

# Economic Freedom and Debt: An Empirical Investigation on The Institutional Determinants of Public Debt

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## Abstract

*his paper investigates the role of the institutional framework in the accumulation of central government debt. We employ the Economic Freedom Index (EFI) as a proxy for institutional framework and study the causal link between institutions that promote economic freedom and the creation of public debt. The results presented in this paper are evidence of causality between institutions and debt-to-GDP ratios. This paper suggests that institutional and structural frameworks of economies bear great importance in public debt accumulation. The countries that score better on the quality of economic institutions are more likely to accrue lower levels of public debt. In particular, a 10-point enhancement in the EFI score can lead to reductions between 1.7 and 7.3 percentage points in debt-to-GDP ratios. We also observed that scores for open markets and government size affect public debt negatively across developed as well as developing countries. Additionally, the evidence suggests that countries deemed less likely to expropriate private property exhibit higher percentages of government debt relative to GDP. We stipulate this is the result of higher perceived trustworthiness which in turn leads to an increased pool of available credit.*

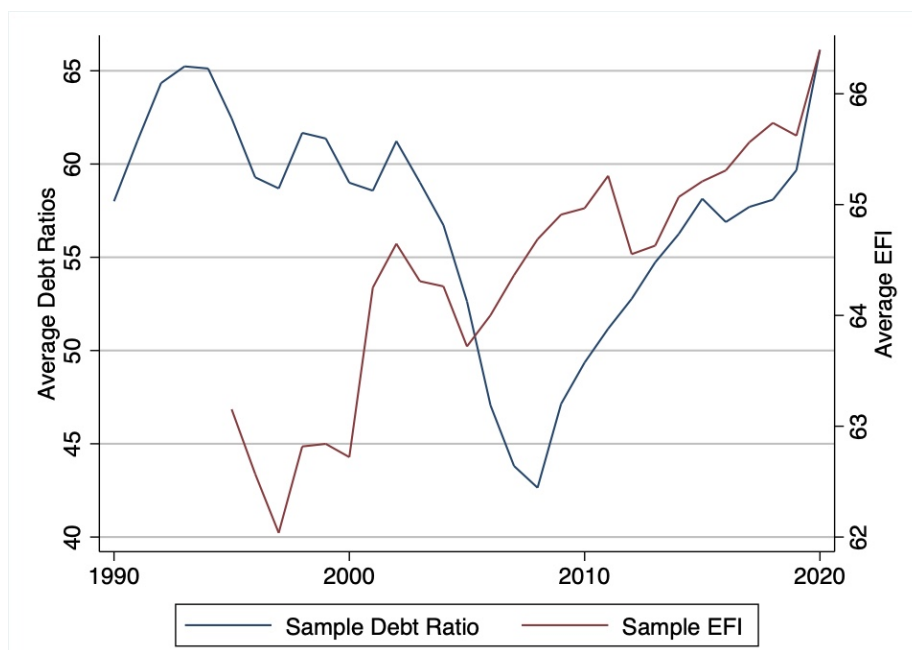
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## Introduction

The increasing involvement of government in economic activity and the expansion of the welfare state in the aftermath of the Second World War has been linked to a steady positive trend in public debt accumulation, especially in high-income countries. Governments have funded their budget deficits by issuing large volumes of bonds on the market and debt levels have soared substantially since. This phenomenon has not been only confined to developed countries. Poorer countries also experienced total or partial defaults on their public debt several times since the 1990s. The issue of government debt became particularly evident after the financial crisis of 2007/8 and the recent coronavirus pandemic, which brought sovereign debts to rise to unprecedented levels. These were primarily the result of automatic stabilizers and extraordinary government spending destined for temporary relief packages. In other words, the structure of economic institutions was essential in understanding the pattern of debt creation over time. Secular trends suggest that many countries around the world have seen their public debt increase in the second half of the 20th century together with the amendments in their institutions. However, some countries have amassed significantly different levels of debt and some economies seem more prone to public debt accumulation. Therefore, we want to investigate and provide an answer as to whether these changes in economic institutions are a leading force driving public debt

differences across countries. For instance, it might be the case that a particular institutional framework allows governments to acquire debt more efficiently than others, or perhaps some fundamental structures of an economy can make it less likely for central governments to resort to public debt issuing.

The preponderance of literature on government debt focuses on the impact of public debt on economic growth and performance [1-4]. There is insufficient empirical work, however, carried out on the macroeconomic factors that lead to the accumulation of debt in the long term. Furthermore, at the time this was written, there is no empirical work exploring a possible link between a country's institutional framework and its level of public debt. Our paper is a first attempt to initiate a discussion on the institutional origins of government debt and to determine a possible causal link between a country's public debt and its economic institutions. To do so, we will be using the Economic Freedom Index (EFI) as a proxy for the quality of economic institutions. This index estimates the freedom and market orientation of economic institutions within any given country and assigns an average score to those institutions. Additionally, the empirical analysis will provide evidence on potential structural reforms that governments could introduce in the pursuit of reducing government debt.



**Figure 1:** Sample Averages of Debt Ratios and EFI (1990-2020)

#### Notes

Annual sample averages of our dependent and independent variables for the period under consideration.

#### Sources

EFI data from the Heritage Foundation while debt-to-GDP ratios mainly from International Monetary Fund (IMF).

Figure 1 shows the co-movement of debt-to-GDP ratios and EFI throughout the time period studied. It shows how, following a reduction of debt ratios in the early 2000s, there has been a rapid and steady increase in public debt since the financial crisis of 2007/8. Similarly, Figure 1 displays an upward trend in EFI scores since 1990s. Overall, this necessitates further analysis into this co-movement for the purpose of discerning a possible causal link between the two indicators. Our main hypothesis is that higher EFI scores, which translates into better-quality economic institutions, lead to lower levels of government debt. In particular, we expect "Government Size" and "Open Markets" to be relatively better in capturing variations in government debt due to three main reasons. Firstly, countries with relatively small public sectors tend to score higher in economic freedom and they are less likely to accumulate government debt. Secondly, relatively more open markets create the economic conditions for more integrated international financial markets, hence the capacity of acquiring higher levels of public debt [5]. Lastly, we expect countries with better quality economic institutions and laws to have a better perceived reputation amongst international lenders and, ergo, face lower interest rates. Therefore, we presume that institutional characteristics such as enforcement of property rights and ranking of government integrity to significantly influence borrowing conditions countries are facing. Generally, we expect economic institutions to promote economic growth and, as a consequence, reduce debt-to-GDP ratios.

This paper is organized as follows. Section 2 is a literature review on the existing research around the issue of public debt accumulation and its determinants. Section 3 describes the data we used to construct our sample, includes a review of the list of countries that comprise our sample, and details what econometric models we employ for our empirical estimations. Section 4 provides an exhaustive discussion of the results obtained from our estimation techniques, while Section 5 summarizes the main findings and suggests paths for further research into the institutional determinants of public debt.

#### Literature Review

The existing literature on public debt mainly focuses on the effects of public debt on the macroeconomic variables, particularly growth, productivity and investment, rather than its determinants. Theoretically demonstrated that public debt is exclusively a function of its previous lag rather than determined by other macroeconomic variables [6]. On the contrary, there is empirical evidence that suggest sovereign debt can be the result of both exogenous as well as endogenous factors. For example, looks into several variables and runs Granger-causality test against the accumulation of debt [7]. He finds that real GDP growth, foreign direct investment, government expenditure, inflation and population growth increase the level of debt while gross fixed capital formation, final consumption expenditure and trade openness have the opposite effect. The role of population growth is another significant factor in the discussion since ageing populations are likely to produce increased spending on welfare. suggested that the sustainability of debt in the near future would depend on how governments respond to ageing population and increasing costs for pension schemes and health care [8]. Pension schemes in the Eurozone were expected to grow from 3 to 5% of GDP and health care expenditures between 1 and 2% in the next decade. The estimated impact of such changes on government expenditure were found to be between 1.7 to 3.9% of GDP leading to

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an inevitable rise in debt-to-GDP ratios across Euro countries [9]. Finally, shows how ageing populations could lead to considerable fiscal consolidation as a greater proportion of younger voters favours the option of debt financing, whereas a majority of elderly voters prioritize debt reduction [10]. It is interesting to pinpoint that argues that there is evidence to suggest that the Ricardian equivalence holds and an increase in debt would not translate into net wealth for households with a positive effect on consumption [11]. Further, states that public debt does not Granger cause private consumption at 1% level of significance. This proposition implies that there is no space for present debt financing through future taxes, but government budgets should be constantly balanced [12].

Furthermore, argues that debt levels were reduced only by decisive and lasting fiscal consolidations in the EU between 1985 and 2009 [13]. The reduction in debt was mostly achieved through cuts in government expenditures for wages and welfare. Further, there was evidence to suggest that countries can “grow their way out of indebtedness” by creating an economic environment that promotes significant and stable GDP growth [14]. On the other hand, finds that in countries with moderate or no capital controls inflation does have a negative impact on the share of domestic debt contrary to those with strict capital controls. This points into the direction of a possible institutional determinant of public debt.

Previous literature also focused on the role of other factors in determining the level of government debt. used the case studies of the UK and US to assess the importance of economic shocks such as business cycle downturns, oil shocks, debt crises and financial crashes to create structural breaks in the data. Additionally, finds corruption to be a significant determinant of debt levels [15, 16]. In particular, perceived government corruption has a larger effect on debt ratios for developed rather than developing countries. Overall, a unit increase in the Corruption Perspective Index (CPI) is expected to increase debt across all countries between 1.4 and 1.7 percentage points. These studies clearly show how corruption can be a drag on growth and, potentially, a hindrance to debt reduction. suggests that debt levels increase with the volatility of insurable income [5]. Thus, as income inequality increases, industrialized economies in particular might find it optimal to accumulate higher levels of debt.

Preponderance of authors also focused on the differentiation between developed and developing economies. for example, find GDP growth, government expenditure, expenditure on education and current account balance to be statically significant determinants of debt for high- and middle-income countries [17]. FDI and inflation have no impact on public debt for high-income countries but are found to be of relevance for the middle-income ones. However, these variables become statistically insignificant when an auto-regressive model is employed. The effects completely disappear with the inclusion of the past realizations of debt. Population density and population above 65 years of age do not have an effect on advanced economies' levels of debt. The study regarding debt in low-income countries showed that there is high heterogeneity across the sample, suggesting that

debt is determined by country-specific factors. The author shows that governmental institutions that deliver structural reforms at a slower pace are more prone to accumulate debt [18]. Conversely, suggests that GDP growth is an important determinant for debt reduction in South American countries, whereas other factors such as inflation and inequality do not have a clear-cut effect on debt [19]. In fact, GDP growth rates of 1% account for around 0.3-0.5% reductions in debt-to-income ratios. An equal increase in inflation can cause a reduction in debt of 0.6-0.7%, but results are not significant when the specification is instrumented out.

Finally, some studies focused on the importance of institutions and economic liberalization in determining the level of government debt. This is what we are particularly interested in exploring. The research in this field is not extensive, but there are some insightful works that are worth following up with further empirical investigation. For instance, argue that institutions are key to debt accumulation. In particular, they argue that countries with shorter-lived governments will tend to follow more myopic and short-term fiscal budgets [20]. This leads to increasingly myopic fiscal policy, which in turn translates into public debt accumulation. Moreover, argue that in a two-period model the political party with a higher preference for fiscal consolidation might increase spending in the first period in order to constrain the spending ability of the subsequent government [21]. Further, they argue that political distortions and institutional soundness are important determinants of fiscal policy bias and government debt accumulation. Other authors like highlighted the role of economic freedom on the accumulation of debt whilst reaching two different conclusions [22, 23]. The former establishes a positive relationship between financial liberalization and debt, whereas the latter argues that gains in the Economic Freedom Index are highly correlated to lower stocks of government debt for all countries. However, their work is based on correlations rather than causation and the papers do not make a fully convincing argument in showing that certain types of institutions are key in determining debt levels.

## Data and Methodology

### Data Description

The panel includes 71 countries across five continents in period between 1990 and 2020. The selection of such economies was made upon careful consideration following the subsequent characteristics: membership to a monetary union, geographical proximity, trading relations, and stages of economic development. These factors considered allows for a reduction of the heterogeneity across countries, making the sample of developed and developing countries comparable and representative of the geographical area they are located in. In particular, there are 32 developed and 39 developing countries from different regions of the world. The distinction between development levels is necessary because developing countries arguably have lower capacities for debt accumulation since they face, amongst others things, higher monetary and financial constraints than developed economies. Most of the data is retrieved from the World Bank, whilst missing observations and some variables were recovered from other sources such as the OECD, the IMF and central bank datasets [24, 25]. The economic rationale for the inclusion of

the variables shown in the Table3 was partially explained in the literature review section on the mat-ter of government debt. The controls are included as potential co-founding factors of GDP growth, clearing the institutional effect of the Index of possible growth channels that affect debt ratios.

Debt-to-GDP ratios come from Reinhart’s database, which is mostly based on the Historical Public Debt database by the IMF3. As aforementioned, we constructed transitory debt as the yearly fluctuation of debt ratios from its country’s historical average. The intention is to study

the effect of our desired independent variables on the level of government debt and to segregate the effects in the short versus the long-run. The variable for transitory debt is constructed as follows:

$$TransitoryDebt_{it} = TotalDebt_{it} - \sum_{i=1}^{72} \frac{TotalDebt_{it}}{t} \quad (1)$$

where the subscript i indicates a particular country and t indicates the time frame. Subsequently, we collected data for the Index of Economic Freedom (EFI) from the institute that computes it, the Heritage Foundation4. The Index is a multi-dimensional score for a country’s several economic institutions and laws, ranking them by how much they are con- sidered to protect and enhance individual economic liberty. Before we set our minds on this particular resource, we have looked into alternative options such as the Economic of the World Freedom (EFW) Index. We realized that the sample size would significantly shrink if we used this indicator, especially in the years prior to 2000. This is primarily because, before 2000 the Index was collected every 5 years, and we did not want to compromise the validity of the data using the extrapolation methods. This would also impact our choice of estimation methods, as the reduced sample size will cause a considerable issue with the non-parametric estimation, particularly in terms of conversion criteria. Therefore, we decided to use the In- dex of Economic Freedom which covers 12 freedoms, grouped into 4 main "pillars" (Rule of Law, Government Size, Regulatory Efficiency, and Open Markets). To give a better idea of how the Index is organized, we provide the following Table:

**Table 1: The Index of Economic Freedom and Its Components**

Pillars	Components
1. Rule of Law	{ Property Rights Government Integrity Judicial Effectiveness
2. Government Size	{ Government Spending Tax Burden Fiscal Health
3. Regulatory Efficiency	{ Business Freedom Labor Freedom Monetary Freedom
4. Open Markets	{ Trade Freedom Investment Freedom Financial Freedom

Table1clarifies how the Index is structured. Each country is assigned a score from 1 (least free) to 100 (most free) for each component. Each component has equal weight to compose the pillar and each pillar weighs a quarter of the overall score. In other words, each of the 12 components has equal weight toward the final overall score of the Index. Countries that score higher are deemed to be economically "freer". The 12 components, which are reduced to 9 due to data availability5, and the overall index that they form is used in this paper as a proxy for a specific quality of economic institution. Throughout the econometric analysis, we had to drop three components due to the lack of data points. These three variables.

presented far fewer observations in the sample compared to other components. The components dropped are Judicial Effectiveness, Fiscal Health and Labor Freedom. Although fiscal health

represents "average deficits as a percentage of GDP and debt as a percentage of GDP, reflecting the government budget management", its exclusion will not significantly affect the results, as it will be reflected in both pillars and full EFI calculations [26]. Equally we are excluding this variable for the purposes of perfect predictability of the variations in our dependent variable. Overall, this Index and its layers were used as proxies for institutions’ qualities and characteristics within a given country. It is important to bear in mind that the Index does not take into consideration social institutions and cultural norms. Countries that score very high in economic freedom are not necessarily countries that protect individual liberties outside the sphere of economics. In other words, this index is to be considered merely as a ranking based on a country’s enforcement and protection of economic liberty. Here are the descriptive statistics for the breakdown of the Index:

**Table 2: Descriptive Statistics for the Economic Freedom Index**

Variable	Mean	Std. Dev.	Min.	Max.	N
EFI	64.2	10.1	33.5	90.5	1825
Rule of Law	55.0	23.3	9	95	1829
Government Size	66.7	17.9	15.2	95.5	1829
Regulatory Efficacy	70.9	10.9	26.9	96.5	1829
Open Markets	63.2	14.9	15	91.7	1829
Property Rights	59.1	24.1	5	98.4	1825
Government Integrity	51.3	24.3	9.8	100	1829
Judicial Effectiveness	122.1	71.2	1	244	<b>298</b>
Tax Burden	71.2	16.2	29.8	99.9	1828
Government Spending	62.0	25.0	0	98.7	1829
Fiscal Health	129.9	71.2	1	228	<b>320</b>
Business Freedom	69.8	15.5	20	100	1829
Labor Freedom	238.7	127.4	1	492	<b>1156</b>
Monetary Freedom	77.1	10.6	0	95.4	1829
Trade Freedom	73.6	13.7	0	95	1828
Investment Freedom	60.2	19.8	0	95	1829
Financial Freedom	56.0	18.9	10	90	1825

Notes: Numbers are rounded to one decimal place when necessary.

Noteworthy, the components that are represented by their number of observations in bold are those that were left out of our econometric analysis. Finally, the panel includes several macroeconomic variables to control for the general economic conditions in our regression models. These variables are summarized in the table below:

**Table 3: List of Macroeconomic Controls**

Controls	Obs	Mean	Std. Dev.	Min	Max
GDP	2195	3.45	4.42	-50.25	35.22
Inflation	2183	12.25	102.69	-4.86	2947.73
Unemployment Rate	2202	6.67	5.26	.11	33.29
Life Expectancy	2232	71.74	9.64	26.17	85.08
Capital Formation	2169	23.36	6.80	-2.42	50.78
FDI	2185	5.26	20.06	-58.32	449.08
Gini	2232	36.95	8.54	.47	63.90
Democracy	2170	0.58	0.31	0	0.9

Notes: Numbers rounded up to two decimal places.

Firstly, we included variables that can control for variations in debt to accentuate business cycle changes. Accordingly, we included data for capital formation, GDP growth and unemployment rates. We are controlling for GDP growth in order to avoid clouding the direct effect of institutional characteristics on debt ratios. Furthermore, we include inflation within our controls. The change in prices can have important implications for the real level of public debt and has been a propelling force for debt reduction at times throughout history, namely the 1970s [27, 28]. Inflation also affects debt ratios through an increase in government revenues from taxation as prices soar. Our set of controls aims at capturing those characteristics in the population that might be causing changes in its composition and, therefore, changes in the structure of government spending. These variables are population growth rates and life expectancy, which can capture variations of debt caused by demographic transformations. These are increasingly a matter of fiscal policy, especially amongst developed countries, as they impact government rev-

enues and spending. Another factor that might be affecting the composition of government expenditure is inequality. In fact, as inequality worsens governments might be facing higher expenses on benefits and lower tax revenue, directly affecting debt level. Thus, we include the Gini coefficient as an overall measure of inequality across countries. The penultimate variable that we have chosen is a proxy measuring the strength of democracy in the sample of countries we have selected since democracies might be more prone to debt accumulation. In fact, a democratic regime would rather "cover its expenses through loans and then pay off the debt over a long period, a policy known as "tax smoothing" than impose dramatically higher taxes" in time of need [29].

### Methodology

This paper will explore three different types of relationships between our dependent and independent variables: linear, non-parametric, and dynamic. For each model that we are go-



ing to exploit, we will run, firstly, a model with the aggregate Index of Economic Freedom and, secondly, we will exploit the multi-dimensionality of the Index and we will run the same model including the pillars and components of EFI. Noteworthy, a simple unit root LLC test on the Economic Freedom Index showed that the Index contains a trend. For this reason, in our estimation, we de-trend this variable and avoid possible spurious regression issues. All regressions will be conducted using the control variables in order to take into account key determinants of debt creation outlined both in the theory and empirical liter-

ature. Furthermore, excluding our linear models, the tables will include models regressed on debt-to-GDP ratios and on transitory debt, as introduced in the previous section. Finally, we run each model for three samples: full, developing and developed countries. This allows us to monitor how the effect of economic freedom might change based on the type of country we consider and understand whether its effect is homogeneous across different stages of development.

The statistical model used in the linear estimation is the following:

$$totaldebt_{it} = \beta_0 + \beta_1 EFI_{it} + \beta_2 gdp_{it} + \beta_3 inflation_{it} + \beta_4 unemploymentrate_{it} + \beta_5 fdi_{it} + \beta_6 lifeexpectancy_{it} + \beta_7 capitalformation_{it} + \beta_8 gini_{it} + \beta_9 democracy_{it} + \alpha_i + u_{it}$$

The analysis starts with the employment of a fixed effects model in analysing the relationship between government debt and the economic freedom index. The linear structure was selected as the initial step in establishing the direction and magnitude of the relationship before the more complex dynamic relationship is considered. In this case, we will not be able to include the estimations for transitory debt as, by construction, this dependent variable is already demeaned. This model also allows us to control for time-invariant characteristics that are country-specific. After checking for significant differences with a random-effects model using the Hausman test, we decided to employ a fixed-effects specification. Furthermore, pillars and components of the Economic Freedom Index are individually regressed in order to deal with collinearity issues. Furthermore, we considered the non-parametric estimation. This type of estimation is agnostic to the functional form of the relationship between the dependent and independent variables, opting for a kernel distribution. Therefore in doing this analysis we are trying to minimize the misspecification error. Given the large number of observations provided in our sample, this type of estimation is appropriate in producing good estimates for our models. More specifically, we exploit a non-parametric kernel so that we estimate a local-linear and local-constant kernel regression. These estimations also produce informative graphical evidence of the obtained structural form of the relationship. Particularly

interesting and important for inference are the marginal effects plots that such estimations allow us to produce. These plots show how a unit change in our independent variable, at any point of its distribution, affects our dependent variable. The graphical representations obtained are useful to understand whether the causal change that we are exploring may or may not change at different levels of economic freedom scores. This will provide some important causal evidence in our non-parametric model. For this type of econometric estimation, we are employing bootstrapped standard errors.

Finally, we include results of a generalized method of moments (GMM) regression by controlling for the dynamic relationship between total and transitory public debt. In this case, we ensure to remove the trend in the Index by de-trending our dependent variable. The standard errors in this instance are HAC and the control variables remain the same across all specifications. The GMM models will help us identify the relative importance of the debt lags in the relationship investigated. More precisely, it will indicate the importance of EFI as a determinant of both changes in transitory and total debt. We include the first two lags of public debt and we instrument them in order to exploit the dynamic relationship. The validity of the instruments will be measured using both the AR test and the Hansen J statistic.

$$totaldebt_{it} = \beta_0 + \beta_1 totaldebt_{i,t-1} + \beta_2 totaldebt_{i,t-2} + \beta_3 EFI_{it} + \beta_4 gdp_{it} + \beta_5 inflation_{it} + \beta_6 unemploymentrate_{it} + \beta_7 fdi_{it} + \beta_8 lifeexpectancy_{it} + \beta_9 capitalformation_{it} + \beta_{10} gini_{it} + \beta_{11} democracy_{it} + \alpha_i + u_{it}$$

## Empirical Results

### The Linear Model

The fixed-effects model is an initial estimation strategy including variables of interest and selected macro controls. The sample will be analyzed in its entirety and then in designated subsamples. The first specification can accommodate time-invariant

characteristics that could be affecting our estimates across countries. Apart from GDP growth, our estimation model includes the controls specified in the previous section. Standard errors are also clustered at the country level and results are presented in Table 4.

**Table 4: Linear Fixed Effects Regressions of Economic Freedom Index on Public Debt**

	(1)	(2)	(3)
	Full Sample	Developing	Developed
Rule of Law	-0.052 (0.152)	0.187 (0.213)	-0.169 (0.141)
Gov. Size	-0.450*** (0.159)	-0.931*** (0.270)	-0.512*** (0.176)
Regulatory Eff.	-0.232 (0.127)	-0.046 (0.257)	0.068 (0.275)
Open Markets	0.074 (0.200)	-0.254 (0.271)	0.029 (0.285)
Controls	Yes	Yes	Yes
<i>N</i>	1720	923	797

The preliminary results indicate a causal link between economic freedom and the level of debt-to-GDP ratios. Particularly, the estimates indicate a more pronounced effect of EFI scores on debt ratios of developing countries. Across the whole sample, the coefficient of the EFI is about -0.6. In other words, the results imply that increasing your Economic Freedom score by 10 points can lead to an overall 6% reduction in public debt. After checking for collinearity between EFI scores and GDP, as institutional framework might affect GDP growth, results do not change significantly when using or not GDP as a control of debt ratios<sup>6</sup>. As aforementioned, the effect of economic freedom on government debt produces larger debt reductions in developing countries. In particular, a 10-point increase in economic freedom scores results in 8.5 percentage points reduction in debt for developing countries compared to developed one, where we observe 8 percentage points decrease. The intuition behind the result signals that economic institutions promoting a free-market economy are important factors for the fiscal health of developing countries. Likely, they advance safer and healthier economic environments which, in turn, incentivize income growth and better policy by the government. Noteworthy, the

predictive power of GDP growth rates is statistically indifferent from zero unlike the remainder of the sample. This evidence indicates that GDP growth does not matter in reducing debt for developed countries whilst economic institutions have a considerable impact. Contrary, GDP growth rates are highly predictive of reductions in debt-to-GDP ratios in developing countries<sup>7</sup>.

In order to look further into the predictive power of the index, we exploit the several dimensions offered by the composition of the Index, namely pillars and components. We examine the factors within EFI that directly affect our dependent variable to understand which institutional characteristics are causal determinants of public debt and help us understand its variations. Accordingly, we regress the four pillars of the Index on government debt previously summarized in Table 5. Each pillar is individually regressed on debt ratios in order to avoid collinearity issues with the Index as explained in the previous section. The same methodology was followed for the components of EFI which can be found in Table 6. Further methodological details about the regression models are included in the notes below each figure.

**Table 5: Individual Fixed-Effects Regressions of EFI Pillars on Debt Ratios**

	(1)	(2)	(3)
	Full Sample	Developing	Developed
Rule of Law	-0.052 (0.152)	0.187 (0.213)	-0.169 (0.141)
Gov. Size	-0.450*** (0.159)	-0.931*** (0.270)	-0.512*** (0.176)
Regulatory Eff.	-0.232 (0.127)	-0.046 (0.257)	0.068 (0.275)
Open Markets	0.074 (0.200)	-0.254 (0.271)	0.029 (0.285)
Controls	Yes	Yes	Yes
<i>N</i>	1720	923	797

(Clustered standard errors in parenthesis below coefficients. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ )

The coefficients reported are those obtained by individually regressing the corresponding pillar of EFI on debt ratios in order to avoid multicollinearity issues. Each regression included the

same controls and sample of countries, including growth rates. The component that stands out immediately in terms of significance and magnitude of an effect is "Government Size"<sup>8</sup>. The magnitude of the coefficient for the full sample has decreased from the overall EFI score, although it still follows the pattern present in the Table 4. The score on government size has a larger

effect in developing countries, and magnitude of its coefficient is twice the one observed in the full sample. It is indeed clear that the score on government size drives the significance of overall Index in explaining debt variation, whilst other determinants have no impact at all. Since the EFI index is an equally-weight-

ed average of pillar scores, it is likely the case that the interaction of 4 pillars, even those statistically insignificant, explains further variation in debt ratios. 9. The results are consistent in both sub-samples although the magnitude of effects differ across samples.

**Table 6: Individual Fixed-Effects Regressions of EFI Dimensions on Public Debt**

	(1) Full Sample	(2) Developing	(3) Developed
Property Rights	0.127 (0.114)	0.219 (0.148)	0.031 (0.132)
Gov. Integrity	-0.186 (0.142)	0.001 (0.220)	-0.190* (0.111)
Gov. Spending	-0.462*** (0.116)	-0.518*** (0.139)	-0.519*** (0.145)
Tax Burden	-0.261 (0.204)	-0.809*** (0.274)	-0.005 (0.166)
Business Freedom	-0.019 (0.156)	-0.212 (0.198)	0.056 (0.153)
Monetary Freedom	-0.014 (0.121)	0.009 (0.154)	0.075 (0.188)
Trade Freedom	-0.044 (0.148)	-0.143 (0.195)	0.024 (0.307)
Investment Freedom	0.162 (0.131)	-0.021 (0.151)	0.085 (0.187)
Financial Freedom	-0.076 (0.112)	-0.102 (0.129)	0.072 (0.155)
Controls	Yes	Yes	Yes
<i>N</i>	1716	923	793

Coefficients reported are those obtained by individually regressing the corresponding component of EFI on debt ratios in order to avoid collinearity issues between independent variables. Each regression contains the same controls and is performed over the same sample of countries.

The results in Table 6 corroborate the importance of government size in producing variations in debt ratios. In particular, results suggest that government spending bears a leading role in increasing public debt<sup>10</sup>. The coefficient is negative and significant for all three samples of countries and appears to be similar for all specifications, fluctuating between  $-0.462$  in the full sample to  $-0.519$  amongst developed countries. The major difference between our two sub-samples was introduced by the tax burden. Findings show that tax burden is a powerful predictor of debt variations in developing countries, while in developed countries and the whole sample it has no effect whatsoever. More precisely, the results in Table 6 suggest that improvements in the tax burden score can be more effective in reducing public debt across developing countries whilst public debt reduction in developed countries must come from reductions in government purchases.

After discussing the components that drive the significance of government size in the table above, there are two main conclusions reached so far. First and foremost, it is the role that government spending has in determining debt. This clearly suggests that countries with higher government spending will inevitably

accumulate more public debt [30]. Secondly, the tax burden has a relatively greater impact than government spending in determining public debt across developing countries. For both indicators, the effect is negative and significant. Developing countries can reduce government debt much more effectively by reducing taxation rather than decreasing the level of government spending as detailed in [31]. Contrary to developed countries, debt reductions from the government size score come predominantly from the level of government spending. These results indicate low levels of government spending in developing countries and ergo higher gains are to be made through changes in the tax system. In fact, their public sectors tend to be small<sup>11</sup> and cuts in government spending are going to be relatively small as well. Tax cuts can be a better solution for promoting higher labour supply, productivity gains and fostering international competitiveness. Additionally, tax systems in developing countries are generally regarded as inefficient and ill-enforced, directly impacting tax revenues [32]. On the contrary, government spending in developed countries represents a major player in debt determination as public sectors are, on average, larger and tax systems are more efficient<sup>12</sup>. The interaction between taxation and government spending in determining debt levels should be taken into account for policy purposes.

### Non-Parametric and Dynamic Models

The non-parametric model allows us to estimate the relationship between public debt and economic institutions without enforcing any predetermined functional form between our dependent



and independent variables. This model is a suitable option in our case since the dataset is large enough to exploit this type of econometric estimation. We will follow the same structure as before, while also including transitory debt as one of the two dependent variables we will examine. This allows us to establish the relationship between the Index and short-term variations

of debt from its historical average<sup>13</sup>. Table 7 shows the first set of results of the economic freedom index on total and transitory government debt. The marginal effects will be outlined on a graph to provide inferential evidence on the relationship between the variables of interest.

**Table 7: Non-Parametric Regressions of EFI on Total and Transitory Debt**

	(1) Full Sample	(2) Developing	(3) Developed	(4) Full Sample	(5) Developing	(6) Developed
EFI	-0.730*** (0.136)	-0.173 (0.179)	-1.593*** (0.069)	-0.312* (0.169)	-0.429*** (0.168)	0.066 (0.201)
GDP	-1.413*** (0.359)	-0.273 (0.315)	-2.532*** (0.723)	-0.465 (0.367)	-0.731*** (0.287)	-0.444** (0.069)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	1616	885	723	1614	885	797

**Notes:** Bootstrapped standard errors in parentheses. Dependent variables: debt ratios in levels for (1)(2)(3), transitory debt for (4)(5)(6). Each independent EFI pillar is regressed individually to avoid collinearity issues. Each column represent a different sample of countries as indicated.

It is important to mention that non-parametric estimations result in the automatic removal of some observations when estimating the model, due to the lack of convergence to a functional form. This will equally affect the size of samples across estimations. The results support precursory evidence on the effect of higher EFI scores on debt ratios, confirming its diverse magnitude across the sample of developed and developing countries. The EFI is negatively affecting debt ratios across the full sample and the cohort of developed countries. In other words, the causal effect of EFI on debt for the whole sample and developed countries could be detected in both total debt levels and

short-run variations of debt from historical averages. It is worth pinpointing the size of the EFI coefficient for developed countries which is 50 percent greater in magnitude than the one in linear estimation. This means that a point increase in the Index score for a developed country leads to more than a percentage point reduction in debt- to-GDP ratios compared to less than a 1 percentage point reduction predicted in the linear estimation. Moreover, the non-parametric estimation reevaluates the role of GDP in debt reduction more effectively than gains in the economic freedom score in the whole sample. This, however is not present for all sub-samples. Additionally it is worth highlighting that EFI scores affect transitory debt more than long-run debt across the sample of developing countries, with its coefficient of -0.429 significant at a 1% significance level. This evidence indicates that EFI is more predictive of short-term shocks in public debt rather than long-term trend. This behavior is unique to developing countries.

**Table 8: Non-Parametric Regressions of EFI Pillars on Total and Transitory Debt**

	(1) Full Sample	(2) Developing	(3) Developed	(4) Full Sample	(5) Developing	(6) Developed
Rule of Law	0.032 (0.041)	0.046 (0.041)	-0.109* (0.064)	0.031 (0.024)	0.056 (0.039)	-0.083** (0.042)
Gov. Size	-0.179*** (0.065)	-0.325** (0.129)	-0.436*** (0.097)	0.357*** (0.058)	0.679*** (0.160)	0.100 (0.079)
Regulatory Eff.	0.157** (0.081)	0.424*** (0.154)	1.169*** (0.284)	-0.005 (0.053)	0.249** (0.126)	-0.034 (0.115)
Open Markets	-0.430*** (0.065)	-0.262*** (0.078)	-0.484*** (0.111)	-0.078* (0.041)	-0.302 (0.275)	0.042 (0.058)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	1629	923	710	1720	896	797

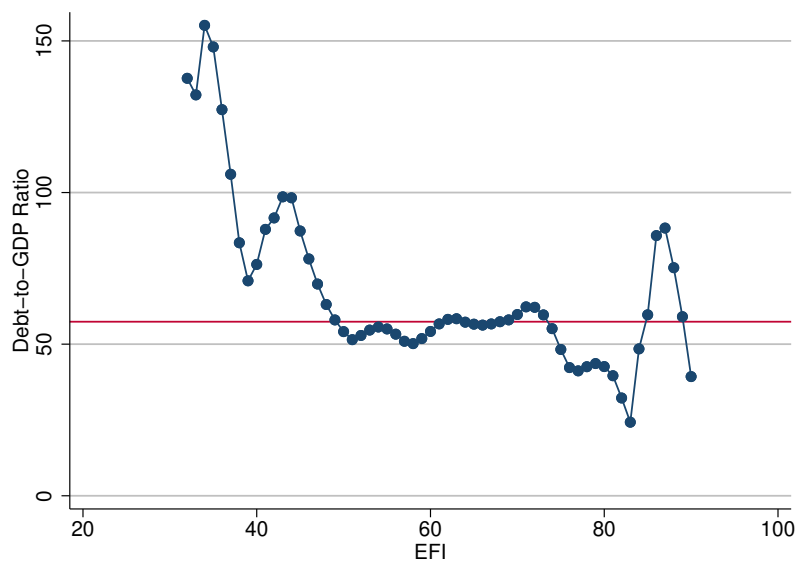
Bootstrapped standard errors in parentheses. Dependent variables: debt ratios in levels for (1)(2)(3), transitory debt for (4)(5)(6). Each independent EFI pillar is regressed individually to avoid collinearity issues. Each column represent a different sample of countries.

We then run non-parametric models for the four pillars of EFI. The results are presented in Table 8. The coefficients uncover further evidence on the relationship between different types of

economic institutions and our dependent variable which was not present in the linear estimation. Apart from the confirmation that government size still is an important predictive component of variations in public debt, using transitory debt as a dependent variable shows that the score on government size actually has an opposite effect in the short-term. Potential explanation is that tax cuts lead to lower tax revenue in the short term and that government spending reduction leads to temporary lower GDP growth hence increasing debt ratios. These channels

would explain why scores on government size have a positive effect on short-term variations of public debt. Apart from negligible effects of the rule of law in developed countries<sup>14</sup>, there are interesting effects of open markets scores in our samples. In particular, this score is a good predictor of debt variations both in developed and developing countries, although a larger effect is detected in the sample of developed countries. This result is substantiated by previous evidence from which showed how liberalized markets allow reaping higher benefits from capital flows and, therefore, promote higher income growth [33]. Finally, scores on regulatory efficiency have a positive effect on debt accumulation, namely more efficient regulation leading on

average to higher public debt levels. It is particularly the case for developed countries showing that it is cheaper and easier for countries with a good institutional and regulatory record to raise funds on international credit markets. In the nutshell, the scores on government size and the openness of markets are debt-reducing determinants, whilst the soundness of a country's regulatory system is a debt-promoting indicator through falls in debt servicing costs. The graphs of marginal effects for non-parametric estimations can help us to provide further evidence on the causal relationship between debt ratios and economic institutions (Figure 2).



**Figure 2:** Marginal Effects Plot for Unit Increases of EFI

Note that the red horizontal line in this figure and in all the following marginal effects plots simply represent the average debt-to-GDP ratio within our sample.

The marginal effects plot above highlights the overall negative effect of EFI scores on the level of government debt. Figure-2 demonstrates that there are bigger gains when EFI scores are below 50. After this threshold, there is an interval of EFI scores that does not affect the level of debt significantly in any direction as the level of debt fluctuates around its mean. However, the marginal effects plot also shows that changes in the EFI scores affect public debt significantly for scores above or around 70. In particular, this plot could be further evidence of the non-linearities

in the relationship between public debt accumulation and economic freedom which substantiates the reasons for preferring a non-parametric estimation to a linear one. The overall trend confirms the estimates that we have obtained in the previous econometric analysis and suggest that marginal changes in EFI scores are particularly effective in reducing debt levels at the extremes of its distribution. Finally, we employ a GMM model that investigates the dynamic relationship between debt and EFI. In order to do so, it follows that the model includes the first two lags of a dependent variable. The results of these estimations can be found in the table below. The Index is also de-trended in all specifications in order to control for stochastic trends.

**Table 9: GMM Estimations of Economic Freedom Index on Total and Transitory Debt**

	(1)	(2)	(3)	(4)	(5)	(6)
	Full	Developing	Developed	Full	Developing	Developed
$Debt_{t-1}$	0.876*** (0.025)	0.869*** (0.032)	1.050*** (0.036)			
$Debt_{t-2}$	-0.074*** (0.021)	-0.088*** (0.029)	-0.177*** (0.031)			
$EFI_{Detrended}$	-0.168*** (0.083)	-0.007 (0.005)	-0.009 (0.067)	-0.250*** (0.066)	-0.152* (0.081)	0.032 (0.081)
$TransitoryDebt_{t-1}$				0.916*** (0.045)	0.890*** (0.047)	1.092*** (0.076)
$TransitoryDebt_{t-2}$				-0.077** (0.032)	-0.076** (0.035)	-0.189*** (0.067)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1716	921	795	1716	921	795

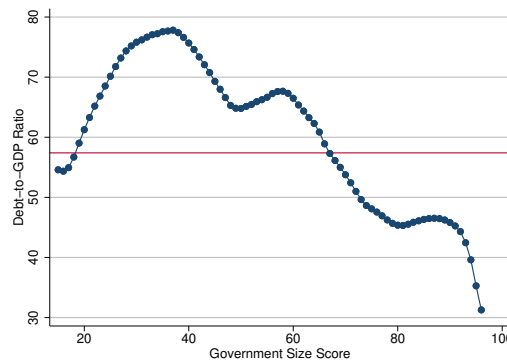
Clustered standard errors in parenthesis, p-value and asterisks. Two lags of dependent variable included, small sample correction.

Bootstrapped standard errors in parentheses. Dependent variables: debt ratios in levels for (1)(2)(3), transitory debt for (4) (5)(6). Each independent EFI pillar is regressed individually to avoid collinearity issues. Each column represent a different sample of countries.

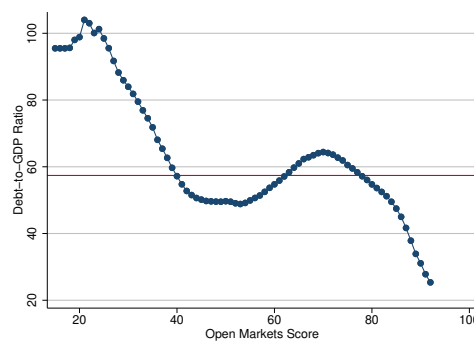
The results support the existence of a negative relationship between a country’s score on economic freedom and public debt accumulation. EFI scores still have a negative effect on debt ratios, although relatively reduced. In particular, a 10-point increase in EFI scores lead, according to GMM results, to an average 1.7 percentage point reduction in debt-to-GDP ratios. There are

less clear indications when our model is applied to sub-samples, although this is most likely a result of reduced predictive power and over-identification of restrictions. Nevertheless, we employ this model in order to underpin our results from non-parametric estimations and obtain very similar patterns<sup>15</sup>.

Following the validation of the results for our non-parametric model and considering the limitations of sub-sampling in our GMM model, we are going to focus on the discussion of non-parametric marginal effects for pillars and components that better describe the non-linear relationship between economic institutions and debt ratios.



**Figure 3: Marginal Effects of Unit Increases of Government Size Scores on Debt Ratios**

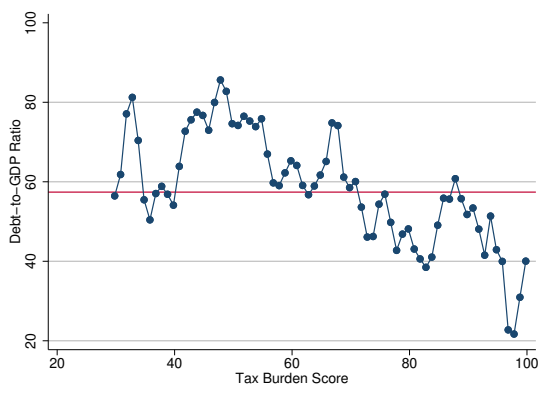


**Figure 4: Marginal Effects of Unit Increases of Open Markets Scores on Debt Ratios**

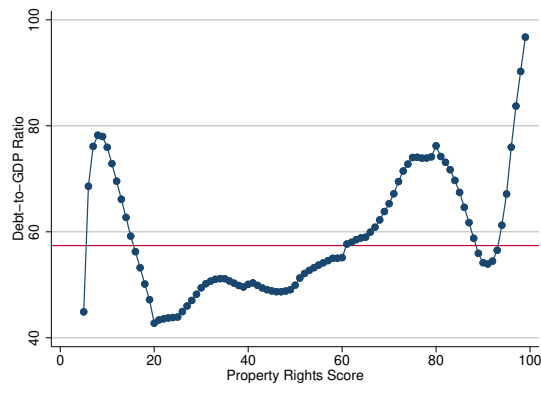
Figure 3 and 4 show the marginal effects for unit changes in the scores of two EFI pillars, respectively government size and open markets. The graphs confirm the behavior of scores against debt ratios. Figure 4 resembles the marginal effects of the overall EF index, with large reductions in debt ratios for unit increases at the extremes of the Open Markets score distribution. There is instead little change to debt ratios for marginal unit changes in the open market score around its average 16. Marginal unit changes above the average open markets score correspond to falls in debt ratios. The behavior of the marginal changes in government size scores is partially different since it does not contain marginal effects flattening out at particular levels of the score distribution. There is a clear negative trend that persists across government scores. Nonetheless, Figure 3 illustrates how marginal effects on

debt-to-GDP ratios exponentially increase in magnitude as we move towards the right tail of the government size distribution, with the exception of two intervals of government size scores; namely the mid-50s and 80s. Overall, the graphs confirm that countries that score above average on the open markets and government size categories exhibit below average levels of public debt.

Finally, we consider the marginal effects plots for two interesting components of EFI that showed contrasting behaviors in our non-parametric regressions in Table 11. In particular, we decided to show in Figure 5 the marginal effects of unit changes in the tax burden scores whilst in Figure 6 we wanted to graph the counter-intuitive effect of trusted property rights on public debt.



**Figure 5:** Marginal Effects of Unit Increases of Tax Burden Scores on Debt Ratios



**Figure 6:** Marginal Effects of Unit Increases of Property Rights Scores on Debt Ratios

Figure 5 gives further insights into the effect tax burden scores have on debt ratios. High scores in this category mean lower average fiscal imposition in a given country. The marginal effects of unit changes in the score support the evidence of the overall negative trend we captured in our non-parametric regression model. However, the illustration of marginal effects across the score distribution shows how unit increases in tax burden score begin to consistently predict a fall in debt ratios only after a score of 60. Before that threshold, the relationship between the two variables looks rather inconclusive. Once again this supports previous econometric evidence that suggested the presence of non-linearity in the relationship of our interest. On the contrary, in Figure 6 we plot the only variable in our econometric

models that has a positive effect on the accumulation of public debt. In fact, as aforementioned, higher scores on property rights were associated with increasing levels of public debt. This arises possibly from a reduced probability of appropriation of foreign debt, hence producing a larger pool of potential lenders and lower debt servicing costs. With this in mind, higher property rights scores will be linked with larger levels of debt-to-GDP ratios. Excluding the extremes of property rights score distribution, there is a visible upward trend between scores of 20 and 80. It is of equal importance to state that marginal effects of unit increase in property rights score cross the average level of government debt around the average score in this category. This means that unit increase in property rights scores above its

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average are associated with above-average debt-to-GDP ratios. This is the way in which economic institutions affect debt ratios.

## Conclusion

### Concluding Remarks

This paper investigates the causal relationship between the Index of Economic Freedom (EFI) and debt-to-GDP ratios. The index was used as a proxy for the quality of economic institutions. Our measurement of different types of economic institutions is a comprehensive index of judicial and regulatory factors that a given country's economy entails. Our hypothesis claims that better scores on the Economic Freedom Index would lead to lower levels of public debt by improving efficiency in the allocation of resources, less governmental involvement and lower levels of corruption. More broadly, we wanted to uncover which types of economic institution play a key role in the accumulation of public debt in a given country. Our results are unique, as previous academic research mainly focused on institutions as a back-channel through which debt levels are affected. The analysis in this paper upholds our hypothesis and ascertained the following details.

Firstly, we found extensive evidence of a causal relationship between the EFI and public debt accumulation. All regression models and specifications purport a negative relationship between economic freedom and public debt. In other words, higher economic freedom scores lead to lower levels of government debt accumulated over time. This finding was present for all functional forms used to estimate this relationship; linear, non-parametric, and dynamic. More specifically, we found that a 10-point improvement in the EFI score can lead to a reduction of 1.7 - 7.3 percentage points in public debt ratios<sup>20</sup>.

Secondly, we find that the index score on government size is the leading factor in debt reduction across countries. In particular, results show estimators to be between -0.3 and -0.4 respectively across developing and developed countries. Our empirical examination of the further components of the Index showed that developing and developed countries are affected differently by these fiscal components. In particular, tax burden plays a much more influential role than government spending in debt reduction among developing countries (Table 11). On the other hand, we find that debt reductions amongst developed countries are predominantly, although not exclusively, driven by changes in government spending. This has an important policy implication for countries at different stages of development facing high levels of public debt. Developing countries react better when a policy improves scores on tax burden (i.e. reduces direct, indirect and corporate taxes), whereas developed countries should focus on government spending reductions rather than tax hikes to bring the reduction in debt-to-GDP ratios. Overall, the results indicate that better scores on the government size lead to lower levels of public debt.

Thirdly, our non-parametric model estimates show that open markets pillar is an important determinant of variations in debt ratios. In particular, a point increase in a country's open markets score leads to a 0.4 percentage point reduction in debt-to-GDP ratios. This effect is particularly pronounced in the sample of

developed countries. Table 11 outlines that trade, investment and financial freedom scores are all significant predictors of variations in debt ratios, with their coefficients ranging between -0.63 and -1.44. These were the most dominant in terms of statistical significance when it comes to economic institutions for all the estimation models. The same estimation model indicates the relevance of government integrity in the accumulation of debt. The estimated coefficient for this score evinces that higher government corruption leads to higher levels of public debt<sup>21</sup>. Conversely, when it comes to developing countries only trade freedom scores play a role in public debt determination.

Lastly, we find that there is extensive evidence on non-linearity that are affecting the causal relationship between EFI scores and debt ratios. The plots of marginal effects of EFI and some of its most relevant components show that unit increase across the score distributions do not lead to equitable changes in debt ratios. When considering the overall EFI, we showed that the sharpest falls in public debt are associated with marginal changes of EFI scores at the extremes of the distribution (Figure 2). Correspondingly, the marginal effects of unit changes in open markets scores contain the highest levels of change around the extremes of its distribution (Figure 4).

### Policy Implications and Further Research Questions

Our research paper aimed at highlighting the importance of institutional factors in debt-reduction policies. The main empirical findings suggest that countries willing to reduce their public debt should consider two institutional factors: the size of government and the rule of law. Depending on the stage of development a specific country is experiencing, our findings suggest that governments should be considering either a lower tax burden or a decrease in government spending. Furthermore, the paper has shown the importance of legal institutions in determining debt levels for developed countries, with particular emphasis on the role played by government integrity and corruption, judicial effectiveness in enforcing contracts and protection of property rights. These effects are not negligible as our estimates suggest that the improvement in these scores can prove more effective in debt reduction than growth itself. Nonetheless, the results also show that income growth is consistently proven to be an important determinant of government debt.

The results in this paper assert the need for further research in the field of government debt and institutions. The first clear example of it would be to extend the paper to a larger sample of countries, perhaps covering all countries around the world, given the availability of EFI data. A larger sample would lead to gains in inference and would allow further analysis of the role of institutions across developed and developing countries. In particular, this would improve doubts about the internal and external validity of our results. In addition to that, the following papers could be looking into the effect of other types of institutions, rather than focusing only on the role of economic ones. For instance, a larger sample could be controlled for membership in a monetary union.

It is our intention to follow this paper up with this extension. Fur-



ther research questions might also arise from the need to address the channels through which these institutional characteristics are resulting in debt reductions. In particular, future research might focus on more specific indicators of institutional performance. For instance, it would be interesting to study which type of tax induces debt reduction in developing countries more than others. Moreover, it would be important to focus on the role of corruption and the channels through which it affects debt accumulation. This research paper also represents the first insight into the understanding of institutional importance in public debt accumulation across countries. The index would be a more efficient measure for creating an economic environment that promotes sustainable public debts by taking into account stages of development and the different weights that each component bears in the overall score. A revision of weights in the EFI would be the first step in this direction.

Overall, there are many aspects of institutions that one might study and many different ways of calculating outcomes and creating proxies for performance. This paper focuses only on economic institutions, and the scores are computed using predetermined weights. In other words, this paper does not cover social and cultural institutions and the role they might have on public debt. All of these questions need an answer which will uncover the necessary steps for the establishment of additional factors that affect debt accumulation.

## References

- Kumar, M. and Woo, J. (2010). Public debt and growth. Available at SSRN 1653188.
- Reinhart, C. M. and Rogoff, K. S. (2010). Growth in a time of debt. *American economic review*, 100(2):573–78.
- Panizza, U., & Presbitero, A. F. (2014). Public debt and economic growth: is there a causal effect?. *Journal of Macroeconomics*, 41, 21-41.
- Eberhardt, M., & Presbitero, A. F. (2015). Public debt and growth: Heterogeneity and non-linearity. *Journal of International Economics*, 97(1), 45-58.
- Azzimonti, M., De Francisco, E., & Quadrini, V. (2014). Financial globalization, inequality, and the rising public debt. *American Economic Review*, 104(8), 2267-2302.
- Barro, R. J. (1979). On the determination of the public debt. *Journal of Political Economy*, 87(5, Part 1), 940-971.
- Swamy, V. (2015). Government debt and its macroeconomic determinants—an empirical investigation. Available at SSRN 2601875.
- Greiner, A., Koeller, U., & Semmler, W. (2007). Debt sustainability in the European Monetary Union: Theory and empirical evidence for selected countries. *Oxford Economic Papers*, 59(2), 194-218.
- EPC, E. U. (2001). Budgetary challenges posed by ageing populations: the impact on public spending on pensions, health and long-term care for the elderly and possible indicators of the long-term sustainability of public finances.
- Ellis, M. A., & Schansberg, D. E. (1999). The determinants of state government debt financing. *Public Finance Review*, 27(6), 571-587
- Becker, T. (1995). Government debt and private consumption: Theory and evidence (No. 71). Stockholm School of Economics.
- Gogas, P., Plakandaras, V., & Papadimitriou, T. (2014). Public debt and private consumption in OECD countries. *The Journal of Economic Asymmetries*, 11, 1-7.
- Nickel, C., Rother, P., & Zimmermann, L. (2010). Major public debt reductions: Lessons from the past, lessons for the future.
- Forslund, K., Lima, L., & Panizza, U. (2011). The determinants of the composition of public debt in developing and emerging market countries. *Review of Development Finance*, 1(3-4), 207-222.
- Gnegne, Y., & Jawadi, F. (2013). Boundedness and nonlinearities in public debt dynamics: A TAR assessment. *Economic Modelling*, 34, 154-160.
- Benfratello, L., Del Monte, A., & Pennacchio, L. (2018). Corruption and public debt: a cross-country analysis. *Applied Economics Letters*, 25(5), 340-344.
- Sinha, P., Arora, V., & Bansal, V. (2011). Determinants of Public Debt for middle income and high income group countries using Panel Data regression.
- Bandiera, L. (2008). Public debt and its determinants in low income countries—results from 7 country case studies.
- Bittencourt, M. (2015). Determinants of government and external debt: Evidence from the young democracies of South America. *Emerging Markets Finance and Trade*, 51(3), 463-472.
- Alesina, A., & Tabellini, G. (1990). A positive theory of fiscal deficits and government debt. *The review of economic studies*, 57(3), 403-414.
- Persson, T., & Svensson, L. E. (1989). Why a stubborn conservative would run a deficit: Policy with time-inconsistent preferences. *The Quarterly Journal of Economics*, 104(2), 325-345.
- Bacchetta, P., & Caminal, R. (1992). Optimal seigniorage and financial liberalization. *Journal of International Money and Finance*, 11(6), 518-538.
- Miller, T. and Foster, J. (2012). Public debt, economic freedom and growth. Miller, AT, Holmes, KR, Feulner, EJ (2012), pages 45–56.
- Schiantarelli, F. (1996). Financial constraints and investment: methodological issues and international evidence. *Oxford Review of Economic Policy*, 12(2), 70-89.
- Bernardini, M., & Forni, L. (2017). Private and Public Debt: Are Emerging Markets at Risk?. *International Monetary Fund*.
- DEPREN, S. K., & DEPREN, Ö. (2021). How economic freedom affect the ease of doing business? Cross-country quantile regression mixture approach. *Sigma Journal of Engineering and Natural Sciences*, 39(4), 434-442.
- Collard, F., & Dellas, H. (2007). The great inflation of the 1970s. *Journal of Money, Credit and Banking*, 39(2-3), 713-731.
- Aizenman, J., & Marion, N. (2011). Using inflation to erode the US public debt. *Journal of Macroeconomics*, 33(4), 524-541.
- Schultz, K. A., & Weingast, B. R. (2003). The democratic advantage: institutional foundations of financial power in

- 
- international competition. *International organization*, 57(1), 3-42.
30. Bohn, H. (1998). The behavior of US public debt and deficits. *the Quarterly Journal of economics*, 113(3), 949-963.
31. Ilzetki, E. (2011). Fiscal policy and debt dynamics in developing countries. *World Bank Policy Research Working Paper*, (5666).
32. Tanzi, V., & Zee, H. H. (2000). Tax policy for emerging markets: developing countries. *National tax journal*, 53(2), 299-322.
33. Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: new evidence from Latin America. *European journal of political economy*, 19(3), 529-545.
34. Gnanon, S. K. (2021). Tax reform and public debt instability in developing countries: The trade openness and public revenue instability channels. *Economic Analysis and Policy*, 69, 54-67.
35. *National tax journal*, 53(2):299–322.

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