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Policy Study

Sustainability of Macedonian General Government Debt

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Abstract

Macedonia has been following an increasing trend of government debt in the past decade, doubling its debt levels in a fairly short period of time. Consequently, the topic of debt sustainability received significant attention. There has been a lot of expert judgments on the sustainable debt threshold, but no quantitative estimates so far. This policy study examines the sustainability of the Macedonian government debt, using the vector error correction method of estimation. Results suggest that the variables affecting debt dynamics are the real growth rates of the economy, interest payments, primary balance, capital investments and real effective exchange rate. The estimates of the sustainable government debt range between 41% and 48.7% of GDP, following a variety of macroeconomic assumptions. With such estimates of the sustainable debt threshold, the current Macedonian government debt level, even though approaching the margins, can still be considered as sustainable. While some space for further increase of government debt is available, results suggest that a great part of such space has been already consumed. The policy recommendations suggest that Macedonia in the medium term shall maintain a wise fiscal policy, focusing on productive investments that would increase the country's repayment capacity. Moreover, striving to improve the credit rating, and consequently achieve lower risk premiums and interest rates would be highly beneficial as well.

Key words: government debt, public debt, sustainability, Macedonia

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Introduction

Public debt is a key economic concept that has been one of the main economic topics of interest in the past decade, following the recent global financial crisis. As an economic concept, public debt is also known as government debt or national debt since in general it refers to the borrowings of a country's government (Arsovski, 2008, p.113). However, the national definitions on what it includes and how it is measured may differ significantly from one country to another. In general, when the public revenues of one country are not sufficient to finance its public spending, the country is obliged to borrow in order to cover the expenses (Arsovski, 2008, p.113). Therefore, some of the primary reasons for the creation of a public debt, are high public expenditures and budget deficit, time gaps between public expenditures and revenues, government interventionism in the economy, extraordinary government expenditures in the areas of infrastructure, social policy, research and development etc. (Arsovski, 2008, p.117).

With the recent global financial crisis, sovereign debt has become one of the greatest global concerns. The reason behind is the enormous indebtedness of countries which is not comparable with any other prior period. In particular, advanced economies faced the crisis with already higher debt to GDP ratios than previous periods of crisis. Further, the collapse of the economy that followed from drop of revenues as well as the costs for stimulating the economy have resulted in sky rocketing debt ratios (Abbas, et al. 2010).

Macedonian debt has also been a question of rising concern in the past decade. Even though Macedonia compared to other countries was considered to be handling quite well with the recent global financial crisis, Macedonian debt has been fast accumulating in the recent years. More specifically, the Macedonian debt has doubled in relative terms, and almost tippled in absolute terms in a period of less than ten years.

The fast and continuous increase of indebtedness provoked a lot of discussions and variety of opinions among Macedonian economic experts and made Macedonian debt and its sustainability the primary topic of interest in the country. Most of the discussions have been mainly focused on the return of the borrowed money as well as the sustainable threshold of Macedonian debt. In terms of the return focus of discussion, the usage of the money borrowed has not always been considered as productive and stimulating growth in the economy. Furthermore, there has been lack of transparency by the government for what purposes some part of the money borrowed are being used (Petreski, 2016) in times of increasing current expenditures beyond the real growth of the economy.

In terms of the debt sustainability threshold focus of discussion, there has been a lot of expert judgment lately but no consensus at all. The only reference is the

Macedonian Fiscal Strategy 2017-2019 (2016, p.37) that sets an upper limit of 60% of GDP for the public debt level, but mainly deriving it from the Maastricht criterion, rather than providing credible estimates that consider the specifics of the Macedonian economy.

On the other hand, IMF's country reports (2016, p.12) suggest that Macedonian debt level shall be maintained under 50% of GDP, again being rather qualitative / IMF staff judgment. However, so far in Macedonia there has been no quantitative estimate of the sustainability level of Macedonian debt. This is why the objective of the study is to calculate – by quantitative means – the sustainable level of Macedonian public debt.

The paper is organized in three main sections. In the first section, a literature review is provided, identifying macroeconomic factors that affect debt dynamics. The identified macroeconomic variables, influencing debt dynamics are later on used as input in the econometric model used in the analysis. The second section provides an overview of the Macedonian public debt. It covers the national concept and definition of Macedonian public debt, as well as its past trajectory and level. The third section is the econometric analysis, estimating by quantitative means, the sustainable level of Macedonian debt. The last section concludes.

1. Literature Review

Debt sustainability in general refers to the ability of a government to meet its debt obligations (Cottarelli&Moghadam, 2011, p.5). The level of debt sustainability is country specific, since it depends on the county's specific circumstances and characteristics of the debt portfolio that determine the country's ability to service and repay its debt obligations (IMF, 2014). For such purposes, the literature defines macroeconomic indicators that have a direct effect over the debt dynamics and trajectories and therefore determine the levels of debt sustainability.

1.1. Real Growth Rates

Real growth rates are one of the main macroeconomic indicators that are considered to directly affect debt levels and its trajectory (Escolano, 2010, p.6). The existing literature identifies interrelated relationship between the debt levels and growth rates as variables. One side of that relationship is the potentially adverse effect that debt has over the long term growth rates. In particular, Hyman (2011, p. 505-507) argues, for the existence of such adverse effect especially after the debt level passes over a certain threshold. The hypothesis is that after a certain threshold, the sufficiently high debt levels start exhibiting negative pressures on the willingness of investors which are providing capital. At a long run, negative effect could come as a result of the potential adverse effects that high government debt has over investment, long term interest rates as well as the expectations that are being formed for future potential taxation growths. Furthermore, high debt levels tend to limit the ability of fiscal expansion in periods of need for countercyclical fiscal policy that can create increased vulnerability to crisis (Elmendorf &Mankiw, 1999).

Some of the empirical researches, that serve as support on the hypothesis for the adverse effects of debt on growth, conducted by Reinhart and Rogoff (2010) or Cecchetti, Mohnaty and Zampolli (2011)show that after a certain threshold, high debt is associated with lower growth rates. According to Reinhart and Rogoff (2010), even though thresholds are always country specific, high debt to GDP levels as 90 percent and above, are ultimately related to lower growth outcomes for both advanced and emerging economies. By investigating a long time period for twenty advanced countries over the last two centuries it could be identified that debt in excess of 90 percent of GDP is related to mean growth of 1.7 percent, compared to mean growth of 3.7 percent in time periods when debt levels were low as under 30 percent of GDP, or growth of 3 percent whenever the debt levels were in between those boundaries. In addition, the threshold point for emerging countries only is set even lower. At levels of debt above 60 percent of GDP, the adverse effects over growth rates could become visible. In another attempt for determining the threshold point, Baum, Checherita and Rother (2012) find that with high debt levels of 95 percent of GDP or above, any additional debt would have a negative impact over the economic growth.

On the other hand of the relationship between debt dynamics and growth rates, a positive growth rate of GDP tend to immediately lower the debt to GDP ratio ceteris paribus. It is also one of the factors that have a direct inverse effect over the debt levels according to the IMF's 'Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates' by Escolano (2010).In particular, positive growth rates, all else being equal, will tend to reduce the debt level and vice versa. The empirical research of Cherif and Hasanov (2012) on the effects of growth shocks over debt dynamics, can serve as confirmation for the inverse relationship of growth rates and debt dynamics. They find that the US public debt unsurprisingly falls as a result of a positive growth shock. As a result of a positive growth rates in GDP, the primary surplus starts contributing with a larger share over debt reduction. Once primary deficit starts prevailing again debt levels converge to their pre-shock paths. However, positive growth rates tend to bring other benefits such as employment, which makes it the best available move for debt reduction for policy makers.

The causal relationship between debt levels and growth rates is hard to be determined. Therefore, it remains unclear whether higher debt levels reduce the growth of the economy, or higher growth rates reduce the debt levels.

1.2.   Interest Rates

High government borrowings are usually accompanied with high costs for interest payments that result from the amount of the debt and the interest rates charged. Generally, the interest rates represent the price of the borrowings, which is why they are one of the factors that have significant effect over debt dynamics. The existing literature, such as Hyman (2011) and Mankew (2004), argue that high debt levels eventually cause an increase of the interest rates in the economy.

The explanation behind it is that change in the budget balance of the government at the same time represents a change in the national or public savings. Governments running budget deficits and borrowing domestically in order to finance those deficits contribute to decline of the public savings and thereby decline of the loanable funds in the economy. The decline in loanable funds available for investment by the private sector can increase interest rates, reduce the private investment and contribute towards reducing the economic growth and the future living standard. So, although fiscal expansion is supposed to stimulate the aggregate demand, at the same time causes raise in the interest rates which reduce the investment spending in the economy. That eventually results with reduction of the aggregate demand known in the literature as the crowding-out effect (Mankiw, 2004, p.768). On the other hand governments having budget surpluses could serve to pay off country's public debt. By this, they would increase the funds available at the capital markets and the national savings which eventually could result with

lowering interest rates, more private investment and higher economic growth (Hyman, 2011, p. 491).

While domestic borrowings could result in crowding-out effect that is not the case when governments borrow abroad. However, the interest rates paid for borrowings at the international market are usually higher than the one paid at the domestic market. Furthermore, elevated debt levels could also cause an increase in the interest rates in the case of international borrowings. Namely, high debt levels at the same time with running budget deficits could increase the country risk premium which would ultimately result in increasing the price of borrowing – the interest rates. (Scheachter et al. 2012)

There is, however, a small number of empirical studies that examine the relationship between interest rates and debt levels. One empirical study that focuses on providing a support for the theoretical hypothesis of adverse relationship is the empirical research of Engen and Hubbard (2004) on federal government debt and interest rates. The empirical results of the study show that:

> 'Taken together, the bulk of our empirical results suggests that an increase in federal government debt equivalent to one percent of GDP, all else equal, would be expected to increase the long- term real interest rates by about three basis points, while some estimates are not statistically significantly different from zero.' (p.42)

Interest rates are also among the factors that have direct and meaningful effect on determining future debt paths. The simplified debt dynamics identifies the interest rates as one of the variables that are directly proportional to debt levels. That means increase in the current year interest rates contributes to increase in the current year debt levels ceteris paribus and vice versa (Escolano, 2010).

The sensitivity of debt dynamics to interest rates shocks is even more emphasized in cases of elevated debt levels. Namely, countries with high debt levels and with budget deficits are challenged with higher financing needs. The greater the financing needs of a country for a new debt, the greater the sensitivity to interest rates shocks.

Furthermore, the sensitivity of interest rate shocks also depends on the composition of the debt portfolio. Since the portfolio can be composed by debt with fixed and floating interest rate, debt with floating rates are more exposed to interest rate risk. Moreover, debt with short maturity is considered to be more vulnerable to changes in interest rates due to the refinancing needs. So, portfolios that have a great share of short term, and/ or floating rate debt are considered to be more risky and sensitive to changes in the interest rates. (International Monetary Fund, &The World Bank, 2014).

1.3. Primary Balance

Another factor that the simplified debt dynamics directly relates to debt levels is the primary balance. Primary balance is one of the macroeconomic indicators that serve as an insight for understanding the position of government fiscal policy. It basically shows the government budget balance excluding interest payments which are attributed to already existing debt. In such way, it serves as an indicator that shows fiscal imbalances that are arising from current government expenditures or the government current fiscal efforts (Escolano, 2010).

By way of explanation, for countries that have primary deficit, the current fiscal imbalances lead to raising borrowing needs to finance those imbalances and contribute to further accumulation of debt levels. On the other hand, countries that achieve primary surplus are showing current fiscal efforts and measures in consolidative direction for reducing government debt levels. The IMF 'Toolkit to assessing fiscal vulnerabilities and risks in advanced economies' (2012) points out the primary balance as one of the medium- and long-term adjustment needs to ensure fiscal sustainability. In particular, having high debt levels and high primary deficits can become unsustainable if not corrected timely. The simplified debt dynamic shows the linear relationship between debt levels and primary balance by primary balance lowering the debt levels, all else being equal. (Escolano, 2010).

So far, the greatest focus for determining the future debt trajectories are the level of growth rates, interest rates and primary balance. As long as country could payoff interest without need for refinancing or with negative implications for economic growth, the debt levels are considered sustainable. What the simplified debt dynamics suggests is that in any given period, the stock of debt or the debt to GDP ratio is influenced by the existing debt level in the previous period, real interest rates, growth rates and the primary balance. As previously mentioned, as long as a country experiences primary surplus, it reduces the debt level. The same holds as long as interest rates are lower than the growth rates of the economy. However, in cases when interest rates are being higher than the growth rates and the primary balance is in deficit, it is the very first and basic indicator that debt levels are becoming unsustainable (Escolano, 2010).

Furthermore, other factors that could influence debt sustainability levels are inflation and exchange rates. However, their relationship with debt dynamics may be weaker when compared to the one of the previously stated factors.

1.4. Inflation

The connection between inflation and debt dynamics is simply due to the fact that high levels of inflation can reduce the costs for servicing debt obligations. One very important fact is that the effects of inflation could be reflected in the nominal debt levels and costs for servicing debt obligations. Attempts to change the real debt

values of debt through the inflationary channel is impossible and governments that attempt in doing so, will be in the position of paying much higher interest rates than before (Reinhart, &Rogoff, 2010).

Empirical research (e.g. Cherif and Hasanov,2012) support the theoretical literature hypothesis by showing the effect of inflationary shock over the debt dynamics. The research shows that positive inflation shocks had an effect of reducing the US debt but with a short-term impulse response after which debt converged to pre-shock debt paths. The effect that inflation has over debt dynamics was not direct but came as a result of various forces. In particular, a positive inflation shock means higher inflation which, on the other hand, is ultimately followed by lower growth, higher interest rates and higher deficit. So, initially the higher inflation causes a reduction in the debt ratio but it does not last long. This means that the favorable effects from higher inflation are not enough to overweight the adverse effects that come from lower growth, higher interest rates and rising primary deficit. In other words, inflation alone would not have the desired effect unless it is expected that the monetary policy would react differently on the positive inflationary shock. In order for an inflation shock to have a stronger role in reducing debt, the monetary policy has to be relaxed with lower interest rate jumps (Cherif and Hasanov, 2012).

1.5.   Exchange Rates

Some countries have composition of debt portfolios that could also be sensitive to factors such as the exchange rates. Small and emerging countries that have undeveloped securities markets tend to rely more on external borrowings which makes their debt levels more sensitive to exchange rate movements. Furthermore, countries that have debt denominated in a currency with a floating exchange rate are considered to beat most sensitive. (International Monetary Fund, &The World Bank, 2014) The sensitivity to exchange rate movements refers to the risks of increasing costs for servicing debt obligations due to changes in exchange rates. Measures that could serve to assess the debt portfolio sensitivity to exchange rate movements could be share of debt denominated in domestic currency in the total debt portfolio as well as ratio of short term external debt to international reserves (IMF, 2014, p.12).
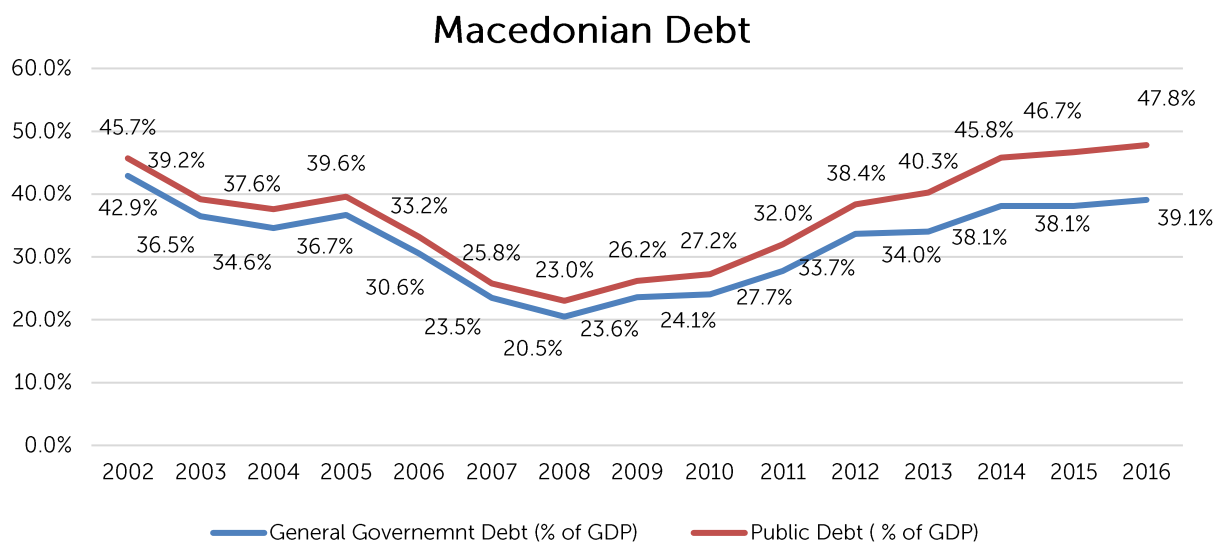
2. Macedonian Debt

To start with, the Ministry of Finance of the Republic of Macedonia (2016) distinguishes between Macedonian government debt and Macedonian public debt when reporting data. According to the Public Debt Law (2014), the concept of general government debt includes the debt of central government and public institutions established by the Republic of Macedonia, as well as the local government debt. On the other hand, the concept of public debt includes the general government debt, but also adds the debt of public enterprises and trading companies for which a sovereign guarantee has been issued. The debt for which a sovereign guarantee has been issued is not a direct liability of the Budget of Republic of Macedonia, however in cases when such guarantee gets activated it is measured within the general government debt level (Official Gazette of the Republic of Macedonia, 2014).

The creation of the Macedonian debt dates back to the breakup of the Social Federal Republic of Yugoslavia when Yugoslav debt was split among the successor republics. The monetary independence that followed as well as the numerous problems that emerged in the period of transition, generated the need for borrowings in order for the country to be able to finance its public needs. More specifically, according to Arsovski, Nenovski and Smiljkovski (2009, p.338) the main reasons behind the creation of the Macedonian debt have been mainly due to activities related to: servicing the part of the Yugoslav debt which was undertaken by Macedonia, reconstruction and rehabilitation on part of the Macedonian banking system, the economic depression which was going on throughout the period of transition, dealing with the issue of foreign currency savings of the citizens which were mainly deposited in the National bank of Yugoslavia, financing of the budget deficits, etc. Under the effect of all of those factors, Macedonian public debt reached its peak in 2000 as 57.2% of GDP (Arsovski et al., 2009, p.338). During the same period, the general government debt level was also at its maximum of 45.6% of GDP. However, in the years afterwards strengthening the management of public finance in Macedonia led to gradual reduction of debt levels. The most intensive reduction started in 2007 when the government decided to pay off part of its concessional debts towards the international financial institutions before their maturity. As a result, the lowest ratio of Macedonian debt was reached in 2008 when public debt was 23% of GDP, while government debt 20.5% of GDP (Arsovski et al., 2009, p.338).

Since the hit of the global financial crisis, Macedonian government started to extensively loosen the fiscal policy. As of2008, budget deficits started modestly increasing, but they were sustained at a level of around 3% of GDP. The modest debt levels in that time period allowed for such budget deficits and they were not seen as a treat to fiscal sustainability but as a proper growth stimulus in times of

crisis (IMF, 2010, p.16). However, since 2012, budget deficit started increasing above 3% of GDP. At the same time, the primary balance, showing the fiscal balance of the country less interest payments, was in a constant deficit, increasing at levels above 2% of GDP or an average primary deficit of 2.6% of GDP since 2012. Consequently, Macedonian debt started to progressively accumulate.

Graph 1. Macedonian general government and public debt

Macedonian Debt

Source: Ministry of Finance of the Republic of Macedonia

Following such raising trend, Macedonian debt, both government and public, doubled since 2008 till 2016 in relative terms, and almost tripled in absolute terms. Public debt was reported as 47.8% of GDP for 2016, while general government debt as 39.1%, respectively (Ministry of Finance, 2016). Even though this relative level of debt to GDP may seem to be much lower compared to other indebted countries within Europe, according to the IMF's country reports (2016), for economy as the Macedonian, this may be considered as reaching the upper limit level of sustainable debt.

In terms of the structure of the Macedonian debt portfolio, Macedonia has a larger share of external debt rather than domestic one. By way of explanation, the underdeveloped domestic market is the reason Macedonia has been relying more on borrowings at the international market, which can usually be associated with higher interest rates. Moreover, within the past ten years, there has been a significant change in the structure of creditors of those external borrowings. More specifically, the private foreign creditors now represent a larger share of the external debt portfolio rather than the official creditors. There are a lot of discussions about

the advantages and disadvantages that such switch in the debt portfolio can bring. One of the most prominent disadvantages are usually the higher interest rates charged by the private creditors. In addition, Macedonian credit rating, which is the critical point for the risk premium imposed on the interest rates of Macedonian borrowings, has been deteriorating in the past few years.

3. Econometric Analysis of the Macedonian Government Debt Sustainability

3.1. Model and Methodology

Due to the limited availability of data for Macedonian public debt, and variables that have been directly associated with its dynamics, such as interest rates, the econometric analysis is limited on estimating the sustainable level of Macedonian general government debt.

For the purpose of the econometric analysis of the Macedonian government debt sustainability, the general empirical model is specified as following:

$$GD_t \ = \ \alpha \ + \beta X_t \ + \varepsilon_t$$

Where GD_t is the stock of general government debt while X_t is the vector of explanatory macroeconomic variables that were identified in the literature review as possessing explanatory power over debt dynamics and debt levels.

More specifically, the independent variables include the GDP at constant prices, the interest payments, capital expenditures expressed as ratio of public expenditures, primary balance expressed as ratio of GDP, and real effective exchange rate of the Denar.

Inflation is not included in the model specification as an explanatory variable. The reason for not including the inflation, which has also been identified throughout the literature review, is due to the fact that it enters the calculation of the real effective exchange rate, thus imposing multicolinearity problems in the model. In addition, inflation in Macedonia has been strongly affected by global price movements (also included in the REER calculation), and Macedonia has not exhibited significant inflationary problems in the past. Therefore, we have decided to drop inflation as an explanatory variable in the final model specification.

The econometric model uses the Vector Error Correction method of estimation. The main reason for using an error correction model is the possibility it gives for estimating both the short-term and the long-term dynamics of the relationships. Since the primary objective of this research is estimation of the sustainable level of Macedonian government debt, the long-term dynamics estimation is given a greater focus in this analysis. More specifically, for the purpose of estimating the sustainability level of Macedonian government debt, the Johansen's approach for VEC estimation of parameters is being used. Furthermore, main advantage of the VEC method of estimation is the fact that uses a cointegration analysis which does not restrict the variables used in the estimation to be only stationary. In particular, the cointegration technique is one of the main solutions used in applied

econometrics to determine relationship between variables which turn out to be non-stationary (Nkoro & Uko, 2016).

The overall econometric analysis follows three steps.

First step is the selection of the model for estimating debt sustainability, with factors that will provide the best possible explanation of the general government debt dynamics. The selection of the factors that are to be included in the model is done on the basis of identified factors influencing debt dynamics within the literature review.

The second step of the econometric analysis is determining the medium-term values for those variables that turn out to be statistically significant in the model. For that purpose, several alternatives of medium-term values are considered, as historical averages and subjectively-chosen optimal medium term values which are based on experts' judgment.

The last step projects the sustainability of the Macedonian government debt. The sustainable level of Macedonian government debt is obtained by simple mathematical multiplication of the determined medium term values with the estimated coefficients. The debts sustainability estimation is done by comparing the actual Macedonian government debt with the sustainable debt level of the analysis.

3.2. Data and Variables

The data used for this analysis consist of six variables and the period covered is from 2000 till 2016. The selection of data to be used in the analysis is done on the basis of the literature review identification of macroeconomic variables that potentially affect the debt dynamics. Due to the data availability limitation, the data used is annual, which means the dataset consists of 17 observations. Data of the variables was in absolute values and therefore for the purpose of the analysis a logarithmic transformation of the data was used. The precise definition of the variables is shown in Appendix 1.

Despite the fact that the Vector Error Correction model does not require pretesting of the variables for their stationarity, Appendix 2 summarizes the Augmented Dickey Fuller testing of the variables. Most of the variables have turned out to be non-stationary. However, all of them that turn out to be non-stationary are integrated of order one, which means that their first difference transformation turns out to be stationary. Since the variables turn out to be integrated of order I(1), we assume it exist a linear combination of them which has a lower order of integration I(0). In other words, we assume that the non-stationary variables are cointegrated among themselves. With this, instead of performing a first difference transformation of the variables, which may also sometimes mean losing some valuable information from

the data, the VEC model implements the Johansen's approach for estimation of parameters and allows us to work with non-stationary variables.

The next step is determining the lags length used in the VEC estimation. Namely, the Vector Error Correction estimation also includes lagged values of both dependent and independent variables which is why it is important to determine the appropriate lag length for the estimation of parameters. Appendix 3 summarizes decision upon each specific variable information criteria, on what is the maximum lag length that is the most appropriate. For almost all of the variables, the number of lags is limited at one, as most appropriate to be used in their estimation.

3.3. Econometric Analysis

3.3.1. Selection of Model

The table below summarizes results of the VEC estimation of the model. More precisely, the table shows the coefficients of different explanatory variables and their significance based on the Vector Error Correction, Johansen's approach for estimation of parameters.

Table 1. Results of Model Specifications – Johansen normalization restriction imposed

Explanatory Variable	Constant	Real GDP	Interest Payments	Primary Balance as % of GDP	Capital Expenditures as % of Public Expenditures	Real Effective Exchange Rate
Coefficient	20.4	-1.55*** (0.131)	1.34*** (0.043)	-0.045*** (0.687)	0.015*** (0.004)	- 0.053*** (0.004)

Source: Author's calculations. Note:*Significance at 10% **Significance at 5% ***Significance at 1%; (Standard Errors given in parentheses);

According to the results shown in table 1,all of the variables used are shown to be statistically significant.

The model specification shows that real GDP at constant prices is statistically significant at 1% for the estimation of debt dynamics. More specifically, the coefficient in front of real GDP shows a strong and negative relationship with general government debt. Namely, 1% increase in GDP at constant prices would result in 1.55% reduction of general government debt, on average and ceteris paribus. This relationship is also in line with the literature overview. Increase in the GDP at constant prices means positive real growth rates, which contributes to greater repayment capacity of the country and a subsequent reduction of debt levels.

The second statistically significant explanatory variable is the interest payments. Namely, the literature review finds a positive relationship between interest rates and government debt. Higher interest rates contribute to higher interest payments of the country and increase of general government debt due to higher financing needs for servicing debt liabilities. This relationship is confirmed with a positive coefficient in front of interest payments. Hence, an increase of 1% of interest payments is associated with an increase of 1.34% of the general government debt.

The theoretical inverse relationship between primary balance and general government debt is also confirmed with the econometric estimation. Namely, at 1% level of significance, the negative coefficient in front of the primary balance shows that as primary balance deteriorates i.e. primary deficit increases, the general government debt increases as well, and vice versa. More specifically, a 1p.p.decrease in primary balance of GDP (implying an increase in primary deficit), is associated with a 4.5% increase in general government debt. The economic interpretation behind is that an increase of primary deficit implies an increase of fiscal imbalances, which means that the country cannot finance its expenditures even without the interest obligations on the existing debt. In such cases, the financing needs further increase and so does the general government debt. The effect of the primary deficit on the debt is rather strong, especially compared to that of GDP and interest payments.

Furthermore, we have decided to include capital expenditures as part of our model specification as well. Even though the literature review has not identified specifically capital expenditures as a variable affecting debt dynamics, our choice was to include this variable in the model specification. The reason to do so was the fact that they show the quality of the government spending, and also have a strong contribution towards economic growth rates and with that, an effect over country's debt repayment capacity. Since capital investments represent part of the country's public expenditures, it is expected that they would have a positive relationship with the level of government debt. Namely greater capital investments would imply greater financing needs and consequently greater indebtedness. The coefficient in front of the capital expenditures confirms such relationship and shows that increasing capital expenditures for 1p.p. of public expenditures will result in increase of general government debt for 1.53%. However, at the same time higher capital investments contribute for the long-term greater repayment capacity of the economy and hence such an increasing pressure onto debt may not necessarily be considered problematic. Including capital expenditures as share of public expenditures has significantly increased the effect of GDP growth over reduction of the general government debt, which may be an indirect confirmation of the previous claim.

The last variable in the model specification is the real effective exchange rate of the Denar, which shows the value of the currency relative to a basket of other major currencies adjusted for the effects of inflation differential. The coefficient in front of the real exchange rate as a variable shows a negative relationship between the change in real exchange rate and the general government debt. Namely, an increase in the real effective exchange rate (implying hampering of the competitiveness) would result in lower general government debt, and vice versa. The economic interpretation can be linked to the fact that Macedonia as a country has a significant share of its debt portfolio in a foreign currency. Appreciation of the real exchange rate would result in lower value of the debt denominated in a domestic currency.

3.3.2.   Selection of Medium Term Values for The Variables

The selection of the medium term values for calculating the sustainable value of Macedonian government debt uses two approaches. The first approach, or the first scenario, uses the historical averages of the variables. The second approach, or the next four scenarios, is based on subjectively-chosen values for the variables based on expert judgment. For the purpose of the subjectively-chosen variables, in this research, we used a simple questionnaire conducted on six economic experts. The results from the questionnaire about the projections of the variables are summarized in Appendix 4. Disadvantage of this approach for choosing the values of the variables is that they are based on subjective judgment. However, this kind of approach may be considered the most relevant, since it involves perception based on the current real economic condition of the country.

The first approach and scenario for the medium term values of the variables is based on the historical averages. Due to the fact that some of the variables such as the gross domestic product or debt interest payments exhibit trends, it would be inconvenient to use the historical averages of the stock of the variables. For that reason, the medium term values of those variables are based on their historical average growth rates. On the other hand, for variables such as the primary balance, capital expenditures or the real effective exchange rates which are expressed in relative terms, or as indices, the medium term values are based on simple historical averages.

The historical average real growth rate of the economy, for the analyzed period of the past 16 years, has been around 2.8%. The medium term value for the Macedonian GDP, according to this approach is to grow with the historical average of 2.8%. On the other hand, the historical average yearly change in the interest payments of the country has been around 13.1%. Even though this historical average change is lower than the yearly growth rate of interest payments in the past eight years, since Macedonian government debt started accumulating intensively, it is taken to be reference for the medium-term value of Macedonian interest payments

under this approach. Furthermore, the relative level of the primary balance, in the past 16 years has been -1.1% of GDP. The level of capital expenditures, expressed as part of total public expenditures, has also been around 8.8%, on average. There are not significant fluctuations or trends within this variable therefore the simple historical average is taken as reference for the medium-term value. The last significant variable for the estimation of the general government debt sustainability is the real effective exchange rate. The historical average of the real effective exchange rate index has been 102.6 and as such it is taken as medium-term value under this scenario.

The second approach that involves subjectively chosen medium term values for the variables, distinguishes between four scenarios. Namely, there would be much more scenarios if different projections for all of the variables were considered. However, it would be inconvenient to present all of them in the research paper. Therefore, according to the questionnaire answered by Macedonian economic experts, combined with the author's judgment, the most significant variables in which two alternative scenarios shall be distinguished are the real GDP growth rates of the economy, and the primary balance of the country. Whereas, for the other variables such as interest payments, capital expenditures and real effective exchange rate of the country, the expert expectations were moving in a relatively similar manner, and therefore only one projection is considered.

In terms of the medium-term values for the real growth rates, the two alternatives involve medium term growth rate of 3% and 4% of the economy, respectively. Namely, the projection of 3% growth rate for the economy corresponds to the average real growth rate in the past four years. Furthermore, it is in line with the average real growth rate for the entire analyzed period. On the other hand, the alternative scenario, which can be considered as slightly more optimistic, is for the economy to grow at 4%. Some of the economic experts believe that the economy can grow with this pace over the medium term, which is also in line with the latest IMF country report medium term growth rate projections (2016, p. 28).Moreover, it also corresponds to the growth rate of the potential GDP prior to the financial and economic crisis (Jovanovic & Kabashi, 2011, p. 22). Considering such scenario is of great importance since the GDP is the variable with strong effect over debt dynamics. Such scenario would show the difference in debt dynamics and its sustainability, coming from the movements in the real growth rates of the economy.

The interest payments are the second variable with significant effect over debt dynamics and have a positive coefficient which implies that their increase also increases the debt levels. Historically, interest payments have been subject to higher growth rates, mainly as a result of the increasing stock of debt in the past decade. However, the effective interest rate on the existing debt has not been subject to significant fluctuations. Therefore, the subjective projections for the interest

payments on the Macedonian government debt are to increase at medium term by 5%. Namely some of the economic experts believe in higher growth rates of interest payment than 5%. However, the reasoning behind this projection comes from various reasons. First of all, the main underlying assumption is that interest payments will not be subject of large increases which follows from moderation of the stock of government debt. By way of explanation, the main assumption behind is that the increasing trend of government debt will stabilize at medium term, and with that so will the interest payments. On the other hand, the current market borrowing conditions are yet considered favorable, which was also the reason for slight reduction in the effective interest rate payments during the past year. Therefore, refinancing of the existing debt is assumed to have no significant changes at medium term in terms of interest rates, consequently interest payments. Last but not least, the medium term focus is assumed to have stronger orientation towards satisfying the borrowing needs at the domestic market – more than presently, which will consequently imply lower interest rates than the one paid at the international markets and by that medium term stabilization of the interest payments.

In terms of the primary balance of the country, there are also two alternative scenario based on the future expectations for the fiscal policy. More specifically, the expectations under the first scenario are more in line with the past movements of the Macedonian fiscal policy. By way of explanation, the first alternative sets a medium-term primary deficit of -2% of GDP. That would mean that the country will further have higher expenditure side than revenues, even without the interest payments associated with the existing debt. On the other hand, the opposite view, that some of the economic experts hold, is that Macedonia will start with the postponed fiscal consolidation that has been subject of discussion in the last International Monetary Fund country report (2016),as well as the Macedonian progress reports by the European Commission (2016). By way of explanation, the expected fiscal consolidation is to be based on significant unproductive expenditure cuts that would result in medium-term primary balance of 0% of GDP. That would imply that the country will cover its expenditures and the budget balance will be in a slight deficit only due to interest payments associated with the existing debt. Since the primary balance has an opposite direction with the movements of the general government debt, two opposite alternatives of the primary balance would show the differences in the general government debt dynamics coming from different approaches in the fiscal policy of the country.

As for the capital expenditures and the real effective exchange rates, one medium-term value is set. Namely, nor significant fluctuations in the capital expenditures as a share of the public expenditure are expected, nor in the real effective exchange rate. The projections given by the economic experts as well as the author for the capital expenditures, on average are about 13% as ratio of public expenditures. The

projection corresponds to the assumptions by some of the economic experts that capital expenditures as share of public expenditures will slightly increase in the near future, compared to the ones realized so far. Furthermore it also corresponds with the share of capital expenditures in the projected budgets each year, hence reflecting government's ambition about the needed level of capital investments. As for the real effective exchange rate, the majority of the economic experts do not expect any significant changes as well, driven by the assumption for maintenance of the fixed exchange rate of the denar to the euro, as well by the absence of significant shifts in inflation differential over the medium haul. Therefore, the medium-term value for the real effective exchange rate is considered to be same as the index in the past five year period which is 102.4.

3.3.3. Estimation of The Sustainable Levels

The third step in the analysis is the estimation of the sustainable level of the Macedonian government debt. This is done by a simple arithmetic. The estimated coefficient present the change in the sustainable level following a percent or percentage change of the respective variable, in the following way: higher growth, lower primary deficit and higher capital investment are assumed to move the sustainability level forward, while higher interest payments are assumed to drag sustainability level backwards. The table below shows the estimation of the Macedonian government debt, under the five scenarios explained in the previous section.

Table 2. Estimation of the Macedonian general government debt sustainable levels

Explanatory Variable	GDP constant prices	Interest Payments	Primary Balance As % of GDP	Capital Expenditures as % of Public Expenditures	Real Effective Exchange Rate index	Sustainable General Government Debt as % of GDP
Historical Averages Scenario	2.8% growth rate	13.1% growth rate	-1.1%	8.8%	102.6	**41%**
Scenario 1	3% growth rate	5% growth rate	-2%	13%	102.4	**43.9%**
Scenario 2	4% growth rate	5% growth rate	-2%	13%	102.4	**45.3%**
Scenario 3	3% growth rate	5% growth rate	0%	13%	102.4	**47.4%**
Scenario 4	4% growth rate	5% growth rate	0%	13%	102.4	**48.7%**

Source: Author's calculations

What is to be observed immediately from the estimated dynamics of the general government debt is that the estimated sustainable level of general government debt is around, or slightly above the current level of the general government debt. More

specifically, the margins of the sustainable general government debt range in between 41% of GDP to the highest of 48.7% of GDP. This would imply that, even though the current level of the Macedonian government debt reaches the margins, it can still be considered as sustainable.

Graph 2. Macedonian general government debt: actual data and the estimated sustainable levels
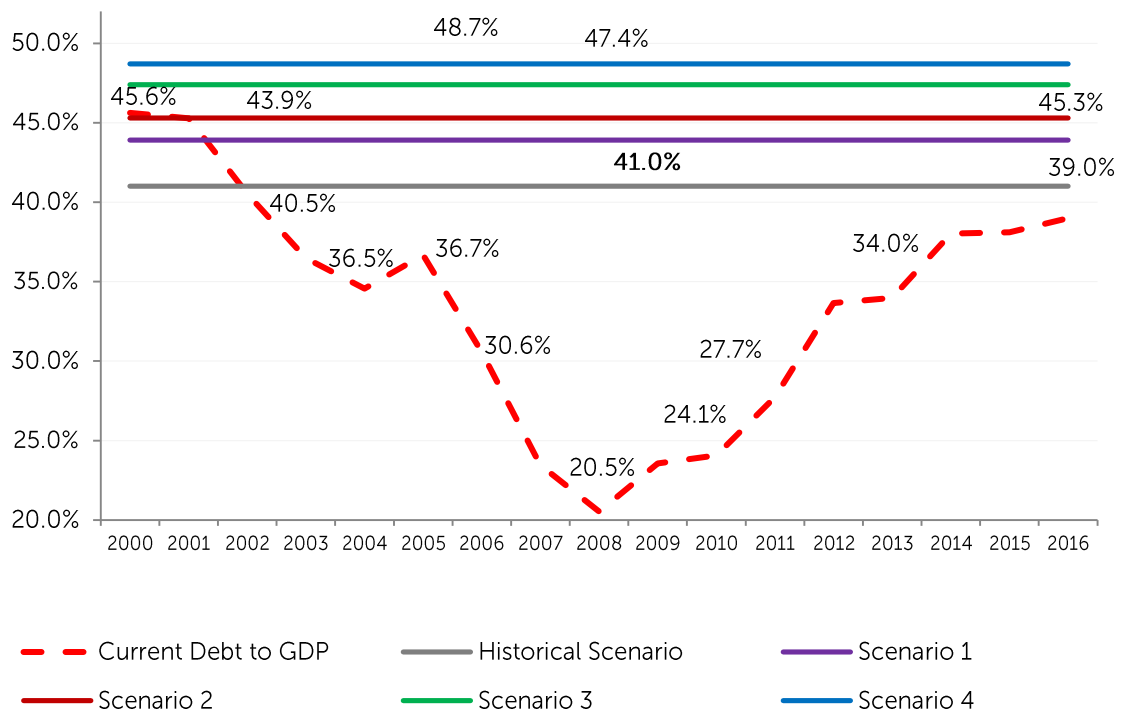
Source: Author's calculations

The estimation of the debt dynamics and its sustainability is in line with the literature expectations. Namely, Reinhart and Rogoff (2010) estimated the sustainable debt threshold around 90% of GDP and 60% of GDP for emerging counties. Macedonian debt threshold estimated with this analysis is more or less consistent with the IMF's (2016) suggestions to keep Macedonian debt below 50% of GDP. As per the above, the highest level of general government debt happens under the fourth scenario that involves a GDP growth rate of 4% combined with a primary balance of 0% of GDP. What this scenario implies is that favorable economic conditions combined with wise public finance management would lead to highest margins of debt sustainability. Namely, Macedonia as a country under such favorable conditions will be able to repay and service debt obligations of even higher debt levels. On the other hand, the lowest relative level of sustainable general government debt is under the historical averages scenario that assumes the lowest growth rate of 2.8% combined with primary deficit of 1.1% of GDP. The sustainable debt threshold under

the historical averages scenario is even lower than the threshold under scenarios which involve even higher primary deficit of 2% of GDP, as per the compensation provided by the higher GDP growth rates. That also confirms that the real growth rates have strong impact over debt dynamics and its sustainability and, consequently, lower real growth rates contribute to lower debt sustainability levels.

According to this econometric analysis, the current level of Macedonian general government debt is maintained below the estimated sustainable debt levels, which is considered to be positive. However, the analysis also suggests that the Macedonian general government debt approaches the sustainability threshold. Moreover, the analysis shows that the government debt dynamics is strongly positively influenced by the interest payments and the primary deficit. Increasing risk premiums for the country, as well as further postponing of the fiscal consolidation, would lead to higher levels of debt. Consequently, it may lead to overstepping the estimated sustainability level. On the other hand, the best way to reduce debt levels is increased growth rates, combined with primary balance, cut of unproductive spending i.e. moving towards greater share of productive capital investments which would increase the repayment capacity of the country. Furthermore, improved credit rating and better borrowing conditions would contribute to borrowing for productive means without compromising the debt sustainability.

Conclusion

The research paper herein attempts to give an answer to one of the most discussed topics recently and that is the question of Macedonian government debt sustainability. Namely, in the past decade, following the global economic and financial crisis, debt sustainability has been one of the economic topics with greatest attention by many countries. Even though Macedonia was considered as one of the countries that handled the global economic and financial crisis quite well, the topic of debt sustainability started to be the main focus in the recent years. Specifically, following an increasing trend of indebtedness and fast accumulation of debt in recent years, many economic experts started discussing the sustainability of the Macedonian debt.

The econometric analysis uses annual data for the past 17 years and estimates the long-run dynamics of the general government debt using the vector error correction model. The statistically significant explanatory variables turn out to be in line with the literature expectations. Namely, significant effect over debt reduction have the real growth rates, whereas the strongest positive effect over the debt dynamics have the interest payments. The analysis has projected the medium-term values for all of the significant variables, using economic experts and researchers' judgments despite the author's perceptions.

By multiplying the estimated coefficients with the medium term values for the variables the analysis estimates slightly higher levels of sustainable debt than the current one. Namely, the sustainable government debt level ranges between 41% of GDP and 48.7% of GDP. Different macroeconomic assumptions lead to alternative scenarios which conclude that the lowest debt sustainability threshold is under the assumptions of slower growth rates combined with expanding primary deficits of the country. On the other hand, slightly more optimistic macroeconomic assumptions of favorable economic movements combined with fiscal consolidation of the country would lead towards higher thresholds of debt sustainability. Moreover, another important segment of the econometric estimations are the interest payments that turn out to have a strong and increasing effect on debt. Deteriorating credit rating of the country, increased risk premiums and/or increased interest rates would result in lower sustainable debt thresholds.

By far, the econometric analysis suggests, that the current level of Macedonian government debt is still to be considered as sustainable. While some space for further increase of government debt is available, results suggest that a great part of such space has been already consumed. Moreover, the question of the productiveness of the accumulated debt remains open. On the other hand, the real growth rates of the economy turn out to be the most important when it comes to

ways of debt reduction. In order to keep the Macedonian government debt level within the margins of sustainability, the focus should remain on fiscal consolidation that would mean cut of the unproductive spending, while moving towards projects with higher fiscal multiplicator, such as quality capital investments that would increase the growth rates of the economy and, at the same time, its debt repayment capacity. Furthermore, Macedonia should strive to improve the credit rating position that would eventually result in debt agreements under better terms such as lower interest rates and longer maturity. At the same time, it should attempt to satisfy the borrowing needs at the domestic market that would also be followed by lower price of those borrowings than the price at the international markets and consequently higher thresholds of debt sustainability.

The research has also confirmed the fact that the discussion of debt sustainability is complex and depends on many different country's characteristics and macroeconomic assumptions. Even a quantitative analysis is unable to give one strict estimate for debt sustainability. Rather the question of sustainability depends strongly on different economic movements and macroeconomic assumptions.

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Appendices

Appendix 1 : Variables Specification

Variable	Description	Source
General government debt	Absolute value, for the purpose of the analysis logarithmic transformation used	Ministry of Finance of the Republic of Macedonia
GDP at constant prices	Absolute value, for the purpose of the analysis logarithmic transformation used	State statistical office of the Republic of Macedonia
Interest payments	Absolute value, for the purpose of the analysis logarithmic transformation used	Tables from monetary sector – National Bank of the Republic of Macedonia
Primary balance	Expressed in relative terms as % of GDP	Calculated as budget balance (Ministry of Finance of the Republic of Macedonia) + interest payments (National Bank of the Republic of Macedonia)
Capital expenditures	Expressed in relative terms as % of Public Expenditures	Budgets of the Republic of Macedonia – Ministry of Finance of the Republic of Macedonia
Real effective exchange rate	Index, 2005 =100, increase indicating appreciation, for the purpose of the analysis first difference transformation is used	Tables from the foreign exchange sector – National Bank of the Republic of Macedonia

Appendix 2: Augmented Dickey Fuller Test of Dependent and Independent Variables

Variable	Augmented Dickey Fuller Test	Decision
General government debt/ First difference of general government debt	$p > 0.05$ / $p < 0.05$	Non Stationary / Stationary
GDP at constant prices / First difference of GDP at constant prices	$p > 0.05$/ $p < 0.05$	Non Stationary / Stationary
Interest payments / First difference of interest payments	$p > 0.05$ / $p< 0.05$	Non Stationary / Stationary
Primary Balance	$p > 0.05$	Stationary
Inflation / First difference of inflation	$p > 0.05$ / $p < 0.05$	Non Stationary / Stationary
Real Effective Exchange Rate	$p > 0.05$	Stationary
Capital expenditures / First difference of Capital expenditures	$p > 0.05$ / $p < 0.05$	Non Stationary / Stationary

Appendix 3: Variables Lag Length Specification

Variable	AIC	SBIC	HQIC	Decision
General government debt	1 lag	1 lag	1 lag	Max lags = 1
GDP at constant prices	1 lag	1 lag	1 lag	Max lags = 1
Interest payments	1 lag	1 lag	1 lag	Max lags = 1
Primary balance	1 lag	1 lag	1 lag	Max lags = 1
Inflation	1 lag	1 lag	1 lag	Max lags = 1
Real effective exchange rate	0 lags	0 lags	0 lags	Max lag = 0
Capital expenditures	1 lags	1 lags	1 lags	Max lag = 1

Appendix 4: Projections for Macroeconomic Variables

Variable	GDP growth rate	Interest payments growth rate	Primary balance as % of GDP	Capital expenditures as % of public expenditures	Real effective exchange rate index
Author's projections	3.2%	5%	-1.5%	12%	No changes
Expert 1	4%	5%	-2%	10%	Slight appreciation (Balassa–Samuelson effect)
Expert 2	3.3%	20%	-3.4%	13%	No changes
Expert 3	2.8%	30%	-2.5%	18%	No changes
Expert 4	3%	15% (next 3 yrs)	3%	10%	Appreciate
Expert 5	2.5%	4%	-2.6%	11%	No changes
Expert 6	4%	26.5%	1-2%	15%	No chnages