

Long- vs. short term orientation and refinancing risk of public debt – evidence form EU economies

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Abstract—The aim of the study is to examine whether countries characterized by long-term orientation (in the context of the Hofstede model) tend to issue public debt with longer maturities compared to countries classified as having a short-term orientation, thereby reducing refinancing risk for public debt. To address this aim, the following research hypotheses were formulated: (1) there is a positive and strong correlation between the level of the long-term orientation index and the maturity length of public debt; (2) the values of the average term to maturity (ATM) are higher in countries with higher levels of the long-term orientation index. The study uses annual data from 2011–2022 collected for the EU member states. Key findings are presented in the section Conclusion and Policy Implications.

Keywords—Public debt, Hofstede model, European Union, sovereign debt maturity.

I. INTRODUCTION

The refinancing risk, also known as rollover risk, refers to the challenges faced when attempting to repay existing debt, which requires securing sufficient financial resources. Governments often address this need by issuing new government securities, a process that effectively rolls over public debt. This cyclical aspect of debt management underscores the continuous financial strategies that governments implement to ensure liquidity and fulfill their fiscal obligations. By managing refinancing risk effectively, governments can maintain stability in their financial systems and support economic growth, while also navigating the complexities of changing market conditions and investor confidence. Understanding this risk is crucial for policymakers as they strive to balance debt levels with sustainable economic practices.

We tentatively assumed that countries with a higher level of long-term orientation (according to In the Hofstede cultural dimensions model) are expected to foster environments where investors are more inclined to purchase long-term sovereign debt instruments, accepting longer maturities and stable returns over time. In contrast, investors in short-term oriented economies may prefer shorter-term debt securities, prioritizing quick liquidity and lower perceived risks.

Our study aims to examine whether countries characterized by long-term orientation tend to issue public debt with longer maturities compared to short-term orientation countries,

thereby reducing refinancing risk. To address this objective, two research hypotheses were proposed:

- there is a positive and strong correlation between the level of the long-term orientation index and the maturity length of public debt;

- the values of the “average term to maturity (ATM) are higher in countries with higher levels of the long-term orientation index.

By analyzing these relationships, the study seeks to provide insights into how cultural dimensions influence sovereign debt structures and their associated refinancing risks. The findings could offer valuable implications for debt management strategies in culturally diverse financial markets.

II. HOFSTEDÉ’S SHORT- VS. LONG-TERM ORIENTATION IN THE CONTEXT OF INVESTORS’ BEHAVIOR

In the Hofstede cultural dimensions model, long-term orientation (LTO) and short-term orientation (STO) represent two contrasting approaches to planning and decision-making (Wang & Liu, 2024). Countries with long-term orientation prioritize future rewards, strategic planning, and patience in achieving long-term goals. In contrast, short-term orientation emphasizes immediate results, quick returns, and fulfilling current obligations.

Hofstede’s cultural dimensions model has been used for analyzing different countries and diverse social and economic aspect of human behavior (see e.g.: Moradi, 2024; Jan et al., 2024; Jo & Ligot, 2024; Ye & Yan, 2024). Of course, we are aware of the fact that Hofstede’s cultural dimensions model, once dominant in national culture comparisons, has been criticized for its reliability. Some recent studies revealed that Hofstede’s dimensions can be flawed (cf.: Minkov, 2024; Birdawod, 2022).

In the context of financial markets, these cultural traits can significantly influence investment behavior, particularly regarding sovereign debt instruments (Casarano et al., 2024; Dang & Partington, 2020). In long-term oriented economies, investors are more likely to favor long-term sovereign debt securities, accepting extended maturity periods in exchange for stable returns and predictable financial outcomes (Mamatha & Bheemanagouda, 2023; Stangebye, 2023). Conversely, in short-term oriented economies, investors may prefer short-term

sovereign debt instruments, prioritizing liquidity, flexibility, and minimizing perceived risks associated with long-term commitments (Anthony & Prasanna, 2023; Aljaloudi & Ibrahim, 2024).

This cultural distinction highlights how investment preferences are shaped not only by economic factors but also by deeply rooted societal values, impacting debt maturity structures and refinancing risk at the national level.

III. IDENTIFICATION AND MEASUREMENT OF REFINANCING RISK

In the current economic climate, the assessment and management of rollover risk have become increasingly vital due to soaring sovereign and public debt levels. Governments are increasingly dependent on financial resources generated from the issuance of securities to cover budget deficits. The mismanagement of public debt and its excessive amount can lead to the insolvency of countries (Ahiadorme, 2023; Zaidan et al, 2024). Rollover risk manifests itself especially when problems arise in securing the necessary funds to meet previous obligations, and in severe cases, when debt repayment becomes entirely unattainable. Such difficulties in refinancing debt can lead to heightened borrowing costs and unfavorable repayment terms, potentially spiralling into a broader public finance crisis that threatens economic stability (IMF & World Bank, 2001).

It is worth noting that the risk of debt refinancing does not only apply to the public finance sector, but also to the corporate sector (Chala, 2018). However, the challenges posed by this risk in public sector transcend mere financial implications for the budget, affecting various aspects of economic stability and governance. This risk is distinctly separate from the market risk tied to sovereign debt, necessitating careful management, particularly in developing nations where financial systems may be more vulnerable. While extending the maturity periods of government debt can alleviate refinancing risk, it simultaneously prolongs the duration of debt servicing obligations, creating a significant fiscal strain on the government and society. Consequently, the critical issue of determining the optimal limits for extending these maturity periods, without overburdening future generations with excessive debt servicing costs, remains a pressing concern that lacks a definitive solution (Tempelman, 2007).

A crucial aspect of refinancing risk in sovereign debt is its maturity structure (Desgranges & Rochon, 2014; González-Fernández & González-Velasco, 2018; Wu et al., 2022; Wang et al., 2023), which plays a significant role in a government's financial sustainability (Zenios et al., 2019). When government debt instruments have longer maturities, the frequency of refinancing decreases, which in turn lowers the government's vulnerability to fluctuations in financial markets. Longer maturity periods serve as a crucial indicator of lower refinancing risk, as they reduce the frequency with which funds must be secured to repay existing debt (Hatchondo & Martinez, 2013; Auray & Eyquem, 2019). This infrequent need for refinancing is particularly beneficial for borrowers, as it allows for greater financial stability and predictability. This stability is

essential as it lessens the immediate requirement for substantial cash inflows necessary to service the debt, ultimately promoting a healthier public finance environment. Nevertheless, it is important to consider the trade-off involved; while longer-term debt can enhance stability and reduce refinancing risk, it often comes with increased cumulative interest costs (Desgranges & Rochon, 2014; Massoudi & Birdawod, 2023), which can strain public finances over time, especially during crises (Kim, & Mihalache, & Bai, 2014). Therefore, governments must carefully evaluate their debt maturity profiles to strike an optimal balance between minimizing refinancing risk and managing interest expenses effectively.

The significance of debt maturity metrics has been well-documented in academic literature, highlighting their importance in financial analysis. Various measures and models, ranging from straightforward to highly intricate, have been developed to assess refinancing risk (see e.g., Luckett, 1964; Athanasopoulou et al., 2018; Zenios et al., 2019). These models aim to provide insights into how different variables interact and influence the likelihood of needing to refinance. However, not all these theoretical frameworks find practical application in real-world scenarios.

IV. METHODOLOGY AND DATA

To assess maturity, we used the maturity structure of sovereign debt in terms of 1-5 years, 15-30 years and over 30 years as well as the synthetic indicator of refinancing risk – the average time to maturity (ATM). It represents the average period, expressed in years, until the redemption of issued debt. The ATM indicator is, of course, criticised (see e.g.: Porath, 2015), but it has the advantage of being clearly structured and usable for comparisons over time and space. It can be calculated using the following formula:

$$ATM = \frac{\sum_{t \in T} t N_t I_0}{\sum_{t \in T} N_t I_0} \quad (1)$$

where:

t – maturity date,

T – the set of all maturity dates (i.e., nominal payment dates),

N_t – nominal value payable at time t ,

I_0 – current indexation factor for the nominal value (for sovereign securities other than indexed bonds, $I_0=1$).

High values of the average time to maturity measure are indicative of reduced refinancing risk, suggesting that organizations can manage their debt obligations more effectively over an extended period. The ATM indicator exemplifies a practical approach to measuring refinancing risk, offering a straightforward yet effective means of evaluating an organization's debt profile. By focusing on the average time to maturity, stakeholders can gain valuable insights into the timing of debt obligations and the associated risks, enabling them to make informed financial decisions that align with their long-term objectives. This practical application underscores the relevance of debt maturity metrics in contemporary financial management.

Data for the ATM values and maturity structure were taken from the World Bank database and the Eurostat database, respectively. Additionally, we obtained data for the Hofstede long-term orientation dimension from <https://www.theculturefactor.com/> (access date: December 30, 2024). The corresponding index, which indicates their long-term or short-term orientation, ranges from 0 (representing the shortest-term orientation) to 100 (representing the longest-term orientation).

The analyses used averaged maturity structure data for the period 2019-2022, averaged ATM value data from 2011-2022 and the latest available long-term orientation data. We investigated 18 out of 27 EU economies, for which statistical data were available.

V. EMPIRICAL RESULTS

Table 1 offers a comprehensive overview of the sovereign debt maturity structures across 18 European Union countries, encompassing both eurozone (EUR) and non-eurozone (non-EUR) economies. It meticulously details the long-term orientation (LTO) of these nations, highlighting the proportions of public debt instruments that reach maturity within specified time frames: 1-5 years, 15-30 years, and beyond 30 years. Additionally, the table includes the average term to maturity (ATM), derived from the previously outlined methodology. This data not only facilitates a deeper understanding of the varying debt maturity profiles but also elucidates the potential influence of cultural long-term orientation on the financial strategies adopted by different EU economies. Such insights are invaluable for policymakers and financial analysts aiming to navigate the complexities of sovereign debt management within the context of cultural and economic diversity across the European Union.

TABLE 1. LONG TERM ORIENTATION DIMENSION AND SOVEREIGN DEBT MATURITY STRUCTURE IN EU ECONOMIES

Country	EUR/non-EUR ^{*)}	LTO ^{**)}	Maturity ^{***)}			ATM ^{****)}
			1-5 y.	15-30 y.	over 30 y.	
Austria	EUR	47	5,95	15,80	24,00	8,78
Bulgaria	non-EUR	51	9,70	25,95	0,10	5,59
Croatia	EUR	40	5,80	13,48	0,35	4,80
Czech Republic	non-EUR	51	9,60	19,33	3,93	4,77
Estonia	EUR	71	4,65	9,85	8,35	8,73
Ireland	EUR	51	5,45	30,00	7,90	10,48
Italy	EUR	39	6,73	17,15	18,35	6,71
Latvia	EUR	69	17,43	25,78	3,18	6,62
Lithuania	EUR	49	7,85	17,85	14,08	6,20
Luxembourg	EUR	64	23,75	1,63	1,83	6,94
Malta	EUR	47	13,43	41,98	2,68	8,48
Poland	non-EUR	49	20,30	7,80	3,30	4,90
Portugal	EUR	42	2,00	26,65	6,15	6,12
Romania	non-EUR	32	17,05	16,38	5,53	5,48
Slovakia	EUR	53	2,63	36,25	9,68	7,10
Slovenia	EUR	50	5,50	27,80	6,15	7,52
Spain	EUR	47	15,10	21,50	5,20	6,70
Sweden	non-EUR	52	25,03	6,55	2,23	5,11

Source: Eurostat data (gov_10dd_rmd) – accessed 20 December 2024, World Bank DataBank (Sovereign debt average maturity, years) – accessed 25 December 2024, Hofstede's dimensions web page

<https://www.theculturefactor.com/> - accessed 30 December 2024)

*) EUR/non-EUR – eurozone and non-eurozone EU economies

***) LTO – long term orientation indicator,

****) share of the sovereign debt with given maturities (% of total sovereign debt)

*****) ATM – average time to maturity of sovereign debt (in years)

The empirical analysis examines the intricate relationship between long-term orientation (LTO) and various financial maturity indicators, specifically focusing on short-term maturity (defined as 1-5 years), long-term maturity (exceeding 15 years), and the average term to maturity (ATM). This comprehensive study delineates three distinct perspectives: the aggregate of all analyzed countries, the subset of eurozone (EUR) countries, and the group of non-eurozone (non-EUR) countries. The findings of the research indicate that there are notable variations in both the strength and direction of the correlations observed across these different groups. This underscores the significant influence of regional and systemic factors in determining preferences related to debt maturity, thereby providing valuable insights into the financial behaviors characteristic of each category.

Table 2 presents the correlation values between LTO and the selected maturity indicators (1-5 years and over 15 years), as well as ATM (average term to maturity), for all analyzed countries, Eurozone (EUR) countries, and non-Eurozone (non-EUR) countries.

TABLE 2. CORRELATION COEFFICIENT VALUES BETWEEN LTO INDEX AND THE SELECTED MATURITY INDICATORS

Variable	All Countries	EUR Countries ^{*)}	Non-EUR Countries ^{*)}
Maturity 1-5 y.	0.18	0.43	-0.06
Maturity over 15 y.	-0.22	-0.38	-0.25
ATM	0.30	0.27	-0.45

Source: as in Table 1

*) as in Table 1

For all analyzed countries, the correlation coefficient between LTO and the share of financial instruments maturing in 1-5 years is 0.18, indicating a weak positive relationship. This suggests a slight tendency for higher long-term orientation values to align with an increased reliance on short-term debt instruments, although the relationship is not strong enough to draw any definitive conclusions.

When isolating eurozone (EUR) countries, the correlation coefficient rises to 0.43, indicating a moderate positive relationship. This result suggests that in the eurozone, higher LTO values are more closely associated with an increased focus on short-term financial instruments. This could be influenced by structural factors, regulatory constraints, or risk management strategies prevalent within the eurozone.

In contrast, non-eurozone (non-EUR) countries exhibit a correlation coefficient of -0.06, reflecting an almost negligible negative relationship. This suggests that in non-eurozone countries, LTO has little to no meaningful connection with short-term financial maturity structures. Other local economic or institutional factors likely exert a more significant influence on short-term debt strategies in these countries.

Examining the relationship between LTO and the share of financial instruments maturing over 15 years, the analysis reveals a weak negative correlation for all countries combined, with a coefficient of -0.22. This indicates a slight tendency for countries with higher long-term orientation values to allocate a smaller share of their financial instruments to long-term maturities.

In eurozone (EUR) countries, the negative correlation

strengthens to -0.38, suggesting a moderate inverse relationship. This implies that higher long-term orientation in these countries correlates with a reduced reliance on financial instruments with maturities exceeding 15 years. Structural financial policies, market practices, or investor preferences in the eurozone may partially explain this outcome.

For non-eurozone (non-EUR) countries, the correlation is -0.25, reflecting a weak negative relationship. Although less pronounced than in eurozone countries, this finding suggests a similar trend, where increased long-term orientation corresponds to a slightly lower share of financial instruments with long-term maturities. The weaker correlation may point to the influence of other factors, such as access to international financial markets or local policy environments.

The final dimension of the analysis investigates the relationship between LTO and the average term to maturity (ATM) of financial instruments. Across all analyzed countries, the correlation coefficient is 0.30, indicating a weak positive relationship. This suggests a slight tendency for higher LTO values to align with longer average debt maturity, although the strength of this correlation remains modest.

In eurozone (EUR) countries, the correlation remains weakly positive, with a coefficient of 0.27. This suggests that while there is a slight alignment between long-term orientation and longer average debt maturities in eurozone countries, it is not a dominant factor driving financial maturity structures. Institutional frameworks, fiscal regulations, or investor preferences likely contribute significantly to the observed maturity patterns.

Conversely, in non-eurozone (non-EUR) countries, the correlation is -0.45, reflecting a moderate negative relationship. This suggests that in non-eurozone countries, higher long-term orientation is associated with shorter average debt maturity. This finding might be attributed to structural differences in financial systems, limited access to long-term financing options, or divergent fiscal strategies in these economies.

VI. CONCLUSION AND POLICY IMPLICATIONS

The analysis of the relationship between Long-Term Orientation (LTO), as defined by Hofstede's cultural dimensions theory, and various financial maturity indicators, including short-term maturity (1-5 years), long-term maturity (over 15 years), and the average term to maturity (ATM), reveals a lack of consistent and meaningful correlation across European countries. This observation holds true both for Eurozone (EUR) and non-Eurozone (non-EUR) economies, suggesting that cultural long-term orientation does not directly translate into the structure of sovereign debt maturity profiles.

While certain weak or moderate correlations were identified in isolated contexts these relationships lack the consistency and strength required to support a broader generalization. Countries with vastly differing LTO scores, such as Estonia (LTO = 71) and Portugal (LTO = 42), demonstrate no uniform pattern in their financial maturity structures. Estonia, despite having one of the highest LTO scores, shows a relatively modest reliance on long-term debt, while Portugal, with a lower LTO score,

exhibits a diversified maturity structure with significant long-term debt instruments. These examples underline the complexity of debt management strategies, which cannot be solely explained through cultural dimensions like LTO.

The findings suggest that the maturity structure of sovereign debt is primarily shaped by immediate fiscal needs, macroeconomic conditions, risk perceptions, and access to financial markets, rather than by deep-rooted cultural predispositions. Governments respond dynamically to short-term budgetary requirements, investor preferences, and external shocks, which often override cultural tendencies towards long-term or short-term financial planning. The treasury debt market, therefore, does not align neatly with Hofstede's LTO measure, reflecting instead a more pragmatic and situational approach to sovereign debt issuance.

Summarizing the results of the empirical research, we should conclude that both research hypotheses stated in the introduction should be rejected. There is neither a positive nor strong correlation between the level of the Long-Term Orientation (LTO) index and the maturity length of public debt. Additionally, the values of the Average Term to Maturity (ATM) are not higher in countries with higher levels of the Long-Term Orientation index.

From a policy perspective, this study underscores the importance of focusing on macro-financial stability, investor confidence, and effective debt management frameworks rather than attempting to derive financial maturity strategies from cultural indicators. Policymakers should prioritize building flexible, adaptive financial instruments and debt issuance strategies that respond effectively to both domestic economic conditions and global market trends.

As a potential direction for future research, an interesting avenue would be to examine the geographic distribution of sovereign debt ownership. Specifically, it would be valuable to test the hypothesis that sovereign debt issuers consider the LTO profiles of their primary investor base when designing maturity structures. Understanding whether governments tailor their debt instruments to align with the cultural characteristics of dominant investor groups could offer deeper insights into the intersection between culture and financial markets.

In conclusion, while cultural long-term orientation provides valuable context for understanding broader societal and economic behaviors, it proves insufficient as a standalone explanatory variable for sovereign debt maturity strategies. The observed patterns suggest a far more complex interplay of economic imperatives, fiscal pressures, and investor landscapes, which collectively shape financial maturity profiles across European economies.

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