960 - 2010
Guinea	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
Guinea-Bissau	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
Haiti	1924 - 2011	1924 - 2011	1924 - 2011	1924 - 2011	1924 - 2011	2011	1924	2011	1924	
Honduras	1927 - 2011	1927 - 2011	1927 - 2011	1927 - 2011	1927 - 2011	2011	1927	2011	1927	
Hong Kong SAR	1961 - 2011	1961 - 2011	1961 - 2011	1961 - 2011	1961 - 2011	2011	1961	2011	1961	1991 - 2010
Hungary	1927 - 2011	1927 - 2011	1927 - 2011	1927 - 2011	1927 - 2011	2011	1927	2011	1927	
Iceland	1909 - 2011	1909 - 2011	1909 - 2011	1909 - 2011	1909 - 2011	2011	1909	2011	1909	
India	1861 - 2011	1861 - 2011	1861 - 2011	1861 - 2011	1861 - 2011	2011	1861	2011	1861	1990 - 2010
Indonesia	1951 - 2011	1951 - 2011	1951 - 2011	1951 - 2011	1951 - 2011	2011	1951	2011	1951	
Iran	1962 - 2011	1962 - 2011	1962 - 2011	1962 - 2011	1962 - 2011	2011	1962	2011	1962	
Iraq	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2011	2004	2011	2004	
Ireland	1926 - 2011	1926 - 2011	1926 - 2011	1926 - 2011	1926 - 2011	2011	1926	2011	1926	1983 - 2010
Israel	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	2011	1950	2011	1950	1999 - 2010

	Italy	1862 - 2011	1862 - 2011	1862 - 2011	1862 - 2011	1862 - 2011	2011	1862	2011	1862	1861 - 2010
	Japan	1875 - 2011	1875 - 2011	1875 - 2011	1875 - 2011	1875 - 2011	2011	1875	2011	1875	1965 - 2010
	Jordan	1985 - 2011	1985 - 2011	1985 - 2011	1985 - 2011	1985 - 2011	2011	1985	2011	1985	
	Kazak hstan	1994 - 2011	1994 - 2011	1994 - 2011	1994 - 2011	1994 - 2011	2011	1994	2011	1994	
	Kenya	1982 - 2011	1982 - 2011	1982 - 2011	1982 - 2011	1982 - 2011	2011	1982	2011	1982	
	Kiribati	1988 - 2011	1988 - 2011	1988 - 2011	1988 - 2011	1988 - 2011			2011	1988	
	Korea, Republic	1953 - 2011	1953 - 2011	1953 - 2011	1953 - 2011	1953 - 2011	2011	1953	2011	1953	
	Kosov	2000 - 2011	2000 - 2011						2011	2000	
	Kuwait	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Kyrgyz Republic	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Lao P.D.R.	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Latvia	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	2011	1998	2011	1998	
	Leban on	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Lesotho	1982 - 2011	1982 - 2011	1982 - 2011	1982 - 2011	1982 - 2011	2011	1982	2011	1982	
	Liberia	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Libya	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Lithua nia	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Madag ascar	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	2011	1980	2011	1980	
	Malaw	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2011	2002	2011	2002	
	Malay sia	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	1991 - 2010
	Maldiv es	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Mali	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Maurit ania	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Mauriti us	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	1995 - 2010
	Mexic o	1900 - 2011	1900 - 2011	1900 - 2011	1900 - 2011	1900 - 2011	2011	1900	2011	1900	
	Moldo va	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	
	Mongo lia	1981 - 2011	1981 - 2011	1981 - 2011	1981 - 2011	1981 - 2011			2011	1981	
	Monte negro	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2002 - 2011	2011	2002	2011	2002	
	Moroc co	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Mozza mbique	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	1980 - 2011	2011	1980	2011	1980	
	Myan mar	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	2011	1998	2011	1998	
	Nambi a	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	2004 - 2010
	Nepal	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Nether lands	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	1880 - 2010
	New Zealand	1876 - 2011	1876 - 2011	1876 - 2011	1876 - 2011	1876 - 2011	2011	1876	2011	1876	1963 - 2010
	Nicara gua	1960 - 2011	1960 - 2011	1960 - 2011	1960 - 2011	1960 - 2011	2011	1960	2011	1960	
	Niger	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	
	Nigeri a	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Norwa y	1881 - 2011	1881 - 2011	1881 - 2011	1881 - 2011	1881 - 2011	2011	1881	2011	1881	1947 - 2010
	Oman	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Pakist an	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	1950 - 2011	2011	1950	2011	1950	1981 - 2010
	Pana ma	1946 - 2011	1946 - 2011	1946 - 2011	1946 - 2011	1946 - 2011	2011	1946	2011	1946	
	Papua New Guinea	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011			2011	1990	
	Parag way	1967 - 2011	1967 - 2011	1967 - 2011	1967 - 2011	1967 - 2011	2011	1967	2011	1967	
	Peru	1900 - 2011	1900 - 2011	1900 - 2011	1900 - 2011	1900 - 2011	2011	1900	2011	1900	
	Philipp ines	1946 - 2011	1946 - 2011	1946 - 2011	1946 - 2011	1946 - 2011	2011	1946	2011	1946	
	Poland	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	
	Portug al	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	1975 - 2010
	Qatar	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Roma nia	1962 - 2011	1962 - 2011	1962 - 2011	1962 - 2011	1962 - 2011	2011	1962	2011	1962	
	Russia	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	1880 - 2011	2011	1880	2011	1880	
	Rwand a	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	2011	1992	2011	1992	
	Saint Vincent and the Grenadines	1979 - 2011	1979 - 2011	1979 - 2011	1979 - 2011	1979 - 2011	2011	1979	2011	1979	
	Samo a	1998 - 2011	1998 - 2011						2011	1998	
	Saudi Arabia	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	2011	1999	2011	1999	
	Seneg al	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Serbia	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Seych elles	1983 - 2011	1983 - 2011	1983 - 2011	1983 - 2011	1983 - 2011	2011	1983	2011	1983	2003 - 2010
	Sierra Leone	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2011	2000	2011	2000	
	Singap ore	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Slovak Republic	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	2011	1997	2011	1997	1999 - 2010
	Sloven ia	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	2011	1995	2011	1995	1992 - 2010
	Solom on Islands	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	South Africa	1913 - 2011	1913 - 2011	1913 - 2011	1913 - 2011	1913 - 2011	2011	1913	2011	1913	
	South Sudan	2011	2011								
	Spain	1850 - 2011	1850 - 2011	1850 - 2011	1850 - 2011	1850 - 2011	2011	1850	2011	1850	1881 - 2010
	Sri Lanka	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011			2011	1990	
	Sudan	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Surina me	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	2011	1990	2011	1990	
	Swede n	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	2011	1800	2011	1800	1867 - 2010
	Switze rland	1899 - 2011	1899 - 2011	1899 - 2011	1899 - 2011	1899 - 2011	2011	1899	2011	1899	1880 - 2010

Syria	1990 - 2010	1990 - 2010	1990 - 2010	1990 - 2010	1990 - 2010	1990 - 2010	1990 - 2010	1990 - 2010	1990 - 2010
São Tomé and Príncipe	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011
Tajikistan	1973 - 2011	1973 - 2011	1973 - 2011	1973 - 2011	1973 - 2011	1973 - 2011	1973 - 2011	1973 - 2011	1973 - 2011
Tanzania	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011
Thailand	1948 - 2011	1948 - 2011	1948 - 2011	1948 - 2011	1948 - 2011	1948 - 2011	1948 - 2011	1948 - 2011	1948 - 2011
Timor-Leste	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011
Togo	1989 - 2011	1989 - 2011	1989 - 2011	1989 - 2011	1989 - 2011	1989 - 2011	1989 - 2011	1989 - 2011	1989 - 2011
Tonga	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011
Trinidad and Tobago	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011	1999 - 2011
Tunisia	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011
Turkey	1936 - 2011	1936 - 2011	1936 - 2011	1936 - 2011	1936 - 2011	1936 - 2011	1936 - 2011	1936 - 2011	1936 - 2011
Turkmenistan	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011
Tuvalu	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011	2004 - 2011
Uganda	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011
Ukraine	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011	1997 - 2011
United Arab Kingdom	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011	1990 - 2011
United States	1830 - 2011	1830 - 2011	1830 - 2011	1830 - 2011	1830 - 2011	1830 - 2011	1830 - 2011	1830 - 2011	1830 - 2011
Uruguay	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011	1800 - 2011
Uzbekistan	1955 - 2011	1955 - 2011	1955 - 2011	1955 - 2011	1955 - 2011	1955 - 2011	1955 - 2011	1955 - 2011	1955 - 2011
Vanuatu	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011	1992 - 2011
Vanuatu	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011	1991 - 2011
Venezuela	1920 - 2011	1920 - 2011	1920 - 2011	1920 - 2011	1920 - 2011	1920 - 2011	1920 - 2011	1920 - 2011	1920 - 2011
Vietnam	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011	1998 - 2011
Yemen	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011	1995 - 2011
Zambia	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011	2000 - 2011
Zimbabwe	2005 - 2011	2005 - 2011	2005 - 2011	2005 - 2011	2005 - 2011	2005 - 2011	2005 - 2011	2005 - 2011	2005 - 2011

Table A2.8. Acronyms of Variables	
Original Variable Names	Acronyms
Capital Control Index	capital_control
Type of Exchange Rate Regime	exchange_type
Polity2	polity2
Voice and Accountability	voice_acc
Political Stability and Absence of Violence&Terrorism	stability
Government Effectiveness	govt_effect
Regulatory Quality	regulatory_qual
Rule of Law	rule_law
Control of Corruption	corruption
Country Risk Level	risk_level
Continent Dummies	dummy_continent
Income Level	inc_level
Currency Crises Dummies	dummy_crises1
Banking Crises Dummies	dummy_crises2
Sovereign Debt Crises Dummies	dummy_crises3
data1var1 - Private debt, loans and debt securities (Percent of GDP)	private_debt1
data1var2 - Household debt, loans and debt securities (Percent of GDP)	household_debt1
data1var3 - Nonfinancial corporate debt, loans and debt securities (Percent of GDP)	corporate_debt
data1var4 - Private debt, all instruments (Percent of GDP)	private_debt2
data1var5 - Household debt, all instruments (Percent of GDP)	household_debt2
data1var6 - Nonfinancial corporate debt, all instruments (Percent of GDP)	corporate_debt2
data2var1 - Central Government Debt (Percent of GDP)	govt_debt1
data2var2 - General Government Debt (Percent of GDP)	govt_debt2

data2var3 - Nonfinancial Public Sector Debt (Percent of GDP)	public_sector1
data2var4 - Public Sector Debt (Percent of GDP)	public_sector2
data3var1 - Real GDP growth (Annual percent change)	real_gdp1
data3var2 - GDP, current prices (Billions of U.S. dollars)	gdp1
data3var3 - GDP per capita, current prices (U.S. dollars per capita)	gdp_pc1
data3var4 - GDP, current prices (Purchasing power parity; billions of international dollars)	gdp3
data3var5 - GDP per capita, current prices (Purchasing power parity; international dollars per capita)	gdp_pc2
data3var6 - GDP based on PPP, share of world (Percent of World)	gdp5
data3var7 - Implied PPP conversion rate (National currency per international dollar)	ppp_rate
data3var8 - Inflation rate, average consumer prices (Annual percent change)	inflation1
data3var9 - Inflation rate, end of period consumer prices (Annual percent change)	inflation2
data3var10 - Population (Millions of people)	population
data3var11 - Unemployment rate (Percent)	unemployment
data3var12 - Current account balance U.S. dollars (Billions of U.S. dollars)	ca1
data3var13 - Current account balance, percent of GDP (Percent of GDP)	ca2
data3var14 - General government net lending/borrowing (Percent of GDP)	govt_lending
data3var15 - General government gross debt (Percent of GDP)	govt_debt1
data4var1 - Net lending/borrowing (also referred as overall balance) (% of GDP)	1 lending_borrowing
data4var2 - Primary net lending/borrowing (also referred as primary balance) (% of GDP)	2 lending_borrowing
data4var3 - Cyclically adjusted balance (% of Potential GDP)	balance1
data4var4 - Cyclically adjusted primary balance (% of Potential GDP)	balance2
data4var5 - Revenue (% of GDP)	revenue
data4var6 - Expenditure (% of GDP)	expenditure
data4var7 - Gross debt position (% of GDP)	gross_debt
data4var8 - Net debt (% of GDP)	net_debt
data5var1 - Real GDP Growth (Annual percent change)	real_gdp2
data5var2 - Real Non-Oil GDP Growth (Annual percent change)	non_oil
data5var3 - Real Per Capita GDP Growth (Annual percent change)	gdp_pc3
data5var4 - Total Investment (% of GDP) (Percent of GDP)	investment1
data5var5 - Gross National Savings (% of GDP) (Percent of GDP)	savings
data5var6 - Overall Fiscal Balance, Including Grants (% of GDP) (Percent of GDP)	fiscal_balance1
data5var7 - Overall Fiscal Balance, Excluding Grants (% of GDP) (Percent of GDP)	fiscal_balance2
data5var8 - Government Revenue, Excluding Grants (% of GDP) (Percent of GDP)	revenue2
data5var9 - Government Expenditure (% of GDP) (Percent of GDP)	govt_expenditure1
data5var10 - Government Debt (% of GDP) (Percent of GDP)	govt_debt2
data5var11 - Broad Money (% of GDP) (Percent of GDP)	broad_money1
data5var12 - Claims on Nonfinancial Private Sector (% of GDP) (Percent of GDP)	private_sector1
data5var13 - Claims on Nonfinancial Private Sector (%) (Annual percent change)	private_sector2
data5var14 - Broad Money Growth (Annual percent change)	broad_money2
data5var15 - Exports of Goods and Services (% of GDP) (Percent of GDP)	export1
data5var16 - External Current Account, Incl.Grants (% of GDP) (Percent of GDP)	ca3

data5var17 - Imports of Goods and Services (% of GDP) (Percent of GDP)	import1
data5var18 - Trade Balance (% of GDP) (Percent of GDP)	trade_balance
data5var19 - Net Foreign Direct Investment (% of GDP) (Percent of GDP)	net_fdi
data5var20 - Reserves (Months of Imports) (Months of imports of goods and services)	reserves1
data5var21 - Real Effective Exchange Rates (2010=100) (Annual Average Index, 2010 = 100)	exchange_rate1
data5var22 - Nominal Effective Exchange Rates (2010=100) (Annual Average Index, 2010 = 100)	exchange_rate2
data5var23 - External Debt, Official Debt, Debtor Based (% of GDP) (Percent of GDP)	external_debt
data5var24 - Consumer Prices, Average (Annual % Change) (Annual average percent change)	consumer_price1
data5var25 - Consumer Prices, End of Period (Annual % Change) (Annual average percent change)	consumer_price2
data5var26 - Terms of Trade (Index, 2010 = 100) (Index, 2010 = 100)	terms_trade
data6var1 - Ratio of reserve/ARA metric (Unit)	reserves2
data6var2 - Reserves/Broad Money (Unit)	reserves3
data6var3 - Reserves/Short-term Debt (STD) (Unit)	reserves4
data6var4 - Reserve/(Import/12) (Unit)	reserves5
data7var1 - Debt (% of GDP)	historical_debt
Direct Investment Abroad (Millions of US Dollars)	investment2
Direct Investment In Country (Millions of US Dollars)	investment3
Private Inflows excluding Direct Investment (Millions of US Dollars)	private_inflow1
Private Inflows excluding Direct Investment (% of GDP) (Percent)	private_inflow2
Private Outflows excluding Direct Investment (Millions of US Dollars)	private_outflow1
Private Outflows excluding Direct Investment (% of GDP) (Percent)	private_outflow2
Portfolio Investment Assets (Millions of US Dollars)	portfolio1
Portfolio Investment Liabilities (Millions of US Dollars)	portfolio2
Portfolio Investment Liabilities (Millions of US Dollars)	portfolio3
Equity Securities Liabilities (Millions of US Dollars)	equity_securities
Debt Securities Assets (Millions of US Dollars)	debt_securities1
Debt Securities Liabilities (Millions of US Dollars)	debt_securities2
Proxy for Official Other Investment Liabilities (Millions of US Dollars)	liabilities1
Other Investment Assets (Millions of US Dollars)	assets1
Other Investment Liabilities (Millions of US Dollars)	liabilities2
Financial Derivatives (Millions of US Dollars)	derivatives
Debt Forgiveness (Millions of US Dollars)	debt_forgiveness
Nominal GDP (Millions of US Dollars)	nominal_gdp
Overall Openness Index (all asset categories) (Units)	openness_index

Currency Crises Model	Banking Crises Model	Debt Crises Model
capital_control	capital_control	capital_control
exchange_type	exchange_type	exchange_type
polity2	polity2	polity2
voice_acc	voice_acc	voice_acc
stability	stability	stability

govt_effect	govt_effect	govt_effect
regulatory_qual	regulatory_qual	regulatory_qual
rule_law	rule_law	rule_law
corruption	corruption	corruption
risk_level	risk_level	risk_level
inc_level	inc_level	inc_level
dummy_crisis1	dummy_crisis2	dummy_crisis3
inflation1	inflation1	private_debt2
population	unemployment	household_debt2
unemployment	lending_borrowing1	govt_debt2
ca2	equity_securities	public_sector2
balance1	derivatives	inflation1
nominal_gdp	nominal_gdp	historical_debt
openness_index	openness_index	debt_forgiveness
real_gdp3	real_gdp3	openness_index
gdp_pc1	gdp_pc1	real_gdp3
ppp_rate	govt_lending	gdp_pc1

Table A3 - Countries Used in the Analyses		
Currency Crises - Countries	Banking Crises - Countries	Debt Crises - Countries
Albania	Albania	Algeria
Australia	Australia	Angola
Austria	Austria	Argentina
Belarus	Belarus	Azerbaijan
Belgium	Belgium	Bangladesh
Brazil	Brazil	Belarus
Bulgaria	Bulgaria	Benin
Cambodia	Canada	Bolivia
Canada	Chile	Brazil
Chile	China	Burkina Faso
China	Colombia	Cambodia
Colombia	Costa Rica	Cameroon
Congo, Democratic Republic of the	Croatia	Chad
Costa Rica	Cyprus	Chile
Croatia	Czech Republic	China
Cyprus	Denmark	Colombia
Czech Republic	Egypt	Congo, Democratic Republic of the
Denmark	Estonia	Congo, Republic of the
Egypt	Ethiopia	Croatia
Ethiopia	FYR Macedonia	Cyprus
Finland	Finland	Czech Republic
France	France	Côte d'Ivoire
Georgia	Georgia	Dominican Republic
Germany	Germany	Ecuador
Greece	Greece	Egypt
Honduras	Honduras	Ethiopia
Hungary	Hungary	Ghana
India	Iceland	Guinea
Indonesia	India	Haiti
Ireland	Indonesia	Honduras
Israel	Ireland	Hungary
Japan	Israel	India
Kazakhstan	Italy	Indonesia
Kyrgyzstan	Japan	Kazakhstan
Malaysia	Kazakhstan	Kenya
Mauritius	Kyrgyzstan	Kuwait
Moldova	Latvia	Kyrgyzstan
Netherlands	Lithuania	Laos
Nicaragua	Malaysia	Libya
Norway	Mauritius	Madagascar
Panama	Moldova	Malaysia
Peru	Netherlands	Mali
Philippines	Nicaragua	Mexico
Poland	Norway	Moldova
Portugal	Panama	Mongolia
Romania	Peru	Mozambique
Slovakia	Philippines	Myanmar (Burma)
Slovenia	Poland	Nepal
Spain	Portugal	Nicaragua
Sweden	Romania	Niger
Switzerland	Russia	Nigeria
Tajikistan	Serbia	Pakistan
Tanzania	Slovakia	Papua New Guinea
Thailand	Slovenia	Peru
Turkey	Spain	Philippines
Turkmenistan	Sweden	Poland

Ukraine	Switzerland	Rwanda
United Kingdom	Tajikistan	Senegal
United States	Tanzania	Slovakia
Uzbekistan	Thailand	Slovenia
Venezuela	Turkey	South Africa
Vietnam	Ukraine	Sri Lanka
	United Kingdom	Sudan
	United States	Tajikistan
	Venezuela	Tanzania
	Vietnam	Thailand
	Yemen	Turkey
		Uganda
		Ukraine
		Uruguay
		Uzbekistan
		Venezuela
		Vietnam
		Zambia
		Zimbabwe
Total 62 countries	Total 67 countries	Total 75 countries