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## Fiscal Deficit and its Effects on Economic Growth: Empirical evidence

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### Abstract

*The main objective of this paper is to determine the effect of the deficit on economic growth for the Eurozone countries, using a panel data model for a period from 1995 to 2015, with a total of 257 observations. To conduct this study, the multiple linear regression model with the least-squares regression was used. In this regard, to test the data used in the model, diagnostic tests have been applied, such as the Durbin-Watson test which has helped to analyze the serial correlation, as well as the Breusch-Pagan to test for determining heteroskedasticity. The emerged results from the tests in the study prove that the model used has no heteroskedasticity as well as, the model shows no relation between serial correlations. The results presented in our study show that the variable deficit to GDP ratio, is statistically significant with a positive sign, and as a result, we have the growth of the deficit to GDP ratio have a positive effect on the EG. In addition to the fiscal deficit, the unemployment and the government bond yield, as independent variables, in relation to EG were used. Furthermore, there is contemporary literature used in this paper that speaks about the effects of fiscal deficit on the euro area in times of pandemic. In terms of policy recommendations, for the countries subject to this study it is suggested that the level of high and long-term deficits should be controlled because this situation with the continuously high level of fiscal deficit, could harm economic growth and create imbalances in other macroeconomic variables, especially at present taking into account the deteriorating situation as a result of the Covid-19 pandemic.*

**Keywords:** *fiscal deficit; economic growth rate; correlation; regression*

**JEL Classifications:** *H26; O47; C33*

## **Introduction**

Regarding the fact whether the fiscal deficit affects economic growth or GDP growth, during the review of the literature we have encountered a significant number of researchers who have dealt with this issue and have come up with different results. Through the results of empirical evidence collected and which have concluded that the fiscal deficit has an impact on economic growth. Such studies are useful for policymakers in developing specific policies such as setting a certain fiscal deficit-to-GDP ratio limit. The best example is the EU which requires all members of the country to respect the rule that the deficit-to-GDP ratio does not exceed 3%

Fiscal deficit or fiscal surplus is one of the most important macroeconomic factors that have an impact on EG (Fischer, 1993). The budget deficit or surplus is a result of the fiscal rule of a government. As indicated by Fischer (1993), although the fiscal deficit is one of the best reliable as well as measurable meters that have an impact on EG it is not easy to use the budget deficit as a single variable to represent the fiscal policy or to assess the impact of the fiscal rule effect. Moreover, the budget deficit- (BD) has an important effect on all macroeconomic variables (Kryeziu and Durguti, 2019), while macroeconomic indicators affect the fiscal deficit or the budget balance (Risti et al, 2013). Therefore, depending on where the expenditure increases, whether productive or non-productive, the results may have a different effect on economic growth.

When it comes to developed countries, according to Tamagawa (2016) for European countries there is a common feature where most of them are facing high public debt and large fiscal deficit. Moreover, according to Ehnts and Paetz (2021), the expected decline in real GDP for the euro area is even greater compared to the worldwidemonetary crisis of 2008/09, where governments and central banks around the world had reacted quickly?

While in developing countries, Tung, LT (2018), in his paper analyzes Vietnam using an Error Correction model for the Vietnamese economy that covered the period from 2003 to 2016. Through this study, he concluded that the fiscal deficit had detrimental sound effects on EG in both the short and long term. Moreover, he concluded in this study that both in the long run and in the short run, developing countries need to act urgently to reduce the fiscal deficit to ensure more sustainable growth.

The hypothesis in this study is that fiscal deficit has a positive effect on GDP growth (economic growth). To evaluate it, along with the economic growth ratio as a dependent variable, there are other independent macroeconomic variables used in the study too. To conduct this research, the multiple linear regression model with the least-squares regression was used. In this regard, to test the data used in the model, diagnostic tests have been applied, such as the Durbin-Watson test which has helped to analyze the serial correlation.

Although the fiscal deficit variable is the main focus of the study, other variables are also used to achieve better results, so far as government bond yield, inflation, unemployment. The results presented in our study show that the variable deficit ratio to GDP, is statistically significant with a positive sign, and as a result, there is the growth of the deficit-to-GDP ratio has a positive effect on the EG.

The study has some limitations, such as that despite the aggregated results where the fiscal deficit positively affects EG, it may happen that in certain countries there may be results other results than those in the study. Moreover, the model used in the study did not enable us to know the effect (positive or negative) of the fiscal deficit on EG in the short as well as long term for the nation state studied.

The structure of the paper consists of Literature Review (theoretical and empirical), Research and Methodology (methodology and data used), Results and Discussions (empirical results and discussion), Conclusions (conclusions and policy recommendations), and References.

## **Literature Review**

### **General overview**

Many studies have shown that there is a correlation between fiscal deficit and economic growth, nevertheless, the effect of budget deficit on (GDP growth) is closely associated with the source of fiscal deficit (Kneller et al., 1999). Bose et al. (2007) by using panel data analysis investigated the relationship between

budget deficit and EG for 30 developing countries, which include a period from 1970 to 1990, and came up with similar conclusions as Fischer (1993), by concluding that the budget deficit variable has a confident impact on GDP growth with a condition that fiscal deficits are the result of productive spendings such as those spending in education, health, and capital investment. There is a study conducted by Nayab (2015), which studies the effect of the budget deficit on EG for Pakistan for the period from 1976 to 2007, through applying techniques of co-integration, Granger causality test VAR, and as a result, the outcome was that the budget deficit has a substantial positive effect on economic growth. The results of the study support the Keynesian point of view of the positive effect of the budget deficit on EG.

Keynes was also one of the first economists to defend the point of view that there is an impact on government deficit spending as portion of a country's fiscal rule response, so far as increasing borrowing-financed government spending, which is one way of creating economic stability through GDP growth (Keynes, 1936). Based on Keynesian concepts, an increase in government expenditure increases both consumption and cumulative demand which steer to augmented output and growing of the economy. Also, in short term, GDP growth through economic constancy is quite influenced by the cumulative spending in an economy. Taking into account the so-called Keynesian Revolution in macroeconomics, there is a large number of economists who have come to the conclusion that financing of deficit spending aims to reach two domestic economic goals or aims such as full employment, and a high level of EG. According to economists of that period, it was thought that the society could benefit from spending through deficits due to reduced production losses, respectively achieving the objective - greater EG (Chrystal and Thornton, 1988).

Consequently, referring to literature that ends with the support of the neoclassical theory, Adam & Bevan (2005) come with results that the fiscal deficit of 1.5 percent in GDP has a positive effect on growth in the economy. In his research Bahmani (1999) analyzed the long-term relationship among federal and capital investment deficits in the United States by using quarterly data between 1947-1992. Thus, the empirical results obtained from the research indicate that fiscal deficits have greatly affected real investment, something that supports the Keynesian theory, supporting the opinion of impacts of fiscal deficits expansion to increase the level of private stock activities in a particular country.

Eisner (1989) argued that spending arising from budget deficits could improve the economy at a time when the country is in economic stagnation stage. In the context of his studies, the variety of effects of fiscal deficit on GDP growth depends on the country studied, making it impossible to determine the real effects on economic growth. Cinaret al (2014) analyzed a group of five (5) states with the lowest debt-to-GDP ratio and five other countries in the Euro area where the debt-to-GDP ratio was very high where economic growth rates, budget deficit, and debt ratios variables were explored. In this study, they placed particular emphasis on the period 2008 and recent years of the so-called global financial crisis, by using the ARDL panel model for the period from 2000 to 2011. Through the results of the study, they came to conclusions that, in the short run, deficit policy had a positive impact on economic growth. Odhiambo et al (2013) studied the effect of the fiscal deficit economic growth for Kenya for the period from 1970 to 2007, by using ADF tests or Dickey-Fuller and Johansen co-integration test. Their study concludes with findings that there is an effect of fiscal deficit on the economic upturn the country studied. Also, Loizides & Vamvoukas (2005) investigated if there is a correlation between fiscal deficit variable and economic growth using the dataset for three countries the United Kingdom, Greece, and Ireland. Based on their research, they concluded that the deficit-to-gdp ratio affects EG in all countries surveyed.

Al-Khedair (1996) investigated the correlation between budget deficit and EG in seven (7) largest industrial countries known as Group of 7, by using data that cover the period 1964 - 1993. Through the study, he concluded that fiscal deficit significantly has a positive effect on growth in all industrialized countries analyzed, more precisely he concluded that the fiscal deficit has more a significant positive impact on EG in Italy, Germany, and France. According to Ball and Mankiw (1995), the large budget deficit helped Morocco and Italy having economic growth due to excess spending helped to raise private consumption levels in the short run, while as per a long run, large fiscal deficits had the opposite direction, and nearly deteriorated the level of both countries economic, as their governments were forced to work on payback of all national debt.

In other studies, such as World Economic Outlook performed by the IMF in 1996, it is found out that developing countries that had a high level of the budget deficit in the mid-eighties have had a very low growth compared with countries with deficit low or medium. Whereas, Ghali (1997), through studies of the economy of Saudi Arabia found out that the budget deficit has a neutral relationship on EG. Similarly, the same conclusions were extracted by the study of Kormendi & Meguire (1985), based on cross-sectional analysis.

On the other hand, there are other studies, which say that the fiscal deficit has a negative impact on EG. In the research made by Anusic (1993), he used data from Croatia in the period the '90s and he argues that budget deficits negatively affect economic growth. In the same study, he also referred to the Keynesian theory that fiscal deficit will trigger a rise in real interest rates, and as a result, will cause falling in real investment. Always referring to his research, the impact of the budget deficit is harmful to the overall economy, but it also depends on the internal conditions and the way in which each individual deficit country is financed.

Whereas, according to a study performed by the US Federal Reserve of Dallas, it was noted that an expansion in government spendings impedes overall growth within a country because the rise in government spending or taxation leads to a steady decline in the job rate growth. (Fu et al., 2003). According to Afonso (2010), while the rate of EG can potentially have a negative linear impact on the growth of public debt to GDP ratio, also a high level of debt can be detrimental to EG, but only after it will reach a certain threshold or level of debt.

Furthermore, based on a study conducted by Vit (2004), which used data collected for the Czech Republic for the period 1995-2002, he concluded that the budget deficit results to some extent as a protection against inflation and after this impedes economic growth. While Krugman (2012) argued that the costs caused by fiscal deficits during recession periods did not help the economy because these costs were insufficient to cause demand and EG.

Based on the Keynesian approach mentioned earlier in this study, an expansive fiscal policy that results in an increase of fiscal deficit and public debt, at the same time increases aggregate demand through the multiplier budget mechanism and thus results in a higher economic growth rate (Haavelmo, 1945). It is worth mentioning that while on one hand, Keynes's approach suggests that during an economic recession, state intervention should be increased in order to replace the decline of aggregate demand, on the other hand, it is not a deficit that directly steers to economic growth's speed up. Barro (1989) points out that at a time when the fiscal stimulus occurs and when the government budget deficit increases, then government debt increases rapidly, while market participants prepare for a period of restrictive measures and tax increases thereon, and as a result, people move their attitude from investments and consumption to savings, and consequently neutralize the effect on demand caused from the fiscal stimulus.

In Table 1, below we summarize some notes where different authors using different data and different econometric models too, which have expressed their conclusions about whether the government fiscal deficit effects economic growth.

**Table 1:** Various authors' conclusions – effects of fiscal deficit on economic growth

Authors	Approach	Findings
Adak, M. (2010)	Ricardian Equivalence and Neoclassic	Negative correlation effect for the fiscal deficit on economic in the short-term growth, whereas in the long-term there is a neutral correlation.
Adam & Bevan (2005)	Neoclassic	Reduction of deficit to GDP ratio for 1.5 percent will have a positive effect on economic growth
Bose et al (2007)	Keynesian	Productive spendings have positive effects on economic growth.
Easterly and Rebelo (1993)	Neoclassic	Large budget deficit levels have negative effects on economic growth. On the other hand, surpluses promote economic growth.
Fischer, S. (1991)	Neoclassic	The budget deficit has a negative correlation with GDP growth.
Fischer, S. (1993)	Neoclassic	Budget deficit reduces economic growth
Gupta et al (2005)	Keynesian	There is a positive relationship between the fiscal deficit and economic growth, for both situations: short or long run, as well as for both: productive and non-productive spendings.
Odhiambo et al (2013)	Keynesian	There is a positive correlation between fiscal deficit and economic growth
Rahman, N. A. (2012)	Ricardian Equivalence	There is not long-term relations between the economic growth with the budget deficit, but there are positive relations to productive spendings.

Source: Fehiman (2015)

### **Fiscal deficit and Eurozone**

In order to create the Economic and Monetary Union, the Maastricht Treaty, as a fundamental part of nominal convergence, introduced a number of criteria on which the EU assesses the ability of countries to join the euro area. Nominal convergence criteria are related to a set of financial, monetary, foreign exchange, fiscal policies, and the so-called macro-financial architecture that validate countries before joining the Eurozone. In essence, convergence criterias consist of a set of macroeconomic indicators that are standardized at specific references that are considered sustainable for a sustainable macroeconomic environment (Triandafil, 2011). The signatory countries of the Maastricht Treaty Stability Pact were limited by their budget deficits in the ratio GDP should be less than 3 percent of their annual deficits. These restrictions were further aggravated especially in 1998 during the selection of countries to be eligible to join the Monetary Union, also known as the Eurozone (Easterly and Bruno, 1998), although it was later seen that individual countries violated these norms many times. Only a small number of countries have been at acceptable levels or within the rule on the annual deficit and not for longer periods (3-6 years), while the rest of the countries continued to violate these requirements, excluding Germany where it is seen that it has been mainly within the accepted standards, even the key EU countries are seen to have not made proper efforts to adhere to these criteria.

The excessive deficit procedure set out in the Maastricht Treaty for the European Union has been underway since 1994. Consequently, in relation to fiscal policy consolidation among member countries, the negative impact of public debt through the annual fiscal deficit has greatly strengthened the arguments that the system fiscal sector in the Eurozone needs to be much more consolidated to try to reduce public debt.

The external deficit and debt constraints for the Eurozone countries were a natural experiment and proved to be an equation with many unknowns. At first, the Eurozone countries showed signs of declining asset accumulation and some even hid the increase in accumulated liabilities. Although various countries sold financial assets such as reserves or capital, these actions did not enable the reduction of the budget deficit (Easterly and Bruno, 1998). From this experience that was observed, the countries that joined the Monetary

Union had fiscal problems inherited from the past as a result of the macroeconomic environment from the past of these same countries. According to Easterly and Bruno, (1998) over-lending causes bad debts to appear in various banks, large fiscal deficits in certain countries, and also very high-level public debts in the peripheral economies (countries) of the Eurozone.

### **Hypothesis development based on literature findings**

There are numerous studies done in different periods to assess if the fiscal or budget deficit has an impact on economic growth. In this field of study, many authors came to conclusions that the fiscal deficit has an impact on economic growth, while in this group there are two approaches:

The fiscal deficit has a positive impact on economic growth,  
The fiscal deficit has a negative effect on economic growth.

Moreover, always based on the literature review there are two subgroups of authors when it comes to the first approach: 1.a. fiscal deficit has a positive effect on economic growth in the short run only, and 1.b. the fiscal deficit has a negative impact on economic growth in the long run.

Based on the literature review research there is a hypothesis derived for this study:

H1: Fiscal deficit has a positive effect on economic growth.

## **Research and Methodology**

In this study, an OLS regression for economic growth rate is presented in the subsequent equation. Based on the research conducted by different authors mentioned in the study, the variable of economic growth rate as a dependent factor, the aim is to evaluate a potential impact of explanatory factors on dependent constraints.

In our case, the purpose of this study is to investigate how fiscal deficits and other explanatory factors will affect economic growth rate (GDP growth rate), while all work in this model has been done by using SPSS econometrics.

The linear regression model for the economic growth rate is as follows:

$$GDP_{Growth\ rate} = C + \beta_1 \left( \left( \frac{Deficit}{GDP} \right) \times 100 \right)_t + \beta_2 \left( \left( \frac{Debt}{GDP} \right) \times 100 \right)_t + \beta_3 Inflation\ rate_t + \beta_4 GBYR_t + \beta_5 ur_t + \varepsilon$$

GDP\_ growth rate - GDP growth rate or annual economic growth,  
B\_1-Deficit/GDP– Fiscal Deficit to GDP ratio,  
B\_2-Debt/GDP– Public debt to GDP ratio,  
B\_3-Inflation rate –Annual inflation rate or Consumer Price Index,  
 $\beta_4$ -GBYR– Government Bond Yield Rate, and  
B\_5-ur– Un-employment rate.

The subsequent table also presents a summary of the linear regression model with the following data: R, R2, and adjusted R2, estimated standard error as well as Durbin-Watson test. Results obtained from the data of the model show that the dependent variable has a sustainable correlation with explanatory variables at the level of .487 and 48.7 percent, respectively.

While R2 in our analysis is .237, which shows that 23.7 of the dependent variables is explained by the independent variables. The estimated standard error is at 3.47 percent, which shows that the model is robust.

**Table 2: Model Summary**

OLS Summary						
Model	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson	
1	.487a	.237	.226	3.47459	1.472	

Source: Author's calculations

Before moving to comments coming from the results, first, we will interpret the outcome of certain diagnostic tests. The adjusted R2 is equal to .226, which indicates that 22.6 percent of the dissimilarity of the dependent factor is explained by the variation of the independent factors. In our investigation, we have used a sequential relationship for verification of model consistency. Grounded on the theory, it is known that the association worth of Durbin-Watson can be in the middle of a range from 0 to 4. Consequently, if Durbin-Watson importance is approximated to zero, then sequential association indicates that data from the model have a high positive impact between the residual values, while on the contrary, if the Durbin-Watson relationship approaches to the worth four (4), it shows that data consume a negative sequential relationship.

Hence, in practice a model can be considered stable when values since the outcomes of the Durbin-Watson test are close to a worth range of two (2) and that Durbin-Watson test is considered to have no sequential relationship within the range of 1.5 to 2.5. Moreover, this tells us that the residual value has no sequential association or there is no autocorrelation among the residual values. When we apply all of this in our case study, based on these intervals, the results show that the Durbin-Watson correlation is in the amount of 1.472, which shows that the required standard model applied in our study has a consistency.

**Table 3: Results of coefficients**

Model	Un-standardized Coefficients			T	Significance
	B	Std. Error	Beta		
(Constant)	4.649	.603		7.706	.000
Deficit/GDP ratio	.327	.059	.322	5.548	.003
Debt/GDP ratio	-.019	.006	-.181	-3.230	.001
Inflation rate	.157	.062	.129	2.542	.011
Government Bond Yield Rate	-.240	.087	-.142	-2.769	.006
Unemployment rate	.093	.051	.098	1.821	.069

Source: Author's calculations

## Results and Discussions

The outcomes offered in table number 3 display us that factors deficit-to-GDP, is statistically important at the level of significance of 99.9 percent with a positive sign ( $P = .003$ ). This specifies that a progression in deficit consumes a progressive effect on GDP growth. So, based on the results gained from the model, it can be seen that a 1 percentage point rise in deficit-to-GDP affects the advance degree by 32.7 percent point in the economic growth rate, only if all other elements are kept constant, or showing it in practical terms: if deficit-to-GDP ratio rises since 3% to 4%, and there is economic growth of 2%, then in our case GDP growth would be 2.65% or ( $2\% \times 32.7\% = 2.65\%$ ).

Thus, if we refer to the measurements from the table offered grounded on the case study model, in regards of constants, we see that deficit-to-GDP ratio is positive and this is in line with findings by similar models from various number of authors, such as: Nayab (2015), where through the use of co-integration techniques, VAR Granger Casualty Test found that budget-deficit has a noteworthy effect on economic growth which revision outcomes supports Keynesian view on budget deficit; (Adamand and Bevan, 2005) conclude that budget deficit of 1.5 % of GDP will have a confident significance on economic growth; Cinar et al. (2014) examined a group of five (5) economies with a low debt-to-GDP and other economies of Eurozone with a high debt-to-GDP for the period 2000-2011 using the ARDL panel model and they set up out that the deficit strategy acquired a confident effect on GDP growth in the short-run; (Loizides and Vamvoukas, 2005), using the dataset for Greece, United Kingdom and Ireland, concluded that in all states surveyed the fiscal deficit affects economic growth.

Compelling into explanation the econometric investigation results, there are two macroeconomic parameters by the adverse effect to GDP growth: Debt as well as Government Bond Yield Rate. Consequently, agreeing to outcomes offered in table number 3 displays that the factor, the debt-to-GDP, is statistically noteworthy at the level of 99.9 percent using an adverse sign ( $P = .001$ ). This indicates that upturn of public debt-to-GDP has an adverse effect on monetary growth, respectively on GDP growth. The outcomes of the investigation for the variable, Government Bond Yield Rate on GDP growth is noteworthy at the 99.9 percent level by an adverse sign ( $P = .006$ ). This indicates that the increase of the Government Bond Yield Rate has a negative result on economic growth.

Nevertheless, two additional features used in the investigation, inflation as well as un-employment have a confident significance to economic or GDP growth. So, the outcomes generated from the examination for the variable, inflation is statistically significant at the 95.0 percent significance level ( $P = .011$ ). Consequently, an increase in inflation has a confident significance on economic growth. Consequently, agreeing to the outcomes, un-employment to GDP growth is statistically significant at 90.0 percent and with the significance level with a confident sign ( $P = .006$ ). The outcomes show that growth of un-employment devises a confident impact on economic growth.

Based on the outcomes coming from the econometric analysis using the panel data model, the deficit to GDP ratio is statistically significant at the level of significance of 99.9 percent with a positive sign. As the result, the deficit to GDP ratio has a positive effect on the economic growth rate for Eurozone countries subject of this study. The findings coming from the study are similar to former studies of Keynesian economics philosophy which indicate that the budget deficit has a positive impact on economic growth. Furthermore, the study results are similar to studies such as the study conducted by Nayab (2015), who analyzes the impact of the budget deficit on economic growth using techniques of co-integration, Granger causality test VAR which concluded that budget deficit has a significant positive impact on economic growth, or Eisner (1989) who argued that spending arising from budget deficits could improve the economy at a phase when the country is in economic stagnation stage, or Cinarat et al (2014), who used the ARDL panel model for the period 2000-2011 deficit had a positive effect on economic growth in the short-run. So, the results of the revision are in line with Keynesian's economists which state that society could benefit from spending through deficits due to reduced production losses, respectively, achieving the objective - greater economic growth (Chrystal and Thornton, 1988). On the other hand, there are other studies such as Krugman (2012) which argued using fiscal deficits during recession periods did not help the economy.

Finally, when it comes to policy recommendations for the euro area countries that are the subject of this study, it is worth noting that although the fiscal deficit is in most cases good for economic growth, the level of deficits needs to be controlled by governments. Towards a long-term period with high deficits can hurt economic growth and create imbalances in other macroeconomic variables. The emerge of anomalies with persistent deficits more than limits allowed, especially in the long run, can have major consequences for the countries that are the subject of this study. When we add to this the effect of the covid-19 pandemic, the situation for these countries becomes even more complicated.

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