



The Relationship between Government Debt and Economic Sentiment

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ABSTRACT

In recent years, the application of sentiment in the economic field has become increasingly important. In the last decades, researchers have mainly explored the macroeconomic impact of sentiment. For example, the prediction of sentiment on unemployment, GDP, and private consumption. Government debt has been a hot topic due to increasing debt in many countries around the world for a long time. Many researchers have argued that declining confidence can lead to a potential debt crisis. But little research has been done in the opposite direction, i.e., do changes in government debt affect economic sentiment (e.g., consumer confidence)? Our paper will provide an in-depth insight into the correlation between the two factors, based on data from the Czech Republic.

Keywords: consumer sentiment, government debt, the European sovereign debt crisis

JEL Classification: D9, H68, H87

1. Introduction

In the last few decades, researchers have explored mostly the impact of sentiment on macroeconomics. For example, the prediction of sentiment on unemployment, GDP, and private consumption. De and Schiaffi (2015) indicate that economic sentiment (e.g., consumer confidence) contains important basic information about future economic conditions. Bachmann and Sims (2012) show that sentiment reacts more dramatically to fiscal expenditure shocks during recessions than during normal periods. De and Ji (2015) demonstrate that sentiment can have a significant impact on debt markets. The national economy is under increasing strain due to the increase in government debt in recent times.

More and more researchers are focusing on how sentiment affects the economy. Thus, do sentiment and government debt have a direct relationship with each other? Giavazzi and Pagano (1989) argue that a decline in confidence can lead to a potential debt crisis. Conversely, does a change in government debt have an impact on economic sentiment (for example: consumer confidence)? Because there are few studies in the relevant research domains that directly link economic sentiment to government debt, our paper will analyze the specific relationship between the two variables, using the Czech Republic as an example.

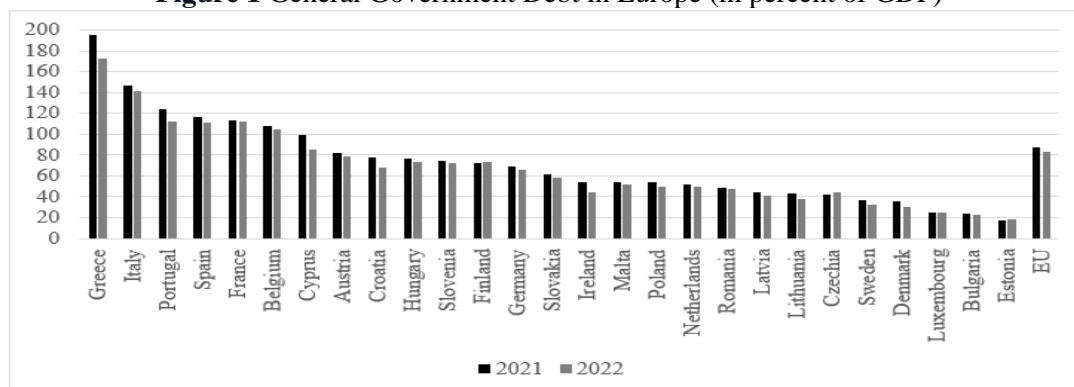
Besides that, we present in the paper the background as well as the current situation regarding the debt crisis in Europe. Also the importance of connecting government debt with sentiment. We use the stationarity test, cointegration test, and Granger causality test to process the data. The results obtained are analyzed and discussed at the end.

2. Material and Methods

2.1 The European Debt Crisis and The Current Situation

The sovereign debt crisis in Europe has its origins in the accumulation of debt and excessive speculation in the financial markets of the countries in the eurozone after its establishment. The crisis erupted in GIIPS countries such as Greece, Ireland, Italy, Portugal, and Spain, leading to global investor panic and capital outflows. The causes of the crisis in European countries varied, including high deficits, historically low interest-rate borrowing, real estate bubbles, and already high public debt. Arellano et al. (2012) mention that after the crisis, the European Union and the International Monetary Fund developed bailout programs for countries such as Greece. However, in the intervening years, the sovereign debt crisis has continued to deepen.

Figure 1 General Government Debt in Europe (in percent of GDP)



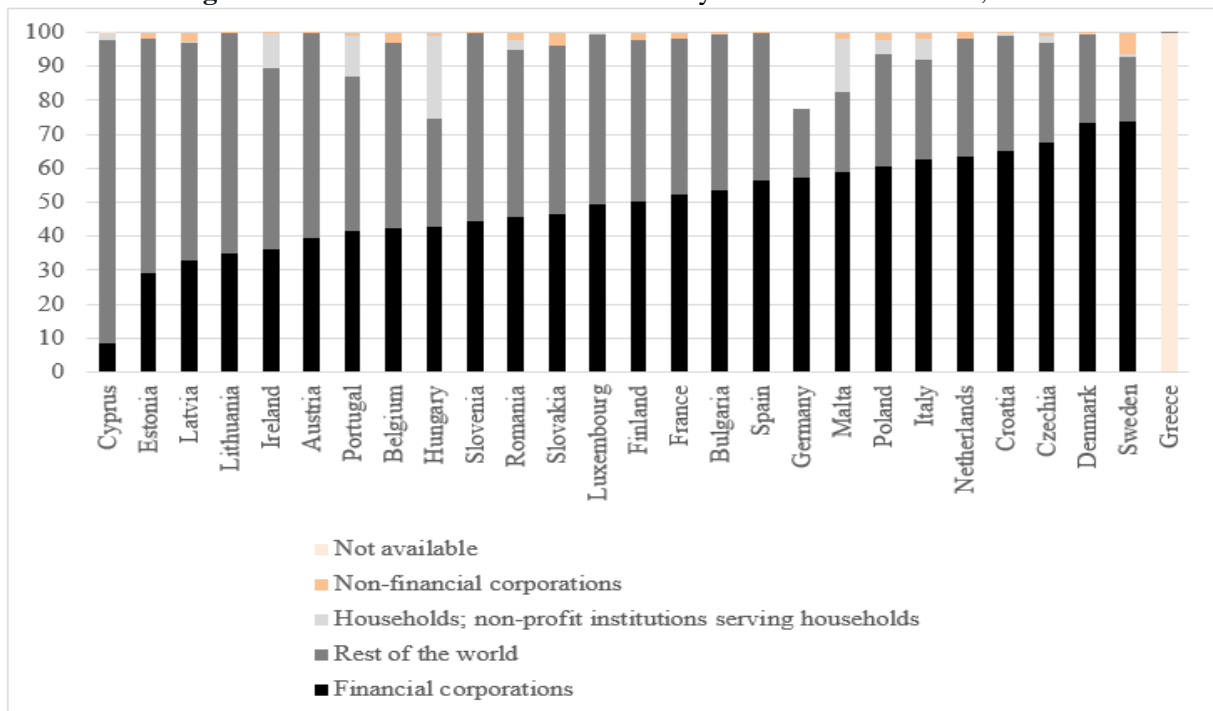
Source: Self-calculation



Figure 1 shows that Greece, the nation hardest hit by the European debt crisis, continues to have the highest government debt-to-GDP ratio in the EU. It is followed by Italy, Portugal, Spain, France, and Belgium. This demonstrates that, although the sovereign debt crisis took place several years ago, its effects remain quite apparent. It will take a long time for these countries to recover to their pre-crisis levels. It is worth noting that the Czech Republic is the only country in this sample in which general government debt increased significantly between 2021 and 2022. The Czech government is currently working on measures that would decrease the large deficits of previous years and the high dynamic of the debt. After the sovereign debt crisis, both the EU and the IMF took active steps to respond and provided significant bailout funds to countries such as Greece,

Ireland, and Spain. The European Central Bank shifted the focus of its monetary policy objectives from maintaining price stability to maintaining financial stability across the eurozone. Bermeo and Pontusson (2012) argue that during this recession, governments relied heavily on tax reductions to stimulate the economy and spending retrenchment to consolidate finances. Heins and Porte (2015) propose that the financial crisis and sovereign debt crisis have exposed the weaknesses of the eurozone. That is interdependent but asymmetrical economies. Without EU and IMF assistance, these peripheral European countries will face problems with refinancing their government debts. Furthermore, the funding risks that nations confront differ based on their type of debt.

Figure 2 General Government Gross Debt by Sector of Debt Holder, 2021



Source: Self-calculation

There are generally three basic types of debt: internal, external, and foreign currency debt. Internal debt is issued to domestic residents or entities, can be partially repaid through tax increases, and is, therefore, less risky than external debt. External debt is held by creditors such as foreign entities, private or commercial banks, and governments, and therefore cannot be repaid through taxes and is riskier. Foreign currency debt is issued in foreign currencies and is subject to exchange rate risk, and the depreciation of the local currency may lead to non-payment. The percentage distribution of debt holders in a few European nations is shown in Figure 2. We can observe that the fraction of domestic inhabitants holding debt is still very high in nations like Sweden, Denmark, and the Czech Republic, with the vast majority of debt being internal debt. External debt, on the other hand, is mostly held by foreigners in nearly half of the nations. Generally speaking, nations with a high percentage of external debt are more vulnerable. Silva (2020) argues that

external debt can negatively affect Europe's financial distress, which in turn can harm countries' GDP and private savings.

2.2 Government Debt and Economic Sentiment

Economic sentiment theory, also known as expectation theory or expectation hypothesis. Lucas (1972) put forward the idea of rational expectations, i.e., market participants have rational expectations and can make the best decisions based on valid information, making government intervention ineffective. Katona (1975) criticized Lucas's view, arguing that it should not be assumed from the outset that people must act rationally, but rather that markets should be linked to human behavior and emotions.

Other economists have likewise made notable contributions to sentiment theory, such as Pigou (2016), who argued that a large part of business cycle fluctuations come from expectations, Scholz (1995), who argued that instability and uncertainty are a huge obstacle to economic development, and Frank (2017) and



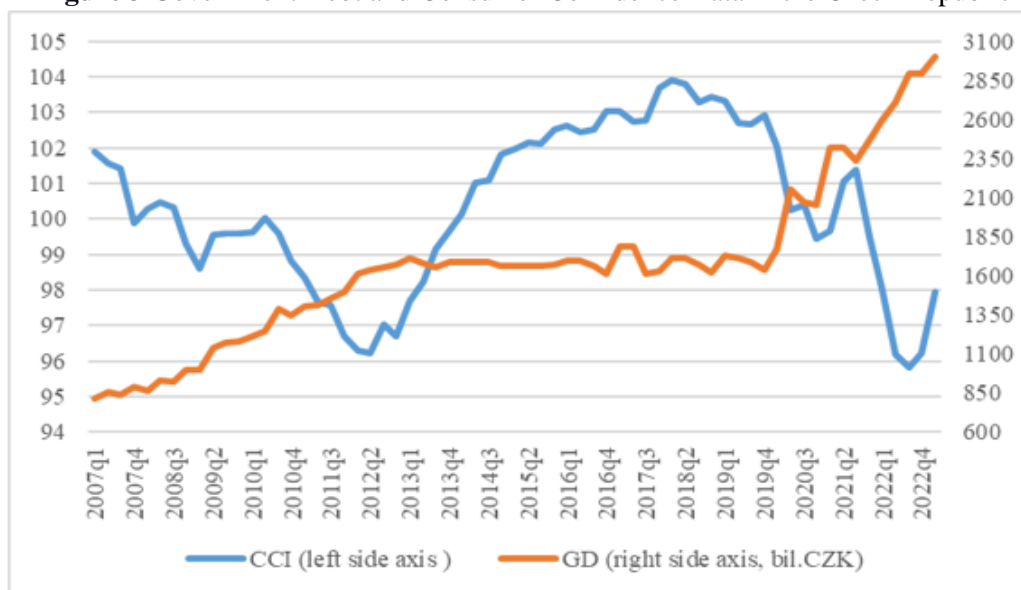
Farmer (2012), who also explored the impact of emotions, uncertainty, and beliefs on economic behavior and markets. Akerlof and Shiller (2010) further developed Keynes' theory of "animal spirits" by looking at the two Great Depressions of 1893 and 1939, breaking it down into five main areas: confidence, fairness, monetary illusion, fraud and corruption, and narrative thinking. These factors provide new insights into economic phenomena that traditional economics cannot explain.

Regarding the relationship between consumer confidence and government debt, there are two primary research schools. The first looks at the relationship between emotion and debt, with research like Giavazzi and Pagano (1989) showing how

important confidence crises are for managing public debt, especially for highly indebted European nations. According to Fernandes et al. (2016), sentiment has an impact on the debt market, especially while bailouts are happening. The significance of consumer views on government debt and how they affect consumer sentiment is emphasized by Sartell (2014). The second school of thought investigates reverse causality and shows, as shown in research by Reinhart and Rogoff (2010) and Alesina and Ardagna (2010), how large levels of government debt impair economic sentiment and economic growth.

2.3 Methodology

Figure 3 Government Debt and Consumer Confidence Data in the Czech Republic



Source: Self-calculation

Figure 3 illustrates that following the start of the financial crisis, consumer confidence in the Czech Republic declined precipitously and did not rise again until 2012. Over this time, the amount of government debt also increased. Vanlaer et al. (2020) argue that the global financial crisis and the European sovereign debt crisis dealt a severe blow to consumer confidence, which rebounded in 2012 when the European Central Bank, the European Union, and the World Monetary Fund adopted policies to help European countries overcome the crisis. In addition, from 2012 to 2019, the Czech government's debt was essentially under control. Between 2019 and 2022, the prospect of the pandemic and potential energy crisis causes consumer confidence to decline as well, and government debt rises dramatically throughout this time.

We substitute the sentiment variable with data from the Czech consumer confidence index. Simultaneously, we acquired data on the government debt issued by the Czech Ministry of Finance. For both, the time frame is quarterly data covering the years 2007–2023. To determine whether there is a stable, long-term correlation between consumer confidence and government debt, we evaluate the data for stationarity and cointegration. We utilized both ADF and Phillips–Perron (1988) tests during this process for the unit root test. Dickey and Fuller (1979) are

referred to as the source for the ADF test, and the basic formula is shown below:

$$\Delta y_t = \alpha + \beta y_{t-1} + \delta t + \sum_{j=1}^k \zeta_j \Delta y_{t-j} + e_t$$

We used Johansen tests to examine the data for cointegration. The null hypothesis of the cointegration test is that there is a cointegration relationship between the data. The cointegration test in Stata is based on the maximum likelihood (ML) methods developed by Johansen (1988):

$$\Delta y_t = \alpha \beta' y_t + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + v + \delta t + \epsilon_t$$

According to the Granger causality tests' methodological design as stated by Granger (1969). If other things remain the same, x_{t-1} is deemed to not be Granger causally connected to y_t if there is no discernible increase in the prediction accuracy of y_t following the addition of the lag variable of x_t .

The Granger causality test formula, according to this definition, is as follows:

$$y_t = \sum_{i=1}^k \alpha_i y_{t-i} + \sum_{i=1}^k \beta_i x_{t-i} + \epsilon_t$$



3. Results

Table 1 Result of Unit Root Test

Variable stationarity test					
Variable	PP t-stat	Critical value			Test result of PP
		1%	5%	10%	
CCI	-1.478	-4.119	-3.486	-3.172	Unit root exists, non-stable
GD	-0.235	-4.119	-3.486	-3.172	Unit root exists, non-stable
ΔCCI	-4.982	-4.121	-3.487	-3.172	Stable at 1%
ΔGD	-8.467	-4.121	-3.487	-3.172	Stable at 1%

Variable stationarity test					
Variable	ADF t-stat	Critical value			Test result of ADF
		1%	5%	10%	
CCI	-1.124	-4.119	-3.486	-3.172	Unit root exists, non-stable
GD	-0.558	-4.119	-3.486	-3.172	Unit root exists, non-stable
ΔCCI	-5.063	-4.121	-3.487	-3.172	Stable at 1%
ΔGD	-8.375	-4.121	-3.487	-3.172	Stable at 1%

Source: Self-calculation

To check for stationarity, we first perform a unit root test on the data for consumer confidence and government debt. Both sets of data pass the unit root test under the ADF test and PP test at the first-order difference and remain steady at the 1%

significance level as Table 1 shows. The data are stationary at differences. Further, to test whether there is a long-run stable relationship between the variables, we performed a cointegration test after the unit root test.

Table 2 Result of Cointegration Test

Johansen tests for cointegration					
Trend: constant			Number of obs = 63		
Sample: 3-65			Lags = 2		
Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	6	-434.165	.	7.743*	15.410
1	9	-430.389	0.113	0.190	3.760
2	10	-430.294	0.003		

Source: Self-calculation

We used Johansen tests to examine the data for cointegration. The null hypothesis of the cointegration test is that there is a cointegration relationship between the data. From the results in Table 2, we can see that the Trace statistic at rank = 1 is 0.1896, which is less than the 5% critical value. The original hypothesis cannot be rejected at this time, so we conclude that

there is at least one cointegration relationship. In short, the results of the cointegration test are stationary and we argue that there is a stable long-term relationship between the variables. Following the cointegration test results, we investigate Granger causality between the variables. The table below displays the precise outcomes.

Table 3 Granger Causality Test

Granger causality Wald tests					
Equation	Excluded	chi2	df	Prob > chi2	
D_CCI	D.GD	0.473	2	0.789	
D_CCI	ALL	0.473	2	0.789	
D_GD	D.CCI	7.872	2	0.020	
D_GD	ALL	7.872	2	0.020	

Source: Self-calculation

The null hypothesis is that there is no Granger causality. When the p-value is greater than 0.05, we accept the null hypothesis. From Table 3 we can observe that the result in the first row of the top half of the figure shows a p-value greater than 0.05 and the null hypothesis cannot be rejected. This means that government debt does not explain the change in consumer confidence. The bottom half of the figure shows that the p-value is less than 0.05, rejecting the original hypothesis. This suggests that consumer confidence is the Granger cause of government debt. Changing in consumer confidence causes changes in government debt.

4. Conclusions

In this paper, we discuss the notion of economic sentiment and how it relates to government debt. Based on quarterly data from 2007 through the beginning of 2023, we find a negative link between consumer confidence and government debt in the Czech Republic. Our study supports the conclusions

made by Fernandes et al. (2016), which is sentiment has a certain impact on the debt markets. We also come to the same conclusion as Sartell (2014), namely that there is a statistically significant correlation between consumer mood and government debt. Similar to the findings of De and Ji (2015), and Mumtaz and Surico (2018), our results also indicate that there is a negative relationship between government debt and consumer confidence. Based on the results of the Granger causality test we conclude that government debt is not a Granger cause of changes in consumer confidence. Rather we identify the opposite calamity, in short, when consumer confidence increases, government debt will decrease. Consequently, debt stress might arise as a result of a nation's confidence crisis. To improve the model, future research is going to investigate additional explanatory variables.

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