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Economic Growth and the Public Deficit in EU Member States in Central and Eastern Europe♦

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ABSTRACT

This paper studies the determinants of economic growth and the role of the public budget in European Union (EU) member states in Central and Eastern Europe, that joined the European Union in 2004, with a balanced data set from 1996 until 2012. A special focus is set on the relationship between growth and the public deficit and their behavior before and after the accession is studied. The outcome reveals a significant negative relationship between the deficit ratio and subsequent economic growth for the group of the eight selected countries. This effect indicates to be stronger after EU accession than before.

Key words: economic growth, public debt, new EU member states

JEL Classification: H62, E62, O40

1. Introduction

The developments of the financial crisis starting in 2008 - 2009 and its processing to a debt crisis in Europe revived the public and academic debate on central economic aspects of the public sector, the public finance situation and its relation to economic growth. Along with the crisis a severe recession affected most economies. Growth rates in many countries turned negative and recovery picks up slowly. Not only economies who had to apply for financial assistance programs were affected. EU members states in Central and East Europe were also distressed strongly. Here, the central question arises what are the effects of the high public deficits on economic growth? Did EU membership change this behavior? It is about ten years ago, when on May 1st 2004 the Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia joined the European Union. Thus, such a research question becomes even more important now.

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This relationship between public finances and economic growth has been intensively analyzed for western European countries. However, such an analysis is much more interesting for transition economies, i.e. Central and Eastern European countries (CEECs), which nowadays often show high growth performances. For instance, the eight Eastern New Member States of the European Union (NMS) joining in 2004 grew by 4% per year on average over the period from 1996 to 2012 with a maximum value of over 12% annual growth in Estonia in 1996, see table 3. At the same time, these economies mainly show rather balanced budgets. These facts emphasizes the potential of an analysis for this group of countries to study the effects which drive the growth rates. The aim of this paper is to shed light on this relationship between the public finance situation and economic growth, based on a new balanced data set, which covers annual observations of the eight Eastern economies of the NMS. Here, Cyprus and Malta are neglected as the focus is set on Eastern Europe. The estimations reveal a negative relationship between budget deficits and subsequent economic growth. This effect is accompanied by negative influence of the initial GDP per capita, inflation and government consumption. Separating the effect of the public deficit on economic growth before and after EU accession, shows a significant influence only after 2004.

As regards literature contributions there are many papers on determinants of economic growth and public sector variables, which focus on the relationship between growth and government debt and it often turns out to be negative for instance Egert (2015), Dreger and Reimers (2013), Kumar and Woo (2010), Reinhart and Rogoff (2010) or Checherita and Rother (2010). However, many of these studies focus on Euro zone or Western European countries. Only fewer contributions regard the specifics of new EU member states. Early papers focus on the influential elements of growth in the transition process (Merlevede (2000), Havrylyshyn and Wolf (1999), Staehr (2005)). They stress the factors reform implementation, macroeconomic stabilization and initial conditions. Other papers focus on the relationship between public debt and growth (Čeh Časni et al. (2014), Mencinger et al. (2014)). Segura-Ubiergo et al. (2006) study the relationship between fiscal adjustment and economic growth in transition economies using a fixed effects model, with fiscal adjustment addressed by the general government budget balance. They find a rather robust positive statistically significant effect. Focusing mainly on South Eastern Europe, Anastasakis et al. (2011) presents a selection of papers studying the effects of the current crisis on growth. This paper goes into a similar direction but the focus is set on studying the relationship between the budget deficit on economic growth in CEECs with a special emphasis on NMS which joined in 2004. The estimations are performed with a panel as this allows to study the common effect of the group, which then gives a more generalized result. The specialization on the 2004 accession allows to study whether this behavior has changed once becoming EU member. The rest of this paper is organized as follows: section two presents the empirical part. First, the data set is described, then, the estimation outcomes are presented. Finally, section three summarizes the main findings and concludes.

2. Estimations

Before starting with the regressions, some facts and figures are depicted to get a first visual impression of the central variables. The panel consists of the eight CEEC that joined the EU in 2004 Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. The data set covers annual observations for the years from 1996 until 2012.

2.1. Dataset

In order to get an idea of the development of annual economic growth, measured as change in real GDP per capita (in LCU), the plot is shown in Figure 1, all figures and estimations have been implemented in R. For the data see appendix.

Figure 1 Annual Growth

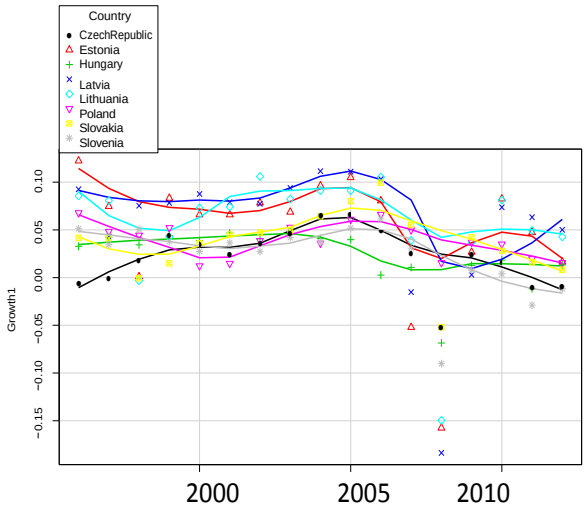
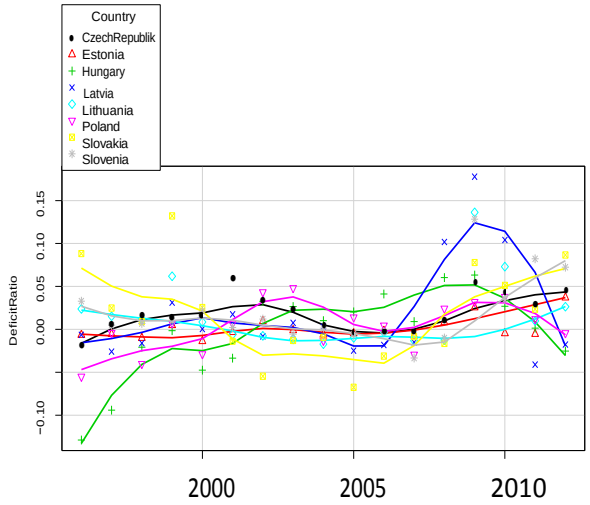


Figure 2 Public deficit to GDP ratio



As regards growth, there is some decline at the beginning of the period for certain countries such as the Baltics or Slovakia, however, growths picks up towards the accession with remarkable annual rates of about 10 percent in Estonia, Lithuania and Latvia in 2004, and of roughly 5% in the other economies. On average across the periods, the annual growth rate for the panel was about 4% (cf. also Table 3 in the Appendix). Certainly, the crisis had a distinctive effect, as the growth rates dropped strongly, the Baltic economies suffered from rates up to -15% and more in 2008. Recently, some recovery arose. Also remarkable is the growth performance of Poland, whose growth rates did not turn to negative values during the crisis.

Figure 2 shows the evolution of the public deficit to GDP ratio for the selected economies. A first impression indicates relatively balanced values fluctuating around zero.Remarkable are Hungary's high surpluses in the 1990s, bringing down their debt ratio and Slovakia's improvement towards the accession. Certainly, Latvia's high deficits in 2008 and 2009 show the impact of the crisis in the more recent observations.

As pointed out by several contributions, the initial situation of the economy matters. Here, the initial conditions are studied by GDP per capita at the beginning and end of the considered period and measured in US $ (constant prices of 2005) for comparison reasons. It reveals that for the eight selected CEECs the situation improved markedly. For instance the GDP per capita. for Estonia, Poland and Slovakia roughly doubled over the considered time horizon and for the Baltics Latvia and Lithuania these values even increased by about 150%. The development shows the catching-up process, which is remarkable here. For countries with a rather high GDP per capita at the beginning of the period, like Czech Republic or Slovenia, the gains were lower as their GDP per capita "only" rose by about 40% over the considered time horizon. Nevertheless, even Slovenia's high 2013 value of 18634 US$ is still comparatively low in relation to other Western European old member states - as it is only about half of the value of Germany (39219 US$) or France (35620 US$), see World Bank (2015) for the Data.

Two further important aspects for transition and EU accession are macroeconomic stabilization and liberalization. Here, as a proxy for macroeconomic stabilization the annual inflation is used, showing a remarkable reduction from values of over 15% per year at the beginning reduced to values of about 5% for

the accession year. There is some increase towards 2007, which has come down to below five percent recently. On average, inflation rates range about 5% for the panel across the period.

Trade openness, measured as the sum of exports and imports to GDP, shows for all selected economies an almost steadily increasing trend. It indicates that trade has become more and more important for all NMS and reveals increasingly integration and participation in international economic relations.

With these impressions of the central variables in mind, a more profound analysis by means of regression estimations is presented in the next subsection.

2.2. Results

As pointed out above, the focus of this study is set on the relationship between public debt and economic growth in NMS. Therefore, following Kumar and Woo (2010) or Mencinger et al. (2014) the regression given by equation (1) is estimated:

$$y_{i,t} - y_{i,t-1} = \alpha_0 + \sum \alpha_j Z_{j,i,t-1} + \varepsilon_{i,t}. \quad (1)$$

Here, $y_{i,t}$ presents the natural logarithm of real GDP per capita (LCU), i reflects the country and t indicates time. Z presents a vector of regressors, ε is the error term. All variables are indicated in the regression at the beginning of a period, this proceeding allows to measure the effect of a certain variable for subsequent output growth. The variable of interest is the public deficit to GDP ratio, which is included in Z. As pointed out by Mencinger et al. (2014) the estimations are implemented as a fixed effects model in order to reduce heterogeneity. Since initial conditions may vary across the group and be country specific, a fixed effect estimation may capture some of these inflation and mitigate to some extent.

For control variables, the real GDP per capita in US $, *log*(*rGDP_us*), is included to incorporate some proxy for the influence of the initial situation in each country, further *Inflation*, measures effects of macroeconomic stabilization and potential influence of monetary policy. Being a proxy for state size, *GovCon* measures government consumption (relative to GDP). To include variables for openness *TradeBal* represents trade openness measured as the external trade balance (exports less imports relative to GDP). Further, *FDI* measures capital inflows in terms of foreign direct investment inflow (relative to GDP), since many studies indicate a positive effect of FDI on growth and they revealed a rather stable development in CEECs up to the crisis period, cf. Baldi and Miethe (2015).

The deficit ratio is used as a proxy for public finance position. This may be appropriate since the deficit ratio measures changes in the debt ratio as deficits of previous years accumulate to debt (stock) – and the debt ratio oftentimes does not reveal a stationary behavior. Both debt and deficits indicate negative budget positions, and due to interest payments and redemptions they both squeeze the fiscal space for maneuver. Table 1 presents the results including the deficit ratio.

Table 1 Result of equation (1)

```
summary(FE_def)
Coefficients :
              Estimate  Std.Err  t-val   Pr(>|t|)
Def Ratio     -0.274    0.103    -2.645  0.009 **
log (rGDP_us) -0.121    0.023    -5.098  1.2e-06 ***
Inflation     -0.338    0.109    -3.086  0.002 **
GovCons       -0.792    0.360    -2.198  0.029 *
FDI           -0.061    0.059    -1.047  0.296
TradeBal       0.074    0.110     0.679  0.498
---
Signif. codes: *** 0.001 ** 0.01 * 0.05 . 0.1
Adj. R-Squared : 0.24242
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Table 2 Result of equation (1) with accession

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summary(FE_A)
Coefficients :
                Estimate  Std.Err  t-val   Pr(>|t|)
I(DefRatio*DBA) -0.159    0.160    -0.997  0.320
I(DefRatio*DAA) -0.352    0.132    -2.654  0.009 **
log (rGDP_us)   -0.114    0.024    -4.654  8.38e-06 ***
Inflation       -0.308    0.113    -2.711  0.007 **
GovCons         -0.718    0.369    -1.944  0.054 .
FDI             -0.062    0.059    -1.061  0.290
TradeBal         0.115    0.118     0.973  0.332
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Adj. R-Squared : 0.24515
```

The results show, that the deficit ratio the regression reveals a significant negative relationship between the deficit ratio in the previous year and the growth rate in the subsequent period for the group of the NMS. This can be interpreted as higher deficits today limit economic boost in the following years. This is an interesting insight, as deficits consists of public spending (both, primary and interest expenditures) and taxation influences Nevertheless, this is in line with contributions in the literature which suggest a negative relationship between public finances (even though mainly debt) and growth. Moreover, the initial GDP per capita, inflation and government consumption indicate to have a significant influence on subsequent growth, whereas the other controls again do not seem to exert a significant effect.

By exploring some more on this relationship between the public finance situation and economic growth, taking the effects of the accession into account, interesting developments can be seen. Table 2 summarizes the outcome. Dummy variables caption and separate the effect before and after the EU accession now. *DBA* presents a dummy variable with 1 for the years before the accession (and 0 afterwards), *DAA* the other way around.

As the estimation reveals, the significant negative effect of the deficit ratio on subsequent growth can be contributed to the years after the accession. This is an interesting effect for interpretation: the negative effect is only significant after joining the EU, economically, this can be assigned to the binding commitment being part of the EU community or the Maastricht criteria for example. Certainly, as the crisis is included in the later interval, also the crisis may be relevant, too. Interestingly, this effect also be seen for inflation (significant negative effect only after 2004) but not for initial GDP per capita, for which both coefficients before and after accession are significantly negative.[1]

Summarizing the results of the estimations it shows that for the group of the 2004 new EU member states, the common effect of the public finance situation on subsequent economic growth is negative, which is explicitly expressed through the budget deficit ratio. However, as the budget deficits accumulate to the debt ratio, this result may indicate an indirect effect also for the debt ratio. As regards the controls, the initial GDP per capita, the inflation and government consumption indicate to exert a significant negative effect, too. Concerning robustness checks, the estimations have also been implemented with a random effects model. They confirm the results of the fixed effects estimation, indicating especially for the deficit ratio a significantly negative coefficient, also confirming the significantly negative effects for the controls initial GDP, inflation and government consumption. Furthermore, altering or changing the regressors on the right hand side of the equation still indicates a significant negative correlation between the deficit ratio and subsequent growth.[2] If instead of the annual growth, the three years growth rate is used as the dependent variable, the estimations again confirm the negative relationship between the deficit and subsequent growth, even though the significance level becomes lower (only at the 10% level - this may be due to the strongly reduced amount of observations). Certainly, there are limits of this analysis as regards the data for instance, quarterly frequency would give more observation and enhance the power of the estimations. Or the explanatory variables may be supplemented or estimation technique may be improved. These aspects remain open questions for future research.

[1] Results not presented, but available on request.

[2] This even holds true if the plain estimation is implemented, i.e. the deficit ratio is the only regressor.

3. Conclusion

This paper has studied the influences of the public finance situation on economic growth in eight new member states which joined the European Union in 2004. The data set covers annual observations for the years from 1996 until 2012, which allows to capture some early years of the transition phase as well as some influences of the recent economic and debt crisis. The estimation, implemented with a fixed effects panel model, reveals a significant negative effect of the deficit ratio on subsequent economic growth for the group of the eight NMS. Also the initial GDP per capita, inflation and government consumption show statistically significant negative effects. Certainly, the results only refer to the common response of the group of the 2004 member states and more specific recommendations need to involve country by country estimations or require case studies. Nevertheless, the outcomes above contribute to the research on Central and Eastern European countries and reveals a shared feature of a negative correlation between deficits (broadly interpreted as debt financing) and subsequent economic growth for these countries. Economically this makes clear sense debt or deficit financing involves future payments on interest and redemptions, which in turn, reduces the scope of budget or fiscal policy decisions. The outcomes can be interpreted as a prudent or careful handling of debt issuing.

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Appendix

Additional data information and estimation results

This section provides additional information on the data set, which has been constructed by resorting to different but few sources. Table 3 summarizes the central information. ECB (2015) stands for European Central Bank (2015), IMF (2014) for International Monetary Fund (2014), OECD (2014) and WB (2015) for World Bank (2015). Most of the variables refer to annual observations (except the three years growth rate). The growth rates are measured as natural logarithm of real GDP p. c., calculated out of current GDP in LCU (source: IMF (2014) and the deflator (source: IMF (2014)). The means of the growth variables and the inflation refer to the geometric mean.

Missing observations for the variables gross fixed capital formation, government consumption and trade variables for Lithuania and Latvia for the year 2012 have been attained from AMECO (2015). GDP in LCU for Latvia has been obtained from WB (2015).[3]

Table 3 Detailed data information (own calculations)

Variable	Source(s)	No. of obs.	Descriptive Statistics			
			Mean	Min.	Max.	St.D.
Annual growth 3 years growth (real GDP p.c. LCU)	GDP: IMF (2014) Defl.: IMF (2014) Pop.: WB (2015)	136 40	0.04 0.09	-0.18 -0.11	0.12 0.33	0.05 0.11
real GDP p. c. (const. US$)	WB (2015)	136	10263	3469	20987	3880
Population (in Mio)	WB (2015)	136	9.14	1.33	38.66	11.56
Inflation	Defl.: IMF (2014)	136	0.05	-0.03	0.22	0.05
Public debt (ratio to GDP)	ECB (2015) OECD (2014)	136	0.32	0.04	0.81	0.19
Gr. fixed capital formation (ratio to GDP)	WB (2015)	136	0.26	0.16	0.37	0.05
Gov. consumption (ratio to GDP)	WB (2015)	136	0.20	0.15	0.24	0.02
FDI (ratio to GDP)	WB (2015)	136	0.05	-0.16	0.51	0.07
Military spending (ratio to GDP)	WB (2015)	136	0.01	0.01	0.03	0
Trade (Exp. and Imp.) (ratio to GDP)	WB (2015)	136	-0.04	-0.21	0.07	0.05

[3] As have observations prior to 1995 for Lithuania and Czech Republic.