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PUBLIC DEBT AND ECONOMIC TRAJECTORIES: A DUAL LENS ANALYSIS WITH AND WITHOUT GOVERNMENT MEDIATION

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Abstract:
We study the governmental and non governmental factors, alongside the sociopolitical and socioeconomic structures, influencing the sustainability and efficiency of debt. We found a negative correlation of 3.9bps in 10 Year Government Treasury Bond Yields for every percentile increase in governance indicators. Furthermore, we created The Fully Modified World Governance Index, which was better acclimatised to predict the impact of governance on bond yields, which is used as a proxy for the sustainability and efficiency of government debt, and has a negative coefficient of 5.9bps for every marginal increase on The Fully Modified World Governance Index. Additionally, the non governmental factors provided significant and strong negative correlations with the bond yields, however, the regression with fundamental rights pertained to the conclusion that sociopolitical austerity and the centralisation of authority lead to lower bond yields, which, in turn, reflect greater sustainability and efficiency of government debt.

Keywords: Governance Bond Yields, Debt Sustainability, Efficiency, Sociopolitical Structures, Fully Modified World Governance Index, Correlation

Introduction:

Government intervention has been the cornerstone of modern economic development and since the inception of The Keynesian Revolution, all forms of governance, from liberal democracies to totalitarian autarkies, and stages of economies, from emerging markets to economics powerhouses, have acclimatised and consolidated their fiscal and developmental policies around this notion, pertaining to central economic authority significantly inflating and deflating investment in various sectors of the economy in order to endorse the governmental macroeconomic aims.

The preliminary catalyst of governmental intervention is government debt, which exists as internal and external debt, with different socioeconomic implications as the former borrows from citizens, hence is influenced by investor confidence, domestic inflation, balances and deficits, and the latter relies upon investors and institutions overseas, so is influenced by an additional plethora of factors including forex rates and trade positions. Governmental borrowing arises due to government revenue being disproportionate and scarce, compared to government expenditure, leading to a fiscal deficit. However, the deficit is a persistent economic trend, observed in a great proportion of economies worldwide since it aids economic growth. Although fiscal deficits share a positive and exponential regression with short term economic growth, an inverted U shape relation is observed with long term economic growth, progenerating the question of debt sustainability.

Furthermore, the nexus of the sustainability and efficiency of government borrowing and governmental and non governmental factors influencing it tends to be two pronged and demands critical examination as the intricacies of its annexation and utilisation, alongside the quality of sociopolitical and socioeconomic institutions may give the economy the vital stimulus it demands or create unremitting intergenerational burden.

Analysing this causality for global economies is imperative especially amidst the nascent recovery from the pandemic and extreme fiscal and monetary austerity witnessed in economies on the verge of turmoil, alluding to the question, as to, what could avert the stimulus provided by the debt from becoming a fleeting illusion based upon a contemporary

boom and what would enable it to be the foundation of exponential economic development. Macro econometric barometers remain, to a certain extent, conflicted upon the sustainability of the debt undertaken by the international governments. They do, however, tend to support the fact that the extent of borrowing is precarious. This is due to the increase in the level of borrowing, deterioration of the debt coefficient, the proportion of expenditure spent on debt servicing and persistent violation of various benchmarks for sustainability of economic growth, this has been further explored below.

Additionally, per the International Monetary Fund, the global public debt to gdp ratio is currently 237% and government debt coefficient is over 100%, both of which significantly supersede the threshold levels. Furthermore, only a fifth of the world's economies have seen a less gradual debt coefficient deterioration compared to pre pandemic levels. The extent of the detrimental impact of this surge in borrowing was witnessed to its full extent in 2022, as the stimuli began withering, with global economic growth forecasts being nearly half their values in the preceding year, deteriorating from over 6% to 3.2%, forcing downward revisions of growth targets for over 70% of Emerging Markets And Developing Economies, EMDE's.

Furthermore, although this topic has been ventured upon by numerous academia since the turn of the 20th century, the seminal and empirical literature is conflicted. This motivated us to find the significance of government borrowing upon the economy and we intend to critically and clearly examine the impact of government debt upon economies across the globe, stressing upon the covid stimulus and its outcomes.

The structure of the paper is as follows, Section 2 provides a detailed Literature Review of existing analyses, Section 3 elaborates upon the methodology of our research, explains the barometers we have used, emphasises upon empirical models and deliberates upon our structural approach to the paper. Section 4 briefly discusses the fundamentally instrumental role of governance in yielding, from government and public debt, economic development. It then elaborated upon the factors, excluding governance, impacting debt sustainability and debt efficiency, alongside a discussion upon the credibility of the Ricardian Equivalence. Section provides conclusions and highlights the critical role it plays in keeping the modern socioeconomic structure of the world afloat.

Literature Review

The effectiveness of public debt is highly debated and has multifaceted arguments, for and against it, with the idea originally being formulated by the British economist John Maynard Keynes, relying upon the notion that government intervention can stimulate economic development through new investment, which creates employment and aids struggling industries, and by increasing aggregate demand in the economy, due to spending and the Keynesian multiplier effect, as its preliminary arguments, this was first introduced in Keynes(1919) and then further consolidated in Keynes(1936). However, per the classical and neoclassical economic theories, government intervention could be helpful to stimulate short term economic growth, but it is an impediment to long run growth, as it triggers interest rates, crowds out public investment when internally sourced, artificially creates demand in the economy and progenerates long run burden of repayment and debt servicing.

Furthermore, another facet of the debate suggests that debt has no impact upon the economy. This was first conceptualised by the British economist David Ricardo in Ricardo(1820), and then further formalised in Barro(1974), discussing the Ricardian Equivalence which suggests that the impact of public debt on the economy is null and void as the government may choose to raise debt now, however this will be serviced and repaid by higher taxes in the future (inflation, too, is considered a form of taxation), else the government could avoid increasing borrowing, and hence not have to collateralise greater fiscal austerity in the future, leading to higher long run economic growth. This is further

discussed later in the paper. The idea of the Ricardian Equivalence has been further built since, with renowned examples such as Martin et al(2009), which speaks of governments using inflation, rather than other forms of taxation, in order to erode the value of debt. Its impact upon consumers depends upon the availability of substitutes of goods impacted by it. Seater(1993) explores the limitations and drawbacks of the Ricardian Equivalence, suggesting that consistent government deficits that pertain to public debt could, in the long run, undermine the credibility and deteriorate the ability to repay debt, of the government.

However, there are certain studies which deem economic growth to be reliant on government debt and suggest that the economy is a benefactor of public debt. This is primarily based on a laffer type relation, which was pioneered Carmen Reinhart and Keneth Rogoff, in the papers, Reinhart and Rogoff(2009), Reinhart and Rogoff(2010a), Reinhart and Rogoff(2010b) and Reinhart and Rogoff(2011), all of which were post the Global Financial Crisis or The Great Recession. They suggested that a debt threshold must be established which exists upon the non linear relation. Later, in 2010, Reinhart and Rogoff found that debt coefficients above 90% almost definitely led to economic slowdowns. They also proved that withdrawing fiscal stimulus rapidly could be detrimental for economic development.

Augustine and Rafi(2021) find the inverted U relation to be true for 26 countries from their sample of 39 countries and deem optimal thresholds to be between 60% to 90% inclusive for a majority of states. Additionally they find that Ricardian Equivalence was only true for 10 countries of their sample. Eberhardt and Presbrito(2015) deem the non linearity to be true, however, they note that there are significant discrepancies in the thresholds for different nations and also state that nations which have higher average public debt burden in the present tend to have, per their panel of data, better debt coefficients in the future, underscoring the importance of non replication of public debt policies of one country in another.

Afonso and Jalles(2013) find a detrimental impact of government debt on economic growth which is statistically significant and observe a threshold of 51% for optimal development. They also find the laffer type relation to be statistically insignificant. Furthermore, Afonso and Jalles(2020) suggests that government debt with a certain degree of austerity and optimal Stock Flow Adjustments help grow the both developed and developing economies. This deems responsible SFA crucial for sustainable debt management.

Additionally, numerous economists and policy makers highlight the importance of accountable governance in executing public public debt which determines its impact on the economy. Musa et al(2023) suggests that government debt, solely, has a negative impact on economies, however, when accompanied by good governance and high quality of governance, a positive impact is observed on economies. Asoum and Alinsato(2023) explores the impact of governance on the nexus between per capita income and public debt, they found that, for a panel of nearly 40 sub saharan countries, those which had a governance level of over 21 points, were able to yield a developmental gain from their borrowings in the long run.

This shows, as analysed above, although the argument is conflicted, most of the literature predominantly tends to support that government debt leads to economic turmoil. The studies which conclude that government debt is benevolent for the economy also have compelling evidence backing them, however, the conditions and parameters they bank upon are often far too liberalised and scarcely found in the modern sociopolitical institutions. Although it is seemingly logical, a significant proportion of studies conclude that under an adequate quality of governance in the economy, public debt can yield a substantive return. Hence, to broaden the scope of findings, we have dedicated Section 4 to discover the causality for this briefly, and Section 5 critically examines the factors excluding governance, which influence the nexus of government debt and economic development.

Furthermore, we discovered that, compiled and critically analysed data pertaining to non governmental factors which influence the impact of public debt was scarce, hence, we intend to factor in literature from various fields of social science, in order to contribute to the multifaceted debate of government debt from the perspective of this nascent domain, and intend to analyse and compile secondary data which could help progress towards a better understanding of economic and social factors influencing the effectiveness of borrowing.

Research Methodology:

There exists a wide range of scattered, however, articulated data which is an allusion to our conclusion, upon which we intend to conduct a combination of quantitative and qualitative analyses. The central tenants of our examination will be thematic and comparative analyses of currently existing literature, economic indicators, policy reports and historical data.

We have used a plethora of credible sources, as listed in the bibliography, including, predominantly; World Bank, The International Monetary Fund, United Nations Conference On Trade And Development, Statista, Organisation For Economic Cooperation And Development, and various other governmental and non governmental sources.

With the data we have collected and analysed, we seek to answer the following questions;

1. With which structural and institutional conditions does government debt result in positive developmental outcomes?
2. What are the governmental factors that influence the efficiency and sustainability of government debt?
3. What are the non governmental factors which increase effectiveness and sustainability of sovereign debt?
4. With rising public debt across nations, is the concept of Ricardian Equivalence credible or is it maimed by inefficient allocations and suboptimal transfers of resources and capital?

In order to devise Section 4 we articulated intergovernmental data and assessments to review the quality of governance, which were then tied to the level of public debt in the nation, and the sustainability of that public debt. Furthermore, we reviewed historical data and previously published literature regarding the same topic in order to develop a comprehensive understanding of the causation of governance upon the efficiency of public debt.

Furthermore, we conducted analyses from secondary data of the impact of governance on treasury yields of high debt nations and those developing at a rapid pace, and in order to ensure compatibility with nations with persistently competent governments, we added the term of human development to our analysis, which was measured using The Human Development Index (HDI). The HDI is a statistical composite index which considers the quality of human life and is published by The United Nations Development Program (UNDP). We used it to increase accuracy and congruency of our analysis, since consistency of inclusive governmental and political institutions will allow for growth in productivity and output of citizens and lead to a further stabilised polity with evident prospects of growth, encouraging investment and increasing price stability, both of which contribute to decreasing the bond yield. This has been used as the barometer for investor confidence in the willingness to lend to the government, since it reflects the change in bond ratings, debt sustainability, economic growth prospect and efficiency of leveraged funds. The proxy used for the government bond yields is the 10 year government treasury bond yield data for a period of 24 years for 11 countries, namely; Australia, Bangladesh, Belgium, Chile, China, Germany, India, Italy, Mexico, Poland, and Spain, however for certain nations the period is shorter due to absence of data or unavailability of bonds during a certain phase in the period 1996-2020.

Furthermore, in order to mitigate the impact of The Global Financial Crisis and the Great Recession we have accordingly adjusted our data by taking values before and after the crises only. However, statistical breaks were not significant during the Dotcom Bubble of 2001.

Additionally, we primarily used the World Governance Indicator (WGI), which describes the broad patterns in perception of quality of governance across countries over a period of time. The WGI observations are published by the World Bank, and are a composite of 6 indicators, namely; Corruption Control, Government Efficiency, Rule Of Law, Political Stability And Absence Of Violence/Terrorism, Regulatory Quality, and Voice And Accountability. However, although the World Bank's publication proportionately weighs the percentile value of each of the indices, in order to adequately fit the motive of our study, the composite index was curated by disproportionate consideration of each of its factors. The Fully Modified World Governance Index (FMGWI) is a composed as follows;

$$Wi = \frac{-\beta i}{\sum_{i=1}^{6} |\beta i|}$$

$$FMGWI = \beta 0+\beta 1X1+\beta 2X2+\cdots+\beta 6X6+\epsilon$$

Where;

- X1,...,X6 are all 6 normalised PCT ranks, orderly; Government Efficiency, Political Stability and Absence Of Violence/ Terrorism, Regulatory Quality, Rule Of Law, Voice And Accountability and Corruption Control.
- β1,...,β6 are the relative weights added to each index, respectively; 35.6%, 22.2%, 18.5%, 11.1%, 8.9%, 3.7%. Each weight is equal to the negative standardised beta coefficients for the particular indicator divided by the sum of absolute values of all the coefficients.

Primarily, the objective of the analysis of Section 4 is to establish a correlation between the quality of governance, in order to obtain substantive evidence, we conducted multiple different tests and regressions, and further developed our model, until we modified the indices to create our own barometer, which provided higher accuracy and outlined the magnitude of the impact of governance on the efficiency of public debt.

Furthermore, the curation of the latter part of section 4 was done using the Ordinary Least Squared Regressions which were best suited for the dataset considering its modest level of heteroskedasticity. The statistical regressions were conducted on multiple macro econometric barometers which, we hypothesised, have an impact on the debt efficiency and debt sustainability of a nation, these predominantly included indicators by The World Justice Project, indicators reflecting the inclusiveness of government institutions, The Credit Facility Score and Ease Of Doing Business Index. Alongside our primary regressions, we used a diverse plethora of literature available to reflect a greater variety of non governmental factors influencing debt efficiency and debt sustainability, however, the great proportion of studies concluded that governmental factors are essential for ensuring the long term debt sustainability of a nation.

The limitations of the research are, primarily, our model's adequacy as it tends to become inaccurate with cases of governance in the lowest quartiles , as the linear regression is often not followed and for the lowest deciles, the prediction is often lower than the actual bond yields, additionally, the model fails for economic superpowers as their bonds are viewed as a safe haven amidst economic turmoil, leading to an anomalous pattern during recessions. However, due to the reliability of data and coherence of the model, limitations were not prominent in the section focusing on governmental influences.

The regressions outlining the impact of non-governmental influences accurately predicted the correlations of the factors with bond yields, however, the coefficient matrix revealed, for variables sharing multicollinearity, an unexpected persistence in statistical significance, which could be attributed to the diverse range of sources for data collection, which pertain to discrepancies in the method of data collection for the databases of the sources. This led to misleading coefficients for intervariable regressions, however, the aforementioned erratum were averted for the most influential non-governmental influences, The Ease Of Doing Business Index and Fundamental Rights.

Governmental Influence

We observed, as discussed in the introduction, a great proportion of literature pertaining to government debt conclude that quality of governance and government efficiency are central to yielding developmental returns and, hence increasing debt sustainability. We used the 10 Year Government Treasury Bond Yields as proxy for debt sustainability as this is influenced by the different bond ratings, investor confidence, debt servicing cost and economic growth. However, we only consider high debt nations in our study and exclude economic superpowers as such trends may be anomalous to them, since, during slowdowns their yields tend to decrease due to an influx of investment backed by their geopolitical hegemony.

An additional observation was made by many economists, most prominently, Tunçer and Weller(2022), that authoritarian regimes tend to borrow at lower costs due to higher [political stability, the observation was made for the period 1870 to 1913. However, the conclusion does not tend to apply upon 21st century economies, due to increased trade openness and the interdependent globalisation among nations, from which extremist regimes are often excluded.

Firstly, we conducted the regression by proportionally weighing all the World Bank's WGIs and plotting them independent to the 10 Year Government Treasury Bond Yield in an Ordinary Least Squared Regression, the results of which are as outlined below

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PCT Rank[b]	.	Enter

a. Dependent Variable: 10 year government treasury bond yield
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.366[a]	.134	.133	2.35838418

a. Predictors: (Constant), PCT Rank

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1088.221	1	1088.221	195.654	.000[b]
	Residual	7030.338	1264	5.562		
	Total	8118.558	1265			

a. Dependent Variable: 10 year government treasury bond yield
b. Predictors: (Constant), PCT Rank

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	7.491	.203		36.864	.000
	PCT Rank	-.039	.003	-.366	-13.988	.000

a. Dependent Variable: 10 year government treasury bond yield

The results of the regression were accurately reciprocated in our hypothesis, as it is seen that for every 1 Percentile a government ranks up on any of the World Governance Indicators, the 10 Year Government Treasury Bond Yield decreases by 3.9 bps. Furthermore, the results were highly statistically significant at the 0% level, with the p value <0.001.

In addition, the F Statistic model for our regression was significantly high at F=195.654, as seen in the ANOVA table, this shows the magnitude of impact our variables had on the dependant variable as it depicts the movement good governance causes upon the !0 Year Government Treasury Bond Yield from the mean of its values recorded.
The accuracy of the regression is of great importance as it fundamentally backs the coherence of the result and shows how the quality of governance is quintessential to improve the debt sustainability and for assuring investors that the resources are being diverted towards capital expenditures and projects which will help develop the economy.

However, although highly statistically significant, the value of $R^2 = 0.134$, this means that the model only predicts 13.4% of the yield variation.

The role government efficiency plays is also of significance as it is tied to the productivity of the polity and hence to the usage of funds. However , certain indices of The World Governance Indices pertain to a less impactful change in bond yields. Hence, we created the Fully Modified World Governance Index(FMWGI), as outlined in the Research Methodology. This weighs the indices as per their standardised beta coefficients in the order of importance, with government efficiency having the highest weightage as explained above. However, the corruption control index has the lowest weightage as it had the weakest correlation to the bond yields. This could be due to two factors, firstly, under good governance with moderate levels of corruption development persists, additionally, although the index may indicate a decrease in corruption, the preconceived notions of a state being regarded as corrupt could disdain the improvements reflected upon the bond yields.

Furthermore, the term of human development was added with the integration of The Human Development Index, as nations with persistently good or bad governance at a stagnant level saw changes in the bond yields as per the quality of governance, which, however, was not reflected in the indices, hence the human development term quantifies persistence of governance and its impact on bond yields is the same as that with governance indices.

The results of the Ordinary Least Squared Regression are as outlined below:

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Fully Modified world government index[b]	.	Enter

a. Dependent Variable: 10 year government treasury bond yield

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.509[a]	.259	.259	2.18194052

a. Predictors: (Constant), Fully Modified world government index

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2102.972	1	2102.972	441.721	.000[b]
	Residual	6012.972	1263	4.761		
	Total	8115.944	1264			

a. Dependent Variable: 10 year government treasury bond yield

b. Predictors: (Constant), Fully Modified world government index

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.224	.174		47.274	.000
	Fully Modified world government index	-.059	.003	-.509	-21.017	.000

a. Dependent Variable: 10 year government treasury bond yield

The regression shows that across all indicators, as governance moves up the percentile ranks the bond yields decrease, pertaining to lower sovereign borrowing costs as confidence among domestic and foreign, and, institutional and retail investors increases.

Furthermore, the modifications made to the formula and the disproportionate weightage of indices yielded a significantly improved result, providing a stronger correlation and more accurate regression. This is due to the higher weightage of factors, such as, government efficiency, which as the sole parameter yields a regression of 7.1 bps for every percentile rank increase and the lower weightage assigned to voice and accountability which yields more moderate regressions, approximately 1.9 bps for each percentile rank increase, suggesting a limited correlation on debt efficiency and investor risk apprehension.

The magnitude of the discrepancy in impact can be attributed to the impulsive response money and foreign exchange markets are expected to and frequently do exhibit due to a change in factors is strong alliance with governance, like government efficiency and regulatory quality, than factors which reflect the quality of governance, however, are not causal to short term turbulence faced in economic development and utilisation of sovereign debt, like voice and accountability. They do, however, improve the democratic credibility of the nation, potentially pertaining to improved globalisation and progress towards populist and inclusive sociopolitical and socioeconomic institutions, which, eventually, will boost economic development and allow for greater institutional quality and, hence, greater debt efficiency. The fundamentals of this notion have been explored in great detail by Acemoglu & Robinson in their book, Why Nations Fail (2012).

Additionally, the Fully Modified World Governance Index superseded the limitations of the previous dataset, as R^2 =0.259, showing that this model can successfully predict 25.9% of the variation in the 10 year government treasury bond yield. Furthermore, as previously witnessed, the current dataset has a p value <0.001, being highly statistically significant, which shows the magnanimity of the impact that quality of governance has upon the debt sustainability and efficiency of government debt. We also observed a negative correlation of 0.059 which shows that for every percentile point a government improves on the FMWGI the 10 Year Government Treasury Bond Yield decreases by 5.9 bps, a correlation far stronger than that with the unmodified indices. The magnitude of this correlation is important for economies across the world. India has a debt of nearly $3.2 trillion, and, for example, if by 2030 the score of India on the FMWGI increased from approximately 35.4 to 45, the yields of the Indian Government's bonds would decrease by 59 bps, leading to a significantly lower spending on debt servicing, of about $17.28 billion annually, which is approximately 4.2% of the current government expenditure.

In addition, the results of the revised regression were significantly stronger than previously. This is seen as the F statistic value is F= 441.721 showing that the Fully Modified World Governance Indicator (FMWGI) is a faithful and adequate macroeconometric barometer for measuring the debt sustainability and the impact of governance on the dependant variable. The improvised model deviated the yields 225% compared to solely The World Governance Indicators (WGI).

Additionally, another empirical observation that could be made was that, from our range of OECD and developing countries, the Less Economically Developed Countries had an increased variation and stronger coefficient for regression of change in bond yields when plotted against the FMWGI. This is due to two reasons, firstly investor confidence is relatively higher for developed countries than developing countries, hence, any change in governance leads to a smaller change in bond yields, and market volatility is higher in developing nations, leading to increased elasticity among investments, causing greater variation in bond yields to any change in the governance of the nation. On the other hand, the

same observation is valid due to the significance of governance improvements in LEDCs. If a median government improves by a percentile rank , the improvements seen in the economy would be far more significant compared to the same change for governments on the highest decile of governance. Additionally, MEDCs tend to have consolidated currencies, such as the EU states, mitigating the impact of exchange rates on the inflows of external debt as changes in governance of one nations would not impact their foreign exchange rates and The Open Market Orders and bond markets would not face the extent of volatility less consolidated currencies would due to arbitrage and hot money flows in the economy. The former reasons significance crescendoes for economic superpowers which are often misfit to the regression and show anomalous trends to the negative correlation. An example of this would be The United States Of America, which often sees a decrease in bond yields during recessions as investors worldwide attempt to invest in US Treasury considering it to be a safe asset. This especially concerns behavioural economics and is a statistical anomaly which our papers findings would not apply to, highlighting a potentially crucial research gap which could be explored in the future helping improve the understanding pertaining to this domain of economics.

Furthermore, our results further solidify and are in coherence with renowned studies pertaining to the domain of government debt. Starting from Keynes(1936) to Reinhart & Rogoff (2011), Afonso & Jalles (2013) and Musa et al (2023) reiterate the importance of government efficiency and quality of governance in order to ensure long run debt sustainability, deeming it to be the most decisive factor in optimising the developmental gains derived from expenditure based on debt and borrowing to stimulate the economy.

However, although the results outline a strong regression, the variation the model can predict shows that there could be other economic drivers and factors which influence the bond yields. Some of which are explored in this section, however, the true extent of economic barometers which have an impact upon bond yields shall be explored in future studies pertaining to this domain, which could evaluate influence due to other governmental influences, however, a great proportion of this would also be due to non governmental influences which have been explored in the following section.

The non governmental influences have a significant impact on the efficiency of government debt, however, these influences of significance tend to be limited to a few. We intend to test barometers which reflect this nexus and have a regression stronger than that of governmental influences.

We used various indices published by The World Justice Project which were individually regressed against the 10 Year Government Treasury Bond Yields. The nations were constant from our previous regressions and the time period chosen allowed for the data of a decade,from 2011 to 2020, to be collected. Alongside this we used the Ease Of Doing Business Indicators for a similar data panel, with the same nations over a period of 8 years, 2013-2020.

The description of the variables has been provided in the table below:

1. Descriptive Statistics

Variable	Mean	Std. Deviation	N
10YGTBY	3.47004	2.630378	144
Factor 3: Open Government	0.6431	0.1184	144
Factor 4: Fundamental Rights	0.6682	0.1792	144
Factor 6: Regulatory Enforcement	0.6241	0.1414	144
Factor 7: Civil Justice	0.6082	0.1422	144
Factor 8: Criminal Justice	0.5821	0.1549	144
The Credit Facility Score	63.6285	18.0534	144
Ease of Doing Business	70.3925	9.8318	144

The descriptive statistics underscore the extent of variation in government bond yields, highlighting the magnitude of discrepancy in costs of borrowing for nations, which is observed as the 10YGTBY has the highest standard deviation, relative to the mean average. This is of particular significance since it adversely affects LEDCs as they face increased costs of borrowing, which, in turn, prevents further development, evolving into a spiral of bond yields and economic development.

The factors such as Open Government show a weak standard deviation from the mean due to the marginal selection of extremist regimes. However, a relatively larger standard deviation is observed for fundamental rights which means it varies with greater magnitude across nations. This has led us to hypothesise that it will, in turn, have a greater impact upon bond yields.

Additionally, criminal justice has a comparatively lower mean, however, has a moderate standard deviation. The regressions outcomes were disproportionate to these empirical observations. The Credit Facility Score has a significant standard deviation from the mean due to the unavailability of credit for economically underprivileged populations and high proportions of non-performing assets, pertaining to banking crises.

Furthermore, as will be observed in the statistical analysis of the beta coefficients, certain variables have an extremely low standard deviation from the mean and themselves have a value less than one as they have been considered as fractions rather than as a percentile, however they are significant and a small movement causes a greater response to be reflected in the bond yields. This can also be attributed to the tightly clustered data points of those factors between 0.58 and 0.67 on a 0 to 1 scale.

2. Correlation Matrix (Pearson, N = 144)

Variables	10YGTBY	F3 Open Govt	F4 Fund. Rights	F6 Reg. Enforce	F7 Civil Justice	F8 Criminal Justice	Credit Facility	Ease of Doing Business
10YGTBY	1.000	-0.548**	-0.664**	-0.785**	-0.847**	-0.819**	-0.064 (ns)	-0.710**
Factor 3: Open Government	-0.548**	1.000	0.847**	0.869**	0.780**	0.700**	0.502**	0.693**
Factor 4: Fundamental Rights	-0.664**	0.847**	1.000	0.882**	0.829**	0.854**	0.334**	0.699**
Factor 6: Regulatory Enforcement	-0.785**	0.869**	0.882**	1.000	0.955**	0.883**	0.345**	0.749**
Factor 7: Civil Justice	-0.847**	0.780**	0.829**	0.955**	1.000	0.925**	0.261**	0.735**
Factor 8: Criminal Justice	-0.819**	0.700**	0.854**	0.883**	0.925**	1.000	0.198**	0.661**
Credit Facility Score	-0.064 (ns)	0.502**	0.334**	0.345**	0.261**	0.198**	1.000	0.624**
Ease of Doing Business	-0.710**	0.693**	0.699**	0.749**	0.735**	0.661**	0.624**	1.000

Note: ** indicates $p < 0.01$; ns = not significant

The correlation matrix outlines all the variables' regressions against the 10YGTBY alongside the various levels of statistical significance. The contemplated (-) sign was seen with Open Government as our model predicted that for every unit increase in the Open Government score, the bond yields decrease by 0.548%. This is a significant rebuttal to

previously published literature which predominantly conclude authoritarian and totalitarian regimes frequently borrow at lower costs and have lower bond yields, as concluded by Tunçer & Weller (2022), Ferguson & Schularik (2006), Mitchener & Weidenmier (2010), Maerean et al (2022), Schularick and Steger (2010) and numerous others.These studies were often conducted with the panel of data of an earlier, often pre World War 1, timeframe, however their credibility and validity in the 21st century is undermined due to the increase in globalisation and international interdependence, as liberal and democratic governance enables international cooperation and, hence, trade openness, which was concluded to be a determining factor for government debt efficiency and debt sustainability by Musa et al (2023). Furthermore, as previously discussed, open governance and inclusivity of institutions, both sociopolitical and socioeconomic, is the central tenant to prolonged economic development and debt sustainability.

The regression of the 10YGTBY with the Fundamental Rights was significantly stronger as compared to open government, as for every unitary increase in fundamental rights, the bond yields decrease by 0.548%, this is in accordance with our hypothesised outcome that, since fundamental rights have a greater standard deviation from the mean, and its impact is further amplified by its smaller mean, compared to open government, it will cause a greater variation to the bond yields of a nation. Furthermore, it proves supplementary to support evidence of disproving the previously validated notion of authoritarian regimes' ability to borrow at lower costs due to a perception of greater sociopolitical stability.

The Regulatory Enforcement in the economy also proved to be essential, for high debt nations, to reduce their bond yields and increase the debt sustainability, as it catalyses investment, particularly from foreign institutions, assuring a credible legal framework in order to ensure just resolution of any disputes, pertaining to a prominent regression against bond yields, as for every marginal increase in Regulatory Enforcement the bond yields reduce by 0.785% which is far stronger than other variables, both governmental and non governmental.

Civil Justice was prognosticated to have a profound impact upon the 10YGTBY, as it significantly reduces the chances of illegitimacy, deception, fraud and embezzlement in corporations and fosters a similar confidence to that endowed by regulatory enforcement among investors, however, it is more concentric to domains relevant to our study leading to a stronger regression, as for every unitary increase in Civil Justice, the 10 Year Government Treasury Bond Yields decreased by 0.847%.

Furthermore, although criminal justice is not directly correlated to confidence among foreign investors and domestic investors, it is attributed to greater political stability, which, in turn, leads to debt efficiency and lower bond yields. Additionally, criminal justice, when regressed against civil justice, shows an almost proportional correlation with the anticipated positive sign at 0.925, this shows the variables' impact upon one another, as they both are often addressed and modified, by governments, simultaneously, which shows the possibility of multicollinearity of variables. The regression of criminal justice with the bond yield shows that for every unitary increase in criminal justice bond yields decrease by 0.819%, which is significantly similar to the result obtained with civil justice due to their interdependence.

The results obtained with The Credit Facility Score, which represents the availability of credit for businesses and, to a certain extent, quantifies the quality of banking and other financial institutions in a nation, were unexpected as the regression provided a positive correlation, however, they were statistically insignificant.

Alongside The Credit Facility Score, The Ease Of Doing Business Index was hypothesised to have the greatest impact upon the bond yields. However, although the impact was inversely proportional to the bond yields, the index did not provide the largest magnitude

of change compared to other variables, both governmental and non governmental. The results of the regression showed that for every point a nation increases on The Ease Of Doing Business Index, the bond yields decrease by 0.710%, which too, is a significant decrease, underscoring the importance of business administration in improving the fiscal capabilities and debt efficiency of any nation across the world.

3. Model Summary – Regression Predicting 10YGTBY

R	R^2	Adjusted R^2	Std. Error	F	df1	df2	Sig.	Durbin-Watson
0.930	0.865	0.858	0.9919	124.245	7	136	0.000	2.045

The model summary, as detailed above, provides crucial details which underline the validity of the study and highlight potential errors which could have occurred in the Ordinary Least Squared Regression. The R value is 0.930, which means the model has a 93.0% correlation between predicted and actual bond yields.

Furthermore, the R^2 value is 0.865, this shows that the model is successfully able to predict 86.5% and the adjusted R^2, too, has a value of 0.858, which means, despite having considered and adjusted for the number of predictors, proving that the model has an extremely high explanatory power.

Additionally, the model has a standard error of estimation or 0.992, which shows that the magnitude of error in predicting the bond yields is within 1% of the actual bond yields. Additionally, the F statistic value shows the variation the variables cause for the bond yields. The F statistic value is 124.245, which shows that the non governmental variables cause a similar variation to that caused by The World Governance Indicators, when proportionally weighted.

The p value for the model is <0.001 showing that the model is statistically significant at the 0.1% level, which shows the impact the non governmental variables have on bond yields and proves the chances of the regression being random are negligible. Furthermore, the Durbin Watson values for the are 2.05, which proves that there is no or minimal autocorrelation among the variables, showing that the errors are independent of each other and the variables' movements are not a reflection of them on a lagged timeframe.

4. ANOVA Table

Source	SS	df	MS	F	Sig.
Regression	855.607	7	122.230	124.245	0.000
Residual	133.794	136	0.984		
Total	989.401	143			

The analysis of the variation is presented in the ANOVA table and it further affirms the conclusions derived from the model summary, while emphasising on the total variation of the 10YGTBY and the residual of variation which the regression could not predict successfully. The df value for the residual is 136, showing the plethora of different variables which together contribute to cause the residual change of approximately 14% in the model. The F statistic and p value show the validity and impact of this model pertaining to the 10 Year Government Treasury Bond Yields.

5. Coefficients Table

Predictor	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
Constant	16.517	0.743	–	22.244	0.000	–	–
Factor 3: Open Government	2.151	1.862	0.097	1.155	0.250	0.142	7.064
Factor 4: Fundamental Rights	3.625	1.301	0.247	2.787	0.006	0.127	7.896
Factor 6: Regulatory Enforcement	-3.964	2.778	-0.213	-1.427	0.156	0.045	22.435
Factor 7: Civil Justice	-4.524	2.757	-0.245	-1.641	0.103	0.045	22.339
Factor 8: Criminal Justice	-5.809	1.730	-0.342	-3.358	0.001	0.096	10.432
Credit Facility Score	0.059	0.007	0.408	8.326	0.000	0.414	2.418
Ease of Doing Business	-0.171	0.017	-0.639	-10.021	0.000	0.245	4.087

The Coefficients Table reveals various insights regarding the regressions as it considers all 7 predictors and the dependent variable, portraying the impact of a change in one when the other variables are constant. Superficially,, the unstandardised beta coefficient shows that with all the variables at 0, the bond yield is likely to be 16.5%, however, in practicality, this value is likely to be higher as linear patterns are not followed at extreme values.

The insignificance of certain variables was unexpected, as seen with open governance, which was statistically insignificant at the 25% level, however, this can be attributed to its overlap with other predictors as the coefficients table considers all other variables constant, leading to the overlap rendering the variable statistically insignificant.

The Civil Justice and Regulatory Enforcement scores proved to be statistically insignificant at the 10.3% and 15.6% level respectively, this may be due to The Variance Inflation Factor which is greater than 22 for both variables showing a prominent multicollinearity among the variables leading to their insignificance.

The Ease Of Doing Business Index remained persistent and had a profound impact upon bond yields as hypothesised, in spite of other variables remaining unchanged, with a p value <0.001 which means its chances of random correlation are negligible and a VIF value of 4.09, helping disdain the problem of multicollinearity, the regression showed that for every point a nation increases upon The Ease Of Doing Business, the bond yields decrease by 0.171% which is shows the magnitude of impact the index remotely has upon the debt sustainability and bond yields of a nation.

The Criminal Justice scores were statistically significant with the p value being 0.001, this shows that they are significant at the 0.1% level, furthermore, the VIF value is 10.4 suggesting a moderate multicollinearity, the regression proves that for every point point increased by a nation on the criminal justice score leads to a decrease of 5.809 bps in bond yields, because, as explained previously, the availability of a fair legal framework catalyses business and bolsters investor confidence.

The results obtained with Fundamental Rights were neither expected nor heuristical, as the p value is 0.006 making the regression statistically significant at the 0.6% level and the

VIF is 7.90 showing a moderate multicollinearity, however the regression shows that for every point increased by a nation on the Fundamental Rights score, there is an increase in bond yields of 3.625 bps. This result indicates that as the fundamental rights in a nation decrease, the bond yields, too, decrease, due to an increase in debt sustainability and greater investor confidence. This is in accordance with some conventional literature, which concludes the same trend as in authoritarian regimes and totalitarian regimes there is greater political stability due to state control and government efficiency is high due to centralisation of power. However, the credibility of the regression in practice could be questioned, as the coefficients table assumes all other variables constant, and, although it is true that only a subjugation of liberties could benefit an economy when the other influences are constant, the restriction of freedoms will often maim various benevolent influences to the economy, such as, innovation, ease of doing business, civil justice and regulatory enforcement.

6. Collinearity Diagnostics

Dimension	Eigenvalue	Condition Index	Variance Proportions (Selected)
6	0.005	40.740	Constant (0.19), Credit Facility (0.18), Ease of Doing Business (0.57)
7	0.002	59.768	Open Govt (0.70), Fund. Rights (0.27), Criminal Justice (0.31)
8	0.001	80.137	Reg. Enforcement (0.78), Civil Justice (0.89)

The Clonerality Diagnostics suggest certain limitations of the research, as for each of the eigenvectors, the Eigenvalues are close to 0, highlighting the issue of multicollinearity across variables. Furthermore, the condition index, which is greater than 30, also alludes to the problem of multicollinearity and helps consolidate the conclusion derived from the Eigenvalue, showing that the standard errors of estimation are likely to have been significantly amplified due to the variables' multicollinearity. However, the variance proportions of certain selected variables shows that the collinearity's magnitude is not as high as portrayed by the condition index, excluding Eigenvector or dimension 8, as it only surpasses the threshold of 0.5 for The Ease of Doing Business Index in the diagnostic.

The Case-wise Diagnostics, alongside the Residual Statistics, has been detailed below, underlining the outliers in the regression with Standard Residuals>3 for additional reference and in order to analyse the dataset and datapoints further in detail, furthermore, the residuals statistics help evaluating the deviation in the observed values and predicted values.

7. Casewise Diagnostics (Std. Residual > 3)

Case	Std. Residual	Actual	Predicted	Residual
19	3.193	10.900	7.733	3.167
91	3.193	10.900	7.733	3.167

8. Residuals Statistics

Statistic	Min	Max	Mean	Std. Dev.	N
Predicted Value	0.1191	8.6950	3.4700	2.4461	144
Residual	-1.7375	3.1674	0.0000	0.9673	144
Std. Predicted Value	-1.370	2.136	0.000	1.000	144
Std. Residual	-1.752	3.193	0.000	0.975	144

An additional note which must be made pertains to the Ricardian Equivalence, as first outlined in Ricardo (1820) and then further conceptualised and acclimatised to the modern

monetary dynamic of the world in Barro (1974), which is the central concept backing empirical arguments regarding the benevolence of excessively high public debt, as it states that public debt does not maim economic development as the surge in borrowings in the present is counterpoised by increased fiscal austerity in the future, leading to inflation and an economic slowdown. However, it must be considered that governmental systems do not have a complete efficiency, which is quintessential for debt sustainability as explained earlier, this leads to the inefficient allocation of resources and borrowed capital. Furthermore, a commonly preconceived notion is that debt means moving future assets into the present, which, to a certain extent, is true, however, debt also means moving current assets from one investment to another as it is a form of investing upon margin and current assets must be present to offset the magnitude of debt. This often translates in more efficient industries being partially liquidated to consolidate investment in struggling industries, progenerating the concept of suboptimal transfers, which is the movement of assets from more efficient allocations to inefficient allocations, leading to a contemporary straddle, rendering a negative impact upon the economy. However, if the resources can help stimulate struggling aspects of the economy, it can have multiple impacts. Firstly, the Ricardian Equivalence would be invalidated, additionally, the consequences of suboptimal transfer would be averted and eventually it would yield a long term benefit in accordance to the impact first suggested by Keynes (1919), helping grow the economy.

Conclusions and policy recommendations

The impact of governmental factors is profound upon the debt sustainability of a nation, as derived from the primary set of data, The World Governance Indicators significantly impact the 10 Year Government Treasury Bond Yields, as for every percentile rank increase, the bond yields decrease by 3.9bps, portraying the extent of the impact.

The model predicting the impact of governance was further improved in order to predict yields more accurately, leading to The Fully Modified World Governance Index, which is, perhaps, the greatest contribution of this paper to existing literature. Furthermore, the decrease in bond yields was significantly higher for the FMWGI, a testament to its adequacy for outlining the governmental impact on the debt efficiency of a nation.

The regression also outlined the impact of non governmental factors on bond yields, which provided strong negative correlations. additionally`, the beta coefficients observed with The Ease Of Doing Business Index and Fundamental Rights are significant in developing the already existing plethora of literature pertaining to this domain. However, the unexpected positive sign with Fundamental Rights was in agreement with conventional literature, underscoring the relevance of classical and neoclassical economic notions and literature in the 21st century socioeconomic and internationalist dynamic.

The policy recommendations which could be derived from the results allude to the importance of adequate government institutions with decisiveness and efficiency by optimising governmental processes. However, the public policy changes which policymakers must consider ought to be concentric towards improving the judicial quality of the nations and ensuring the settlement of disputes with facility, helping diminish the probability of defraudation and malpractices in the economy. Additionally, there must be a carefully curated balance between openness and control by governing authority to maintain sociopolitical stability as it is evident that overexposure without defined policy will inadvertently amplify perceived risks. Additionally, the governmental and commercial policy must endorse the facility of doing business as it is essential within the polity and economy for ensuring prosperity. Further research in this domain could focus on a crucial research gap which encompasses the anomalous trends of government debt against socioeconomic factors, which would be a significant contribution to the literature available pertaining to this domain,

enabling policymakers and economists to grasp the causality, amidst economic uncertainty and slowdowns, of the lower borrowing costs for major economies.

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