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The case of transition economies: what institutions matter for growth?

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ABSTRACT

There is a consensus among scholars that institutions (i.e. norms and regulations) are country specific. The article aims to contribute to the debate by examining what types of institutions have been most important for growth in transition countries. It employs a new set of institutional variables of the World Bank against the commonly used transition index of the European Bank for Reconstruction and Development. It appears that among the institutional variables government effectiveness has the most significant impact on growth in former planned economies. At the same time, classical growth factors seem to be more important for growth than institutions.

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INTRODUCTION

Some researchers focused on the classical institutional factors such as democracy and how they affect economic success in former planned economies. As such, Fidrmuc (2003) tested the validity of the findings in the growth literature that democracy tends to harm growth at the early stages of development. He revealed that a direct influence of political liberalisation on growth was negative (i.e. in the early stages). On the other hand, he also found that democracy had a positive indirect impact on growth, which was realised through liberalisation policies. However, this indirect impact was insignificant in the early period of transition. He explains that in transition countries democratisation was largely imposed by the international organisations (e.g. as part of the EU accession terms), while some successful economies such as South Korea implemented political reforms only after their economic policies proved to be successful. On the contrary, China still remains as the communist nation after its proven success with the economic reforms. The author concludes that democratisation as such is unable to explain growth differences in the transition process and therefore an autocratic market economy is expected to be more conducive to economic development in the former planned economies. Furthermore, Cheung (1998) argues that initiatives to implement democratic reforms in the post-communist countries tend to have significant economic costs. He explains that the vertical rent distribution system inherited from the former communist era cannot be transformed into the horizontal one unless the transition to a private property-based economy is complete. Otherwise, as he predicts, there is a risk of ending up with the political and economic system similar to India, where the officials tend to issue extra regulations to compensate for the loss of their vertical gains. Other scholars proposed that the "strong hand" policy is favorable to support the economy at times of recession (see Roland, 2002).

The article aims to contribute to the debate by examining institutions, which have been most important for growth in transition countries. Like other articles in the institutional literature, we test growth against institutions and classical growth factors such as investment and export. However, our sample focuses on the post-1996 period of the transition process, which allows avoiding the period of structural breaks in the early 1990s. Also we employ a new set of the institutional

variables published by the World Bank (WB) against the transition index of the European Bank for Reconstruction and Development (EBRD), which has been commonly used by other researchers. The transition index represents the quality of restructuring (e.g. privatisation), while the governance indicators (e.g. rule of law) measure the quality of institutions. We employ the governance data from an aggregate and four individual sources[1]. Since the institutional variables tend to correlate strongly with the rest of regressors, we thoroughly examine all sources in order to choose the variables that are not subject to multicollinearity. We also test for the presence of endogeneity between growth and institutions.

1 LITERATURE REVIEW

There is no unique set of institutional variables that is commonly accepted by all researchers. As two of the most often-referenced authors in the field Stephen Knack and Philip Keefer put it, the main justification behind searching for other (a new set of) variables explaining institutional change is that these new variables provide an additional insight into the sources of economic growth. As an example, Knack and Keefer (1995) tested the databases of the International Country Risk Guide (ICRG) and Business Environmental Risk Intelligence (BERI) as the alternatives to the Gastil indices offered by Barro (1991). The ICRG includes measures of the expropriation risk, rule of law, repudiation of contracts by the government, government corruption and quality of bureaucracy, while the BERI database represents the quality of the contract enforceability and infrastructure. On the other hand, the Gastil indices, which were once the only institutional data source, measure the civil liberties and political freedom. To avoid the multicollinearity between these databases, authors aggregated all indices of the ICRG and BERI into the single ICRG and BERI variables, respectively.

Originally Barro (1996) employed the following growth equation specification:

$$Growth_{i,t} = \beta_{0,i} + \beta_1 GDP60_{i,t} + \beta_2 SEC60_{i,t} + \beta_3 PRIM60_{i,t} + \beta_4 GOVCONS_{i,t} + \beta_5 Gastil_{i,t} + \beta_6 PPRIDEV_{i,t} + \varepsilon_{i,t}$$

1 All of them are published by the World Bank at http://info.worldbank.org/governance/wgi/index.asp

where $Growth_{i,t}$ is the annual growth of real output from 1690 to 1985 of the country i at time t, $GDP60$ is initial income in the sample of 1960-85, $SEC60$ and $PRIM60$ are secondary and primary school enrollment in 1960, $GOVCONS$ is government consumption, $Gastil$ is the Gastil democracy indices and $PPIDEV$ is the deviation of the Summers and Heston investment deflator from the sample mean. This was later modified by Knack and Keefer (1995) in order to substitute the ICRG and BERi for the Gastil indices. The results indicated that the ICRG and BERI coefficients had a better explanatory power than did the Gastil measures. Moreover, they were robust to the inclusion of investment variables, which implies that even if the returns were expected to be high in the countries with low capital stock, investors would prefer to invest into the high stock countries with high quality institutions. Another important finding is that the capital accumulation and similar classical explanatory variables were not included into the regression based on the assumptions that they would be correlated with the variables such as government consumption and property rights protection (i.e. capturing their influence and producing biased standard errors). The authors admit that the specification used by them, as well as, by Barro(1996) is subject to omitted variable bias. However, they argue that growth depends on multiple factors and it is normal for any equation to omit some of them (Knack and Keefer 1995). The ICRG and BERI proved to be significant also in the case when the Gastil indices were included into the regression. According to the authors, this result suggested that the former captured the effect of some variables omitted by Barro and therefore produced less biased estimates[2]. In addition, they assumed that their estimations, as well as those, by Barro, may be subject to endogeneity.

In the case of transition economies, the inclusion of traditional growth factors such as government expenditure and investment has been questioned by some scholars. The estimations by Fidrmuc (2003) showed that these variables had an insignificant effect on growth and, in some cases, with the reverse signs. Falcetti, Lysenko and Sanfey (2006) argue that the quality of data on capital investment is poor and therefore unreliable. Instead, based on the other similar studies, the authors proposed to include the explanatory variables capturing the

2 In their estimations adjusted R^2 was close to 0.28 against 0.5 in the typical cross-country regressions. They explained this with the limited sample (1974-1989) and a limited number of observations: 97 in the case of ICRG, and 47 for BERI.

initial conditions and stabilisation policies. They calculated a composite index for initial conditions which includes the initial level of GDP, the distance relative to the EU, the initial allocation of labour, the length of the former command economy period in the region, etc. As to stabilisation policy, they had two options to choose from: inflation and fiscal balance of the government. Since inflation took extremely high values in the beginning of the transition, the authors chose the second option. However, they admit that the data on fiscal balance were also not reliable for the early periods of transition due to improper accounting practices. Furthermore, they also employed the reform index of the EBRD, but since not all reforms can be included into the estimation (i.e. because of multicollinearity), they used the composite EBRD index[3]. The other methodological issue was that some of those countries, which initially experienced severe output declines had significant growth rates in the recovery period. For example, the CIS countries, which typically faced long and deep recessions, saw their growth rates to be close to 6-8 %. By contrast, in the former command economies with relatively smooth starts the medium term growth rates were also moderate. Furthermore, an increase in oil prices helped growth in oil-rich countries such as Russia and, in general, the authors found a strong correlation between oil prices and growth in transition economies. Since all transition countries have become integrated into the regional economy, these oil-spillovers (e.g. in Russia) expanded to the whole CIS region. Similarly, growth in Central and Eastern Europe was largely helped by the economic development in the EU. Finally, based on the theoretical assumptions above, Falcetti, Lysenko and Sanfey (2006) proposed the following specification (with expected signs):

$$Growth_{i,t} = \beta_{0,i} + \beta_1 t + \beta_2 t^2 + \beta_3 IC_{i,t} \cdot t + \beta_4 IC_{i,t} \cdot t^2 + \beta_5 Ref_{i,t-1} + \beta_6 Fis_{i,t} + \beta_7 Recov_{i,t} + \beta_8 Oilbal_{i,t} + \beta_9 Expgrowth_{i,t} + \varepsilon_{i,t}$$

where $Growth_{i,t}$ is the annual growth of real output of the country i at time t, IC is initial conditions index, Ref is the EBRD's reform index, Fis is general government balance relative to GDP, $Recov$ is a dummy

3 They considered the possibility of assigning a proper weight to each reform in the composite EBRD index. Indeed, some refroms are more difficult to implement. However, they admitted that any weight assigned would be done in a subjective manner. They proposed to use a simple averge of all reform measures of the EBRD.

variable indicating if the country has reached its output level in 1989, *Oilbal* is the share of oil exports in the GDP, *Expgrowth* is growth of exports.

Falcetti, Lysenko and Sanfey (2006) found that output recovery, oil prices and external growth had a positive impact on growth. However, the statistical significance of these variables for growth has not been more than reforms. The authors also revealed that the impact of initial conditions on growth diminishes over time.

Summarising the empirical findings in the literature on the institutions and transition, Staehr (2005) has listed the followings:

(i) The initial growth rates were negative across all transition countries, including those early reformers. There is little correlation between the initial fall in output and reforms.

(ii) Classical production factors fail to explain growth in transition countries.

(iii) The structure and economic well-being in the pre-transition period determined the rate of initial growth. However, their influence weakened over time.

(iv) Structural reforms, including monetary stabilisation, have a long term positive impact on growth, but in the short run they may also decrease it.

He also points to the unresolved issues in the literature on the link between institutions and transition. Notably, it is not yet clear what reforms have had the most significant contribution to growth, what set of the complementarily is the most effective and what is the desired speed of reforms. Staehr (2005) states that there have been a number of articles attempting to figure out the most significant reform for promoting growth (see Havrylyshyn and Rooden, 2000). He argues that all these efforts did not yield conclusive outcomes, since there is multicollinearity between individual reform variables, the quality of data is poor, theoretical assumptions are poor and the growth process is itself unstable. To address multicollinearity the aggregate indices of reforms can be employed in the regressions. Otherwise, there is risk of misspecification bias. On the other hand, there is a debate on whether

complementarity is more important than the individual reforms, given that there is a lack of the reliable data and the issue of specification. Given endogeneity between reforms and growth Staehr (2005) proposes that growth can be explained by the initial conditions, the choice of economic reforms and external shocks. His estimations were based on the EBRD indices since he assumed that the major institutional variables were strongly correlated with these indices. Staehr (2005) applied the following specification:

$$Growth_{i,t} = \beta_{0,i} + \beta_1 Growth_{i,t-1} + \beta_2 TREND_{i,t} + \beta_3 WAR_{i,t} + \beta_4 INFLATION_{i,t} + \beta_5 EBRD_{i,t} + \varepsilon_{i,t}$$

where $Growth_{i,t}$ is the annual growth of real output of the country i at time t, $TREND$ is a time trend variable (1989-2001) that controls for time in growth variables, WAR is a dummy, which equals 1 in the case of war and civil unrest, and $EBRD$ is the EBRD reform index that is the average of eight variables explaining reforms in the area of liberalisation, competition, governance restructuring, large-scale privatisation, small scale privatisation, price liberalisation, securities market and foreign exchange system.

Staehr (2005) found that Growth and TREND were statistically significant, which suggests that the latter had absorbed the influence of the omitted variables (which was mainly due to the exclusion of outliers). On the other hand, to offset heteroskedasticity, the author employed the Weighted Least Square (WLS) model and checked robustness of the estimations applying the alternative methods such as the Ordinary Least Squares (OLS) and the Generalised Method of Moments (GMM). While similar results were obtained across all methods, WLS seems to have outperformed the rest because it demonstrated smaller standard errors.

Alternatively, De Macedo and Martins (2008) proposed the following specification:

$$Growth_{i,t} = \beta_{0,i} + \beta_1 InitCon_{i,t} + \beta_2 INFLATION_{i,t} + \beta_3 RL_{i,t} + \beta_4 RC_{i,t} + \beta_5 \Delta RL_{i,t} + \beta_6 \Delta RC_{i,t} + \varepsilon_{i,t}$$

where $Growth_{i,t}$ is the annual growth of real output of the country i at time t, $InitCon$ is the set of dummy variables taking a value of 1 for each group according to the EBRD classification, $INFLATION$ is the

inflation rate based on CPI, *RL* is the reforms level (the average of the EBRD's transition scores, which range from +1 to +4) and *RC* is the reform complementarity index, which can be interpreted as the measure of variety of reforms[4]

Their sample included 28 transition countries over the period of 1984-2004. The macroeconomic stabilisation policy outcomes were proxied by the CPI growth (i.e. inflation). According to the authors, compared to other alternative measures, the inflation rate is commonly accepted as the best proxy for the effectiveness of macroeconomic policies. As De Macedo and Martins (2008) explain, the expected signs imply that at the outset of transition, the increased pace of reforms positively contributes to growth, but then reform complementarity will be necessary to keep high growth rates. The authors applied the GMM method to avoid endogeneity (or simultaneity) arising between growth, level of reforms and the inflation rate.

It should be noted that the majority of research articles have been focusing on reforms such as liberalisation, privatisation, etc. Almost all authors employed the EBRD indices to represent the institutions, while we propose to substitute the alternative measures of institutional quality for the EBRD data. As we shall see, the institutional variables and the EBRD data tend to be strongly correlated and therefore they mutually cause the multicollinearity in our regressions. While the EBRD indices represent the reforms in the areas such as finance, telecommunications, infrastructure, they do not completely qualify to be proxies for the institutional qualities. Since our aim is to find which institutions have been most important for growth, we employ the data on governance indicators (both aggregate and individual) as explained in the next section.

2 METHODOLOGY

North (1989) claims that institutions are important for growth. Moreover, he argues that institutions explain differences in economic development to a greater extent than the traditional factors of production. This is in line with a few empirical findings in the

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4 $RC = \frac{1}{\sum_i \left(\frac{R_i}{RL\,N}\right)^2}$, where N is the number of reform areas (such as large scale privatisation, financial sector reform, etc).

transition literature, which show that classical production factors cannot always explain growth. Other authors compared effects of institutions and structural policies on growth. For example, Keefer and Shirley (2000) argue that strong institutions in the presence of weak macroeconomic policies cause greater growth compared to weak institutions in the background of strong macroeconomic policies. We contribute to this debate by examining whether institutions have a greater impact on growth than factors of production and macroeconomic policies in the case of transition economies. Subsequently, we propose to test the following hypothesis:

Hypothesis 1: The importance of institutions for growth is higher than other inputs.

Acemoglu and Robinson (2008) put forward the hypothesis that the cross-country differences in growth seem to be caused by not only the quality of institutions, but also by their heterogeneity. They give an example of European colonies in the late fifteenth century. Europeans initiated two categories of institutions in their colonies: first, property-rights and other institutions conducive to the development of business by European settlers; and second, institutions helping to develop extractive industries. The first category was established in colonies in the U.S., Canada, Australia and the second in Africa, Central America and South Asia. The authors found that there was a strong correlation between the category of institutions and income per capita.

Although heterogeneity of institutions matters for growth, it is not clear which institutions are growth promoting. North (1990) singles out property rights as a significant factor shaping growth. Knack and Keefer (1997) tested the link between trust and growth across 29 market economies. They found trust and civic norms to have a significant positive impact on economic development. However, the statistical significance of certain types of institutions in growth regression varies from sample to sample. We contribute to this debate by testing the following hypothesis:

Hypothesis 2: Certain types of institutions affect growth more than others in transition economies.

The empirical test results will help us to answer our research question: "what institutions have been most important for growth in transition

economies?" Furthermore, we control for the EU membership incentives, which have a strong impact on rapid institutional changes in the EU accession countries.

Falcetti, Lysenko and Sanfey (2006) found that reforms had a significant influence on growth after the break-up of the former Soviet regime. Furthermore, the effect of the reforms lasted over subsequent years and enhanced growth necessitated the implementation of further reforms. The simultaneity bias caused by endogeneity between growth and institutions in the sample of transition countries has been acknowledged by other authors too (see Staehr, 2005; De Macedo and Martins, 2008). We propose the following hypothesis to address this issue:

Hypothesis 3: Growth affects institutions and therefore both growth and institutions are endogenous.

As discussed in the methodology section below, we employ Hausman and Granger causality tests for endogeneity. Subsequently, the 2SLS model is employed to account for possible simultaneity bias. However, due to the short transition period the effect of growth on institutions may not be large.

2.1 DATA

In the transition literature it is often assumed that that the data collection was imperfect in the early period of the transition process. Indeed, the transition started unexpectedly because the collapse of the socialist ruling itself was unanticipated by experts. As a result, the public statistical agencies, like many other government bodies, experienced rapid administrative transformations. Since the old methodologies were inadequate and the new ones were not yet in place, the data collection practices remained at a poor level. Therefore, many researchers question the reliability of the data gathered at the beginning of the transition process. For example, De Macedo and Martins (2008) had to remove outlier points of the unusual (or unexpected) high growth and inflation rates, which would cause biased estimates of other variables. Such outliers are the observations for Yugoslavia during 1992-1993, Georgia in 1994 and Turkmenistan in 1993. Obviously, these unexpected and extreme values in data reduce the reliability of the research outcomes. Similarly, Staehr (2005) and

Falcetti, Lysenko and Sanfey (2006) also had problems with the data for the early periods of transition. The sample that we employ starts from 1996 and, to our best knowledge, this year and beyond were not mentioned in the literature as the years with the outlier points. On the other hand, the world financial crisis of 2008-09 may be considered as a structural change too. As we shall see, due to the cross-match between different databases, our panel regression samples will include the data up to 2007. Therefore, we effectively avoid this issue of structural changes caused by the world financial crisis. As mentioned in the literature review, we employ the Worldwide Governance Indicators (WGI) published by the WB as variables explaining the quality of institutions [5]. The database was first published in 1996, then once every two years until 2002 and on an annual basis starting in 2002. It comprises the data collected from 31 sources provided by 25 organisations and covers over 200 countries. At present, the WGI is the only comprehensive database on institutions drawing from all available public and commercial governance data sources. For example, the global poverty reduction projects such as the United States Millennium Challenge Account employs the WGI indicators as the eligibility criteria for the applicant countries (Kaufmann, Kraay, and Mastruzzi 2007). As Kaufmann, Kraay and Mastruzzi (2007) claim, the WGI indicators have a competitive advantage over the other databases on institutions because they cover the largest number of countries and reduce biases involved in using the individual databases through offering the aggregated estimates across all available sources. Furthermore, they find that due to the specific weights assigned to the source data, the WGI indices demonstrate 20 percent fewer marginal errors compared to alternative aggregate data based on the unweighted averages. However, the WGI has been criticised for joining the different data sources under one category (e.g. corruption), which might make it impossible to apply the WGI indices in the panel data analysis (see, Arndt and Oman, 2006). For example, in the extreme case, one country may appear in the judiciary corruption database and not appear in the procurement corruption data series. Answering these and some other critiques, Kaufmann, Kraay and Mastruzzi (2007)

5 This database is one of the most important outcomes of a research program that the WB Institute and the Research Department of the WB launched in 1990 (IBRD 2007). Daniel Kaufmann and Aart Kraay were initiators of this program and therefore the governance database variables have become known as "KK" indicators. See www.govindicators.org for more details.

argue that the cases where a country is present in one source and absent in the other are relatively few. Moreover, the WGI standardises various databases and generalises them (e.g. considering corruption on the very general level) so that the comparability is no longer an issue. However, the authors admit that the above criticisms would be relevant should the source databases be able to accurately distinguish between the corruption types. Furthermore, it is unlikely that different types of corruption will be uncorrelated. In practice, it is almost impossible to meet any country with high levels of judiciary corruption and, at the same time, with the low level of administrative corruption (Kaufmann, Kraay, and Mastruzzi 2007:9).

The data from all 31 different sources are organised into one of the six WGI categories:

1) Voice and accountability (VA) - transparency of the elections, free media and free associations 2) Political stability and absence of violence (PV) - absence of political coups and violence 3) Government effectiveness (GE)- the quality of public and civil services, the quality of policy initiatives and implementation effectiveness

4) Regulatory quality (RQ) - ability of the government to devise the required policies and to implement them, its commitment to policies and credibility

5) Rule of law (RL) – the extent to which residents follow the rules of society, the contract enforcement quality, property rights, the effectiveness of courts and police

6) Control of corruption (CC) – capture of the state for private interests, the extent to which authority is exercised for private gain and corruption.

The aggregation procedure for each of these categories is done through assigning specific weights for the sources[6]. Kaufmann, Kraay and Mastruzzi (2010) explain that the weights are assigned as follows:

$$w_k = \frac{\sigma_k^{-2}}{1 + \sum_{k=1}^{K} \sigma_k^{-2}}$$

6 See www.govindicators.org for more details.

where w_k is the weight assigned to the k^{th} source, σ is the variance of error term of the k^{th} source, K is the number of sources involved in WGI index.

An individual source with the lower error variance receives a greater weight in the WGI index because it has a more precise measure compared to other underlying sources. Each WGI indicator takes value from -2.5 to +2.5 and higher values reflect the improved institutional performance. The authors admit that since there are no clear-cut borderlines between the institutional categories above, the individual WGI categories tend to be highly correlated. This implies that there is a strong interrelation between the governance indicators. Moreover, the annual updating of the WGI indicators also covers all previous periods. This is done by the WB in order to maintain the comparability of time series across years. Kaufmann, Kraay and Mastruzzi (2010) suggest that when comparing WGI across categories and countries, it is useful to take into account the source data because the WGI is a sum of the weighted averages and these weights may change over time. The authors also claim that the true measure of governance is unobservable and we can only estimate it through imperfect proxies. In order to increase the precision and coverage, each of WGI categories includes as many sources as possible. In turn, this makes the database unbalanced, which means that, for example, changes in the data may be caused by the newly-added individual database.

We sorted the WGI database to create a sample consisting of 29 transition countries as defined by the EBRD. The sample includes all available observations for the years 1996, 1998, 2000 and 2002-2009. The missing data for some countries and discrete time series between 1996 and 2002 make our panel unbalanced. Nevertheless, these missing points constitute a small fraction compared to the overall data and therefore we do not have strong arguments to assume that they may cause the problem of extreme heteroskedasticity. On the other hand, following Kaufmann, Kraay and Mastruzzi (2010), we expect that the WGI indices, which are weighted averages of the individual sources, are strongly correlated. Indeed, as table 1 shows, the cross-correlations between the WGI variables in our sample demonstrate a strong multicollinearity pattern across all categories.

Table 1: Cross correlations of WGI indicators

	VA	PV	GE	RQ	RL	CC
VA	1					
PV	0.71	1				
GE	0.89	0.75	1			
RQ	0.92	0.67	0.91	1		
RL	0.91	0.80	0.93	0.90	1	
CC	0.89	0.77	0.92	0.85	0.94	1

Source: Based on Worldwide Governance Indicators database

These strong correlations may cause the multicollinearity in our regressions, thus increasing the standard errors of the explanatory variables. Although multicollinearity will not make our estimates biased, it may change the significance of our control variables and lead to Type II errors (i.e. we do not reject the false null hypothesis). Since the different individual sources tend to overlap in their methodology and data collection procedures and they have very similar definitions for different governance indicators, their averages are also correlated. In other words, because of grouping the various sources into one the WGI category, our sample is unbalanced and there is high correlation between these categories.

Following the suggestion of Kaufmann, Kraay and Mastruzzi (2010) that the WGI should be complemented by the analysis of the underlying source data, we examined the coverage of individual sources[7]. There are four individual sources which completely cover the whole observation period (11 years). They are the Political Risk Services (PRS), the Economist Intelligence Unit Riskwire and Democracy Index (EIU), the Institute for Management and Development World Competitiveness Yearbook (WCY), the Global Insight Business Conditions and Risk Indicators (WMO). To answer our main research question, we employ all these sources in our regression analysis. However, the main limitation of this method is that some of the transition countries are present in one source and absent in the other. For example, Georgia and Kyrgyz Republic are in the EIU, but missing in the WCY. As a result, some of these individual sources have shorter coverage than others. Nevertheless, these sources enable us to choose the most appropriate one to test our hypothesis. As discussed above, the institutional variables tend to be

7 Data are available on request (see also Raimbaev, 2011).

highly correlated with each other. As a result, we run the cross-correlation tests across WGI, PRS, EIU, WCY, and WMO in order to reveal the database with the least correlated variables. The test results suggested that the PRS demonstrates the least cross-correlation compared to other sources, while the WMO shows the highest correlations except for PV.

Another important data set for our research is the transition index published by the EBRD. There are 14 categories in the transition index. They all range from +1 to+ 4 with high scores implying better performance (see EBRD, 2010). These categories are namely: large scale privatisation, small-scale privatisation, enterprise restructuring, price liberalisation, trade and foreign exchange system, competition policy, banking reform and interest rate liberalisation, securities markets and non-bank financial institutions, overall infrastructure reform, telecommunications, railways, electric power, roads and water and waste water. As the names imply, these indicators measure the effectiveness of policies in the infrastructure, finance and communications sectors. We employ the unweighted average of the EBRD index since there is a strong correlation between its individual components.

It was mentioned earlier in the methodology section that some authors suggest employing the inflation rate as the measure of the success of the macroeconomic stabilisation policies. The WB provides the GDP deflator, CPI and annual inflation percentage rates based on these two price levels. Among them, the data on GDP deflator is the most complete variable covering all 29 transition countries over the period from 1996 to 2009. CPI series have many missing points compared to the data on inflation percentage rates based on CPI. This is explained by the unwillingness of some countries to disclose the actual price levels, while agreeing to publish the rates of inflation.

Following the literature review, we have sorted these WB data for the application in our regression analysis: the school enrollment (primary and secondary), gross fixed capital formation, general government final consumption expenditure, and energy production from all sources (equivalent of t of oil), energy use and foreign direct investment. Additionally, we included an EU accession dummy for the new member countries.

2.2 SPECIFICATION

We start our empirical analysis by employing the fixed effect panel regression analysis. The sample consists of 29 transition countries and covers the period of 11 years (1996, 1998, 2000 and 2002-2009). The fixed effect model has two main advantages: first, it helps to increase the number of observations given the limited database on transition economies and second, it avoids the omitted variable bias associated with data that do not change over time. The latter is expected to substantially improve the regression results since the transition economies are supposed to have region-specific fixed features. The fixed model also helps to avoid the effects related to the initial conditions, since most of the authors claim them to be time-invariant (See, De Macedo and Martins, 2008). As a result, with the fixed effects panel model there is no need to include dummy variables capturing the regional and initial conditions. This is perfectly consistent with the modeling outcomes from the previous chapter, which demonstrated that there are time-invariant features of institutions. Therefore, the fixed effects model allows us to specifically focus on the impact of the dynamic or formal institutions on growth.

Following Staehr (2005), we specify our regression model to include explanatory variables such as inflation and the average of the EBRD transition indices. Structural economic changes due to the break-up of the former Soviet regime caused persistent high levels of inflation rates in post-command economies. Initially the consequences of inflation-curbing policies were not dramatic given that there were few banks and the financial sector was not yet fully functional. However, later the creation of national financial markets increased the cost of anti-inflationary measures. Cottarelli and Doy (1999) argue that the transition countries have learned to live with inflation and reduce its social costs by persistent indexation of salaries, stipends and pensions to match the expected price increases. The EBRD transition indices are also important part of our specification, because they measure the scale of the post-soviet reforms in the areas of liberalisation, governance restructuring, securities market and foreign exchange system. These indices are traditionally employed in the literature as an institutional explanatory variable.

We also follow Falcetti, Lysenko and Sanfey (2006), who proposed including variables such as oil production, export growth and general

government balance relative to GDP. Economies of oil and gas rich transition countries such as Azerbaijan and Russia are dependent on world energy prices. For example, Azerbaijan had the growth rate peaking at 33% in 2006, which was made possible by the opening of the Baku-Tbilisi-Ceyhan pipeline in collabouration with Armenia (EBRD, 2006). The opening of the pipeline was accompanied by high world oil prices. Due to this extraordinary growth rate Azerbaijan was the fastest growing economy in the world. To account for resource-rich economies, we employed balance of energy production and consumption per capita (t of oil equivalent) in our specification. Exports are the main source of foreign currency income for all transition economies and therefore export growth has been a priority direction after the break-up of the former Soviet Union. As Falcetti, Lysenko and Sanfey (2006) observe the inflation rate and government expenditure are traditionally employed in the literature to account for the success with the stabilisation policies. However, government expenditure may collinear with the inflation variable because in transition economies, where financial markets are still in their initial stage of development, the issuing of extra liquidity is a common way of covering the budget deficits. On the other hand, if inflation is cost-push this assumption will be weak because this type of inflation may co-exist with budget surpluses. Therefore, we include both inflation (given by GDP deflator)[8] and general government balance. Furthermore, we add an EU accession dummy to account for an impact of the EU accession process. Furthermore, foreign direct investment growth and fixed capital formation are also included in the specification because growth depends on the attractiveness of business environment for foreign capital and domestic investment[9]. One of the distinguishing features of transition economies is strong human capital. Following Knack and Keefer (1995), we add the primary and secondary school enrollment regressors to account for the effect of human capital on growth:

8 As discussed earlier the available data provide us with three options: inflation given by CPI, GDP deflator and logarithm of GDP deflator. We chose inflation based on GDP deflator over the rest because it has a better coverage of the sample.

9 Initially, we planned to include foreign aid, but the data on aid turned out to be incomplete. Moreover, we expect that the volume of the aid tends to drop dramatically over time and, therefore, the aid variables were not included.

$$GROWTH_{i,t} = \beta_{0,i} + \beta_1 EBRDAVER_{i,t} + \beta_2 FDIGROWTH_{i,t} + \beta_3 ENERGY_{i,t} + \beta_4 EUACCESS_{i,t} + \beta_5 EXPGR_{i,t} + \beta_6 LFIXCAP_{i,t} + \beta_7 GOVBAL_{i,t} + \beta_8 TIME + \beta_9 INFLATION_{i,t} + \beta_{10} ENROLPRIM_{i,t} + \beta_{11} ENROLSECOND_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $GROWTH_{i,t}$ is the annual percentage growth of real output of the country i at time t in PPP terms (constant 2005 international $), $EBRDAVER$ is an average of EBRD transition indices, $FDIGROWTH$ is a foreign direct investment growth (BoP, current US $.), $ENERGY$ is a balance of energy production and consumption per capita (t of oil equivalent), $EUACCESS$ is *a* dummy taking value 1 for the new EU member states, $EXPGR$ is percentage growth of exports of goods and services (constant 2000 US $), $LFIXCAP$ is logarithm of fixed capital formation (constant 2000 US $), $GOVBAL$ is a general government final consumption expenditure (constant 2000, US $), $TIME$ is a transition period variable taking value 1 starting from 1996, $INFLATION$ is the inflation rate based on GDP deflator (annual %), $ENROLPRIM$ is a school enrolment, primary (% gross), $ENROLSECOND$ is a school enrolment, secondary (% gross).

To test *hypothesis 1* we add the aggregated institutional variables across all five sources (i.e. WGI, PRS, EIU, WCY and WMO) to equation (1):

$$GROWTH_{i,t} = \beta_{0,i} + \beta_1 INST_{i,t} + \beta_2 EBRDAVER_{i,t} + \beta_3 FDIGROWTH_{i,t} + \beta_4 ENERGY_{i,t} + \beta_5 EUACCESS_{i,t} + \beta_6 EXPGR_{i,t} + \beta_7 LFIXCAP_{i,t} + \beta_8 GOVBAL_{i,t} + \beta_9 TIME + \beta_{10} INFLATION_{i,t} + \beta_{11} ENROLPRIM_{i,t} + \beta_{12} ENROLSECOND_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $INST_{i,t}$ is an average of institutional categories from the different sources given by WGIAVER, PRSAVER , EIUAVER, WCYAVER and WMOAVER for the country i at time t.

We use the aggregated variables to avoid multicollinearity that the individual institutional indicators (VA, PV, GE, RQ, RL, CC) might have within each source. Subsequently, this allows us to test *hypothesis 1* across all sources. The explanation for the positive signs in equation (2) is straightforward. However, government consumption as a share of GDP can affect growth both positively and negatively.

Therefore, there is no predetermined sign for it. If the government focuses on value-added activities such as construction or investment in education, then the positive sign should be expected. On the other hand, more centralised expenditures may also imply diverting resources to less productive areas. The theory would suggest that growth is subject to business cycles and since transition countries are supposed to be in the recovery phase, TIME is expected to have a negative sign. Based on our observations, we may add that the high oil prices from the recent past might have been significantly harmful to growth prospects in transition economies. As a result, the increases in TIME should be associated with the diminishing rates of growth. INFLATION is expected to get the negative sign because the high rates of inflation are associated with the failing macroeconomic reforms.

We start our regression runs with the model which includes all theoretically relevant regressors in order to avoid the possible omitted variable bias. Although equation (2) has all of its variables based on theoretical assumptions, we nevertheless expect some of them to be irrelevant. After balancing out our regressions (i.e. removing irrelevant regressors), we test *hypothesis 2*. For this reason, we replace the averages of institutional indicators with individual variables:

$$GROWTH_{i,t} = \beta_{0,i} + \beta_1(VA, PV, GE, RQ, RL, CC)_{k,i,t} + \beta_2 EBRDAVER_{i,t} + \beta_3 FDIGROWTH_{i,t} + \beta_4 ENERGY_{i,t} + \beta_5 EUACCESS_{i,t} + \beta_6 EXPGR_{i,t} + \beta_7 LFIXCAP_{i,t} + \beta_8 GOVBAL_{i,t} + \beta_9 TIME + \beta_{10} INFLATION_{i,t} + \beta_{11} ENROLPRIM_{i,t} + \beta_{12} ENROLSECOND_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $(VA, PV, GE, RQ, RL, CC)_{k,i,t}$ is *VA, PV, GE, RQ, RL,CC* variables from WGI(k=1), PRS(k=2), EIU (k=3), WCY (k=4) and WMO (k=5)

As discussed above, our regressors may be subject to endogeneity, which is the feedback effect from growth to the institutional variables. Some authors suggested that endogeneity is not an issue in the case of transition economies because transition has gone over a very short period for this effect to be apparent. However, De Macedo and Martins (2008) claimed that there might be endogeneity between growth, the inflation rate and level of reforms in the transition countries. We use the Granger causality and Hausman tests to reveal any simultaneity

between growth and individual institutional variables[10]. Then, if the simultaneity is detected, Two Stage Least Squares (2SLS) method will be used to run our regressions as a simultaneous equations system. In addition, this change in specification tests our estimations for robustness. Moreover, Staehr (2005) suggested that the growth model should be of the dynamic form with the first order lagged dependent variable as one of the regressors. However, we suppose that the application of dynamic regression model to the small samples will generate biased estimates. This bias is normally caused by the serial correlation specific to the dynamic models and makes the Durbin-Watson *d* test unreliable[11]. While there are some alternative remedies to cope with these issues, their effectiveness is not significant in the small samples. Nevertheless, in the results section below we also provided the outcomes for the dynamic version of equation (3). We used the GMM method for dynamic panel estimates with the fixed effect.

The advantage of the panel estimation with the fixed effect is that it helps to control for the impact of country specific fixed features on economic development. However, if there is need to evaluate the magnitude of the heterogeneities, the random effect model is appropriate (although it may be subject to the omitted variable bias). We propose to run a Hausman test in order to see if the fixed and random effect models for equation (3) are indeed significantly different. If they are not, then we would be able to extract unbiased results from the random effects model too and evaluate the coefficients of the region-specific dummy variables.

3 RESULTS

In this section, we empirically test *hypotheses 1, 2 and 3.* Table 2 (a,b) below shows the regression estimates based on equation (2). Following our methodology, first we try to identify the irrelevant variables. Regressions 7 and 8 demonstrate a serial correlation pattern. It should be noted that although we collected the maximum data

10 We use the Hausman test proposed by Davidson and MacKinnon (1989). This version of the Hausman test is done with the help of auxiliary regressions.

11 The serial correlation in dynamic models is the usual case since the error term is always correlated with the lagged dependant variable. Unlike in other OLS models, this serial correlation also results in biased estimates.

available for our variables and in the best case would expect the degrees of freedom to reach 300 observations, the missing data in some of variables caused the sample to diminish almost by half (i.e. to around 150 observations). Since we are applying unbalanced data the maximum possible sample is employed. The results presented in table 2 (a,b) suggest that there are some irrelevant variables. Our decision about the relevancy of a variable is based on the theoretical assumptions, the cross-correlation table (i.e. for possible multicollinearity), changes in adjusted R^2 and the Akaike and Schwarz criterion.

The insignificant t- statistics from table 2 (a,b) below suggest that the EBRDAVER, EUACESSS, and GOVBAL are irrelevant variables. Indeed, regressions 2, 4, 6, 8, 10 and 11 demonstrate that the estimates become slightly better once these variables are removed. We also find EBRDAVER to be strongly correlated with all aggregate institutional variables and EUACCESS[12]. Similarly, GOVBAL is strongly correlated with INFLATION, which may suggest that governments in transition countries tend to cover their budget deficits primarily from inflationary sources. As with regard to ENROLPRIM and ENROLSECOND, the tests showed that these are relevant variables although they remain steadily insignificant. Their exclusion caused the omitted variable bias, which is opposite to Falcetti, Lysenko and Sanfey (2006), who claimed that school enrollment can be omitted from growth regressions in the case of the former planned economies. As discussed in the methodology section above, the authors supposed its effect to be too weak at the early stages of the transition. While we agree that ENROLPRIM and ENROLSECOND have insignificant effect, we keep them in our regressions based on the strong theoretical assumptions from the classical growth literature and in order to reduce the possible omitted variable bias.

To test *hypothesis 1* we use even numbered regressions (columns) in table 2 (a,b) because they do not include irrelevant variables discussed above. The WGI data are measured on the scale from -2.5 to +2.5, while the institutional variables from PRS, EIU, WCY and WMO

12 It can be argued that these variables are subject to a severe multicollinearity and therefore, not necessarily irrelevant. On the other hand, as a remedy for multicollinearity some of these variables might be removed. Based on these arguments, we still tend to consider them as irrelevant variables.

databases take values between 0 and 1. Therefore, we expect the coefficients of WGI to be greater than that of the alternative sources. EUACCESS is a dummy variable, FDIGR also ranges from 0 to 1, ENERGY is measured in tons of energy equivalent of oil per capita, EXPGR, INFLATION and school enrollment explanatory variables are given in percentage terms.

We can draw a number of conclusions from the regression results presented in table 2 (a,b). Except for WCYAVER, across all regressions three variables demonstrated a significant impact on growth: ENERGY, EXPGR and LFIXCAP. On the other hand, our interest variables WGIAVER, PRSAVER, EIUAVER, WCYAVER and WMOAVER were not as significant, except perhaps for PRSAVER. However, these interest variables increased their significance after the removal of the EBRDAVER, which pointes to the presence of multicollinearity in the original regressions (i.e. regressions 1, 3, etc).

Regression 11 which does not include the interest variables demonstrated good statistical results. Its adjusted R^2 is equal to 0.68 and there is no sign of econometric issues. On the other hand, the explanatory power of this regression increases to 0.73 after we add PRSAVER to the regression (i.e. adjusted R^2 increased from 0.68 in the column 11 to 0.73 in column 4). However this is not the case with other institutional variables. It follows that *hypothesis 1* test results depend on which institutional source is considered. We may accept this hypothesis if we employ the aggregated PRS database, while reject it in the case of the EIU. Both WGI and WMO's aggregated measures demonstrated the rejection of the null hypothesis of no institutional impact on growth at 10% significance level. It can be argued based on the theoretical assumptions that these regressions may be subject to endogeneity (or simultaneity) bias and that there is a feedback effect going from growth to institutional variables. As a result, there might be a specification error too. To address this argument, we run the Granger causality and Hausman tests across growth and aggregate institutional variables[13]. The Granger causality test results demonstrate that there is no dual causality (therefore, endogeneity).

13 Estimations are available on request.

Table 2a: OLS fixed effect panel regression results over the five sources (WGI, PRS, EIU, WCY, WMO). Dependent variable: GROWTH

	WGIAVER		PRSAVER		EIUAVER	
	(1)	(2)	(3)	(4)	(5)	(6)
WGIAVER	2.33	2.50				
	(1.32)***	(1.6)***				
PRSAVER			17.78	19.70		
			(2.18)**	(2.63)*		
EIUAVER					5.27	5.29
					(1.03)	(1.10)
EBRDAVER	0.26		2.33		-3.18	
	(0.12)		(1.01)		(-1.27)	
EUACCESS	0.84		1.11		0.74	
	(1.05)		(1.26)		(0.91)	
FDIGR	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05
	(-0.71)	(-0.73)	(-0.87)	(-0.90)	(-1.13)	(-1.13)
ENERGY	2.26	2.18	2.03	1.79	2.61	2.36
	(3.79)*	(3.83)*	(3.21)*	(3.04)*	(4.32)*	(4.26)*
EXPGR	0.13	0.14	0.15	0.16	0.18	0.17
	(5.69)*	(6.27)*	(5.54)*	(6.28)*	(6.80)*	(7.20)*
LFIXCAP	5.35	4.82	4.34	3.75	3.78	4.01
	(4.65)*	(4.75)*	(3.39)*	(3.40)*	(3.20)*	(3.95)*
GOVBAL	0.10		0.01		-0.09	
	(0.73)		(0.05)		(-0.58)	
TIME	-0.29	-0.19	-0.29	-0.01	-0.16	-0.22
	(-1.48)	(-1.58)	(-1.13)	(-0.02)	(-0.72)	(-1.78)
INFLATION	-0.04	-0.04	-0.05	-0.04	-0.12	-0.10
	(-2.89)*	(-3.00)*	(-3.21)*	(-3.53)*	(-4.73)*	(-5.03)*
ENROLPRIM	-0.02	-0.02	0.03	0.03	-0.06	-0.07
	(-0.28)	(-0.34)	(0.41)	(0.54)	(-0.96)	(-1.15)
ENROLSECOND	0.01	0.01	0.04	0.04	0.10	0.07
	(0.13)	(-0.17)	(0.54)	(0.61)	(1.30)	(0.97)
C	-108.74	-94.25	-112.52	-96.88	-69.52	-82.09
	(-4.05)	(-4.32)	(-3.82)	(-3.95)	(-2.40)	(-3.76)
Number of observations:	161	170	127	135	131	140
Adjusted R^2	0.68	0.68	0.73	0.73	0.75	0.75
Durbin Watson stat	1.92	1.87	1.84	1.79	1.99	1.93

Notes: *, ** and *** denote variables are significant at 1%, 5% and 10% respectively.

The Hausman test, based on lagged growth as an instrument, suggests that there might be some endogeneity between growth and aggregate institutional variables. Therefore, the existence of endogeneity is ambiguous. Furthermore, as we shall see below, possible remedies for endogeneity are not effective given the limited sample size.

Table 2b: OLS fixed effect panel regression results over the five sources (WGI, PRS, EIU, WCY, WMO). Dependent variable: GROWTH

	WCYAVER		WMOAVER		
	(7)	(8)	(9)	(10)	(11)
WCYAVER	-0.09 (-0.01)	-3.00 (-0.36)			
WMOAVER			8.73 (1.28)***	9.00 (1.49)***	
EBRDAVER	13.08 (3.02)*		0.32 (0.09)		
EUACCESS	-0.65 (-0.72)		0.49 (0.58)		
FDIGR	0.01 (0.05)	0.01 (0.03)	-0.02 (-0.36)	-0.02 (-0.38)	-0.04 (-0.86)
ENERGY	-2.23 (-0.70)	0.44 (0.18)	1.79 (3.00)*	1.70 (3.06)*	2.08 (3.66)*
EXPGR	0.10 (2.18)**	0.16 (3.87)*	0.14 (6.05)*	0.14 (6.70)*	0.13 (6.12)*
LFIXCAP	4.18 (1.50)	4.85 (2.25)**	2.94 (2.25)**	2.65 (2.28)**	5.16 (5.14)*
GOVBAL	-0.29 (-0.69)		0.04 (0.20)		
TIME	-0.50 (-1.61)	-0.10 (-0.51)	-0.03 (-0.14)	0.05 (0.32)	-0.18 (-1.48)***
INFLATION	0.04 (0.42)	-0.07 (-0.86)	-0.01 (-0.78)	-0.01 (-0.72)	-0.04 (-2.95)*
ENROLPRIM	0.07 (0.68)	0.02 (0.19)	-0.03 (-0.50)	-0.03 (-0.51)	-0.01 (-0.08)
ENROLSECOND	-0.17 (-1.46)	0.06 (0.63)	0.11 (1.35)***	0.10 (1.35)***	-0.01 (-0.105)
C	-121.01 (-1.80)	-112.72 (-2.29)	-70.94 (-2.35)	-63.82 (-2.63)	-103.51 (-4.89)
Number of observations:	52	60	147	155	170
Adjusted R^2	0.66	0.62	0.70	0.71	0.68
Durbin Watson stat	1.69	1.42	1.94	1.94	1.83

Notes: *, ** and *** denote variables are significant at 1%, 5% and 10% respectively.

The Durbin-Watson statistic shows that there is no serial correlation. Moreover, we did not find any heteroskedasticity in our estimates. Furthermore, since we are using the non-stationary growth variable and our panel with fixed effects controls for the possible heterogeneities in the cross-sections, we have strong arguments to assume that our t-

statistics are not biased[14]. To summarise, our regression results found that the statistical significance of the link between growth and institutions depends on the choice of the governance database. This reflects the considerable discrepancies in the methodologies of the organisations publishing governance indicators. Moreover, we find that even though institutions appeared to be significant for growth, their explanatory power was not more than that of other growth determinants. Therefore, we reject *hypothesis 1*. This supports the findings of Havrylyshyn and Rooden (2000) who claim that while institutions are important for growth in the transition countries, their impact is not as strong as that of structural reforms (or classical growth factors)[15].

We now turn to testing *hypothesis 2*. For this reason, we employ the disaggregated institutional variables as in equation (3) and re-run the previous regressions. The regression results are presented in table 3. When considering the regression outcomes we should recall from the methodology part that except for the PRS, all databases demonstrated high levels of multicollinearity among their individual institutional components. Regressions 12, 13, and 14 suggest GE to be the most significant governance indicator for growth.

GE and RQ are categorised in the WGI methodology into a single category representing "The capacity of the government to effectively formulate and implement sound policies" (Kaufmann, Kraay, and Mastruzzi 2010:4). The greater values of GE represent the improved expectations about the quality of public and civil services, while RQ implies the perception about the potential of the government to implement the regulations aimed at promoting private sector development. As a result, we conclude that institutional variables differ in their significance for growth in the former command economies.

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14 Additionally, as the theory of econometrics suggests, heteroskedasticity, like multicollinearity, does not cause biased estimates, but may increase their standard errors.

15 As discussed in the literature review Havrylyshyn and Rooden (2000) find structural reforms such as privatisation of state assets and eliminating price distortions to have a stronger impact on growth than institutions. Similarly, in our regressions, growth of fixed capital formation and exports (which outperformed institutions) is closely tied to such structural reforms.

Table 3: Panel fixed effect regressions based on equation (3). Dependent variable: GROWTH

	WGI (OLS) (12)	EIU (OLS) (13)	WMO (OLS) (14)	PRS (OLS) (15)	PRS (2SLS)[c] (16)	PRS (GMM)[d] (17)
VA	-3.11 (-2.38)*	2.26 (0.68)	-1.04 (-0.23)	0.05 (0.01)	-32.20 (-1.58)***	0.74 (0.05)
PV	0.89 (1.09)	1.50 (0.39)	-0.33 (-0.10)	3.14 (0.58)	18.76 (2.87)*	15.58 (1.31)**
GE	5.32 (3.88)*	6.37 (1.66)**	12.46 (2.54)*	3.56 (0.99)	3.79 (0.45)	-4.83 (-0.22)
RQ	0.28 (0.23)	2.41 (0.57)	-8.82 (-1.59)**	5.63 (2.17)**	8.87 (3.02)*	-0.84 (-0.09)
RL	-1.23 (-0.71)	-1.03 (-0.22)	3.55 (0.68)	5.14 (1.30)***	-10.64 (-1.78)**	13.58 (0.51)
CC	-1.15 (-0.88)	-2.91 (-1.17)	3.69 (1.01)	-2.30 (-0.55)	8.13 (1.82)**	-26.53 (-1.58)**
FDIGR	-0.04 (-0.84)	-0.05 (-1.11)	-0.01 (-0.30)	-0.04 (-0.93)	-0.07 (-1.11)	-0.05 (-0.66)
ENERGY	1.78 (3.20)*	2.14 (3.56)*	1.86 (3.37)*	1.86 (3.08)*	1.59 (2.98)*	0.70 (0.08)
EXPGR	0.14 (6.54)*	0.19 (7.43)*	0.15 (6.94)*	0.16 (6.04)*	0.17 (6.37)*	0.10 (1.25)
LFIXCAP	4.84 (4.77)*	4.39 (3.82)*	4.12 (3.29)*	4.56 (3.35)*	-0.52 (-0.30)	6.87 (0.87)
TIME	-0.25 (-1.87)	-0.27 (-1.84)**	-0.08 (-0.51)	-0.22 (-0.96)	0.53 (1.71)**	-0.17 (-0.17)
INFLATION	-0.03 (-2.43)*	-0.09 (-4.41)*	-0.03 (-1.63)**	-0.04 (-2.78)*	0.01 (-0.02)	0.03 (0.27)
ENROLPRIM	-0.03 (-0.47)	-0.04 (-0.72)	-0.01 (-0.22)	0.03 (0.46)	-0.02 (-0.13)	0.13 (0.40)
ENROLSECOND	-0.02 (-0.27)	0.07 (1.03)	0.08 (1.13)	-0.01 (-0.08)	0.01 (-0.01)	-0.36 (-1.27)
C	-93.31 (-4.27)	-94.91 (-3.74)	-94.06 (-3.63)	-106.35 (-3.76)	21.63 (0.53)	
GROWTH(-1)						0.33 (0.84)
Number of observations:	170	140	155	135	129	110
Adjusted R^2	0.71	0.75	0.72	0.73	0.55	
D W	1.86	1.93	2.05	1.88	2.34	

Notes: a.*, ** and *** denote variables are significant at 1%, 5% and 10% respectively. b. WGI column should read: WGIVA, WGIPV, WGIGE, WGIRQ, WGIRL, WGICC; EIU column: EIUVA, EIUPV, EIUGE, EIURQ, EIURL, EIUCC, etc.- six institutional variables across four databases (WGI, EIU, WMO, PRS). c. Panel Two Stage Least Squares (2SLS) method. Instrumental rank-33, instruments used for VA: C, GROWTHt-1, PRSPV, PRSGE, PRSRQ, PRSRL, PRSCC, FDIGR, ENERGY, EXPGR, LFIXCAP, TIME, INFLATION, ENROLPRIM, ENROLSECOND. White period standard errors and covariance were applied to correct for possible biases in SE caused by the serial correlation. The first stage F-statistics suggests that these

instruments are valid. d. J statistics -1.33, Instrumental rank- 19.0, Instrumental list-second order lagged regressors.

Our empirical estimates suggest that we cannot reject *hypothesis 2* since the effectiveness of the government in the implementation of policies appears to be the most significant determinant of growth compared to other governance indicators. This complements the arguments discussed above, which claimed that the success of economic development in the transition countries was positively linked to the ability of the government to implement reforms (see, for example, Cheung, 1998; Fidrmuc, 2003).

To test *hypothesis 3* we employed only the PRS source, because unlike the rest of governance databases, it is not subject to a severe multicollinearity. Specifically, we test if there is a simultaneity bias in our estimations, which might be caused by a dual casual link between growth and the individual institutional categories. For this reason we run a Granger causality test. The test results suggest that the dual causality exists between the VA and growth. The Hausman test also demonstrated the presence of endogeneity[16]. Subsequently, we apply the 2SLS model to evaluate our estimates in the system of simultaneous equations:

$$GROWTH_{i,t} = \beta_{0,i} + \beta_1 PRSVA_{i,t} + \beta_2 PRSPV_{i,t} + \beta_3\, PRSGE_{i,t} + \beta_4\, PRSRQ_{i,t} + \beta_5 PRSRL_{i,t} + \beta_6\, PRSCC_{i,t} + \beta_7 FDIGROWTH_{i,t} + \beta_8 ENERGY_{i,t} + \beta_9 EXPGR_{i,t} + \beta_{10} LFIXCAP_{i,t} + \beta_{11} TIME + \beta_{12} INFLATION_{i,t} + \beta_{13} ENROLPRIM_{i,t} + \beta_{14} ENROLSECOND_{i,t} + \varepsilon_{i,t}$$

$$PRSVA_{reduced,i,t} = \beta_{0,i} + \beta_1 GROWTH_{i,t-1} + \beta_2 PRSPV_{i,t} + \beta_3 PRSGE_{i,t} + \beta_4 PRSRQ_{i,t} + \beta_5 PRSRL_{i,t} + \beta_6\, PRSCC_{i,t} + \beta_7 FDIGROWTH_{i,t} + \beta_8 ENERGY_{i,t} + \beta_9 EXPGR_{i,t} + \beta_{10} LFIXCAP_{i,t} + \beta_{11} TIME + \beta_{12} INFLATION_{i,t} + \beta_{13} ENROLPRIM_{i,t} + \beta_{14} ENROLSECOND_{i,t} + \varepsilon_{i,t}$$

where $PRSVA_{reduced,i,t}$ is a reduced form of endogenous variable (i.e. first stage variable defined by the instruments).

16 However, the results of the Hausman test were different when we applied the EBRDAVER as an instrument. Although, the tests suggested no endogeneity, we found that the EBRDAVER was highly collinear with other variables. Therefore, the Hausman test results in the case of EBRDAVER might be biased.

The results of the 2SLS estimation are presented in table 3 (regression 16). Normally, it is expected that 2SLS has lower coefficients than the OLS estimates of the same regression. However, the results demonstrate the greater coefficients and more significant t-statistics for the institutional variables in the case of 2SLS. On the other hand, there is a serial correlation pattern suggested by the DW statistic. As a remedy, we applied the White correction method to reduce the impact of this serial correlation on the standard errors. In general, 2SLS has a lower explanatory power than the OLS model in our example. Moreover, the relatively small sample does not give us a strong ground to assume that the estimates in the regression 16 are unbiased. As it is known, 2SLS is especially sensitive to the sample size compared to OLS. Nevertheless, the regression output demonstrates that, although estimates might be biased, there is a link between the individual institutions and growth. Furthermore, ENERGY and LFIXCAP, like in the previous regressions, remained as significant determinants of growth. As a result, *hypothesis 3* can be accepted with the assumption that in the larger samples endogeneity between growth and institutions will be more evident.

Finally, we test to see if the OLS specifications should include the lagged growth variables as suggested by some authors above. We apply the GMM method for the dynamic panels. The results are presented in table 3, column 17. Again, we employed the same instruments as in the 2SLS method. The regression output shows that there is almost no significant variable in the GMM specification[17]. As with the endogeneity link between growth and institutions, the dynamic features of growth seem to be too weak to appear in the empirical analysis.

As we presented above, OLS seems to be the best specification compared to other alternatives. Furthermore, in the methodology part we proposed to test our panel regressions to see if they can also be run with the random effect. The random effect model would allow us to measure the heterogeneity that may exist across regions. The Hausman test results suggested that our regressions (in tables 2 and 3) should be measured with only the fixed effect model. This implies that our chosen specification is indeed robust. Moreover, we also tested our

17 We came to a similar conclusion testing our OLS specification in the dynamic form.

estimates for the robustness using the shorter samples and found that both the GE and RQ estimates remained significant over the earlier periods too. As a result, we conclude that the outcomes of our empirical analysis are reliable measures to test our hypotheses.

4 CONCLUSION

Among the institutional variables that we tested government effectiveness had the most significant impact on growth. We found that the governance indicators from the PRS database was the least subject to multicollinearity. The aggregate transition index of the EBRD did not have a significant impact on growth. Endogeneity was present, but because it was weak OLS performed better than 2SLS. We did not find the evidence for the validity of the GMM specification proposed by some authors. Therefore, OLS seems to be the best specification for the empirical analysis of institutions in the transition economies at present. On the other hand, our estimations demonstrated that the significance of institutions for growth is far less than that of the classical growth factors. This can be explained by the fact that transition economies are still in the process of developing market institutions. Unless these institutions have the potential to influence the business environment, the transactions will be managed by the so-called "informal institutions"[18]. These are informal norms and traditions which change very slowly over time. They were inherited from the former Soviet Union and, perhaps, working in the background as the natural break for the reform process. The quality of these informal rules is not quantifiable and, as a result, regression analysis cannot explicitly show their effect on growth. Furthermore, the generalisation of our results might be limited due to the short sample period, which is typical to the literature on transition. As the influence of market institutions on growth will become comparable to that in the developed economies in the long run, we will be in a better position to obtain the estimates of a greater significance.

18 See North (1992) for a comprehensive introduction to the theory of informal institutions.

REFERENCES

Acemoglu, D. and J. Robinson. 2008. "The Role of Institutions in Growth and Development." Commission on Growth and Development Working Paper (10).

Arndt, C. and C. Oman. 2006. "Uses and Abuses of Governance Indicators". Paris: OECD Development Centre Studies."

Barro, R. 1991. "Economic Growth in a Cross Section of Countries." Journal of Economics 106(2):407-443.

Barro, R. 1996. "Democracy and Growth." Journal of Economic Growth 1(1):1-27.

Cheung, S.N.S. 1998. "The curse of democracy as an instrument of reform in collapsed communist economies." Contemporary Economic Policy 16(2):247– 249.

Cottarelli, C. and Peter D. 1999. "Taming Inflation in the Transition Economies." Finance and Development, June.

De Macedo, J. B. and J. O. Martins. 2008. "Growth, reform indicators and policy complementarities." Economics of Transition 16(2):141–164.

EBRD. 2008. "Transition Report 2008. Growth in Transition". London: The European Bank for Reconstruction and Development.

EBRD 2010. "Transition Report 2010. Recovery and Reform." London: The European Bank for Reconstruction and Development.

"European Bank for Reconstruction and Development Database." 2010. (http://www.ebrd.com/pages/research/economics/data.shtml).

Falcetti, E., T. Lysenko, and P. Sanfey. 2006. "Reforms and growth in transition: Re-examining the evidence." Journal of Comparative Economics 34(3):421-445.

Fidrmuc, J. 2003. "Economic reform, democracy and growth during post-communist transition." European Journal of Political Economy 19(3):583-604.

Havrylyshyn, O. and R. Rooden. 2003. "Institutions matter in Transition, but so do Policies." Comparative Economic Studies 45(1):2.

IBRD. 2007. "Governance Matters 2007. A Decade of Measuring the Quality of Governance." Washington D.C.

Kaufmann, D., A. Kraay, and M. Mastruzzi. 2007. "The Worldwide Governance Indicators Project: Answering the Critics." Working paper 4149, The World Bank.

Kaufmann, D., A. Kraay, and M. Mastruzzi. 2010. "The Worldwide Governance Indicators. Methodology and Analytical Issues". Washington D.C.: The World Bank.

Keefer, P. and M. Shirley 2000. "Formal versus Informal Institutions in Economic Development." In: Claude Menard (ed.), Institutions, Contracts, and Organisations. Cheltenham: Edward Elgar: 80-107.

Knack, S. and P. Keefer. 1995. "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Variables." Economics and Politics 7(3):207-227.

Knack, S. and P. Keefer. 1997. "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation." The Quarterly Journal of Economics 112(4):1251-1288.

North, D. C. 1989. "Institutions and Economic Growth: A historical introduction." World Development 17(9):1319-1332.

North, D. C. 1990. "A transaction cost theory of politics." Journal of Theoretical Politics 2(4):355-367.

Raimbaev, A. 2011. "The case of transition economies: what institutions matter for growth?" EERI Research Paper Series No 2011/16, Economics and Econometrics Research Institute, Brussels.

Roland, G. 2002. "The Political Economy of Transition." Journal of Economic Perspectives 16(1):29.

Staehr, K. 2005. "Reforms and Economic Growth in Transition Economies: Complementarity, Sequencing and Speed." The European Journal of Comparative Economics 2(2):177-202.

"World Development Indicators." 2010. Retrieved November 20, 2010 (http://data.worldbank.org/data-catalog).

"Worldwide Governance Indicators." 2010. Retrieved December 2, 2010 (http://info.worldbank.org/governance/wgi/index.asp).

APPENDIX

Table 4: Variables, their definitions and sources

Variables	Definition	Source
CC	Capture of the state for private interests, the extent to, which authority is exercised for private gain and corruption.	The Worldwide Governance Indicators
EBRDAVER	Average of EBRD transition indices	EBRD
ENERGY	Balance of energy production and consumption per capita (t of oil equivalent),	The World Bank database
ENROLPRIM	School enrolment, primary (% gross)	The World Bank database
ENROLSECOND	School enrolment, secondary (% gross)	The World Bank database
EUACCESS	Dummy taking value 1 for the new EU member states	
EXPGR	Percentage growth of exports of goods and services (constant 2000 US $)	The World Bank database
FDIGROWTH	Foreign direct investment growth (BoP, current US $)	The World Bank database
GE	The quality of public and civil services, the quality of policy initiatives and implementation effectiveness	The Worldwide Governance Indicators
GROWTH	Annual percentage growth of real output in PPP terms (constant 2005 international $)	The World Bank database
GOVBAL	General government final consumption expenditure (constant 2000, US $)	EBRD Transition Report (2009)
INFLATION	The inflation rate based on GDP deflator (annual %)	EBRD Transition Report(2009)
INSTITUTIONS	The unweighted average of six institutional variables published by the Worldwide Governance Indicators project; ranges from -2 to +2	The Worldwide Governance Indicators
LFIXCAP	Logarithm of fixed capital formation (constant 2000 US $)	The World Bank database
PV	Absence of political coups and violence	The Worldwide Governance Indicators
RL	The extent to, which residents follow the rules of society, the contract enforcement quality, property rights, the effectiveness of courts and police	The Worldwide Governance Indicators
RQ	Ability of the government to devise the required policies and to implement them, its commitment to policies and credibility	The Worldwide Governance Indicators
TIME	Transition period variable taking value 1 starting from 1996	
VA	Transparency of the elections, free media and free associations	The Worldwide Governance Indicators