IMPACT OF THE DEFICIT CREATION ON THE ECONOMIC GROWTH: EMPIRICAL ANALYSIS FOR EU 14 COUNTRIES

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Abstract

Many countries struggle with similar fiscal problems. Therefore, there is a pressing need to look for measures that are not only able to decrease the public debt and but at the same time do not limit the economic growth. The aim of this article is to assess the impact of the fiscal deficit creation according to the chosen main budget components divided by the economic classification and based on these findings the possible solutions of the current problems will be suggested. The empirical analysis is based on a dynamic panel model, in which the data for the EU 14 countries in the period of 2002-2013 are used. Our findings suggest that deficit decreasing by the changes in debt service has the strongest positive effect among all estimates. Actually, every expenditure cut other than public investment is recommended. On the revenues side, we do not consider the growth of indirect taxes to be appropriate. However, increase in direct taxes leading to deficit decrease could slightly support the economic performance.

Key words: Fiscal Deficit, Economic Growth, Panel Regression

JEL Code: H62, O40,C23

Introduction

The financial crisis uncovered grave deficiencies in the fiscal politics of several countries. The dynamics of the development of the public debt and deficits has increased nearly in the whole world. Particularly Europe suffers the most. The ECB is not able to stimulate the inflation growth by standard monetary policy tools. Everything seems that Europe and predominantly the euro area will have to face a long period of inflation close to zero. If prices do not grow or they even fall, the position of creditors is much more advantageous than that of debtors. In this environment it is really important to find possibilities of decreasing the deficits without negative impacts on the economic growth as these impacts could lead to the deflation pressures.

Therefore, the aim of the presented article is to evaluate different impacts stemming from the creation of the deficit according to the chosen groups of the general government expenditures and revenues classified by means of the economic classification. Based on conducted analyses convenient ways of a deficit decline will be suggested. These ways could positively influence the public debt development and at the same time could stimulate the economic growth, or at least not to threaten the growth path of chosen economies.

1   Empirical evidence

Barro (1990) elaborated the model of the endogenous growth with fiscal policy, which can stimulate the growth in long time periods thanks to government investment and distortionary taxes. From the long-term view a balanced budget should be created. Kneller *et al*. (1999) confirmed these assumptions and they extended the empirical analysis by including a deficit. According to them the deficit negatively influences the growth if it is generated by the growth of non-productive disbursements. Easterly and Schmidt-Hebbel (1993) state that high deficits created year by year have always a negative impact. They highlight that based on the chosen way of financing of these budget inequalities there exist different ways of influencing the real economy. Gupta *et al*. (2005) claim that if the deficit decreases and there is a decrease also in demand for domestic resources, it has 1.5 times more positive impact in comparison with proportionally same decrease of demand for home and foreign resources at the same time. Theoretically more acceptable negative influence of the deficit on the economic growth was elaborated in works of, e. g.Checherita and Rother (2010), Fisher (1993), Gupta *et al*. (2005), Kneller *et al*. (1999), etc.

On the other side there exist certain hints according to which the deficit can influence the growth positively. Buscemi and Yallwe (2012) found out that the level of budgetary deficits influences the long-term growth of China, India and South Africa in a directly proportional way. Blanchard *et al*. (2010) indirectly proves a positive impact of process within the deficit creation from other point of view. If the deficits are generated as a result of effective inbuilt stabilizers, then the fiscal policy can (without discretionary measures) decrease the fluctuation of short-term product around the trend trajectory (decreasing the magnitude and length of product gaps) and in this way contribute to the growth of a potential output in time. Taylor *et al*. (2012) imply that fiscal deficits act in favour of the economic growth taking into account the impact on real interest rates. Countercyclical primary deficits stimulate the GDP growth, what positively influences growth ability in long-term. Impact of

the deficit on interest rates and long-term interest rates is in this case rather short. Moreover, they point out that in understanding the sustainability of public finances there applies a rule of higher growth rates of economy against the real effective interest rates from the debt. However, constant stimulation by means of a fiscal imbalance creates a pressure on the growth of deficit of the current account of the balance of payments.

Pelagidis and Desli (2004) claim that deficit positively correlates with the attained capital gains of corporations. It creates a characteristic form of leverage, when sufficient government expenditures, predominantly capital ones, decrease the allotment of a private capital on macro level, by which they contribute to higher returns of equity. These authors recommend the government to bring into effect the budgetary deficiencies also during so-called good times. On the other hand, Alesina *et al.* (2002) claim that the growth of governmental expenses, mainly wages in public sector, creates a pressure on raising wages in private sector. This situation creates a more negative impact on companies´ profitability in comparison with that generated by the increasing of direct taxes. According to Agnello and Sousa (2011) the growth of fiscal deficits leads to the growth of interest rates, but those cause the decrease of the price of assets. While of the prices of financial assets adapt to the shock quite quickly, the impact of fiscal stimulation on prices of real assets lasts for a long time. The increasing of deficits even causes the packing of private consumption. The final effect of deficits is in favour of growth, in the same way as in case of Taylor *et al.* (2012), even considering the negatives connected with the increasing of interest rates.

2 Analytical Framework, Methodology and Data

The standard neoclassical economic growth model is unable to capture persistent effects of fiscal policy. From the theoretical point of view it is necessary to follow endogenous growth models allow for effects of fiscal policy on long-term growth (see e.g. Afonso and Alegre, 2008; Barro, 1990; or Machová and Kotlán, 2013). Empirical specification of this endogenous model can be written as follows:

$$g_{it} = g_{it-1} + \sum_{k=1}^{K} \beta_k X_{kit} + \sum_{f=1}^{F} \gamma_f FIS_{fit} + \mu_i + \upsilon_t + \varepsilon_{it} \qquad (1)$$

where the index *i (i=1, ..., N)* denotes the country and the index *t (t=1, ..., T)* denotes the time, g_{it} is annual growth rate of real GDP per capita, g_{it-1} is AR(1) process, X_{kit} is a set of *k*

control variables and FIS_{fit} is a set of f fiscal variables, μ_i and υ_t are the country specific and the country invariant (time) effect respectively, ε_{it} is an error term.

The set of control variables consists of variables that are using on a regular basis in an empirical works such this type. Namely, the capital accumulation of physical capital and the capital accumulation of human capital are considered as the most important growth determinants. The first one was approximated by logarithm of private gross capital accumulation as portion to GDP ($invest_{it}$). Accumulation of human capital was approximated by the logarithm of the share of labour force with upper-secondary education in the 15-64 year´ group ($human_{it}$).

The set of fiscal variables consists of total government expenditures ($govex_{it}$), total government revenues ($govre_{it}$) and budget balance ($fisdef_{it}$). Values of $fisdef_{it}$ was calculated in order to capture deficit in positive values and surplus in negative ones. All FIS_{fit} are expressed as share of GDP. To describe different effects of different deficit creations we follow Kneller *et al.* (1999) omitted variable approach. The main motivation to choose this approach can be explained by the means of one of regression assumptions where individual coefficients are evaluated in *ceteris paribus* condition. If we take into the equation (1) all budget elements, it is impossible to determine the effect of a unit change of one of them because all others have to remain unchanged. If we let some budget category to be omitted, it allows us to evaluate coefficient of specific fiscal variable as the effect of its own unit change offset by a unit change in the omitted variable that is according to Kneller *et al.* (1999) the implicit financing element. The other motivation is that if we take into equation (1) all budget components the sum of estimated coefficients γ_f should be 0, hence then the model suffers from perfect collinearity. After all these explanations there has been assumption created, that every coefficient γ_f in equation (1) after gradually omitting some variable has different meaning. It can be expressed as $\gamma_f = \lambda_{f-\theta} - \lambda_\theta$, where $\lambda_{f-\theta}$ is the effect of the *f-θ* fiscal variable, λ_θ is the effect of the *θ* omitted variable and expression $\lambda_{f-\theta} - \lambda_\theta$ means the effect of the *f* fiscal variable which is implicitly financed by the *θ* omitted variable. Omission of the variable means, that we subtract values of the variable from its total category. This approach allows for all estimations to remain with the lowest number of regressors possible. We gradually omitted some essential budget components and their aggregated groups.

Our data set covers 14 EU member states in period 2002-2013.[1]All data were obtained from Eurostat and are expressed in annual periodicity. From methodological point of view, the dynamic panel regression is used. We are assuming that the economic growth is, among other things, dependent on its previous level. It is more appropriate to estimate regression with an AR process by the GMM, than that by the OLS. Specifically the Arellano-Bond estimator was employed for the estimation of all presented results.[2]

In terms of methodology, stationarity tests using the panel unit root were performed first. All the variables were found to be stationary in the first differences (D). Using a robust estimator in calculating the covariance matrices ensured that the results of standard deviations of parameters and hypothesis tests were correct with regard to a possible occurrence of autocorrelation and heteroscedasticity. This method is called the "White Period" and it is enabled by the econometric software used (Baltagi, 2002).

3   Results of empirical analysis

The main goal of the empirical analysis is to find out differences in impacts of the fiscal deficit using the omitted variable approach. We gradually omitted government final consumption, social expenditures, interest payable, public investments and productive expenditures from total government expenditures ($D(govex_{it})$) and direct taxes, social contribution, indirect taxes, distortionary taxes and non-distortionary taxes[3]from total revenues ($D(govre_{it})$). Therefore, if the assumption of implicit financing of the omitted variable approach is valid, gained results, abstracted from some methodological implications, will be able to be considered as the different impact of different deficit creation on the economic growth rate.

Following table (1), which is divided into two groups, shows the results of estimations of the equation (1). The upper half of table (1) consists of the results of omitting an expenditures category. The lower half is formed from the results of omitting a revenues category.

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[1] Our goal was to perform the analysis for 15 origin EU members. Due to poor quality of Greek time series Greece had to be excluded. Cross-section consists of Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Ireland, Italy, Luxembourg, Netherland, Portugal, Spain and Sweden.
[2]For more details see e.g. Afonso and Alegre (2008) or Machová and Kotlán (2013).
[3] According to Barro (1990) distortionary taxes consist of direct taxes and social contribution. All other revenues categories other than distortionary taxes are considered to be non-distortionary. Classification of each type of revenues relies on assumption of their direct impact on the investment decision making process or on the labour-leisure choice, for more details see e.g Kneller *et al*. (1999).

In the analysis, 14 instruments were used. The validity of the instruments was tested using the standard Sargan test at the 5% significance level (as indicated by J-statistic). All the estimation results presented in the tables below were thus confirmed as correct.

Tab. 1: Regression results of omitting budget components

Dependent variable	Annual rate of real GDP per capita growth (g)				
Omitted variable	Final consumption	Social expenditures	Interest payable	Government investments	Productive expenditures
g(-1)	0.225***	0.190***	0.072*	0.031	0.047
	5.99	5.17	1.66	0.41	0.60
D(invest)	9.755	6.828	21.291***	19.833**	19.087**
	1.47	1.65	4.48	2.15	2.05
D(human)	7.693	8.964*	11.557**	9.064	8.653
	0.95	1.73	2.44	1.62	1.44
D(govre)	-1.772**	-2.509***	-3.068***	2.443***	-0.616
	-2.16	-8.67	-3.28	3.05	-1.11
D(govex)	1.612***	3.054***	3.042***	-3.046***	2.965***
	3.00	3.95	3.44	-2.86	2.61
D(fisdef)	-1.831***	-2.842***	-3.316***	2.345***	-0.786
	-3.75	-6.19	-3.73	3.17	-1.35
J-statistic	10.80	9.43	13.10	9.78	9.06
Obs.	168	168	168	168	168
Omitted variable	Direct taxes	Social contributions	Indirect taxes	Distortionary taxes	Non-distortionary
g(-1)	0.092***	0.132***	0.049	0.082**	0.082**
	2.88	4.32	0.30	2.17	2.17
D(invest)	20.364***	20.963***	9.376	18.730**	18.730**
	4.74	3.42	0.71	2.53	2.53
D(human)	12.903**	9.508	4.329	13.876*	13.876*
	2.55	1.06	0.24	1.78	1.78
D(govre)	-0.946***	0.906	2.916*	-0.440	0.440
	-6.76	1.30	1.79	-1.11	1.11
D(govex)	0.287	-0.921	-4.010*	-0.295	-0.734
	1.085	-1.22	-1.76	-0.62	-0.97
D(fisdef)	-0.548***	0.809	3.118*	-0.127	0.313
	-3.13	1.04	1.66	-0.41	0.56
J-statistic	10.46	9.93	5.87	11.07	11.07
Obs.	168	168	168	168	168

Source: own calculation[4]

In this section we present differences in parameters of the fiscal deficit ($D(fisdef_{it})$) obtained from the table (1). We consider these estimated coefficients to be an effect of a unit

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[4] Note: t-statistics that are adjusted for heteroscedasticity and autocorrelation are included in parentheses; standard deviations are calculated using robust estimates; *, **, *** stand for significance levels of 10%, 5% and 1%, respectively. GMM - Generalized Method of Moments is the method used to estimate the dynamic panel.

change of the fiscal deficit created as a unit change in the omitted variable. Hence, the deficit generated by the increase of every expenditure category other than government investment and productive expenditures leads to decrease of the economic growth. While the influence of productive expenditures was not confirmed as statistically significant, the impact of the deficit creation by the government investments may be positive. Omission of the final government consumption appears to lead the fiscal deficit to have negative effect that is the lowest among all statistically significant deficit-growth relations in the first half of table (1).The strongest effect of the fiscal deficit from all observed estimates was obtained after omission of the interest payable. This negative impact of the deficit relies on the debt service costs. It is possible that the higher the public debt is the stronger relationship between the deficit and the economic growth will be. According to Checherita and Rother (2010) the influence of public debt on the economic growth is non-linear but the influence of deficit is always in linear form. Ourand Checherita and Rother (2010) results suggest that if the public debt reaches some crucial level, then deficit will always have negative impact no matter what budget component is omitted. All these considerations are supported by the results gained by omitting the social expenditures. Deficit appears to be detrimental to growth. If the social expenditures mainly consist of mandatory expenditures and they are dependent on demographic development, then it will create additional pressure on increase of the public debt. Therefore with no significant fiscal reform it is possible to assume that the fiscal deficit will always be detrimental to growth, because negative effects of the growing debt will exceed any positive effects of the public investments.

Only the government investments are able to create deficit, which are not detrimental to growth. This fact could be expected based on Barro (1990). On the other hand we assumed to observe similar deficit effects from omission the direct taxes or at least the distortionary taxes. It seems the direct and indirect taxes have switched roles in the EU 14. While the deficit after omission of direct taxes appears to be slightly detrimental, the deficit after omission of indirect taxes may be strongly positive, which is almost as strong as the negative effect of deficit creation by the increase of the interests payable. It means that deficit created by the decrease of indirect taxes supports the economic growth, while deficit that is result of decrease of direct tax revenues is detrimental. There can be a problem associated with tax quota being insufficient tax burden indicator[5] or there can be an endogeneity issue of the revenues-growth relation. From the other side, with regard to subjects of the direct taxation,

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[5]For more detailsseee.g. Machová and Kotler (2013).

we consider them to be rational; hence they are able to expect the future tax burden growth caused by tax burden decline today that leads to deficit. Therefore, they are using increased income to make savings. This is well known Ricardian equivalence theorem. Nevertheless, in the environment where public debt is high and debt service rises rapidly, the rationality of subjects could cause an oversized incline to savings due to postponing consumption and investments when government conducts the direct taxes cut. Hence then, the deficit creation by decrease in direct taxes could be harmful, especially in European countries based on their recent development.

The positive impact of omission of indirect taxes on deficit effect could be explained by means of relation between consumption and indirect taxes, which is assumed to be negative. If the tax burden of indirect taxes is considered as high, its additional increase leading to decrease in the deficit generates harmful pressures against the economic performance by means of weakening private consumption. Consequently, the fiscal deficit created by the changes of indirect taxes seems to be a good countercyclical measure. All other results of fiscal deficit omitting a revenue category were insignificant. Machová and Kotlán (2013) claim that every tax category is detrimental to the economic growth, although it may seem our results disprove their conclusions, it is necessary to emphasize that we were trying to capture effects of different deficit creations, not effects of taxation changes themselves.

Conclusion

The aim of this article was to investigate the impact of different fiscal deficit creations according to the chosen main budget components divided by the economic classification. The second goal was to suggest some possible solutions of current fiscal and economic growth problems based on our findings. The empirical analysis is based on a dynamic panel model, in which the data for the EU 14 countries in the period of 2002-2013 are used.

Our findings hint the efficiency of expenditure cuts. Lowering all expenditures, other than public investment, which lead to the deficit changes do not reduce the growth rates. Actually the decrease of debt service costs could encourage them highly. Slightly weaker effect of deficit was gained by omitting social expenditures. The impact of deficit decrease by means of changes of the final government expenditures appears to be almost twice lower than that of the interest payable.

From the other side of the budget, there was observed strong positive effect of deficit after omission of the indirect taxes. Hence we do not recommend their increasing. On the other hand, the omission of direct taxes led deficit to gain slightly negative impact on growth.

Therefore we can claim that increase in direct taxes using as a measure of lowering the deficit could even support growth rates gently. Increase of social contribution in relation to decrease of the deficit is not harmful to growth. It is necessary to emphasized that these results could be influenced by an insufficiency of the tax quota as tax burden indicator (Machová and Kotlán, 2013).

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