INFLUENCE OF ECONOMIC AND
POLITICAL FACTORS ON THE
LEVEL OF GOVERNMENT DEBT:
CASE OF TRANSITION COUNTRIES

by

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Abstract

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The paper investigates the size of impact of political and economic factors on the level of government debt in transition countries using panel data on 14 emerging economies for 11 time-periods. The analysis is performed following Hendry's approach ("general to specific") to finding the right specification of the model. Different econometric methodologies such as fixed/random effects, FGLS, pooled OLS were employed in order to find out and test the most applicable model. Obtained results of the study are consistent with mainstream economic theory and economic intuition. The model clarifies that effect of such economic variables as GDP per capita, growth rate of output, change in output gap, inflation, unemployment and real interest rate was found to be significant in explaining the level of government debt. Furthermore, one of the main conclusions of the paper is that political factors, such as EU membership, years of elections and extent to which a given politician is constrained in his/her choice of future policies, give the reasonable explanation of their influence on the level of government debt.

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GLOSSARY

Central government budget balance, % of GDP is a measure of fiscal solvency of the national government; negative number shows that a government is spending more than it is receiving. Thus, deterioration in budget balance means increase in budget deficit or decrease in budget surplus.

Government debt. It represents accumulated budget deficits minus budget surpluses. Deterioration in budget balance signifies increase in government debt.

Fiscal Burden index includes taxes and government expenditures, ranges from 1 to 5, with 1 being the freest and 5 being the most repressed by taxes.

Overall political constraint index measures the extent to which a given politician is constrained in his or her choice of future policies

Government intervention index (subindex of the overall Economic Freedom Index) measures government consumption and government production

Control of corruption. This index reflects bureaucratic honesty. It defines corruption as the abuse of public office for private gain, and measures the degree to which corruption is perceived to exist among a country's public officials and politicians

INTRODUCTION

What are the reasons of government debt increase? Are economic reasons, such as, for example, expansionary economic policy, more influential than political ones, for instance, war expenses? What does the history say? Both developed and the developing countries, experienced debt increase throughout their histories. From the historic point of view the answer could be ambiguous: wartime spending and depressions are "responsible" for such growth. There were large increases in the debt held by the public related to the Civil Wars and also to World Wars I, II. For instance, United States debt in 1940 ran to 42.9 billion and reached 258 billion dollars as the nation fought World War II[1]. When governments were trying to find the sources for military production financing, many of them chose to do so by running into budget deficits. Increased budget expenditures gave additional job places for people and incentives to work more. During the depression national income falls and tax receipts have the tendency to cause deficits (McConnel & Brue, 1998). Thus, for example, government debt of the USA during Great Depression constituted about 270% of GDP (Jain, 2005).

However, the war, which is thought to be both economic and political factor, is not the only one that has an impact on the level of government debt. In comparison with the developed countries, in transition countries intricate political environment and political instability could also influence the economy of those countries (Ben-Ami, 2003). Political instability could be seen as frequent change of governments or, for instance, as "revolutions" (like those in Georgia and

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[1] Sourse: http://www.socialstudieshelp.com/Eco_Spending_and_Debt.htm

Ukraine that took place recent years) that may lead to change of the governmental budgetary policy or may not.

It is difficult to determine the degree of linkage between fiscal deficit and political instability, but it can be observed that if government is changed with a great frequency, especially if it is a matter of regular changes of government, the debt financing tends to be more attractive (Babić et. al., 2001).

Countries with big public debt might be less attractive candidates joining different economic alliances. With a valuable size of the debt it becomes harder to receive new credit lines for implementation of restructuring in different industries, because nobody believes such countries that they would be able to repay their debts as well as to pay interest payments on it. While developed countries can talk about integration with the same developed ones and both receive mutual benefits (capitalist countries form e.g. European Union, taking the advantage of trading with rich neighbors), countries in transition are not so successful in joining such coalitions, as, for instance, the latter one. Debt history of developing countries is the factor that spoils their reputation in the rest of the world.

On the other hand, there is a strong empirical and theoretical evidence of the impact of country's debt (either external or internal) on economic growth as well as on many other economic indicators, such as inflation, probability of country default, etc. (e.g. Cohen (1997), Calvo (1998), Pattillo et al, (2002), Woodford, (1996), Lonning, (1999),. Afonso, 2002).

Therefore, "looking in the root" of the problem, we can investigate what factors (economic or political) have the most influential power on the level of the government debt in transition countries. Being more politically unstable, transition countries may have as the result higher government debt. Originating from this, we would like to investigate if political factors in transition countries are more powerful in explaining the occurrence or persistence of high deficits, whereas in developed countries they were found to have no influence on level of

the government debt, except for the years of election (Tijula and Wolswijk, 2004). For instance, in comparison with developed countries frequency of changing the government in transition countries is higher.

Besides, evaluating how strongly changes in the macroeconomic environment affect fiscal balances we would be able to reveal which economic factors or shocks have important effect on the level of public debt in transition countries.

As the result, if we know how much economic and politic factors impact the public debt, it could help to form expectations about future budgetary developments. Such an insight, for instance, is of particular importance in Europe. By manipulating economic and political events (as well as having "right" institutional framework) policymakers could control the size of the government debt. Thus, the influence of public debt on probability of country default, exchange rates, savings, employment and could be regulated.

The question of interest is to determine whether political environment is more powerful in explaining government debt size in transition countries than in developed ones. We use econometric model with the set of structural variables, budget, political and macroeconomic, as was suggested in the theory. As a starting point, we applied the model developed by Tujula and Wolswijk (2004) in which they investigated the case of OECD and EU countries. Furthermore, we introduced some additional dummies and variables, e.g. soviet regime dummy or years being under the communist regime, as transition countries experienced quite different processes comparing to developed countries, control for corruption variable, etc. The choice of transition countries was based on similar economics of those countries. Therefore, East, Middle and Central Asian countries were excluded. In analysis panel data for 14 East European and former USSR republics for period 1995 — 2004 (2005) is used.

The paper is structured as follows: Chapter 1 states the importance of conducting of such an investigation for transition countries. Chapter 2 presents literature review on underlying economic theory with brief description, analysis of

different models and empirical findings. Particular attention is paid to the literature which analyses the influence of political factors on the level of the public debt. <u>Chapter 3</u> contains methodology, in accordance to which the influence of economic and political factors on budget balances will be investigated; in addition to this variable consideration will be presented. In **the light of all theoretical expositions,** <u>Chapter 4</u> provides empirical evidence in form of regression analysis of influence of political end economic factors on the public debt in transition countries. Finally, <u>Chapter 5</u> presents conclusions and policy implications with possible areas for further research.

LITERATURE REVIEW OF THEORY AND EMPIRICAL TESTING

Public debt could be the great good or the great evil for the country. On the one hand, debt can help developing and emerging countries by 1) empowering governments to invest in infrastructure projects and in the social sectors or 2) facilitating tax smoothing and counter-cyclical fiscal policies (Gill & Pinto, 2005). On the other hand, high government external debt can positively influence the probability of country default, when market participants being uncertain about a country possibility to pay its debt, could initiate a liquidity crunch (Sturzenegger, 2002).

A vast number of theoretical and empirical studies have been done to reveal the direction and impact size of public debt on macroeconomic indicators such as economic growth rate (e.g. Cohen (1997), Calvo (1998), Pattillo et al, (2002)), price stability (e.g. Woodford, 1996), the probability of default (e.g. Lonning, 1999), interest rate, inflation, exchange rate, countries' credit ratings (e.g. Afonso, 2002) etc.

Nevertheless the fact, that the influence of public debt on the above mentioned macroeconomic indicators has been keeping the interest of many economists for many decades the study of the factors that influence debt/deficits is quite new topic. First oil crisis encouraged economic research of the causes of such budgetary changes. The second wave of interest to this agenda was roused in the late 1990s, after the series of international crises: first, in Asia in 1997 — 1998, followed by the Russia crisis in 1998 and the Argentinean meltdown in 2001 — 2002.

The existing literature on public debt related to this topic can be divided according to several criteria. Firstly, we can outline the papers that explain the influence of politic environment on the government debt. Secondly, impact of the economic factors would be taken into consideration in a vast number of theoretical and empirical papers on this subject. We could see that different approaches in determining dependent variable and factors influencing debt/budget deficits exist and supplement each other. Hereinafter, aforesaid criteria will be analyzed.

First of all, it is important to distinguish between 3 main classes of variables, which have been suggested to have significant impact on the size of the budget deficit of a country. Public debt theory proposes to take into account:

1) Political variables; they represent the level of political instability and political polarization in a country, etc.;

2) Macroeconomic variables;

3) Structural variables; they determine or reflect the efficiency level of the tax system in a

Country (Chen, 2003);

First class of variables is considered to be relatively new topic for empirical studies. Beginning from the end of 1980-s political instability, frequent changes of the government, political freedom and political orientation of the cabinet of ministers, etc. has been analyzing as the factors that explained the level of budget deficits in a country. However, as would be shown later, these factors are less significant for explaining government debt in developed countries than economic ones are and vice versa, are powerful in emerging countries.

Alesina and Tabellini, (1988) in their model of accumulation of external debt considered 2 types of government which had conflicting distributional goals. Under assumption of uncertainty over the fiscal policies, incentives for the current government to accumulate external debt were observed. Hereout, it was predicted that right wing governments were less inclined to impose restrictions on capital

outflows than left wing governments and that debt repudiation may take place after a change in politic regime. Furthermore, above-mentioned authors concluded that with the higher degree of polarization between two policymakers and lower probability for the current government of be re-elected equilibrium level of debt accumulation is higher. That is why, disagreement between composition of government spending may lead to deficit bias. Alesina and Tabellini (1990).

In others empirical studies, the following political aspects were taken into consideration. It was observed that frequent changes of governments may cause a country's deficit to grow and confidence in the society to drop. It could be done through uncertainty of market participants about country's possibility to pay its debt (Sturzenegger, 2002). This in turn, gives rise to interest rates and the value of the currency to fall. As a result, an immediate increase in debt servicing costs could be observed, so the deficit grows further and confidence declines even more. Vice versa, as confidence rises, interest rates drop. An immediate reduction in deficit follows, which in turn increases confidence. We can observe the net result in either case is that all positive or negative shocks are immediately followed by significant changes in debt servicing costs (Pettis, 2003).

Edwards and Tabellini (1991) are the supporters of the influence of political instability on the size of budget deficit too. On their opinion, the more politically unstable a country is, the larger will be its budget deficit. Political instability increases the frequency of government changes and lowers the likelihood of reelection of a current policymaker. They postulate

"…In simple terms, the policymaker may wish to borrow in excess of the optimum and let his successors "pay the bills". Thus, political instability and polarization tends to lead to a larger than optimal size; of the budget deficit, even if the policymaker and the voters are rational and forward-looking…".

Political freedom indicator was also considered to be essential. In Cukierman and Meltzer's theory of has been suggested that the majority rule or a democratic

political system was very important for budget deficits. Therefore, controlling for time of being under a military dictatorship or any other period during which political freedom to vote was restricted, is quite necessary.

Later, political orientation of the cabinet or the number of spending ministers or the number of political parties in the government was taken into account. (e.g. Carlsen (1997)). It was also assumed by Kontopoulos and Perotti (1999) that left-wing political parties were more expenditure- and deficit-prone than right wing parties. Hallerberg and Von Hagen (1999) suggested the significance of the budgetary institutions in explaining budgetary deficits/surpluses. On the other hand, quality of political institutions in a country was considered to have an impact on the level of budgetary outcomes as well. Henisz (2000) revealed negative relationship between the quality of institutions and expected budget deficits.

The model developed in 2004 by Tujula and Wolswijk tried to capture most of the issues. An empirical analysis was done by them for developed countries and they found that the only political variable showed significant result was Years of election, for both OECD and EU sample.

However, single political factors were investigated and found to be significant in emerging and developing countries. Institutional stability, i.e. absence of government's corruption and quality of the bureaucracy, was revealed to have the impact on the level and maturity of international debt of the country (which is the part of government debt). Empirical evidence on the data for 83 developing and emerging market economies for the period 1982-1997 supported the hypothesis that institutional stability lead to the increase of international lending and lengthen its maturity (Wasseem and Young, 2002).

Another finding on transition countries was made by Faychuk, (2003). He found that political business cycles matter and in years when elections took place, on average, the ratio of government current spending to government capital expenditures has been increased by 5 — 31% depending on the degree of democracy in the country.

Returning to the second criterion according to which we distinguish literature related to the debt, we could outline that one of the key theories on public debt could be considered Barro tax-smoothing model (1979), based on society's attempt to minimize the excess burden of taxation over time. In his paper Barro kept focus on the minimization of the deadweight loss of taxation due to the timing of tax collection. His argument was that governments would run budget deficits in periods of high expenditures or recession in the economy, and vice versa. Temporary expenditure shocks can cause budget deficits and distortionary costs that associated with tax rate variations hereby could be avoided. Looking at the behavior of tax collection during the recessions and economic booms Barro pointed out a cyclically adjusted balanced budget rule: ***'The budget should be balanced over the business cycle, but not every fiscal year'***.

The main result obtained by Barro (1979) is the existence of a positive relationship between unanticipated changes in government expenditure and the budget deficit, and a negative relationship between unanticipated changes in output and the budget deficit hereafter.

However, this model has some drawbacks:

1) Barro did not take into account intergenerational reallocation of resources as a reason for the issuance of public debt.

2) His theory focuses on a closed economy without capital. Herein, a large national government controls a population of given size, and any effects of public debt policy on migration is ignored.

One more disadvantage of this model would be discussed later.

Proceeding from the fact that public debt *may* provide the opportunity for intergenerational transfers from children to parents that and Barro tax-smoothing model (1979) did not pay attention to that, Cukierman and Meltzer (1989) concentrated on intergenerational redistributive effects of public debt.

The authors postulate the existence of *bequest constrained individuals*[2] and of democratic political system, in which the larger is the share of bequest-constrained individuals in the population, the more likely the government to run larger deficits. Originating from these assumptions, were revealed the following: if the expected rate of economic growth tends to increase, expected longevity and spread of income distribution augment the share of bequest-constrained individuals; all of the above mentioned could lead to larger budget deficits[3].

As we can see from the Barro tax-smoothing approach, budget deficit has the negative relationship with *unanticipated* changes in output but is positively correlated with *expected* increase in economic growth in Theory of negative bequest motives of Cukierman and Meltzer (1989).

Meantime, these theoretical papers had empirical support. But tests were mainly done for the case of developed industrial countries, e.g. USA and United Kingdom by Barro, (1979, 1987), Trehan and Walsh (1990), Bohn (1998), Roubini and Sachs (1989). For instance, the tax-smoothing hypothesis was rejected for the USA using data range 1914 — 1986, but it was not rejected for the post-war period (Trehan and Walsh, 1990). Bohn (1990) revealed that government policy has reacted to changes in the debt-to income ratio. Barro in his research of USA (1917 — 1976 data range) and UK (1706 — 1918 data range) countries study detected that the debt to GNP ratios increase during wars, fall in peacetime, and fluctuate with the business cycle. Thus, the conclusions were almost the same. However, Alesina, Roubini and Cohen (1997) show the divergence with Barro tax-smoothing theory because of observed cross-country-variation in fiscal behavior as well as in fast increasing debt ratios in the 1970s and 1980s.

Thereby, Barro's approach is not the best model to explain changes in government fiscal positions. Some more "pros" for applying Barro tax-smoothing

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[2] Such type of individuals would like to transfer resources from future generations to finance current consumption, via negative bequests. Bequest constrained individuals will favor any fiscal policy that reduces current taxes without decreasing current government expenditures.

[3] These conditions are not based on mathematical derivations but are quite intuitive.

model to empirical testing on the data of transition countries exist. These are the facts that transition economies do not experience cycles and Barro didn't take into account political factors. Concerning the first fact, here is the evidence that after the liberalization macroeconomic performance of transition countries was different. However, almost all countries from the range of chosen for our analysis transition economies have U-shaped GDP (Roland, 2000). Nevertheless the fact that following the increasing part of the GDP shape, which is the recovery after initial output fall, we might expect fall in public debt, it was not the case. As an integral part of transition process loans from different financial institutions occur. Almost all transition countries, except Belarus, took different loans from IMF, World Bank, EBRD, etc. increasing in such a way their external debt.

Empirical evidence showed that Theory of negative bequests also had drawbacks in explaining the level of public debt. Using simple OLS regression and cross-section data for USA on long term debt financing by the American states in the mid-1980s, Clingermayer (1991) run a test of the above mentioned model. Unfortunately, there were some shortcomings in empirical evidence. Recall that one of the assumptions of the model states that in case of high expected growth higher standards of living of future generation are expected by current generation now. However, this measure of expected economic growth is too "short-run" whereas might be long-run, i.e. high standards of living might be expected for a long time. Another drawback is the use of elderly share to proxy for longevity, which was proved to be inappropriate.

Another approach to public debt was developed by Edwards and Tabellini (1991). In their study authors paid great attention to structural variables that explain the efficiency level of the tax system.

From their point of view, if the economy has inefficient tax system, *ceteris paribus*, it is not able to collect large amount of tax revenues in comparison with the economy in which tax system is efficient.

Aforesaid originated from the fact, that inefficient tax system experiences higher costs of tax collection and administration. Factors, which are responsible for the efficiency of the tax system in a country, can be divided into two categories: 1) variables that explain the sectoral composition of GDP; 2) the stage of economic development. Thus, the hardest sector of the economy to receive tax revenue is considered to be the agricultural; the easiest one is the manufacturing. Therefore, if economy has large manufacturing sector, it implies efficient tax system, which in turn leads to lower budget deficit.

In order to make a comparison of different approaches, which estimated public debt it is important to note that the most frequently used indicators to assess the burden imposed by country's debt they are debt ratios. The most important of them are:

1) the debt to GDP (Debt/GDP) ratio (it measures the size of the stock of debt relative to the economy and is the most general proxy for debt burden).

2) the interest payment to GDP (I/GDP) ratio that determines the impact of the interest payments of the country on the debt level.

Nevertheless, these ratios just indicate debt problems. It is not necessary that a country with a relatively small debt would have small interest payments. If it faces large interest payments there is a high probability that country may default on its debt in the near future. Vice versa, countries possessing high debt to GDP ratios may have low interest burdens and hereat not have a debt problem. (Sturzenegger, 2002).

Approach of using debt to GDP ratio as the dependent variable was used by Barro (1979, 1987) in his study of budget surpluses and deficits in USA and UK, by Kneebone and Leach (2002) while studying the debt accumulation in Canada, by Ziesemer (2005) for the three Asian countries in the run-up to the 1997 Asia crisis, by Martin (2004) for USA etc. Nevertheless, models tested by aforementioned economists had as the **dependent variable debt to GDP ratio** factors that have influenced Debt/GDP were quite different.

Author	Factors					Country
Ziesemer, 2005	Investments	Savings				Korea, Malaysia, Thailand
Martin, 2004	Output	Interest rate	Nominal bond stock	Aggregate money stock	Price level	USA
Kneebone and Leach, 2002	Output gap	Interest rate	Growth rate of output	Changes to tax rate	Program spending	Canada
Fortin, 1996						
Barro, 1979, 1987	Output		Currency issue	Tax revenue	Government expenditure	USA

Bohn (1998) using as the **dependent variable primary surplus** on the US data sample made the conclusion that US primary surplus is the increasing function of debt-to-GDP ratio.

Bohn, 1998	Temporary governent spending	Business circle indicator	Debt-to-GDP ratio			USA

As could be seen from the papers mentioned in the table above, political variables which might impact the size of the public debt were overlooked by the researchers. None of the authors that explained budget deficit by economic variables paid attention to the influence of political environment.

That is why the most appropriate model for our analysis is that developed by Tujula and Wolswijk (2004), which investigates the impact of both economic and political factors in developed countries.

Our paper investigates the significance of both economic and political variables in transition countries, in particular, we are interested more in explanatory power of political variables.

EMPIRICAL EVIDENCE IN TRANSITION COUNTRIES

3.1 *The econometric model and methodology*

In order to investigate the influence of economic and political factors on the level of government debt in transition countries, further the following panel model will be used.

$$Y_{it} = \alpha_{it} + \beta X_{it} + \delta X_{it-1} + \gamma_1 * d_1 + \gamma_2 * d_2 + \gamma_3 * d_3 + \gamma_4 * d_4 + \varepsilon_{it}$$

where X_{it} is the set of control variables, i.e. budget, macroeconomic and political factors that may have an impact on the size of government debt; d_n, n = (1,..,4) is the set of dummies.

d_1 is the soviet regime dummy, which takes value 1 if country was under soviet regime, 0 otherwise;

d_2 is dummy on years of election. It takes 1 in case of parliamentary or presidential election or referendum and 0 otherwise.

d_3 EU dummy taking value 1 in EU Member States, 0 otherwise

d_4 is year dummy for each year to capture cross-country related macroeconomic shocks, e.g. oil shocks or any other negative or positive shocks that happened in the economy. For instance, such shock as Iraq war in early 1990 and in 2001—2002 (September 11th terrorist attack and second Iraq war took place) takes value 1, 0 otherwise.

Because of given the short histories of transition countries as well as their limited number it is not possible to do cross-sectional analysis and that is why the only decision is to use panel data. This allows us to make a regression analysis

with both a spatial and time dimension. Different estimation techniques, as GLS, fixed/random effects and different statistical tests will be applied.

As a starting point we use Hendry's (London School of Economics) "general to spesific" Approach to model selection. We start with the model that contains more regressors we indicated and then reduce it to a model that contains only "important' variables (Gujarati, 1995).

However, data could experience some problems.

1) Heteroskedasticity can arise from countries differences, e.g. cultural, economic, etc. as well as autocorrelation could be inherent within the panels between time periods. That is why in case of heteroskedasticity the full sample equation would be re-estimated using White-heteroscedasticity-consistent standard errors and covariance (Gujarati, 1995) in case of pooled data. If we reject the hypothesis of common intercept in favor of panel data use of FGLS or random effect can help in solving this problem.

2) If in our model autocorrelation and/or moving average errors will be revealed, first differences (Wooldridge, 2002) or GLS corrected for ARMA errors can be used. If we find that autocorrelation occurs within the panels from one time period to another we can use Cochrane-Orcutt transformation to deal with autocorrelation in the residuals (Gujarati, 1995).

3) At last, we have point estimates for three variables. Due to this fact, for estimation of Political stability index, Control for corruption and Fiscal governance for years 1997, 1999, 2001, 2003 interpolation technique would be applied.

One of the most applicable methods in case of panel data, fixed effects model, has a big advantage, which allows us to apply this estimation technique for our study. This is the fact that error terms may be correlated with the country-specific effects. The choice between fixed or random effects model could be made by means of Hausman specification test (Greene, 2000). Choice of random effect

model allows us to have almost homoskedastic panels and we will be allowed to estimate coefficients of Soviet regime dummy, which is fixed over time.

Separately, the use of output gap in our model should be outlined. This variable was included in empirical analysis of budget balances for OECD and EU countries by Tujula and Wolswijk, (2004). Output gap is determined as the difference between real and trend of real GDP, in percentage of the latter. For that reason we have to calculate the values of the trend by Hodrick-Prescott filter (HP-filter) on the data of transition countries. This procedure is the commonly used in statistical literature to determine trend components in macroeconomic series. (Bouthevillain et. al., (2001), Cronin and McCoy (1999), Giorno et. al. (1995), etc.).

The following procedure was applied for trend calculation:

$$\min_{y_t^*} \sum_{t=1}^{T} \left(\left(Y_t - Y_t^* \right)^2 + \lambda \left(Y_{t+1}^* - Y_t^* \right)^2 \right)$$

where Y_t^* is trend component of series Y (real GDP), λ is the smoothing parameter.

HP-filter minimizes the sum of squared deviations of actual output around its trend and the variability of the trend itself (the second term), depending on the weights of these two terms. (Bouthevillain et. al., 2001). Lower values of λ imply that the trend is closer to the original series; particularly, λ of zero shows that trend is equal to actual GDP. For quarterly data is proposed to use $\lambda = 1600$, whereas for annual data, it is recommended and widely used $\lambda = 500$, 400 or 100 (Giorno et. al. (1995), Bouthevillain et. al., (2001). Hodrick-Prescott filter allows a better filtering of actual output data because it uses for calculation of GDP trend weighted moving averages, rather than simple arithmetic moving average.

In order to be consistent with the theory for our estimation procedure we follow Tujula and Wolswijk, (2004) approach and use $\lambda = 100$.

3.2 *Variable consideration*

In order to test our hypothesis of political variables' significance as well as to reveal what factors have the major impact on debt level of countries under consideration our goal is to investigate the significance of budget, macroeconomic, political variables. Besides, we determine the extent of their influence on the budget balance.

As the dependent variable in our analysis we use *government budget balance, % of GDP*. This variable is a measure of fiscal solvency of the national government; negative number shows that a government is spending more than it is receiving. Thus, deterioration in budget balance means increase in budget deficit or decrease in budget surplus.

On the right hand side as explanatory variables Fiscal Burden as *budget variables*; Unemployment rate, Output growth rate, Output gap, Real interest rates, Inflation rate, Welfare level, i.e. GDP per capita; as *macroeconomic variables*; Fiscal governance, Overall political constraint index, Election year, Government intervention, Political stability Index, Control of corruption as *political variables* are included. Next we will explain the motivation of including of the above-mentioned variables as dependent ones.

Fiscal Burden index is considered to have negative relationship with the dependent variable, i.e. the higher is the fiscal burden the higher is the budget deficit. Fiscal burden (taxes and government expenditures) index has the scores from 1 to 5, with 1 being the freest and 5 being the most repressed by taxes.

Unemployment rate, Output growth rate, Output gap (the latter is calculated with the help of HP-filter) evaluate fiscal responsiveness to macroeconomic conditions. They are considered to be the automatic stabilizers through unemployment expenditures and tax revenues. Unemployment rate and output gap depending on the policy government follows (either anti-cyclical or pro-cyclical) may have ambiguous impact on the level of the budget balance. Also, we assume that higher income

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level and higher development of the economy may result in more international lending to this country, which in turn leads to the increase in government debt.

Real interest rates. There are two effects of the long-term interest rates that could be expected and depending on which effect dominates we can establish the direction of the impact on our dependent variable. If interest expenditures on newly issued debt have the tendency to be increased then a high interest rate could lead to the worsening of budget balance (negative correlation between interest rates and budget balances). However, high interest rate as well could force governments to improve budget balance through showing a higher opportunity cost of bond market financing. We include values in real terms because while including nominal values we may find that inflation to some extent captures the effect of interest rate.

Inflation rate is included originating from the fact that governments might welcome inflation because the real value of government debt could be reduced in such a way. On the other hand, it may have negative effect on investments and economic growth because of the increase in long-term interest rates.

Welfare level, which is GDP per capita, is assumed to have positive relationship with the dependent variable, i.e. low welfare levels could lead to higher deficits. Countries with low level of living experience the higher need in investments and thus, face higher budget deficits. [4]

Overall political constraint index is included to measure the extent to which a given politician is constrained in his or her choice of future policies. This variable measures credible commitment and is calculated as one minus the expected range of policies for which all political actors with veto power agreed on a change in the status. Lower values tell us that the same party controls the executive and the legislative chamber and/or opposition is small and/or heterogeneous. By contrast, if the value of political constraint is relatively high the executive's

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[4] We have to distinguish between income level of the economy, i.e. GDP and level of living (GDP/capita).

majority is very precarious and/or heterogeneous (and/or opposition is large and homogeneous). Index varies from 0 to 1. (Henitz, 2005)

Government intervention index (subindex of the overall Economic Freedom Index) measures government consumption and government production. The scales run from 1 to 5, where a lower value indicates less government intervention.

Political stability index ranges from around –2.5 to around 2.5 Higher or positive values indicate greater political stability. This variable is included to be in line with the theory. Sturzenegger, (2002) concluded that fall of the confidence in the society may lead to increase of budget deficit. People may not believe to the government to repay its debt. On the other hand, frequent changes of governments (e.g. the elections of new government) require monetary funds. Quite logically that such government changes are financed from the state budget increasing, in turn, budget deficit. Thus, we assume that greater political stability may lead to reduction of budget deficit.

Control of corruption reflects bureaucratic honesty. It defines corruption as the abuse of public office for private gain, and measures the degree to which corruption is perceived to exist among a country's public officials and politicians. Index ranges from 0 to 6. Lower scores show high likelihood of government officials to demand "special payments". It is expected that higher corruption index value corresponds to lowering of budget deficit.

Dummies

Election year. It is assumed that budget deficit increases in years when presidential, parliamentary elections or referendum take place. Politicians may extend government spending or decrease taxes in order to increase the probability of being re-elected. 1 corresponds to years when above-mentions events took place, 0 otherwise.

Soviet regime dummy is included for the fact that transition economies experienced communist regime with planned economy quite different from the processes that

took place in developed countries. 1 is applied to the countries that were closely connected with soviet regime policies (republics of former USSR), 0 otherwise.

EU dummy shows that countries that had an intention to join the EU and now are currently there might comply with convergence criteria on debt and deficits. It takes value 1 if country is in EU, 0 otherwise.

Year dummy is introduced to capture cross-country macroeconomic shocks, such as oil price shocks, economic crises. For instance, in 2001 (September 11th) — 2002 terrorist attack and second Iraq war took place.

From the table below expected sign of independent variables could be seen.

Independent variable	Expected sign
Fiscal Burden index	negative
Unemployment rate, Output gap	ambiguous
Output growth rate	positive
Real interest rate	ambiguous
Inflation rate	ambiguous
Welfare level, i.e. GDP per capita	positive
Fiscal governance index	?
Overall political constraint index	?
Government intervention index	negative
Political stability index	positive
Control of corruption	positive
Election year	negative
Soviet regime dummy	?
EU dummy	negative
Year dummy	?

3.3 *Data description*

In our analysis we use data on the following transition countries: Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovak Republic, Slovenia and Ukraine. Due to the short histories of transition countries as well as their limited number given we are not allowed to provide cross-sectional analysis and that is why the only decision was to use panel data.

Data on these countries were obtained from OECD Economic Outlook database, IMF World Economic Outlook and Global Financial databases, World Bank group database, WIIW Handbook of statistics "Countries in transition/2004", Polcon database, www.electionworld.org, ILO and LABORSTA Internet, Central banks sites of the above-mentioned states and Financial statistical Yearbook 2001, 2006. Thus, in our analysis panel data which consist of 14 cross-sections and 11 time periods are used. All data are presented on the annual basis. Summary statistics of the data sources could be seen in **Tables 1, 2**.

Due to the fact that for several variables such as Political stability index, Control for corruption and Fiscal governance only point estimates for years 1996, 1998, 2000, 2002, 2004 are available we applied interpolation technique to deal with problem.

Furthermore, in our specifications we use *Output gap*, which could be calculated as the difference between actual and trend real GDP using a Hodrick-Prescott (HP) filter on real GDP, with lambda value of 100. Besides, we use the data on Overall political constraint index, which was developed by Henisz (2005). It provides quantitative measure of jeopardy made by the politicians using a simple spatial model of political interaction.

Data on our dependent variable *Central government budget balance, % of GDP* have been taken mainly from the World Bank Development indicators 2004. As has been mentioned earlier, this variable is the measure the fiscal solvency of the national government. Values are expressed as % of GDP and negative number shows that a government is spending more than it is receiving. From our data we could make a conclusion that since 1995 in countries under consideration deficits to GDP were equal to 2.21% on average. The largest deficit as percentage to GDP we observed in Bulgaria in 1996 and it constituted 10.44%, while the largest surplus belong to Russia in 2004 in amount of GDP equal to 4.5%.

Data on *unemployment rate* were obtained from International Labor Organization, Source: (FB) Employment office records and includes annual data for period 1995 — 2005. Average unemployment during the period under consideration constituted about

10.4%. The lowest value of unemployment was observed in Ukraine in 1996 and is equal to 0.3%, probably this value indicates official registered value, while real unemployment rate was much higher. The highest unemployment rate constitutes 23.1 % and was observed in Croatia in 2001.

 Inflation data were obtained from WIIW Handbook of statistics "Countries in transition/2004" and World Bank Group Database. This indicator is expressed as consumer price index. The range for the data is 1995 — 2005. The same database was used to receive data on GDP per capita. It is expressed as gross domestic product in current prices, billions USD with data range for 1995 — 2005. The highest inflation rate measured by the consumer price index was observed in Bulgaria in 1997 when the economy witnessed the highest annual inflation since the onset of transition to a market economy. It constituted almost 1060%. The lowest level of inflation is equal to 0.1% and was observed in Czech Republic in 2003. Average inflation for the periods under consideration is approximately equal to 26%.

 Nominal *interest rates* data have been received from the Financial Statistical Yearbook 2001, 2006. In order to obtain real interest rate we deducted inflation from nominal interest rate. Due to high hyperinflation in Bulgaria in 1997 the lowest real interest rate for that period was observed to be negative and equal to -977%, while the highest interest rate showed Russian Federation in 1995 to be equal to 122%. Thus, probably because of Bulgaria, average value of real interest rate in 14 countries for 11 periods was negative and equal to -1%.

 The source of *Growth rate of GDP* data is WIIW Handbook of statistics "Countries in transition/2004".

 Data for *Fiscal Burden, Government intervention and Governance indicator* were received for years 1996, 1998, 2000, 2002, 2004. To obtain values for 1997, 1999, 2001, 2003 we made cubic interpolation with the means of Matlab.

Chapter 4

MODEL ESTIMATION AND RESULTS

As was mentioned above, to find out the dependence between central government budget balance and explicative variables GLS and fixed/random effects techniques have to be used. Our data range includes 14 cross-section and 11–year time period (1995 — 2005). All data were taken from official sources, except for the output gap, which was calculated as the difference between actual and trend real GDP, as a percentage of the latter, using HP-filter with lambda equal to 100.

In order to be consistent with the literature at the very beginning we test the significance of economic variables only (GDP per capita, change in output gap, output growth rate, inflation, unemployment and real interest rate). Pooled OLS was found to be not appropriate estimation procedure because of low R-squared (about 0.21) and after performing F-Test we reject the hypothesis of common intercept in favor of panel data **(Table 3)**.

Running random effects regression and testing for random effects specification with Breush-Pagan Test, we received very small p-value for chi-squared with 1 degree of freedom. Thus, we can reject null hypothesis of no variation in individual disturbance term and made a conclusion that we had to choose random effects model. Once, we rejected pooled OLS hypothesis in favor of random effects model the next step was to test for fixed effects specification. Therefore, we estimated both random and fixed effects and by the means of Hausman Test distinguished between them. However, we found out that we could not check the null hypothesis that difference in coefficients was not systematic, because of chi2<0. Thus, knowing that specification doesn't

experience heteroskedasticity we may choose fixed effects model. By and large, we can see that the only insignificant variable in this specification is change in output gap. GDP per capita, unemployment, real interest rate and inflation are significant at 5% significance level. Significance of these coefficients coincides with the mainstream economic theory. However, without including political variables we suspect observed results to be biased and did not follow to our assumptions.

Hence, at the next stage of our analysis, we included political variables and tested for fixed/random effect again. However, we found out that Political stability index is highly correlated with Control for corruption (0.9), Governance indicator (0.8) and Overall political constraint (0.6). Furthermore, Overall political constraint was found to be correlated with Control for corruption (0.5) and Governance indicator (0.6) also. Finally, high correlation was observed between Control for corruption and Governance indicator (0.9) **(Table 13)**. Thus, we decided to exclude Control for corruption, Governance indicator, Fiscal Burden index and Government intervention from our analysis as variables producing insignificant results **(Table 5)**. At the same time we included EU-dummy, Election year's dummy, Soviet regime dummy and year dummy. On the basis of F-test we found out that we could not use pooled data and, consequently, we have fixed or random effects.

In order to determine which one fixed or random effects model is the most appropriate we run Least Squares Dummy Variables Regression (LSDV) to capture country specific effects and check for heteroscedasticity. Taking into account these findings and following Hendry's approach ("general to specific") in the next step we excluded above mentioned variables from our model. **(Table 6)**

Excluding variables that showed insignificant results we observed the increasing in significance of unemployment, change in output gap, overall political constraint, real interest rate and inflation in random effects model. On the other hand, decrease in significance of GDP per capita, years when elections take place,

being the member of EU and being the member of Soviet regime system (USSR) was observed. After running a test for jointly significance of Fiscal Burden index Government intervention index, Political stability index, Control of corruption and Governance indicator we found out that we could not reject the null hypothesis that coefficients were equal to zero. Thus, our decision to exclude these variables was right.

Recalling that the other problem our model specification could suffer was heteroskedasticity we run Breush-Pagan test to detect it. From the result of the test we found out that we rejected the null hypothesis of constant variance, thus we had a problem of heteroskedasticity. The possible solution to this problem is GLS transformation. Thus, we have to distinguish between fixed and random effects model and if we reveal that we have random effects model problem it will help us to solve the problem of heteroskedasticity. Another possible alternative specification, which helps us in dealing with heteroskedasticity is Feasible GLS.

On the basis of Breusch and Pagan Lagrangian multiplier test for random effects (p-value is equal to zero) we may make a conclusion in favor of random effects model. Due to the fact that model fails to meet asymptotic assumptions of the Hausman test, making eye-ball test and taking into consideration that we have heteroskedasticity we inclined to choose random effects model.

Check for autocorrelation, while running a regression with AR(1) disturbances showed almost the same results, the only difference in significance of the coefficients was observed in Change in output gap and Unemployment: under specification mentioned above these variables became insignificant, all other variables did not changed their signs. **(Table 9)**

Consequently, our final model is random effects model and now we shall discuss the main results of our estimation procedures. **Table 7** summarized the main estimation results of our work.

Table 7
Dependent variable: Central government budget balance, % of GDP

Explanatory variable	Random effects model			FGLS model		
	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
GDP per capita	.0002529	.0001284	0.049	.0002348	.0000678	0.001
GDP growth rate	.1976367	.0539893	0.000	.2103034	.0573738	0.000
Inflation*	-.0147361	.0066824	0.027	-.0057663	.0070191	0.411
Change in output gap**	-.1950663	.1254742	0.120	-.2040286	.1338357	0.127
Unemployment*	-.0964058	.0594222	0.105	-.0155822	.0378998	0.681
Real interest rate*	-.015271	.0067941	0.025	-.0075044	.0071366	0.293
Overall political constraint	-4.578009	1.325821	0.001	-2.144909	.7778587	0.006
yr95	.7956478	.9776336	0.416	.7761463	1.038016	0.455
yr96	1.067198	.9160399	0.244	1.171699	.9851655	0.234
yr97	.9458781	.8661016	0.275	.8792287	.9310569	0.345
yr98	1.471081	.7769951	0.058	1.578691	.8466776	0.062
yr99	.870535	.6626046	0.189	.7014646	.7312826	0.337
yr00	.7175365	.6583294	0.276	.8056386	.7289136	0.269
yr01						
yr02	-.868097	.6545043	0.185	-.7201084	.7237074	0.320
yr03	-.5351467	.7235582	0.460	-.2470952	.7820344	0.752
yr04	-.6470815	.8866084	0.465	.2291425	.9456172	0.809
yr05	-.2098059	.9366486	0.823	.8076417	.9759234	0.408
Election dummy	-.6049602	.3105346	0.051	-.8305067	.3314128	0.012
Soviet regime dummy**	1.102147	.8643595	0.202	1.761482	.4140461	0.000
EU dummy	-1.598536	.7446893	0.032	-2.691501	.7469942	0.000
Constant	-.020301	1.533072	0.989	-2.944045	1.06567	0.006
Number of observations	154			154		
Breusch and Pagan Lagrangian multiplier test for random effects	**chi2(1) = 36.85 Prob > chi2 = 0.0000**					
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	**chi2(1)=15.16 Prob > chi2 = 0.0001**					
F-test	**F(13, 121) = 5.97 Prob > F = 0.0000**					

Note that * variable is significant in random effects model, ** significant in random effects and FGLS specifications at 12% significance level, *** significant in FGLS specification

As it could be seen, in general our models (random effects model and FGLS alternative specification) comparatively well explain the size of central government budget balance. However, it could be observed that such political

variables as EU dummy and Election dummy were significant at 5% significance level in random effects specification and received significant values while running FGLS at 1% significance level. The significance of Soviet regime dummy, which shows that countries were the members of USSR in the past, is doubtfully in random effects model, however falls in 99% confidence interval, in FGLS model. Another political variable Overall political constraint was found to be highly significant in our specifications with p-value, which shows that countries were the members of USSR in the past, equal to zero. Another thing that is seemed to be good is the fact that in general models show consistency. It can be pointed out that all significant variables have the same sign and their coefficients are quite comparable with each other. This fact gives the hope that we have right specification. Next, we will discuss in more detail received coefficients.

· *GDP per capita,* which shows welfare level of the nation and was expected to have positive impact on the level of budget balance proved to be significant at 5% significance level in random effects model and at 1% significance level in FGLS. Results obtained from EU countries, however, reported this variable to be insignificant. Probably, differences in income across EU were not large enough to detect this effect. In our data we could observe that the difference in income is sufficient. For instance, real GDP per capita in Czech Republic constituted about 11930 USD in 2005, while in Belarus income per capita for this period was equal to 2775 USD. The possible explanation to received positive sign of this variable could be the fact that people "migrate" from budget sphere to business and receive salaries there. Thus, governments spend less on budget employees. On the other hand, decrease in the number of population in countries under consideration could be observed, which logically led to the increase in GDP/capita. In this situation government spends less on different cash grants, state subsidies, pensions and other payments to population. Another possible reason for improvement in budget balance could be external migration of people in developed countries, which lead to decrease in number of population.

Originating from the fact that in general migrating people remit at home, current consumption, which is the part of GDP, increases. Thus, we observed that increase in 1 USD in real GDP per capita could lead to 0.0002348 — 0.0002529% improving in budget balance. Result obtained in our model is not compatible with Chen, (2003) which found that in period 1973 — 1982 **"positive effect of the increase in per capita real GDP was not sufficiently large to offset the negative effects of the increase in political rights and increase in urban population share, which resulted in a large decrease in the budget surplus share for the developed countries"**.

· *Output growth rate* was found to be significant for transition countries at 1% significance level and have positive relationship with the dependent variable showing income elasticity of the budget to be equal to 0.197 — 0.21. This result differs from that obtained in EU, where income elasticity is equal to 0.5. So we could observe that increase in output growth rate in 1% leads to 0.2 percent to GDP improving in budget balance (decrease in budget deficit or increase in budget surplus). It could be explained by the fact that governments follow anty-cyclical policies: increasing budget deficits in recessions and shortening different spending program in rise or boom, in order not to reach the overheating of the economy.

· *Unemployment* rate is significant at 11% significance level in random effects model and not significant in FGLS specification. However, we received the negative sign of the coefficient which did not coincide with our assumption of automatic stabilizer. 1% increase in unemployment rate is followed on average by 0.09 % of GDP deterioration of budget balance. The possible explanation of this fact could be the following: government increased program spending to fight against unemployment, paid unemployment cash benefits. It is worth to note, that unemployment rates, reported by official institutions of transition countries may not coincide with the real rates of unemployment. Applying true

unemployment's rates may increase the significance of this variable and its explanatory power towards the level of government debt.

· *Change in Output gap* was found to be significant at 13% significance level. Income elasticity of the budget is very similar in all specifications and is equal to -0.19 — (-0.2). This result is in contrary with Mika and Tijula, (2004) which found output gap to be significant and equal to -0.06 — (-0.12) in different specifications which indicated that income elasticity of the budget to be lower in recessions. In our model we observed that increasing in the difference between actual and trend real GDP as percentage of the letter by 1% could lead to 0.2% deterioration on average in budget balance in transition countries under consideration. This may reflect expansionary policies which lead to higher expenditure growth.

· *Inflation* rate in contrary with the findings on EU sample[5] was found to be significant. Probably, EU countries have different indexation mechanisms. From our results we could reveal that 1% increase in inflation rate leads to increase in budget deficit (or decrease in budget surplus) by 0.01 % of GDP. Thus, we could observe that expenditures rise, in general, with the rise in inflation rate. Probably, it happened because of governments' inability to decrease spending or collect taxes and fight against inflation. Such thing, for instance, had been taking place in Russia before 1998, when inflation had been hard to control as well as decrease in government spending had been (Krugman and Obsfield, 2000).

· *Year* that was observed to be significant in both FGLS and random effects specification at 10 % significance level is 1998. It may capture shocks of Russian crisis and show at the same that events that took place in 1998 had positive impact on the budget balance. It means that during this year in countries under consideration improvement in budget balance by 1.4% of GDP on average was observed Actually, looking at the real data we could reveal that in comparison

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[5] Here and after the results on EU sample 1970 — 2002 are taken from Mika and Tijula, (2004)

with the year 1997 next one showed deteriorating of budget balance in 5 out of 14 countries, correspondingly improvement of budget balance in the rest of countries. In 1999 we could observe slightly improvement of budget balance in 8 countries and sharp deterioration in 6 ones. **(Table 12)**. Regretfully, our model did not prove the significance of year 1999.

· *EU dummy* resulted in deteriorating of budget balances for being a member of EU on 1.6 — 2.7% and proved its significance at 1-5% significance level. Actually, we could observe that in comparison with 2003, which is the year before joining EU, 2005 results in worsening of budget balance for Bulgaria, Czech Republic, Estonia, Lithuania, and Poland. Slovakia's budget balance deteriorated from 3.8% of GDP in 2004 to 4% of deficit to GDP in 2005. Data for all countries which joined EU in 2004 could be seen in table below.

Central government balance, % of GDP

Country/year	2003	2004	2005
Bulgaria	0,003	-0,2	-0,7
Czech republic	-4,3	-5,9	-5,1
Estonia	2	0,3	-0,2
Hungary*	-5,7	-4,9	-4,2
Latvia*	-1,43625	-1,10885	-1,18088
Lithuania	-1,4	-1,7	-2,9
Poland	-4,5	-7	-5,8
Slovakia*	-4,7	-3,8	-4
Slovenia*	-1,37	-1,7	-1,5

Source: World Bank Development indicators

· *Election years dummy* was proved to be significant at 5% significance level. It was quite logical to assume that in the years when elections either presidential or parliamentary or even referendum took place budget deficits had to be increased. This assumption was found empirically to be significant. Thus, in the years of election central government budget balance deteriorates on average on 0.7 % of GDP. In EU countries this coefficient was found to constitute about 0.3% of GDP. Besides, the value of Election years dummy could capture at the some extent the effect of macroeconomic conditions on the budget. For instance, if

elections are in line with the business cycle, politicians are less likely to decrease government spending in order not fall from favor.

•   Significance of *Soviet regime dummy* is quite doubtful. It was found to fall into 80% confidence interval in random effect model, however showing high significance in FGLS. It is worth to mention, that the value of coefficients differs in two specifications. Thus, we may reject this variable to be accountable to explain at some extent the level of government debt.

•   *Overall political constraint index* was not proved to be significant in EU, while it was found out to be highly significant in transition countries (falls in 99% confidence interval). Recall that this index measures the extent to which given political actor is constrained in his/her choice of future policies. i.e. how executive and legislative power is constrained by the government. From the results obtained we can see that this index matters and has negative relationship with the dependent variable. Therefore, we can make a conclusion that the more executive and legislative branches of the power are restricted in their choice for future policies the worse would be budget balance.

•   *Real interest rate* showed its high significance at 5% significance level in random effects model. We can see that 1% increase in interest rates leads to 0.02% of GDP deterioration of budget balance. Hence, higher interest payment on issued debt led to the increase in budget deficit. This result is in line with Pettis, (2003), which proved that if uncertainty of public about government possibility to pay its debt increases, increase in debt servicing costs could be observed because of the rise in interest rates and fall in value of the national currency. Thus, increase in budget deficit follows and confidence of the society falls even more.

Going further, we check our model for robustness. In this case we restricted our model excluding from our sample former soviet republics (Belarus, Estonia, Latvia, Lithuania, Russia, and Ukraine). In fact, we can see that in restricted sample model almost all variables preserve their signs **(Tables 10, 11)**. This fact

could emphasize the relative stability of our model. However, it should be noted that random effects model chosen after testing lost in explanatory power of GDP per capita, growth rate of output, and change in output gap on the level of government debt.

Chapter 5

CONCLUSIONS AND POLICY IMPLICATIONS

Study of influence of political factors on the level of the government debt is relatively new. Most studies have been done on developed economies but only few on transition countries.

This study attempts to find the answer to the following question: what is the size of impact of political and economic factors on the level of government debt in transition countries. As an underlying model we used empirical study by Mika and Tujula (2004), which were interested in developed economies. We applied their approach for 14 transition countries.

At the very beginning in order to be consistent with mainstream economic literature we tested the significance of economic variables only. Our results were found out to be in line with economic theory. Thus, GDP per capita, unemployment, real interest rate and inflation were detected to be significant at 5% significance level. Further, at the next stage of our analysis, we included political variables and following Hendry's approach ("general to specific") tested our model specification. Due to short histories of transition countries the only alternative was to use panel data and estimation procedures that were commonly applied to it.

Several econometric specifications were enabled such as pooled OLS, fixed/random effects, FGLS, model corrected for autocorrelation. Testing for the most appropriate one, we revealed that our specification suffered from heteroskedasticity and the only specification that was able to help to deal with this problem was GLS, in particular, random effects. Checking for robustness we

excluded from our sample former USSR republics (Belarus, Estonia, Latvia, Lithuania, Russia, Ukraine).

Before reporting the main results of our study let us make several assumptions: 1) that underlying literature used in our paper was broad and appropriate; 2) that we employed good model specification, which allowed us to some extent explain how the level of central government debt in countries with transition economies was impacted by political and economic factors.

Originating from the above mentioned we can state that:

·   Almost all economic variables that were assumed by us to have the influence on the level of government debt in transition countries were found to be significant at different levels of significance. The signs of variables coincided with our assumptions.

·   Furthermore, we revealed that being a member of EU deteriorated central government balances in range of 1.6 — 2.7 % of GDP. This finding is in line with the real data, which state that in comparison with 2003, almost ¾ of countries entered the EU in 2004 had worse budget balance next year. Elections, either presidential or parliamentary, matter in the sense that in time when elections take place, 0.6 — 0.8% deterioration in budget balance/GDP was observed. This result proved our logic and intuition: during the elections cutting government expenditures or rising taxed was very unpopular, whereas increasing subsidies, transfers and other cash grants could help in fight for electorate. The significance of overall political constraint index, which measures the extent to which given politician is constrained in his/her choice of future policies. i.e. how executive and legislative power is constrained by the government, was proved at 99% significance level. Hence, it could be seen that the more executive and legislative branches of the power are restricted in their choice for future policies the worse would be budget balance and, consequently, the higher government debt would be. This variable did not prove its significance in developed countries, thus, we could conclude that countries of Europe with higher level of

development of the economy, possess much more political freedom. In contrary, the economy of transition countries is constrained by a small group of politicians which dictate their own policies and pursue its own group ends that could easily run the budget into deficit. Significance of being the member of former USSR seems to be doubtful originating from the statistics received.

Based on the results achieved it could be concluded that while explaining the level of central government debt in transition economies political factors do matter. Understanding that sustainable level of the debt is quite important when asking donors and borrowers for credits and grants some policy implications on the debt problem could be outlined.

Firstly, as had been revealed, on average in transition countries under consideration a small group of politicians controlled executive and legislative branches of power and opposition was not strong enough. Thus, governments are more likely to run into budget deficits and, hence, accumulate government debt to pursue its own group ends. Consequently, without softening political constraints and reaching the sustainable political freedom we would not be able to control for the level of government debt. In years when elections take place, budget funds should be spent rationally, what, however, is not always the case. Coming back to the influence of economic factors, it is worth to mention that government should pay much attention to debt management profile, trying to repay the debt and interest payments on it in time.

For further investigation we may propose to distinguish between the influence of presidential and parliamentary elections, to see during which elections the stress on the budget is larger. Another suggestion is to wait until having longer time periods and use other econometric techniques, which may better explain the model.

Concluding remarks

As a final remark, it should be outlined that the model used by us is not perfect and results have to be taken into consideration carefully. As W. Greene emphasized *"…in macroeconomics almost no variable can be said to be truly exogenous in the fashion that most observers would understand the term…"* . We suspect our model to suffer from reverse causality. Actually, we were not able to use another, probably, most appropriate techniques to fight this problem. One of the reasons was that our sample had been restricted to 11 periods. Due to the short history of transition countries, most of which proclaimed their existence in 1991 — 1993, we had no possibility to use time-series and the only decision was to use panel data. Thus, such econometric methodologies as VAR and SUR were unattainable to us. Another drawback that has to be pointed out is the difficulty to find good appropriate instrumental variables to run instrumental estimation.

Hopefully, further research studies would be able to overcome these problems.

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APPENDICES

Table 1

Summary statistics

Variable	Number of observations	Mean	Std. Dev.	Min	Max
GDP/capita	154	4437.569	3176.874	632.447	18526.51
Output growth rate	154	4.048601	4.16639	-12.2	13.7
Inflation	154	26.38265	93.56098	.1	1061.2
Change in output gap	154	.3776165	2.222123	-6.17948	7.007927
Unemployment	154	10.39097	5.035523	.3	23.1
Fiscal burden	149	3.437248	.7644587	1.375	5
Government intervention index	150	2.987078	1.042952	.771434	5
Overall political constraint	154	.6592053	.2380735	0	.790249
Political stability index	126	.510803	.5200872	-.93	1.34
Control for corruption	126	.023993	.5767859	-1.02	1.1
Governance indicator	126	.1347521	.6243265	-1.2	1.02
Budget balance, % GDP	154	-2.218228	2.512209	-10.4411	4.5
Real interest rate	154	-1.062265	83.72676	-977.2399	122.31

Table 2

Sources of the data

Variable	Source	Period
Central government budget balance	World Bank Development indicators 2004 online WIIW Handbook of statistics "Countries in transition/2004"	1995-2005
Unemployment rate	Global Econ Data, World Bank Development Data	1995-2005
Output growth rate	WIIW Handbook of statistics "Countries in transition/2004"	1990-2005
Inflation	World Bank Group Database, WIIW Handbook of statistics "Countries in transition/2004"	1995-2005
GDP per capita	Global Econ Data http://www.econstats.com/weo/V016.htm	1995-2005
Real interest rate	Financial statistical Yearbook 2001, 2006	1995-2005
Political stability index	http://www.worldbank.org/wbi/governance/pubs	1995-2005
Overall Political Constraint	Polcon database	1995-2005
Control of corruption index	http://www.infoplease.com/ipa/A0781359.html	1996-2004
Fiscal governance index	http://www.infoplease.com/ipa/A0781359.html	1996-2004
Government intervention index	http://humandevelopment.bu.edu/dev_indicators	1996-2004
Fiscal burden index	http://humandevelopment.bu.edu/dev_indicators	1996-2004

Table 3

Pooled regression (economics variables only)

Dependent variable: Central government budget balance, % of GDP

	Pooled OLS		
Explanatory variables	Coefficient	Standard error	p-value
GDP per capita	-.0000475	.0000642	0.460
GDP growth rate	.2568114	.0603064	0.000
Inflation	.0004023	.0073279	0.956
Change in output gap	-.060725	.090169	0.502
Unemployment	-.090328	.0398918	0.025
Real interest rate	-.0007396	.0075012	0.922
Constant	-2.068728	.7091087	0.004
R-squared	R-squared = 0.2112		
Number of observations	154		

Table 4

Fixed/random effects (economic variables only)

Dependent variable: Central government budget balance, % of GDP

Explanatory variables	Fixed effect			Random effect		
	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
GDP per capita	-.0002566	.0000927	0.006	-.0001718	.0000793	0.030
GDP growth rate	.1754899	.052633	0.001	.1938471	.0521652	0.000
Inflation	-.0141611	.006336	0.027	-.0117066	.0063458	0.065
Change in output gap	-.0917181	.0784829	0.245	-.0699715	.0766328	0.361
Unemployment	-.2151538	.0748105	0.005	-.1448104	.0574198	0.012
Real interest rate	-.0143673	.0065109	0.029	-.01217	.0065176	0.062
Constant	.8579067	1.065885	0.422	-.3921431	.9169567	0.669
R-squared	overall = 0.1559			overall = 0.1854		
F-statistics	**F(13, 134) = 8.03 Prob > F = 0.0000**					
Breuch-Pagan test for random effects	**chi2(1) = 85.29 Prob > chi2 = 0.0000**					
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	**chi2(1) = 3.59 Prob > chi2 = 0.0582**					
Number of observations	154			154		

Table 5 *Fixed/random effects (general model)*						
	Fixed effects			**Random effects**		
Explanatory variables	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
GDP per capita	.0003884	.0003075	0.210	.0003233	.000145	0.026
GDP growth rate	.1948064	.0716108	0.008	.2388368	.0826532	0.004
Inflation	-.0322517	.0149959	0.034	-.0185402	.0167894	0.269
Change in output gap	-.1512536	.1448958	0.299	-.1408811	.1649638	0.393
Unemployment	-.1208135	.0880323	0.173	-.048827	.0502165	0.331
Real interest rate	-.0336408	.0153948	0.031	-.022035	.017262	0.202
Fiscal burden	-.1230886	.3640978	0.736	.180583	.394855	0.647
Government intervention index	.1723686	.2347013	0.465	-.0287976	.2349818	0.902
Overall political constraint	-7.790126	2.083569	0.000	-.6017938	1.166225	0.606
Political stability index	.1562759	1.558467	0.920	-1.855729	.9815858	0.059
Control for corruption	.4809224	1.231788	0.697	-.4796861	1.114969	0.667
Governance indicator	.9873735	1.346259	0.465	.7675851	.9546356	0.421
yr95	(dropped)					
yr96	3.501652	1.449533	0.018			
yr97	3.231541	1.298491	0.015	-.5019675	.8607396	0.560
yr98	3.559811	1.219263	0.004	.3578415	.9103465	0.694
yr99	3.213965	1.186311	0.008	-.3874516	1.114854	0.728
yr00	2.675745	1.158608	0.023	-.416217	1.190978	0.727
yr01	1.999143	1.112291	0.076	-.9967735	1.236626	0.420
yr02	.7684189	1.063301	0.472	-1.735156	1.168003	0.137
yr03	.7821106	.8908159	0.382	-1.631268	1.145131	0.154
yr04	(dropped)			-2.183202	1.317882	0.098
yr05	(dropped)					
Election dummy	-.2248662	.3666399	0.541	-.7269418	.4245236	0.087
Soviet regime dummy	(dropped)			1.565095	.6073926	0.010
EU dummy	-.5543451	1.091587	0.613	-1.833025	1.215924	0.132
Constant	.2699717	2.823438	0.924	-2.186413	2.392347	0.361
Number of observations	126			126		
R-squared	overall = 0.1609			overall = 0.4398		

Table 6 *LSDV/ Random effects*						
	LSDV			**Random effects**		
Explanatory variables	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
GDP per capita	.0003908	.0002993	0.195	.0002541	.0001606	0.113
GDP growth rate	.2071359	.0688454	0.003	.2236385	.0706281	0.002
Inflation	-.0291317	.0143083	0.045	-.0252616	.0143686	0.079
Change in output gap	-.1547032	.1420654	0.279	-.1245641	.1390499	0.370
Unemployment	-.1306687	.0859424	0.132	-.0899267	.0644468	0.163
Real interest rate	-.0298021	.0146501	0.045	-.0267306	.0147534	0.070
Overall political constraint	-7.198649	1.940652	0.000	-3.410809	1.460302	0.020
Political stability index	.5193844	1.478217	**0.726**	-.6904517	.9160103	**0.451**
yr95	(dropped)					
yr96	1.216034	1.090121	0.267			
yr97	1.038821	.9596364	0.282	-.3278078	.7131638	0.646
yr98	1.421372	.8205699	0.087	.2431802	.7505099	0.746
yr99	1.142891	.6723241	0.092	-.2190793	.930956	0.814
yr00	.7008493	.6822746	0.307	-.4465374	.9884144	0.651
yr01	(dropped)			-1.027493	1.024146	0.316
yr02	-1.191739	.6712042	0.079	-1.940287	.9903879	0.050
yr03	-1.15832	.8123299	0.157	-1.815444	.9479818	0.055
yr04	-1.78674	1.081095	0.102	-2.530479	1.111552	0.023
yr05	(dropped)					
Election dummy	-.2971484	.3505564	0.399	-.4270696	.3607743	0.237
Soviet regime dummy	-.8630334	1.936241	0.657	1.099946	.8556637	0.199
EU_dummy	-.7566077	1.066621	0.480	-.8444277	1.032844	0.414
_Iid_2	-5.853909	1.427918	0.000			
_Iid_3	-3.874409	1.521977	0.013			
_Iid_4	-4.169789	1.841594	0.026			
_Iid_5	.3853588	2.602103	0.883			
_Iid_6	-6.481221	1.636828	0.000			
_Iid_7	-1.396024	2.330711	0.551			
_Iid_8	-2.051336	2.275389	0.370			
_Iid_9	-3.558368	1.270017	0.006			
_Iid_10	-1.65742	.9765733	0.093			
_Iid_11	(dropped)					
_Iid_12	-3.911231	1.343684	0.005			
_Iid_13	-4.180369	3.042851	0.173			
_Iid_14	.2163946	1.635048	0.895			
Constant	4.965074	2.194039	0.026	.72752	1.781246	0.683
Number of observations	126			126		
R-squared	R-squared=0.6831			overall = 0.3764		
Hausman test	**chi2(14) Prob>chi2 = 0.9997**					
Breusch and Pagan Lagrangian multiplier test for random effects	**chi2(1) = 22.42 Prob > chi2 = 0.0000**					
F-test for jointly significance of Fiscal Burden, Government intervention, Political stability index, Control for corruption, Governance indicator	46 **F(5, 102) = 1.54 Prob > F = 0.1851**					

Table 8 *Fixed effects /Random effects/ FGLS*								
	Random effects			**Fixed effects**			**FGLS**		
Explanatory variables	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
GDP per capita	.0002529	.0001284	0.049	.0003252	.0002252	0.151	.0002348	.0000678	0.001
GDP growth rate	.1976367	.0539893	0.000	.1734957	.0542771	0.002	.2103034	.0573738	0.000
Inflation*	-.0147361	.0066824	0.027	-.0181044	.0067447	0.008	-.0057663	.0070191	0.411
Change in output gap**	-.1950663	.1254742	0.120	-.2383337	.128665	0.066	-.2040286	.1338357	0.127
Unemployment*	-.0964058	.0594222	0.105	-.1421953	.07448	0.059	-.0155822	.0378998	0.681
Real interest rate*	-.015271	.0067941	0.025	-.0180478	.0068316	0.009	-.0075044	.0071366	0.293
Overall political constraint	-4.578009	1.325821	0.001	-7.397799	1.839565	0.000	-2.144909	.7778587	0.006
yr95	.7956478	.9776336	0.416	(dropped)			.7761463	1.038016	0.455
yr96	1.067198	.9160399	0.244	.1868849	.6529694	0.775	1.171699	.9851655	0.234
yr97	.9458781	.8661016	0.275	.2190939	.7015895	0.755	.8792287	.9310569	0.345
yr98	1.471081	.7769951	0.058	.6039274	.7674429	0.433	1.578691	.8466776	0.062
yr99	.870535	.6626046	0.189	.0633348	.9468667	0.947	.7014646	.7312826	0.337
yr00	.7175365	.6583294	0.276	-.2767733	.999056	0.782	.8056386	.7289136	0.269
yr01				-.9752112	1.055464	0.357			
yr02	-.868097	.6545043	0.185	-1.917126	1.071441	0.076	-.7201084	.7237074	0.320
yr03	-.5351467	.7235582	0.460	-1.651978	1.117905	0.142	-.2470952	.7820344	0.752
yr04	-.6470815	.8866084	0.465	-1.825405	1.095443	0.098	.2291425	.9456172	0.809
yr05	-.2098059	.9366486	0.823	-1.487828	1.212823	0.222	.8076417	.9759234	0.408
Election dummy	-.6049602	.3105346	0.051	-.5274199	.3071128	0.088	-.8305067	.3314128	0.012
Soviet regime dummy**	1.102147	.8643595	0.202	(dropped)			1.761482	.4140461	0.000
EU dummy	-1.598536	.7446893	0.032	-1.516701	.8179897	0.066	-2.691501	.7469942	0.000
Constant	-.020301	1.533072	0.989	3.590341	1.677793	0.034	-2.944045	1.06567	0.006
Number of observations	154			154					
R-squared/Log likelihood	overall = 0.2933			overall = 0.3906			Log likelihood = -315.2119		
Breusch and Pagan Lagrangian multiplier test for random effects	**chi2(1) = 36.85 Prob > chi2 = 0.0000**								
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	**chi2(1)=15.16 Prob > chi2 = 0.0001**								
F-test	**F(13, 121) = 5.97 Prob > F = 0.0000**								

Note that * variable is significant in random effects model, ** significant in random effects and FGLS specifications at 12% significance level, *** significant in FGLS specification

Table 9

Model corrected for autocorrelation

Dependent variable: Central government budget balance, % of GDP

Model corrected for autocorrelation			
Explanatory variables	Coefficient	Standard error	p-value
GDP per capita	.0002269	.0001145	0.048
GDP growth rate	.2000684	.0548597	0.000
Inflation	-.0131102	.0070423	0.063
Change in output gap	-.0980968	.1354154	0.469
Unemployment	-.0807654	.0594218	0.174
Real interest rate	-.0152341	.0071332	0.033
Overall political constraint	-3.425418	1.251042	0.006
yr95	.2088453	1.046821	0.842
yr96	.5626684	.9822119	0.567
yr97	.4026675	.9039453	0.656
yr98	1.094897	.8110734	0.177
yr99	.6794309	.6594444	0.303
yr00	.6385597	.5643247	0.258
yr02	-.9377069	.5633205	0.096
yr03	-.7008809	.7150796	0.327
yr04	-.8669932	.9104978	0.341
yr05	-.4138333	.971786	0.670
Election dummy	-.4760541	.2720338	0.080
Soviet regime dummy	1.256089	.7420484	0.091
EU dummy	-1.611434	.7588777	0.034
Constant	-.7704762	1.462417	0.598
Number of observations	154		
R-squared/Log likelihood	**overall = 0.4094**		

Table 10 *LSDV/random effects (restricted sample)*						
	LSDV			**Random effects**		
Explanatory variables	Coefficient	Standard Error	p-value	Coefficient	Standard Error	p-value
GDP per capita	.0001621	.0002531	0.524	.0001079	.000084	0.199
GDP growth rate	-.1778728	.095156	0.066	.0325229*	.1143125	0.776
Inflation	-.1301077	.0200603	0.000	-.0536688	.0204986	0.009
Change in output gap	-.3650574	.2826506	0.201	.28723	.3356274	0.392
Unemployment	-.2277738	.0815673	0.007	-.0803725	.0523031	0.124
Overall political constraint	-9.396642	3.133525	0.004	-3.364113	3.200346	0.293
yr95	4.026639	1.529732	0.011	.4754576	1.809317	0.793
yr96	3.496279	1.28247	0.008	.429555	1.573808	0.785
yr97	2.478151	1.074581	0.025	.2556087	1.35003	0.850
yr98	2.549898	1.027412	0.016	.9791011	1.360793	0.472
yr99	2.447836	.7901733	0.003	1.489011	1.090027	0.172
yr00	1.010921	.7071823	0.158	1.104572	1.010303	0.274
yr01	(dropped)					
yr02	-1.259789	.7102872	0.081	-1.411305	1.007991	0.161
yr03	-.4378502	.9073898	0.631	-1.099938	1.222894	0.368
yr04	.2489966	1.155828	0.830	-.2810317	1.58361	0.859
yr05	.007871	1.238867	0.995	-.0895227	1.615698	0.956
Election dummy	-.2940692	.3303931	0.377	-.6083151	.4563089	0.182
EU dummy	-1.432443	.9211886	0.125	-2.929436	.9994956	0.003
Real interest rate	-.1332843	.0204892	0.000	-.0576203	.0210646	0.006
_Iid_3	-3.391662	1.345428	0.014			
_Iid_4	-4.947541	1.597545	0.003			
_Iid_6	-5.977578	1.335668	0.000			
_Iid_9	-2.55348	.9773317	0.011			
_Iid_10	-.7165317	.7659432	0.353			
_Iid_12	-3.045759	1.015464	0.004			
_Iid_13	-2.0947	2.585771	0.421			
Constant	10.99777	2.793598	0.000	1.262307	2.895344	0.663
Number of observations	88			88		
R-squared/Log likelihood	R-squared = 0.7546			overall = 0.4272		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	**chi2(1) = 7.69 Prob > chi2 = 0.0056**					
Breusch and Pagan Lagrangian multiplier test for random effects	**chi2(1) = 42.41 Prob > chi2 = 0.0000**					

Note that * does not preserve its sign in comparison with unrestricted model

Table 11

Model corrected for autocorrelation (restricted sample)

Dependent variable: Central government budget balance, % of GDP (restricted sample)

	Model corrected for autocorrelation		
	Coefficient	Standard Error	p-value
GDP per capita	.0000154	.00013	0.906
GDP growth rate	-.0995778	.1020318	0.329
Inflation	-.1006102	.0206466	0.000
Change in output gap	-.121661	.2679367	0.650
Unemployment	-.1483133	.0696982	0.033
Overall political constraint	-7.407802	3.186638	0.020
yr95	2.644023	1.449685	0.068
yr96	2.32519	1.260652	0.065
yr97	1.655404	1.060586	0.119
yr98	1.98891	1.050095	0.058
yr99	2.080586	.817376	0.011
yr00	.944442	.6851686	0.168
yr02	-1.245743	.6879342	0.070
yr03	-.4315137	.9256025	0.641
yr04	.3378952	1.219719	0.782
yr05	.4018088	1.25909	0.750
Election dummy	-.3016708	.3221945	0.349
EU dummy	-1.723487	.8688703	0.047
Real interest rate	-.1040104	.0210136	0.000
Constant	5.984911	2.951569	0.043
Number of observations	88		
R-squared	overall = 0.3581, within = 0.6583		

Table 12

Development of Central Government Budget Balance, % to GDP
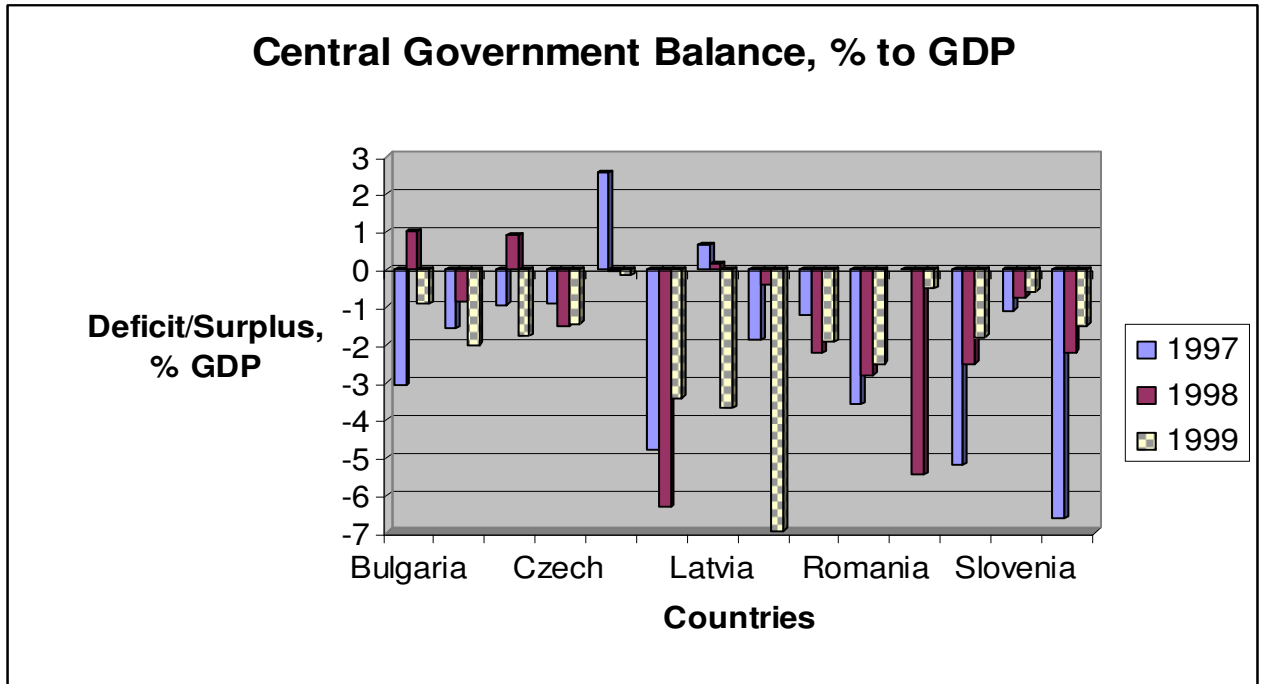
	1997	**1998**	**1999**
Bulgaria	-3,07	0,99	-0,93
Belarus	-1,56	-0,85	-1,99
Croatia	-0,94	0,91	-1,78
Czech Republic	-0,9	-1,5	-1,45
Estonia	2,55	-0,06	-0,16
Hungary	-4,8	-6,3	-3,4
Latvia	0,65	0,14	-3,7
Lithuania	-1,87	-0,41	-6,93
Poland	-1,2	-2,24	-1,91
Romania	-3,6	-2,8	-2,5
Russia	0	-5,44	-0,5
Slovakia	-5,2	-2,5	-1,8
Slovenia	-1,1	-0,74	-0,6
Ukraine	-6,6	-2,2	-1,5

Note that positive value indicates surplus, while negative deficit

Table 13

Correlation statistics

	Fiscal burden	Government intervention	Overall political constraint	Political stability index	Control for corruption	Governance indicator
Fiscal burden	1.0000					
Government intervention	0.2818	1.0000				
Overall political constraint	-0.0882	-0.1312	1.0000			
Political stability index	-0.2422	-0.2482	0.5798	1.0000		
Control for corruption	-0.2820	-0.2235	0.4996	0.8740	1.0000	
Governance indicator	-0.3640	-0.3374	0.5448	0.8368	0.9066	1.0000