Essays on Socio Economic Ills

A thesis submitted for the degree of Doctor of Philosophy

by

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Declaration

I hereby declare that the thesis is based on my original work, except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Brunel University or other institutions.

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Abstract

This thesis is comprised of three essays that examine the impact of economic deterioration on the economy and society. It focuses on the interrelations among several socio-economic ills examined: sovereign defaults, excessive public debt, absence of economic growth and suicides. In an attempt to provide a holistic view of the topics covered, a combination of both economic and political explanatory variables are used.

After discussing in Chapter 1 the motivation for this thesis, the Global Financial Crisis of 2007, Chapter 2, investigated the determinants of sovereign defaults. With the help of a logit regression and using a variety of political and economic variables, we show that both types of variables determine whether a county will default or not. Various robustness tests were also carried out that confirm these findings.

In Chapter 3, the effect of the IMF intervention, once a country has defaulted, on its economic growth is investigated. The IMF intervention is measured as a dummy and the method used is the two stage least squares regression, where the instruments are the level of democracy and the UN Security council temporary membership. The findings suggest that the lagged effect of IMF rather than its contemporaneous effect is positive with respect to economic growth.

In Chapter 4, the focus is on the sociological effects of the IMF intervention, with the dependent variable being suicide rates. The data sample has been split in many different ways, such as males/females, and the results of the research show that IMF intervention, unemployment and abortions increase suicides whereas alcohol consumption decreases them.

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Chapter 1 Introduction

This thesis attempts to examine the impact of countries' economic hardship on various socio-economic variables. The concept of socio-economic ills captures what this research will focus on: sovereign defaults, excessive debt and their interrelation with future economic growth and suicide rates, trying to give a holistic view of the three ills examined. The trigger for this study was the Global Financial Crisis (GFC) that started in 2007 and the effects of which are still visible until now in certain countries. There has been a great debate on why some countries have been hit harder by the crisis and on whether the measures taken to overcome the crisis were the most suitable ones. The question that arises is whether the GFC revealed other underlying economic problems that have been there for a while? In this thesis, we will firstly try to understand why sovereigns reach a stage where they cannot repay their debt and examine whether the determinants of defaults are only economical or both economical and political. Then we will investigate on what happens after such an event. We are interested in the implications of the country making a request for help from International Financial Institutions (IFIs) and more specifically the International Monetary Fund (IMF): such assistance can have both economic, and, more broadly, social repercussions. The question that we have asked is what determines whether a country will default? And when it does, what is the effect of the IMF intervention on its growth? And does this intervention impact only the economy or has other effects on the society, for example, on the rate of suicides?

To start with, it will be useful to give a bit of background on the GFC. In 2007 the US market experienced a subprime mortgage crisis which spread fast to the banking sector with the final hit being the collapse of the investment bank Lehman Brothers on September 15th, 2008. This financial crisis is considered the worst crisis after the Great Depression in 1930. Unfortunately, this crisis was not restricted only to the US but spread all over the world becoming a global crisis. Both emerging and advanced markets faced great pressure in their foreign exchange and stock exchange markets as well as in their sovereign debt markets. Some countries experienced large reductions in their GDP, for example, Latvia and Romania saw their GDP decreasing by

35% and 20% respectively between 2008 to 2010 (World Bank Data). Some other European countries that had accumulated high levels of debt in relation to their GDP were unable to repay their debts. The two options in that case were either to default on the debt or restructure it. The latter can be done by either extending the debt's due date or by devaluing the currency so the debt becomes more affordable. When devaluing currency, in the medium-term, goods produced in the country become cheaper helping the manufacturing sector with an increase in exports. Needless to say that the above will need a period of adjustment and will not happen straight after the devaluation. On the contrary, when a country defaults or reconstructs its debt, it usually turns for help to IFIs, such as the IMF.

Many studies have tried to examine IMF's effect on the economy. The research looks into whether IMF programs lower inflation, improve current account balance and increase growth rate. However, measuring IMF's success is difficult. Haque and Khan (1998) have identified two reasons why this is difficult. Firstly, a country's economy faces many external shocks such as changes it the terms of trade that are outside of its control and affect the economy. The effect of the programme is difficult to isolate from the effect of the external shocks making it impossible to measure it. Secondly, it is also difficult to measure whether all the policy changes that come along with the programs lead to the desired outcomes as the dynamic linkages between the policy packages and the macroeconomic targets are not well established. In the literature there are different approaches that are used to evaluate the effect. There is the before and after approach that compares the macroeconomic performance of the country before and after the programme. Also, many researchers use the with or without approach which compares the performance of a country in the program (with) to a control group that is not under any program (without). Finally, in order to correct any biases that the first two methodologies have, a generalised evaluation where countries in a programme and countries not in a programme are compared after having been adjusted and controlled for exogenous influences and initial conditions.

Apart from the impact on the economy, recessions influence the society. Cohen (2014) argues that the US society experienced fewer divorces and births but more violence after the recession. On the same side, World Health Organisation (2011) clearly relates recession to deteriorated mental health and Bartoll et al. (2013) report an increase of poor mental health in males in Spain. Another impact is the decrease in fertility rate. According to Sobotka et al. (2011) the fertility rate can be decreased in two stages: firstly, by a rise in unemployment and economic

uncertainty and secondly by cutting the support that a government provides to families i.e. decreased funds in childcare system or benefits to families. Örsal and Goldstein (2010) separate male and female unemployment. However, they have found an adverse relationship between fertility rates and both male and female unemployment. Adsera (2010) focuses only on female unemployment and finds that when it increases it delays substantially the first birth but also affects the second and third births. Macunovich (1996) and Berkowitz King (2005), focusing on female unemployment in US this time, report similar results to Adsera's. Finally, having looked into France, Belgium and Netherlands, Neels (2010) concluded that high unemployment negatively affects first birth rates, more specifically those of woman aged under thirty.

Another variable that is affected by a recession is marriage. Retherford et al. (2001) found that young people in Japan delay their marriages during a recession due to lower income. In 2003, Eun, again concentrating on Asia and in South Korea more specifically, concluded that the 1997 crisis resulted in marriages' postponement which is the most significant proximate determinant of declining fertility. Apart from delaying a new marriage, economic hardship can impact already existing marriages as well. Arkes and Shen (2013) argue that a crisis increases divorces only for couples that have been married between 6 to 10 years. However, literature suggests that divorces are pro-cyclical, meaning that divorce rate is higher when unemployment rate is lower and income is higher (Hellerstein and Morrill 2011; Scharler 2012; Chowdhury 2013). The explanation is that divorces can be expensive and in periods of economic difficulty couples cannot afford them, thus they postpone them.

Having discussed some of the effects of an economic recession in both the society and the economy it is time now to move on to explaining the structure of this thesis. It is worth starting by explaining what is sovereign debt and the cause of sovereign defaults. Debt is a function of every economy and government. Governments borrow to not only invest in infrastructure, such as schools, hospitals, roads and prisons but also to fund various benefits, tax cuts, pensions and many more. Many advanced economies experience high percentages of debt with Japan having the highest in the world with 234% of GDP as reported by OECD in 2016. Sometimes, countries with high debt to GDP ratio end up being unable to repay it, resulting in a default. In such cases, it is common to ask for help from the IMF. The IMF lends conditionally to ensure that the borrowing country will repay the remaining part of the debt by adopting sound economic and finance policies. Usually the conditions are austerity measures such as tax

increases and/or decreases in pensions aiming to increase the government revenues. Worth noting that IMF defines itself as an organisation of countries with one of its primary aims being to sustain economic growth. Having said that, apart from ensuring debt repayment, its measures also target helping a country to overcome the economic difficulties and in the end, reach economic growth. The austerity measures, although they might be designed to help the country to stabilize the economy, their effects cannot only be restricted only in the economy but they may affect the society too. This is expected as the people experience circumstances that might be unusual.

Therefore, in the second chapter we examine the determinants of sovereign defaults. We use macroeconomic factors such as debt, GDP volatility, general government balance, the current account balance and the outflows capital restriction index as constructed by Fernandez et al. (2015). However, as suggested by literature, politics also play a role on a country's decision to default. Eaton and Gersovitz (1981) were first to separate a country's ability from its willingness to repay debt. Consequently, we have decided to include political variables in the analysis. These are various indices that are widely used as political indicators such as the level of democracy, as measured by Polity IV, the International Country Risk Guide, a proxy of political stability, the overall economic freedom, provided by the Heritage Foundation and finally the world governance indicators. What we find is that both economics and politics impact sovereign defaults. When it comes to economics, the findings suggest that higher debt, fiscal imbalances and more specifically deficit and output volatility decrease a government's ability to repay its debt. On the contrary, the higher the degree of democracy, overall economic freedom and the ICRG the lower the probability to default.

As we have established that both economics and politics affect defaults we decided to examine how these countries perform after such an incident. Most countries after having experienced difficulties to repay debts turn to financial institutions for help as discussed previously. An example institution is the IMF, often referred to as the "lender of last resort". Thus, in the next chapter we are trying to understand the IMF's effect and more explicitly to understand whether it actually helps countries to achieve economic growth after crises. To address the endogeneity problem that may arise by having economic growth and IMF assistance in the same regression we use instruments. One of these is the temporary membership of UN Security Council, and as Dreher, Sturm and Vreeland (2009) have concluded, there is a significant relationship between

that and participation to IMF programs. The evidence shows that having IMF assistance increases the economic growth a year after receipt of the loan.

Having checked the economic effect of IMF on sovereigns that resort to it for help, we have decided to examine its effect, if any, on sociological variables and more specifically suicide rates in chapter four. Suicide rates were chosen because economic crises have been blamed for their upsurges (Lopez Bernal et al. (2013), Isabel et al. (2016)) but at the same time not a lot of research has been published on the actual effects of economic crises against suicides. To explain them we use unemployment rate, GDP growth and IMF loans as a dummy on the economic side and the number of abortions per 1000 of live births, democracy and the alcohol consumption as litre per capital on the sociological side. The sample is split in various ways, that will be discussed in detail in the chapter, but what we can generally report is that both IMF intervention and unemployment, increase suicide rates whereas GDP growth is insignificant. Evidence also proves that the more democratic the country the fewer the suicides but at the same time the higher the number of abortions lead in more suicides. Finally, the most interesting result is related with the alcohol consumption. The more alcohol someone consumes, the less the possibility to commit suicide.

Finally, chapter five aims to combine the results of the three chapters and highlight the main findings. However, considering the length restriction on this thesis and the extent of the three points above, we are aware that there is scope for further research on all these topics and their interrelations. Having said that, there is also a section with further recommendations that we believe will enrich the research and robustness of results on all three chapters.

Chapter 2 Sovereign Defaults: Economics versus Politics

Abstract

The aim of this study is to investigate the main factors causing the sovereign defaults. We use a panel of 99 countries to assess the impact that various macroeconomic and political risk indicators have on sovereign defaults on foreign currency bank loans, foreign currency bonds and local currency debt, utilizing an extended database constructed by the Bank of Canada. Our results suggest that the favourable economic indicators, lower debt levels and political stability all reduce the likelihood of default. We also find that the capital outflows restrictions are positively associated with higher probability of default.

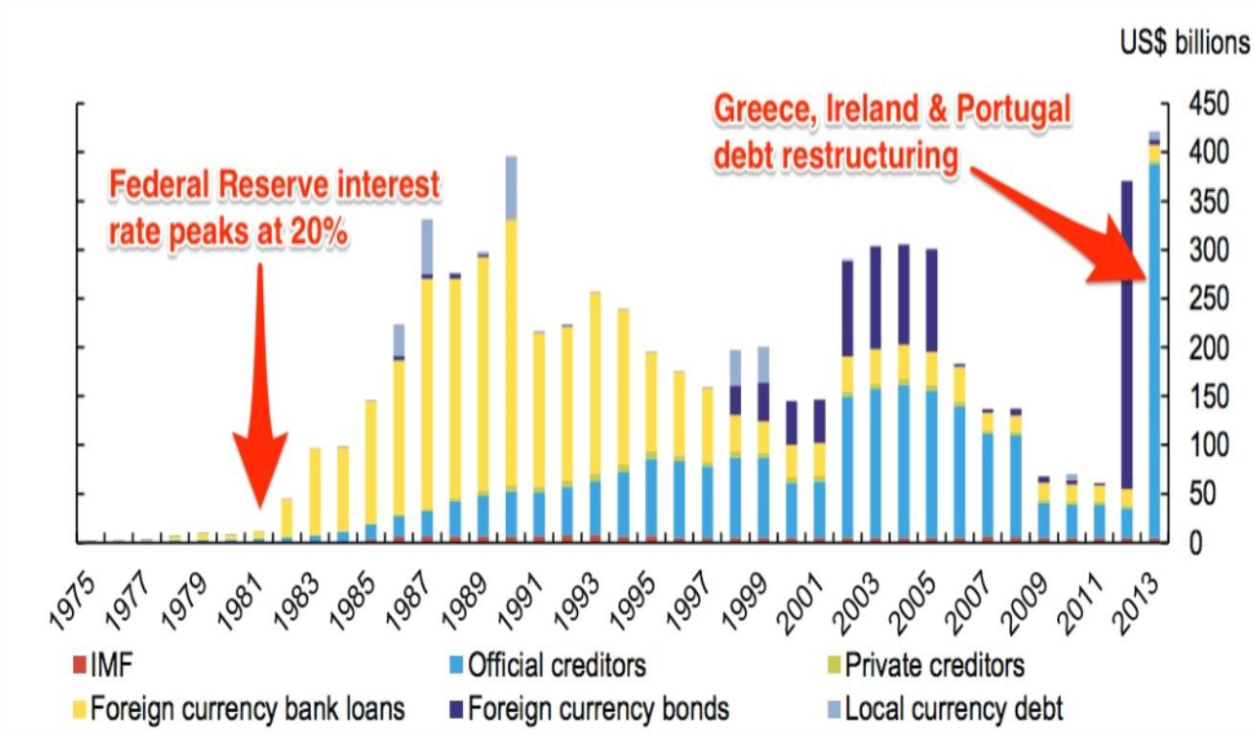
2.1. Introduction

Sovereign defaults are defined as a country's failure to repay its debts. In case of such an event, the results for the defaulted country can be disastrous not only in the short term but also in the medium and long term as it will be difficult and expensive to borrow. During the last 35 years, sovereign defaults have become common. In Europe in the late 1980s several Eastern European countries (Romania, Poland, Hungary and Yugoslavia), experienced severe debt crises. The same decade, the oil price shock caused widespread defaults in South America followed by the Mexican default in 1994 which affected other Southern American economies. Its impact is also known as the "tequila effect". Three years later the East Asian crisis, which started in Thailand, spread very quickly to Indonesia, Korea and other East Asian countries. Russia followed soon after (1998) and more recently Iceland (2008) and Greece (2012). In the case of Greece more specifically, in March 2012, the International Swaps and Derivatives Association announced that it has triggered a restructuring "credit event" under credit default swap contracts. Approximately 97 per cent of privately held Greek bonds took a 53.5 per cent cut of the bond principal, about €107 billion reduction in Greece's debt stock.

Moody's (2013) in an extended analysis of sovereign defaults records 24 such incidents since 1997. Nine of the defaults were on both local and foreign currency government bonds, 8 were on local currency government bonds only and 7 affected foreign currency government bonds. At this point it should be stressed that these defaults have been observed at different debt levels. There are countries that have endured debt levels of more than 100% of GDP and have not experienced a default while others defaulted while maintaining lower debt levels. This suggests that other reasons besides economic factors play a role on the sovereign's decision to default. An example would be the case of Hungary compared to Russia. Just after the collapse of the former Soviet Union, Hungary was on the verge of defaulting many times between the period of 1990 to 1994 while experiencing negative GDP growth. From fear on the impact of a default to the support that received from Western countries, it managed to find different ways to deal with this problem. On the other hand, Russia in 1998 decided to default. The use of the word decided was carefully chosen, as its government continued making domestic currency debt payments and only defaulted on foreign denominated bonds. Nonetheless, the examples demonstrated above show that a country can end up not repaying its debt either due to deteriorated economic fundamentals or due to political reasons. Below is a graph from Bank of Canada that depicts the sovereign debt in default by six creditors. The spike that is observed

according to the Bank of Canada is attributed to Greece's, Ireland's and Portugal's debt restructuring.

Figure 2.1: Total Sovereign Debt in Default by Creditor **Source: Bank of Canada**



What has led all these countries mentioned above to default? Are there any common characteristics with respect to their economies and politics? There is a large number of research papers, which attempt to explain the sovereign risk, observed sovereign bond yields and credit default swaps prices. Favero and Missale (2012) find evidence that the fluctuations in the euro area bond spreads are driven by fundamentals. In line with the above, Di Cesare at al. (2012) suggests that the levels of sovereign bond yields after the global financial crisis reached levels that can be explained by fiscal and macroeconomic fundamentals.

In this paper we consider to which extent macroeconomic fundamentals and political indicators explain the sovereign defaults. We use the Sovereign defaults database (CRAG) constructed by the Bank of Canada, which includes defaults on debt in different subcategories of creditors; International Monetary Fund, International Bank for Reconstruction and Development, Paris Club, other official creditors, private creditors, foreign currency bank loans, foreign currency bonds and local currency debt, from 1960 until 2015. We analyse the effect of macroeconomic indicators for a set of 99 countries (see table 2.10 in Appendix 2.1) from 1985 until 2015 on sovereign defaults. Consistent with the literature, we find evidence that the debt to GDP ratio

and the real GDP growth volatility are statistically significant in explaining the sovereign defaults. The innovation of this paper is that we also examine the explanatory power of indicators associated with the political risk on sovereign defaults. We incorporate four different indicators – the World Governance Indicators, the International Country Risk Guide (ICRG), the Polity IV and Economic Freedom- and find that the political risk captures a significant part in explaining the sovereign defaults.

The paper is structured as follows. Firstly, we will review the relevant literature and then we will present the data and the method that we will use to examine the dependent variable. In the third section we will present and discuss the results. The final section will offer a summary of the paper and the concluding remarks.

2.2. Literature Review

There is a vast literature discussing sovereign defaults, their causes and determinants. Eaton and Gersovitz (1981) were the first ones to separate between bankruptcy of an individual economic agent in a national economy and a default by a government. When it comes to sovereign defaults they distinguish their willingness to pay their debt and whether they can actually repay. It can be argued that the latter is dependent on the economic situation of the country whereas the former is more linked to political factors. In line with the above, Verma (2002) used both structural and political variables, to explore what affects a country's decision to default. He concluded that political factors affect a sovereign's decision to default using a multivariate probit model. More specifically, countries with more democratic regimes tend to default more than others.

The literature thus examines both economic and political variables as possible determinants of sovereign defaults. We will firstly discuss papers that examine macroeconomic variables and then move on to the ones that investigate political factors and their effects. To start with, Arellano and Kocherlakota (2014) attempt to investigate the link between domestic debt default risk and sovereign debt in 18 emerging markets. Using temporal and country specific evidence they found that domestic defaults result in sovereign defaults and that this relationship is not causal. They argue that non-fundamental shocks lead to domestic defaults, which in turn result in fiscal pressures that may cause defaults on foreign loans.

Catao and Sutton (2002), try to explain the variations in sovereign default probabilities by examining the role of macroeconomic volatility. They break down the latter into externally

induced volatility, considering this to be linked to the trade, and policy induced volatility that is linked to foreign exchange, monetary and fiscal policies. Their sample consists of twenty-five emerging economies over a period of thirty-one years from 1970 to 2001. Their findings suggest that countries that demonstrated higher policy induced volatility are more likely to default. Sharp decreases of GDP growth and fiscal balances mostly precede these defaults as expected. However, they also find that there is a gradual deterioration of some other indicators, such as ratio of debt service to export.

Hilscher and Nosbusch (2010) in their analysis of the determinants of sovereign risk find that the volatility of terms of trade has statistically and economically significant impact on sovereign yield spreads. As noted by Bulow and Rogoff (1989) any dollar revenues generated by the country's trade activity could increase its ability to pay its external dollar denominated debt. Similarly, Eicher and Maltriz (2013) argue that the terms of trade are significant in explaining the sovereign risk because they affect the country's ability to generate foreign currency revenues which can be used for foreign currency denominated debt.

Bi (2012), introducing an endogenous and stochastic fiscal limit, which measures the country's ability to pay its debts, argues that it relies on economic fundamentals, such as the fiscal policy, the size of the government, economic diversity and political uncertainty. Baldacci et al. (2008) using a panel of 30 emerging market economies investigate the determinants of country risk premiums. Measured by the sovereign bond spreads they argue that fiscal and political factors drive the credit risk. Beirne (2013) analyses the drivers of sovereign risk as expressed by the sovereign yields and sovereign credit default swaps, shows that deterioration in countries' fundamentals has a significant impact on both of them. The linkage between the macroeconomic fundamentals and the sovereign credit risk is investigated for six euro area countries by Yahya et al (2013). They conclude that the creditworthiness of the studied countries is affected by macroeconomic fundamentals such unemployment, debt to GDP ratio and gross fixed capital formation. Clark and Kassimatis (2015) using a new set of macroeconomic variables, which reflect investor's expectations, find them significant in explaining and forecasting the sovereign credit spreads, expressed as proxy for the sovereign risk. According to Min (1998) inflation is another important factor in explaining the government borrowing cost for a sample of Asian and Latin American countries. On the contrary, Diaz and Gemmill (2006) who examine the factors affecting the creditworthiness of

four Latin American economies find no connection between inflation and the sovereign risk as expressed by the government bond spreads.

Defaults episodes are more likely to occur in periods of recession. Tomz and Wright (2007) investigating whether there is a relationship between sovereign defaults and economic activity in the defaulting country. Covering 169 defaults for 175 sovereign entities they conclude that 62 per cent of these defaults occurred in periods of economic recession. Cantor and Parker (1996) exploring the criteria underlying sovereign ratings conclude that factors such as the GDP growth and GDP per capita income are statistically significant in explain the rating decision by two leading ratings agencies, Moody's Investors Service and Standard and Poor's. In another study Mellios and Paget-Blance (2006) examine what are the factors that the three major rating agencies, Fitch Ratings, Moody's and Standard and Poor's consider when assigning their rating. Using a principal component analysis they find that the sovereign ratings are mainly determined by per capita income, government income, real exchange rate changes, inflation rate and default history. Similarly, Afonso et al. (2007) in a European Union focused empirical analysis over a period from 1995 to 2005 conclude that the GDP per capita, real GDP growth, government debt, government effectiveness, external debt and external reserves, sovereign default indicator as well as being member of European Union are the main indicators that the three largest rating agencies consider for the rating decisions.

In the body of literature, we found several papers trying to identify the determinants of sovereign defaults using variables that are indicators of defaults instead of using the variable per se. Below, we will provide an overview of the most interesting and relevant ones. We will start with Maltritz (2012) who uses a Bayesian Model Averaging (BMA) in his attempt to identify the determinants of default risk in countries of the European Union. As an indicator for risk he uses government yield spreads in all EMU member states from 1999 until 2009. What he finds, after having tested various variables, is that government debt to GDP, budget balance to GDP and more specifically the deficit significantly affect the dependent variable. Alesina et al (1995), examined the borrowing rates and the debt of OECD countries. They find a significant relationship in both the sovereign yield spreads, which is often an indicator of default, and public debt in countries where the debt to GDP ratio is not stable. Lastly, another paper that uses an untraditional way to examine the sovereign default risk is the one of Alfonso (2003). Using data from S&P and Moody's he tries to identify the determinants of sovereign

credit ratings. He argues that GDP per capita, external debt as a percentage of exports, inflation and real growth rate are significant in the determination of the credit ratings.

Moving on to the literature focused on the political risk, Hatchondo et al. (2007), identify the political factors, borrowing costs and resources as the factors that determine whether a country will default or not, based on the existing literature. Empirical studies suggest that countries have greater probabilities to default in periods where the available resources in a country are low (Tomz and Wright (2007) and Cantor and Packer (1996)) and when borrowing costs for a country are high (Arora and Cerisola (2001) and Lambertini (2001)). Finally, different political factors seem to play a role on whether a country will default or not. Political instability has been found statistically significant by Citron and Nickelsburg (1987) and Balkan (1992). The latter also reports that democracy plays a role in defaults. In line with that Kohlscheen (2003) finds that countries with parliamentary democracies have a lower probability of default than compared to countries with presidential systems. Alesina and Tabellini (1990) also show that political instability increases the probability of a default.

In a bit more detail, Balkan (1992) examines if and how the level of democracy and political instability affect the country's probability to repay its debt. The method adopted in the paper is a probit regression run in 33 countries over a period of 13 years, starting in 1971. The choice of the countries was based on the criteria of them being developing nations with an external debt higher than one billion dollars. In line with others in the literature he states that democracy decreases the default probabilities whilst high level of political instability increases them. On the note of political stability, Manasse and Roubini (2005)) amongst other variables that have examined is whether a country has presidential elections in less than five years which is considered a sign of instability. Using a Classification and Regression Tree Analysis (CART) find that these countries have increased probability to default when international capital markets are tight.

Cuadra and Sapriza (2008), in their attempt to test the interaction of political factors with defaults use a neoclassical open economy model. The model has two types of political parties, each period one of the two in power and foreign lenders. They also assume that the only asset traded in financial markets is a noncontigent one period bond. This bond is available only to ruling political. The results of the model reinforce the vast literature that politics play indeed a role in a sovereign's likelihood to default. What they find is that unstable and more polarised economies lead in both higher default rates and volatility of interest rate spreads.

Yu (2016) has also tried to understand whether political factors affect the probability of a country to default. He examines 68 countries, a mix of developed and emerging economies, from 1970 until 2010 using a panel logit model. What Yu argues is that apart from economic reasons, political associated variables play a role in a country's probability to default. For example, Tabellini and Ozler (1991) report that when two types of government with multiple equilibria alternate in power, defaults are more probable. Also, Sapriza and Cuadra (2008) prove that a government can choose to default when election results are uncertain by taking excessive debt, as a preventive move. Coming back to Yu, his main findings suggest that political stability is a significant factor that determines this probability. More specifically, more democratic countries that are political stable will less likely default whereas higher chances of political turnover along with younger political regimes have the opposite effect.

Baldacci et al (2011), focus on emerging markets only in their attempt to understand the determinants of sovereign defaults. They study bond spreads as a spike in them is translated as a higher probability to default. Their sample consists of 46 countries over a period of 11 years from 1997 to 2008. They find that both political and fiscal factors affect the credit risk of these countries. More precisely, in periods of economic downturn the markets are less tolerant in institutional risk asking for an extra premium to lend them by increasing the spreads.

Rijckeghem and Weder (2008) show that to explain defaults in both domestic and external obligations, the political institutions of a country should be examined. Using a non- parametric technique, to exploit the advantage of identifying patterns in the data that this technique offers compared to a standard logit, prove that indeed political factors matter in defaults. For example, when economic fundamentals are sufficiently strong, democracies with a parliament system assure that a default on an external debt will be avoided. In dictatorships on the other side, assuming the same as above, high stability and tenure guarantee that the country will not default on its domestic debt.

Finally, Eichler and Plaga (2016) take a different approach to the issue. They examine the links between sovereign bond holdings and political factors, as these can be an indicator of a default. They focus on US investors that hold bonds in 60 countries between 2003 to 2013. US investors seem to reduce their investment in bonds when there is political uncertainty. In cases, where the default risk is high or a country has already experienced one, they prefer to invest to country bonds with higher political constraints. However, when none of these two exist they prefer sovereigns with few political constraints on the government.

2.3. Methodology and Data

2.3.1 Data and Variables

In our analysis we use the Bank of Canada Sovereign defaults database constructed by Beers and Mavalwalla. Consistent with the literature and the rating agencies, Beers and Mavalwalla (2017) consider a default event has occurred when debt is service is not paid on the due date or within a specific time frame in any of the following circumstances[1]:

- Agreements between governments and creditors that reduce rates and/or extend maturities on outstanding debt.
- Government exchange offers to creditors where existing debt is swapped for new debt on less-economic terms.
- Government purchases of debt at substantial discounts to par.
- Government redenomination of foreign currency debt into new local currency obligations on less-economic terms.
- Swaps of sovereign debt for equity (usually relating to privatization programs) on less-economic terms.
- Retrospective taxes targeting sovereign debt service payments.
- Conversion of central bank notes into new currency of less-that-equivalent face value.

GRAG's sovereign database[2] presents data for sovereign defaults from 1960 to 2016 for the creditors' categories listed below:

- International Monetary Fund (IMF)
- International Bank of Reconstruction and Development (IBRD)
- Paris Club
- Other official creditors
- Private creditors
- Foreign currency bank loans
- Foreign currency bonds
- Local currency debt

[1] Bank of Canada, Database of Sovereign Defaults 2015, page 2.
[2] Available at https://www.bankofcanada.ca/wp-content/uploads/2016/06/r101-revised-june2017.pdf

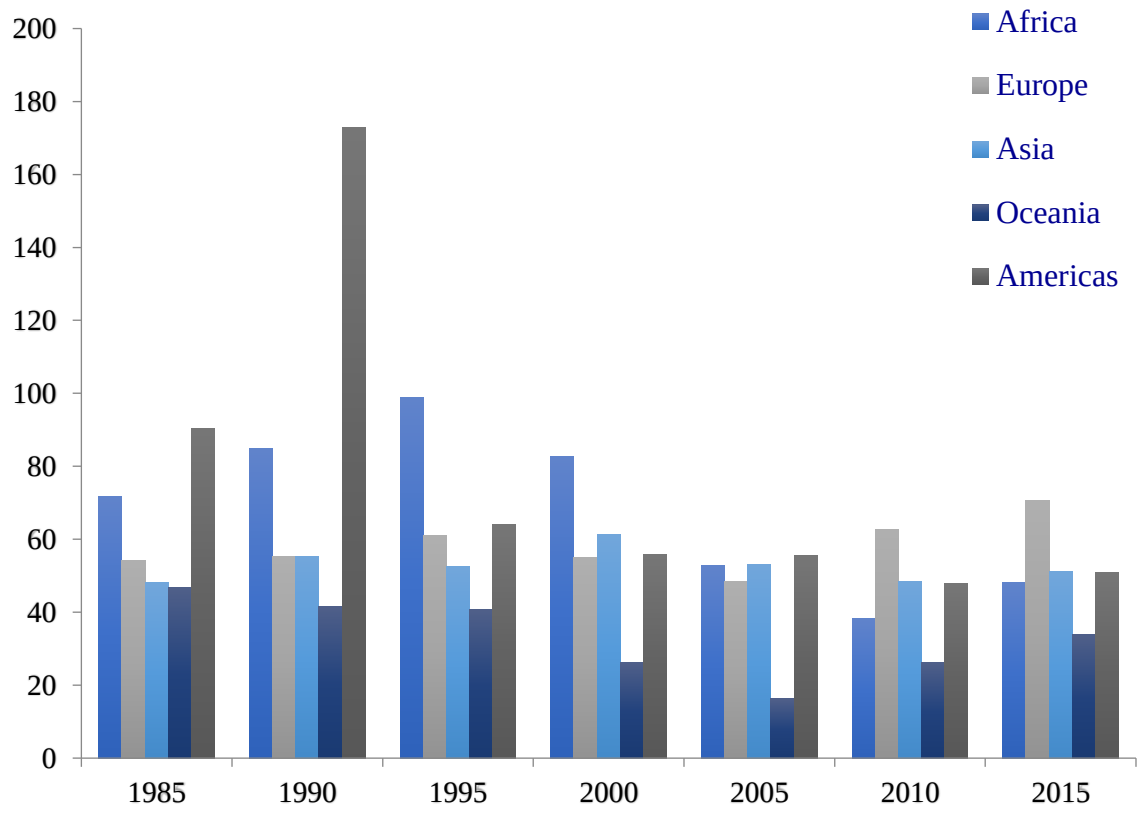
The analysis used in this paper is in line with the practices followed by credit rating agencies. Their method is based in measuring the probability of missed payments of the government and central bank bills, notes, bonds and bank loans, not the probability of missed payments of loans contracted from the IMF, the multilateral lending institutions and other official creditors. Moody's Investor Services (2008) in a survey about the post-1960 history of sovereign defaults presents 38 case of sovereign bond defaults. Moody's survey unveils that 45 per cent of defaults have been on foreign currency bonds, while 34 per cent affected local currency bonds and 21 per cent were on a joint basis.

We attempt to investigate the relationship between the sovereign default and the imposition of capital restrictions over a period of 20 years for 99 countries. To achieve this, we use the dataset of capital restrictions constructed by Fernandez et. al (2015). For the construction of the dataset Fernandez et al (2015) based on the methodology developed by Schindler (2009), but including more countries, more years and more asset categories. The most important feature of this dataset is the fact that it disaggregates the information of the capital restriction on inflows or outflows. The sample covers the period 1985 to 2015 and the following ten asset categories:

- Money market instruments, which includes securities with original maturity of one year or less.
- Bonds or the other debt securities with original maturity of more than one year.
- Equity, shares or other securities.
- Collective investment securities such as mutual funds and investment trusts.
- Financial credit and credits other than commercial credits granted by all residents to nonresidents and vice versa.
- Derivatives.
- Commercial credits for operations linked with international trade transactions.
- Guarantees, Sureties and Financial Back-Up Facilities provided by residents to nonresidents and vice versa.
- Real Estate transactions representing the acquisition of real estate not associated with direct investment.
- Direct investment accounts for transactions made for the purpose of establishing lasting economic relations both abroad by residents and domestically by residents.

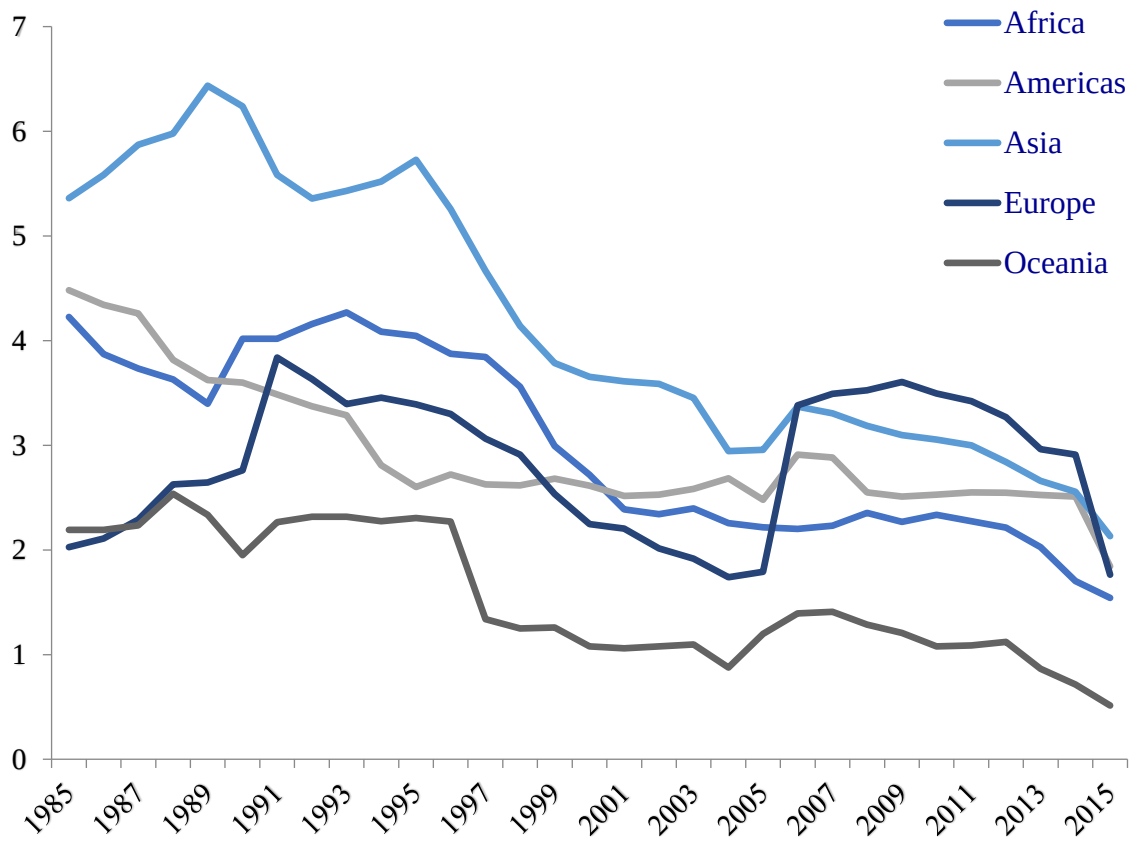
The empirical investigation concentrates on explaining the sovereign defaults across a diverse set of countries and time range. To try to achieve that we use two different groups of variables; economic and political. The first group of variables that we use include several macroeconomic fundamentals. The debt to GDP ratio is a proxy used to determine whether a country can repay its obligation. A higher the debt to GDP ratio is associated with a higher probability of default. We also incorporate in our analysis the output volatility, as a proxy for the country's capacity to absorb shocks and adapt to changes. In Figure 2.2 we calculated its average based on the countries in the analysis and we present the average per continents. The same for Figures 2.3 to 2.9 that follow.

Figure 2.2: General Government Debt (as a percentage of GDP)



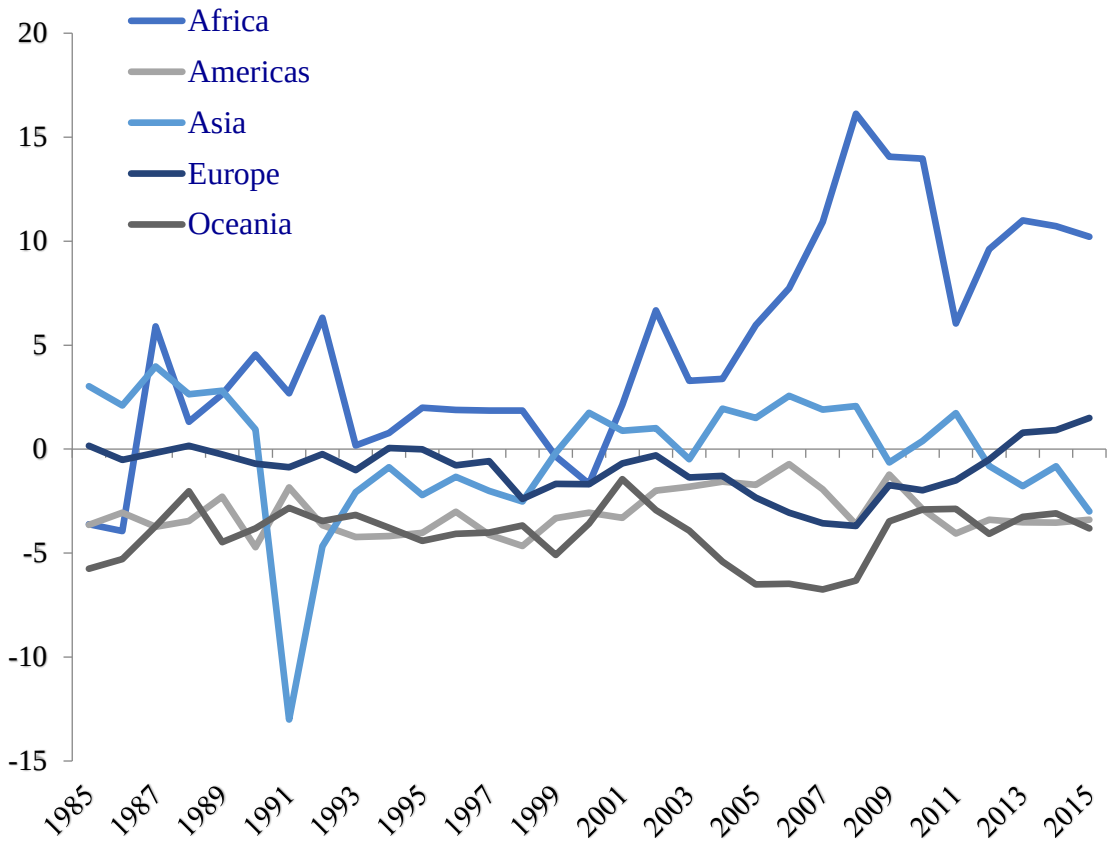
Real GDP growth (Figure 2.3), which is defined as year on year percentage change of real GDP, is an indicator of how solid economic performance makes the economy stronger and less likely to default on its debts. We calculate the standard deviation of the real GDP growth rate over 4 years of historical data, plus projected output over the next 3 years. Higher output volatility implies higher likelihood of default.

Figure 2.3: Real GDP growth rate



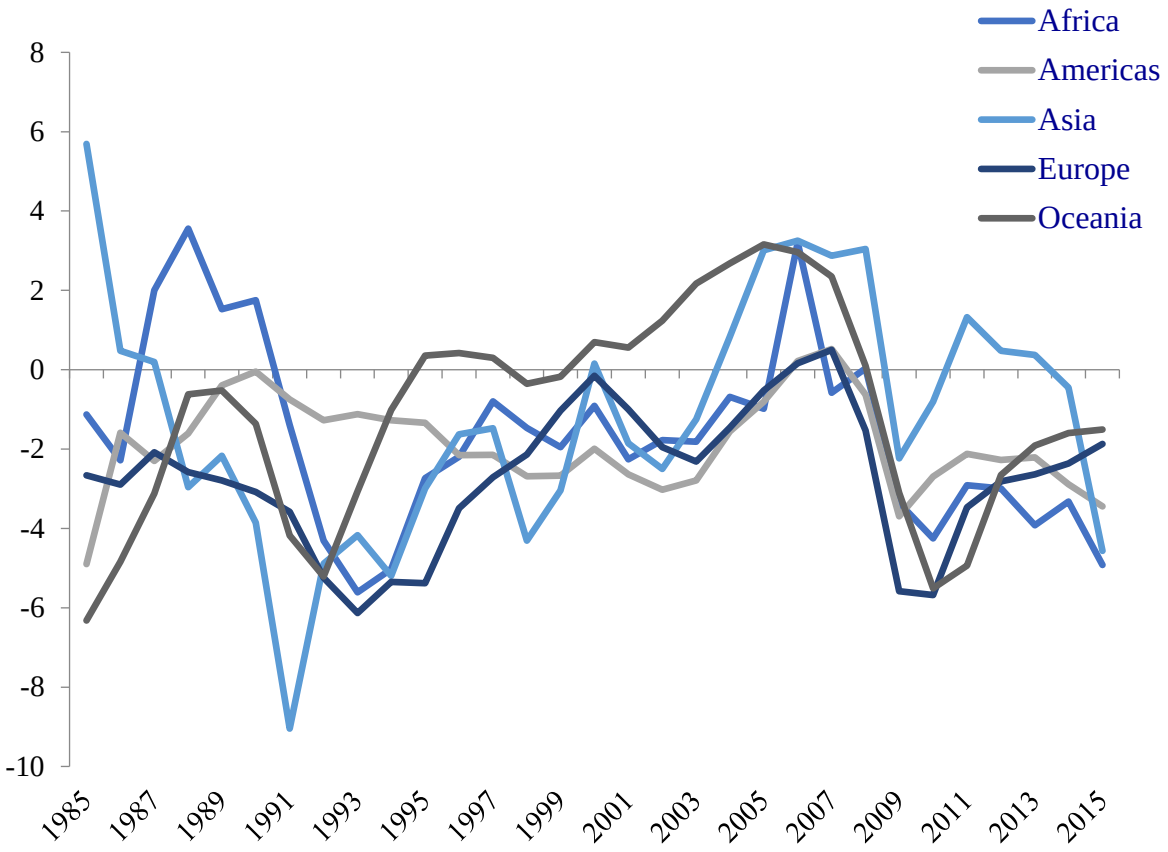
We use the current account balance (as a percentage of GDP – Figure 2.4) as a proxy for the country's external solvency, which is linked with its level of external indebtedness. In the event of a sudden stop in financing, countries with large current account imbalances can be forced to undertake sharp macroeconomic adjustment. Therefore, we expect the current account to have negative sign.

Figure 2.4: Current account balance (as a percentage of GDP)



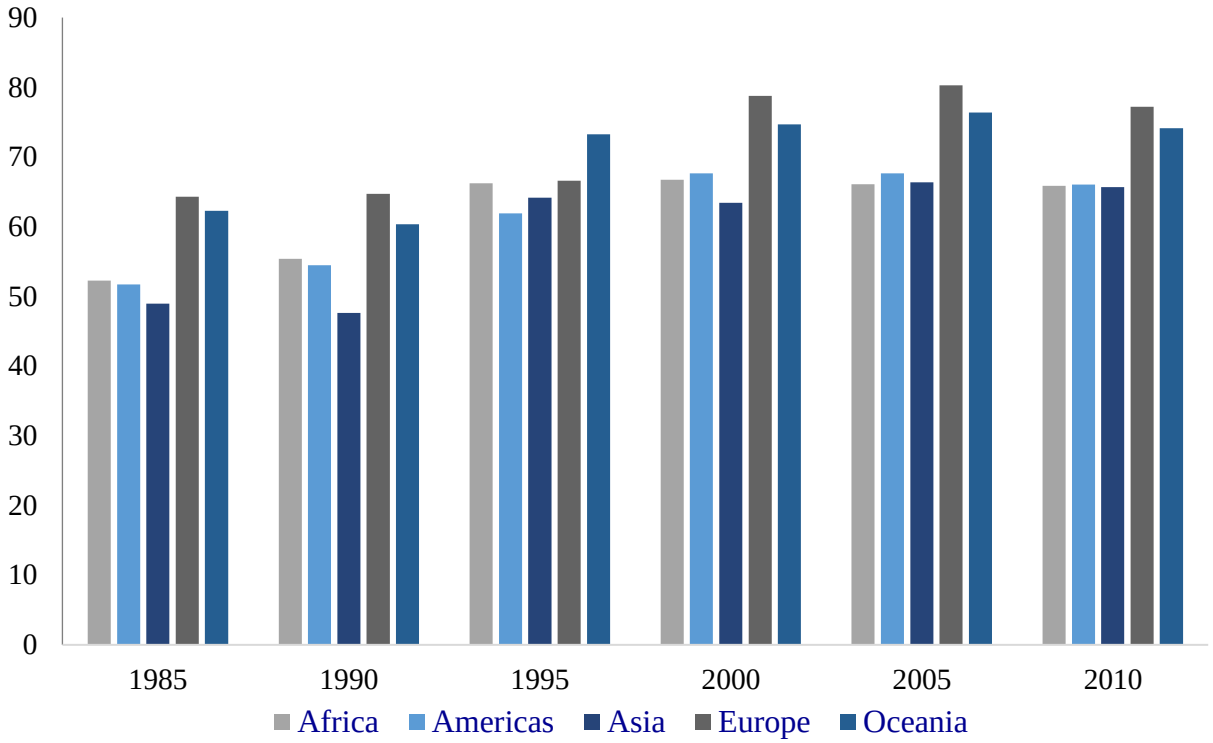
Another variable, which characterizes the country's financing needs is the fiscal balance (Figure 2.5). A country with a stronger fiscal position should have less probability of default. Therefore, we expect this indicator to have a negative sign.

Figure 2.5: General government fiscal balance (as a percentage of GDP)



Moving on to the political variables, we will start with the International Country Risk Guide (ICRG – Figure 2.6). The ICRG reports three subcategories of risk: the political, financial and economic, which are updated monthly for 140 countries. For the above three, a separate index is created with a 100 points as a maximum for the political risk and 50 points for the other two. The scores to the indices are given by a business oriented model. The model quantifies a risk by examining country specific elements considering 22 variables. For the 22 variables 30 metrics are used to assess them. In this paper, we will only use the political risk index. This index comprises of 12 variables which exhibit both social and political traits. Some examples are internal conflict, socioeconomic conditions, corruption and bureaucratic quality. These 12 then get points with the maximum ranging from 4 to 12 that attribute to the total of the 100 points. ICRG is used as a proxy of political stability.

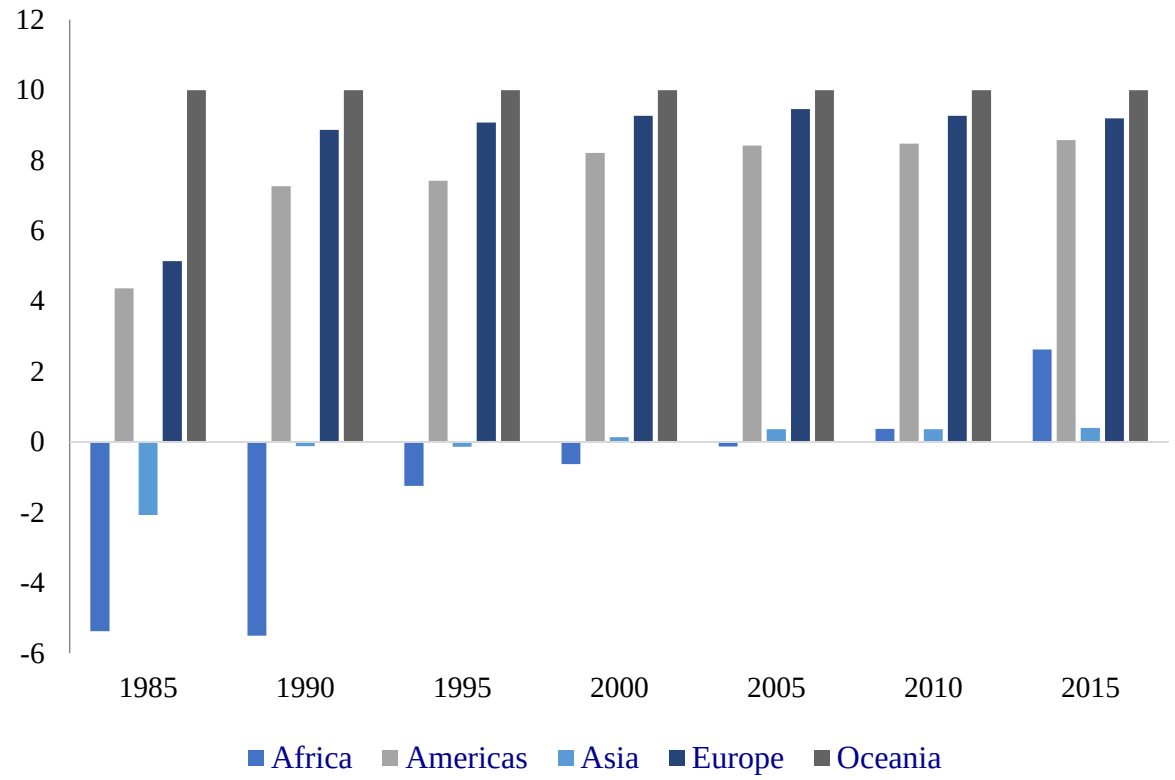
Figure 2.6: International country risk guide indicator



The next variable that we thought might be worth to examine is democracy. Polity IV (Figure 2.7) is a research project that measures democracy from 1800 until present and it is commonly used in the political science research. We chose this data source as compared to other databases as polity provides data for a greater range of both years and countries. The database covers 167 countries as it only covers states of a population of 500,000 and more. The score that is assigned to them ranges between -10 to 10. The two extremes represent hereditary monarchy and consolidated democracy respectively. From -10 to -6 autocracies, +6 to +10 democracies and the middle range from -5 to +5 anocracies. [3]

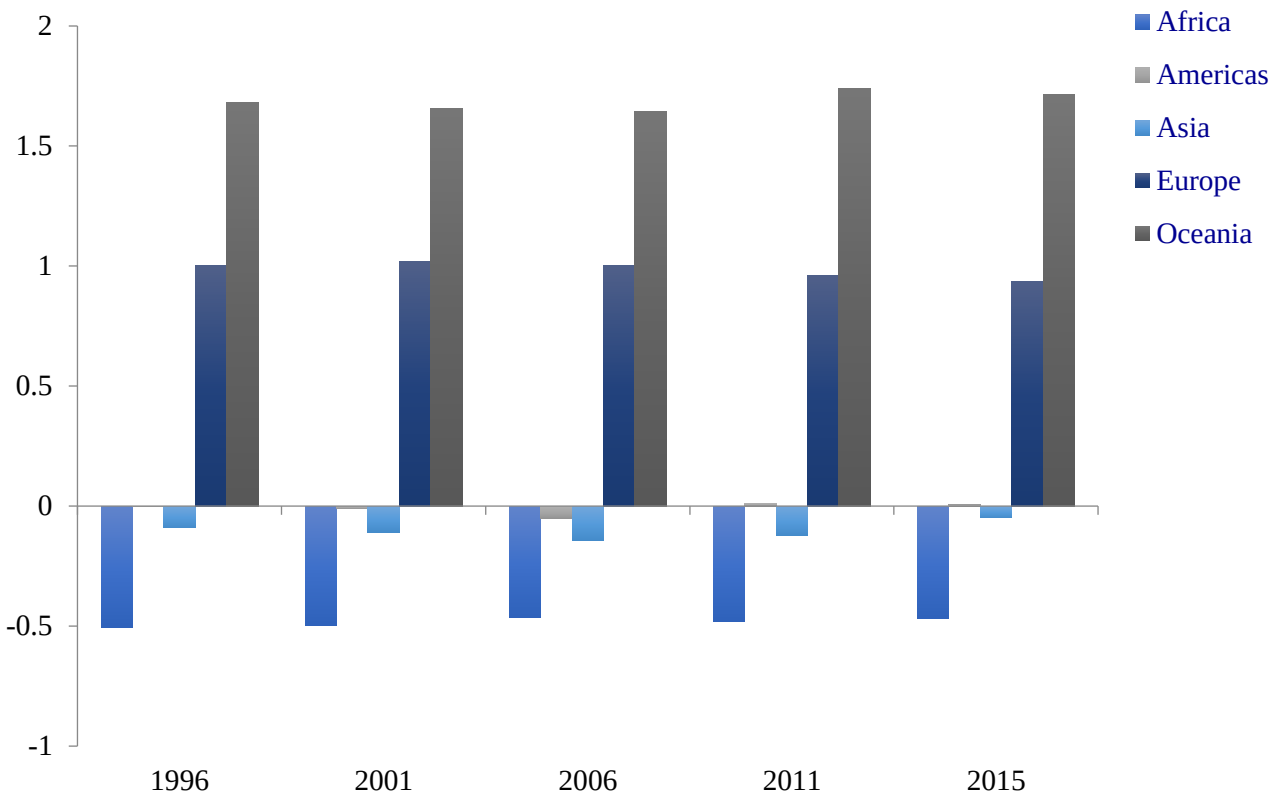
[3] Anocracy, is characterized by institutions and political elites that are far less capable of performing fundamental tasks and ensuring their own continuity, http://www.systemicpeace.org/vlibrary/GlobalReport2017.pdf.

Figure 2.7: Polity IV



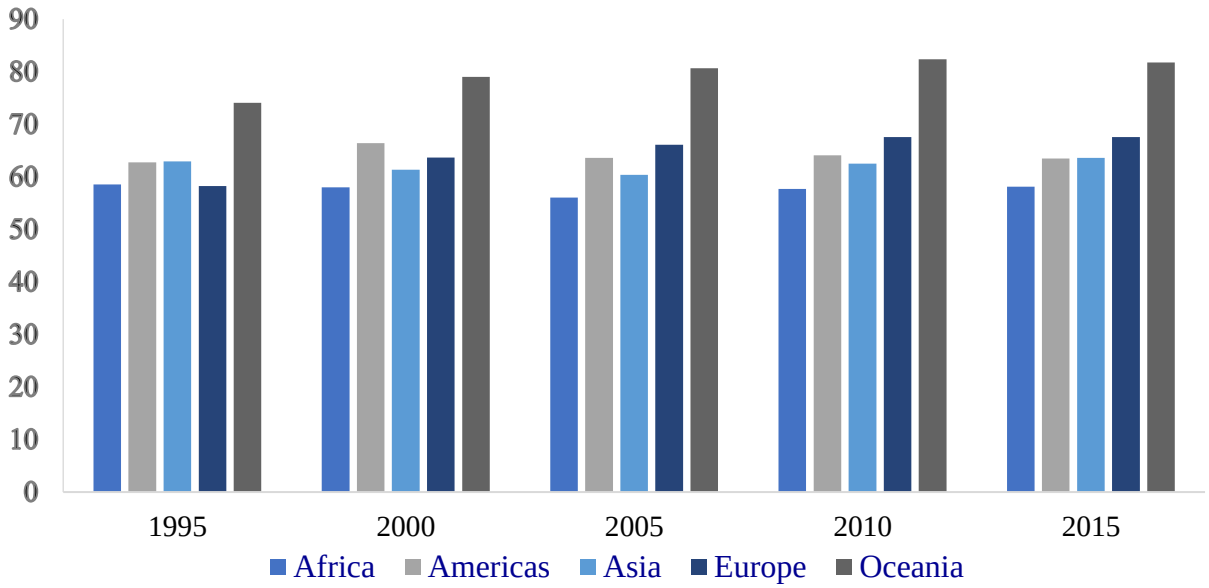
Another source of data widely used by researchers is the worldwide governance indicators (WGI – Figure 2.8). WGI report both individual and aggregate governance indicators from 1996 until 2015 (at the moment that this paper is written it has been announced that 2016 will soon be released) for over 200 countries. The way that authority in a country is exercised via its traditions and institutions is what defines governance. To measure it in every country, the following six dimensions, that are informed by 30 underlying sources are used: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality rule of law and control of corruption. In this paper, we use all six indicators, individually, as an average and as a principal component.

Figure 2.8: World Governance Indicator (average)



The last index that we use to as an independent variable is the economic freedom index (Figure 2.9). The Index has been created by the Heritage Foundation and the Wall street Journal yearly since 1995. It reports the relationship between economic freedom and various other positive economic and social goals in 186 countries. It is measured based on twelve freedoms that form four categories: the rule of law, government size, regulatory efficiency and open markets. The index gets a score of a maximum 100 that is calculated by averaging the score that is given to the twelve freedoms. It is available from the Heritage Foundation web site.

Figure 2.9: Economic Freedom Index



2.4. Empirical Model

The dependent variable, as mentioned in the previous section, is sovereign defaults. The values that it takes is 1 in case of a reported default in a country and 0 otherwise. Since we are dealing with a binary variable, the most appropriate model to use is either a probit or a logit. The advantage of these two models compared to a simple linear OLS model is that they produce an S-shaped curve that respects the dependent variable boundaries of 0 and 1. The difference between them two is the assumption on the distribution of errors. Logit assumes that distribution is logistic whilst the probit that it is a standard normal distribution.

As we have a panel dataset we need to account for any country specific effects leading us to use fixed effects (fe) model rather than random effects (re). To make sure that this is the best approach, we run a Hausman test which confirms that fe is the model we need to use. Debt and current account balance have been lagged one year as their impact is more likely to be visible a year after.

In this paper we perform both probit and logit analysis in our sample. The intention is to better understand if and how both sets of variables affect the independent one. To begin with, in the tests that we perform we include only macroeconomic variables ((eq 2.1))

$$y_i = \beta_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \varepsilon_i \quad \text{(eq 2.1)}$$

where $\mathcal{Y}_i$ sovereign defaults, d_i debt to GDP ratio ,v_i GDP growth volatility, g_i general government balance , $c_i$current account balance

Then we run all the regressions again with more than one macroeconomic variables but only one political variable at the time((eq 2.2) (eq 2.3) (eq 2.4) (eq 2.5)).

$$\mathcal{Y}_i = \beta_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_w w_i + \varepsilon_i \quad \text{(eq 2.2)}$$

$$\mathcal{Y}_i = \beta_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_z z_i + \varepsilon_i \quad \text{(eq 2.3)}$$

$$\mathcal{Y}_i = \beta_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_p\, p_i + \varepsilon_i \quad \text{(eq 2.4)}$$

$$\mathcal{Y}_i = \beta_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_f\, f_i + \varepsilon_i \quad \text{(eq 2.5)}$$

where $\mathcal{Y}_i$ sovereign defaults, d_i debt to GDP ratio ,v_i GDP growth volatility, g_i general government balance , $c_i$current account balance and w_i world governance indicators (eq 2.2), z_i is the international country risk guide (ICRG) (eq 2.3), p_i democracy as in polity IV (eq 2.4), f_i economic freedom (eq 2.5)

Finally, we add in the both sets of regressions the overall outflow restriction variable, once with only economic variables (eq 2.6) and then with one political variable at the time (eq 2.7), (eq 2.8), (eq 2.9),(eq 2.10) as above. All the regressions are firstly run with the fixed effects logit model and then the probit.

$$\mathcal{Y}_i = \beta_i + \beta_k\, k_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \varepsilon_i \quad \text{(eq 2.6)}$$

$$\mathcal{Y}_i = \beta_i + \beta_k\, k_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_w w_i + \varepsilon_i \quad \text{(eq 2.7)}$$

$$\mathcal{Y}_i = \beta_i + \beta_k\, k_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_z z_i + \varepsilon_i \quad \text{(eq 2.8)}$$

$$\mathcal{Y}_i = \beta_i + \beta_k\, k_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_p\, p_i + \varepsilon_i \quad \text{(eq 2.9)}$$

$$\mathcal{Y}_i = \beta_i + \beta_k\, k_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_f\, f_i + \varepsilon_i \quad \text{(eq 2.10)}$$

where $\mathcal{Y}_i$ sovereign defaults, k_i capital restriction outflow index, d_i debt to GDP ratio, v_i GDP growth volatility, g_i general government balance , $c_i$current account balance and w_i world governance indicators (eq 2.7), z_i is the international country risk guide (ICRG) (eq 2.8), p_i democracy as in polity IV (eq 2.9), f_i economic freedom (eq 2.10)

2.4.1 Interaction Term

To expand and enhance the results we have decided to include an interaction term. Its introduction in the regression will help in a better understanding of the explanatory variables and its effects on the dependent one. The interaction term is simply the product of two explanatory variables and its interpretation is the effect of one explanatory variable for different values of another explanatory variable. The interaction terms included in our regression is the product of one political variable with one political at a time, resulting in twenty regressions run. One example below is equation (eq 2.11).

$$\mathcal{Y}_i = \beta_i + \beta_k\, k_i + \beta_d\, d_i + \beta_v\, v_i + \beta_g\, g_i + \beta_c\, c_i + \beta_w w_i + \beta_{wd} w_i * d_i + \varepsilon_i \quad \text{(eq 2.11)}$$

where $\mathcal{Y}_i$ sovereign defaults, k_i capital restriction outflow index, d_i debt to GDP ratio, v_i GDP growth volatility, g_i general government balance, $c_i$current account balance, w_i world governance indicators and $w_i * d_i$ the interaction term of world governance indicators with the debt to GDP ratio

Needless to say that the main effects are still thought the coefficients of the main variables. At this stage, a couple of things should be noted before demonstrating the results that will help us understand them better. Firstly, there are cases where the significance or the coefficients of the variables that form the interaction term give very different results to the main regression. The reason behind it is likely to be that when the term is included, the coefficient for the variable demonstrates its effect when the other variable of the term is zero also called the conditional effect. However, in a regression without an interaction term it shows its connection with the dependent averaged over all the levels of the rest explanatory variables. Secondly, apart from the coefficients the constant can also change. The change stems from the fact that the variables now are centered at the mean compared to before when they were uncentered.

2.5. Estimation Results

2.5.1 Regression Analysis Results

In this section we will present the estimation analysis results. We will start by presenting and discussing the logit results with only the macroeconomic variables, then the ones with one

political variable at a time but excluding the overall outflow restriction index and then the set of results when it is included.

The analysis begins by examining the impact of the general government balance to GDP ratio, the GDP volatility, the one-year lagged debt to GDP ratio and the one-year lagged current account balance as a percentage to GDP. All the variables are positive and significant at the 1 per cent level apart from the lagged current account balance that does not have any effect on the dependent variable. What the results indicate is that when debt, fiscal deficits and GDP volatility increase the probability of sovereign default increases. This is what we expected as deteriorated macroeconomic variables can result in a country's inability to repay its debts and could lead in a default. However, we felt that maybe the effect of the current account balance result it is visible on the same year. So we re-run the regression but this time with the variable not lagged. The results remain the same as before (Table 2.1).

The next step is to try and understand the effect of political variables on the defaults. As explained above, one political variable at a time will be used in conjunction with the macroeconomic variables. A brief reminder of the variables that we use at this point will be useful: PolityIV as a measure of democracy, the rule of law, the overall economic freedom index and finally the International Country Risk Guide index (ICRG). Increase in debt and GDP volatility in all four cases increases the sovereign default probability whilst current account balance (lagged or no) is insignificant. When it comes to the fiscal balance to GDP ratio the results are not very consistent. The fiscal balance as a percentage of GDP when the level of democracy and the ICRG are included, result in a significant and positive effect but once overall economic freedom and the average of WGI are introduced it becomes insignificant. The political variables in all cases are significant and negative. Meaning that the higher is the level of democracy, the economic freedom, the WGI and the higher the political stability (higher ICRG) the lower the risk for a sovereign to default (Table 2.1).

Table 2.1: Logit Regression results

Sovereign Defaults	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Debt to GDP ratio (lagged)	0.0010 (0.0002)***	0.0009 (0.0002)***	0.0010 (0.0002)***	0.0009 (0.0002)***	0.0011 (0.0002)***
GDP Growth Volatility	0.0037 (0.0038)***	0.0036 (0.0009)***	0.0034 (0.0007)***	0.0046 (0.0010)***	0.0029 (0.0008)***
General Gov Balance	0.0006 (0.0006)***	-0.0001 (0.0002)	0.0005 (0.0001)***	-0.0001 (0.0002)	0.0004 (0.0001)***
Current account (lagged)	0.00015 (0.0002)	-0.0002 (0.0002)	0.0002 (0.0002)	0.0000 (0.0003)	0.0003 (0.0002)
WGI		-3.1446 (0.8073)***			
Polity IV			-0.1270 (0.0311)***		
Economic Freedom				-0.0800 (0.0251)***	
ICRG					-0.0881 (0.0145)***
Number of countries	45	38	45	45	86
Number of observations	1177	681	1117	648	2146

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

In the regression we also add the overall outflow restriction index. The index has a significant positive effect on defaults, similar to debt to GDP ratio and GDP growth volatility. The current account balances, both lagged and current, are insignificant. Compared to before though the introduction of the restriction index changes the government balance to become insignificant.

We then add the political variables and re run the model. The outflow restriction index is positively significant when we include ICRG, polity and rule of law; only at the 10% significance level in the latter. It is insignificant however when the overall economic index is included. Debt to GDP ratio, GDP growth volatility and current account (current or lagged) balance as a percentage of GDP behave the same as before; the first two increase the probability of a sovereign to default whereas the third has no effect. The last one when it comes to the economic explanatory variables is the fiscal balance as a percentage of GDP which is found

insignificant in all cases. Lastly, all the political variables apart from the level of democracy have negative significant effects on defaults (Table 2.2).

Table 2.2: Logit regression results including capital restriction outflows

Sovereign Defaults	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Kao Index	2.4380 (0.7811)***	1.6923 (0.9226)*	2.1830 (0.7389) ***	1.0693 (0.8011)	1.720 (0.7987) **
Debt to GDP ratio (lagged)	0.0010 (0.0010)***	0.0010 (0.0002)***	0.0010 (0.0002)***	0.0009 (0.0002)***	0.0012 (0.0002) ***
GDP Growth Volatility	0.0029 (0.0029)***	0.0032 (0.0010)***	0.0033 (0.0008)***	0.0046 (0.0010)***	0.0029 (0.0010) ***
General Gov Balance	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.000 (0.0002)
Current account (lagged)	0.0001 (0.0002)	-0.0001 (0.0003)	0.0000 (0.0002)	-0.0000 (0.0002)	0.0003 (0.0003)
WGI		-2.4913 (0.8959) ***			
Polity IV			-0.0426 (0.0477)		
Economic Freedom				-0.0649 (0.0273) **	
ICRG					-0.0406 (0.0136) ***
Number of countries	39	38	39	35	32
Number of observations	734	681	734	648	575

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

All the results that were reported above seem to have similarities. Debt to GDP ratio and GDP growth volatility were always found to be positively significant something that we have expected, whereas the current account balance, either current or lagged, did not have any effect on the defaults whatsoever. The general government balance as a percentage of GDP gives very inconsistent results. It is positive and significant in the cases where in the regression we have only the macroeconomic indicators and in the ones where polity and ICRG are included. In all other cases, both including the outflow restrictions or not is insignificant. To continue, when the overall outflow restrictions index increases, the probability of sovereign default increases every time except for the time that in the regression the overall economic freedom

index is included. In that case the explanatory variable becomes insignificant. Finally, all the political indicators have a negative impact on sovereign defaults apart from the level of democracy that loses its significance when the overall outflow restriction index is included.

In order to deal with multi-colinearity problems between the World Governance Indicators we use the Principal Components Analysis (PCA)[4]. PCA can be used to reduce the dimension of a data set and extract the significant information from the table. In Table 2.3 we have computed the new variables, namely principal components, which are the linear combinations of the original variables and we-re run the logit regression.

[4] The principal component analysis is performed using STATA.

Table 2.3: Logit regression results including principal component

Sovereign Defaults	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Debt to GDP ratio (lagged)	0.0009 (0.0000)***	0.0010 (0.0002)***	0.0009 (0.0002)***	0.0009 (0.0002)***	0.0009 (0.0002)***	0.00088 (0.0002)***	0.0009 (0.0002)***	0.0009 (0.0002) ***
GDP Growth Volatility	0.0039 (0.0009)***	0.0037 (0.0009)***	0.0033 (0.0010)***	0.0040 (0.0009)***	0.0037 (0.0009)***	0.0041 (0.0009)***	0.0036 (0.0009)***	0.0036 (0.0010)***
General Gov Balance	-0.0001 (0.0002) ***	-0.0001 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
Current account lagged	0.0001 (0.0002)	-0.0010 (0.0002)	-0.0000 (0.0002)	-0.0002 (0.0002)	-0.0000 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)
Voice and Accountability	-1.2831 (0.4872) **							
Political Stability		-0.8304 (0.3193) **						
Government Effectiveness			-1.7877 (0.7319) **					
Regulatory				-1.4636 (0.4872) ***				
Control of Corruption					-1.1285 (0.6146)*			
Rule of Law						-2.1057 (0.6439)***		
Avg WGI							-3.1446 (0.8073)***	
PCA								-1.2651 (0.3227)***
Number of countries	38	38	38	38	38	38	38	38
Number of observations	681	681	681	681	681	681	681	681

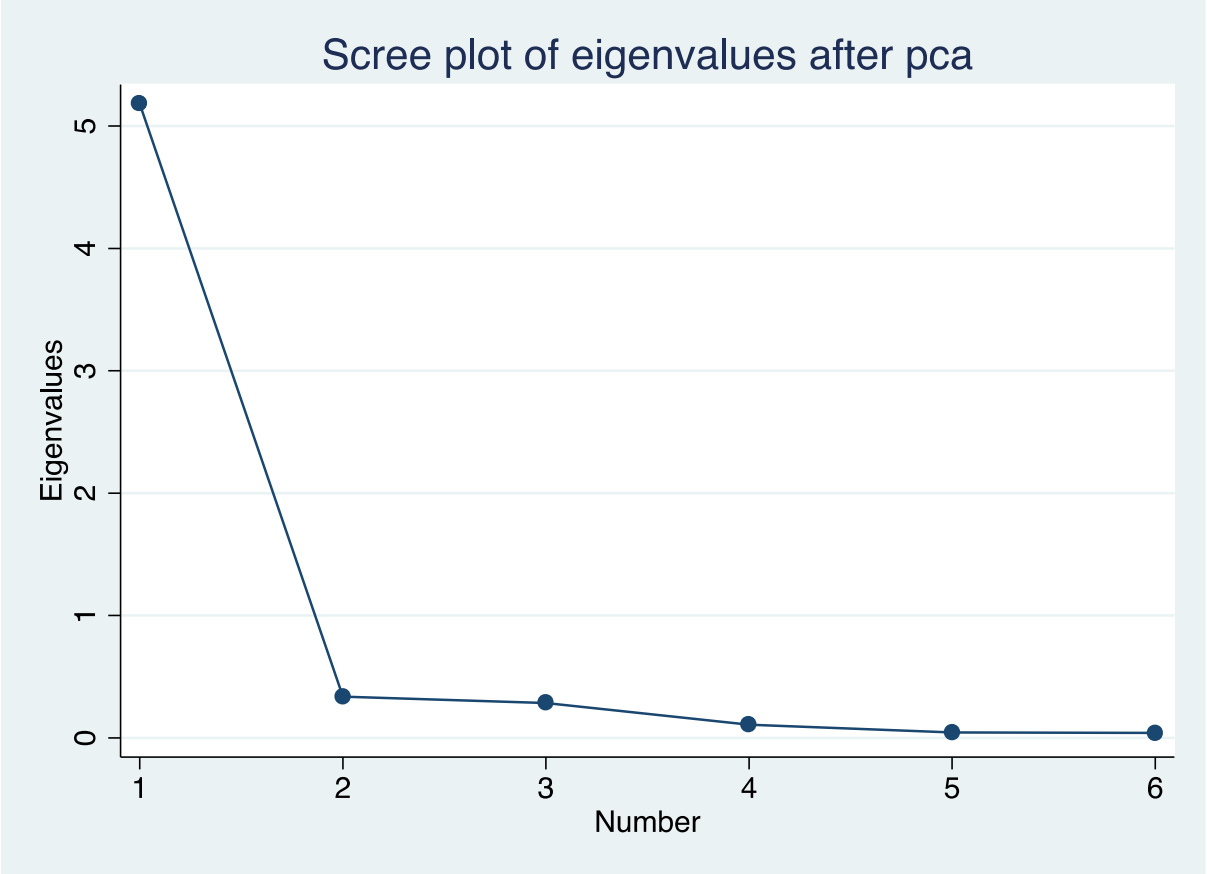
Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

As we can observe from Table 2.4 the Component (1) explains 86.38 per cent of the total variance. Moreover, the scree plot of the eigenvalue suggests that Component (1) is higher than 1. Therefore, we choose to retain Component 1 in our analysis. In Figure 2.10 the scree plot of Eigenvalues after the PCA as an output of Stata is represented.

Table 2.4: PCA

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.1825	4.84471	0.8638	0.8638
Comp2	0.337797	0.052224	0.0563	0.9201
Comp3	0.285573	0.177195	0.0476	0.9676
Comp4	0.108378	0.0629611	0.0181	0.9857
Comp5	0.0454165	0.00508507	0.0076	0.9933
Comp6	0.0403314	.	0.0067	1

Figure 2.10: Eigenvalues after PCA (STATA output)



2.5.2 Robustness

The robustness of the results is an important issue. To ensure that the results are robust, we run the same regression using the probit model now instead of the logit and we also introduce the interaction terms, as was discussed in the methodology section. Finally, using a three year moving average for debt, we run the logit regression again to examine whether the results will change.

2.5.2.1 Probit

Using the same variables and running exactly the same regressions as above we find that the results do not differ from before. The only change that we can report is that the overall outflow restrictions from a 10% significance level become insignificant when the WGI is included. (Tables 2.5 and 2.6).

Table 2.5: Probit Regression Results

Sovereign Defaults	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Debt to GDP ratio (lagged)	0.0006 (0.0001)***	0.0005 (0.0001)***	0.0006 (0.0001)***	0.0005 (0.0001) ***	0.0006 (0.0001)***
GDP Growth Volatility	0.0022 (0.0004)**	0.0018 (0.0005) ***	0.0020 (0.0004)***	0.0027 (0.0005)***	0.0017 (0.0005)***
General Gov Balance	0.0003 (0.0001)***	-0.0001 (0.0001)	0.0003 (0.0001)***	-0.0001 (0.0001)	0.0002 (0.0001)***
Current account (lagged)	0.0001 (0.0001)	-0.0001 (0.0001)	0.0001 (0.0001)	-0.0001 (0.0001)	0.0001 (0.0001)
WGI		-2.2444 (0.2456)***			
Polity IV			-0.0748 (0.0162)***		
Economic Freedom				-0.0664 (0.0139)***	
ICRG					-0.0534701 (0.0072)***
Number of countries	99	98	95	93	86
Number of observations	2559	1743	2479	1707	2146

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

Table 2.6: Probit regression results including capital outflows

Sovereign Defaults	(1)	(2)	(3)	(4)	(5)
Kao Index	1.3073	0.4685	1.2670	0.5143	0.9836
	(0.3712)***	(0.3805)	(0.3687)***	(0.3976)	(0.4021)***
Debt to GDP ratio	0.0005	0.0004	0.0005	0.0005	0.0007
(lagged)	(0.0001)***	(0.0001)***	(0.0001)***	(0.0001)***	(0.0001)***
GDP Growth	0.0020	0.0019	0.0019	0.0026	0.0016
Volatility	(0.0005)***	(0.0005)***	(0.0005)***	(0.0005)***	(0.0006)***
General Gov	-0.0001	-0.0001	-0.0001	-0.0001	-0.0000
Balance	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Current account	-0.0001	-0.0001	0.0001	-0.0001	0.0002
(lagged)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
WGI		-2.1465			
		(0.2662)***			
Polity IV			-0.0297		
			(0.0237)		
Economic Freedom				-0.0584	
				(0.0149)**	
ICRG					-0.0325
					(0.0001)***
Number of countries	98	98	94	93	85
Number of observations	1830	1743	1768	1707	1504

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

2.5.2.2 Interaction Term Results

To understand better the effect of the political explanatory variables to sovereign defaults we introduced the interaction term. The interaction terms are formed using one of the economic variables, apart from the current account balance that is always insignificant, along with one political indicator at a time. We then run all the regressions again and discuss the results below. Before we move to the presentation of the results it is worth reminding that from the tests above we find that, all the political variables had a negative effect whereas all the economic variables a positive effect on sovereign defaults.

The first term created contains the overall economic freedom index. When it interacts with the GDP volatility and the fiscal balance, is negative, but when with the debt is insignificant. This means that the political variables have a stronger effect on defaults than GDP volatility and government balance but not stronger than debt. The World Governance Indicators and the economic stability (ICRG) generate very similar results. Both their impact is stronger, when interacting with the GDP volatility, as the term has a negative sign, but not with debt and government balance where it is insignificant. Finally, the effect of the level of democracy is lower than debt, as we find the term to be positive and no effect with the rest. The same procedure as above was followed again with the addition of the overall outflow restrictions. What we find is that only the overall economic freedom index has a stronger effect compared to overall outflow and all the rest are insignificant. In Table 2.7 the combination of the columns with each row represent the interaction terms.

Table 2.7: Logit interaction term results

Sovereign Defaults	**WGI**	**Polity IV**	**Overall Economic Freedom**	**ICRG**
Debt to GDP ratio (lagged)	0.0001 (0.0002)	0.0005 (0.0002) **	-0.1239 (0.0375) ***	0.0004 (0.0001)
GDP Growth Volatility	-0.0035 (0.0015)**	-0.0005 (0.0001)	-0.0053 (0.0414)	-0.0001 (0.0006) **
General Gov Balance	-0.0001 (0.0002)	0.0002 (0.0001)	-0.0299 (0.0332)	-0.0001 (0.0001)
Current account (lagged)	0.0006 (0.0003) *	0.0009 (0.0001)	-0.134 (0.0346)****	-0.0001 (0.0001)
Kao Index	0.5736 (1.2449)	0.1371 (0.1054)	-0.1136 (0.0664)*	0.0173 (0.0425)

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

2.5.2.3 Three-year Moving Average on Debt

Finally, we test how the variables behave when instead of using one year debt lagged, we use its three year moving average. Tables 2.8 and 2.9 depict the results of the logit regression when excluding and including the outflow restriction index respectively.

Table 2.8: Logit using a three year moving average on debt

Sovereign Defaults	**(1)**	**(2)**	**(3)**	**(4)**
3 years moving average	0.0679	0.0377	0.0660	0.0356
Debt to GDP ratio	(0.0099)***	(0.0049)***	(0.0097)***	(0.0054)***
GDP Growth Volatility	0.0022	0.0020	0.0027	0.0018
	(0.0010)**	(0.0007)***	(0.0012)***	(0.0009)**
General Gov Balance	-0.0002	0.0004***	-0.0002	0.0002
	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Current account lagged	-0.0003	0.0001	-0.0002	0 .0003
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
WGI	-1.2831			
	(0.8374)**			
Polity IV		-0.1131		
		(0.0323)***		
Economic Freedom			-0.0342	
			(0.0253)	
ICRG				-0.0906
				(0.0142)***
Number of countries	38	45	35	37
Number of observations	720	1233	685	956

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

What we can observe from the table above is that the results are the same as before with the debt having a positive significant impact on defaults whereas all the political variables a negative, with the only exception of the index of overall economic freedom.

Table 2.9: Logit using a three year moving average on debt including kao

Sovereign Defaults	**(1)**	**(2)**	**(3)**	**(4)**
Kao Index	0.8206	1.0767	0.2765	0.5346
	(0.9372)	(0.8019)	(0.9179)	(0.9304)
3 years moving average	0.0670	0.0602	0.0658	0.0693
Debt to GDP ratio	(0.0099) ***	(0.0087) ***	(0.0097) ***	(0.0109)***
GDP Growth Volatility	0.0023	0.0018	0.0027	0.0012
	(0.0010) **	(0.0009) *	(0.0010)***	(0.0011)
General Gov Balance	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Current account lagged	-0.0003	-0.0001	-0.0002	0.0003
	(0.0002)	(0.0002)	(0.0002)	(0.0003)
WGI	-1.8285			
	(0.8602)**			
Polity IV		-0.0403		
		(0.0489)		
Economic Freedom			-0.0342	
			(0.0279)	
ICRG				-0.0342
				(0.0128)***
Number of countries	38	39	35	32
Number of observations	720	776	685	576

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

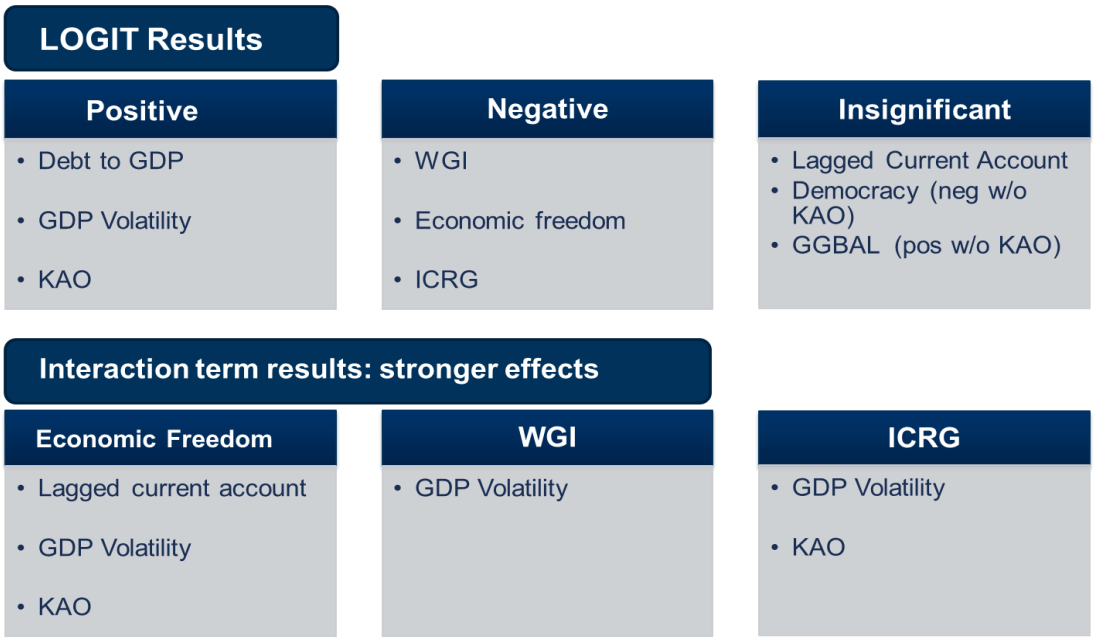
However, the introduction of the three year moving average on debt, instead of the lagged debt seems to weaken the impact of the capital restriction outflow index where it becomes insignificant. On the political indices side, the only change compared to before is the economic freedom which again becomes insignificant.

2.6. Conclusions

The purpose of our empirical investigation is to analyse the determinants of the sovereign defaults. We employ a panel of 99 countries using annual data over the period 1985 – 2015. Our analysis is based on the Bank's Credit Rating Assessment Group (CRAG) default's database constructed by the Bank of Canada. This paper contributes to the literature not only by examining the impact of both macroeconomic and political indicators on the sovereign defaults, but emphasizing on the quality of the political institutions and the capital controls.

Our results (figure 2.11) indicate that the sustainability of a government's debt is a fundamental consideration in sovereign risk analysis. Higher debt ratio might be interpreted by the market participants as a warning signal about the country's future ability to repay its debts. The default risk is also positively affected by the fiscal imbalances. We show that higher fiscal deficits are associated with increased likelihood of default. We also incorporate the real GDP growth volatility in our analysis and provide evidence that increased output volatility weakens the government ability to repay its outstanding debt obligations. As a measure of country's external solvency and its ability to generate foreign revenues, we introduced in our empirical analysis the current account balance as a percentage of GDP. The results indicate an insignificant relationship between the current account and the incidence of sovereign defaults. We can argue that the current account imbalances (deficits) do not necessarily imply higher risk, as well-managed countries run current account deficits in cases of a country's expansion.

Figure 2.11: Summary of findings



However, we believe that sound macroeconomic fundamentals are not the only factors to assess a country's credit worthiness. Therefore, four different political indicators are included to investigate the effect of political risk on sovereign defaults. We use the International Country Risk Index, the Polity IV, the rule of law and the economic freedom index. We find that these are all significant in explaining the probability of sovereign defaults. This is consistent with the results of Yu (2016) and Hatchondo et al. (2007) who also conclude that the political stability, as measured by higher level of democracy and freedom, together with consistent political regime lowers the probability of default.

Another contribution of our research is that we incorporate in our analysis a new dataset of capital control restrictions on outflows constructed by Fernandez et al. (2015). This dataset includes an extended sample of countries, years and asset categories on both capital controls on inflows and outflows. We find evidence that the capital controls outflows index is positively associated with the sovereign defaults with the macroeconomic fundaments remaining statistically significant. This is in contrast with Moody's Investor Services (2008) survey on Sovereign defaults and Interference, which finds that deposit freezes occurred outside of government defaults and therefore the relation between deposit controls with sovereign defaults is not perfect. Further work could explore in more depth the association between the capital control restrictions and the sovereign defaults.

Appendix 2.1

Table 2.10: Countries in the sample

Countries			
Algeria	Ethiopia	Malaysia	South Africa
Angola	Finland	Malta	Spain
Argentina	France	Mauritius	Sri Lanka
Australia	Georgia	Mexico	Swaziland
Austria	Germany	Moldova	Sweden
Bahrain	Ghana	Morocco	Switzerland
Bangladesh	Greece	Myanmar	Tanzania
Belgium	Guatemala	Netherlands	Thailand
Bolivia	Hong Kong SAR	New Zealand	Togo
Brazil	Hungary	Nicaragua	Tunisia
Brunei Darussalam	Iceland	Nigeria	Turkey
Bulgaria	India	Norway	Uganda
Burkina Faso	Indonesia	Oman	Ukraine
Canada	Islamic Republic of Iran	Pakistan	United Arab Emirates
Chile	Ireland	Panama	United Kingdom
China	Israel	Paraguay	United States
Colombia	Italy	Peru	Uruguay
Costa Rica	Jamaica	Philippines	Uzbekistan
Cote d'Ivoire	Japan	Poland	Venezuela
Cyprus	Kazakhstan	Portugal	Vietnam
Czech Republic	Kenya	Qatar	Zambia
Denmark	Korea	Romania	
Dominican Republic	Kuwait	Russia	
Ecuador	Kyrgyz Republic	Saudi Arabia	
Egypt	Latvia	Singapore	
El Salvador	Lebanon	Slovenia	

Table 2.11: Defaulted countries per year

Countries	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15
Algeria						x	x	x	x	x	x	x	x	x														x			
Angola					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Argentina	x	x	x	x	x	x	x	x	x								x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Bangladesh	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	
Bolivia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
Brazil	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x				x	x	x	x	x	x	x		
Bulgaria					x	x	x	x	x	x	x	x	x	x	x	x	x	x		x											
Burkina Faso	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Chile	x	x	x	x	x	x																									
Colombia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x												
Costa Rica	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
Cote d'Ivoire	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Cyprus																													x		
Dominican Republic	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
Ecuador	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Egypt	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
El Salvador	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																
Ethiopia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Georgia								x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Ghana	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Greece																												x	x		
Guatemala	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								x		
Hungary																									x						
India								x	x																						
Indonesia	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x										
Ireland																													x		
Islamic Republic of Iran	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x												x	x	x		

Jamaica	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Kazakhstan									x	x	x			x	x															
Kenya	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Korea	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Kuwait						x	x																							
Kyrgyz Republic									x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Lebanon	x	x	x	x	x	x	x	x	x	x	x																			
Mauritius				x		x	x	x	x	x	x	x															x	x	x	
Mexico	x	x	x	x	x	x																								
Moldova									x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Morocco	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
Myanmar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Nicaragua	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Nigeria	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								x	x	
Pakistan					x	x	x	x						x	x		x													
Panama	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x													
Paraguay	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Peru	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
Philippines	x	x	x	x	x	x	x	x		x				x	x	x	x	x	x		x	x	x	x						
Poland	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x												
Portugal																												x		
Romania		x											x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Russia						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
Slovenia								x	x	x	x	x																		
South Africa	x	x	x		x				x																					
Sri Lanka				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x							x	x	
Swaziland		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Tanzania	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Thailand																								x	x	x	x	x		
Togo	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Tunisia	x	x	x		x	x	x	x	x	x	x																	x		
Uganda	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Ukraine								x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Uruguay	x	x		x		x	x												x											

Uzbekistan														x	x	x	x	x	x	x	x		x	x	x	x	x				
Venezuela	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Vietnam	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x		x					
Zambia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Chapter 3 Impact of IMF Assistance on Economic Growth Revisited

Abstract

We investigate the effect of IMF assistance on economic growth in a broad panel of countries. We argue that countries are likely self-select into seeking IMF involvement based on their economic performance. We control for such endogeneity by means of instrumental variables. Our findings indicate that the contemporaneous effect of the IMF involvement is insignificant while the lagged effect is positive. The 2SLS effect is larger than the OLS one, indicating that the latter is downward biased.

3.1. Introduction

The International Monetary Fund (IMF) was set up in 1944 with the aim to promote economic and monetary stability and foster economic growth around the world. Since then, the IMF provided financial assistance to numerous developing and developed countries, including, recently, a number of peripheral European countries such as Hungary, Greece and Portugal. The economic effects of IMF assistance have been the subject of an on-going and greatly controversial debate. The findings are rather disappointing: the research available so far suggests that the effect on growth has been insignificant and may even have been negative.

In theory, the IMF intervention should improve economic growth both directly and indirectly, for a number of reasons. First, the IMF gives policy advice at the times of crises. Following that advice should help improve the economic climate and thus foster growth in the future. Second, IMF loans frequently have strict conditions attached to them, such as changing the execution of monetary policy or implementing fiscal austerity. The disbursement of IMF loans only takes place if the recipient country adheres to the conditions. Following IMF's advice and accepting the conditionality should have similar effects: improved policy making, if credible, is seen by consumers as indicative of a lower tax burden and higher growth in the future, which leads them to increase their consumption, thus fuelling growth.[5] Finally, the money that is disbursed helps relax financial constraints that the countries face and should stimulate their economies. In particular, as the recent EMU crisis illustrates rather well, in the absence of external financial assistance, crisis-stricken countries would face prohibitively high interest rates.

The literature also highlights possible indirect channels: moral hazard (Vaubel 1983) and the Dutch Disease (Paldam, 1997; Doucouliagos and Paldam, 2009). The moral hazard argument rests on the fact that being able to apply for assistance from the IMF (and other similar institutions) is similar to insurance. This can give the countries in question incentive to engage in risky or unsound policies. The Dutch Disease hypothesis, in turn, points out that countries with large inflows of foreign currency may experience a pressure on their currency to appreciate, which in turn undermines the competitiveness of their manufacturing firms at

[5] Giavazzi and Pagano (1990 and 1995) argue, for example, that fiscal austerity can stimulate growth in the short term. They argue that Denmark and Ireland in the 1980s both experienced improved growth performance immediately after fiscal reforms.

international markets. Hence, while the direct channels stipulate a positive effect of IMF assistance, the indirect channels are associated with a negative impact.

An additional issue is that of endogeneity: the countries requesting assistance from the IMF may be already facing imminent economic difficulties at the time they submit their request. Alternatively, out of the countries that apply for financial aid from the IMF, those that receive support tend to be in worse economic situation that those that do not, or the former receive more substantial assistance. The negative or insignificant relationship between IMF assistance and economic growth therefore then can be due to such an endogeneity bias.

Besides endogeneity, another problem with much of the past analytical literature on the IMF involvement and its effect is that it typically only considers how such involvement affects contemporaneous economic performance. If the IMF fosters growth, the positive effect of its assistance may appear only with a lag (Clemens et al., 2012, make a similar point about the effectiveness of developmental aid).

In this paper, we revisit the effect of IMF loans while taking account of the aforementioned criticisms of the previous literature: endogeneity bias and the delay between IMF assistance and its economic effect. To account for endogeneity, we use instrumental variables. Finding suitable instruments, however, is difficult. In particular the instruments need to possess sufficient explanatory power when it comes to explaining the probability (or size) of IMF assistance without being themselves correlated with growth to allow the analyst to exclude them from the main (second-stage) regression equation. Variables indicative of the economic hardship, such as the countries' indebtedness or interest rates that they are facing when borrowing, are good predictors of the probability that they will seek IMF assistance. However, the same economic hardship is likely to be responsible for the low economic growth that those countries experience at the time of seeing IMF help, or that they will be encountering in the near future. Therefore, we rely on non-economic instrumental variables. Specifically, we use the degree of democracy and the United Nations Security Council (UNSC) non-permanent membership. To account for the possibility that the effect of IFI assistance may not occur contemporaneously but with a delay, we allow the IMF loans to have a lagged effect on growth.

In the following section, we briefly discuss the literature on the economic effects of IMF assistance. We present our data and methodology in Section 3.4 and the results in Section 3.5 and Section 3.6 concludes.

3.2. IMF

As mentioned in the introduction, the IMF's purpose when founded was amongst other to promote economic growth and stability. It counts 189 country members from all over the world that work together towards that goal. Each of these countries is assigned a quota that is determined based on the country's GDP, openness, international reserves and economic variability which are measured in Special Drawing Rights (SDRs). the IMF's unit of account. The quotas are important as they determine the country's access to financing, voting power and subscription (this determines the maximum amount of financial resources that a country must provide to the fund), with United States having the highest one and Tuvalu the lowest. The SDR is a supplementary international reserve asset that was created in order to account for every country's official reserves. It is calculated as a basket of currencies that is reviewed every five years.

One of its fundamental responsibilities as IMF claims on its website is the provision of loans to its members that are experiencing balance of payments problems. It is worth mentioning that it does not provide loans for specific projects unlike the World Bank. To receive a loan a country must submit a letter of intent where it describes its plan for economic recovery and how it will repay the loan. The executive board of the fund then examines the letter and agrees with the country on the terms and conditions. The process after the provision of the loan has been agreed, is simple and as follows. The amount of the loan is made available under one of the various lending instruments that IMF has in its disposal. These instruments determine both the arrangement under which the loan is provided and the rules that are attached to it. However, and most importantly under every instrument is defined the specific percentage of the quota up to which the country can borrow. The choice of the instrument is made based on what specifically the country needs to address the problem. There are five facilities under which non-concessional loans are provided. In cases of low income countries that borrow money under the Poverty Reduction and Growth Trust (PRGT) concessional loans are offered; i.e. no interest rates is charged until the end of a specified period.

The five facilities are: the Stand-By Arrangements (SBA), Flexible Credit Line(FCL), Precautionary and Liquidity Line (PLL), Extended Fund Facility (EFF) and finally Rapid Financing Instrument (RFI). We will now briefly explain their characteristics and differences:

- SBA: Suitable for countries that face short term balance of payments problems. Its length is flexible but usually is between 1 to 2 years but no more than 3, with the repayment period ranging from 3.25 to 5 years. The amount of the loan can be up to 145% of the. country's quota for any one-year period and up to a cumulative 435% over the life of the program. Countries are monitored and have to reach certain pre-agreed goals. It is worth noting that the majority of non-concessional loans were given under SBA.
- FCL: Loans under this program are only given to countries with strong policies and economic fundamentals as well as track records of policy implementation. Its length is either one or two years. If two years there is an interim review after the first year to ensure that the qualifications are still met. The repayment period is 3.25 to 5 years. Unlike SBA, there is no access limit and no conditional to implementation of a specific strategy.
- PLL: It is addressed to countries that have sound economic fundamentals but do not meet the qualifications to receive a loan under FLL but at the same time do not need as many policy adjustments as the ones in SBA. The conditions attached to it are focused on "correcting" the country's vulnerabilities. Its duration is from 0.5 to 2 years. If 0.5 year then the amount that can be borrowed is up to 125% of the quota whereas longer programs have a limit of 250% with semi-annual reviews on the progress. Limits on both occasions can be doubled in very exceptional cases.
- EFF: It is for countries that require important economic reforms to address medium or long-term balance of payments problems. It usually longer that a SBA and the repayment period is 4.5 to 10 years. Similar to the SBA the amount of the loan can be up to 145% of the. country's quota for any one-year period and up to a cumulative 435% over the life of the program. The increase of the loans provided under EFF the lately features the economic situation of recent years.
- RFI: It is designed to offer quick financial assistance to countries that face an urgent balance of payments need. Its conditionality is limited and the country can borrow up to 37.5% of its quota annually and 75% cumulatively and the repayment period is 3.25 to 5 years.

Table 3.1 below depicts the loans that have been given by IMF under SBA from 2002 to 2009, measured in thousands of SDRs.

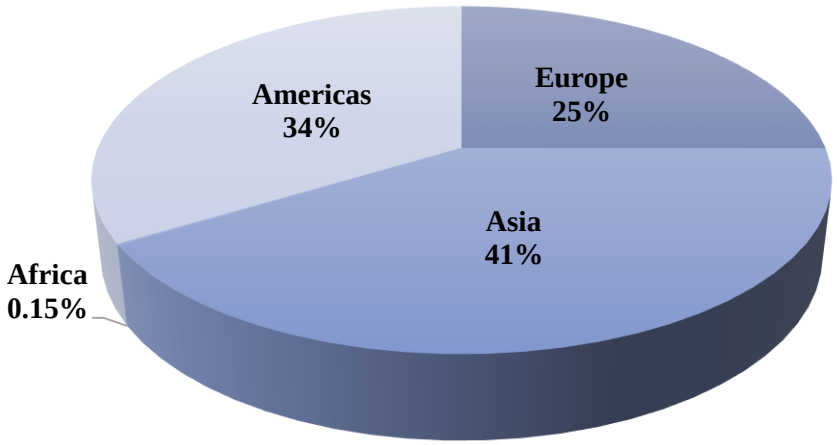
Table 3.1: IMF loans under SBA '02-'09 **Source: IMF**

Member	Date of Arrangement	Expiration	Total Amount Agreed	Undrawn Balance	IMF Credit Outstanding Under GRA
Stand-By Arrangements (SBA)					
Argentina	September 20, 2003	September 19, 2006	8,981,000	6,910,000	10,687,165
Belarus, Republic of	January 12, 2009	April 11, 2010	1,618,118	1,100,320	517,798
Bolivia	April 02, 2003	April 01, 2004	214,390	48,230	166,160
Bosnia and Herzegovina	August 02, 2002	February 29, 2004	67,600	12,000	88,305
Brazil	September 06, 2002	March 31, 2005	19,765,429	10,175,482	19056479
Bulgaria	February 27, 2002	February 26, 2004	340,000	152,000	1,557,858
Colombia	January 15, 2003	January 14, 2005	1,548,000	1,548,000	0
Croatia, Republic of	February 03, 2003	April 02, 2004	202,880	202,880	0
Dominican Republic	August 29, 2003	August 28, 2005	1,313,400	980,660	524,278
Ecuador	March 21, 2003	April 20, 2004	151,000	90,600	251,712
El Salvador	January 16, 2009	March 31, 2010	513,900	513,900	0
Gabon	May 28, 2004	June 30, 2005	146,590	104,926	78,333
Georgia	September 15, 2008	March 14, 2010	477,100	315,400	161,700
Guatemala	June 18, 2003	March 15, 2004	84,000	84,000	0
Honduras	April 07, 2008	March 30, 2009	38,850	38,850	0
Hungary	November 06, 2008	April 05, 2010	10,537,500	6,322,500	4,215,000
Iceland	November 19, 2008	November 18, 2010	1,400,000	840,000	560,000
Iraq	December 23, 2005	March 22, 2007	950,720	950,720	297,100
Jordan	July 03, 2002	July 02, 2004	85,280	74,620	279,302
Latvia, Republic of	December 23, 2008	March 22, 2011	1,521,626	986,282	535,344
Macedonia, former Yugoslav Republic of	April 30, 2003	June 15, 2004	71,675	49,175	52,119
Pakistan	November 24, 2008	October 23, 2010	5,168,500	3,101,100	2,070,559
Paraguay	December 15, 2003	March 31, 2005	145,000	145,000	0
Peru	February 01, 2002	February 29, 2004	714,647	714,647	173,875
Romania	July 07, 2004	July 06, 2006	250,000	250,000	285,354
Serbia, Republic of	January 16, 2009	April 15, 2010	350,775	350,775	0
Seychelles	November 14, 2008	November 13, 2010	17,600	11,440	6,160
Turkey	February 04, 2002	December 31, 2004	38,966,480	7,854,557	41,167,249
Ukraine	March 29, 2004	March 28, 2005	11,411,600	8,411,600	4,076,610
Uruguay	April 01, 2002	March 31, 2005	3,859,400	792,200	3,338,950

Total	**110,913,060**	**53,131,864**	**90,147,410**

Figure 3.1 below presents the amounts agreed under SBA the period 2002 to 2009 per continents.

Figure 3.1: SBA amounts agreed per continent '02-'09



It is worth briefly discussing the PRGT which is tailored made to suit to the needs of low income countries. As mentioned above it is concessional lending and funds are obtained by bilateral loan agreements at the market rate. The PRGT has three facilities, the Extended Credit Facility (ECF), the Standby Credit Facility (SCF) and the Rapid Credit Facility (RCF).

- ECF: It is a medium to long term engagement that is used to address protracted balance of payments problems.
- SCF: It used for short term actual or potential balance of payments caused by external for domestic shocks or policy slippages
- RCF: Unconditional single up-front payout for countries that are facing urgent balance of payment needs.

Table 3.2 below depicts the loans that have been given by IMF under PRGT from 2000 to 2008, measured in thousands of SDRs.

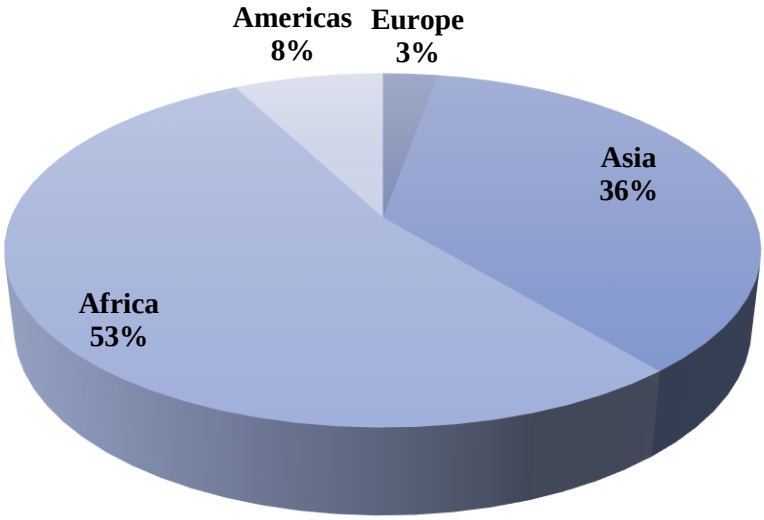
Table 3.2: IMF loans under PRGT '00-'08 **Source: IMF**

Member	Date of Arrangement	Expiration	Total Amount Agreed	Undrawn Balance	IMF Credit Outstanding Under GRA
Poverty Reduction and Growth Facility Trust					
Albania	June 21, 2002	June 20, 2005	73,046	33,741	231,172
Armenia, Republic of	May 23, 2001	May 22, 2004	147,200	56,530	557,044
Azerbaijan	July 06, 2001	March 31, 2005	148,030	51,480	207,696
Bangladesh	June 20, 2003	June 19, 2006	1,547,990	767,980	780,010
Benin	July 17, 2000	March 31, 2004	61,050	14,670	69483
Burkina Faso	June 11, 2003	June 10, 2006	102,340	58,772	230,541
Burundi	January 23, 2004	January 22, 2007	323,400	194,700	198,000
Cabo Verde	April 10, 2002	April 09, 2005	17,280	6,210	11070
Cameroon	December 21, 2000	December 20, 2004	167,130	63,690	445,125
Congo, Democratic Republic of	June 12, 2002	June 11, 2005	1,740,000	186,399	1,553,601
Cote d'Ivoire	March 29, 2002	March 28, 2005	585,360	468,280	486,528
Dominica	December 29, 2003	December 28, 2006	23,064	12,366	10,698
Ethiopia	March 22, 2001	July 31, 2004	100,277	20,858	105,835
Gambia, The	July 18, 2002	July 17, 2005	68,440	48,660	52,757
Ghana	May 09, 2003	May 08, 2006	553,500	316,350	627,434
Guinea	May 02, 2001	May 01, 2004	182,070	125,001	173,706
Guyana	September 20, 2002	March 19, 2006	163,650	98,610	137,630
Kenya	November 21, 2003	November 20, 2006	850,000	600,000	404,637
Kyrgyz Republic	December 06, 2001	December 05, 2004	240,040	90,060	704,497
Lao People's Democratic Republic	April 25, 2001	April 24, 2005	63,400	27,160	53,249
Lesotho	March 09, 2001	June 30, 2004	24,500	7,000	17,878
Madagascar	March 01, 2001	November 30, 2004	354,380	144,236	378,496
Malawi	December 21, 2000	December 20, 2004	211,670	110,004	213,793
Mauritania	July 18, 2003	July 17, 2006	54,740	30,610	91,115
Mongolia	September 28, 2001	July 31, 2005	56,980	32,560	61,854
Nepal	November 19, 2003	November 18, 2006	199,600	135,430	64,730
Nicaragua	December 13, 2002	December 12, 2005	442,000	246,570	442,698
Niger	December 22, 2000	June 30, 2004	167,770	49,800	265,314
Pakistan	December 06, 2001	December 05, 2004	1,033,700	344,560	944,721
Rwanda	August 12, 2002	August 11, 2005	36,030	17,769	138,923
Senegal	April 28, 2003	April 27, 2006	121,350	62,400	338,383

Sierra Leone	September 26, 2001	September 25, 2004	365,410	121,006	320,557
Sri Lanka	April 18, 2003	April 17, 2006	807,000	691,830	120,770
Tajikistan, Republic of	December 11, 2002	December 10, 2005	195,000	78,400	174,594
Tanzania	August 16, 2003	August 15, 2006	78,400	36,400	580,602
Uganda	September 13, 2002	September 12, 2005	27,000	14,000	280,131
Vietnam	April 13, 2001	April 12, 2004	290,000	165,800	226,880
Congo, Republic of	December 06, 2004	December 05, 2007	228,420	156,471	101,088
Georgia	June 04, 2004	June 03, 2007	294,000	154,000	501,695
Honduras	February 27, 2004	February 26, 2007	213,600	111,890	166,392
Mali	June 23, 2004	June 22, 2007	55,980	24,681	128,545
Mozambique	July 06, 2004	July 05, 2007	34,080	16,260	139,160
Zambia	June 16, 2004	June 15, 2007	709,195	157,471	684,809
Chad	February 16, 2005	February 15, 2008	75,600	63,000	132,898
Sao Tome & Principe	August 01, 2005	July 31, 2008	8,880	4,228	7,395
Afghanistan, Islamic Republic of	June 26, 2006	June 25, 2009	243,000	135,600	107,400
Central African Republic	December 22, 2006	December 21, 2009	116,955	43,400	98,667
Grenada	April 17, 2006	April 16, 2009	33,050	22,980	10,070
Haiti	November 20, 2006	November 19, 2009	237,510	106,430	131,080
Moldova, Republic of	May 05, 2006	May 04, 2009	332,640	136,110	256,590
Djibouti	September 17, 2008	September 16, 2011	12,720	8,856	11,259
Liberia	March 14, 2008	March 13, 2011	239,020	24,760	214,260
Togo	April 21, 2008	April 20, 2011	84,410	53,175	31,235
Total			**14,541,857**	**6,749,204**	**14,424,695**

Figure 3.2 below presents the amounts agreed under PRGT the period 2000 to 2008 per continents.

Figure 3.2: PGRT amounts agreed per continent '00-'08

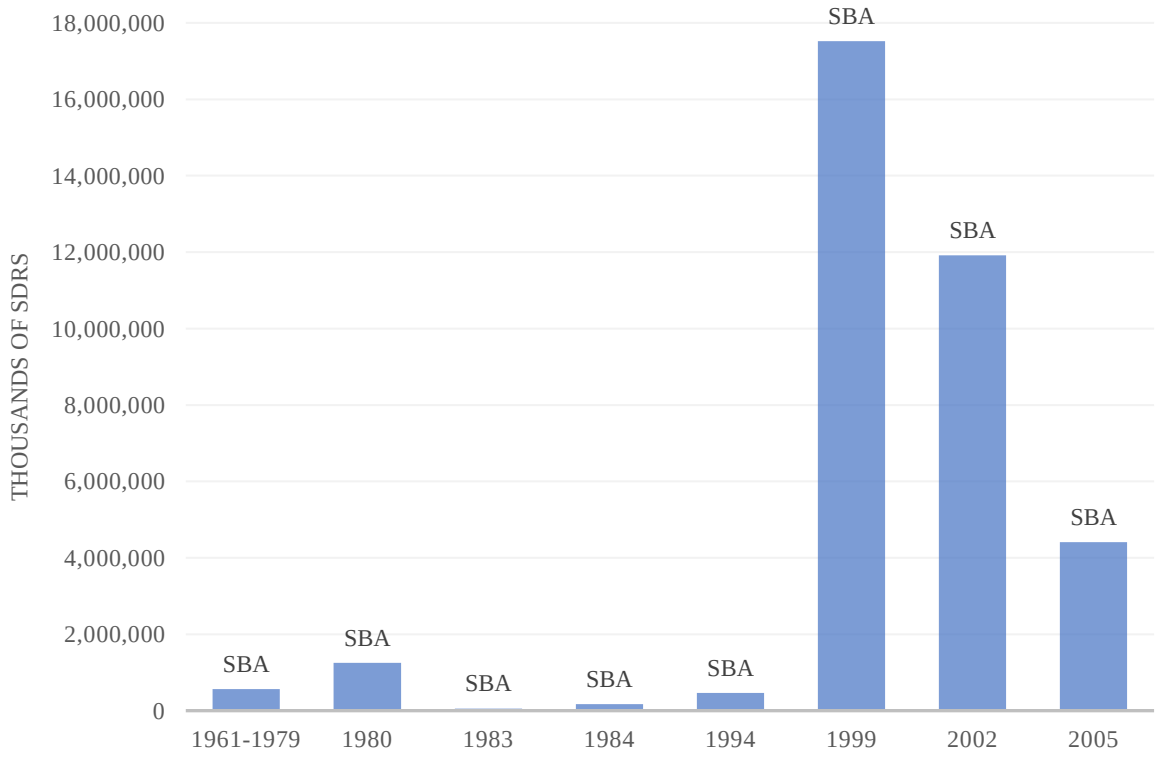


Suffice to say that IMF's involvement has resulted in both successes and failures. Below we will briefly present two case studies; one that has been characterised as a success and one as failure. The former is the case of Turkey in 2001 and the latter the case of Russia in 1998.

3.2.1 IMF Success Story

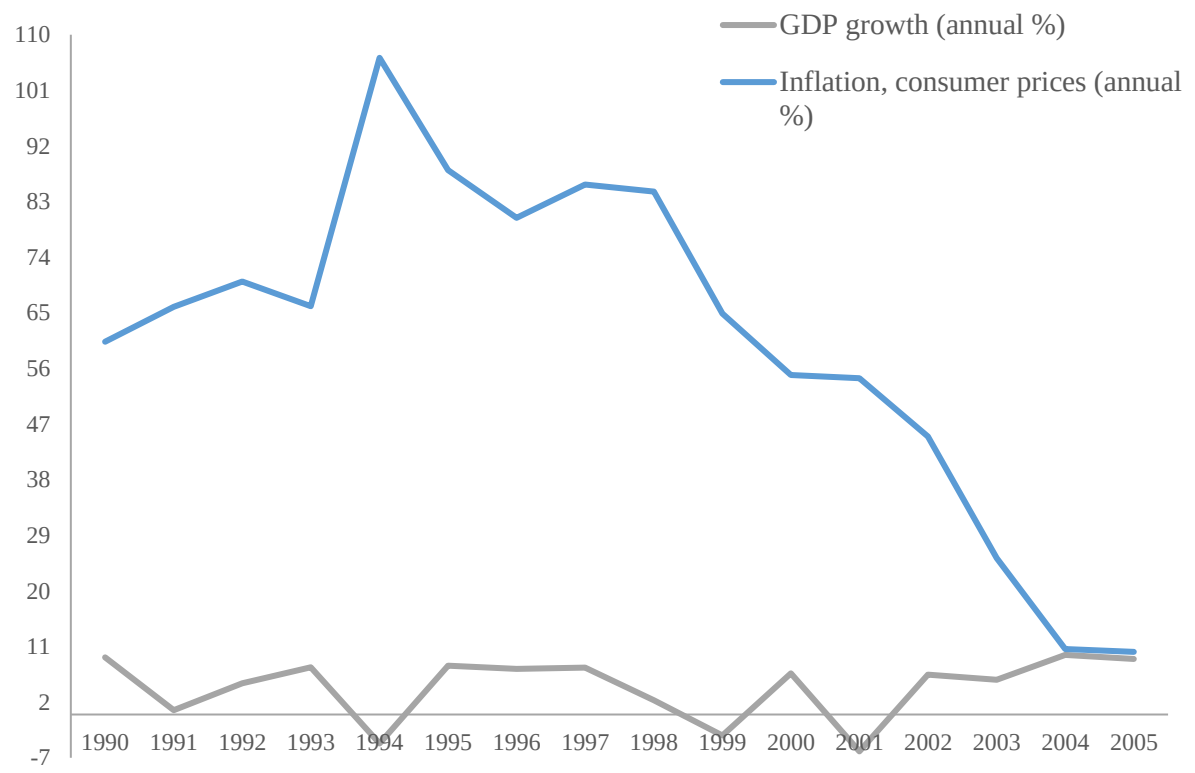
Turkey has a long history with IMF as it has resorted to its funding 18 times since 1961 with the last one being 2015 (Figure 3.3).

Figure 3.3: IMF agreements in Turkey **Source: IMF**



The 2002 program is widely known as one of the fund's greatest successes. It was a SBA agreement of 11,914 billion SDRs. The government passed 19 laws and regulations regarding structural reforms (Arpac and Bird 2009). Amongst these was independence of the Central bank, a change from price support to income support in the agricultural sector and regulations regarding the public procurement. During the program, the government has changed which usually has a negative impact on its implementation. Having said that though in this case it was different. The new government was determined to make it work thus continued the work of the previous government. The result was that inflation has fallen dramatically, GDP has increased and the debt to GDP ratio has decreased. In figure 3.4 we can see that GDP growth starts increasing starting 2002 and inflation falling.

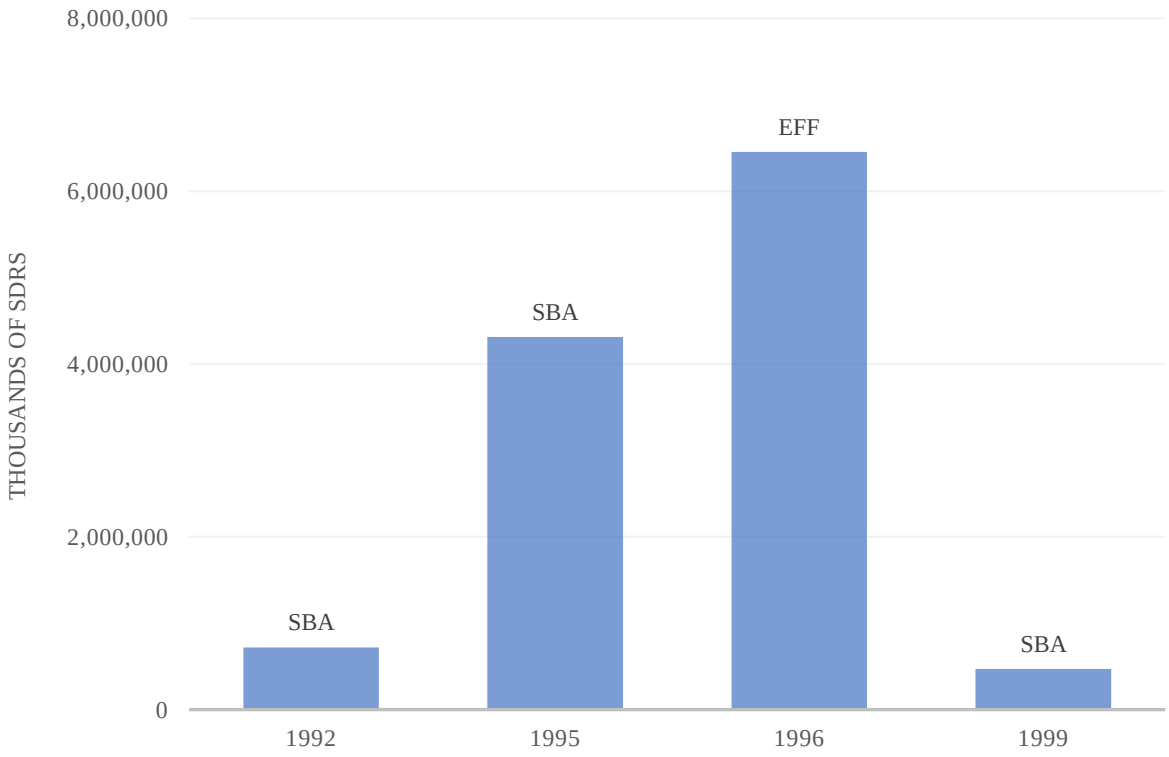
Figure 3.4: GDP growth and inflation in Turkey '95-'05 Source: World Development Indicators



3.2.2 IMF Failure Story

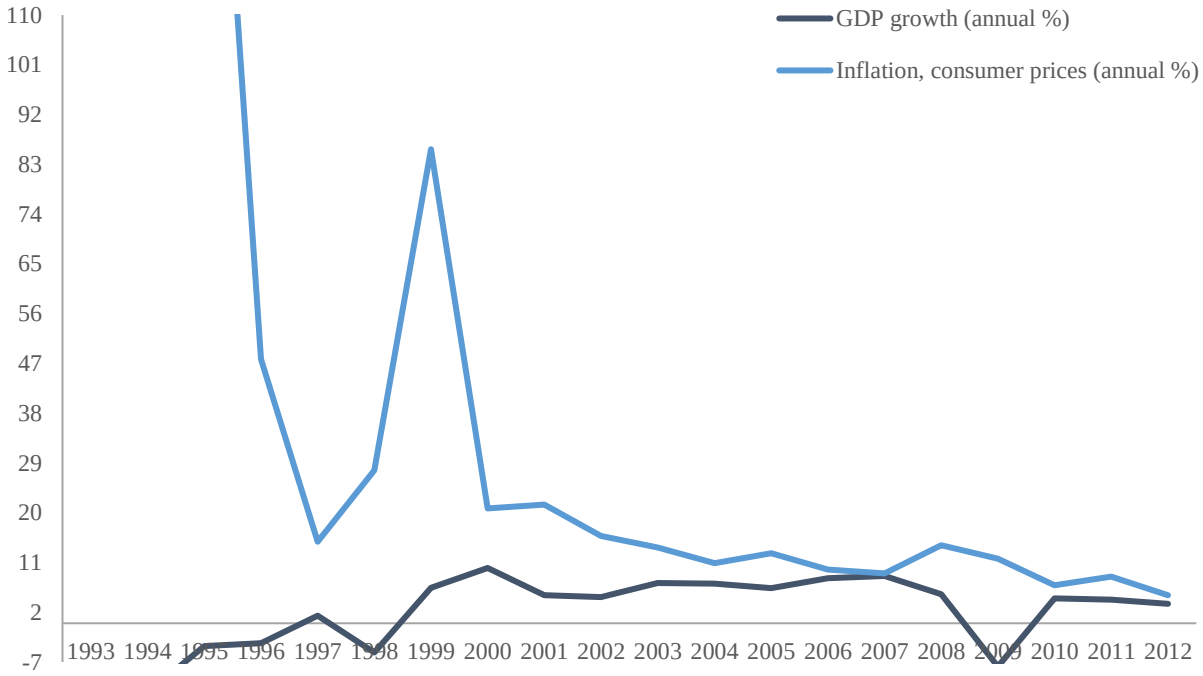
Unlike Turkey, Russia has not resorted to IMF for help many times as it has been a member only since 1992 (figure 3.5) and the last one has been characterised as one of IMF's failures.

Figure 3.5: IMF agreements in Russia **Source: IMF**



Russia's stock market in the period 1996 to 1997 has performed very well, however in the Asian crisis of 1997 has impacted it as many foreign investors started to withdraw their assets. This in combination with the oil price drop which is one of its major foreign currency earnings has resulted in the deterioration of its economy. Russia resulted to IMF for help. The reforms that had to be implemented were many and required a strong political will to ensure that the necessary changes will take place. The government was unable to implement the changes. The fund though at the same time, did not deny the provision of any of tranches of the loan even thought it was responsible for checking that requirements were met and were clearly not. In figure 3.6 we can see the decrease of the GDP growth in 1998-1999 and the increase of inflation.

Figure 3.6: GDP growth and inflation in Russia '93-'12 Source: World Development Indicators



3.3. IMF and Economic Growth

The reasons why a country enters into an agreement with a financial institution such as the IMF can vary. Governments may do so when they face pressures of a foreign reserve crisis or in an attempt to protect themselves from the political cost that adjustment policies may cause. In the latter case, the institution-lender plays the role of the "scapegoat" for austerity measures and essential economic reforms that usually are strict and unpleasant for the public (Przeworski and Vreeland 2000).

The general finding of the existing literature is that receiving aid from the IMF and other international financial institutions does not stimulate economic growth of the recipient country. One of the first to examine the effect of IFIs on growth is Pastor (1987). He examines amongst other variables the effects of an IMF program in 18 Latin American countries on growth. The way he tries to test it is by comparing program and no-program countries as well as behaviour of the countries pre and post receiving IMF lending. He finds that there is no evidence to support neither that programs decrease growth rates nor that increase them. Using the

methodology of before and after analysis as well, Evrensel (2002) supports that IMF programs provide a balance of payment alleviation but only in the short term. In the after-program period these improvements are not sustained and in many cases the recipient countries re-enter the program in worse macroeconomic conditions compared to the first time they have entered.

Butkiewicz and Yanikkaya (2005) approach differently than the rest the issue of IFI lending in their attempt to understand its effects on economic growth. Instead of using the existence of programs they use the value of Fund and Bank credits. Using an empirical growth model which includes various determinants of growth and applying different econometric techniques they find that Fund lending negatively effects growth. On the other hand, Bank credit is some cases of low income and poor democracy countries increases growth.

Przeworski and Vreeland (2000) find that the country's participation to the program has a negative effect on growth rates as long as countries remain under it. They observe also that as soon as they leave the program, their growth accelerates compared to the period under the program but they do not grow as fast as they would if they had never participated. Dreher (2006) argues that the reason behind the reduced growth rates of the recipient countries can be the self-selection into these programs. Przeworski and Vreeland seek to address this issue. They identify countries that face similar fiscal and monetary problems, foreign reserves crises or high domestic deficits, with some participating in an IMF program and others not. They find that those receiving IMF assistance grow by 2.35% less than the ones that do not, despite displaying similar economic conditions before participation.

Barro and Lee (2003) attempt to address the issue of endogeneity of IMF programs. They argue that the IMF is a "bureaucratic and political organization" so that countries which have more influence in it have better chances to receive a loan, and that loan is likely to be larger compared to countries with less influence in the organization. Therefore, to deal with the endogeneity of the IMF loans, they use instrumental variables that reflect the recipient countries' political and economic connections. These variables were political proximity to the US and major European countries, trade links with the US and Europe, which they combine with economic characteristics, such as reserves, lagged growth and GDP per capita. Dreher (2006) follows a similar approach, combining economic and political variables. Nevertheless, both papers' results again indicate a significantly negative impact of the participation in an IMF program on the economic growth, with or without accounting for the potential endogeneity bias. A potential drawback of both analyses is that their instruments include economic indicators which are

likely to be correlated with contemporaneous economic growth, the left-hand side variable in their second-stage regression. We discuss below how we seek to avoid this weakness.

Dreher, Sturm and Vreeland (2009) examine the relationship between the temporary membership in the United Nations Security Council (UNSC) and the participation in an IMF program. They conclude that there is a strong and significant relationship between UNSC temporary membership and participation to the programs and that the UNSC membership translated into fewer conditions attached to the program. This suggest that IMF loans are potentially motivated by political considerations: countries serving on the UNSC enjoy disproportionate influence and the IMF (or its major shareholders) use IMF loans to secure the support of UNSC members. Thacker (1999) in his attempt to understand whether politics play a role on IMF lending uses as well the United Nations vote but in the General Assembly this time. Amongst various variables that includes in his model is the UN General Assembly (UNGA) vote. The variable is constructed to measure the degree of coincidence of the votes in the UNGA between the sample country and the US in 10 to 15 issues that the State Department has deemed as key votes. It ranges between 0 and 1. Evidence show that the UNGA vote affects IMF lending. More specifically, a 0.10 movement in the variable increases the log odds of getting a loan by 0.29.

Another frequently raised argument is that the IMF in many instances uses its credit in order to support undemocratic regimes. For instance, Edwards and Santaella (1993), Bandow (1994) and Vreeland (2003) argue that the international financial institution use their loans to supports undemocratic regimes. Furthemore, Barro and Lee (2005) show that the participation in IMF loan programs might result in minor effects on the rule of law and democracy.

A number of previous studies thus sought to account for the possible self-selection into IMF programs using instrumental variables. However, these generally tend to rely on using economic characteristics as instruments. We propose, instead, to use political and institutional characteristics, which are less likely to be correlated with the (observable or unobservable) economic performance of countries before they apply for IMF aid. As both Barro and Lee (2003) and Dreher, Sturm and Vreeland (2009) observe, political considerations are important predictors of participation to IMF loan programs. Important, such considerations should be largely orthogonal to the economic need for IMF assistance.

3.4. Data and Methodology

Our data include 213 countries (see table 3.6 in Appendix 3.1) and 38 years (1971 to 2009). The panel is unbalanced since not all observations for all countries and years are available. The data, apart from some exceptions mentioned below, were obtained from the World Bank World Development Indicators (WDI) Edition of April 2012.

The analysis is based on estimating an augmented Solow model of growth (see Mankiw, Romer and Weil, 1992) (eq 3.1)

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_f\, f_i + \beta_p\, p_i + \varepsilon_i \text{ (eq 3.1)}$$

where $\mathcal{Y}_i$ economic growth , g_i gross fixed capita formation (GFCF) p_i population growth , f_i IMF loan dummy

The dependent variable is the growth rate of GDP per capita. We include population growth and investment (gross fixed capital formation to GDP ratio) as explanatory variables, alongside an IMF loan dummy, the principal explanatory variable. The IMF dummy is constructed so as to take the value of 1 in years during which the country received a loan and 0 otherwise. We consider 3 IMF programs: Stand-by Arrangements (SBA), Extended Fund Facility (EEF) and Poverty Reduction and Growth Facility Arrangement (PRGF). The differences lie in the length of the repayment period, interest rates and eligibility criteria as discussed earlier. The dummy takes the value of 1 if the program was in effect for at least 5 months in a particular year. The source of this dataset is the webpage of Axel Dreher and his 2006 paper. Descriptive statistics on all variables, including the instruments (see below) are reported in Table 3.5.

Table 3.3: Descriptive statistics

Variables	Min	Max	Mean	Std Dev
GDP per capita growth rate	-50.047	90.470	1.846	6.186
Investment/GDP	-23.763	113.578	22.294	8.542
Population Growth	-44.408	17.738	1.739	1.671
IMF Loans	0	1	0.222	0.416
Democracy	-10	10	0.781	7.453
UNSC	0	1	0.059	0.235

A plausible reason why the previous literature has found a negative effect of IMF loans on economic growth is the endogeneity of IMF assistance: countries seek IMF help, for the most part, when they already face economic problems or are about to face such problems in the very

near future. Therefore, there may be reverse causality between the dummy variable for IMF involvement and the growth rate. To find good instruments, however, is invariably difficult. The instruments have to be uncorrelated with the error term; this can be tested by means of the Sargan statistic: insignificant result suggest that the instruments can be excluded from the main regression. Furthermore, we need to ensure that the instruments are not correlated with the economic hardship that the countries are experiencing at the time of applying for IMF assistance. Therefore, we focus on instruments that reflect institutional and/or political rather than economic conditions. We select democracy and the United Nations Security Council (UNSC) non-permanent membership (as for the latter, Dreher, Sturm and Vreeland, 2009, find the UNSC temporary membership to be a strong predictor of countries' participation in IMF programs). The UNSC non-permanent membership takes the form of a dummy coded 1 when the country was a member and 0 when not.[6] The data on democracy are obtained from the PolityIV site. The variable takes values between -10 and 10, with the extreme values indicating autocracy and consolidated democracy, respectively. The model that we run is the second stage OLS , with eq 3.2 being our first stage OLS and our main regression and eq 3.3 being the second stage the IMF dummy against the chose instruments is estimated.

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_f\, f_i + \ \beta_p\, p_i + \varepsilon_i \text{ (eq 3.2)}$$

$$f_i = \beta_i + \beta_d\, d_i + \beta_u\, u_i + u_i \text{ (eq 3.3)}$$

where $\mathcal{Y}_i$ economic growth , g_i gross fixed capita formation (GFCF) p_i population growth , f_i IMF loan dummy, d_i democracy as in polity IV u_i UN Security Council temporary membership

Finally, loans disbursed in one year may affect the economy in that year or in the subsequent year or years (see Clemens et al., 2012). The effect may be delayed for a number of reasons. Some loans may be allocated relatively late in the year and therefore cannot have much effect on that year's economic outcomes. Furthermore, it may take a while for the effect of such loans (and/or the attached conditions) to work its way through the economy. In particular, it is possible for the loans and especially for the attached conditions to be associated with a J-curved effect: the immediate effect is negative, because of the austerity measures required, but the economy rebounds successfully, as the loans and the reforms start having a positive impact on

[6] We are grateful to Axel Dreher for making the data available on his webpage.

growth. To explore this possibility, we include the IMF dummy in our regressions contemporaneously as well as lagged by up to three years.

3.5. Results

Table 3.3 reports the OLS results. The first column presents the results with the IMF variable entering the regression contemporaneously: this regression confirms the general result suggesting that the effect of IMF assistance on economic growth is insignificant. The other two explanatory variables are significant at the 1% level, with the investment having a positive effect whereas that of the population growth negative. To examine how the growth rate behaves over time in relation to the IMF aid, we lag the IMF program dummy by between one and three years (columns 2-4). Doing so results in a striking change in the results: the dummy is significant at the 1 percent level in all three cases. Nevertheless, the effect seems low: participation in an IMF program increases the average annual growth by between 0.68 and 0.82 percent. The effects of the other two explanatory variables remain unchanged.

Table 3.4: OLS Results

GDP per capita growth rate	**(1)**	**(2)**	**(3)**	**(4)**
Investment	0.1607	0.1614	0.1583	0.1631
	(12.75)***	(12.65)***	(12.29)***	(12.58)***
Population Growth	-0.5626	-0.569	-0.5821	-0.6007
	(-6.07)***	(-6.07)***	(-6.18)***	(-6.35)***
IMF Loans	0.1552	0.6844	0.7056	0.8172
	(0.76)	(3.30)***	(3.37)***	(3.87)***
R^2	0.0591	0.0592	0.0588	0.0599
Lag of IMF Loans	0	1	2	3
Number of countries	183	183	183	183
Number of observations	5498	5410	5321	5231
Method of estimation	OLS	OLS	OLS	OLS

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%.

As we argue above, the OLS results may be biased due to endogeneity of IMF assistance. If this is the case, the growth rate may be falling independently of the IMF program participation. To remedy this, we apply the instrumental variables discussed in the preceding section: democracy (PolityIV score) and UNSC temporary membership. We report the 2SLS results in

Table 3.4, again for the contemporaneous effect as well as with the IMF dummy lagged by up to three years. The first-stage F-statistic is always over 10, indicating that our two instruments explain the variation in IMF program participation rather well. In particular, democracy is positively correlated with the probability of participating in an IMF program, although the UNSC membership, contrary to expectations, turns out insignificant. The Sargan statistic is insignificant with the exception of the regression with the 2nd lag of IMF aid: given that our instruments pass this hurdle in three cases out of four, we feel fairly confident that our instruments are valid. The IMF effect, when examined contemporaneously, is again insignificant. When we lag the IMF dummy, it always turns out positive and significant. Moreover, the magnitude of the effect is increased considerably compared with the OLS results, indicating that the OLS indeed yields downward-biased estimates. The size of the effect rises as more lags are used and the effect of IMF program participation appears sizeable: growth improves, on average, by between 4 and 7 percent per year. After correcting for the endogeneity bias and allowing for a lagged effect of IMF loans, we see that participation in IMF programs indeed has a positive, and powerful, effect on economic growth.

Table 3.5: 2SLS Results

GDP per capita growth rate	**(1)**	**(2)**	**(3)**	**(4)**
Investment	0.1707	0.1624	0.1484	0.1544
	(11.72)***	(11.02)***	(9.84)***	(9.95)***
Population Growth	-0.5208	-0.4778	-0.3910	-0.3396
	(-5.03)**	(-4.57)	(-3.65)	(-2.97)
IMF Loans	3.4548	4.0134	5.7628	6.9738
	(1.61)	(2.20)***	(3.47)***	(4.29)***
Sargan Statistic (p-value)	0.292 (0.59)	0.284 (0.59)	5.007 (0.02)	0.486 (0.49)
F-statistic 1st stage	11.57	16.10	20.11	23.59
Lag of IMF Loans	0	1	2	3
Number of countries	104	104	104	104
Number of observations	4484	4388	4290	4190
Method of estimation	2SLS	2SLS	2SLS	2SLS

Notes: Absolute values of t statistics are shown in parentheses. Significance: * 10%; ** 5%; *** 1%. The excluded instruments are democracy (Polity IV score) and UN security-council temporary membership.

As Table 3.5 shows, our data include observations of extremely low and high growth rates. These pertain mainly to countries affected by war (low growth) or recovering from a war (high growth). To make sure that our results are not affected by such potential outliers, we replicate the 2SLS analysis without observations for which the growth rate is outside the [-10,10] range. This leads to dropping 186 observations with growth rates below -10 percent and 2173 observations with growth above 10 percent. The 2SLS results, nevertheless, are qualitatively similar to those in Table 3.3. The main difference is slightly lower magnitude of the coefficients estimated for the IMF effect, ranging from 2.42 for the contemporaneous effect (which is significant at the 10 percent level) to 5.21 for the 3rd lag. These results are available upon request.

3.6. Conclusions

International financial institutions, such as the IMF and the World Bank, disburse sizeable sums of money to countries in need. Yet, the empirical evidence on the effectiveness of that assistance, in terms of fostering economic growth or investment, is disappointing. As the recent overview studies by Doucouliagos and Paldam (2008, 2009) demonstrate, the effect of aid on growth is at best zero. The performance sheet of the IMF is particularly bad, with several studies reviewed in Section 3.3 of this paper concluding that countries that receive assistance from the IMF do significantly worse than those who do not.

In this paper, we take a second look at the impact of IMF aid on economic growth. We argue that the insignificant or negative results found by the other studies can be due to two facts: (1) the effect of IMF assistance arrives with a lag rather than immediately, and (2) countries self-select to request IMF assistance, so that the relationship between IMF involvement and economic growth is likely to be subject to endogeneity bias. We therefore allow IMF assistance to affect growth not only contemporaneously but also with a lag of up to three years, and use instrumental variables to remove the endogeneity bias. Moreover, we select instruments that are of political rather than economic nature – democracy index and temporary membership of the UN Security Council – to minimize the possibility that the instruments reflect the countries' economic conditions.

The results (figure 3.7) of our analysis paint a generally more positive picture than the previous literature. We find that allowing for IMF assistance to affect growth with a lag is enough to obtain a positive impact on growth, even when using only OLS. Moreover, the longer the lag, the greater is the size of the positive effect. Accounting for the likely endogeneity of IMF assistance, furthermore, increases the size of the estimated effect. With these two methodological modifications, we find that receiving IMF assistance increases the annual growth rate of recipient countries by between 4 (with a lag of 1 year) and 7 percent (3 years'lag).

Figure 3.7: Summary of findings

LAGS	Positive	Negative	Insignificant
0	Investment	Population growth	IMF loan dummy
1	Investment IMF loan dummy		Population growth
2	Investment IMF loan dummy		Population growth
3	Investment IMF loan dummy		Population growth

Appendix 3.1

Table 3.6: Countries in the sample

Countries			
Afghanistan	Dominican Republic	Lesotho	San Marino
Albania	Ecuador	Liberia	Sao Tome and Principe
Algeria	Egypt, Arab Rep.	Libya	Saudi Arabia
Ametrican Samoa	El Salvador	Liechtenstein	Senegal
Andorra	Equatorial Guinea	Lithuania	Serbia
Angola	Eritrea	Luxembourg	Seychelles
Antigua and Barbuda	Estonia	Macao SAR,China	Sierra Leone
Argentina	Ethiopia	Macedonia, FYR	Singapore
Armenia	Faeroe Islands	Madagascar	Slovak Republic
Aruba	Fiji	Malawi	Slovenia
Australia	Finland	Malaysia	Solomon Islands
Austria	France	Maldives	Somalia
Azerbaijan	French Polynesia	Mali	South Africa
Bahamas, The	Gabon	Malta	Spain
Bahrain	Gambia, The	Marshall Islands	Sri Lanka
Bangladesh	Georgia	Mauritania	St. Kitts and Nevis
Barbados	Germany	Mauritius	St. Lucia
Belarus	Ghana	Mayotte	St. Vincent and the Grenadines
Belgium	Gibraltar	Mexico	Sudan
Belize	Greece	Micronesia, Fed. Sts.	Suriname
Benin	Greenland	Moldova	Swaziland
Bermuda	Grenada	Monaco	Sweden
Bhutan	Guam	Mongolia	Switzerland
Bolivia	Guatemala	Montenegro	Syrian Arab Republic
Bosnia and Herzegovina	Guinea-Bissau	Morocco	Tajikistan
Botswana	Guinea	Mozambique	Tanzania
Brazil	Guyana	Myanmar	Thailand
Brunei Darussalam	Haiti	Namibia	Timor-Leste
Bulgaria	Honduras	Nepal	Togo
Burkina Faso	Hong Kong SAR, China	Netherlands Antilles	Tonga

Burundi	Hungary	Netherlands	Trinidad and Tobago
Cambodia	Iceland	New Caledonia	Tunisia
Cameroon	India	New Zealand	Turkey
Canada	Indonesia	Nicaragua	Turkmenistan
Cape Verde	Iran, Islamic Rep.	Nigeria	Turks and Caicos Islands
Cayman Islands	Iraq	Niger	Tuvalu
Central African Republic	Ireland	Northern Mariana Islands	Uganda
Chad	Isle of Man	Norway	Ukraine
Channel Islands	Israel	Oman	United Arab Emirates
Chile	Italy	Pakistan	United Kingdom
China	Jamaica	Palau	United States
Colombia	Japan	Panama	Uruguay
Comoros	Jordan	Papua New Guinea	Uzbekistan
Congo, Dem. Rep.	Kazakhstan	Paraguay	Vanuatu
Congo, Rep.	Kenya	Peru	Venezuela, RB
Costa Rica	Kiribati	Philippines	Vietnam
Cote d'Ivoire	Korea, Dem. Rep.	Poland	Virgin Islands (U.S.)
Croatia	Korea, Rep.	Portugal	West Bank and Gaza
Cuba	Kosovo	Puerto Rico	Yemen, Rep.
Cyprus	Kuwait	Qatar	Zambia
Czech Republic	Kyrgyz Republic	Romania	Zimbabwe
Denmark	Lao PDR	Russian Federation	
Djibouti	Latvia	Rwanda	
Dominica	Lebanon	Samoa	

Chapter 4 Impact of IMF Assistance on Society: an Essay on Suicide Rates

Abstract

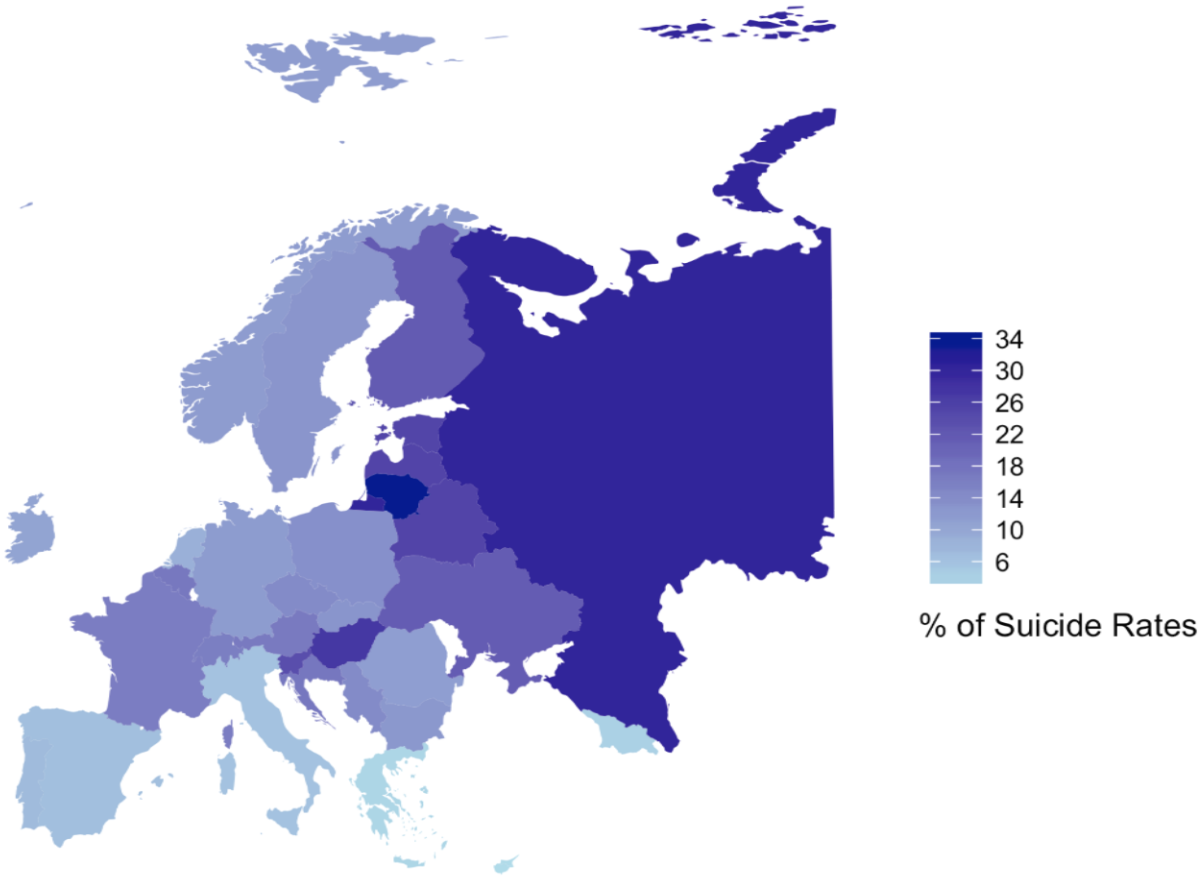
This paper aims to investigate the effect of various socioeconomic variables on suicide rates in Europe. We also examine the long and short-term dynamics of suicides by means of panel cointegration analysis. In an attempt to understand better the behaviours associated with suicides, we split the data according to geography and sex. The empirical results indicate that IMF intervention, abortions and unemployment positively affect suicides whereas alcohol consumption and the level of democracy influence them negatively. On the other hand, the growth rate of GDP per capita has no effect. However, when performing the panel cointegration analysis it seems that a short run causal effect exists. The only other variable that exhibits short-term effect is alcohol consumption. Finally, the results of the various samples vary.

4.1. Introduction

The effects of the global financial crisis of 2008-2009 are still visible on European continent. Almost all European countries have been affected during the past eight years and some are still struggling with economic problems. Needless to say, the crisis has also brought to the surface other problems such as the deterioration of public finance variables that have remained ignored or well-hidden until 2008. To deal with excessive debt, some of the countries turned to the International Monetary Fund (IMF) for help, which, in Europe, cooperated closely with the European Central Bank (ECB) and the European Commission.

The proposed solution to escalating public debt on the European fringe rested on implementation of strict austerity measures. This policy has been much debated and criticized. The main criticism is that this policy has not delivered the desired results. Unfortunately, unemployment has remained high and sustained economic growth has not been achieved in the crisis-stricken countries such as Greece and Spain. It was even argued that there has been an unusually high number of suicides in some European countries, and that this was attributable to the austerity measures and the IMF involvement. In this paper we will try to shed light on this claim. To this effect, we analyse the determinants of suicide rates in 35 European countries European countries during the period 1985-2011 with the objective to identify the relationship between economic outcomes and suicides, if any (Map 4.1).

Map 4.1: Suicide Rates in Europe



Our aim is to investigate suicides from both the economic and sociological perspective. What factors can lead people to commit suicide and what can affect someone's decision whether to commit suicide or not? The variables chosen were carefully selected based on the relevant existing literature. Our focus is on 35 European countries, selected according to data availability. The sample was also split geographically into subsamples: Northern versus Southern Europe and Eastern versus Western Europe, and according to gender, males versus females. This will provide a general view on the factors that drive suicides, including geographical and gender-specific differences.

The main methodology used is OLS, in the main sample and the subsamples. In an attempt, to test the robustness of our results, we have applied also another methodology, the panel cointegration model. These help us investigate not only the relationship between the independent and the dependent variable, but also the dynamics of their relationship. This means that we will understand both the long term and short term effects of the chosen variables on suicides.

4.2. Literature Review

4.2.1 Economics of Suicides

Suicides are a phenomenon that has been widely studied since at least 1897 when Emile Durkheim firstly published his book "Le suicide", considered as the first attempt to methodologically study them. Following Durkheim, many researchers tried to identify the relationship of this phenomenon with other variables, mainly sociological ones. Some of them were abortions, alcohol and drug abuse as well as mental disorders (Mota et al. (2010), Lester (2005)).

In spite of the fact that suicides are considered to be a subject of social sciences, some researchers look into them also from the economic perspective. Variables such as unemployment, GDP per capita and real income growth along with the other sociological were propose to explain suicides in more thorough way (Jungeilges and Kirchgässner (2002), Noh (2009)).

Durkheim studied the topic of suicide using sociological methods applied in the context of society in 1897 in his book called "Suicide". Durkheim was the first to argue that suicides are not a result of individual characteristics and personalities but can be also attributed to social factors. He claims that economic growth characterised by industrialisation results in higher level of social anomie: a personal state of anxiety and isolation that stems from an absence of social control and regulation, which leads to an increase of suicides. Simpson and Gonklin (1989) support Durkheim. They find that there is a strong positive correlation between suicide rate and industrialisation using data from 71 nations worldwide. In line with the above, Lester (1996) and Unnithan et al (1994) that economic development increases the rate of suicides.

Another seminal contribution in the field of suicide is Hamermesh and Soss (1974) with their "theory of suicide". Their "innovation" lies in the fact that they connected a social phenomenon – suicide- with the economic theory. According to them, the decision of an individual to commit suicide depends on the expected life utility. When this falls below a certain threshold, the individual decides to commit suicide. For example, they argue that higher income gives higher expected utility which results in a lower probability of committing suicide. To test it they used three different datasets: data by age in different developed countries, a 20-year time series (1947-1967) by age group in the United States and lastly a cross section by state and age group in 1960. Their results indicate that after 1945, mild cyclical decreases in the economy

resulted in the same proportionate increases in suicides as stronger cyclical fluctuations before 1945. Another result that came out from both time-series and cross section analysis is that older people are affected more adversely by unemployment compared to younger people.

4.2.2 Combining Social and Economic Variables

There is a vast literature, which examines suicide using economic variables alone or combined with some sociological ones. Jungeilges and Kirchgässner (2002) attempted to investigate the way suicide rates are related to real income growth, real income per capita and civil liberty. The two economic variables were found to have a positive and significant impact on the dependent variable: the higher the economic growth and/or the higher real income the higher the suicide rate. Nevertheless, the significance of these effects varies depending on age. To be more specific, middle aged people and older women are affected more by income. At the same time, older people are more affected by income growth. On the other hand, liberty has a negative significant effect on suicides- the higher the liberty the lower the suicide rate.

Another important economic variable whose effect has been studied is unemployment. argue that high unemployment rates will lead to high suicide rates. Noh (2009) tests how real GDP per capita variations affect the relationship between unemployment and suicide. The study extends from 1980 until 2002 and covers 24 OECD countries. The intuition behind this paper is that in a country where low income is the norm and people are poor; the shame associated with losing a job is less than the shame that one would get if he would lose a job in a society where everyone works. He finds that countries with higher income display a positive effect of unemployment on suicide rates and the opposite happens in countries with lower income. Apart from the effect of real GDP and unemployment, Noh (2009) examined other variables as well, for example alcohol consumption that has a positive significant impact. Furthermore, it is also interesting that there is a very strong link between the proportion of old people and suicide rates.

Schminke and Studnicka (2011) test the way that both economic and sociological variables affect growth. The period that they examined is from 1993 to 2009 in a sample of 32 European countries. They argue that countries with lower GDP per capita and higher unemployment tend to have higher suicide rates whereas religion has a negative effect on suicides. Nevertheless, they did not seem to find any indication that economic deterioration in a country affects suicide rates in any way as the GDP growth was insignificant. Religion and the divorce rate both have a significant negative impact on the suicide rate. It should be noted that the two variables –

religion and divorce – are usually connected. More religious societies tend to have lower divorce rates.

Andres (2006) decided to approach suicide rates differently. He split his sample into males and females and into various age groups. This paper examines 15 European countries over a 28-year period extending from 1970 to 1998. Various variables were estimated; both economic and sociological ones: real GDP per capita, economic growth, Gini coefficient, unemployment, divorce and fertility rate, female labour participation and alcohol consumption. For the regression analysis fixed effects were used in the panel data. Striking enough is the result that GDP per capita and unemployment were found to be insignificant in contrast with the papers discussed above. Divorce rates and female labour participation rate do not seem to affect the suicide rates either. On the other hand, economic growth and fertility rate significantly negatively affect the dependent variable whereas alcohol consumption has a positive significant impact. He reports also that the Gini coefficient, although positive, is not significant. He highlights that the latter should be treated with caution because according to Gravelle et al. (2002) the reason for the Gini coefficient inconsistent findings is the poor quality of aggregate data. A final outcome of this paper is that socioeconomic predictors have different effects on different age groups. Some variables significantly affect younger people and others older people; for example fertility rate has a significant negative impact on males aged 45 to 64 but not in other age groups.

Research on suicide rates has also been conducted in specific countries. Zhang et al. (2010), focused on China and more specifically on Shandong Province, the second largest province in that country, in a period extending from 1982 to 2005. Their aim is to define the trend of suicide rates and detect the various socioeconomic variables that shape this tendency. To begin with, the sample considered was divided according to gender and urban vs rural areas. This resulted in six samples: urban male, female and both and the same for the rural regions. It is worthwhile mentioning that the chosen province has 45% of rural population and 55% of urban and is considered to be representative of China as a whole in terms of structure, cultural and social life. As independent variables, they used the GDP per capita, rural and urban income both as an average and adjusted for inflation. The data were analysed by regression models with ARMA errors. Their results contrary to other studies indicate that economic growth negatively affects suicide rates. Increases in both rural and urban income decrease suicide rates. Finally, they find that as soon as economic growth reaches a steady state then suicide rates also reach a steady state with no ups and down.

Chang et al. (2009) focus on suicide rates and their behaviour in Asia; particularly in Japan, Hong Kong, South Korea, Taiwan, Singapore and Thailand. The trigger for this paper was the Asian financial crisis in 1997, which started in Thailand and spread very fast to the other South East Asian countries. The years examined extended from 1985 to 2006 and the data were obtained from the World Health Organisation and the Taiwanese mortality statistics. The authors believe that including a period of 12 years before crisis allows them to observe the suicide trends in these societies and separate the effects of the economic downturn from already existing trends. The analysis was made age and sex specific; where the age groups were specified according to whether and how long they were in the workforce. The groups are the following: people who entered the labour market recently (15- 34 years old), people that have been working longer (35 to 64 years old), and lastly the retired ones, (65 years old and above). They test the effect of GDP per capita, GDP growth, unemployment, divorce rates and marriage rates Their results indicate that suicide rates were higher during the crisis in Korea, Hong Kong and Japan but not in Taiwan and Singapore where the crisis had a smaller impact on unemployment and GDP. More specifically, male suicide rates were more affected by an increase in unemployment. This effect is more visible in Hong Kong and Korea. At the same time marriage and divorce did not seem to affect the dependent variable.

4.2.3 Sociological Variables Only and Suicides

As already mentioned above, the majority of studies in the suicide literature account for both economic and sociologic variables. Having discussed for the impact of various economic variables the next step is to move on to the sociological ones. Gruenewald et al. (1995), focusing on the states of USA, examine the relationship between suicides and alcohol consumption measured as alcohol sales, over a period of 20 years, 1969 to 1989. The results imply that suicide rates were connected to the sale of spirits, the age structure of the state, per capita land area, unemployment and finally religious preferences. Focusing solely on alcohol consumption, it has been observed that suicide rates were significantly and positively correlated with the sale of spirits and but not with wine or beer. Another variable that affects suicides positively is the rate of unemployment; on the other hand, religion, and more specifically Baptism and Mormonism have a negative impact on suicide rates.

Stack and Wasserman (1993) argue that previous research has not made clear the effect of marital status on suicides and at the same time they highlight the way that alcohol consumption has been neglected in the research. Therefore, they evaluate the above linkages. Their dependent variable is the death by suicide (binary variable). The sample consists of 10,906

deaths based on the 1986 National Mortality Followback survey. This gives them 306 observations with suicide the cause of death and 10,600 with the cause of death reported as 'other'. Their findings support the previous literature that low marital integration affects suicide rates but at the same time they find that alcohol consumption has a positive direct effect on the dependent variable. Finally, they argue that some of the low marital integration impact on suicide is via its association with heavy alcohol consumption.

4.2.4 Alcohol Consumption and Suicides

Lester (1995) also examines, amongst other things, the relation between alcohol consumption and suicide. He used data that measure alcohol consumption per capita per year in litres, acquiring the data from the Finnish Foundation for Alcohol studies, the World Health Organization (WHO) as well as the official statistics of some nations. The time span of the data extends from 1950 to 1972 and the dependent variable is measured as suicides per 100,000 living people per year. Another independent variable was the divorce rate aiming at explaining the effect of alcohol on suicide rates above and beyond divorce. After running a regression analyses and a simple Pearson correlation, Lester found that both independent variables affect positively suicide rates in 9 out of 13 nations examined.

Nemtsov (2003) restricted his research to Russia choosing his sample to be from 1981 until 1993 taking into account the anti-alcohol campaign of 1985-1991 and the market reforms of 1992. The dependent variable is the suicide rates counted as per 100000 of the population, and it is related to alcohol consumption estimates and data on alcohol poisoning. The results indicate that alcohol consumption has a significant positive effect on suicide rates. More specifically, a decrease in alcohol consumption by 3.7% in the years 1985-1987, as an outcome of the anti-alcohol campaign, led in a decline in suicides. The anti-alcohol campaign was abandoned after 1987. However, the suicide rates increased only with a lag. The author attributes the lag to the fact that in order to reach the stage of committing suicide, 1 or even 2 years of massive drinking precedes.

Powell et al. (2001) look into the subject from a different angle compared to the rest. They have tried to explore the connection between alcohol consumption and nearly lethal suicide attempts. Alcohol consumption is counted in different forms: binge drinking, frequency as well as quantity of drinking, alcohol consumption, and drinking within 3 hours of the suicide attempt. A case-control study was conducted on humans between 13 to 43 years old. The findings of bi-variate analysis show that all the above variables are associated with the dependent variable.

All variables apart from the age at which began drinking exhibited a J-shaped relationship between alcohol exposure and nearly lethal suicide attempts. Having controlled for potential confounders and other measures of alcohol exposure, they find that drinking within 3 hours of attempt remained most strongly associated with the outcome. Finally, alcoholism remained significantly associated in most models, but at lower strength.

4.2.5 Abortions

Another variable that has attracted the interest of researchers is abortions. Often its effect is associated with deliberate self-harm and suicides. Morgan et al. (1997) have linked admissions for induced abortion, miscarriage and normal delivery to suicide attempts in a five-year sample period. Their findings suggest that induced abortion can cause mental health deterioration however it is unlikely that abortions lead to suicides.

Mota et.al (2010) focusing on United States conducted research with 3000 women who have undergone abortion. Having controlled for various sociodemographic characteristics, they concluded that abortions are strongly related to mental disorders. The disorders range from mood disorders and anxiety disorders to suicidal ideation and attempts. The increased risk for the latter reaches 59%. Gissler et al. (2005) examined 13-year data on pregnancy associated deaths in Finland. The research was based on data that were obtained from three different national health sources where information on death were recorded. Amongst their findings they noted that an increased risk of suicide was observed after abortions specifically in women between 15-24 years.

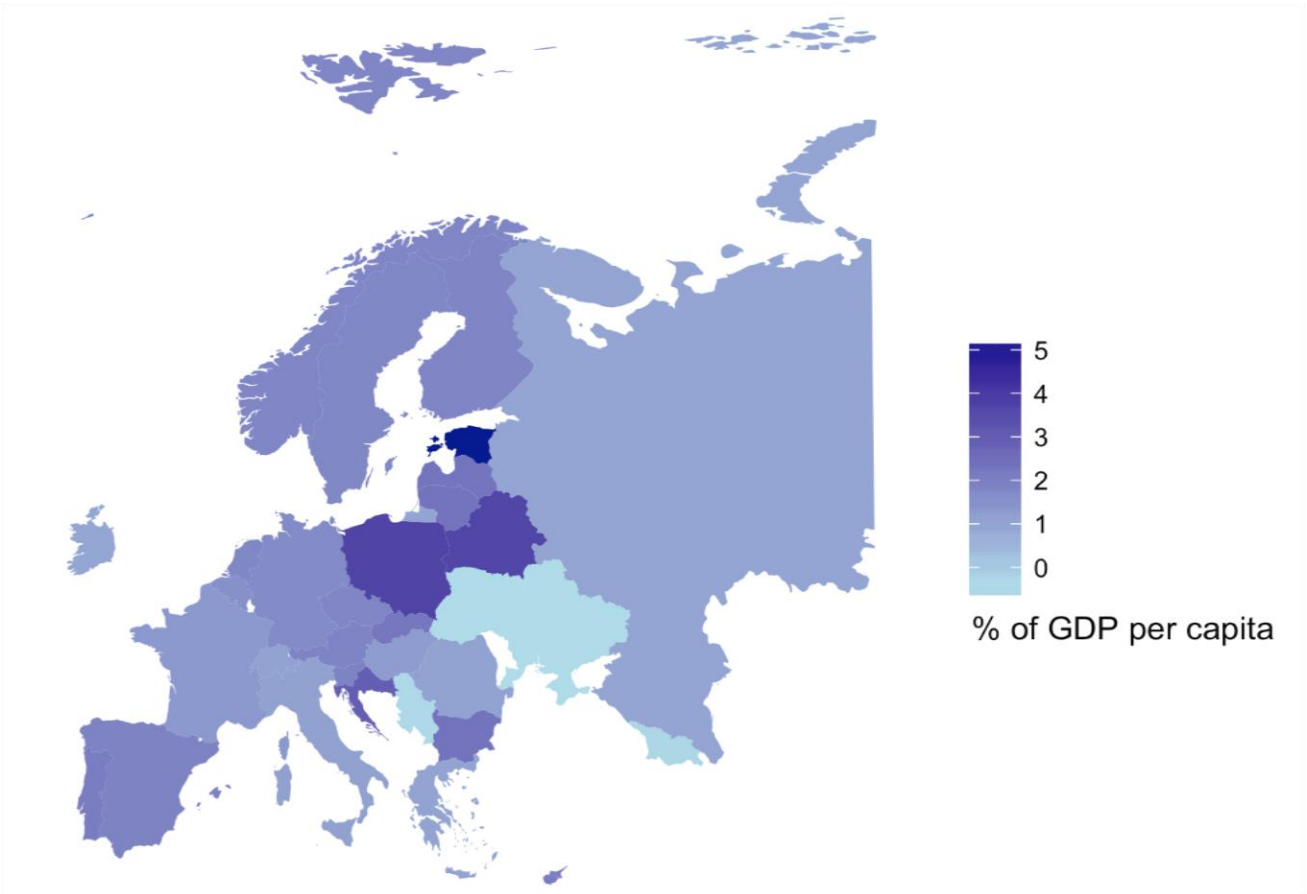
Thorp et al. (2005) conducted an analysis on abortion and its physical and psychological consequences based on papers written between 1966 and 2002 that used over 100 women as sample and a minimum of 2 months follow-up after. The outcome of their extensive research is that abortions both induced and elective substantially increase risks for mood disorders that can lead to self-harm attempts. It should also be noted that latest cohort studies, in contrast to earlier studies, connect abortions to deliberate self-harm, suicide and psychiatric admission. Coleman (2011), using as well meta-analysis, has tried to identify the link of abortions with mental health based on 22 studies that meet selection criteria, such as minimum sample size of 100, and at the same time minimize bias. The conclusions drawn were that abortion increases the risk of developing psychological problems following the procedure by 81%, from which a 10% is directly attributed to the procedure. Finally, the results indicated that in comparison to

women who delivered normally, women that had abortion exhibited higher frequency of suicidal behaviour and substance abuse.

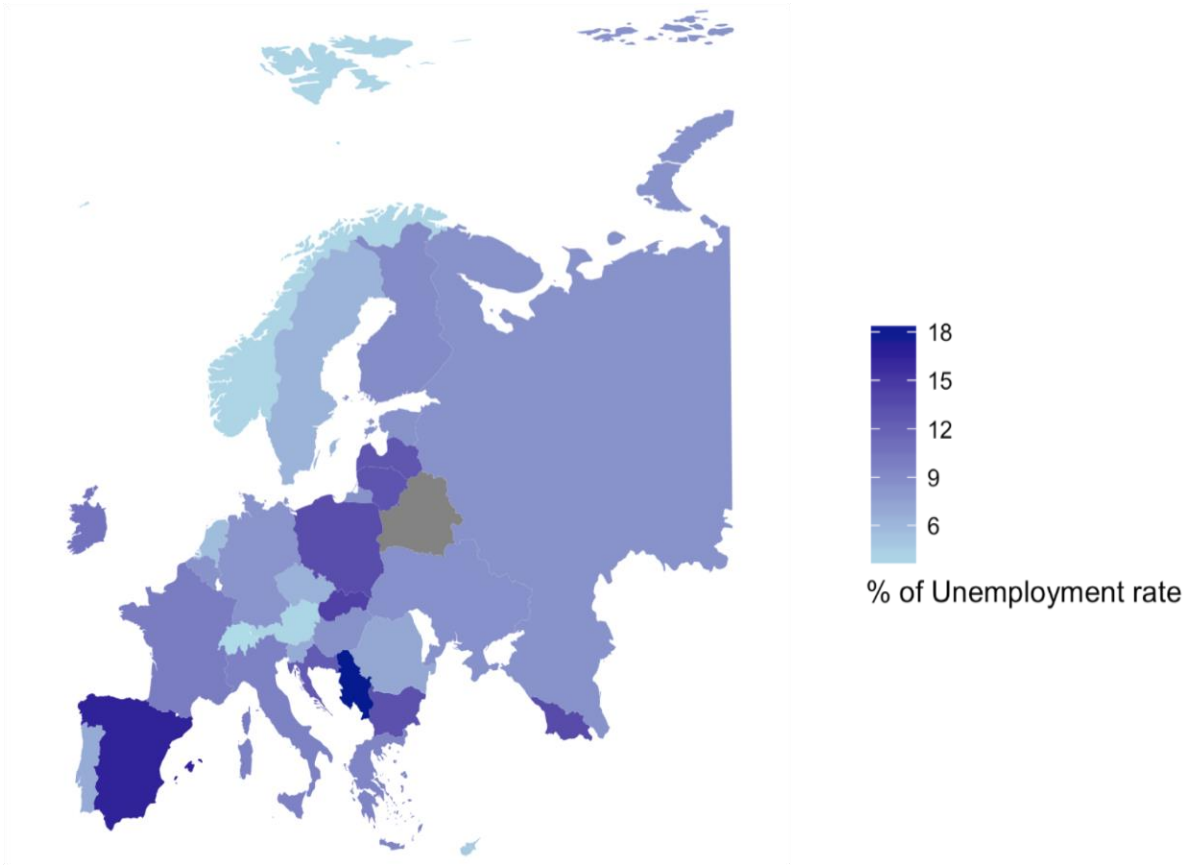
4.3. Data and Methodology

The analysis covers 34 European countries based on data availability over the period 1985 to 2011 obtained from the World Health Organisation (WHO). Descriptive statistics on suicide rates per country are presented in Table 4.1 in Appendix 4.1. We relate the suicide rates to a number of socioeconomic variables. The first is the GDP growth rate, a widely accepted indicator of the economic situation and welfare of a country. We also include the unemployment rate, another economic variable that is believed to affect suicides. We obtained data for both from the World Bank World Development Indicators (WDI) Edition of April 2012. Below we have plotted growth and unemployment rates on the map of Europe (Map 4.2 and 4.3).

Map 4.2: GDP per capita in Europe

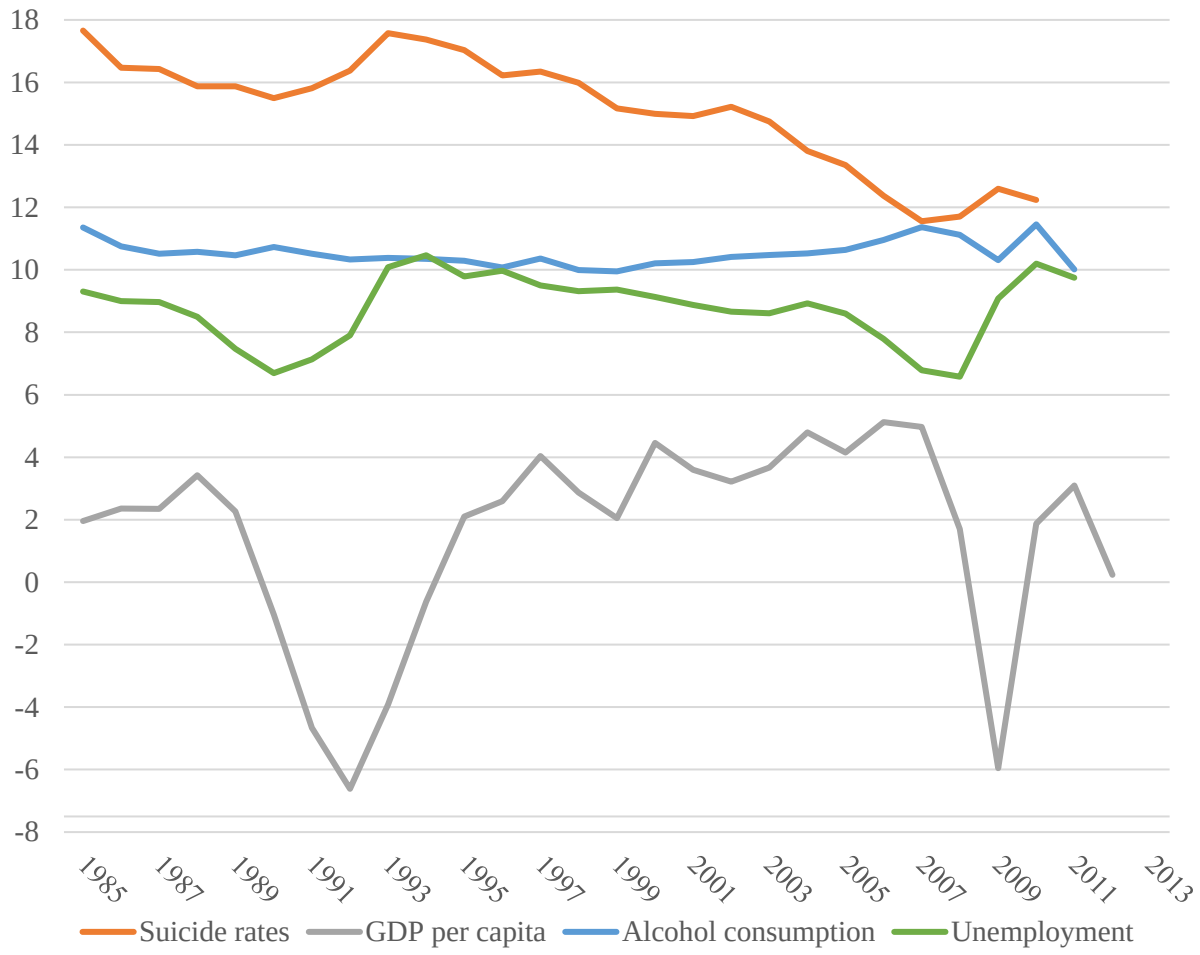


Map 4.3: Unemployment rate in Europe



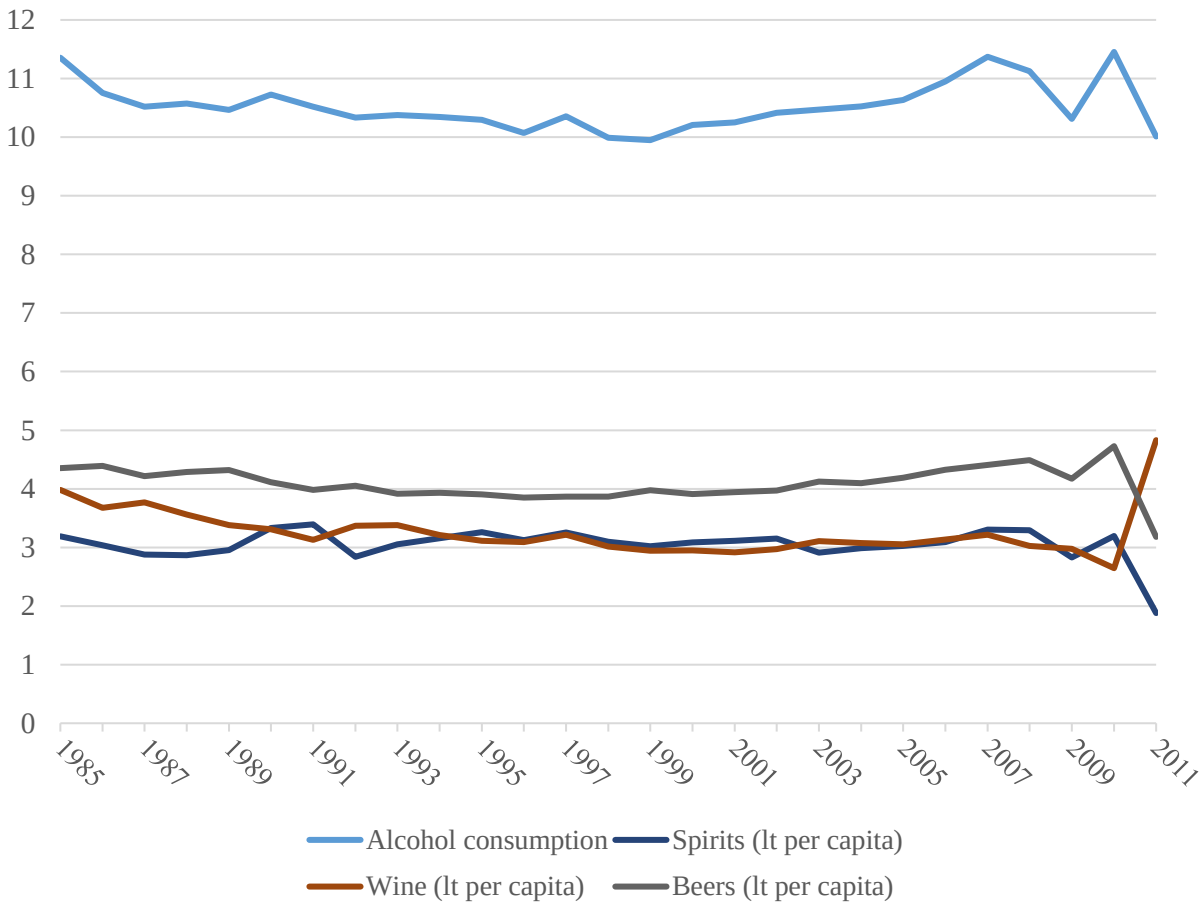
The last variable that we examine is the IMF involvement as a dummy variable with 1 indicating the years when the country received an IMF loan and 0 otherwise. To be more specific, the following 3 "facilities" are included in this variable, the Stand-By Arrangements (SBA), the Extended Fund Facility (EEF) and the Poverty Reduction and Growth Facility Arrangement (PRGF). The main differences lie in the length of the repayment period, the interest rates and the eligibility criteria. The dummy takes the value of 1 if the program was in effect for at least 5 months in a particular year. The source of this dataset is the webpage of Axel Dreher and his 2006 paper.

Figure 4.1: Evolution of the main variables



As we are dealing with a phenomenon that is mostly a subject of study of sociology, the decision was made to include some social variables to examine their effect as well. These variables include alcohol consumption counted as litres per capita; this is available as the total consumption and broken down into spirits, beer and wine (litres per capita); and the number of abortions per 1000 live births. These were retrieved from the Eurostat and the World Health Organisation (WHO), respectively. In Figures 4.1 and 4.2 the evolution of these variables years the alcohol consumption over the years respectively are represented. Finally, we also include an institutional variable, the level of democracy. Data on the latter were obtained from the PolityIV project site. The variable takes values between -10 to +10, ranging from autocracies to consolidated democracy. The descriptive statistics of all variables are provided in Table 4.2.

Figure 4.2: Alcohol consumption (litres per capita) per year



4.3.1 Methodology

4.3.1.1 Ordinary Least Squares (OLS)

As a first step, we run a standard OLS regression analysis to assess the effects of the explanatory variables described in the previous section on our dependent variable, the suicide rate per 100,000 of population. Bearing in mind that we deal with panel data, the first questions that arises is whether we should apply fixed or random effects. The main difference lies in the way the relationship between predictor and outcome variables is treated. In the fixed effects (FE) model it is assumed that each group has a different intercept in the regression equation whilst in the random effects (RE) model it is assumed that each group has different disturbance.

To determine the method to be used, we run the Hausman test. Its null hypothesis (H0) is that the unobserved effect is uncorrelated with the explanatory variable; so that RE is consistent. Running the test, we fail to reject the H_0 as the p-value= 0.8149 therefore the RE method was chosen. To ensure that RE will be the most appropriate for our sample we run a complimentary

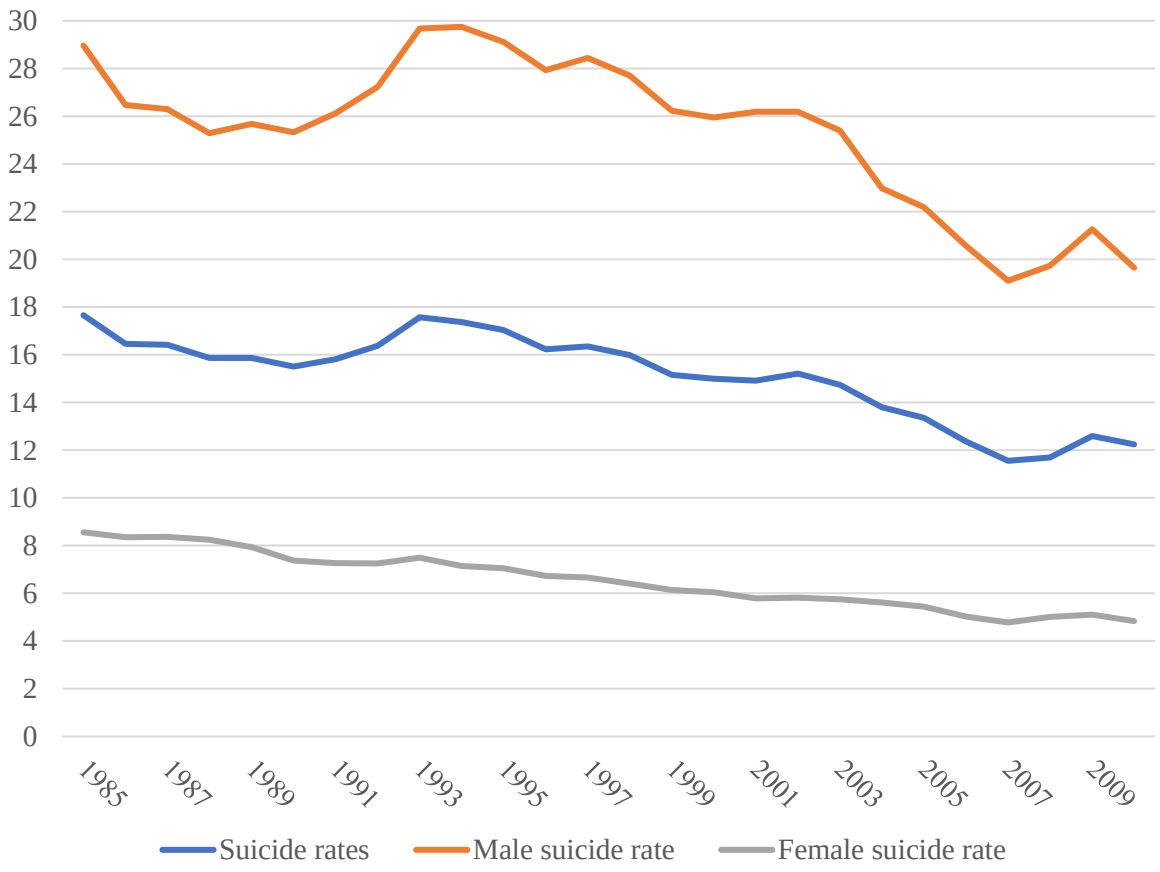
test, the Breusch-Pagan Lagrange multiplier (LM). In this case the H_0 hypothesis is that variances across entities is equal to zero, indicating that there is no significant difference across units. The LM test results gives a p-value less than 0.05 we reject H_0 affirming the decision that RE is the most suitable method (Table 4.6). The equation that will be estimated is below (eq 4.1)

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_a\, a_i + \beta_z z_i + \beta_u\, u_i + \beta_p\, p_i + \beta_f\, f_i + \varepsilon_i \text{ (eq 4.1)}$$

where $\mathcal{Y}_i$ rate of suicides ,g_i GDP per capita, a_i abortions per 1000 live births, z_i alcohol consumption as litre per capita, p_i democracy as in polity IV, u_i unemployment rate, f_i IMF loan dummy variables

To examine in depth what factors affect suicide rates in Europe, we divide the sample into two categories of subsamples. The first division is according to geography with the division being based on United Nations statistics division and the CIA World Factbook. This resulted in the two sets of sub-samples being Northern versus Southern and Eastern versus Western European countries. It should be noted that countries in the same geographic region exhibit similar characteristics. For example, Southern countries have a family oriented culture, similar weather, lower GDP per capita and were hit harder by the economic crises compared to the Northern European countries. Table 4.7 presents the country sub-samples. The other division is by gender: the dataset on suicide rates has information on the percentage of the suicides that were committed by males and females (Figure 4.3). For all the categories in the subsamples dummy variables were created.

Figure 4.3: Total suicide rates per year



This allowed us to calculate the suicide rates for women and men separately. For each sub-sample, we will run two regressions aiming in getting a clear idea on how suicide rates are affected. The first one will have all the variables as mentioned above- dropping of course abortions for the male sub-sample. In the second regression, the alcohol consumption will be substituted with its subcomponents: wine, spirits and beer consumption per capita ((eq 4.2), (eq 4.3),(eq 4.4), (eq 4.5)).

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_a\, a_i + \beta_u\, u_i + \beta_p\, p_i + \beta_f\, f_i + \beta_w w_i + \beta_s s_i + \beta_v\, v_i + \varepsilon_i \quad \text{(eq 4.2)}$$

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_a\, a_i + \beta_u\, u_i + \beta_p\, p_i + \beta_f\, f_i + \beta_w w_i + \varepsilon_i \quad \text{(eq 4.3)}$$

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_a\, a_i + \beta_u\, u_i + \beta_p\, p_i + \beta_f\, f_i + \beta_s s_i + \varepsilon_i \quad \text{(eq 4.4)}$$

$$\mathcal{Y}_i = \beta_i + \beta_g\, g_i + \beta_a\, a_i + \beta_u\, u_i + \beta_p\, p_i + \beta_f\, f_i + \beta_v\, v_i + \varepsilon_i \quad \text{(eq 4.5)}$$

where $\mathcal{Y}_i$ rate of suicides ,g_i GDP per capita, a_i abortions per 1000 live births, z_i alcohol consumption as litre per capita, p_i democracy as in polity IV, u_i unemployment rate, f_i IMF loan dummy variables , s_i spirit consumption as litre per capita, w_i wine consumption as litre per capita, v_i beer consumption as litre per capita

Before testing the effect of the independent variables on the suicide rates in the different subsamples it is essential to check if there is any difference in the way these two are affected. In order to achieve that, we perform the Chow test. This test tests whether the coefficients in a regression model are the same in the various subsamples. The null hypothesis is that $a_1=a_2$ and $b_1=b_2$ and so on—when the H_0 is accepted it indicates that the slope and intercept are the same in the subsamples.

The Chow test tests whether the coefficients of two linear regressions on different data sets are equal. In our case we will conduct it in the two subsamples i.e. Eastern vs Western and Southern Vs Northern European countries. The results will then be used to determine whether the independent variables have different impacts in the examined subgroups and consequently to justify the need of dividing the data set into different subsamples.

4.3.1.2 Panel Cointegration Models

As an alternative to regression analysis, and a robustness check, we use panel cointegration analysis. The panel cointegration techniques give the opportunity to the researcher to test variables that have both time-series and cross-sectional dimension. This will allow us to account for complicated relationships between variables by testing simultaneously for dependencies amongst countries that exist over time. This increases the power of the test, which can be accounted as its main advantage compared to OLS. We run both cointegration and causality tests to report the short run and long run effects of the independent variables on suicide rates.

Cointegration and unit root

When non stationary variables are tested in a simple regression, the results can imply a causal relationship between them when no such relationship exists - spurious regression. In this case, we can draw interesting and useful insights by observing the way the cointegrated variables behave.

The lag selection criterion to be used in the analysis is the Akaike's information criterion (AIC) (Ng and Perron, 1995, Burnham and Anderson, 2002). The criterion indicates the preferred lag selection based on minimising the Kullback-Leibler distance between the model and the truth. The AIC criterion shows that the optimal number of lags to be used in our case is 8. After

having identified the lag length we run the Johansen Maximum Likelihood(ML) with the lag length as indicated by AIC to examine the number of cointegrating equations in our sample. The results show that there are at least four thus the cointegration rank is three. Having confirmed its existence, we try to identify the effects of independent variables to suicide rates by checking the causality.

Causality

According to Granger (1969), causality can be divided in short-run and long-run. This means that the independent variables may cause an effect to the dependent in the short and not in the long run, vice versa or both. In the case of suicides, we will try to understand which of the exogenous variables affect them in the short run and which on the long run. With the use of vector error correction model and the Wald test we check if the above effects exist and then identify their nature. It should be mentioned at this stage that the error correction term determines the existence of long-run causality from the explanatory variables to the dependent. On the other hand, the test that determines the short-run causality is a Wald or F-test on the joint significance of the lagged explanatory variables. The null hypothesis in both cases is that there is no long-run effect and no short-run effect.

4.4. OLS and Chow Test Results

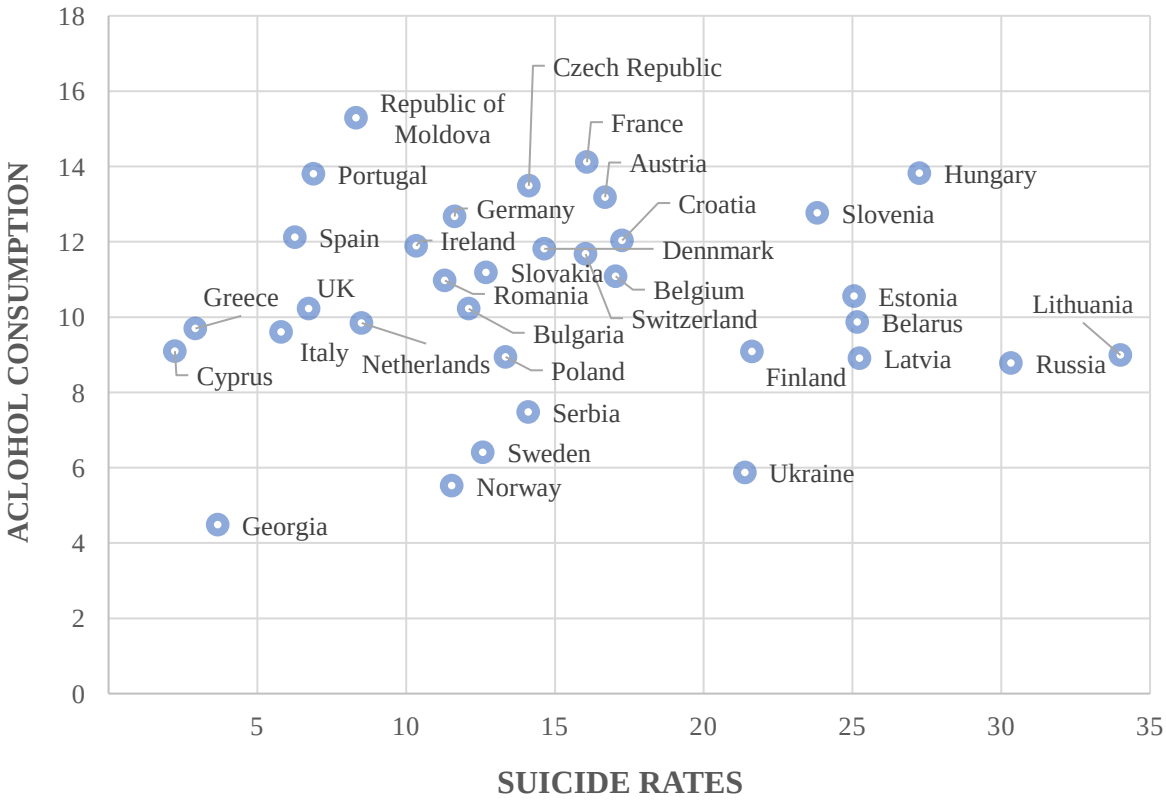
4.4.1 OLS Results

Table 4.1 depicts the OLS results. The results show that IMF's intervention increase the total suicide rate, which confirms our expectation. More specifically it seems that, on average, the suicides increase by 1.1 deaths per 100,000 when an IMF program is in effect, with this effect being significant at the 5% level of significance. In contrast, growth of GDP per capita does not have any effect on the suicide rate. Each additional abortion per 1000 live births leads to 0.006 increase in suicides per 100,000 people. Put differently, 167 abortions per 1,000 live births can account for one additional suicide per 100,000 people. An increase in the unemployment rate by 1 percentage point leads to 0.21 more suicides per 100,000 people. The above two results are not surprising; these variables are closely linked to a person's psychology and their positive effect on the dependent variable was to be expected. Unemployment and more specifically long-term unemployment leads to negative feelings that can distort the mental health of the unemployed that often leads to depression. Unemployment also means lower family income and at the same time a fall in social status, which strengthens the negative feelings, described above and could potentially lead to self-harm incidents.

On the other hand, democracy lowers the suicide rate: the more democratic the country the lower the suicide rate (a decrease of 0.19 suicides per 100,000 people for every one-point increase in democracy). Knowing that the dataset comprises European countries it is not very common to see countries in the lower bands in the Polity IV scale. The majority of the countries in Europe are democracies or close to being democracies. However, during the 28 years of the sample period there have been some countries diverging from democracy. The countries that were given a score less than 0 are depicted in Table 4.8.

The last variable to discuss is the alcohol consumption per capita. The striking result is that alcohol consumption has a negative effect on the suicide rates. The results indicate that an increase in alcohol consumption by 1 litre per person decreases the suicide rate by 0.28 per 100,000. Trying to examine if this result persists, we lagged the variable one and two years. When lagging once the decrease in the rate of suicides is larger; 0.41, and after applying two lags the effect is 0.47. The effect of the other exogenous variables is similar to the effect in the baseline regression. In Figure 4.4 we plot the suicide rates against alcohol consumption for the countries in the dataset.

Figure 4.4: Suicide rates vs alcohol consumption per country



Considering the latter to be interesting, we have decided to further explore the alcohol effect on suicides by considering the breakdown of alcohol consumption into types of alcohol. Specifically, we rerun the regressions while substituting the alcohol consumption with wine, beer and spirits consumption as litres per capita (Table 4.2) for both the whole dataset and the subsamples.

The results indicate that only spirits and wine lower suicides, being significant at the 1% and 5% significance levels, respectively. On the other side, beer consumption increases suicides. The impact of the remaining variables is unchanged compared to what was reported earlier.

To ensure that the results reported above are not distorted due to collinearity among the three different types of alcohol we run all the regressions again including only one alcohol variable at a time. When including only one type of alcohol at a time, the results do not seem to significantly different from what was reported above, however there are some results that differ. Beer, as before seems to increase suicides apart from the males sample, in which there is no effect, whereas spirits negatively affect suicides in most of the subsamples. The exceptions are the females whose suicide rates are not affected by the consumption of spirits and the Western countries where consumption of spirits is positively correlated with suicide rates. On the other hand, the results that we get when we run the regression for wines are not very consistent. In the whole sample, the northern countries and the males subsamples, the wine consumption is insignificant as a factor of suicides. When it comes to females and Western countries the effect of wine is negative. In contrast, in Southern and Eastern countries it is positive (Table 4.3). The results of the other variables are unchanged apart from the IMF effect on the Western countries when we run the regression with only beers: the IMF impact appears negative whereas before it was positive.

From the results reported above the one that we thought it was interesting that the effect of spirits was positive in Western countries. To examine it further we have decided to check whether there is a specific country or countries that trigger this effect. We re-run the regression for the Western countries sample again dropping one country at a time to check if there is a change in the results. During the first run, we observed that when dropping Finland, the spirit impact on suicides becomes insignificant with the highest p-value compare to the results that other countries generate. However, none of the regressions give us a negative significant result so we repeat the same procedure one more time with all the Western countries but having as a starting point the sample where we do not include Finland. The observation was that in the case

where both Finland and Spain are not included in the sample, an increase in the spirits per capita decreases suicide rates in the Western countries sample. The p-value equals 0.001 and the coefficient is -2.15. As far as the other variables are concerned when both countries are excluded unemployment increases suicides while democracy decreases them. The remaining three variables, abortions, GDP and IMF have no effect whatsoever.

4.4.1.1 Chow Test Results

In an attempt to evaluate the suicide effect in more depth we test its effect by splitting the sample in two ways: North vs South, and East vs West. We performed the Chow test to examine if any differences in the samples exist. In Table 4.10 both the Chow test results for Southern versus Northern and Western versus Eastern countries are represented.

The P-value in both samples is less than 0.05 meaning that the null hypothesis is rejected. We can proceed with the OLS regressions for both samples.

Southern vs Northern Europe

In the first sample the results are similar but not identical. Suicide rates in both Southern and Northern countries are affected positively by abortions and unemployment. The level of democracy seems to have a negative effect on the Southern countries- so the more democratic the countries are the lower the suicide rate but democracy does not affect suicides in the Northern part of Europe. On the other hand, alcohol consumption affects negatively the dependent variable in the Northern countries while the IMF dummy has a positive effect whereas both variables are insignificant in Southern Europe. Finally, suicide rates in both cases are not affected by GDP per capita. The results in detail are represented in Table 4.1.

Focusing on the alcohol breakdown effect in the Northern countries we see that all three types of alcohol significantly affect suicides. Spirits and wine, have a negative effect while the effect of beer is positive. Looking into the Southern countries, we notice that wine and beer consumption increase suicide rates whilst spirit consumption decrease them. When comparing the rest of the variables nothing changes in terms of significance and the way they impact suicides (Table 4.2). The only exception is unemployment, which seems to change from a positive to negative effect. Dropping spirits from the regression it changes to positive again.

Eastern vs Western Europe

The differences in the other subsamples are substantial. The only variable remaining unchanged is GDP growth that does not exhibit any significance in either subsample. In Eastern European countries, abortions, unemployment and IMF dummy have a positive effect while alcohol consumption and level of democracy negative. On the other hand, in the Western part of Europe, the IMF assistance and the level of democracy do not play any role in determining the level of suicides. Nevertheless, abortions, unemployment and alcohol consumption impact the dependent variables positively. The results are depicted in Table 4.1 in detail.

In the second regressions that we run, spirits and beer positively affect suicides and wine negatively for Western countries whereas in Eastern Europe only spirits are found to be negatively significant. It should be mentioned that there is no difference in the behaviour of the remaining variables compared to what it was reported above (Table 4.2).

Males Vs Females

To continue we investigate the way the two genders behave towards suicides. Dropping the abortions variables from the male sample for self-explanatory reasons, we perform the OLS regression. Starting with the male sample, we observe that all variables but one, the GDP per capita, affect the dependent variable. Alcohol and level of democracy decrease the suicide rate whilst unemployment and IMF involvement the opposite (Table 4.1). Examining the effect of the specific type of alcohol we find that wine does not have any effect but spirits and beer per capita decrease the rates of suicides. The behaviour of the other variables is in line to what reported above (Table 4.2).

The female sample generates different results. Including the abortions variable this time, we observe that for women, only abortions and unemployment lead them to commit suicide (Table 4.2). The results differentiate a bit when we introduce the alcohol breakdown in the regression. To begin with, wine has a negative effect whereas beer a positive; spirits seem to have no effect whatsoever. Unemployment and abortions do not change compared to before, however the level of democracy now has been found negatively significant (Table 4.2).

Map 4.4: Females Vs Males suicide rates

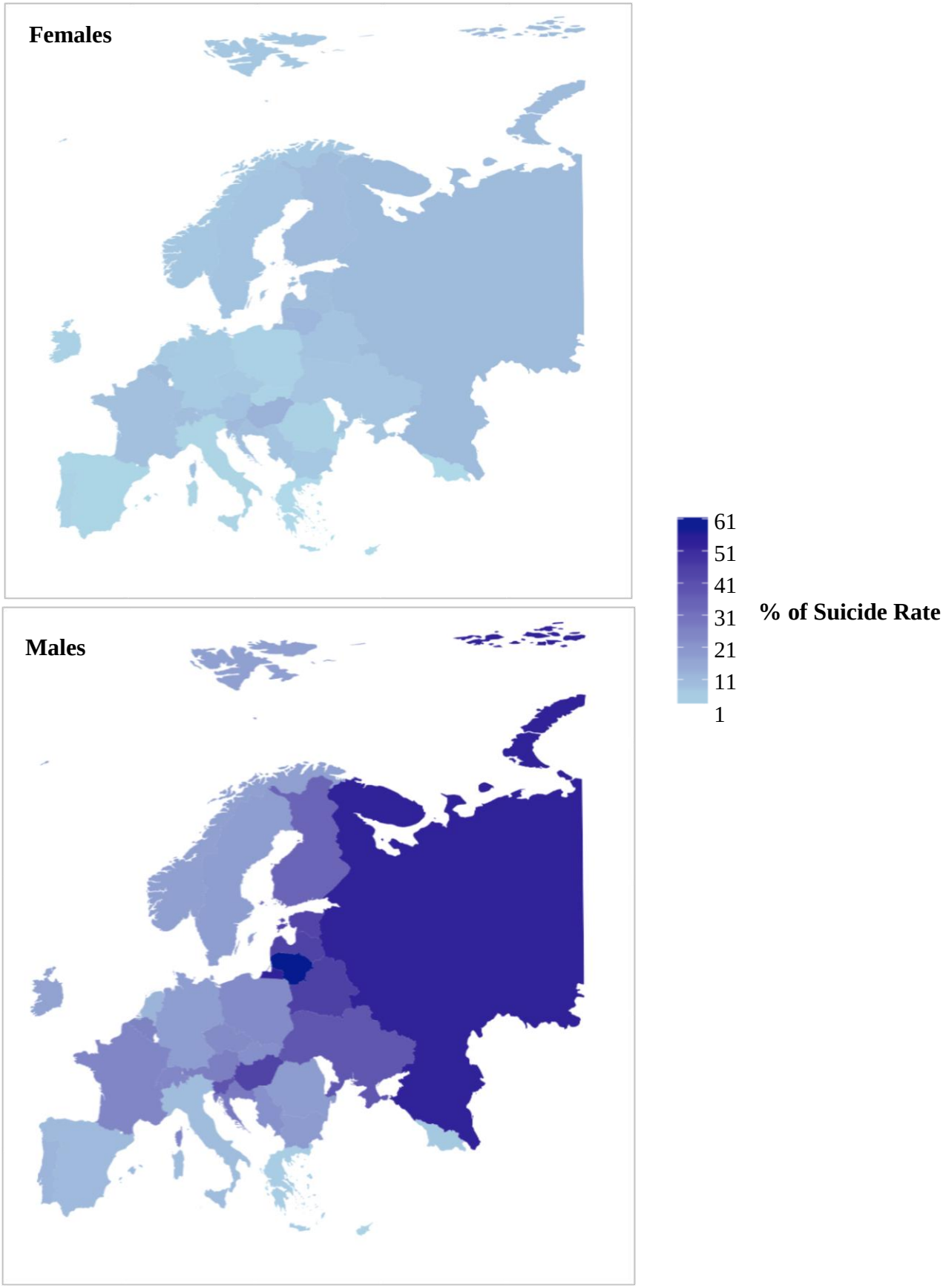


Table 4.1: OLS and sample results

Suicide rates	OLS	Southern	Northern	Eastern	Western	Males	Females
GDP per capita	0.01930	-0.02264	0.03225	0.01961	0.02595	-0.04574	0.00948
	(0.0320)	(0.0402)	(0.0389)	(0.0368)	(0.0665)	(0.0490)	(0.0164)
Abortions (per 1000live births)	0.00640 (0.0008)***	0.00756 (0.0009)***	0.00676 (0.0011)***	0.00506 (0.0008)***	0.03299 (0.0058)***	- -	0.00345 (0.0004)***
Alcohol consumption (lt per capita)	-0.27528 (0.0919)***	0.06447 (0.0962)	-0.35202 (0.1234)***	-0.42889 (0.1075)***	0.42740 (0.1797)***	-0.90659 (0.1286)***	0.00918 (0.0465)
Unemployment	0.20904	0.09469	0.24738	0.25487	0.24096	0.36872	0.12075
	(0.0450)***	(0.0436)***	(0.0628)***	(0.0651)***	(0.0631)***	(0.0688)***	(0.0230)***
Democracy	-0.18976 (0.1126)	-0.27176 (0.0662)***	0.24256 (0.2999)	-0.24373 (0.1184)***	0.60291 (0.8475)	-0.79302 (0.1718)***	-0.08831 (0.05763)
IMF loans	1.09393 (0.4492)***	-0.12474 (0.4979)	1.44825 (0.5710)***	1.61148 (0.5206)***	-1.02826 (0.9968)	3.18523 (0.6746)***	0.03165 (0.2305)
R-sq	0.2929	0.5518	0.2862	0.437	0.1573	0.2278	0.2489
Number of obs	511	126	385	265	246	597	513
Rho	0.901	0.9119	0.8604	0.9317	0.8533	0.9286	0.8272
Wald chi2	202.7	127.67	152.23	189.72	40.74	164.81	154.18
Prob>chi2	0	0	0	0	0	0	0

Table 4.2: Alcohol consumption results

Suicide rates	OLS	Southern	Northern	Eastern	Western	Males	Females
Spirits[1]	-0.67545	-0.73652	-0.75093	-0.91694	0.96897	-1.17772	-0.00476
	(0.1237)***	(0.3144)***	(0.1574)***	(0.1362)***	(0.3712)***	(0.2018)***	-0.0618
Wine [1]	-0.28043	0.64703	-0.66962	0.36138	-0.49769	-0.23286	-0.27555
	(0.1488) **	(0.2167)***	(0.2322)***	(0.2025)	(0.24207)***	(0.2223)	(0.073)***
Beer [1]	0.84111	3.65681	0.88716	-0.19305	1.62072	-0.64604	0.67529
	(0.1701)***	(0.2618)***	(0.1960)***	(0.2454)	(0.2686)***	(0.2494)***	(0.0844)***
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.3652	0.2446	0.3663	0.52	0.3898	0.2168	0.3556
Number of obs	511	126	385	265	246	597	513
Rho	0.9152	0	0.8809	0.9476	0.6835	0.9179	0.8562
Wald chi2	281.27	308.47	211.72	259.59	115.94	150.15	254.73
Prob>chi2	0	0	0	0	0	0	0

1. litres per capita

Table 4.3: Separate alcohol consumption by type

Suicide rates	OLS	Southern	Northern	Eastern	Western	Males	Females
Spirits[1]	-0.74122	-0.94567	-0.71766	-0.94744	1.30229	-1.07769	-0.04954
	(0.1220)***	(0.1370)***	(0.15228)***	(0.1287)***	(0.4056)***	(0.1986)***	(0.0637)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.3332	0.6859	0.3146	0.5112	0.1905	0.2049	0.2491
Number of obs	511	126	385	265	246	597	513
Rho	0.9066	0.9843	0.8685	0.9401	0.6962	0.9145	0.8291
Wald chi2	241.34	248.12	171.47	253.14	41.72	140.34	155.09
Prob>chi2	0	0	0	0	0	0	0
Wine[1]	-0.04037	0.519277	-0.23174	0.625485	-1.19613	-0.02332	-0.21473
	(0.1543)	(0.1184)***	(0.2327431)	(0.1962)***	(0.2439)***	(0.225306)	(0.0762)***
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.2775	0.6172	0.271	0.4241	0.2244	0.156	0.2645
Number of obs	511	126	385	265	246	591	513
Rho	0.8984	0.972	0.8576	0.9274	0.8379	0.9205	0.8324
Wald chi2	190.36	182.1	142.46	179.97	61.35	105.92	164.94
Prob>chi2	0	0	0	0	0	0	0
Beer [1]	0.99411	1.32374	1.00127	0.47778	2.12723	-0.49018	0.64515
	(0.1712)***	(0.3275)***	(0.19898)***	(0.2377)***	(0.2417)***	(0.254151)	(0.0838)***
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

R-sq	0.3229	0.515	0.3217	0.4044	0.3545	0.1623	0.3309
Number of obs	511	126	385	265	246	597	513
Rho	0.9035	0.6713	0.8646	0.9262	0.9183	0.9238	0.8408
Wald chi2	236.88	112.04	175.79	169.87	124.8	110.43	232.69
Prob>chi2	0	0	0	0	0	0	0

1. litres per capita

4.4.2 Panel Cointegration

In this section of the paper we will present the results from the panel cointegration analysis. Both the long and the short-term results will be discussed.

4.4.2.1 Wald Test

The Wald test results (Table 4.9) indicate that a long run effect exists. The p-value is less than 0.05 thus we reject the null hypothesis that the independent variables have no effect on the dependent. Next, we will try to investigate a bit further by trying to understand whether each individual variable affects suicide rates in the short run. The results of the Wald tests (Table 4.9) show that there is not a specific trend. The latter means that one of the variables seem to effect suicide rates in the short run but some do not have any effect. More specifically, unemployment, abortions, polity (the scale of democracy) and the IMF dummy do not suggest any short run effect on suicides.

On the other hand, the other two variables, alcohol consumption and GDP per capita, exhibit a short-run causal effect on the dependent variable. Both their p-values are 0.03% leading to the rejection of the null that there is no short-run effect at the 5% level of significance.

Observing the results, we have tried to understand the reasons behind the fact that only alcohol consumption and GDP growth have a short run effect on suicides. We believe that the other variables do not exhibit short run effects because they need time to show their effects on individuals. Starting with unemployment, it can be argued that it does not exhibit any short-term effect, as it takes time for negative feelings to build up while unemployed and it is not an instant feeling. However, when someone is without a job for a long period of time, means that you are not able to provide to your family or even not being able to satisfy your basic needs. The above, only result in feeling depressed and maybe even "useless". Needless to say, also that peer pressure plays its role in situations like that, especially, when surrounded by people that all work. Everything mentioned may as well lead someone in committing suicide.

When it comes to abortions, we think that it takes some time for a woman to realise what has been through and understand the feelings that an abortion has. Finally, an IMF program and the different conditions that are imposed to the country to hit the targets agreed do take time to implement. This insinuates that the citizens of a country that receives the loan will only understand the impact of the IMF aid only in the long run.

4.5. Conclusions

The focus of this paper is the determinants of suicide rates in Europe. Literature on the topic exists in both sociology and economics. Our results confirm the various variables identified by the two disciplines indeed affect the way people behave towards suicides. More specifically, many papers in literature argue that an increase of both abortions and unemployment affect negatively suicide rates as per the results of our research. On the other side, the majority of the papers report that a decrease in GDP per capita and an increase in alcohol consumption positively affects suicides, whereas we found the former to be insignificant and the latter negative.

In our paper we also examine the effects of our independent variables on suicides in various subsamples. We find that there are also considerable differences across countries, and between males and females. Focusing on European countries, we try to identify not only what factors can lead people to commit suicide but also their relative weight. The results are mostly as expected. Two of the variables, that both generate negative feelings and are associated with changes in the psychology of a person, abortions (measured as a number per 1000 live births) and unemployment, increase suicides. The IMF intervention dummy has a similar effect. On the other hand, the level of democracy decreases suicides, implying that the more democratic a country the fewer suicides it has. The GDP growth is found to be insignificant. Finally, the most striking result, came from the analysis is that alcohol consumption reduces the suicide rate. When breaking down the alcohol consumption into types of alcohol, we find that wine and spirits decrease the rate of suicides whilst beer increases it. A possible interpretation for this surprising result is that alcohol offers an alternative to suicide: depressed people drown their sorrows, not themselves. The fact that only stronger kinds of alcohol appear to have this kind of effect seems consistent with this explanation. Nevertheless, further research will be needed to confirm this finding.

Moving now to the results from the different subsamples, we see that results vary depending on geography and sex. Firstly, we report the results obtained from two geographic divisions, Northern compared to Southern and Eastern compared to Western. Three of the independent variables appear with the same effect on suicides in all geographic regions: abortions, unemployment always increase suicides and GDP growth always has no effect. The IMF assistance increases suicides in both Northern and Eastern Europe but is insignificant for the other two subsamples. The level of democracy increases suicides in Southern Europe,

decreases them in Eastern Europe and does not affect the remaining two. In Northern and Eastern European countries, alcohol consumption decreases the rate of suicides. More specifically, spirits were found negative in both, wine negative in the Northern sample, while beer was positive and both wine and beer insignificant in Eastern Europe. On the other hand, its effect is positive in Western countries, with spirits and wine being positive and wine negative, and in Southern Europe. Introducing the breakdown, spirits turned out significant and negative but the rest insignificant. In figure 4.5 a summary of findings is presented.

Figure 4.5: Summary of findings

Sample	• Positive	Negative	Insignificant
OLS	• Abortions • Unemployment • IMF loan Dummy	Alcohol consumption	Democracy GDP per capita
Southern	• Abortions • Unemployment	Democracy	IMF loan dummy GDP per capita Alcohol consumption
Northern	• Abortions • Unemployment • IMF loan Dummy	Alcohol consumption	Democracy GDP per capita
Eastern	• Abortions • Unemployment • IMF loan Dummy	Alcohol consumption Democracy	GDP per capita
Western	• Abortions • Unemployment • Alcohol consumption	Democracy	GDP per capita IMF loan Dummy
Males	• Unemployment • IMF loan Dummy	Democracy Alcohol consumption	GDP per capita
Females	•Abortions •Unemployment • Alcohol consumption		Democracy IMF loan Dummy GDP per Capita

Another round of tests, focused on the alcohol effect on suicides, was to investigate what is the effect of each one on its own by excluding the other two types of alcohol but still including all the other control variables. Starting with beer, we observe that its consumption always increases suicides in all the samples but one, the male sample where the effect is insignificant. On the other hand, spirits are insignificant in the female sample and negatively significant for all the others apart from the one for Western countries. When Finland and Spain are dropped though in the specific sample the spirit effect changes to negative, suggesting that these two

countries may be outliers driving the positive result in the Western sub-sample. The last type of alcohol that we have tested is the wine. Its results are not very consistent. In the whole sample, the North and the males it has no effect, in the South and East it is positive whilst in the West and the Females is negative.

The last regression results to report are the gender subsamples. Excluding abortions in the males' sample for obvious reasons, we find that the IMF dummy and the unemployment increase suicide rate whereas the level of democracy decreases it. The alcohol consumption impacts male suicide rates negatively, with both spirits and beer being negative and wine having no effect. The GDP growth is insignificant. Bringing back abortions to the regressions and re running it for females, we found that abortions and unemployment increase suicides whilst the other variables are insignificant. In the alcohol breakdown though, wine consumption was negative, beer positive and spirits had no effect.

It is also worth noting that in an attempt to understand a bit better what affects suicides we have decided to check the short run and the long run effects if any with the help of a panel cointegration regression. The results indicate that all the variables exhibit long run effects but not short run effects. More specifically, alcohol consumption and GDP per capita seem to have short run causal effect on suicide rates.

Appendix 4.1

Table 4.4: Descriptive statistics for countries

Country	N	Mean	Min	Max	Std. Deviation
Czech Republic	26	14.12	10.6	18.34	2.18
Austria	26	16.69	11.15	24.31	3.69
Belarus	19	25.17	16.79	31.84	5.50
Belgium	22	17.04	14.92	19.4	1.25
Bulgaria	26	12.10	8.21	14.47	2.07
Croatia	26	17.26	12.92	20.56	2.47
Cyprus	9	2.23	0.13	4.4	1.48
Dennmark	25	14.64	8.97	23.79	5.25
Estonia	26	25.06	14.72	37.74	6.93
Finland	26	21.63	16.23	27.48	3.61
France	23	16.08	13.03	19.47	1.83
Georgia	16	3.68	1.81	4.42	0.75
Germany	26	11.63	8.64	16.79	2.09
Greece	26	2.92	2.29	3.53	0.33
Hungary	26	27.25	18.45	38.79	6.51
Ireland	26	10.35	7.21	13.17	1.52
Italy	24	5.81	4.57	6.72	0.58
Latvia	26	25.24	16.18	37.87	6.16
Lithuania	26	34.00	24.06	44.35	6.99
Netherlands	26	8.51	6.93	10.11	0.74
Norway	26	11.54	1.5	15.64	2.60
Poland	24	13.34	11.04	15.8	1.01
Portugal	26	6.89	3.7	9.6	1.61
Republic of Moldova	24	8.32	3.7	15.92	3.90
Romania	22	11.30	8.39	18.7	2.37
Russia	22	30.33	21.38	39	5.62
Serbia	12	14.11	12.59	16.05	1.05
Slovakia	26	12.69	8.8	17.47	2.55
Slovenia	26	23.82	15.21	30.46	4.26

Spain	26	6.27	5.7	6.78	0.28
Sweden	26	12.58	10.34	16.19	2.01
Switzerland	26	16.03	11.1	21.66	2.70
Ukraine	22	21.39	16.48	26.43	3.30
United Kingdom	26	6.73	5.73	7.93	0.54
Total	**810**	**15.17**	**0.13**	**44.35**	**8.52**

Table 4.5: Descriptive statistics

Variables	Min	Max	Mean	Std. Deviation
Suicide rates per 100000 population	0.13	44.35	15.17	8.52
GDP per capita	-45.32	18.69	1.61	5.65
Abortions per 1000live births	0.34	3152.59	492	448.28
Alcohol consumption (lt per capita)	2.06	21.13	10.52	2.91
Unemployment	0.6	23.9	8.8	4.34
Democracy	-8	10	8.06	4.18
IMF loans	0	1	0.16	0.36

Table 4.6: Breusch-Pagan Lagrange multiplier (LM)

Estimated Results	Variance	sd = sqrt(Var)
Suicide rates per 100000 population	67.2855	8.2028
e	7.3273	2.7069
u	71.4939	8.4554
Var(u)	0	
chi2(1)	3409.7	
Prob > chi2	0	

Table 4.7: EU country division

Northern	Eastern	Western	Southern
Austria	Czech Republic	Austria	Bulgaria
Belarus	Belarus	Belgium	Croatia
Belgium	Bulgaria	Denmark	Cyprus
Czech Republic	Croatia	Finland	Georgia
Denmark	Cyprus	France	Greece
Estonia	Estonia	Germany	Italy
Finland	Georgia	Ireland	Portugal
France	Greece	Netherlands	Serbia
Germany	Hungary	Norway	Slovenia
Hungary	Italy	Portugal	Spain
Ireland	Latvia	Spain	
Latvia	Lithuania	Sweden	
Lithuania	Poland	Switzerland	
Netherlands	Republic of Moldova	United Kingdom	
Norway	Romania		
Poland	Russia		
Republic of Moldova	Serbia		
Romania	Slovakia		
Russia	Slovenia		
Slovakia	Ukraine		
Sweden			
Switzerland			
Ukraine			
United Kingdom			

Table 4.8: Countries with low Polity IV score

	Polity IV Score						
Country	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**
Czech Republic	0	4	1	0	0	0	0
Belarus	0	17	0	0	0	0	0
Bulgaria	0	5	0	0	0	0	0
Croatia	0	0	0	4	0	4	0
Hungary	0	3	0	0	0	0	1
Poland	0	2	2	0	0	0	0
Romania	4	0	0	0	0	0	1
Russia	0	3	1	0	1	0	0
Slovakia	0	4	1	0	0	0	0
Total	**4**	**38**	**5**	**4**	**1**	**4**	**2**

Table 4.9: Wald test result

Variables	**t-statistic**	**F-statistic**	**Chi-square**
Long run	0.0000	0.0000	0.0000
GDP per capita	-	0.0316	0.0267
Abortions per 1000live births	-	0.3913	0.3864
Alcohol consumption (lt per capita)	-	0.0363	0.0310
Unemployment	-	0.7169	0.7179
Democracy	-	0.3842	0.3791
IMF loans	-	0.1383	0.1301

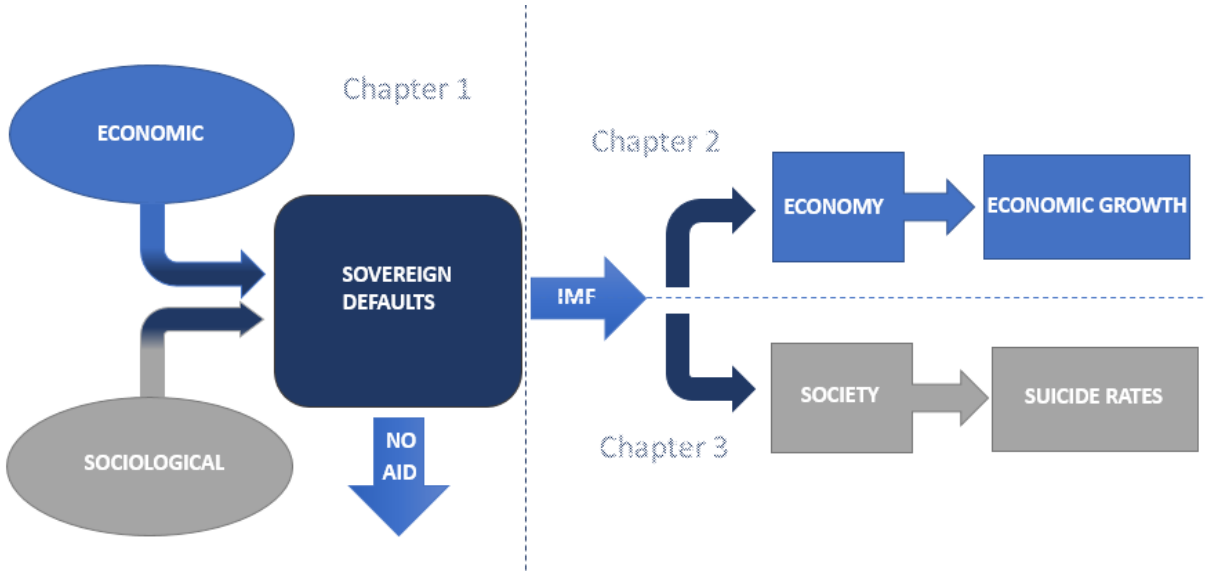
Table 4.10: Chow test results

Variables	**Southern vs Northern**	**Western vs Eastern**
GDP per capita	0	0
Abortions per 1000live births	0	0
Alcohol consumption (lt per capita)	0	0
Unemployment	0	0
Democracy	0	0
IMF loans	0	0
chi2(6)	13.89	38.85
Prob > chi2	0.0309	0

Chapter 5 Conclusions

This thesis investigates the determinants and consequences of several socio-economic ills: sovereign defaults, suicides, alcohol consumption, abortions and public finance crises. All the above interact and can affect each other. Being more specific, there has been literature suggesting that alcohol consumption is related to spontaneous abortions (Kline et al (1980), Cavallo et al (1995), Abel (1997), Henrisken (2004)). There are also papers that investigate the impact of poor economics and the effect on society and find evidence to support that economic hardship increases the probabilities of abortion (Jones et al (2011)) and also is responsible for alcohol use (Conger et al (2001), Haan et al (2010), Hardaway and Cornelius (2014)) . Finally, a vast literature argues that poor finances increase the probabilities of a country to declare default. It can be observed that the socio-economic ills are related and can affect or can be affected by each other. In this thesis, we attempt to provide a complete and clear image on sovereign defaults determinants and its affect on economics and society. We understand that this is a broad topic and the impacts can be various, as discussed, thus the decision was to focus on the economic growth of the country after experiencing a default and the role of the IMF on one side and on the other side, its s effect on the society by focusing on suicide rates and their behaviour after such an event. The figure below (5.1) depicts the link between all the chapters and how these are interrelated.

Figure 5.1: Link between the chapters



Below, the main conclusions and contribution of its chapters will be discussed, then we will summarise the main findings of this thesis and finally a discussion on recommendation regarding future research. Starting with Chapter 2, we combine the different approaches we read in the literature that try to explain sovereign defaults but also introduce more variables in our attempt to contribute to the existing research. The novelty is the use of various political indices as explanatory variables and the capital controls in outflows dataset constructed by Fernandez (2015). These political indices are the World Government Indicators, democracy as measured by Polity IV, the ICRG and the Economic Freedom as defined by the Heritage Foundation. The main findings are that indeed political institutions play a role in whether a country defaults. We find that increased political stability, democracy, economic freedom negatively affect the probability of a country to default. On the other hand, capital controls on outflows, have the contrary result. We also find that when a country is in economic hardship thus having a high debt to GDP ratio, high fiscal deficits and increased output volatility increase the chances of a country to default.

Having established that a sovereign's institutions play a key role on a country's probability to default and that indeed deteriorated macroeconomic variables increase the probability, in Chapter 3 we focus on one international financial institution this time instead of focusing on

the country, the IMF, and test whether it promotes economic growth in the countries that is intervening in. We believe that there is a gap in the literature with respect to addressing endogeneity. Bearing that in mind, instead of running a simple OLS regression we run a two stage OLS using political and institutional instruments. These are the UNSC temporary membership and the level of democracy. It is worth noting as well that we lag the IMF dummy by up to three years in addition entering it contemporaneously. This helps account for the possibility that the effect of IMF bailouts is only observed with a lag. The results indicate that IMF assistance does help the countries to reach economic growth but not immediately. The positive effect of the IMF's intervention becomes visible only with a lag of at least one year.

The aim of Chapter 4, is to investigate how the society is affected after a crisis, both in the short run and the long run. The popular press has repeatedly raised the argument that the recent Great Recession has led to increases in suicides. We therefore explore whether such a relationship exists or not. Since, this is a topic that mostly falls into the field of sociology, in addition to the economic variables we also used sociological outcomes as explanatory variables. These include abortions, alcohol consumption and the level of democracy. In line with the literature, we conclude that there is a positive relationship between suicide rates and abortions and unemployment but the opposite holds for the level of democracy. IMF interventions increase suicides as well, but strikingly alcohol consumption decreases them. All the variables exhibit long run effects but not short run except for alcohol. Conducting further tests on geography, types of alcohol and sex we can safely report that abortions and unemployment always have a positive relationship with suicides, IMF either leads to an increase in suicides or has no effect. Finally, spirits decrease suicides whilst wine and beer provide mixed results.

We believe that one of the main conclusion of this thesis is the evidence that an interrelation between political and economic variables exist and their combination increases the explanatory power of the model and the results robustness. In Chapter 2 we establish that institutions affect the probability of sovereign default and in Chapter 3 we provide evidence that institutions determine whether the IMF will get involved when countries face public-finance and broader economic crises. The results presented in this thesis also stress the importance of identifying the right regression specification in terms of sample composition, time or model. In Chapter 3, we argue that endogeneity and contemporaneity distort the results and consequently the use of instruments and lags is crucial. In this Chapter 4, dividing the sample into various sub samples

demonstrates that sometimes very different results can be obtained depending on which countries are included in the analysis.

We can also generally report that the level of democracy plays a significant role in all the topics examined in this thesis. The more democratic the country the smaller the probability to default or receive an IMF loan and the smaller the suicide rate. Furthermore, we can argue that IMF intervention does indeed have an impact on both the society and the economy; it boosts economic growth with a lag a year but unfortunately increases suicides. The latter effect, importantly, appears even when we control for economic growth and unemployment, so that it cannot be attributed to the worsening of economic performance associated with the economic hardship that led the country to request IMF assistance. One possible way to approach and explain this result is to focus on the measures that the fund implements in the countries that intervenes. These are mostly austerity measures, targeting in taxes and government spending, increases in the first case and decreases in the second. In many countries these except for resulting in social unrest, unfortunately also negatively affect the people's psychology leading to increased probabilities to suicide. Lastly, a general observation would be that when analysing socio-economic ills, the results can be unexpected and counter intuitive such as the effect of alcohol consumption on suicides.

The thesis covers a lot of ground but there some limitations. We believe that future research could introduce more variables in the models. Starting with the Chapter 2, since evidence shows that political institutions determine defaults, it would be interesting to examine whether politics also affect in any way the country's decision to repay the debt. Some of the explanatory variables that can be included are the orientation of the government in power just before and while the default occurs. By orientation, we mean whether it is a left or a right- wing government in power; the database of http://www.cpds-data.org/can be used. The timing to elections will also be a metric that can be used as it can be argued that governments that have only a year left before the elections would probably try to avoid the default to stand a chance to win the upcoming elections.

The orientation of the government in power can also be used as an instrument in Chapter 3 along with the UNSC temporary membership and level of democracy. This is because the probability of resorting to IMF is different depending on orientation of government but this does not affect the economic growth of the country. To elaborate a bit more, a left-wing government is not expected to resort easily to IMF for help as it is contract with the ideas and

ideology that stands for. Also, the use of individual- level of implications of IMF bailouts will enhance the research.

Finally, in Chapter 5 to understand a bit better how suicide rates behave in difficult economic periods, it would be interesting to investigate how and if changes in income affect suicides in the whole sample and by sex and differences in the general economic state of a country. One would expect that females for example, in an advanced economy where they earn similar to their male counterparts and contribute the family, would react differently to a cut in their income compared to females in emerging economies where probably have not reached that stage of "income" equality yet. Lastly, in the analysis of suicide determinants rather than using in the analysis aggregate level data, individual could be used to enhance the results and provide a better understanding.

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