GOVERNANCE AND GOVERNMENT DEBT

João Imaginário [*], Maria João Guedes [**]

* University of Lisbon, ISEG (School of Economics and Management), Portugal
** *Corresponding author,* University of Lisbon, ISEG (School of Economics and Management), Portugal
Contact details: University of Lisbon, Rua do Quelhas 6, 1249-078, Lisbon, Portugal

Abstract

The continuous increase in debt ratios raises concerns in economic institutions concerning fiscal sustainability and its effect on the world economy. The empirical evidence has shown that both developed and developing countries have become highly indebted and fiscal deficits are not sustainable (Afonso, 2005) As such, the quality of institutions has an important role in debt accumulation (Presbitero, 2008) and fiscal stance is closely related to government institution quality as well as political and social stability (Woo, 2003). However, little attention has been devoted to the relationship between governance quality and government debt. This study examines whether the quality of governance relates to government debt. Using a sample of 164 countries for the period between 2002 and 2015, our results show that governance quality is negatively and statistically related to government debt. For low-income countries evidence was found that a better governance environment is associated with lower public debt levels for low-income countries, but not for high-income countries.

Keywords: Governance Quality, Government Debt, Low-Income Countries, Panel Data Analysis, Worldwide Governance Indicators

1. INTRODUCTION

In the aftermath of the 2007/08 crisis, we have witnessed an increase in public debt across countries, both developing and developed. The empirical evidence has shown that fiscal deficits are not sustainable (Afonso, 2005) and countries have become highly indebted. The continuous increase in debt ratios raised concerns in economic institutions regarding fiscal sustainability and its effect on the world economy. Although the fiscal policies of the countries have received increased interest, little attention has been devoted to the relationship between governance quality and government debt.

A handful of studies have studied the relation between governance quality and government debt. On the one hand, a substantial part of these studies focused on the impact of corruption on public debt using the World Governance Index (WGI) or the Corruption Perceptions Index (CPI) indicators as explanatory variables (Cooray, Dzhumashev, & Schneider, 2017). On the other hand, Tarek and Ahmed (2017) use all six dimensions of WGI in their study to assess to what extent public debt is

affected by governance quality in the Middle East and North African countries. Also, Presbitero (2008) suggested that the quality of institutions has an important role in debt accumulation in low and middle-income countries. In the same vein, Woo (2003) found evidence that the fiscal stance is closely related to the government institution's quality as well as political and social stability.

Following the relevant strand of literature, the objective of the present study is to assess the relation between governance quality and government debt reduction. To that end, the study uses the World Bank indicators of the WGI project. These aggregated governance indicators are a combination of related indicators that measure perceptions of corruption, rule of law, regulatory quality, voice and accountability, political stability, and absence of violence/terrorism. Despite the critiques presented by some authors (Arndt & Oman, 2006; Knack, 2006; Kurtz & Schrank, 2007; Thomas, 2009), this aggregation method has its advantages: it covers a wider set of countries; it permits cross-country analysis concerning governance; it provides more precise governance measures (Kaufmann, Kraay, & Zoido-Lobaton, 1999b). Furthermore, the presence of margin errors (related to this aggregation procedure) does not consequently unable governance comparisons across countries or over time (Kaufmann, Kraay, & Mastruzzi, 2010). Indeed, Kaufmann, Kraay, and Zoido-Lobaton (1999a) found evidence of a strong relation between better economic development results, and efficient governance performance.

In order to assess the relation between governance quality and government debt, the present study uses two regression techniques. The *fixed effects* (FE) and *generalized method of moments* (GMM) are estimated with data for 164 countries for the period from 2002 to 2015. As a robustness check, the sample of countries is split into "low-income" and "high-income" countries and empirical results are also presented for this specification. The main contribution of this study to the existing literature is the analysis of the relationship between governance indicators and debt accumulation for two opposite sets of countries: "low-income" and "high-income" countries. This study also aims to provide a deeper insight into the impact of each governance dimension (and their inter-relations) on government debt.

The remainder of this study is organized as follows: Section 2 reviews the related literature; Section 3 explains the dataset and the methodology adopted; Section 4 reports the empirical results; Section 5 presents the study conclusion, limitations, and future suggestions for research.

2. LITERATURE REVIEW

In the last decades, government debt has been the focus of many economists' research work. On the one hand, some studies focused on the debt-growth relationship; on the other hand, little research has been concentrated on institution and governance quality associated with government debt and budget balance deficits. However, it is more common to find studies about the importance and the extent that public debt influences economic growth. Reinhart, Rogoff, and Rogoff (2010a) explored the effects of high central government debt on economic growth

as well as on the level of inflation for both advanced and emerging countries. Their main findings rely on the negative relation between growth and debt, meaning public debt to gross domestic product (GDP) ratio above a 90% threshold is associated with a low economic growth on both sets of countries. Similar conclusions were reached by Checherita and Rother (2010) and Reinhart, Reinhart, and Rogoff (2012) for different subsets of countries. In particular, Afonso and Alves (2014) found evidence of a negative impact of debt on growth in both the short- and long-term. In the same line of thought, high debt seems to impair growth at certain thresholds when exanimating industrial countries, as discussed by Cecchetti, Mohanty, and Zampolli (2011). The causality from growth-to-debt, according to Reinhart and Rogoff (2009), is also directly affected by fiscal impacts associated with banking crises for advanced and emerging countries. A vast literature has found evidence that economic downturns lead to higher levels of debt to GDP ratios whether the source of it was a financial crisis or not (Reinhart, Rogoff, & Rogoff, 2010b).

2.1. Fiscal sustainability

The continuous and persevering increase in government debt has sounded alarms over fiscal sustainability and its consequences on economic activity (Kim, Ha, & Kim, 2017). Even today there are different definitions and methods to assess debt sustainability as Neck and Sturm (2008) pointed out. It is common knowledge that the sustainability of public finances had been discussed in the last decades but there still exists considerable discomfort about is conclusions and especially about the explanation of the considerable cross-country differences. It is believed that the economic arguments are not sufficient to explain public debt ratio differences across similar groups of countries, like the Organization for Economic Cooperation and Development (OECD) countries. Looking at an example of PIIGS countries, Fincke and Greiner (2011) found that the euro area countries raised more concerns about debt sustainability in the last decades. The authors found evidence that Ireland, Portugal, and Spain followed sustainable debt policies in the last decades. However, the same does not apply to Greece.

Some studies followed what is called the "Ricardian equivalence", such as Barro (1979). The seminal work by Barro (1979) through the tax smoothing theory showed that public debt and budget deficits could improve welfare, and thus positively influence economic performance. This means that fiscal deficits rise when government spending is high, working as a buffer. Summarizing, the government (i.e., the social planner) should keep the tax rate constant. The present value of spending should equal the present value of taxes and that is how the level of taxes is determined (Alesina & Perotti, 1995). Notwithstanding, Woo (2003) criticizes Barro because it is quite difficult to harmonize this view when deficits are very large and there are wide variations in countries.

Other views state that the positive effect of debt has to do with egalitarian redistribution of the costs between generations. Public investment today will benefit future generations; therefore, the current cohort should not bear all the costs, meaning that issuing debt to sustain investment will make future

generations' contributors. Apart from this, Alesina (1988) argued that economic policy models cannot be disassociated from politics, highlighting the importance of the link between political competition and government debt. Moreover, Alesina and Perotti (1995) reinforced this idea, summarizing other models that suggest a relation between debt accumulation and preference polarization, the effect of elections, and also party competition.

The party polarization problem is also investigated by Roubini and Sachs (1989) which stated that there was clear evidence of larger deficits in governments with multiple political parties in the "ruling coalition", for a certain period in time. More precisely, debt accumulation comes from postponed fiscal adjustments typically associated with weaker coalition governments. Nevertheless, this result was contested by de Haan and Sturm (1997), which found that there is no positive association between government debt increases and the power dispersion index used in their work.

Some authors associate left-wingers with higher spending in areas like social security and welfare which implies more public spending and ultimately higher deficits (Afonso & Guedes, 2018). Roubini and Sachs (1989) in their study also found evidence that supports the idea that left-wing parties are bigger spenders when compared to right-wing governments or coalition governments. However, Müller, Storesletten, and Zilibotti (2016) dissect this idea and show that left-wing governments tend to increase debt accumulation only during recessions, unlike right-wing ones. Indeed, right-wing governments are more prone to adopt debt accumulation policies in "normal" times.

2.2. Public debt and institutions quality

As previously mentioned, there is a vast literature about the relationship between public debt and economic growth. Still, little attention has been given to the importance of institutions and good governance, which are seen as fundamental to preserve sustainable economic growth and a stable fiscal stance. Budgetary institutions produce effects on fiscal outcomes and, therefore, might explain cross-country differences in debt accumulation (Alesina & Perotti, 1995). According to Kim et al. (2017), good institutions reduce uncertainty for economic decision-makers leading to better productivity. Also, Masuch, Moshammer, and Pierluigi (2016) argued that the quality of institutions is a crucial determinant of GDP per capita growth. The authors found evidence (for OECD countries) that good institution quality is a major instrument to smooth government debt since it allows better management of government expenditures and thus ensures economic growth sustainability. Another study that provides empirical results about debt-institutions relation is Cordella, Ricci, and Ruiz-Arranz (2010). The authors argue that countries with a good institution and policy quality deal with debt overhang in much lower thresholds than developing countries that implement bad policies and have inefficient institutions. Similarly, Kraay and Nehru (2006) studied the determinants of "debt distress" and found that countries with good policies are able to deal with debt levels three times higher than the ones who have the same "debt distress" problems. Following the same theme, results suggested by Presbitero (2008) demonstrate

also that policies and institutions might have an effect either on debt accumulation and growth in low- and middle-income countries. Woo (2003) goes beyond and argues that socio-political stability is fundamental to explain the existing differentiation on fiscal outcomes of countries, but government institutions have an important role in fiscal stance.

A broad consensus has been established in recent years about the role of institutions on economic performance and government debt. Nonetheless, the measurement of this "good governance" and "institution quality" is not clear. In the scarce literature which takes into account these kinds of themes, the majority use indices related to corruption measures as a proxy for good institutions. Several studies use CPI index published by Transparency International as a measurement of corruption, where lower levels mean more corruption (Cooray et al., 2017); or use the Country Policy and Institutional Assessment Index (CPIA) where higher values are associated with a superior policy environment (Cordella et al., 2010).

Notwithstanding, the present study follows another strategy which not only considers corruption but also other dimensions to determine what could be accounted for as good governance and institution quality. Following Tarek and Ahmed (2017) and Barişik and Baris (2017) studies, the present study uses the six worldwide governance indicators created under the WGI project of the World Bank in order to assess their impact on government debt.

2.3. Governance and WCGI

Although various studies focus on the governance and its impact, the idea and the concept of governance is not clear and there is not a broad consensus about the definition. Several authors defined governance in a more embracing way, others presented more narrow meanings. Nevertheless, the work by Kaufmann et al. (1999a) suggests an intermediate definition: governance is seen as "the traditions and institutions by which authority in a country is exercised" (Kaufmann et al., 1999a, p. 1). The authors constructed the first indicators covering three major areas measured: "the process by which governments are selected, monitored and replaced" (p. 1) captured by Voice and Accountability and Political Stability and Absence of Violence/Terrorism indices; "the capacity of the government to effectively formulate and implement sound policies" (p. 1), measured by Governance Effectiveness and Regulatory Quality indices; "the respect of citizens and the state for the institutions that govern economic and social interactions among them" (p. 1), corresponding to the Rule of Law and Control of Corruption indices dimension.

Due to the asymmetry in country coverage and score ratings, all the individual sources are rescaled in order to perform comparisons over time. Considering this fact, the authors constructed aggregated governance indicators (mentioned above) which take into account these differences. The aggregation procedure called the unobserved components model allows for meaningful aggregation across sources (Kaufmann et al., 1999a, 1999b, 2010; Kaufmann, Kraay, & Mastruzzi, 2007b). This approach has the ability to put all the data collected from the individual sources into common units and uses a framework that allows the weighting of the indicators by their relative precision. In the

end, the aggregated indicators provide more information about unobserved governance than the individual governance sources separately, as Kaufmann et al. (2007b) report.

Governance estimation measures follow a normal distribution with a mean of zero and a standard deviation of one every period which imply that 99% of governance scores will be between -2.5 and 2.5, where lower scores mean worse ratings and, therefore, non-desirable outcomes. Governance rankings instead are from 0 to 100 (percentile rank) across all countries covered. As consistently reported in Kaufmann et al. (2007b), governance estimations are accompanied by margins of errors entirely attributable to the inevitable uncertainty related to governance measuring. With the wider coverage of countries and with the addition of new data sources to the aggregated indicators, margins of errors have been substantially reduced. It is of major importance to consider margins of errors when interpreting country scores, especially because small differences in the country's rankings are improbable enough to be statistically significant (Kaufmann et al., 1999b). However, this does not mean that the indicators cannot be used in cross-country comparisons (Kaufmann et al., 2010).

Despite the merits of this governance measure, some authors have criticized the WGI project. Critiques stem from the lack of comparability, the construct validity and the reliability and comparability across countries as summarized by Arndt (2008). One criticism is that comparisons over time and across countries are not possible using WGI (Arndt & Oman, 2006; Knack, 2006). They state that when comparing two countries' scores, governance estimations could have roots on different underlying sources. Kaufmann, Kraay, and Mastruzzi (2007a) in their working paper answer this critique arguing that despite the fact that could happen, the aggregation method used permits putting different underlying data sources into common units, thus enabling comparisons across countries. The fact that different data sources could measure different concepts of corruption does not seem to be a problem when comparing two countries' scores. This might be true either because the aggregated indicator pulls out the common component from the underlying sources and distinct forms of a component measurement tend to be highly correlated among them. Following this response, Knack (2006) argues that it may be more appropriate to use data from a single source rather than a composite index because of the loss of conceptual precision in aggregation seems to be inadequate.

On the other hand, Kurtz and Schrank (2007) state that WGI suffers from potential perceptual and selection biases towards the firm/business' views present on surveys. This fact might imply that well-founded answers about governance could diverge from the ones of common good defenders. Nevertheless, as stated by Kaufmann et al. (2007a), the existing evidence is quite robust, with correlations across all types of government data sources.

Another important question that was raised by Thomas's (2009) work is the "construct validity". Thomas criticizes the WGI in the sense that they do not present a suitable definition for each of the six dimensions of governance, in other words, if WGI are valid measurements, of what they are supposed to measure? According to the author, for a construct

measure to be valid, it has to satisfy the following two points: the theoretical definition of the construct must be represented and there must be a one-to-one relationship between measurement proposed and the observable variables. Therefore, the argument of criticism is based on the non-evidence of construct validity. Despite this fact, Kaufmann et al. (2007a) emphasize that governance definition does not have consensus in academia, therefore, the definitions for all the six dimensions are quite reasonable since they are founded on some existing definitions and on understandings of the concepts. Regarding the "discriminant" and "convergent" validity failure, the authors in their previous work demonstrated evidence that rejects these critics.

2.4. Hypotheses development

Apart from the abundant literature on economic growth and governance relationship, little has been done concerning government debt and governance quality. In any case, when and to what extent governance indicators affect public debt should be analyzed. Some studies focused particularly on the effects of corruption on government debt accumulation. First empirical works appeared in the late 1990s, especially through Mauro (1995), who found evidence that public investment is negatively affected by corruption with consequences extended to economic growth. Thus, corruption can broadly be seen as an impediment to economic development and growth. This is corroborated by Méon and Sekkat (2005) which presented evidence in favor of "sand the wheels" hypothesis in contrast with "grease the wheels" hypothesis which affirms that bad governance could be offset by corruption. Again, the authors found evidence of a positive association between corruption and public investment (Tanzi & Davoodi, 1997) where deficient resource allocation is present on government spending (Mauro, 1998). A more insightful look at Tanzi and Davoodi (1997) results, suggests that corruption reduces economic growth by decreasing government revenue through losses in tax revenues. Also, Al-Marhubi (2000) found statistical evidence of a positive association between corruption and inflation, also arguing that tax evasion costs tend to be higher in more corrupt countries. This tax revenue reduction is intimately related to the expansion of shadow economy activity (Friedman, Johnson, Kaufmann, & Zoido-Lobaton, 2000). Dreher and Schneider (2006) corroborate this finding by arguing that fiscal burden is negatively associated with unofficial activity for a 10% level of significance. The authors go further and present evidence that confirms a complementarity of the shadow economy and corruption for low-income countries. Actually, corruption does not allow governments to have an efficient tax collection and, therefore, permits an upward trend in tax evasion. Furthermore, the shadow economy diminishes the tax base and, consequently, even higher tax rates are imposed. This "mechanism" creates a vicious circle and, ultimately, leads to a worsening of economic growth, reduction of exports, hinders productivity, and also hampers foreign direct investment (Kaufmann et al., 2010). Apart from this, corruption can also worsen government expenditure composition by decreasing education and health expenditures in favor of other investments (Mauro, 1996, 1998). Such conclusions are put forward by

Delavallade (2006): government expenditure allocation is directly affected by corruption where the share of social expenditures is reduced in favor of public services and order.

Following this corruption view, it can be understood that, ultimately, corruption can be favorable for well-connected private individuals and, therefore, affect income distribution. According to Gupta, Davoodi, and Alonso-Terme's (2002) study, an increase in corruption leads to a higher propensity for the reduction in social services available to the poorest and, thus, increases poverty. The authors also believe that corruption is harmful to government income distribution since it negatively affects human capital formation and human capital distribution. Consequently, economic growth suffers a downward impairing country's fiscal stance. Finally, public expenditures can also be negatively affected by corruption through the adoption of riskier decisions over public debt composition which might lead to more expensive debt servicing (Kaufmann et al., 2010).

Many studies, the majority of them already identified in this study, have shown the negative effects and the channels through which corruption hampers growth and debt accumulation with a greater focus on developing countries (which are associated with bad governance). Nevertheless, this phenomenon is not entirely isolated to this cohort; industrialized countries also suffer from high fiscal deficits and destabilized public finances. Kaufmann et al. (2010), using WGI, emphasize that there is a dispersion between industrialized countries in controlling corruption. Moreover, evidence was found of a high correlation between corruption and fiscal deficits for the same sample of countries. Similar results were obtained by Cooray et al. (2017) study when using the same WGI of corruption method as Kaufmann. Authors state that corruption negatively affects public debt through an increase in government expenditure and shadow economy size.

From these outcomes can be inferred that misgovernance and, more specifically, corruption is not a problem exclusively of low income per capita countries but also of richer ones (Kaufmann, 2005). In line with this argument, the first proposed hypothesis is that bad governance is associated with higher government debt, stated as:

H1: Higher levels of government debt are associated with poor governance.

This implies that a country's government should be aware of the importance of governance on their fiscal stances and also that economic and financial institutions which cover both low- and high-income countries should promote the implementation of policies targeting better governance.

Notwithstanding, contrasting views about this topic have been released. Some studies claim that corruption can increase countries' efficiency in the presence of inefficient institutions. Méon and Weill (2010), using corruption and government effectiveness indexes of the WGI project, found that corruption is less detrimental in countries with more ineffective institution quality. This may occur because corruption could accelerate the decision process widely plagued with bureaucracies or as a form of trespassing a weak regulatory and institutional framework. Leff (1964) attributes importance to corruption in improving welfare and economic growth since corruption may encourage economic development by enhancing higher rates of investment and promoting innovation.

Another line of research was concerned about the other 5 governance indicators which have an impact on government debt either through direct or indirect mechanisms. Kaufmann et al. (2010) claim that WGI cannot be thought of as independent of each other and give the example that less corruption could come from a better accountability framework. It seems that all six-dimension governance indicators cannot be analyzed independently; de facto, corruption and government effectiveness have close tights relations. As Tanzi and Davoodi (1997) refer to, the government becomes more inefficient on spending and investment function due to high levels of corruption. Not only a country's output performance but also its politics contribute to the lack of effectiveness of governments. In fact, government debt deterioration is closely related to weak coalition governments (Roubini & Sachs, 1989). The work by Alesina and Perotti (1995) notes that coalition governments affect government effectiveness by delaying the implementation of necessary fiscal adjustments to combat budget deficits. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999) addresses this issue by claiming that there are differences between rich and poor countries concerning the quality of public good provision and public sector efficiency. Government size is also emphasized as being positively associated with better performance. The bigger government might imply higher inherent costs, however, the gain of efficiency on government management seems to have a wider effect on the public debt (due to a higher collection of taxes, for example). Nonetheless, Méon and Sekkat (2005) believe that corruption might also be a consequence rather than a cause of government ineffectiveness. The authors state that corruption on investment increase due to ineffective governments' decisions.

As can be seen, there is no space for an analysis of government effectiveness without exploring rule of law determinants impact. This interrelation was noted by Dreher and Schneider's (2006) paper where authors have reasons to believe that a better rule of law and greater democracy can positively affect government effectiveness by substantially reducing corruption in a country. Unofficial activities, also known as shadow economy activities, tend to be smaller in countries with better rule of law and, thus, strengthening public finances according to Friedman et al. (2000). Nevertheless, Weingast (2009) presents a contrasting view arguing that implementing and improving a better rule of law in developing countries tends to be harder than in developed countries.

Another linkage is expressed by Kaufmann et al. (2010) which states that better regulatory environments can be achieved through more effective governments. How does this affect government debt? Rules and regulations through which government budgets are designed and implemented are the responsibility of budgetary institutions and they may explain the presence of difference in debt across countries. Indeed, Alesina and Perotti (1995) found evidence that fiscal policy outcomes are influenced by budget institutions. Regulatory quality can enhance economic development, especially in some low-income group of countries like in sub-Saharan Africa (Kaufmann, 2005). Good regulatory infrastructure promotes

private sector development (Tarek & Ahmed, 2017) but also productivity and public goods provision. Nevertheless, when there is room for over-regulation and bureaucracies, shadow economy activities tend to develop (Friedman et al., 2000). Also, Kaufmann (2005) found evidence that bureaucracy in OECD countries is a major hindrance to enterprise activity. This problem could weaken government revenue, tax collection, the country's competitiveness, and, therefore, negatively impacting government debt.

Last but not least, Voice and Accountability and Rule of Law indexes: according to Kaufman et al. (2010), more transparent and fair processes of choosing and replacing governments can be obtained by citizens respecting a proper rule of law. Both developed and developing countries benefit in terms of tax performance by improving voice and accountability and control of corruption (Bird, Martinez-Vazquez, & Torgler, 2008). Legitimate and responsive governments seem to be an important factor in indulging tax effort, meaning that good governance increases the predisposition of citizens and businesses to pay taxes. Notwithstanding, another study suggests that government debt could be negatively affected by improvements in Voice and Accountability of a country. Schultz and Weingast (2003) claimed that liberal governments normally have greater access to credit comparing with illiberal governments which face a premium payment leading to credit rationing. The simple fact that government officials are constrained by limited government institutions increases the likelihood of debt repayment because electoral accountability in liberal countries have greater power in punishing governments in the case of default. Consequently, the state's borrowing power is expanded, a greater amount of loans are conceded to the country at low-interest rates, and, ultimately, government debt increases. In this latter case, political stability plays a key role. Indeed, sovereign loans tend to be larger in the presence of political instability for unconstrained regimes (Ozler & Tabellini, 1991). Moral hazard and perceiving country risk positively affect political instability which in turn might lead to a more expensive debt serving and an increase in demand for sovereign loans.

Summarizing, the main goal of this study is to assess to what extent governance has an impact on government debt. Governance itself does not influence public debt in the same way on countries; therefore, we propose to assess this fact by analysing two sets of countries: low-income and high-income countries. Following this line of thought, *Hypothesis 2* (*H2*) proposes that governance improvements have a greater impact on government debt in low-income countries.

H2: For low-income countries, government debt is lower with a better governance environment.

3. DATA AND METHODOLOGY

3.1. Sample

The data used in this study was collected from the World Bank (World Bank DataBank) as well as from the International Monetary Fund (IMF DataMapper) and Worldwide Governance Indicators database. It covers the period between 2002 and 2015 for a sample of 164 countries. The countries were divided into low-income and high-income countries for robustness purposes, as presented in Table A.1 (see Appendix). The low-income countries are those which present low per capita income measured by gross national income (GNI) per capita in US dollars, according to the World Bank classification, a threshold below $958. They can be classified as part of developing countries. Inversely, high-income countries are those which have the highest thresholds of per capita income (above $12,056), previously called "industrialized" countries. This income group division is mainly based on the operational threshold for "civil work preference" (World Bank's Data Help Desk). According to the World Bank Atlas method, GNI per capita is calculated and four groups are defined corresponding to a certain threshold as previously described. Despite the fact that GNI per capita does not account for income distribution inequalities, it has demonstrated to be a useful indicator when measuring some parameters that summarize a country's level of development. Figure 1 presents the governance debt-governance nexus for high- vs low-income countries in 2015. The disparities in governance ratings across high- and low-income countries are clear.

Figure 1. Government debt – governance nexus for high- and low-income countries (2015)

● Goverment Debt (Low income countries)   ● Government Debt (High Income countries)
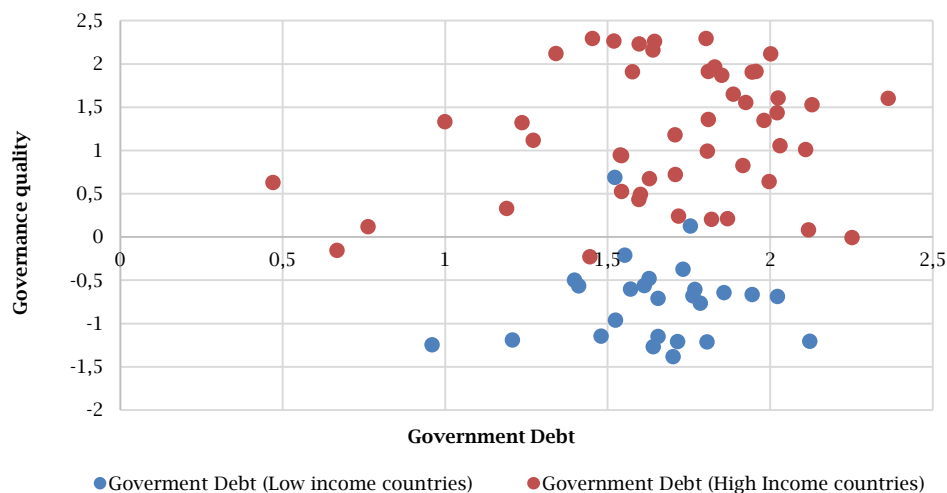
3.2. Variables

The dependent variable is general government gross debt as a percentage of gross domestic product (GDP) as a proxy for government debt. It is defined as consolidated general government gross debt at nominal value outstanding at the end of the year, according to the Maastricht Treaty. It includes debt liabilities, currency, and deposits, debt securities and loans. This set of data comes from the IMF database which has been widely used in other studies (e.g., Kim et al., 2017; Cooray et al., 2017).

Governance can be defined as "the traditions and institutions by which authority in a country is exercised" as referred by Kaufmann et al. (1999a, p. 4). This kind of definition implies that governance itself includes: "the process by which governments are selected, monitored and replaced" (p. 4) capture by Voice and Accountability and Political Stability and Absence of Violence/Terrorism indices; "the capacity of the government to effectively formulate and implement sound policies" (p. 4), measured by Governance Effectiveness and Regulatory Quality indices; "the respect of citizens and the state for the institutions that govern economic and social interactions among them" (p. 4) corresponding to the Rule of Law and Control of Corruption indices dimension.

This study uses six measures of an institution's quality which were constructed under the WGI project of the World Bank. Recalling their descriptions, we have: *Control of Corruption* (*CC*), which tries to quantify how "public power is exercised for private gain as well as 'capture' of the state by elites and private interests"; *Government Effectiveness* (*GE*) concerns about the "perceptions of public service provision and bureaucracy quality, civil servants competence, civil service independence from political pressures and government's credibility"; *Regulatory Quality* (*RQ*) index captures "perceptions of unfriendly market policies incidence and excessive regulation burden"; *Political Stability* and Absence of Violence/Terrorism (*PS*) concerns to the perceptions measurement of the likelihood government destabilization and overthrown by violent or antidemocratic means"; *Rule of Law* (*RL*) measures to what extent "society rules are obeyed and trusted by the agents"; *Voice and Accountability* (*VA*) indicator measure "to what extent citizens are able to select a country government and have freedom of speech". Here the estimations range from (-2.5) to (2.5), with the lower values representing lower governance performance. More details about the underlying sources, aggregation method, and their interpretation can be found in the WGI methodology by Kaufmann et al. (2010).

The control variables that follow the related literature are *GDP per capita* (current US$) which is used to measure the level of development of a country and to capture some socio-political effects (Cooray et al., 2017; Tanzi & Davoodi, 2000; Woo, 2003). Furthermore, whereby government consumption expenditure is directly affected by existing countries' corruption (has a negative impact), then it is also taken into account in the empirical analysis as Gupta et al. (2002) suggest. Accordingly, General Government Final Consumption Expenditure as a percentage of GDP (*LOG_GGFCE*) is used since could be seen as a macroeconomic variable that accounts for government spending, following Swamy's (2015a) research. Public investment and foreign direct investment can be negatively influenced by corruption through different channels (Mauro, 1996, 1998; Kaufmann et al., 2010; Cooray et al., 2017; Kim et al., 2017; Tanzi & Davoodi, 1997). Therefore, another variable used in the model is gross fixed capital formation as a percentage of GDP (*LOG_GFCF*) in an attempt to proxy fiscal policy, which is representative of gross net investment. Unemployment (*LOG_UNEM*), which refers to the share of the labour force that is available and seeking a job but is not working is referred to as being an important variable in relation to the debt-growth nexus (Swamy, 2015a; Cecchetti et al., 2011). Tarek and Ahmed (2017) acknowledge that unemployment can be directly affected by corruption and other macroeconomic dimensions captured by the WGI lead to an increase in government debt. The rate of inflation (*LOG_INF*) measured by the consumer price index is also included. As Woo (2003) presents, fiscal deficits are widely affected by inflation through multiple channels. Rising inflation is positively correlated with high nominal interest payments as well as with lower real tax revenues. The previous variables are subject to a log transformation in order to transform the data into a less skewed distribution (a mechanism largely used in the related literature).

Trade openness is defined as the sum of exports and imports of goods and services measured as a share of GDP a*cco*rding to the World Bank definition. Indeed, it seems to be a relevant control variable once economies with higher levels of trade volume are associated with higher levels of external debt (Colombo & Longoni, 2009). Age dependency ratio (as a % of working-age population) represented by the variable *AGE,* is a measure of ageing and population structure which has a negative and statistically significant impact on growth which indirectly affects public debt (Cecchetti et al., 2011). Furthermore, the authors note that both industrialized and emerging countries (with some exceptions) are facing an upward trend on ageing turning it into an important variable when studying public debt in our sample. Data for all of these variables were collected from the World Bank Database.

Finally, there is a categorical variable for income grouping in order to control for economic and institutional development factors. Good institution quality is believed to have a positive impact on government debt either through a better allocation of government expenditures financed by debt (Masuch et al., 2016) or through higher investment which enhances sustainable economic growth (Kim et al., 2017) among other channels. This idea is supported by La Porta et al. (1999) who found evidence that poor countries demonstrate inferior governance performance than rich ones. Accordingly, this work seeks to assess whether governance quality affects public debt of low- and high-income countries differently. In this way, dummies *LOW_INC* and *HIGH_INC* divide the sample into a country grouping classification following World Bank methodology.

3.3. Methodology

This study uses a strongly balanced panel data of 164 countries between the period from 2002 to 2015. Some panel techniques are used to estimate the empirical model. There are some advantages in using this kind of empirical approach, as Afonso and Alves (2014) refer to. The most important is that it highlights the individual heterogeneity as well as some associated problems like missing data for some particular countries. To estimate the model, panel FE is used with the system GMM. Some issues arose when deciding when it would be adequate to estimate using the *fixed effects* or *random effects* (RE) method. As mentioned by Geller and Guedes (2017), FE could be better when testing within-country variation. Moreover, FE seems to be the best way to better estimate a model where omitted variables and explanatory variables are correlated, as shown by Afonso and Alves (2014). Nevertheless, it is also possible to deal with unobserved effects through a RE model.

In order to better decide which specification test is more suitable the Hausman test as suggested by Hausman (1978) was applied. Based on the results of the Hausman test, the FE model appears to be the correct choice since the null hypothesis is rejected. Otherwise, if the null hypothesis were accepted, then the RE model would be the most convenient to employ. Therefore, this work only reports the results for FE estimations.

Another recurrent problem when dealing with panel data analysis is endogeneity meaning that some explanatory variables are not completely exogenous. With the view to control for it and to avoid biased estimators, the system GMM estimator is considered. Thus, the empirical model is also estimated by the GMM estimator. Despite the fact that some issues could arise in using GMM estimator with macroeconomic and cross-country data, as cited by Presbitero (2008), it is shown that is a good estimator and there is a gain of efficiency on the results obtained. Also, GMM techniques seem to work properly when the number of panel units is large and the time scope small (Blundell & Bond, 1998). Therefore, the model is represented by the equation (1):

$$LOG\_GovDebt_{i,t} = \alpha + \beta_0 X_{1i,t} + \beta_1 CC_{i,t} + \beta_2 GE_{i,t} + \beta_3 RQ_{i,t} + \beta_4 PS_{i,t} + \beta_5 RL_{i,t} + \beta_6 VA_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $LOG\_GovDebt_{i,t}$ is the government debt ratio to GDP terms for country i in the period t. $X_{1i,t}$ represents the vector of control variables (*LOG_GGFCE, LOG_INF, LOG_GDP, LOG_GFCF, LOG_UNEM, AGE, TRADE*). $CC_{i,t}$, $GE_{i,t}$, $RQ_{i,t}$, $PS_{i,t}$, $RL_{i,t}$, $VA_{i,t}$ are the variables that measure institutions' quality designate as the World Governance Indicators. $\varepsilon_{i,t}$ is a random error term that considers the possible effects of the omitted variables. α, β_0, β_1, β_2, β_3, β_4, β_5, and β_6 are unknown coefficients to be estimated.

In an initial stage, the full sample of countries is tested with no introduction of categorical variables, testing *H1*. To better examine the impact of governance quality on government debt, an index was built of overall governance indicators (an aggregation, merely representative). This aggregation was built through Principal Component Analysis (PCA) which transforms several correlated variables into a smaller set of uncorrelated variables (Jackson, 1991). Recalling the aforementioned, this modification on the model is given by:

$$LOG\_GovDebt_{i,t} = \alpha + \beta_0 X_{1i,t} + \beta_1 WGI\_INDEX_{i,t} + \varepsilon_{i,t} \tag{2}$$

where $LOG\_GovDebt_{i,t}$ is the government debt ratio to GDP terms for country i in the period t. $X_{1i,t}$ represents the vector of control variables (*LOG_GGFCE; LOG_INF; LOG_GDP; LOG_GFCF; LOG_UNEM; AGE; TRADE*). $WGI\_INDEX_{i,t}$ is the index that includes all of the six measures of institutions' quality. $\varepsilon_{i,t}$ is a random error term that considers the possible effects of the omitted variables.

Then, the sample is split into low-income and high-income countries. Two regressions were constructed, one for each set of countries using the dummy variable *LOW_INC* and using the dummy *HIGH_INC*. The control variables used are the same as the previous model specification. In this way, it can be assessed whether governance indicators are more relevant to improving government debt thresholds in countries with low per capita income comparing with the richest countries. Therefore, *H2 – government debt level of low-income countries benefit from a better governance performance –* is verified. Developing an empirical model with these specifications can be seen as the main contribution of this research for the existing literature on this subject.

4. RESULTS AND DISCUSSION

Table 1 presents descriptive statistics for all variables. Taking a glance at the government debt minimum and maximum values it can be said that there is a quite big disparity between all countries, an outcome more a less expected since our sample includes both low per capita income countries and high-income ones. This heterogeneity among countries is also present in inflation. It is believed that this divergence has roots in different national central bank's views about the inflation rate level. With regard to the governance indicators, Political Stability appears to be the one with the lowest score where negative levels mean worst governance quality. Episodes of terrorism, democratic revolutionary events, and civil wars in recent years all over the world may be the source of such low scores. Undoubtedly, Government Effectiveness and Regulatory Quality have a significant deviation between the lowest and highest score.

Table 1. Descriptives

Variables	Mean	S.D.	Min.	Max.
LOG_GovDebt	1.5873	0.3311	-0.3116	2.7109
LOG_GGFCE	1.1639	0.1578	0.4371	1.5847
LOG_INF	0.5912	0.4600	-3.2109	4.3876
LOG_GDP	3.9341	0.5308	2.6366	5.0108
LOG_GFCF	1.3443	0.1464	0.3473	2.0597
LOG_UNEM	0.8007	0.3339	-0.7959	1.5711
AGE	60.9886	18.4404	16.4518	111.6156
TRADE	89.4835	51.3867	0.1750	441.6038
CC	0.0332	1.0282	-1.7728	2.4700
GE	0.0183	0.9899	-2.0415	2.4370
RQ	0.0528	0.9337	-2.2444	2.2335
PS	0.1476	0.9565	-2.8273	1.6881
RL	0.0481	1.0003	-1.9163	2.1003
VA	0.0312	0.9589	-2.0674	1.8010

Note: S.D. means the standard deviation; Min. and Max. concern the minimum and maximum value for each variable, respectively.

Table 2 presents the correlation matrix. The correlation between WGI variables is highly positive and statistically significant. As noted by Kaufmann et al. (2010), this strongly positive correlation shows that governance indicators cannot be thought of as being independent of each other. Interactions arise in very different ways, for example, good accountability mechanisms are an important tool to reduce corruption, or a sound and effective government could prompt a better regulatory framework. Concerning the correlation with government debt, it is clear that they are lowly correlated but highly statistically significant. The governance indicators should have negative coefficients yet this is not true in all cases. However, as the seminal work of Kaufmann et al. (1999a) argues, there might be some determinants of government debt that are not accounted for that could invert this positive causal relationship. Therefore, this correlation does not mean that better governance impairs a reduction in government debt, as shown in this research. Macroeconomic variables have relatively low correlation with the dependent variable; however, Inflation (*LOG_INF*) is negatively correlated with government debt which contradicts some of the existing literature. As Cooray et al. (2017) present, high inflation is related to the higher government due to a rise in interest payments and thereby increasing the stock of debt.

Table 3 shows the results for the estimations using panel fixed effects and the system GMM for the full sample of countries. Thus, the results have been reported and interpreted for both estimation methods. The regressions present the basic model in order to assess whether or not government debt is reduced in the presence of better governance quality. The results for FE estimation (in column 1) in part confirm the *H1* in the sense that Control of Corruption (*CC*) and Political Stability (*PS*) have negative coefficients and are statistically significant. Also, the Regulatory Quality index presents a negative relationship with the dependent variable as previously expected but is not statistically significant. Indeed, all three governance dimensions seem to influence each other. Economic and political stability is closely knitted together with a decent regulatory environment and, consequently, enhancing a satisfactory control of corruption.

Nevertheless, the results for the remaining governance quality indices do not support the *H1* since Government Effectiveness (*GE*), Rule of Law (*RL*), and Voice and Accountability (*VA*) indices have positive coefficients. Undoubtedly, *VA* could increase government debt in some circumstances. As Schultz and Weingast (2003) stressed, representative institutions of liberal countries can enhance the state's borrowing power. In this way, the access to credit is easier meaning that, despite the rise in demand for funds, it won't result in tax increase due to a policy called "tax smoothing".

Concerning the control variables, the majority of estimated coefficients had the expected theoretical sign. The findings of Cecchetti et al. (2011) in part confirm this effect, that ageing is more broadly affecting the industrial countries by driving their government expenditure upward and their revenue down. Besides, Gross Fixed Capital Formation and Inflation estimated coefficient receive a negative sign, which should have been positive. As Reinhart et al. (2010a) presented, higher inflation can affect countries by reducing the real value of debt stock. For FE model *TRADE* is positive associated with government debt being statistically significant at 5%. The clarification of this result has to do with some mechanisms through which trade openness negatively affects government debt being the reduction of tax collection via an increase in income inequalities one of the many examples (Savvides, 1998). Also, inflation positively affects debt in both estimation models. Surely, when kept under control (as it happens in the majority of high-income countries), inflation can attract debt on much affordable and favourable terms than those countries with higher levels (Swamy, 2015a). Likewise, the negative coefficient corroborates Al-Marhubi (2000) view that governments could create inflation in order to generate seigniorage and, thus, reduce debt (according to the theory of optimal taxation). The negative coefficient of GFCF can be explained by the inability of attracting new sovereign debt creditors due to the disequilibrium on fiscal position of the certain countries (Swamy, 2015a).

Table 2. Correlation matrix

	LOG_GovDebt	*LOG_GGFCE*	*LOG_INF*	*LOG_GDP*	*LOG_GFCF*	*LOG_UNEM*	*AGE*	*TRADE*	*CC*	*GE*	*RQ*	*PS*	*RL*
LOG_GovDebt	1												
LOG_GGFCE	0.0838***	1											
LOG_INF	0.0680***	0.2879***	1										
LOG_GDP	0.1625***	0.3615***	0.3475***	1									
LOG_GFCF	0.1960***	0.0649***	0.0819***	0.1698***	1								
LOG_UNEM	0.0370	0.2721***	0.0014	0.1568***	0.0583**	1							
AGE	0.1296***	0.2188***	0.2018***	0.7818***	0.2611***	0.1019***	1						
TRADE	-0.0257	0.0967***	0.1355***	0.2823***	0.1307***	0.0013	0.2651***	1					
CC	0.0643***	0.4758***	0.4163***	0.6998***	0.1133***	0.0861***	0.5036***	0.2551***	1				
GE	0.0710***	0.4416***	0.4256***	0.7760***	0.1441***	0.0855***	0.6050***	0.2705***	0.9410***	1			
RQ	0.0208	0.4302***	0.4498***	0.7464***	0.1030***	0.1128***	0.5727***	0.2675***	0.8894***	0.9394***	1		
PS	0.0733***	0.4027***	0.3818***	0.5845***	0.2114***	0.0900***	0.4519***	0.3672***	0.7603***	0.7262***	0.7073***	1	
RL	0.0651***	0.4686***	0.4413***	0.7270***	0.1430***	0.0915***	0.5356***	0.2648***	0.9597***	0.9582***	0.9323***	0.7772***	1
VA	0.1752***	0.4284***	0.3520***	0.5455***	0.0285	0.1671***	0.3938***	0.1273***	0.8036***	0.7958***	0.8142***	0.6702***	0.8269***

*Note: *, ** and *** represent statistical significance at levels of 10%, 5%, and 1%, respectively.*

Table 3. Government debt and governance quality, full sample

	(1)	(2)	(3)	(4)
	FE	GMM	FE	GMM
L.LOG_DEBT		0.8385***		0.8419***
		(0.0503)		(0.0482)
LOG_GGFCE	0.2135	0.6200***	0.1589	0.6293***
	(0.2071)	(0.0741)	(0.2319)	(0.0794)
LOG_INF	-0.0512***	-0.0160*	-0.0450**	-0.0162*
	(0.0176)	(0.0092)	(0.0179)	(0.0090)
LOG_GDP	-0.0213	-0.0355	-0.1091	-0.0432
	(0.1214)	(0.0741)	(0.1208)	(0.0770)
LOG_GFCF	-0.4920***	0.1244*	-0.5132***	0.1145
	(0.0862)	(0.0705)	(0.0923)	(0.0710)
LOG_UNEM	0.1493**	0.0552	0.1645**	0.0473
	(0.0715)	(0.0442)	(0.0808)	(0.0442)
AGE	0.0096**	-0.0042**	0.0098**	-0.0039**
	(0.0039)	(0.0018)	(0.0038)	(0.0019)
TRADE	0.0016**	-0.0012***	0.0015***	-0.0013***
	(0.0007)	(0.0003)	(0.0005)	(0.0003)
CC	-0.1229**	-0.0430	----	----
	(0.0492)	(0.0271)	----	----
GE	0.0744	0.0585**	----	----
	(0.0645)	(0.0253)	----	----
RQ	-0.0855	-0.0441*	----	----
	(0.0560)	(0.0231)	----	----
PS	-0.0943***	-0.0656***	----	----
	(0.0330)	(0.0146)	----	----
RL	0.0769	0.0988**	----	----
	(0.0527)	(0.0386)	----	----
VA	0.0471	-0.0498*	----	----
	(0.0502)	(0.0272)	----	----
WGI_INDEX	----	----	-0.1061**	-0.0345*
	----	----	(0.0483)	(0.0202)
Constant	1.2624*	-0.1744	1.6898**	-0.1414
	(0.6675)	(0.4146)	(0.6715)	(0.4300)
Observations	1,810	1,603	1,947	1,603
R-squared	0.209		0.198	
Countries	157	157	157	157

*Notes: *, ** and *** represent statistical significance at levels of 10%, 5%, and 1%, respectively. The robust standard errors are in parentheses. Dependent variable – logarithm of government debt ratio (% GDP).*

In order to strengthen the validity of *H1*, an index of overall WGI (as previously mention on Methodology section) was created. The results, for both FE and GMM estimators (column (3) and (4)) seem to suggest support for our hypothesis, meaning that, there is a negative and statistically significant relationship between governance quality and government debt. Nevertheless, we cannot infer for certain that poor governance leads to higher debt levels, or the inverse.

To remove possible distortions and to obtain more consistent and reliable results the sample is split between low-income and high-income countries, where the results are presented in Table 4. The results from GMM estimation (in column (2) and (4)) show that the interaction between governance quality and government debt differ when referring to low-income or high-income countries. By this we mean that improvements in some governance parameters seem to be associated with lower levels of public debt. Political Stability and Absence of Violence/Terrorism, and Voice and Accountability indexes have negative coefficients and are statistically significant at 5% and 1%, respectively. These results are in line with the ones of Woo (2003) which specifies that public deficits tend to be smaller in countries with better institutional procedures. However, Rule of Law shows every sign of being statistically significant and positively associated with public debt (for FE model this does not apply). As shown by Weingast (2009), low-income countries normally require some reforms on

their institutions and rule of law system. These reforms aim to dismantle natural states of privilege and rents (which are a tool for controlling violence and disorder) but, in the end, threaten to make the society worse off. Therefore, societies of poor countries tend to resist reforms and hundreds of billions are spent in improving rule of law system with few visible results.

The results reported for control variables from low-income countries are consistent with existing literature. Per capita income seems to have a negative coefficient (and statistically significant) suggesting that the higher GDP per capita, lower will be the government debt ratio. Concerning the negative coefficient obtained on Trade Openness, according to Combes and Saadi-Sedik (2006), at a certain level of trade instability more open economies is more likely to have higher budget deficits due to a higher exposure to external shocks. The authors also state that it may negatively influence public debt directly via a decrease in government revenues in short-term (when more trade activity comes from a decrease in tariffs). Nevertheless, the Age Dependency ratio is a little muddled; still, there some explanations exist for the outcomes. Cecchetti et al. (2011) pointed out that the impact of ageing on real interest rates are controversial. Ageing has an ambiguous effect on capital intensity: despite the reduction of the growth of young cohort could lead to an increase in the rates of returns, there is a direct effect on interest rates (Krueger & Ludwig, 2007).

Table 4. Governance quality in low-income and high-income countries

	(1)	(2)	(3)	(4)
	Low-income	*Low-income*	*High-income*	*High-income*
	FE	*GMM*	*FE*	*GMM*
L.LOG_DEBT		0.5987***		0.6191***
		(0.0886)		(0.0862)
LOG_GGFCE	-0.3812	0.0709	0.9590***	1.1335***
	(0.2821)	(0.1526)	(0.2232)	(0.2262)
LOG_INF	-0.0849**	-0.0002	-0.0498**	0.0022
	(0.0356)	(0.0211)	(0.0198)	(0.0116)
LOG_GDP	-1.6949***	-1.0189***	0.2894	0.3550***
	(0.4989)	(0.3164)	(0.2417)	(0.1270)
LOG_GFCF	-0.0680	-0.0149	-0.3911	0.0850
	(0.1612)	(0.0976)	(0.3111)	(0.1638)
LOG_UNEM	0.0420	-0.1865	0.1036	0.1708*
	(0.1435)	(0.1248)	(0.1985)	(0.0973)
AGE	-0.0069	-0.0198***	0.0220**	0.0029
	(0.0136)	(0.0074)	(0.0094)	(0.0077)
TRADE	0.0029***	0.0009**	0.0015	-0.0009
	(0.0006)	(0.0004)	(0.0010)	(0.0007)
CC	0.0297	-0.0773	-0.0085	0.0078
	(0.1502)	(0.1124)	(0.0709)	(0.0305)
GE	0.0406	0.0677	-0.1359	0.0392
	(0.1684)	(0.1435)	(0.1171)	(0.0291)
RQ	-0.2213	0.0207	-0.1548*	-0.0558
	(0.1782)	(0.1025)	(0.0885)	(0.0507)
PS	-0.1638**	-0.1660**	-0.0820	-0.0319
	(0.0673)	(0.0658)	(0.0763)	(0.0355)
RL	-0.0395	0.3128**	0.0277	0.0606
	(0.1325)	(0.1312)	(0.1297)	(0.0631)
VA	0.1846*	-0.1972***	0.1668	0.0192
	(0.0976)	(0.0696)	(0.1509)	(0.0360)
Constant	7.7021***	5.5936***	-1.4387	-2.7682***
	(2.7175)	(1.6100)	(1.2735)	(0.5927)
Observations	275	231	543	482
R-squared	0.468		0.446	
Countries	25	25	47	47

*Notes: *, **, and *** represent statistical significance at levels of 10%, 5%, and 1%, respectively. The robust standard errors are in parentheses. Dependent variable – logarithm of government debt ratio (% GDP). Columns (1) and (2) refer to low-income countries regressions; columns (3) and (4) refer to high-income countries regressions.*

The depletion of young population causes a reduction of the labour supply in the future leading to labour scarcity in relation to capital, increasing capital-to-labour ratios and hence reducing interest rates. This downward pressure on real interest rates at world level might benefit government debt through a reduction on interest payments.

Relative to high-income countries, none of the WGI are statistically significant. This result gives support to our *H2* – the link between good governance quality and government debt reduction is more evident for low-income countries. Our results also match the existing literature in the sense that Masuch et al. (2016) found evidence that strong institutions have an important role in respect of debt effect on growth. Actually, the majority of governance indicators (for GMM estimations) have positive coefficients although not significantly different from zero. For the positive (but not significant) coefficient of Control of Corruption index, Gupta et al. (2002) state that as per capita GDP is a robust determinant of corruption and, once included in the regression, reduces the explanatory power of corruption index. Rothstein and Teorell (2008) also point that countries with low levels of corruption tend to be associated with greater government size. Furthermore, Government Effectiveness positive coefficient can also be explained. La Porta et al. (1999) found that governments' performance is in part affected by legal origin, ethnolinguistic heterogeneity, etc, and, more important, found that larger governments

perform better. Better performing governments can be linked to more expenses from a larger government size, thus, higher public debt. Nevertheless, Regulatory Quality and Political Stability ensure a positive impact on government debt. Indeed, for FE model, Regulatory Quality is statistically significant at 10% suggesting that government debt decreases 0,15% with one unit increase in the mentioned index.

Concerning the results for the control variables mentioned above, they have the expected signs being the lagged Government Debt, General Government Final Consumption Expenditure, Trade Openness and Unemployment are statically significant at 1% and 10% level. As Reinhart and Rogoff (2009) denoted in their work, government spending tends to markedly rise in the years following a banking/financial crisis in an attempt to fight the recession, as happen in some of high-income countries (e.g., Portugal, Spain, Ireland, Greece, etc.). Notwithstanding, per capita income seems to be statistically significant but with a positive coefficient. It is known that several high-income countries, during and after the crisis of 2008, suffered from low economic growth rates. Public debt and slow economic growth are synchronously related, yet this relation is not linear accordingly to Reinhart et al. (2012). The authors state that the majority of high debt events coincide with low economic growth times. Also, Krugman (2010) goes even further and says that causation can sometimes run from growth to debt as happen with

Japan few years ago. More surprising, Swamy (2015b) found evidence that GDP growth has a significant negative effect on debt. Finnaly, Roubini and Sachs (1989) noted that large budget deficits could result from economic growth slowdown and high unemployment. It is evident that after the financial crises, governments of these countries had some difficulties in dealing with social security and public safety requirements of public finances. This corroborates the historical phenomena of an upward trend in unemployment rate seen after a banking or financial crisis according to Reinhart and Rogoff (2009) research. Lastly, GGFCE have a positive and statistically significant coefficient at 1% level for both FE and GMM specification models. This follows in line with research in Leão (2013) which argues that, using a Keynesian framework and under full employment, public debt ratio could be reduced with a rise in government spending.

5. CONCLUSION

The majority of the existing literature has focused on the relationship between public debt and economic growth. In what concerns the governance and government debt nexus the same does not apply. Although little has been discussed about this issue, some literature explores the impact of corruption on government debt levels and budget deficits. This study aims to ascertain whether and to what extent all six-dimension governance quality indicators (WGI) affect government debt thresholds.

A panel data analysis is carried out using fixed effects and generalized method of moments' estimations for a set of 164 countries on a period between 2002 and 2015. The estimation results for the FE model suggest that Control of Corruption and Voice and Accountability indexes are negative and statistically significant in influencing government debt. In part, this result confirms our *H1* that better governance quality is associated with lower levels of public debt.

For robustness purposes, estimation results are presented for two other specification models: for low-income countries and for high-income countries.

The sample is divided into these two sets of countries with 25 and 47 countries, respectively. The results are robust in the sense that, for the GMM estimation model, Political Stability and Absence of Violence/Terrorism (PS) and Voice and Accountability (VA) indexes are negative and statistically significant for low-income countries. Therefore, it can be argued that *H2* is partially supported, only when we claim that low-income countries have a better performance on government debt accumulation with an improved governance quality. The main contribution of this study is also related to the fact that results suggest that improving governance is more beneficial for countries with lower levels of per capita income when compared with high income ones.

Hence, we can conclude that there is a positive association concerning government debt levels and institutional and regulatory quality of a country. This fact may have some policy implications in the sense that government institutions and international economic organizations should seek to pin down sound policies with regards to strengthening governance quality. Policies that promote a better government environment may lead to a soaring economic growth and public debt sustainability.

This study faces some limitations, such as a restrained time span availability for WGI variables (which only exist annually from 2002) and the lack of economic data for some countries (which could have enlarged the dataset dimension). The fact that WGI only captures "perceptions", measures which are based on surveys, may constrain the present study.

For future research, the impact of politics on the interaction between government debt and governance could be explored. Political polarization, as referred by Roubini and Sachs (1989) and Alesina and Perotti (1995), has an important role on government debt dynamics. Moreover, in order to better understand the debt-governance relation, analyzing the impact of the banking and financial crisis of 2008 could provide interesting results, especially when looking to the most plagued European countries.

REFERENCES

1. Afonso, A. (2005). Fiscal sustainability: The unpleasant European case. *FinanzArchiv: Public Finance Analysis, 61*(1), 19-44. https://doi.org/10.1628/0015221053722532
2. Afonso, A., & Alves, J. (2014). *The role of government debt in economic growth* (ISEG-UTL Economics Department Working Paper No. 16/2014/DE/UECE). https://doi.org/10.2139/ssrn.2468805
3. Afonso, A., & Guedes, M. J. (2018). Do Finance Ministers characteristics mater? EU Finance Ministers, capital markets and fiscal outcomes, Escritos em Homenagem a José Maria Carvalho Ferreira, 264-282.
4. Alesina, A. (1988). Macroeconomics and politics. *NBER Macroeconomics Annual, 3*(1988), 13-62. https://doi.org/10.1086/654070
5. Alesina, A., & Perotti, R. (1995). *The political economy of budget deficits* (NBER Working Paper No. 4637). Retrieved from https://econpapers.repec.org/paper/nbrnberwo/4637.htm
6. Al-Marhubi, F. A. (2000). Corruption and inflation. *Economics Letters, 66*(2), 199-202. https://doi.org/10.1016/S0165-1765(99)00230-X
7. Arndt, C. (2008). The politics of governance ratings. *International Public Management Journal, 11*(3), 275-297. https://doi.org/10.1080/10967490802301278
8. Arndt, C., & Oman, C. (2006). *Uses and abuses of governance indicators.* https://doi.org/10.1787/9789264026865-en
9. Barişik, S., & Baris, A. (2017). Impact of governance on budget deficit in developing countries. *Theoretical and Applied Economics, 24*(2 (611)), 111-130. Retrieved from http://www.ectap.ro/impact-of-governance-on-budget-deficitin-developing-countries-salih-barisik_abdullah-baris/a1272/
10. Barro, R. J. (1979). On the determination of the public debt. *The Journal of Political Economy, 87*(5), 940-971. https://doi.org/10.1086/260807

11. Bird, R. M., Martinez-Vazquez, J., & Torgler, B. (2008). Tax effort in developing countries and high income countries: The impact of corruption, voice and accountability. *Economic Analysis and Policy, 38*(1), 55-71. https://doi.org/10.1016/S0313-5926(08)50006-3

12. Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143. https://doi.org/10.1016/S0304-4076(98)00009-8

13. Cecchetti, S. G., Mohanty, M. S., & Zampolli, F. (2011). *The real effects of debt* (BIS Working Paper No. 352). Retrieved from https://www.bis.org/publ/work352.htm

14. Checherita, C., & Rother, P. (2010). *The impact of high and growing government debt on economic growth: An empirical investigation for the euro area* (Working Paper Series 1237, European Central Bank). Retrieved from https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1237.pdf

15. Colombo, E., & Longoni, E. (2009). *The politics of external debt in developing countries* (Working Paper No. 176, University of Milano-Bicocca, Department of Economics). Retrieved from https://econpapers.repec.org/paper/mibwpaper/176.htm

16. Combes, J. L., & Saadi-Sedik, T. (2006). How does trade openness influence budget deficits in developing countries? *Journal of Development Studies, 42*(8), 1401-1416. https://doi.org/10.1080/00220380600930762

17. Cooray, A., Dzhumashev, R., & Schneider, F. (2017). How does corruption affect public debt? An empirical analysis. *World Development, 90,* 115-127. https://doi.org/10.1016/j.worlddev.2016.08.020

18. Cordella, T., Ricci, L. A., & Ruiz-Arranz, M. (2010). Debt overhang or debt irrelevance? *IMF Economic Review, 57*(1), 1-24. https://doi.org/10.1057/imfsp.2009.20

19. de Haan, J., & Sturm, J.-E. (1997). Political and economic determinants of OECD budget deficits and government expenditures: A reinvestigation. *European Journal of Political Economy, 13*(4), 739-750. https://doi.org/10.1016/S0176-2680(97)00033-5

20. Delavallade, C. (2006). Corruption and distribution of public spending in developing countries. *Journal of Economics and Finance, 30*(2), 222-239. https://doi.org/10.1007/BF02761488

21. Dreher, A., & Schneider, F. (2006). Corruption and the shadow economy: An empirical analysis. *Public Choice, 144*(1), 215-238. https://doi.org/10.1007/s11127-009-9513-0

22. Fincke, B., & Greiner, A. (2011). Debt sustainability in selected euro area countries: Empirical evidence estimating time-varying parameters. *Studies in Nonlinear Dynamics and Econometrics, 15*(3), 1-23. https://doi.org/10.2202/1558-3708.1777

23. Friedman, E., Johnson, S., Kaufmann, D., & Zoido-Lobaton, P. (2000). Dodging the grabbing hand: The determinants of unofficial activity in 69 countries. *Journal of Public Economics, 76*(3), 459-493. https://doi.org/10.1016/S0047-2727(99)00093-6

24. Geller, G., & Guedes, M. J. C. (2017). Was the collapse of the communist bloc a game changer in the stock markets? Left-wing vs right-wing political preferences and stock market development. *Research in International Business and Finance, 39*(A), 423-432. https://doi.org/10.1016/j.ribaf.2016.09.002

25. Gupta, S., Davoodi, H., & Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of Governance, 3*(1), 23-45. https://doi.org/10.1007/s101010100039

26. Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica, 46*(6), 1251-1271. https://doi.org/10.2307/1913827

27. Jackson, J. E. (1991). *A user's guide to principal components.* https://doi.org/10.1002/0471725331

28. Kaufmann, D. (2005). *Myths and realities of governance and corruption* (MPRA Paper No. 8089, University Library of Munich, pp. 81-98). https://doi.org/10.2139/ssrn.829244

29. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2007a). *The worldwide governance indicators project: Answering the critics* (The World Bank Policy Research Working Paper No. 4149). https://doi.org/10.1596/1813-9450-4149

30. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2007b). *Governance matters VI: Aggregate and individual governance indicators for 1996-2006* (The World Bank Policy Research Working Paper No. 4280). Retrieved from http://info.worldbank.org/governance/wgi/pdf/govmatters6.pdf

31. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators: Methodology and analytical issues* (The World Bank Policy Research Working Paper No. 5430). Retrieved from http://hdl.handle.net/10986/3913

32. Kaufmann, D., Kraay, A., & Zoido-Lobaton, P. (1999a). *Governance matters* (The World Bank Policy Research Working Paper No. 2196). https://doi.org/10.1596/1813-9450-2196

33. Kaufmann, D., Kraay, A., & Zoido-Lobaton, P. (1999b). *Aggregating governance indicators* (The World Bank Policy Research Working Paper No. 2195). https://doi.org/10.2139/ssrn.188548

34. Kim, E., Ha, Y., & Kim, S. (2017). Public debt, corruption and sustainable economic growth. *Sustainability, 9*(3), 1-30. https://doi.org/10.3390/su9030433

35. Knack, S. (2006). Measuring corruption: A critique of indicators in Eastern Europe and Central Asia. *Journal of Public Policy, 27*(3), 255-291. https://doi.org/10.1017/S0143814X07000748

36. Kraay, A., & Nehru, V. (2006). When is external debt sustainable? *World Bank Economic Review, 20*(3), 341-365. https://doi.org/10.1093/wber/lhl006

37. Krueger, D., & Ludwig, A. (2007). On the consequences of demographic change for rates of returns to capital, and the distribution of wealth and welfare. *Journal of Monetary Economics, 54*(1), 49-87. https://doi.org/10.1016/j.jmoneco.2006.12.016

38. Krugman, P. (2010, August 11). Reinhart and Rogoff are confusing me. *The New York Times.* Retrieved from https://krugman.blogs.nytimes.com/2010/08/11/reinhart-and-rogoff-are-confusing-me/

39. Kurtz, M. J., & Schrank, A. (2007). Growth and governance: Models, measures, and mechanisms. *Journal of Politics, 69*(2), 538-554. https://doi.org/10.1111/j.1468-2508.2007.00549.x

40. La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics, and Organization, 15*(1), 222-279. https://doi.org/10.1093/jleo/15.1.222

41. Leão, P. (2013). The effect of government spending on the debt-to-GDP ratio: Some Keynesian arithmetic. *Metroeconomica, 64*(4), 448-465. https://doi.org/10.1111/meca.12013

42. Leff, N. H. (1964). Economic development through bureaucratic corruption. *American Behavioral Scientist, 8*(3), 8-14. https://doi.org/10.1177/000276426400800303

43. Masuch, K., Moshammer, E., & Pierluigi, B. (2016). *Institutions, public debt and growth in Europe* (Working Paper Series No. 1963). Retrieved from https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1963.en.pdf

44. Mauro, P. (1995). Corruption and growth. *The Quartely Journal of Economics, 110*(3), 681-712. https://doi.org/10.2307/2946696

45. Mauro, P. (1996). *The effects of corruption on growth, investment, and government expenditure* (IMF Working Papers No. 96/98, pp. 1-28). https://doi.org/10.5089/9781451852097.001

46. Mauro, P. (1998). Corruption and the composition of government expenditure. *Journal of Public Economics, 69*(2), 263-279. https://doi.org/10.1016/S0047-2727(98)00025-5

47. Méon, P. G., & Sekkat, K. (2005). Does corruption grease or sand the wheels of growth? *Public Choice, 122*(1–2), 69-97. https://doi.org/10.1007/s11127-005-3988-0

48. Méon, P. G., & Weill, L. (2010). Is corruption an efficient grease? *World Development, 38*(3), 244-259. https://doi.org/10.1016/j.worlddev.2009.06.004

49. Müller, A., Storesletten, K., & Zilibotti, F. (2016). The political color of fiscal responsibility. *Journal of the European Economic Association, 14*(1), 252-302. https://doi.org/10.1111/jeea.12154

50. Neck, R., & Sturm, J. (Eds.). (2008). *Sustainability of public debt.* Cambridge, England: MIT Press.

51. Ozler, S., & Tabellini, G. (1991). *External debt and political instability* (NBER Working Paper No. 3772). https://doi.org/10.3386/w3772

52. Presbitero, A. F. (2008). The debt-growth nexus in poor countries: A reassessment. *Economics: The Open-Access, Open-Assessment E-Journal, 2*(30), 1-29. https://doi.org/10.5018/economics-ejournal.ja.2008-30

53. Reinhart, C. M., & Rogoff, K. S. (2009). The aftermath of financial crises. *American Economic Review, 99*(2), 466-472. https://doi.org/10.1257/aer.99.2.466

54. Reinhart, C. M., Reinhart, V. R., & Rogoff, K. S. (2012). Public debt overhangs: Advanced-economy episodes since 1800. *Journal of Economic Perspectives, 26*(3), 69-86. https://doi.org/10.1257/jep.26.3.69

55. Reinhart, C. M., Rogoff, K. S., & Rogoff, S. (2010a). Growth in a time of debt. *American Economic Review, 100*(2), 573-578. https://doi.org/10.3386/w15639

56. Reinhart, C. M., Rogoff, K. S., & Rogoff, S. (2010b). *Debt and growth revisited* (MPRA Paper No. 24376, University Lybrary of Munich). Retrieved from https://econpapers.repec.org/paper/pramprapa/24376.htm

57. Rothstein, B., & Teorell, J. (2008). What is quality of government? A theory of impartial institutions. *Governance, 21*(2), 165-190. https://doi.org/10.1111/j.1468-0491.2008.00391.x

58. Roubini, N., & Sachs, J. D. (1989). Political and economic determinants of budget deficits in the industrial democracies. *European Economic Review, 33*(5), 903-938. https://doi.org/10.1016/0014-2921(89)90002-0

59. Savvides, A. (1998). Trade policy and income inequality: New evidence. *Economics Letters, 61*(3), 365-372. https://doi.org/10.1016/S0165-1765(98)00197-9

60. Schultz, K. A., & Weingast, B. R. (2003). The democratic advantage: Institutional foundations of financial power in international competition. *International Organization, 57*(1), 3-42. https://doi.org/10.1017/S0020818303571065

61. Swamy, V. (2015a). *Government debt and economic growth – An empirical investigation* (MPRA Paper No. 64106, University Library of Munich). https://doi.org/10.2139/ssrn.2601875

62. Swamy, V. (2015b). *Government debt and its macroeconomic determinants – Decomposing the cause and effect relationship* (MPRA Paper No. 64105, University Library of Munich). https://doi.org/10.2139/ssrn.2601874

63. Tanzi, V., & Davoodi, H. (1997). *Corruption, public investment and growth* (IMF Working Paper No. 97/139, International Monetary Fund). https://doi.org/10.5089/9781451929515.001

64. Tanzi, V., & Davoodi, H. (2000). *Corruption, growth, and public finances* (IMF Working Paper No. 00/182, International Monetary Fund). https://doi.org/10.5089/9781451859256.001

65. Tarek, B. A., & Ahmed, Z. (2017). Governance and public debt accumulation: Quantitative analysis in MENA countries. *Economic Analysis and Policy, 56*(12), 1-13. https://doi.org/10.1016/j.eap.2017.06.004

66. Thomas, M. A. (2009). What do the worldwide governance indicators measure? *The European Journal of Development Research, 22*(1), 31-54. https://doi.org/10.1057/ejdr.2009.32

67. Weingast, B. R. (2009). *Why are developing countries so resistant to the rule of law?* (Stanford University Working Paper No. 382). Retrieved from https://kingcenter.stanford.edu/sites/default/files/publications/382wp.pdf

68. Woo, J. (2003). Economic, political, and institutional determinants of public deficits. *Journal of Public Economics, 87*(3-4), 387-426. https://doi.org/10.1016/S0047-2727(01)00143-8

APPENDIX

Table A.1. List of countries in the full sample and their classification

Sub-sample	Country
Low-income countries	Afghanistan, Benin, Burkina Faso, Burundi, Central African Rep., Chad, Comoros, Congo Dem. Rep., Eritrea, Ethiopia, Gambia, Guinea-Bissau, Haiti, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Rwanda, Senegal, Sierra Leone, South Sudan, Tanzania, Togo, Uganda, Zimbabwe
High-income countries	Australia, Austria, Bahamas, Bahrain, Barbados, Belgium, Brunei Darussalam, Canada, Chile, Cyprus, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Rep., Kuwait, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Oman, Poland, Portugal, Saudi Arabia, Singapore, Slovak Rep., Slovenia, Spain, Sweden, Switzerland, Trinidad and Tobago, United Arab Emirates, United Kingdom, United States, Uruguay
Full sample	Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Central African Rep., Chad, Chile, China, Colombia, Comoros, Congo Rep., Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Rep., Denmark, Djibouti, Dominican Rep., Ecuador, Egypt Arab Rep., El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran Islamic Rep., Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea Rep., Kuwait, Kyrgyz Rep., Lao PDR, Lebanon, Lesotho, Latvia, Lithuania, Luxembourg, Macedonia FYR, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Fed., Rwanda, Saudi Arabia, Senegal, Sierra Leone, Singapore, Slovak Rep., Slovenia, South Africa, South Sudan, Spain, Sri Lanka, St. Lucia, Sudan, Suriname, Swaziland, Sweden, Switzerland, Tajikistan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen Rep., Zambia, Zimbabwe