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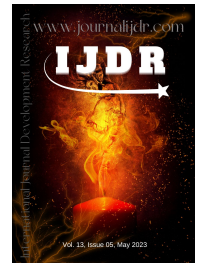
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RESEARCH ARTICLE

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INTEREST CHARGES AND SUSTAINABILITY CHALLENGES: THE CASE OF OECD COUNTRIES

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ABSTRACT

Servicing public debt is a significant budgetary burden. In the sense that the payment of interest charges is a liability on the balance sheet of the public budget and affects fiscal policy. Interest charges can sometimes become a burden if they crowd out private activities. In order to analyze and understand the determinants of the debt burden and its impact on the sustainability of public finances, the present work focuses on OECD countries. It is noted from the literature that the factors that determine interest charges are macroeconomic (inflation, GDP growth and interest rates) and public finances (primary balance and public debt). After analyzing a panel of 33 OECD countries and using ordinary least squares (OLS), we find that public debt, inflation and long-term interest rates are positively correlate with interest charges. An increase in any of these variables leads to an increase in debt charges. On the other hand, a growth in GDP is negatively associated with interest charges. Indeed, an increase in GDP generates enough revenue to meet the repayment of debt charges. According to the empirical analysis, we can say that, despite the large and growing debt-to-GDP ratio of major OECD countries, interest charges are not a threat to the sustainability of public finances. However, it is important for these countries to reduce the ratio of public debt to GDP, because in the face of the many challenges (health, ageing population, etc.) that are looming on the horizon, an increase in interest rates could bring with it considerable burdens that would threaten the budgetary balance of these states.

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INTRODUCTION

The concern for the efficiency of public finances has spurred states to attach importance to public debt, which has contributed to the creation of services dedicated to its management. Public debt management is both important for the creditor partners of states whose objective is the repayment of the debt in order to have a positive image at international and national level. It also contributes to analyze the sustainability of public finances internally, which makes it possible to guard against possible economic conditions. Public debt services have been created for this purpose under the background of analysis and efficiency. In Belgium, the Federal Debt Agency (Agence fédérale de la dette) is in charge of public debt management, just as the France treasury agency (Agence France Trésor) is for France, to name but a few. The missions of these agencies are, among others, to minimize the financial costs of debt and to smooth out repayments over time. In addition to the administrative aspect of debt servicing, the technical aspect is of interest and will be the subject of this paper. Debt service is an amount that a borrower has to pay to honor the debt. It consists of a principal which is the amount of capital borrowed and which is repaid when it matures or is reschedules. It depends on the duration and amount of the loan. It also includes interest, which is calculate by applying an interest rate to the outstanding capital (the amount that has not yet been repaid). According to (Waserman, 2018), the principal

of the state's loans does not appear as a revenue in the budget, which is why it does not appear as an expenditure in the budget either. In addition, states very often roll over the principal of the debt, i.e. they repay the maturing principal by making new loans. Interest charges, on the other hand, are explicitly included in the budget balance sheet and are a significant part of public expenditure. Interest payments are also call interest charges or interest on debt. Each year, this burden, which is that of the general government, is calculated and reported on the GDP. The latter will be the subject of this study. (Cornille, 2019) report that government interest charges in Belgium were 11.5% of GDP in 1990 and nowadays they have fallen considerably to 2.3% in 2018. While the literature on the analysis of public indebtedness is abundant, the analysis of interest charges does not generate enough enthusiasm among researchers. In the spirit of innovation, we want to contribute, however small, to the further development of this other important aspect of public finances. When we talk about public finances, its efficiency is analyzed by the sustainability of fiscal policy. Moreover, (Pagano, 2007) tells us in this respect that a fiscal policy is sustainable if it can be maintained without limit in time. If we focus on public debt, this implies that it should be low and stable in the long run. If interest charges are closely link to public debt, it is good practice to analyze them in relation to sustainability. The objective of our study is thus to find out whether interest charges constitute a threat to the achievement of public finance sustainability in view of the increasingly high public debt ratio in many OECD

countries. It is a question of interrogating the existing literature in order to find the determinants of these on the one hand and on the other hand, to see how they explain our key variable before concluding whether interest charges would impede the health of public finances. The literature shows that elements of public finances and macroeconomics underlie the determination of interest charges. (Izak, 2004), tells us that debt to GDP and primary balance on the one hand, and GDP growth and inflation on the other hand, are the key elements in determining interest charges. While (Caselli, 1999) show that an improvement in the primary budget balance and a reduction in the stock of debt are associated with significant reductions in debt servicing costs, (Izak, 2004) shows that GDP growth reduces interest charges on debt and an increase in inflation leads to an increase in interest on debt.

An increase in inflation is associated with a panic effect by investors, who, wanting to reassure themselves of the profitability of public securities, increase interest rates and this immediately reflect in the debt charges. The opposite mechanism is true when we are dealing with GDP growth. When productivity increases, the confidence effect takes hold, the demand for securities increases, which contributes to reduce interest rates and thus debt charges. Interest rates (short and long term) are also crucial in determining debt charges, as the lower they are, the lower the debt charges will naturally be (Ardagna, 2007). Within this continuum, public finances will prove to be sustainable. The rest of our paper will be organized as follows: following this introduction, the second part will return to the analysis of sustainability and present the motivations of the topic. The third part will be dedicated to the literature review and the theoretical analysis. The empirical analysis will be analyzed in the fourth part and finally, a conclusion will conclude our study.

SUSTAINABILITY ANALYSIS AND MOTIVATION OF THE TOPIC

A Sustainability Analysis: The sustainability of public finances has been defined as a set of rules relating to public expenditure and revenue so that they can be maintained under predictable conditions. Thus, (Nerlich, 2018), told us. Sustainability is generally define as the ability of the government to meet its long- term financial commitments (Bouthevillain, 2007). It thus comes to satisfying the government's intertemporal budget constraint, which implies that the present value of future primary surpluses is equal to the stock of public debt to be recovered. (Domar, 1944) analyzing public debt, proposes another definition of sustainability. He requires that the public debt ratio converge to a finite value in order to avoid a continuously rising tax rate. For him, the more the debt evolves, the more mechanisms are needed to increase taxation to cope with this ever-increasing debt, which unbalances fiscal policy and could be a source of social tension. (Buiter, 1985) and (Blanchard, 1990) argue that sustainability only makes sense if the debt ratio converges towards its initial level. This would mean setting up policies that impose a return to the initial level of indebtedness, or at least the level that allows for the solvency and sustainability of public finances. Following this logic, (Melyn, 2016) see the sustainability of public finances as the fact that governments avoid defaults related to public debt and thus be solvent. For the latter, long- term sustainability is the situation in which a government can meet its current debt obligations based on future primary surpluses (i.e. budget surpluses excluding interest charges). In formal terms, this means that the intertemporal budget constraint must be satisfied, i.e. the value of the current debt must be equal to the present value of future primary surpluses. It is only necessary to say that the current contractual obligations on the debt are fulfilled, so that there are no defaults or delays in payment, and that the debt is not monetized by the monetary authorities in the form of inflation. Moreover (Pagano, 2007) to adds that a fiscal policy is sustainable if it can be maintained without limit in time. This implies that public debt should aim at a low and stable level in the long term. Here, the Keynesian paradigm makes sense, insofar as, if deficits are allowed during periods of weak demand, automatic stabilizers will guarantee surpluses that will make it possible in the long term to

stabilize or even reduce the debt. Sustainability can be analyzed in the short run. In fact, it is only the set of fiscal policy commitments without additional pressure on expenditure and taxation over a period generally limited to one year. Short-term sustainability is also important, because the set of short-term sustainability could translate into long-term sustainability. However, in our analysis, we will work on the long run.

Motivation of the topic: Studies on the sustainability of public finances have been the subject of an extensive literature. Both sides analyses it in relation to fiscal policy, public debt to GDP or debt service in general. Our study, which intended to be innovative, has of course been inspired by the vast literature on the above- mentioned topics. Our interest in interest charges is analyzed in relation to GDP. This study is important in that, compared to public debt, interest charges are repaid at year-end. On the other hand, debt (capital) once issued often does not need to be repaid at maturity, but can be deferred to the distant future. What we are pointing out here is that even if the capital is not repaid (rolled over), the interest on it will still have to be paid. In this respect, to the public debt to GDP ratio as a solution to the study of the sustainability of public finances, interest charges on the debt to GDP can be proposed as an alternative. (Barro, 1974) was right when he reminded us that future interest payments on public debt must be financed in some way, even if they fall due. On the other hand, the principal can eventually be repaid later. It should also be noted that government bonds such as the Belgian OLO often have maturities of up to 30 years. In this context, the interest charges on them are nevertheless repaid at the end of each financial year once the primary balance has been calculated. Of course, by extending the debt, as (Cornille, 2019) point out, there is an additional cost in interest charges. Because the longer the public debt is extended, the higher the interest rates will be (term premium). However, if public finances were on a sustainable path, there would be no pain to overcome the extension.

Moreover, the other interesting aspect of our analysis is that the debt ratio is not very representative of the real burden in the liabilities of public finances. As mentioned above, the principal of the debt is generally not recorded on the public accounts. This tends to see a high debt-to-GDP ratio as a burden that it is not. A debt ratio like that of Japan, which in 2019 had a gross debt ratio of 286% of its GDP, would in no way reflect alarmism, if its liabilities include an interest burden that the state's assets can cover without any additional pressure on fiscal policy. In addition, when we know that nowadays interest rates are historically low, public finances would by no means be on an unsustainable path. It is therefore interesting, in view of the above, to propose something else to analyze sustainability. Is this not the occasion to dwell on interest charges and the related literature?

LITERATURE REVIEW AND THEORETICAL ANALYSIS

Literature Review: Closely linked to public debt, interest charges represent a significant part of public expenditure. When we look back in history, we see that these were considerable in the 1980s and are now in sharp decline. The arguments put forward to justify this fall are mainly due to macroeconomic elements such as the fall in inflation, economic growth and low interest rates. However, other public finance factors such as deficits, public debts and primary surpluses strongly influence public debt charges. Therefore, we present here the literature that has focused on the determinants of these. (Izak, 2004), (Caselli F., 1999), (Ardagna, 2007) and (Perovic, 2015), have each put forward the inflation argument as a determinant of interest costs. Inflation, understood as the increase in prices, is a means by which the public authorities have recourse in one direction or the other to influence the economic situation. (Nautet, 2011), point out that in the face of rising debt, governments may be tempted to monetize public debt. In this case, they will issue debt that will ultimately be bought by central banks. The money received by the government from the central banks will be used to finance budget deficits. The money supply is likely to increase and an inflationary

surge will be observed which could sometimes lead to hyperinflation. In this situation, interest rates are likely to rise due to the panic effect that creates doubts in the minds of creditors about the solvency of public finances. This effect leads to an increase in interest charges on the public debt. The opposite effect occurs in a situation where inflation is under control, nominal interest rates tend to fall. This, in turn, contributes to lower real interest rates. (Ducoudré, 2019) Report that in the 1980s, the annual inflation rate measured by the consumer price index was around 13.5% in the US, 16.8% in the UK and 13% in France. Moreover, history reminds us that it is during fiscal crises caused by shocks (wars, economic crises, health crises, etc.) that economies tend to experience marked inflation or even hyperinflation. This is why central banks have made themselves independent in order to fight inflation. In most OECD countries, inflation rates are low and current data show that they are around 2%. Moreover, budget deficits and public debts are both causes and consequences of interest charges on the debt. Indeed, without public debt there would be no debt service. Public debt is created from budget deficits and in order to finance expenditures that could not be covered by public revenues, recourse to debt is the means to achieve this. Public debt is also created when demand is weak as Keynesianism insists. In order to stimulate investment and consumption, governments take on debt to boost the economy, which will create jobs, the economy may then grow and due to multiplier effects, the benefits generated will cover the expenses related to the debt. However, whatever the source of the debt, there are expenses to cover, hence the problem of profitability posed by (Barro, 1974) who wonders whether government bonds generate wealth. If the debt burden is huge, the budget deficits for the current year deteriorate considerably. In addition, if the deficits get out of control, the public debt gets out of control, leaving the next year with a higher burden. Public debt is more decisive in defining the debt burden through its ability to influence other parameters such as economic growth that determines the improvement or deterioration of the debt burden. Indeed, with (Blanchard, 1990), we have seen that the sustainability of public finances depends on the economic growth that the economy needs to generate to meet the debt burden. Moreover, if an economy is experiencing low growth and a high debt ratio, the debt burden will rise. In addition, if the opposite happens, the debt burden is lightened and this ipso facto leads to a decrease in the debt ratio and the risk of falling into the snowball effect trap is removed.

Considered as the main determinant of debt charges, interest rates on government bonds are attracting the attention of many researchers. This is because they are historically low in a context where debt-to-GDP ratios are particularly high, especially in the advanced countries. The interest rates on government bonds represent the yield on them for the government and its various detachments. These rates are short, medium or long term. Interest rates are expressed in nominal and real rates. The difference between these two expressions lies in the taking into account of the inflationary factor, more precisely on the real interest rates. This implies that nominal interest rates do not consider inflation. In recent years, these rates have been particularly low. As (Cornille, 2019) teach us, in the 1980s, particularly in 1982, the 10-year interest rate for Belgium was above 13%. This was more or less the case in many European countries such as France, Germany, the Netherlands and Italy. In 2018, our authors continue, these rates were 0.82% for Belgium, 0.78% for France and 0.40% for Germany. To find reasons for such a fall in interest rates, we refer to Blanchard (2019), (Tille, 2019) and (Klein, 2017). For these authors, the reasons are mainly monetary, macroeconomic and demographic. One of the reasons for the fall in interest rates at the macroeconomic level is a decline in the long-term growth rate of GDP, mainly due to the slowdown in productivity growth observed in recent decades. Furthermore, (Tille, 2019), proposes a demographic explanation. Indeed, he says, the retirement of the baby-boom generations has reduced the supply of labor, while the accumulated capital has remained the same, leading to an abundance of capital, which has pulled down returns and interest rates. The accumulation of capital has thus weakened demand. The reasons mentioned above led central banks to react on the monetary level by lowering interest rates. The aim was to support demand by increasing the value of

assets (real estate, shares, etc.), thus creating a wealth effect favorable to consumption and investment. In addition, (Klein, 2017) argues, lower interest rates intend to encourage economic agents, households and firms, to save less, consume more and invest, possibly by borrowing. In addition, the slowdown in economic growth coupled with rising debt levels were signs for policy makers to come up with alternatives to emerge from the crisis after the global debt overhang and allow for gradual debt relief. Setting a nominal interest rate lower than the nominal growth rate or, at worst, the same value was the appropriate response. It is obviously easier to deleverage when interest rates are lower than GDP growth rates. At the same time, it is important to avoid the snowball effect that leads to a self-sustaining debt, which would plunge states into another economic crisis.

In addition, the primary balance is another determinant of interest charges on the debt. First of all, it should be remembered that the primary balance is the difference between government revenue and expenditure net of interest charges. This can be positive; in that case, it becomes a primary surplus. It is a determining factor in the improvement or deterioration of the debt burden. (Perovic, 2015) Points out that it is important as its influence can be interpreted differently depending on the sample to be analyzed. In the study conducted, he refers to the primary deficit, as do (Ardagna, 2007). The first one teaches us that a primary deficit negatively affects the yields on government securities. This is because an increase in the primary deficit is associated with an increase in debt charges. The second states that a large primary deficit is associated with an increase in long-term interest rates. (Caselli, 1999) support the idea by pointing out that an improvement in the primary budget balance is associated with a reduction in debt servicing costs. (Izak, 2004) agrees by admitting that a strong primary balance is associated with lower debt servicing costs. Some authors, such as (Blanchard O. C., 1990) have argued that the sustainability of fiscal policies depends on a positive budget balance or budget surplus as the one that stabilizes the debt to GDP ratio over a given period. To do this, these primary surpluses (positive balance between revenue and expenditure excluding the payment of interest on the debt) must be able to cover or stabilize the interest payments on the public debt when the growth rate of the economy does not allow it to be met. This would mean that, faced with an explosive debt, the ultimate recourse left to the economy is the primary surplus. (Mottoul, 2008) Teaches us that faced with a situation of rapid growth of public expenditure over revenue, public finances could explode leading to a snowball effect. The snowball effect assumes that the debt is self-sustaining through the charges due on it. Like (Bohn, 1998) and (Izak, 2009), he proposes to use the primary surplus.

It is fundamental to remember that public expenditure and revenue influence the interest charges on the public debt indirectly via this budget balance. Indeed, in a situation of high expenditure, especially in times of health crises such as the one the whole world is currently experiencing with Covid-19, budget deficits are enormous, which results in an increase in public debt and, by the same token, in the charges on it. The opposite effect occurs when public revenues are abundant, and the surpluses generated make it possible to reduce the interest on the debt. GDP growth plays a role in the economic system in general and in public finances in particular, as mentioned above. The extensive literature on the subject teaches us that GDP growth has a positive role in improving the state budget. The topic under discussion in this article cannot offer a diverse answer. The articles used in our analysis are unanimous: GDP growth is negatively associated with interest charges on the debt. This would mean that the higher the economic growth, the lower the interest burden on the debt. (Izak, 2004), (Caselli, 1999), (Ardagna, 2007) and (Perovic, 2015), (Dreger, 2013) each demonstrate that economic growth exerts negative pressure on interest rates. Indeed when the economy grows, subscribers of government securities are inclined to pay these securities accepting low rates of return, as confidence is high. Taxation or spending cuts will cover the debt charges. The opposite effect is especially true when there is a probability of default on the horizon. In this case, they will demand high yields (Barro, 1974), (Dreger, 2013). Country-specific aspects can also be proposed in the

determination of interest charges. Risk premiums related to the macroeconomic, socio-political and fiscal situation determine the risk premiums associated with public debt. They are very often the basis for the definition of interest rates. This is because investors look at these indicators before they look at government treasury bonds. This is why unstable states will experience high interest rates on government securities, resulting in high charges on government debt.

Theoretical analysis

The debt burden, as we have said, represents the value of public expenditure devoted to the amortization of public debt. To understand its theoretical functioning, (Caselli F., 1999) and (Izak, 2004) allow us to analyze it from the public debt accumulation equation.

$$B(t) = G(t) - T(t) + rB(t - 1) \dots\dots\dots(1)$$

Where *G* are the general expenditures, *T* the revenues and *r* the real interest rate and *B* is the debt. This equation in relation to GDP gives the following expression:

$$b(t) = g(t) - t(t) + rb(t - 1) \dots\dots\dots(2)$$

Taking *gy* as GDP growth, we have:

$$b(t) + gy(t) = (g(t) - t(t)) + rb(t - 1) \dots\dots\dots(3)$$

In reorganizing, we have:

$$b(t) = (g(t) - t(t)) + rb(t - 1) - gy(t) \dots\dots\dots(4)$$

The real interest charges on public debt look like the following expression:

$$rb(t) = b(t) + (g(t) - t(t)) + gy(t) \dots\dots\dots(5)$$

The interest charges in nominal terms give the following expression:

$$ib(t) = (g(t) - t(t)) + gy(t) + P(t) + b(t) \dots\dots\dots(6)$$

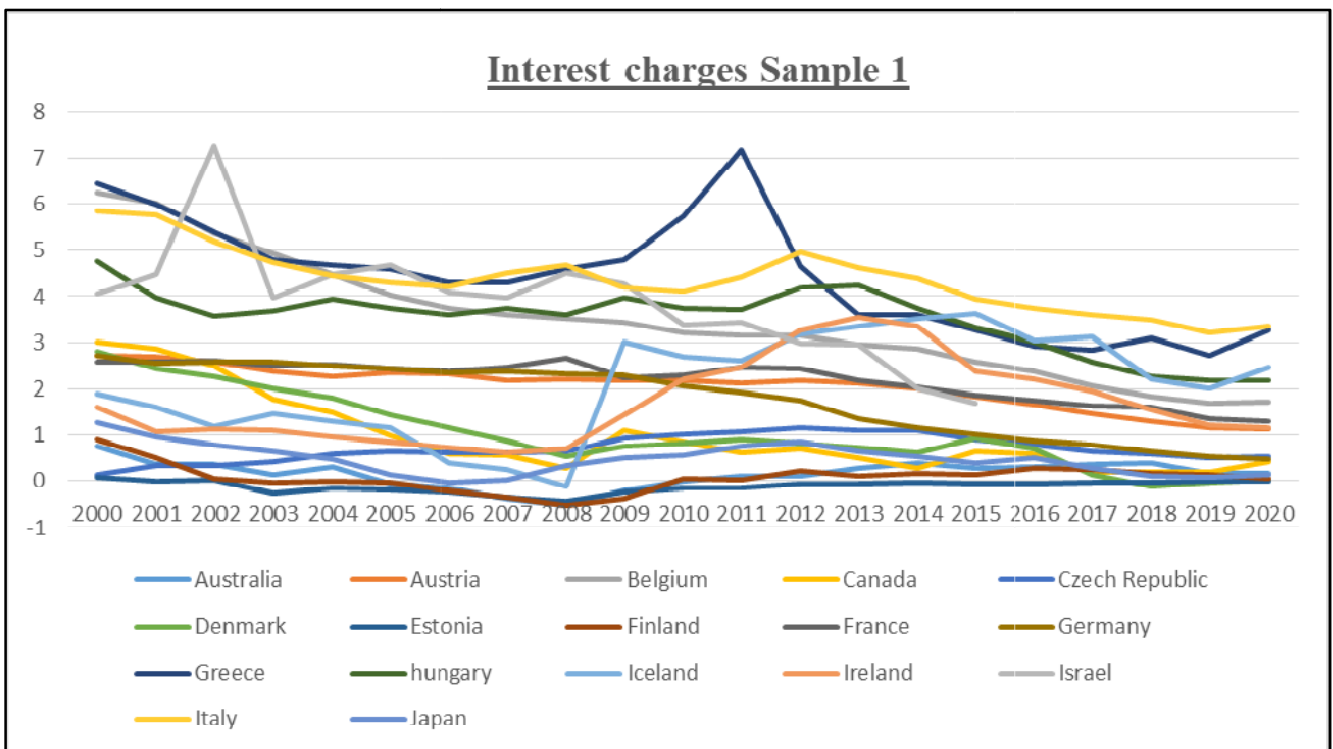
Where *P(t)* is the inflation rate.

We can see that the factors that determine the debt burden in nominal terms are the primary balance, the growth rate, the inflation rate and the variation of the debt, in proportion to GDP, except for the inflationary and GDP growth variables. The following graphs give us an idea of the interest charges of the OECD countries. The graphs have been segmented into two samples, as a sample of 33 countries would be difficult to manage and see in one graph. From our graphics, we can see that in general, from 2000 to 2020, the interest charges on the public debt have fallen; even if there have been rebounds from one year to the next. This is the case from 2009 onwards, which is a consequence of the economic crisis of 2008. In addition, we can notice that the interest charges of our samples are lower than 5% of GDP. Even though we can see that Israel in 2002 and Greece after the 2008 crisis had interest charges exceeding 5% of GDP. However, these figures quickly fell back to converge with the other countries towards the minimum thresholds. We note that some countries, such as Norway, have a negative debt burden, which could be a sign of good financial health. From the data of the descriptive statistics, we notice that the interest charges on the debt have a standard deviation close to the average in the period under consideration. Over the same period, the maximum interest burden is 7.2%, which proves that we are far from the periods when it exceeded 10% of GDP. It can also be seen that the debt ratio is quite divergent, indicating that in our sample there are countries with a very high ratio (maximum 266.2) and others with a low one (minimum 3.771), and all this is confirmed by the standard deviation which is far from the average.

EMPIRICAL ANALYSIS

A brief empirical literature review: Debt charges have been the subject of a series of empirical analyses. Here, we highlight some of the inspiring ones. (Izak, 2004) Has made an analysis of the cost of debt servicing in four Eastern European countries over the period 1994-2002. These countries also considered as transition countries include Poland, Czech Republic, Hungary and Slovakia. Using Ordinary Least Squares (OLS), he concludes that: Inflation growth should mainly be associated with an increase in the average interest cost; real GDP growth should decrease the average interest cost; an increase in the primary balance should decrease the average interest cost; and an increase in debt should increase the average interest cost.

Graph 1. Interest Charges Sample 1



Graph 2. Interest charges sample 2

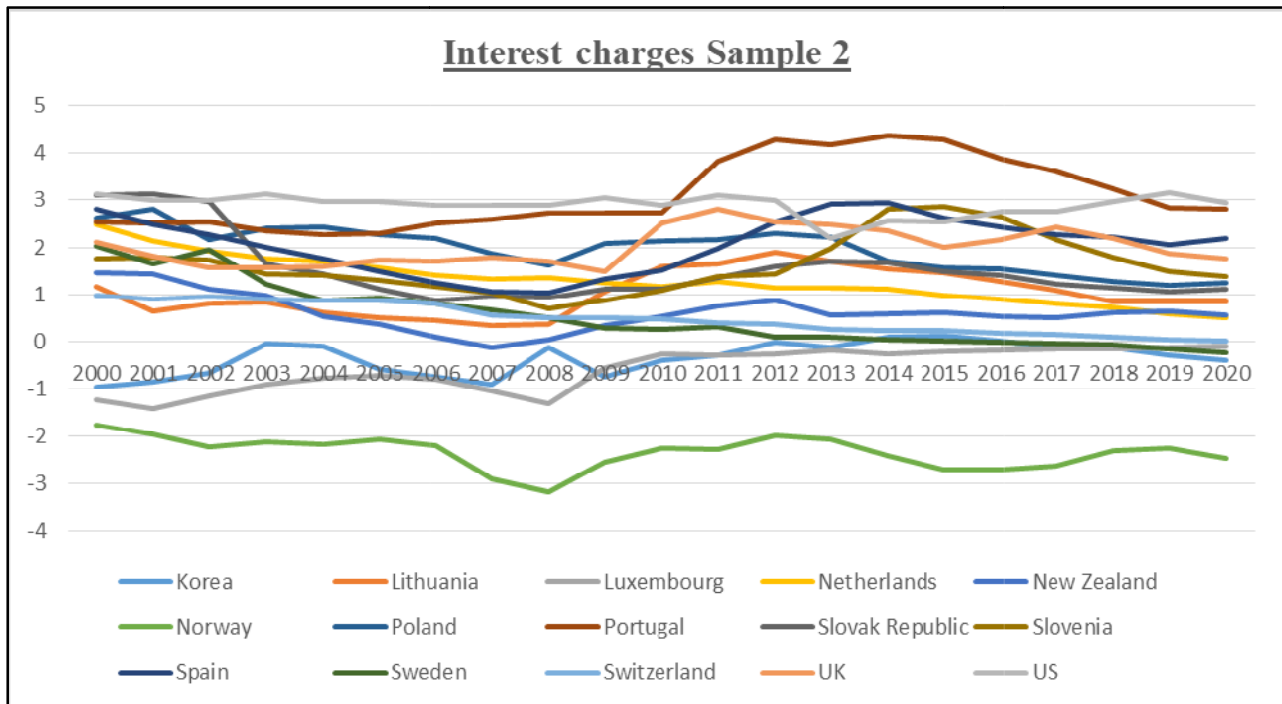


Table 1. Descriptive Statistic

VARIABLES	N	Mean	St. Dev.	min	max
Interest Charges	667	1.502	1.620	-3.180	7.270
Debt GDP	691	62.79	42.10	3.771	266.2
Primary Balance	688	-0.579	4.037	-29.85	15.72
GDP Growth	693	4.308	4.950	-22.60	34.76
Inflation	693	2.134	1.962	-1.693	15.25
General expenditures	693	43.67	7.119	23.68	65.11
General Revenues	693	41.60	7.112	23.06	59.21
Interest LT	659	3.618	2.462	-0.524	22.50
Interest ST	691	2.444	2.729	-0.784	18.88

Table 2. Spécification test

VARIABLES	IntCharges
DebtGDP	0.021*** (0.001)
PrimaryBalance	-0.025* (0.015)
GDPGrowth	0.017 (0.015)
Inflation	0.195*** (0.033)
Constant	-0.334** (0.143)
Observations	665
R-squared	0.292
F test	68.17

Note: Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

(Caselli, 1999), worked on 17 OECD countries over the period 1970-1997. In analyzing the cost of debt servicing, the authors propose two methods of analysis: generalized least squares (GLS) and non-linear least squares (NLS). They conclude that an improvement in the primary budget balance and a reduction in the stock of debt are associated with significant reductions in debt service costs. Furthermore, they find that there are country-specific effects that need to be taken into account, including the degree of indebtedness, debt management and market infrastructure. (Perovic, 2015), proposed a study of long-term government debt returns in 10 Central and Eastern European countries over the period 2000-2013. Using ordinary least squares (OLS), he concludes that a one-percentage point increase in debt is associated with an increase in yields on government securities

of 2.7 to 4 percentage points. In addition, a one-percentage point increase in the primary deficit relative to GDP is associated with an increase in government borrowing from 12.9 to 24.3 percentage points (Ardagna, 2007), use a panel of 16 OECD countries over several decades to analyze the effects of government debts and deficits on long-term interest rates. Using Ordinary Least Squares (OLS) and Vector Autoregression (VAR), they conclude that a one-percentage point increase in the primary deficit relative to GDP increases long-term interest rates by about 10 basis points. In addition, they find that the effect on public debt is not linear, as the significance only holds if the debt ratio is above a certain threshold. This means that the effect on public debt is country-specific.

RESEARCH METHODOLOGY

Data: Our data were extracted from the “OECD Economic Projections, N° 108 December 2020”. The essential of our sample is take from this. However, the public debt to GDP ratio is take from the Knoema website in the World data atlas; section economy. This data covers 33 OECD countries. The other four (Chile, Colombia, Mexico and Turkey) have not been included due to lack of data for some variables, or some years are not covered.

Model: (Izak, 2004), inspires our basic model, where we use ordinary least squares (OLS) as a technical method of analysis on the panel data covering the period 2000 to 2020. The resulting model is as follows:

$$\text{IntCharges}(i,t) = \alpha + \beta_1 \text{DebtGDP}(i,t) + \beta_2 \text{PrimaryBalance}(i,t) + \beta_3 \text{GDPGrowth}(i,t) + \beta_4 \text{Inflation}(i,t) + \mu(i,t).$$

IntCharges	=	interest charges on the debt in relation to GDP.
DebtGDP	=	is the gross debt to GDP ratio.
PrimaryBalance	=	is the revenue minus expenditure excluding interest charges expressed as percentage of GDP.
Inflation	=	is the consumer price inflation index.

The results of the basic specification test are report in Table 2 below. Other additional variables willbe included in the rest of our analysis.

RESULT

The results of our regression show that our model is globally significant and the signs are as expected, particularly that of public debt over GDP, which is consistent with the empirical literature. Indeed, the variable DebtGDP is significant at 1% and is positively associated with interest charges. A one-percentage point increase in the stock of public debt is associated with a 2.1 basis point increase in interest charges on the debt. Citing previous literature, an increase in debt tends to push up debt charges. Conversely, as the debt decreases, the downward effect leads to a reduction in the interest rate and thus in the debt service charges (Blanchard, 2019). In our model, the primary balance has a low significance (10%) and is negatively associated with debt charges. This result is ambiguous as (Perovic, 2015) points out. Depending on the model, it can have a positive or negative sign. However, it will be the subject of an in-depth analysis, as will GDP growth, which is not significant in our model. Inflation is positively associated with interest charges in our sample. A one-point increase in inflation is associated with a 0.19 point increase in interest charges. This would imply that as inflation increases, interest expenses via interest rates increase due to the panic effect of government securities demand. (Ducoudré, 2019), (Reinhart, 2010) inform us that among the reasons that explain the fall in interest charges in recent years, the fall in inflation has contributed significantly. Indeed, in the 1980s, the annual inflation rate measured by the consumer price index was around 13.5% in the US, 16.8% in the UK and 13% in France. We note that with the decline in inflation over the last few decades, interest rates have been reduced to as low as 0% in countries such as Germany and by extension in the European Union. We can see that our model seems acceptable, however, given that we are working on a large panel and over a defined period, it is likely that our model lacks specifications that we will analyze with robustness tests where we will include some additional variables.

Robustness analysis: In this section, we present the results of the robustness tests. In order to justify the robustness of our model, several tests have been performed. Working on a large panel and on a limited horizon, it was good practice to start by checking that our model had no missing variables. A significant Ramsey test at 1% allowed us to understand that the model was likely to be missing variables and not wanting to deviate from the original model, we inserted the lag of the dependent variable (LagIntCharges). Since our

sample is time limited, we inserted the time variable into our regression to capture the time effects. We performed multicollinearity tests to check that some of the independent variables are not correlate with each other. We also performed the Hausman test to determine whether fixed or random effects regression would be adequate for our model. Unsurprisingly (our data being panel data over a limited time arc) the significance at 1% allowed us to understand that we should adopt the fixed effects model. We also used the variation in the primary balance (Primary balance (t)-Primary balance (t-1)). Because in the basic model, it was not very significant. Moreover, since the elements of public finances are reflected over one or more periods, inserting its change seemed fair. Our regressions were run with *r* in stata program in orders to ensure the heteroscedasticity tests, which confirms the robustness of our analyses. The results are present in Table 3. Overall, our model improves, the R-squared, which was low in the baseline specification model, improved and stabilized at 0.562 against 0.2. In regression 1, the variable LagIntCharges is positively associated with interest expenses and is significant at 1%. This is correct because the previous year's expenses determine the following year's expenses. The other variables, such as debt to GDP, are also significant at 5% and confirm what the empirical literature has already revealed.

By inserting the variation of the primary balance in our regression, it stabilizes with a significance at 1%, but is positively associated with interest charges. The GDP growth is also improved and its significance is at 1%, which is in line with what (Izak, 2004), stated by showing that the growth of GDP generates enough profits to face the interest charges and therefore, these are reduced. Inflation here remains significantly positive even though it is at 10%. Our time variable is also significant at 1%. In regressions 2 and 3 we have inserted short and long- term interest rates, the results are identical and the expected signs are the same of being positively associated with interest costs and all are significant at 5%. The increase of one percentage point in the long-term and short-term interest rate respectively leads to an increase of 7.1 and 5.8 percentage points in the interest burden. In regressions 4 and 5, we have replaced the primary balance by inserting the lags of government expenditure and revenue, which are its components. The expected signs are those verified in the literature. An increase in government revenues leads to a reduction in the supply of government securities. The interest burden is also reduce through the payment of previous or at least the reduction. The opposite effect continues with general expenditure. However, in our model, only general expenses are significant at the 5% level. In regression 6, we have squared the debt and introduced it in our model to analyze the panic effect of an explosive debt. Our variable is not significant. This would imply that OECD countries are not worried and do not panic about a growing or explosive debt and therefore believe that their debts are sustainable as well as the charges that go with them. Especially since, despite high debt levels, interest rates remain historically low. In regression 7, we have introduced a binary variable to capture the period after the 2008 crisis; it takes the value 0 for the periods 2000-2008 and 1 for the period 2009-2020. Our variable here is significant at the 5% level that would mean that the period from 2009 onwards has contributed to higher interest charges on the debt.

Specificity analysis: In our analysis, we have introduced interaction variables to analyze the specific effects of our model. Most of the literature we have analyzed highlights country-specific aspects. As our panel is made up of countries with different geographical situations, public finance and political organizations, it is a good idea to analyze the specificities of each country. In regression table 4, we have introduced a binary variable that takes the value 0 if the public debt to GDP ratio is less than or equal to 100% of GDP and 1 for a debt to GDP ratio greater than 100%, inspired by (Reinhart, 2010). We find that our variable is not significant. This would mean that a debt above 100% of GDP, all else being equal, does not lead to an additional interest burden proportional to the level of debt. This is why countries like Japan, which in our sample has the highest debt to GDP ratio, does not have an interest burden higher than 1% of its GDP considering its level of debt.

Table 3.

VARIABLES	Reg.1	Reg.2	Reg.3	Reg.4	Reg5	Reg.6	Reg.7
	IntCharges	IntCharges	IntCharges	IntCharges	IntCharges	IntCharges	IntCharges
LagIntCharges	0.477*** (0.056)	0.528*** (0.042)	0.516*** (0.040)	0.463*** (0.061)	0.465*** (0.062)	0.535*** (0.060)	0.470*** (0.055)
DebtGDP	0.011** (0.004)	0.011*** (0.004)	0.010** (0.004)	0.011** (0.004)	0.013*** (0.004)		0.010** (0.004)
VarPrimaryBal	0.038*** (0.011)	0.031** (0.011)	0.028** (0.011)			0.045*** (0.011)	0.033*** (0.011)
GDPGrowth	-0.031*** (0.009)	-0.029*** (0.010)	-0.035*** (0.009)	-0.014** (0.005)	-0.014** (0.006)	-0.040*** (0.009)	-0.031*** (0.009)
Inflation	0.042* (0.021)	0.018 (0.019)	0.029 (0.021)	0.028 (0.019)	0.031 (0.020)	0.044* (0.022)	0.042** (0.021)
Years	-0.038*** (0.009)	-0.037*** (0.008)	-0.037*** (0.009)	-0.042*** (0.011)	-0.045*** (0.010)	-0.024*** (0.008)	-0.052*** (0.009)
VarInterestLT		0.071** (0.026)					
VarInterestST			0.058** (0.022)				
LagsGeneralExpen				0.024** (0.009)			
LagRevenue					-0.004 (0.015)		
DebtSquare						0.000 (0.000)	
DummyCrisis							0.200** (0.092)
Constant	76.512*** (18.822)	74.188*** (16.354)	75.355*** (17.254)	82.667*** (21.478)	91.563*** (20.636)	49.219*** (15.828)	105.100*** (17.891)
Observations	662	623	659	662	662	662	662
R-Square	0.562	0.613	0.579	0.541	0.526	0.524	0.567
Countries number	32	31	32	32	32	32	32

Note: Standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.

Table 4.

VARIABLES	Reg.1	Reg.2	Reg.3	Reg.4	Reg.5	Reg.6	Reg.7
	IntCharges	IntCharges	IntCharges	IntCharges	IntCharges	IntCharges	IntCharge
LagIntCharges	0.477*** (0.056)	0.477*** (0.056)	0.475*** (0.057)	0.430*** (0.067)	0.473*** (0.056)	0.471*** (0.059)	0.477*** (0.056)
DebtGDP	0.010** (0.005)	0.011** (0.004)	0.011** (0.004)	0.016*** (0.003)	0.011** (0.004)	0.012** (0.005)	0.011** (0.004)
VarPrimaryBal	0.038*** (0.011)	0.038*** (0.011)	0.038*** (0.011)	0.038*** (0.011)	0.038*** (0.011)	0.038*** (0.011)	0.038*** (0.011)
GDPGrowth	-0.031*** (0.009)	-0.030*** (0.009)	-0.029*** (0.009)	-0.032*** (0.010)	-0.031*** (0.009)	-0.030*** (0.010)	-0.031*** (0.009)
Inflation	0.042* (0.021)	0.042* (0.021)	0.044** (0.021)	0.032* (0.018)	0.042* (0.021)	0.044** (0.020)	0.042* (0.021)
DebtDummy	0.113 (0.179)						
Years	-0.038*** (0.009)	-0.038*** (0.009)	-0.039*** (0.010)	-0.044*** (0.010)	-0.038*** (0.009)	-0.038*** (0.010)	-0.038*** (0.009)
GermanyDebt		-0.017*** (0.004)					
EstoniaDebt			0.049** (0.019)				
GreeceDebt				-0.024*** (0.002)			
ItalyDebt					-0.011*** (0.004)		
JapanDette						-0.004 (0.005)	
USDebt							-0.004 (0.004)
Constant	76.189*** (18.728)	76.306*** (18.819)	77.891*** (19.184)	88.503*** (20.097)	76.186*** (18.916)	77.229*** (19.370)	76.302*** (18.840)
Observations	662	662	662	662	662	662	662
R-squared	0.563	0.563	0.564	0.612	0.564	0.564	0.563
Countries N.	32	32	32	32	32	32	32

Standards Errors in bracket *** p<0.01, ** p<0.05, * p<0.1

This also answers our main question of whether interest charges at the current level of indebtedness would be a brake on the sustainability of OECD countries. We answer in the negative. In addition, we have selected six countries in our sample for which we have created interaction variables from the country code and subsequently interacted with the debt to GDP variable. The results are present in regressions 2 to 7. Three scenarios are present. In scenario 1, three countries (Germany, Italy and Greece) have a negative and significant pressure at 1% of public debt on interest charges, which would suggest a threat to the sustainability of public finances if nothing is done. Because in a context of ageing population and multifactor crises (health crisis linked to Covid 19), it is imperative to adjust budgetary policies to avoid the snowball effect where public debt goes up due to interest charges. The case of Germany is surprising, given that its debt ratio and fiscal policy are among the most stable of the OECD countries, and having the same trend as that of Greece or Italy requires further study. In scenario 2, notably with Estonia, (regression 3), public debt on interest charges exerts a significantly positive pressure. This would mean that government securities in this country are rather profitable. What could be the reasons for such a situation? Is it the size of its economy, which is one of the smallest in the OECD, its particularly low debt ratio or its economy based on technological innovation? However, it's also an area that could be exploited. In the last scenario, which includes Japan and the US (regression 6 and 7); our variables are not significant, even if our signs are negative. Overall, we agree with the highlighted authors that specific aspects have to be taken into account in the analysis of interest costs, even if all countries converge towards sustainability.

CONCLUSION

Having reached the end of our analysis, where our study focused on the interest charges in relation to the sustainability of public finances. We first made a conceptual analysis of sustainability, presenting the views of some authors on this issue. We then identified the concept of debt service before giving the motivations for the choice of the topic. Once our framework was established, we conducted a literature review and a theoretical analysis of interest charges before conducting an empirical study. It emerges that after using the ordinary least squares method, a one-percentage point increase in debt to GDP is associated with a 2.1 percentage point increase in interest charges. This is in line with the literature reviewed. However, even if most OECD countries have a high debt-to-GDP ratio, this would not mean that public finances are threatened by unsustainability. As we have seen, high debt levels do not mean that the economy is failing, the interest charges that go with it are not necessarily crowding out other sectors of the economy. Moreover, since interest rates are historically low these days, there is no need to panic. Rather, OECD countries should take advantage of this situation to develop fiscal and economic policies aimed at reducing the debt-to-GDP ratio in preparation for the future challenges of post-Covid-19 crisis management and ageing populations.

REFERENCES

- Aizenman, J. M. 2009. "Using inflation to erode U.S Public debt". *NBER Working paper n° 15562 December*.
- Ardagna, S. C. 2007. "Fiscal discipline and the cost of public debt service: some estimates for OECD countries". *B. E. Journal of Macroeconomics* 7(1), 1-33.
- Barro, R. J. 1974. "Are government bonds net wealth?". *Journal of political economy*, November/December, 82, 1095-1117.
- Barro, R. J. 1974. "Are Government bonds net wealth?". *Journal of political economy* 82(6), 1095-1117.
- Barro, R. J. 1979. "On the determination of the public debt". *Journal of Political Economy*, October 1979, 87, 940-971.
- Blanchard, O. 1990. "Suggestions for a new set of fiscal indicators". (p. Working paper n°79). Paris: OECD Department of economics and statistics.
- Blanchard, O. 2019, January. "Public debt and low interest rates". *AEA Presidential lecture*.
- Blanchard, O. C. 1990. "The sustainability of fiscal policy: new answers and to an old question". *OECD Economics Studies* 15, 7-36.
- Bohn, H. 1998. "The Behavior of US public debt and deficits". *Quarterly Journal Of Economics* 113, 949-963.
- Bouthevillain, C. S. 2007. "Quels indicateurs Budgétaires pour quels objectifs de politiques économiques". *Bulletin de la banque de France, Researchgate.net*.
- Buiter, W. H. 1985. "A guide to public sector debts and deficits". *Economic Policy*, 13-61.
- Calvo, G. A. 1988. "Servicing the public debt: the role of expectations". *The American Economic Review Vol. 78 N°4 (September 1988)*, 647-661.
- Caselli F., G. A. 1999. «Fiscal Discipline and the Cost of Public Debt Service: Some Estimates for OECD Countries». *Washington, International Monetary Fund, Working paper N°55*.
- Cornille, D. G. 2019. "How risky is the high public debt in the context of low interest rates?". *NBB Economic Review, September*, 2-27.
- Domar, E. 1944. "The "burden of the debt" and national income". *The American Economic Review*.
- Dreger, J. R. 2013. "Does euro area membership affect the relation between GDP growth and public debt". *Journal of macroeconomics*, 481-486.
- Ducoudré, B. S. 2019. "Taux d'intérêt durablement bas et orientation de la politique budgétaire". *Revue de l'OFCE* 163(3), 281-301.
- Gervorkyan, A. v. 2016. "Assessing recent determinants of borrowing costs in Sub-Saharan Africa". *Review of Development economics*, 20(4), 721-738.
- Guerrin B., V. F. 1997. "La dette publique: fardeau des générations futures?". *Alternatives Economiques, Novembre*.
- Hausman, J. A. 1978. "Specification tests in econometrics". *Econometrica (Journal of the econometric society) Nov. 1978, Vol. 46 n° 6 (Nov. 1978)*, 1251-1271.
- Izak, V. 2004. "Public debt service, interest rates and fiscal variables in transition countries". *Prague economics Paper* 1,, 3-15.
- Karagol, E. 2002. "The causality analysis of external debt service and GNP: The case of Turkey". *Central Bank Review* 2(1), 39-64.
- Klein, M. 2017. "Austerity and private debt". *Journal of Money, Credit and Banking*, 49(7), 1555-1585.
- Lejour, A. L. 2010. "Sustainability of government debt in the EU". *CPB Netherlands Bureau for Economic Policy Analysis*, 2-35.
- Melyn, W. V. 2016. "The sustainability of public finances in the context of population ageing". *Economic Review*, 87-103.
- Mottoul, J. M. 2008. "Effet Boule de neige et solde paquebot". *Federale Overheidsdienst Financien- Belgique*.
- Nautet, M. V. (2011). "Economic impact of public debt". *Economic Review*, 2, 7-19.
- Nerlich, C. S. 2018. "The impact of population ageing and pensions reforms". *Economic Bulletin Articles, European Central Bank Vol. 2*.
- Nersisyan, Y. W. 2011. "Un excès de dette publique handicape-t'il réellement la croissance?". *Revue de l'OFCE N° 116*.
- OECD. (2020, December). "Economic Outlook n° 108". Tratto da OECD.Stat. <https://stats.oecd.org/?lang=fr&SubSessionId=38867c8f-7a20-48aa-9e01-50ce73100266&themetreeid=200>
- Pagano, G. 2007. "Les recommandations du conseil supérieur des finances sur le coût du vieillissement". *Courrier Hebdomadaire du CRISP*, 10/2007 n° 1955, 5-48.
- Perovic, L. M. 2015. "The impact of fiscal positions on government bonds yield in CEE countries". *Economic Systems* 39(2), 301-316.
- Reinhart, C. M. 2010. "Growth in the time of debt". *American Economic Review: Papers and Proceedings*, 573-578.
- Roubini, N. S. 1989a. "Government spending and budget deficits in the industrialized countries". *Economic Policy* 8, 99-132.
- Roubini, N. S. 1989b. "Political and economic determinants of budget deficits in the industrial democracies". *European Economic Review* 33, 903-933.
- Scheltegger Ch. A., W. M. 2014. Fiscal adjustment and costs of public debt service. *Applied economics*, 2593-2610 DOI: 10.1080/00036846.907479.

Tille, C. 2019. "The burden of Swiss public debt: lesson from research and option for the futur". *Economic section, The graduate institute of international studies* , Working paper 14 .

Uma, K. E. 2013. "Debt and Debt service: Implications on Nigerian economic development". *Asian Journal of social science and Humanities*, 2(2) , 275-284.

Waserman, F. 2018. "Les finances publiques". *La Documentation Francaise*.
