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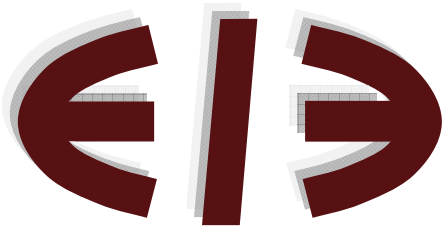

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Abstract

There is a consensus among scholars that institutions (i.e. norms and regulations) are country specific. The paper aims to contribute to the debate by examining the type of institutions which have been the most important for growth in transition countries. It employs a new set of the institutional variables published by the World Bank against the commonly used transition index of the European Bank for Reconstruction and Development. Also, the paper tests the validity of some arguments presented in the institutional literature. As a result, it appears that among the institutional variables government effectiveness has the most significant impact on economic development of the former planned economies. However, at this stage, the classical growth factors such as investment and export turn out to be more important for growth than institutions.

JEL: O43, P21, P36
Keywords: Institutions, governance, transition economies, growth

1 Introduction

Some researchers focused on the classical institutional factors such as democracy and how they affect the economic success in the former planned economies. As such, Fidrmuc (2003) tested the validity of the assumptions made by some scholars that democracy tends to harm growth at the early stages of development. He revealed that the direct influence of political liberalization 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 realized through the liberalization policies. However, this indirect impact was still insignificant in the early periods of transition. He explains that in the transition countries democratization was largely imposed by the international organizations (e.g. as part of the E.U. accession terms), while some successful economies, such as South Korea, implemented the political reforms only after their economic policies proved to be successful. On the contrary, China still remains as the communist nation even after its proven success with the economic reforms. The author concludes that democratization as such is unable to explain growth differences in the transition process and, therefore, the autocratic market economy is expected to be more conducive to economic development in the former planned economies. Furthermore, Cheung (1998) argues that the 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 that of India, where the officials tend to issue extra regulations to compensate for the loss of the vertical gains. Other scholars proposed that the "strong hand" policy is favorable to support the economy at times of recession (see Roland, 2002).

The paper aims to contribute to the debate by examining the type of institutions which have been the most important for growth in transition countries. Like other papers in the institutional literature, we test growth against institutions and classical growth factors such as investment and export. However, our sample focuses on the middle period of the transition. 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 Develoment (EBRD), which has been commonly used by other researchers. The transition index represents the quality of restructuring (e.g. privatization), while the governance indicators (e.g. rule of law) measure the quality of institutions. We employ the governance data from an aggregate and the 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 severe multicollinearity issues. We also test for the presence of endogeneity between growth and institutions.

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

2 Literature review

There is no a 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 accordingly.

Originally Barro employed the following growth equation specification (with the expected signs):

GR6085=f(+GDP60, +SEC60, +PRIM60, +GOVCONS, -Gastil, -PPIDEV)

where GDP60- initial income in the sample of 1960-85, , SEC60 and PRIM60 are secondary and primary school enrollment in 1960, GOVCONS- governemnt consumption, PPIDEV-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 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). 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 the endogeneity problem.

In the case of transition economies, the inclusion of traditional growth factors such as education, government expenditure and investment has been questioned by some scholars. The estimations by

[2] Note that in their estimations adjusted R^2 was close to 0.28 on average against 0.5-0.6. in the typical cross-country regressions. They explained this with the short sample (1974-1989) and limited number of observations : 97 in the case of ICRG, and 47 for BERI.

Fidrmuc (2003) showed that these variables had an insignificant effect on growth and, in some cases, with the reverse signs. Similarly, Falcetti, Lysenko and Sanfey (2006) argue that education should not be included into the specification because the transition period is still a relatively short and, thus, estimations are unable to capture its effect. Moreover, they explain that the quality of data on capital investment and education is poor and therefore, these data are unreliable. Instead, based on the other similar studies, the authors proposed to include the explanatory variables capturing the initial conditions and stabilization 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 labor, the length of the former command economy period in the region, etc. As to stabilization 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, authors chose the second option. However, they admit that the data on fiscal balance also were 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 the multicollinearity problem), 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 which had 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, 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 into the whole CIS region. Similarly, the growth in the CEB was largely helped by the economic development in the E.U. Finally, based on the theoretical assumptions above, Falcetti, Lysenko and Sanfey (2006) proposed the following specification (with expected signs):

$$Growth=f(+Time, -Time^2, +IC \cdot Time, -IC \cdot Time^2, +Ref(-1), +Fis, +Recov, +Oilbal, +Exgrowth, D)$$

where Time- transition time, IC- initial conditions index, Ref[4]-the EBRD's reform index, Fis- general government balance relative to GDP, D- dummy variables to capture the fixed country effects.

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

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

1. 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.

[3] They considered the possibility of assignin proper weight to each reform in the composite EBRD index. Indeed, some refroms are harder to impelement that others and therefore, to achieve a good rating on them, country should invest more time and effort. However, they admitted that any weight assigned would be done in the subjective manner and therefore, not reliable. Instead, they used the simple averge of all EBRD reform measures.

[4] The authors assume that reforms are not expected to have an immediate effect and therefore included it as lagged variable.

2. Classical production factors fail to explain growth in transition countries.
3. The structure and economic well-being in the pre-transition period determined the rate of initial growth. However, their influence weakened over time.
4. Structural reforms, including monetary stabilization, 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 papers attempting to figure out the most significant reform for promoting growth (see, for example, Havrylyshyn and Rooden, 2000). He argues that all these efforts did not yield conclusive outcomes, since there is severe multicollinearity between individual reform variables, the quality of data is poor, theoretical assumptions are poor and the growth process is itself unstable. Commenting on the paper about the complementarity of reforms, he states that some authors suggest using the aggregate indices of reforms in the regression estimates. 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. Acknowledging the existence of 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. Finally, he applied the following specification:

Growth=f(+Growth(-1), +TREND, -WAR, - Inflation, aggregated the EBRD reform indices)

where TREND includes 1989-2001 and aims to control for time in growth variables, WAR- dummy which equals 1 in the case of war and civil unrest, aggregated the EBRD reform indices include 8 variables explaining reforms in the area of liberalization, competition, governance restructuring, large-scale privatization, small scale privatization, price liberalization, securities market and foreign exchange system.

As a result of his estimations, Growth and TREND demonstrated a very strong significance suggesting 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 the heteroskedasticity problem, Staehr 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 Generalized 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=f(initial conditions, - macroeconomic stabilization, +RL,-RC,-Δ RL,+ ΔRC)

where initial conditions are dummy variables taking a value of 1 for each group according to the EBRD classification. *RL*- reforms level (the average of the reforms' scores, which range from +1 to

+4) and *RC*- the reform complementarity index, which can be interpreted as the measure of variety of reforms[5]

Their sample included 28 transition countries over the period of 1984-2004. The macroeconomic stabilization 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 the endogeneity (or simultaneity) arising between growth, level of reforms and inflation rate.

The issue of the reverse causality from growth to institutions has also been subject to debate in the literature of transition economics. Falcetti, Lysenko and Sanfey (2006) found that the reforms did have a significant influence on growth in the following periods. Furthermore, their effect lasted over the subsequent years too. This enhanced growth necessitated the implementation of further reforms. On the other hand, as discussed in the methodology part below, some authors argue that this endogeneity is not always apparent given the short period of transition.

It should be noted that the majority of research papers has been focusing on reforms such as liberalization, privatization, 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 the most important for growth, we employ the data on governance indicators (both aggregate and individual) as explained in the next section.

3 Methodology

Hypothesis

To answer our research question, "what institutions have been most important for growth in transition economies?" we put forward the following hypotheses:

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

Hypothesis 2: Certain types of institutions affect growth more than others

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

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

Data

It has become a normal practice for researchers to assume that the data collection was imperfect in the early years of transition. Indeed, the transition started unexpectedly to the degree that the collapse of the socialist ruling itself was unanticipated by experts. As a result, the public statistical agencies, like many other government bodies, experienced the rapid administrative transformations. Since the old methodologies were inadequate and the new ones were not yet a priority, the data collection practices remained at a poor level. Therefore, many researchers question the reliability of the data gathered at this time. 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 World Governance Indicators (WGI) published by the WB as variables explaining the quality of institutions[6]. 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 organizations 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 criticized 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) argue that the cases where a country is present in one source and absent in the other are relatively few. Moreover, the WGI standardizes various databases and generalizes 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

[6] 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.

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 organized into one of the six WGI categories[7]:

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[8]. Kaufmann, Kraay and Mastruzzi (2010) explain that the weights are assigned as follows:

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

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

The individual source with the lower error variance receives 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.

[7] See Appendix 3 for the complete list of the underlying sources
[8] See Appendix 4 for weights assigned to all sources participating in the WGI database.

We sorted the WGI database to create the 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 1.1[9] shows, the cross-correlations between the WGI variables in our sample demonstrate a strong multicollinearity pattern across all categories. These strong correlations may cause the multicollinearity problem in our regression runs, 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 examine the weighted averages presented in table 2.1[10]. As table 2.1 shows, there are four individual sources (highlighted) 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 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 are given in Appendix 1. 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 privatization, Small-scale privatization, Enterprise restructuring, Price liberalization, Trade and Forex system, Competition Policy, Banking reform and interest rate liberalization, 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

[9] See Appendix 1
[10] See Appendix 2

infrastructure, finance and communications sectors. We employ the unweighted average of the EBRD index since there is a strong correlation between its individual components (see table 3.1 in Appendix 3).

The next set of data concerns the growth rate. We apply Gross Domestic Product (GDP) per capita in order to reduce the differences associated with the scale of economies. Here we have a number of options. Some authors claim that the Penn Tables are more informative in the cross-country analysis than other databases since they are constructed with the specific aim of making international comparisons less biased. Other options include the growth reports by the International Monetary Fund (IMF) and the WB. To see if the choice of the income data source may significantly affect our empirical results, we run the cross-correlation tests across 151 countries over 9 years.

Table 1 Cross-correlation between Penn Tables, WB and IMF growth data

	PTGDP	PTGDPP	WBGDP	WBGDPP	IMFGDP	IMFGDPP
PTGDP	1					
PTGDPP	0,991204	1				
WBGDP	0,942428	0,9343713	1			
WBGDPP	0,980371	0,9866032	0,943783163	1		
ÏMFGDP	0,901237	0,8974946	0,940697564	0,901431297	1	
IMFGDPP	0,972449	0,9801523	0,943547752	0,987330483	0,926362095	1

Source: Own calculations

where PTGDP and PTGDPP- GDP per capita in constant terms and purchasing power parities in the Penn Tables; WBGDP and WBGDPP- GDP per capita in constant terms and purchasing power parities in the WB; IMFGDP and IMFGDPP- GDP per capita in constant terms and purchasing power parities in the IMF.

Table 1 shows that there is a strong correlation between all income data sources, which implies that our results are not likely to be biased by the choice of growth database. For our analysis, the WB's growth data seem to be the most appropriate for two reasons: first, we draw the institutional variables from the WGI of the WB (i.e. in order to keep consistency) and second, as we observed, the WB database is updated earlier than other databases and cover all transition countries. We also choose between per capita income in constant terms and in purchasing power parity (PPP) terms. Again, we test if these two categories differ significantly. The cross-correlation table 2 below for 29 transition economies (over 11 years) shows that they do not:

Table 2 Cross-correlation between growth in constant and PPP terms

	GDP per capita (constant 2000 US$)	*GDP per capita, PPP (constant 2005 international $)*
GDP per capita (constant 2000 US$)	1	
GDP per capita, PPP (constant 2005 international $)	0.945391893	1

Source: Own calculations

Our preference is therefore GDP per capita in PPP terms (constant 2005 international $). As it is known, income measured in PPP terms gives more precise comparisons across economies.

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 stabilization 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 kt of oil), energy use and foreign direct investment. Additionally, we included the E.U. accession dummy for the new member countries.

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, 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. For example, the EBRD categorizes 29 post-soviet economies into the CEB, SEE and CIS+M. 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. Moreover, 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. The latter is supposed to represent inflationary pressures since 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, which may exist even with budget surpluses, this assumption will be weak. Therefore, we include both inflation (given by GDP deflator)[11] and general government balance. Furthermore, we add E.U. accession

[11] As dicussed 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 better coverage of the sample.

dummy for the new member states, foreign direct investment growth and fixed capital formation[12]. Following Knack and Keefer (1995), we also add the primary and secondary school enrollment regressors:

LGDPCPPP=f(EBRDAVER, FDIGROWTH, ENRBALANCEPC, EUACCESS, EXPORTGROWTH, LFIXCAP, GOVCONSRATIO, TIME, INFDEF, ENROLPRIM, ENROLSECOND) *(Eq.1)*

where LGDPCPPP – logarithm of GDP per capita, PPP (constant 2005 international $), *EBRDAVER*- average of EBRD transition indices, *FDIGROWTH*- foreign direct investment growth (BoP, current US $.), *ENRBALANCEPC*- Balance of energy production and consumption per capita (t of oil equivalent), *EUACCESS*-dummy taking value 1 for the new E.U. member states *(i.e. in 2004 and 2007)*, *EXPORTGROWTH*- percentage growth of exports of goods and services (constant 2000 US $), *LFIXCAP*- logarithm of fixed capital formation (constant 2000 US $), *GOVCONSRATIO*-General government final consumption expenditure (constant 2000, US $), *TIME*- transition period variable taking value 1 for 1996, etc., *INFDEF*-inflation, GDP deflator(annual %), *ENROLPRIM*-school enrolment, primary (% gross), *ENROLSECOND*- 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 the *Eq.1.* (with expected signs):

LGDPCPPP=f(+$INST_k$, + EBRDAVER, + FDIGROWTH, +ENRBALANCEPC, +EUACCESS, +EXPORTGROWTH, +LFIXCAP, GOVCONSRATIO, -TIME, -INFDEF, +ENROLPRIM,+ ENROLSECOND) *(Eq.2)*

where INSTk – averages of institutional categories from the different sources given by WGIAVER, PRSAVER , EIUAVER, WCYAVER and WMOAVER.

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 *Eq.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 centralized expenditures may also imply diverting resources to less productive areas. The theory would suggest that the growth is subject to business cycles and since transition countries are supposed to be in the recovery phase, TIME should have the 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. INFDEF is expected to get the negative sign because high levels 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 *Eq.2* has all of its variables based on theoretical assumptions, we nevertheless expect some of them to be irrelevant. After balancing out our regressions

[12] Initially, we planned to include foreign aid, but the data of the 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.

(i.e. removing irrelevant regressors), we test *Hypothesis 2*. For this reason, we replace the averages of institutional indicators with individual variables:

$$LGDPCPPP=f(+VA, PV, GE, RQ,RL, CC)_k, + EBRDAVER, + FDIGROWTH, +ENRBALANCEPC, +EUACCESS, +EXPORTGROWTH, +LFIXCAP, GOVCONSRATIO, -TIME, -INFDEF, +ENROLPRIM,+ ENROLSECOND) \quad (Eq.3)$$

where $(VA, PV, GE, RQ, RL, CC)_k$ - *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 the endogeneity that 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, 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[13]. 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[14]. 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 we also provided the outcomes for the dynamic version of *E.q.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 *E.q.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.

In the results section, we run the relevant tests (e.g. Dickey-Fuller tests) for the issue of non-stationarity in order to avoid spurious regression outcomes[15]. We expect income to be non-stationary as it is the case with many macroeconomic variables. In the case of non-stationary growth, one remedy will be to see if the cointegration test suggests that the residuals are free from the unit root. The latter would enable us to run our regressions with non-stationary dependent and independent variables and still obtain the

[13] We use Hausman test proposed bv Davidson and MacKinnon (1989). This version of Hausman test is done with the help of auxillary regresssions.
[14] 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.
[15] Non-stationarity assumes the constant mean, constant variance and the diminishing effect of the distributed lag model.

reliable results. Another remedy is to modify the dependent variable in order to de-trend and clean it from any random walk effects. Such modification includes the alternative options such as using the percentage growth terms or taking first-order differences. Finally, to test our results for the robustness, we run the regressions for different samples and, as mentioned above, across the different specifications.

4 Results

In this section, we empirically test *Hypothesis 1, 2 and 3*[16]. The first run of OLS panel regression with the fixed effect based on *Eq.2* revealed the non-stationary pattern of LGDPPCPPP[17]. Moreover, the cross-sectional graphs (graph 4.1 and 4.2) and the unit root tests suggest that LGDPPCPPP is indeed non-stationary. Although the cointegration test showed that there is a significant cointegration among regressors, the extreme levels of the goodness of fit were indifferent to the specification changes. As a result, instead of LGDPCPPP, which is a traditional growth variable in the literature, we apply the annual percentage growth rates of GDPPCPPP (given by GDPPCPPPGROWTH). The tests showed that it is a stationary variable suitable for our hypothesis testing.

Table 3 below shows the regression estimates of *E.q.2.* Following our methodology, first we try to identify the irrelevant variables. Regressions 7 and 8 demonstrate a serial correlation pattern and, overall, have a very limited sample (only 52 and 60 observations)[18]. For this reason, we drop the WCY institutional variables from our analysis. It should be noted that although we collected the maximum data 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 3 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 issues), changes in adjusted R^2 and the Akaike and Schwarz criterion.

The cross-correlation table in Appendix 10 and the insignificant t-test statistics from table 3 below suggest that the EBRDAVER, EUACESSS, and GOVCONSRATIO 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[19]. Similarly, GOVCONSRATIO is strongly correlated with INFDEF, 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

[16] The regression estimates are done with the help of the software *EViews 6.* Greene (2008) was consulted for the theory and practice of panel regression analysis.
[17] See Appendix 4 for tests of LGDPPCPPP and GDPPCPPPGROWTH
[18] See Appendix 5 for all regression outputs produced in *EViews 6*
[19] Some might argue that these variables are subject to 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.

of the former planned economies. As discussed in the methodology section above, they 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 3 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 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, FDIGROWTH also ranges from 0 to 1, ENRBALANCE is measured in tons of energy equivalent of oil per capita, EXPORTGROWTH, INFDEF and school enrollment explanatory variables are given in percentage terms.

Table 3 OLS fixed effect panel regression results over the five sources (WGI, PRS, EIU, WCY, WMO). Dependent variable: GDP percentage growth (GDPPPPGROWTH)

	WGIAVER		PRSAVER		EIUAVER		WCYAVER		WMOAVER		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
WGIAVER	2.33 (1.32)***	2.50 (1.6)***									
PRSAVER			17.78 (2.18) **	19.70 (2.63) *							
EIUAVER					5.27 (1.03)	5.29 (1.10)					
WCYAVER							-0.09 (-0.01)	-3.00 (-0.36)			
WMOAVER									8.73 (1.28) ***	9.00 (1.49) ***	
EBRDAVER	0.26 (0.12)		2.33 (1.01)		-3.18 (-1.27)		13.08 (3.02) *		0.32 (0.09)		
EUACCESS	0.84 (1.05)		1.11 (1.26)		0.74 (0.91)		-0.65 (-0.72)		0.49 (0.58)		
FDIGROWTH	-0.03 (-0.71)	-0.03 (-0.73)	-0.04 (-0.87)	-0.04 (-0.90)	-0.05 (-1.13)	-0.05 (-1.13)	0.01 (0.05)	0.01 (0.03)	-0.02 (-0.36)	-0.02 (-0.38)	-0.04 (-0.86)
ENRBALANCEPC	2.26 (3.79) *	2.18 (3.83) *	2.03 (3.21) *	1.79 (3.04) *	2.61 (4.32) *	2.36 (4.26) *	-2.23 (-0.70)	0.44 (0.18)	1.79 (3.00) *	1.70 (3.06) *	2.08 (3.66) *
EXPORTGROWTH	0.13 (5.69) *	0.14 (6.27) *	0.15 (5.54) *	0.16 (6.28) *	0.18 (6.80) *	0.17 (7.20) *	0.10 (2.18) **	0.16 (3.87) *	0.14 (6.05) *	0.14 (6.70) *	0.13 (6.12) *
LFIXCAP	5.35 (4.65) *	4.82 (4.75) *	4.34 (3.39) *	3.75 (3.40) *	3.78 (3.20) *	4.01 (3.95) *	4.18 (1.50)	4.85 (2.25) **	2.94 (2.25) **	2.65 (2.28) **	5.16 (5.14) *
GOVCONSRATIO	0.10 (0.73)		0.01 (0.05)		-0.09 (-0.58)		-0.29 (-0.69)		0.04 (0.20)		
TIME	-0.29 (-1.48)	-0.19 (-1.58)	-0.29 (-1.13)	-0.01 (-0.02)	-0.16 (-0.72)	-0.22 (-1.78)	-0.50 (-1.61)	-0.10 (-0.51)	-0.03 (-0.14)	0.05 (0.32)	-0.18 (-1.48) ***
INFDEF	-0.04 (-2.89) *	-0.04 (-3.00) *	-0.05 (-3.21) *	-0.04 (-3.53) *	-0.12 (-4.73) *	-0.10 (-5.03) *	0.04 (0.42)	-0.07 (-0.86)	-0.01 (-0.78)	-0.01 (-0.72)	-0.04 (-2.95) *

ENROLPRIM	-0.02 (-0.28)	-0.02 (-0.34)	0.03 (0.41)	0.03 (0.54)	-0.06 (-0.96)	-0.07 (-1.15)	0.07 (0.68)	0.02 (0.19)	-0.03 (-0.50)	-0.03 (-0.51)	-0.01 (-0.08)
ENROLSECOND	0.01 (0.13)	0.01 (-0.17)	0.04 (0.54)	0.04 (0.61)	0.10 (1.30)	0.07 (0.97)	-0.17 (-1.46)	0.06 (0.63)	0.11 (1.35) ***	0.10 (1.35) ***	-0.01 (-0.105)
C	-108.74 (-4.05)	-94.25 (-4.32)	-112.52 (-3.82)	-96.88 (-3.95)	-69.52 (-2.40)	-82.09 (-3.76)	-121.01 (-1.80)	-112.72 (-2.29)	-70.94 (-2.35)	-63.82 (-2.63)	-103.51 (-4.89)
Number of observations:	*161*	*170*	*127*	*135*	*131*	*140*	*52*	*60*	*147*	*155*	*170*
Adjusted R²	*0.68*	*0.68*	*0.73*	*0.73*	*0.75*	*0.75*	*0.66*	*0.62*	*0.70*	*0.71*	*0.68*
Durbin Watson stat	*1.92*	*1.87*	*1.84*	*1.79*	*1.99*	*1.93*	*1.69*	*1.42*	*1.94*	*1.94*	*1.83*

** 1% one-tail level of significance, ** 5% one-tail level of significance *** 10% one-tail level of significance. For GOVCONSRATIO all tests are on the two-tail level.*

We can draw a number of conclusions from the regression results presented in table 3. Except for WCYAVER, across all regressions three variables demonstrated a significant impact on growth: ENRBALANCEPC, EXPORTGROWTH 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).

The 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 into 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[20]. While Granger causality test results demonstrate that there is no dual causality (therefore, endogeneity), Hausman test, based on lagged growth as an instrument, suggest 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.

The Durbin-Watson statistic shows that there is no issue of 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 severe heterogeneities in the cross-sections, we have strong arguments to assume that our t-statistics are not biased[21]. To summarize, our

[20] See Appendix 9.

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

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 organizations 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)[22].

We now turn to testing *Hypothesis 2*. For this reason, we employ the disaggregated institutional variables as in Eq. 3 and re-run the previous regressions. The regression results are presented in table 4. 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. Although, in the regression 12 VA appears to be significant and similarly, in the regression 13 RQ is significant at 10% level, we should ignore them because they have unexpected (i.e. reverse) signs. As a result, their null hypotheses are not rejected. Obviously, these unexpected negative signs result from severe multicollinearity mentioned above. On the contrary, in the regression 15, RQ has the most significant t-statistic compared to other institutional regressors.

Table 4 OLS panel fixed effect regressions for E.q. 3.

	WGI (OLS) (12)	EIU (OLS) (13)	WMO (OLS) (14)	PRS (OLS) (15)	PRS (2SLS)[a] (16)	PRS (GMM)[b] (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) **
FDIGROWTH	-0.04 (-0.84)	-0.05 (-1.11)	-0.01 (-0.30)	-0.04 (-0.93)	-0.07 (-1.11)	-0.05 (-0.66)
ENRBALANCEPC	1.78 (3.20) *	2.14 (3.56) *	1.86 (3.37) *	1.86 (3.08) *	1.59 (2.98) *	0.70 (0.08)
EXPORTGROWTH	0.14 (6.54) *	0.19 (7.43) *	0.15 (6.94) *	0.16 (6.04) *	0.17 (6.37) *	0.10 (1.25)

[22] As discussed in the literatur review Havrylyshyn and Rooden (2000) find structural reforms such as privatization of state assets and eliminating price distortions to have 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.

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)
INFDEF	-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)	
GDPPCPPPGROWTH(-1)						0.33 (0.84)
Number of observations:	*170*	*140*	*155*	*135*	*129*	*110*
Adjusted R²	*0.71*	*0.75*	*0.72*	*0.73*	*0.55*	
Durbin Watson stat	*1.86*	*1.93*	*2.05*	*1.88*	*2.34*	

* 1% one-tail level of significance, ** 5% one-tail level of significance *** 10% one-tail level of significance.
a. 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).
b. Panel Two Stage Least Squares (2SLS) method. Instrumental rank-33, instruments used for VA: C , GDPPCPPPGROWTH(-1), PRSPV, PRSGE, PRSRQ, PRSRL, PRSCC, FDIGROWTH, ENRBALANCEPC, EXPORTGROWTH, LFIXCAP, TIME, INFDEF, ENROLPRIM, ENROLSECOND. White period standard errors and covariance was applied to correct for possible biases in SE caused by the serial correlation. The first stage F-statistics suggests that these instruments are valid.
b. J statistics -1.33, Instrumental rank- 19.0, Instrumental list- second order lagged regressors.

GE and RQ are categorized 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 do differ in their significance for growth in the former command economies. Our empirical estimates suggest that we can accept *Hypothesis 2* since the effectiveness of the government in the implementation of policies appear 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) and Fidrmuc (2003)).

To test *Hypothesis 3*, we employ only the PRS source, because unlike the rest of governance databases, it is not subject to severe multicollinearity. Specifically, we test if there is a simultaneity bias in our estimations, which might be caused by the dual casual link between growth and the individual

institutional categories. For this reason we run a Granger causality test[23]. The test results suggest that the dual causality exists between the VA and growth. The Hausman test also demonstrated the presence of endogeneity[24]. Subsequently, we apply 2SLS model to evaluate our estimates by help of the system of simultaneous equations as given below:

GDPCPPPGROWTH=f(+PRSVA, PRSPV, PRSGE, PRSRQ, PRSRL, PRSCC),, + FDIGROWTH, +ENRBALANCEPC, +EXPORTGROWTH, +LFIXCAP, -TIME, -INFDEF, +ENROLPRIM,+ ENROLSECOND) *Eq.4*

$PRSVA_{reduced}$*=f(GDPCPPPGROWTH(-1), PRSPV, PRSGE, PRSRQ, PRSRL, PRSCC , FDIGROWTH, ENRBALANCEPC, EXPORTGROWTH, LFIXCAP, TIME, INFDEF, ENROLPRIM, ENROLSECOND)* *Eq.5*

where $PRSVA_{reduced}$*- reduced form of endogenous variable (i.e. first stage variable defined by the instruments)*

The results of the 2SLS estimation are presented in table 4 (regression 16). Normally, it is expected that 2SLS have lower coefficients than does the OLS estimates of the same regression. Also, the standard errors are supposed to be higher in the former. 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 clear serial correlation pattern suggested by 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 the lower explanatory power than does OLS 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, ENRBALANCEPC 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 the 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 4, 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[25]. 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 show that our regressions (in tables 3 and 4) should be

[23] See Appendix 6.
[24] However, the Hausman test result was different when we applied the EBRDAVER as an instrument. Although, the test suggested no endogeneity, we found that the EBRDAVER was subject to multicollenearity issues. Therefore, Hausman test results in the case of EBRDAVER might be biased.
[25] We came to a similar conclusion testing our OLS specification in the dynamic form.

measured with only the fixed effect model[26]. This implies that our chosen specification is indeed robust. Moreover, we also tested our estimates for the robustness using the shorter samples and found that both the GE and RQ estimates remained significant over the earlier periods too[27]. As a result, we conclude that the outcomes of our empirical analysis are reliable measures to test our hypotheses.

Conclusion

Among the institutional variables that we tested, government effectiveness had the most significant impact on growth. Also, we found that the governance indicators from PRS database was the least subject to multicollinearity issues. The aggregate transition index of the EBRD did not have 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 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 this stage.

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. Until these institutions have the potential enough to influence the business environment, the transactions will be managed by the so-called "informal institutions"[28]. 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. However, once the influence of the market institutions on growth will become comparable to that in the developed economies, we will be in a better position to obtain the estimates of a greater significance.

[26] See Appendix 7 and 8
[27] See Appendix 9
[28] See North (1992) for a comprehensive introduction to the theory of informal institutions.

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Appendix 1

Table 1.1 Cross correlation of WGI indicators

	VA	*PV*	*GE*	*RQ*	*RL*	*CC*
VA	1					
PV	0.709546	1				
GE	0.886151	0.745869	1			
RQ	0.918392	0.667027	0.912965	1		
RL	0.907301	0.802274	0.93188	0.898635	1	
CC	0.891435	0.746257	0.920468	0.854828	0.941406	1

Table 1.2 Cross correlation of PRS indicators

	VA	*PV*	*GE*	*RQ*	*RL*	*CC*
VA	1					
PV	0.205375	1				
GE	0.693778	0.324561	1			
RQ	0.579209	0.213827	0.567957	1		
RL	0.290654	0.178507	0.340727	0.078312	1	
CC	0.44774	0.275154	0.559197	0.089065	0.466919	1

Table 1.3 Cross correlation of EIU indicators

	VA	*PV*	*GE*	*RQ*	*RL*	*CC*
VA	1					
PV	0.791719	1				
GE	0.752232	0.695825	1			
RQ	0.810934	0.648619	0.683914	1		
RL	0.864952	0.766412	0.830285	0.792426	1	
CC	0.816721	0.720006	0.802603	0.619554	0.860914	1

Table 1.4 Cross correlation of WCY indicators

	VA	*PV*	*GE*	*RQ*	*RL*	*CC*
VA	1					
PV	0.54084	1				
GE	0.77614	0.649339	1			
RQ	0.652521	0.627157	0.853388	1		
RL	0.550212	0.677484	0.773732	0.824256	1	
CC	0.658697	0.567654	0.744608	0.721349	0.762194	1

Table 1.5 Cross correlation of WMO indicators

	VA	*PV*	*GE*	*RQ*	*RL*	*CC*
VA	1					
PV	0.636293	1				
GE	0.903817	0.611241	1			
RQ	0.89212	0.670728	0.928506	1		
RL	0.834742	0.761879	0.852576	0.843197	1	
CC	0.831582	0.622087	0.856759	0.806289	0.869445	1

Appendix 2 Table 2.1 WGI database weights by indicator and year

	Voice and Accountability												Political Stability											
	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009		1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	
Commercial Business Information Providers												**aver***												**aver**
dri	..	..	..	..	..	..	..	..	..	..	..		0.31	0.18	0.26	0.24	0.18	0.19	0.21	0.12	0.14	0.13	0.13	
eiu	0.14	0.19	0.14	0.09	0.09	0.15	0.13	0.10	0.10	0.12	0.12	**0.13**	0.17	0.18	0.18	0.26	0.21	0.19	0.16	0.19	0.14	0.13	0.12	**0.18**
ijt	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	0.14	0.14	0.09	0.11	0.11	0.05	
prs	0.09	0.18	0.17	0.08	0.06	0.07	0.05	0.04	0.04	0.05	0.05	**0.08**	0.08	0.27	0.08	0.07	0.07	0.06	0.06	0.05	0.07	0.07	0.09	**0.09**
wmo	..	0.17	0.13	0.06	0.06	0.10	0.08	0.03	0.03	0.03	0.03	**0.07**	..	0.16	0.17	0.16	0.23	0.17	0.16	0.18	0.21	0.22	0.24	**0.19**
Surveys of Firms or Households																								
afr	..	..	..	0.00	0.00	0.00	0.04	0.02	0.02	0.03	0.03		..	..	..	..	..	..	..	..	..	..	..	
bps	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
gcb	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
gcs	..	..	0.04	0.02	0.02	0.02	0.03	0.01	0.01	0.01	0.01		..	..	..	0.06	0.05	0.03	0.06	0.03	0.03	0.05	0.05	
gwp	..	..	..	..	..	..	..	0.00	0.00	0.00	0.00		..	..	..	..	..	..	..	..	..	..	..	
lbo	0.15	0.08	0.10	0.01	0.02	0.02	0.01	0.01	0.00	0.00	0.02		..	..	..	..	..	..	..	..	..	..	..	
prc	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
vab	..	..	..	..	..	0.01	0.03	0.02	0.02	0.02	0.01		..	..	..	..	..	..	..	..	..	..	..	
wcy	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	**0.01**	..	..	0.15	0.09	0.07	0.07	0.06	0.06	0.04	0.04	0.04	**0.07**
Non-Governmental Organization Data Providers																								
bti	..	..	..	0.20	0.15	0.12	0.11	0.12	0.13	0.12	0.13		..	..	..	..	..	..	..	..	..	..	..	
ccr	..	..	..	..	0.19	0.12	0.11	0.16	0.15	0.13	0.14		..	..	..	..	..	..	..	..	..	..	..	
frh	0.47	0.23	0.20	0.18	0.13	0.09	0.09	0.14	0.18	0.19	0.16		..	..	..	..	..	..	..	..	..	..	..	
gii	..	..	..	..	..	..	..	0.07	0.06	0.04	0.03		..	..	..	..	..	..	..	..	..	..	..	
her	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
irp	..	..	0.10	0.08	0.05	0.06	0.05	0.04	0.03	0.03	0.03		..	..	..	..	..	..	..	..	..	..	..	
msi	..	..	..	0.17	0.15	0.14	0.12	0.04	0.04	0.04	0.03		..	..	..	..	..	..	..	..	..	..	..	
obi	..	..	..	..	..	..	0.05	0.03	0.03	0.03	0.03		..	..	..	..	..	..	..	..	..	..	..	
rsf	..	..	..	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.02		..	..	..	..	..	..	..	..	..	..	..	
Public Sector Data Providers																								
adb	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
asd	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
ebr	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
hum	0.10	0.11	0.08	0.05	0.04	0.03	0.03	0.03	0.04	0.03	0.03		0.35	0.16	0.11	0.09	0.15	0.11	0.10	0.08	0.08	0.07	0.08	
ifd	..	..	..	..	..	0.01	0.01	0.01	0.01	0.00	0.00		..	..	..	..	..	..	..	..	..	..	..	
ipd	..	..	..	..	..	..	..	0.08	0.07	0.08	0.08		..	..	..	..	..	..	..	0.14	0.13	0.12	0.16	
pia	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
tpr	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	

Table 2.1 continued:

	Government Effectiveness												Regulatory Quality											
	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009		1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	
Commercial Business Information Providers												**aver**												**aver**
dri	0.14	0.10	0.10	0.07	0.06	0.06	0.05	0.04	0.04	0.05	0.05		0.18	0.08	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.03	
eiu	0.50	0.10	0.14	0.16	0.14	0.12	0.10	0.09	0.13	0.11	0.09	**0.15**	0.09	0.11	0.10	0.11	0.11	0.10	0.09	0.06	0.07	0.08	0.07	**0.09**
ijt	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
prs	0.11	0.02	0.07	0.06	0.06	0.06	0.05	0.07	0.09	0.07	0.07	**0.07**	0.07	0.02	0.02	0.10	0.08	0.09	0.08	0.07	0.07	0.05	0.06	**0.07**
wmo	..	0.62	0.22	0.20	0.13	0.12	0.28	0.13	0.12	0.18	0.17	**0.22**	..	0.17	0.15	0.18	0.23	0.18	0.22	0.18	0.13	0.10	0.08	**0.16**
Surveys of Firms or Households																								
afr	..	..	..	0.10	0.12	0.10	0.04	0.04	0.06	0.03	0.05		..	..	..	..	..	..	..	..	..	..	..	
bps	..	..	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		..	..	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
gcb	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
gcs	0.12	0.05	0.09	0.08	0.11	0.14	0.15	0.17	0.09	0.09	0.10		0.16	0.11	0.12	0.05	0.04	0.03	0.06	0.06	0.04	0.04	0.03	
gwp	..	..	..	..	..	..	..	0.01	0.01	0.01	0.01		..	..	..	..	..	..	..	..	..	..	..	
lbo	0.00	..	..	0.00	0.01	0.01	0.03	0.03	0.00	0.00	0.03		..	..	..	..	..	..	..	..	..	..	..	
prc	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
vab	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
wcy	0.08	0.02	0.04	0.04	0.03	0.02	0.03	0.04	0.08	0.07	0.07	**0.05**	0.34	0.12	0.16	0.11	0.10	0.06	0.07	0.06	0.06	0.07	0.04	**0.11**
Non-Governmental Organization Data Providers																								
bti	..	..	..	0.07	0.06	0.06	0.08	0.07	0.06	0.06	0.05		..	..	..	0.10	0.09	0.11	0.11	0.10	0.09	0.08	0.12	
ccr	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
frh	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
gii	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
her	..	..	..	..	..	..	..	..	..	..	..		0.08	0.06	0.06	0.05	0.03	0.04	0.03	0.04	0.05	0.05	0.06	
irp	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
msi	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
obi	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
rsf	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
Public Sector Data Providers																								
adb	..	0.03	0.04	0.02	0.02	0.08	0.06	0.08	0.07	0.10	0.11		..	0.12	0.11	0.06	0.04	0.09	0.10	0.11	0.13	0.13	0.11	
asd	..	..	0.17	0.13	0.18	0.12	0.04	0.07	0.04	0.02	0.02		..	..	0.01	0.01	0.06	0.04	0.01	0.02	0.04	0.07	0.07	
ebr	..	..	..	..	..	..	..	..	..	..	..		0.03	0.09	0.10	0.08	0.08	0.09	0.08	0.11	0.10	0.09	0.10	
hum	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
ifd	..	..	..	..	..	0.02	0.01	0.03	0.03	0.04	0.04		..	..	..	..	..	0.04	0.02	0.03	0.03	0.05	0.05	
ipd	..	..	..	..	..	..	..	0.04	0.06	0.05	0.06		..	..	..	..	..	..	..	0.04	0.03	0.03	0.06	
pia	..	0.05	0.10	0.06	0.06	0.08	0.05	0.06	0.09	0.09	0.08		..	0.08	0.09	0.07	0.06	0.07	0.07	0.07	0.09	0.12	0.10	
tpr	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	
	Rule of Law												**Control of Corruption**											
	1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009		1996	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	

Commercial Business Information Providers													**aver**												**aver**	**total aver***
dri	0.10	0.09	0.11	0.13	0.14	0.11	0.05	0.03	0.03	0.03	0.03			0.02	0.09	0.08	0.05	0.07	0.07	0.04	0.03	0.03	0.02	0.02		
eiu	0.32	0.22	0.24	0.18	0.17	0.16	0.16	0.14	0.13	0.14	0.15	**0.18**		0.71	0.17	0.08	0.18	0.10	0.08	0.08	0.05	0.07	0.07	0.07	**0.15**	**0.15**
ijt	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..		
prs	0.05	0.04	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.03	0.02	**0.03**		0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.02	**0.02**	**0.02**
wmo	..	0.20	0.19	0.16	0.19	0.17	0.13	0.09	0.10	0.11	0.08	**0.14**		..	0.11	0.09	0.08	0.13	0.11	0.16	0.07	0.07	0.07	0.07	**0.10**	**0.1**
Surveys of Firms or Households																										
afr	..	..	..	0.00	0.00	0.00	0.03	0.03	0.04	0.05	0.04			..	..	..	0.01	0.01	0.02	0.01	0.02	0.02	0.04	0.07		
bps	..	..	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			..	..	0.00	0.02	0.02	0.01	0.02	0.04	0.05	0.00	0.00		
gcb	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	0.05	0.03	0.02	0.02	0.01	0.01		
gcs	0.07	0.10	0.09	0.06	0.05	0.06	0.08	0.09	0.07	0.06	0.05			0.03	0.13	0.08	0.06	0.05	0.05	0.06	0.08	0.06	0.06	0.06		
gwp	..	..	..	..	..	..	..	0.00	0.00	0.00	0.00			..	..	..	..	..	..	..	0.01	0.01	0.01	0.01		
lbo	0.03	0.02	0.02	0.01	0.03	0.01	0.01	0.01	0.01	0.02	0.04			..	..	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
prc	..	..	..	..	..	..	..	..	..	..	..			0.14	0.12	0.21	0.16	0.13	0.11	0.10	0.09	0.07	0.08	0.13		
vab	..	..	..	..	..	0.01	0.05	0.03	0.03	0.01	0.01			..	..	..	..	..	0.02	0.01	0.01	0.01	0.01	0.01		
wcy	0.11	0.06	0.06	0.07	0.07	0.07	0.09	0.07	0.07	0.07	0.06	**0.07**		0.07	0.06	0.07	0.08	0.08	0.09	0.09	0.11	0.11	0.10	0.09	**0.09**	**0.07**
Non-Governmental Organization Data Providers																										
bti	..	..	..	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02			..	..	..	..	..	0.05	0.05	0.06	0.06	0.05	0.05		
ccr	..	..	..	..	0.00	0.00	0.01	0.01	0.01	0.01	0.01			..	..	..	..	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
frh	0.20	0.09	0.07	0.09	0.08	0.14	0.11	0.11	0.12	0.11	0.11			..	0.18	0.18	0.15	0.24	0.21	0.23	0.16	0.16	0.24	0.24		
gii	..	..	..	..	..	..	..	0.03	0.02	0.02	0.02			..	..	..	..	..	..	..	0.00	0.00	0.00	0.00		
her	0.05	0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.05	0.07			..	..	..	..	..	..	..	..	..	..	..		
irp	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..		
msi	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..		
obi	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..		
rsf	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..		
Public Sector Data Providers																										
adb	..	0.03	0.02	0.04	0.03	0.03	0.05	0.06	0.06	0.04	0.05			..	0.03	0.02	0.02	0.01	0.04	0.02	0.04	0.04	0.03	0.02		
asd	..	..	0.04	0.07	0.02	0.05	0.03	0.02	0.00	0.01	0.01			..	..	0.09	0.10	0.06	0.01	0.01	0.01	0.01	0.01	0.01		
ebr	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..		
hum	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.02	0.01			..	..	..	..	..	..	..	..	..	..	..		
ifd	..	..	..	..	..	0.01	0.01	0.01	0.01	0.02	0.01			..	..	..	..	..	0.01	0.01	0.02	0.02	0.02	0.03		
ipd	..	..	..	..	..	..	..	0.08	0.07	0.07	0.08			..	..	..	..	..	..	..	0.09	0.11	0.11	0.05		
pia	..	0.05	0.05	0.05	0.04	0.06	0.06	0.06	0.06	0.10	0.10			..	0.07	0.07	0.05	0.06	0.04	0.04	0.04	0.05	0.04	0.04		
tpr	..	..	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01			..	..	..	..	..	..	..	..	..	..	..		

* *aver*-averages of the governance indicator; *total aver*- total averge across all governance indicators

Appendix 3 Table 3.1 Cross-correlations for the EBRD index

THE EBRD transition indicators (currency and units)	*Large scale privatization*	*Small scale privatization*	*Enterprise restructuring*	*Price liberalization*	*Trade and Forex system*	*Competition Policy*	*Banking reform and interest rate liberalization*	*Securities markets and non-bank financial institutions*	*Overall infrastructure reform*	*Telecommunications*	*Railways*	*Electric Power*	*Roads*	*Water and waste water*
Large scale privatization	1.000													
Small scale privatization	0.817	1.000												
Enterprise restructuring	0.798	0.783	1.000											
Price liberalization	0.782	0.746	0.680	1.000										
Trade and Forex system	0.780	0.811	0.705	0.883	1.000									
Competition Policy	0.686	0.670	0.832	0.506	0.580	1.000								
Banking reform and interest rate liberalization	0.799	0.766	0.890	0.705	0.764	0.766	1.000							
Securities markets and non-bank financial institutions	0.650	0.633	0.837	0.470	0.531	0.842	0.797	1.000						
Overall infrastructure reform	0.758	0.692	0.851	0.639	0.669	0.761	0.880	0.837	1.000					
Telecommunications	0.775	0.701	0.781	0.613	0.666	0.725	0.813	0.781	0.857	1.000				
Railways	0.620	0.524	0.721	0.503	0.497	0.639	0.716	0.707	0.866	0.627	1.000			
Electric Power	0.788	0.713	0.734	0.678	0.686	0.658	0.799	0.678	0.871	0.726	0.718	1.000		
Roads	0.532	0.534	0.712	0.542	0.608	0.596	0.753	0.706	0.835	0.642	0.675	0.673	1.000	
Water and waste water	0.683	0.623	0.838	0.544	0.557	0.742	0.838	0.818	0.918	0.787	0.777	0.739	0.731	1.000

Appendix 4

Dependent Variable: LGDPPCPPP
Method: Panel Least Squares
Sample (adjusted): 1998 2007
Periods included: 8
Cross-sections included: 21
Total panel (unbalanced) observations: 124
Convergence achieved after 14 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WGIAVER	0.004127	0.036525	0.112997	0.9103
THE EBRDAVER	-0.105192	0.061395	-1.713370	0.0901
EUACCESS	0.003610	0.011520	0.313416	0.7547
FDIGROWTH	-8.20E-05	0.000390	-0.210369	0.8339
ENRBALANCEPC	0.123266	0.011310	10.89849	0.0000
EXPORTGROWTH	0.000698	0.000247	2.831698	0.0057
LFIXCAP	0.168031	0.029188	5.756868	0.0000
GOVCONSRATIO	-0.006145	0.002513	-2.445699	0.0164
TIME	0.056295	0.006672	8.437765	0.0000
INFDEF	-0.000188	0.000171	-1.103373	0.2728
ENROLPRIM	0.001977	0.000794	2.491104	0.0146
ENROLSECOND	0.001185	0.001129	1.049826	0.2966
C	4.844606	0.661779	7.320583	0.0000
AR(1)	0.618610	0.051694	11.96668	0.0000

Cross-section fixed (dummy variables)

R-squared	0.999170	Mean dependent var	8.920686
Adjusted R-squared	0.998866	S.D. dependent var	0.773618
S.E. of regression	0.026054	Akaike info criterion	-4.229370
Sum squared resid	0.061093	Schwarz criterion	-3.456067
Log likelihood	296.2210	Hannan-Quinn criter.	-3.915237
F-statistic	3283.466	Durbin-Watson stat	1.840886
Prob(F-statistic)	0.000000		

Inverted AR Roots .62

Panel unit root test: Summary
Series: LGDPPCPPP
Sample: 1996 2009
Exogenous variables: Individual effects, individual linear trends
User specified lags at: 1
Bandwidth selection is fixed using Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-0.10260	0.4591	29	260
Breitung t-stat	6.23466	1.0000	29	231
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	3.10272	0.9990	29	260
ADF - Fisher Chi-square	42.7364	0.9334	29	260
PP - Fisher Chi-square	52.9599	0.6627	29	289

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Kao Residual Cointegration Test
Series: LGDPPCPPP WGIAVER THE EBRDAVER EUACCESS FDIGROWTH ENRBALANCEPC EXPORTGROWTH LFIXCAP GOVCONSRATIO TIME INFDEF ENROLPRIM ENROLSECOND
Sample: 1996 2009
Included observations: 319
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Lag selection: fixed at 1
Newey-West bandwidth selection using Bartlett kernel

	t-Statistic	Prob.
ADF	-3.545971	0.0002
Residual variance	0.001176	
HAC variance	0.001666	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 12/04/10 Time: 13:42
Sample (adjusted): 2000 2007
Included observations: 101 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.438390	0.088692	-4.942823	0.0000
D(RESID(-1))	0.389943	0.085644	4.553052	0.0000

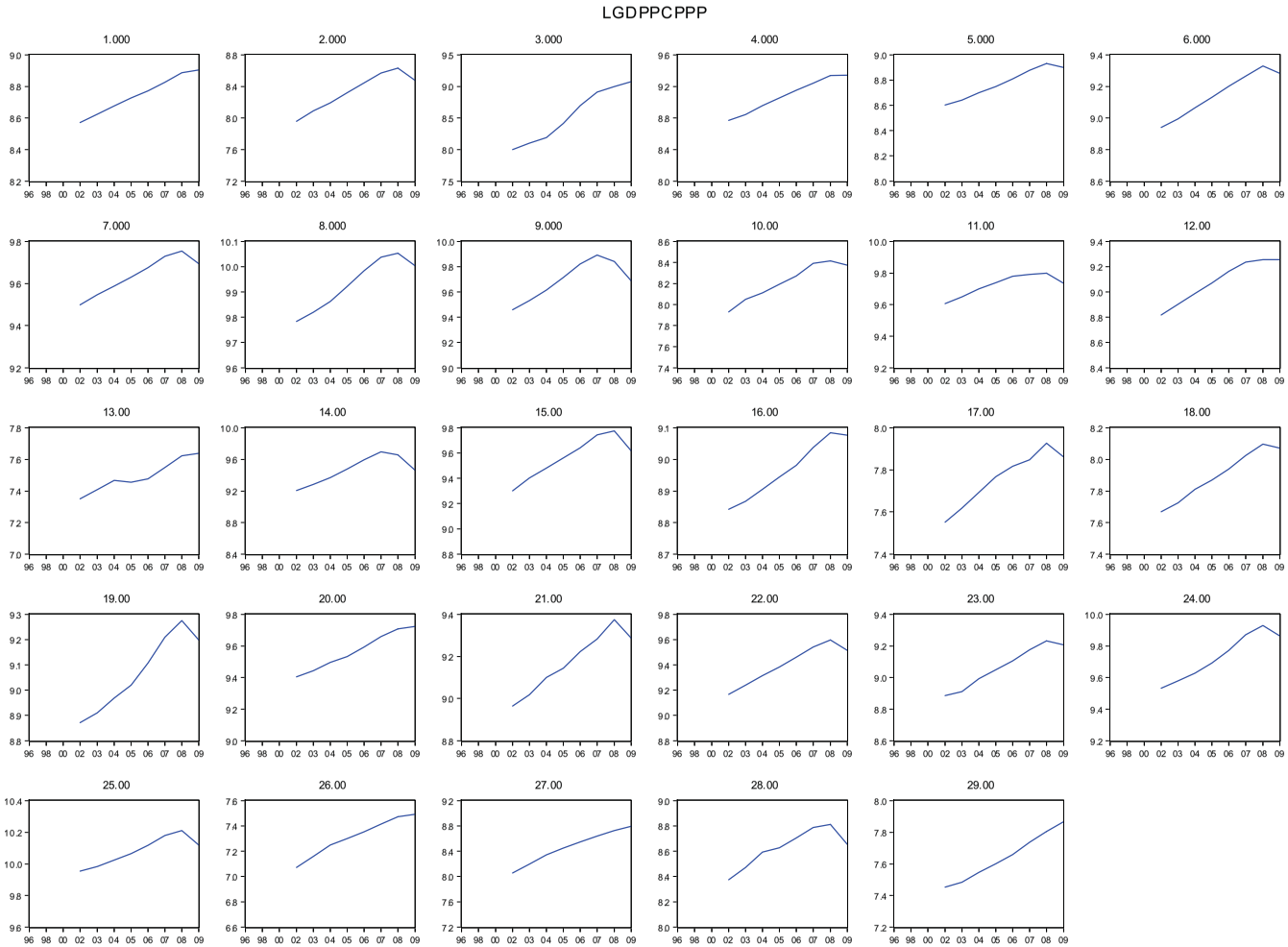
R-squared	0.242020	Mean dependent var	0.001451
Adjusted R-squared	0.234364	S.D. dependent var	0.033100
S.E. of regression	0.028963	Akaike info criterion	-4.226016
Sum squared resid	0.083045	Schwarz criterion	-4.174231
Log likelihood	215.4138	Hannan-Quinn criter.	-4.205052
Durbin-Watson stat	1.836715		

Panel unit root test: Summary
Series: GDPPCPPPGROWTH
Sample: 1996 2009
Exogenous variables: None
User specified lags at: 1
Bandwidth selection is fixed using Bartlett kernel

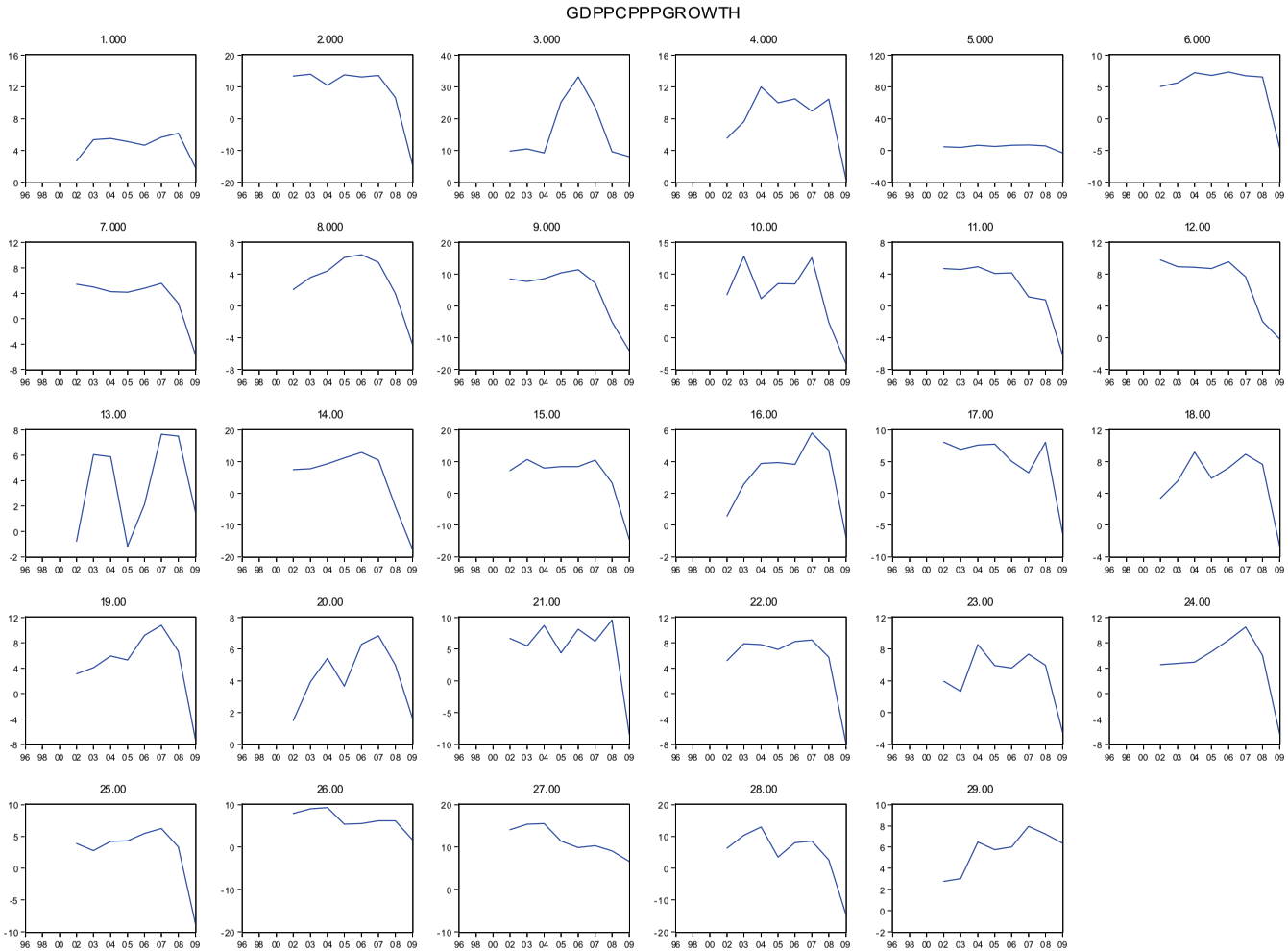
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-5.67997	0.0000	29	260
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	89.3777	0.0051	29	260
PP - Fisher Chi-square	118.582	0.0000	29	289

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Graph 4.1 Cross-sectional graph of LGDPCPPP.



Graph 4.2 Cross-sectional graph of GDPCPPPGROWTH.



Appendix 5

Regression 1 and 2

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 22
Total panel (unbalanced) observations: 161

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WGIAVER	2.329167	1.766355	1.318629	0.1897
THE EBRDAVER	0.263418	2.174505	0.121139	0.9038
EUACCESS	0.844254	0.807439	1.045595	0.2977
FDIGROWTH	-0.034818	0.049036	-0.710057	0.4790
ENRBALANCEPC	2.264852	0.597430	3.790991	0.0002
EXPORTGROWTH	0.131437	0.023084	5.693766	0.0000
LFIXCAP	5.352358	1.150697	4.651404	0.0000
GOVCONSRATIO	0.098946	0.136118	0.726911	0.4686
TIME	-0.289222	0.195931	-1.476147	0.1424
INFDEF	-0.041424	0.014319	-2.893061	0.0045
ENROLPRIM	-0.016698	0.058794	-0.284012	0.7769
ENROLSECOND	0.009097	0.070854	0.128386	0.8980
C	-108.7364	26.82616	-4.053372	0.0001

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.743124	Mean dependent var	7.092623
Adjusted R-squared	0.676377	S.D. dependent var	4.340363
S.E. of regression	2.469141	Akaike info criterion	4.830760
Sum squared resid	774.2753	Schwarz criterion	5.481492
Log likelihood	-354.8762	Hannan-Quinn criter.	5.094984
F-statistic	11.13340	Durbin-Watson stat	1.915755
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 24
Total panel (unbalanced) observations: 170

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WGIAVER	2.507637	1.536364	1.632189	0.1049
FDIGROWTH	-0.034963	0.047573	-0.734939	0.4636
ENRBALANCEPC	2.186646	0.570693	3.831560	0.0002
EXPORTGROWTH	0.136387	0.021741	6.273130	0.0000
LFIXCAP	4.822552	1.016343	4.745006	0.0000
TIME	-0.188572	0.118990	-1.584771	0.1153
INFDEF	-0.038861	0.012922	-3.007434	0.0031
ENROLPRIM	-0.018795	0.054502	-0.344850	0.7307
ENROLSECOND	-0.010869	0.064484	-0.168546	0.8664
C	-94.25055	21.79858	-4.323702	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.742183	Mean dependent var	6.969813
Adjusted R-squared	0.681963	S.D. dependent var	4.269053
S.E. of regression	2.407521	Akaike info criterion	4.767490
Sum squared resid	794.0734	Schwarz criterion	5.376204
Log likelihood	-372.2366	Hannan-Quinn criter.	5.014499
F-statistic	12.32455	Durbin-Watson stat	1.865979
Prob(F-statistic)	0.000000		

Regressions 3 and 4

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/03/10 Time: 22:45
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 18
Total panel (unbalanced) observations: 127

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRSAVER	17.78172	8.169034	2.176723	0.0319
THE EBRDAVER	2.331422	2.302212	1.012688	0.3137
EUACCESS	1.108496	0.880274	1.259263	0.2110
FDIGROWTH	-0.042692	0.049339	-0.865285	0.3890
ENRBALANCEPC	2.029449	0.632658	3.207812	0.0018
EXPORTGROWTH	0.151308	0.027306	5.541303	0.0000
LFIXCAP	4.344203	1.280608	3.392297	0.0010
GOVCONSRATIO	0.008901	0.172630	0.051563	0.9590
TIME	-0.287691	0.254225	-1.131641	0.2606
INFDEF	-0.045736	0.014233	-3.213392	0.0018
ENROLPRIM	0.026044	0.064192	0.405723	0.6858
ENROLSECOND	0.043857	0.081968	0.535043	0.5938
C	-112.5211	29.43168	-3.823130	0.0002

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.786587	Mean dependent var	7.525470
Adjusted R-squared	0.722783	S.D. dependent var	4.490423
S.E. of regression	2.364273	Akaike info criterion	4.761783
Sum squared resid	542.2091	Schwarz criterion	5.433638
Log likelihood	-272.3732	Hannan-Quinn criter.	5.034749
F-statistic	12.32817	Durbin-Watson stat	1.840173
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/04/10 Time: 00:12
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 19
Total panel (unbalanced) observations: 135

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRSAVER	19.69936	7.494787	2.628408	0.0098
FDIGROWTH	-0.042782	0.047622	-0.898377	0.3710
ENRBALANCEPC	1.787961	0.587778	3.041898	0.0030
EXPORTGROWTH	0.158434	0.025222	6.281552	0.0000
LFIXCAP	3.753891	1.104750	3.397955	0.0010
TIME	-0.003219	0.129742	-0.024813	0.9803
INFDEF	-0.044848	0.012691	-3.533904	0.0006
ENROLPRIM	0.030927	0.057426	0.538556	0.5913
ENROLSECOND	0.044111	0.072201	0.610944	0.5425
C	-96.88206	24.50677	-3.953277	0.0001

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.785399	Mean dependent var	7.346411
Adjusted R-squared	0.731248	S.D. dependent var	4.425233
S.E. of regression	2.294099	Akaike info criterion	4.680926
Sum squared resid	563.1293	Schwarz criterion	5.283502
Log likelihood	-287.9625	Hannan-Quinn criter.	4.925796
F-statistic	14.50372	Durbin-Watson stat	1.790761
Prob(F-statistic)	0.000000		

Regressions 5 and 6

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/03/10 Time: 22:58
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 21
Total panel (unbalanced) observations: 131

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EIUAVER	5.267153	5.107884	1.031181	0.3050
THE EBRDAVER	-3.184058	2.507255	-1.269938	0.2071
EUACCESS	0.740492	0.813761	0.909962	0.3651
FDIGROWTH	-0.051833	0.045925	-1.128649	0.2618
ENRBALANCEPC	2.605947	0.603483	4.318180	0.0000
EXPORTGROWTH	0.177370	0.026081	6.800665	0.0000
LFIXCAP	3.783776	1.182011	3.201134	0.0018
GOVCONSRATIO	-0.091801	0.157745	-0.581956	0.5619
TIME	-0.161717	0.223368	-0.723993	0.4708
INFDEF	-0.122797	0.025955	-4.731081	0.0000
ENROLPRIM	-0.058951	0.061260	-0.962320	0.3383
ENROLSECOND	0.098802	0.076163	1.297234	0.1976
C	-69.51567	29.01395	-2.395940	0.0185

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.814425	Mean dependent var	7.017746
Adjusted R-squared	0.753829	S.D. dependent var	4.468813
S.E. of regression	2.217229	Akaike info criterion	4.643981
Sum squared resid	481.7783	Schwarz criterion	5.368267
Log likelihood	-271.1807	Hannan-Quinn criter.	4.938290
F-statistic	13.44026	Durbin-Watson stat	1.993836
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/04/10 Time: 00:25
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 23
Total panel (unbalanced) observations: 140

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EIUAVER	5.294909	4.831776	1.095851	0.2756
FDIGROWTH	-0.050273	0.044662	-1.125641	0.2628
ENRBALANCEPC	2.366238	0.555018	4.263351	0.0000
EXPORTGROWTH	0.173867	0.024137	7.203482	0.0000
LFIXCAP	4.018991	1.016432	3.954019	0.0001
TIME	-0.222818	0.124956	-1.783169	0.0774
INFDEF	-0.096368	0.019141	-5.034539	0.0000
ENROLPRIM	-0.068349	0.059160	-1.155327	0.2505
ENROLSECOND	0.066525	0.068201	0.975432	0.3315
C	-82.09439	21.77876	-3.769470	0.0003

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.809249	Mean dependent var	6.873433
Adjusted R-squared	0.754496	S.D. dependent var	4.373320
S.E. of regression	2.166907	Akaike info criterion	4.582111
Sum squared resid	507.1126	Schwarz criterion	5.254486
Log likelihood	-288.7477	Hannan-Quinn criter.	4.855344
F-statistic	14.78009	Durbin-Watson stat	1.927696
Prob(F-statistic)	0.000000		

Regressions 7 and 8

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/03/10 Time: 23:19
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 11
Total panel (unbalanced) observations: 52

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WCYAVER	-0.091789	9.762585	-0.009402	0.9926
THE EBRDAVER	13.07800	4.337448	3.015138	0.0053
EUACCESS	-0.653614	0.901567	-0.724975	0.4743
FDIGROWTH	0.001494	0.030675	0.048706	0.9615
ENRBALANCEPC	-2.232135	3.179692	-0.701997	0.4883
EXPORTGROWTH	0.103256	0.047348	2.180801	0.0375
LFIXCAP	4.179358	2.791406	1.497223	0.1451
GOVCONSRATIO	-0.293771	0.426377	-0.688992	0.4963
TIME	-0.498762	0.310024	-1.608786	0.1185
INFDEF	0.041683	0.100014	0.416774	0.6799
ENROLPRIM	0.072796	0.106375	0.684331	0.4992
ENROLSECOND	-0.172708	0.118617	-1.456014	0.1561
C	-121.0079	67.18728	-1.801053	0.0821

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.809393	Mean dependent var	6.025718
Adjusted R-squared	0.664795	S.D. dependent var	2.456787
S.E. of regression	1.422404	Akaike info criterion	3.843242
Sum squared resid	58.67379	Schwarz criterion	4.706292
Log likelihood	-76.92429	Hannan-Quinn criter.	4.174115
F-statistic	5.597524	Durbin-Watson stat	1.692517
Prob(F-statistic)	0.000013		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/04/10 Time: 00:32
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 12
Total panel (unbalanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WCYAVER	-3.003421	8.425583	-0.356464	0.7234
FDIGROWTH	0.001093	0.031768	0.034395	0.9727
ENRBALANCEPC	0.439790	2.452370	0.179333	0.8586
EXPORTGROWTH	0.155349	0.040125	3.871678	0.0004
LFIXCAP	4.848508	2.153247	2.251719	0.0300
TIME	-0.098447	0.192624	-0.511082	0.6122
INFDEF	-0.070139	0.081365	-0.862029	0.3939
ENROLPRIM	0.019840	0.101950	0.194606	0.8467
ENROLSECOND	0.056530	0.090418	0.625204	0.5355
C	-112.7200	49.31730	-2.285608	0.0278

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.748103	Mean dependent var	5.822802
Adjusted R-squared	0.618925	S.D. dependent var	2.395616
S.E. of regression	1.478844	Akaike info criterion	3.889616
Sum squared resid	85.29221	Schwarz criterion	4.622636
Log likelihood	-95.68847	Hannan-Quinn criter.	4.176340
F-statistic	5.791260	Durbin-Watson stat	1.419802
Prob(F-statistic)	0.000002		

Regressions 9 and 10

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample (adjusted): 1998 2007
Periods included: 8
Cross-sections included: 22
Total panel (unbalanced) observations: 147

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WMOAVER	8.729702	6.819108	1.280182	0.2031
THE EBRDAVER	0.318489	3.582320	0.088906	0.9293
EUACCESS	0.490200	0.838239	0.584798	0.5598
FDIGROWTH	-0.016771	0.046591	-0.359968	0.7195
ENRBALANCEPC	1.792604	0.596720	3.004093	0.0033
EXPORTGROWTH	0.137860	0.022783	6.050932	0.0000
LFIXCAP	2.939677	1.305076	2.252495	0.0262
GOVCONSRATIO	0.035498	0.177713	0.199750	0.8420
TIME	-0.034904	0.252968	-0.137977	0.8905
INFDEF	-0.012903	0.016454	-0.784202	0.4346
ENROLPRIM	-0.030825	0.061319	-0.502706	0.6161
ENROLSECOND	0.110558	0.081814	1.351343	0.1793
C	-70.93863	30.21464	-2.347824	0.0206

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.766089	Mean dependent var	7.347502
Adjusted R-squared	0.697779	S.D. dependent var	4.223163
S.E. of regression	2.321668	Akaike info criterion	4.721989
Sum squared resid	609.0862	Schwarz criterion	5.413654
Log likelihood	-313.0662	Hannan-Quinn criter.	5.003020
F-statistic	11.21486	Durbin-Watson stat	1.941250
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample (adjusted): 1998 2007
Periods included: 8
Cross-sections included: 24
Total panel (unbalanced) observations: 155

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WMOAVER	9.009990	6.049030	1.489493	0.1389
FDIGROWTH	-0.016990	0.044863	-0.378702	0.7056
ENRBALANCEPC	1.699944	0.556440	3.055037	0.0028
EXPORTGROWTH	0.141881	0.021161	6.704879	0.0000
LFIXCAP	2.646625	1.161520	2.278588	0.0244
TIME	0.047589	0.150137	0.316969	0.7518
INFDEF	-0.011041	0.015301	-0.721557	0.4719
ENROLPRIM	-0.029092	0.057181	-0.508769	0.6118
ENROLSECOND	0.099928	0.073768	1.354635	0.1780
C	-63.55923	24.18423	-2.628128	0.0097

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.769806	Mean dependent var	7.218386
Adjusted R-squared	0.709427	S.D. dependent var	4.164592
S.E. of regression	2.244914	Akaike info criterion	4.641614
Sum squared resid	614.8359	Schwarz criterion	5.289569
Log likelihood	-326.7251	Hannan-Quinn criter.	4.904799
F-statistic	12.74963	Durbin-Watson stat	1.943506
Prob(F-statistic)	0.000000		

Regressions 11 and 12

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/04/10 Time: 00:43
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 24
Total panel (unbalanced) observations: 170

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDIGROWTH	-0.040839	0.047722	-0.855787	0.3936
ENRBALANCEPC	2.086818	0.570817	3.655843	0.0004
EXPORTGROWTH	0.133270	0.021788	6.116779	0.0000
LFIXCAP	5.155734	1.001617	5.147413	0.0000
TIME	-0.176524	0.119475	-1.477494	0.1418
INFDEF	-0.038341	0.012995	-2.950395	0.0037
ENROLPRIM	-0.004419	0.054109	-0.081660	0.9350
ENROLSECOND	-0.006814	0.064824	-0.105119	0.9164
C	-103.5089	21.17414	-4.888460	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.737170	Mean dependent var	6.969813
Adjusted R-squared	0.678128	S.D. dependent var	4.269053
S.E. of regression	2.421993	Akaike info criterion	4.774984
Sum squared resid	809.5146	Schwarz criterion	5.365252
Log likelihood	-373.8736	Hannan-Quinn criter.	5.014508
F-statistic	12.48562	Durbin-Watson stat	1.830619
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/04/10 Time: 01:07
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 24
Total panel (unbalanced) observations: 170

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WGIVA	-3.106068	1.302724	-2.384286	0.0185
WGIPV	0.894119	0.823417	1.085863	0.2795
WGIGE	5.323422	1.372686	3.878106	0.0002
WGIRQ	0.278998	1.200050	0.232489	0.8165
WGIRL	-1.231560	1.744249	-0.706069	0.4814
WGICC	-1.151338	1.307654	-0.880460	0.3802
FDIGROWTH	-0.038120	0.045385	-0.839929	0.4025
ENRBALANCEPC	1.782084	0.556434	3.202685	0.0017
EXPORTGROWTH	0.136202	0.020827	6.539602	0.0000
LFIXCAP	4.839332	1.014162	4.771754	0.0000
TIME	-0.248182	0.132387	-1.874665	0.0630
INFDEF	-0.031953	0.013160	-2.428014	0.0165
ENROLPRIM	-0.025773	0.054389	-0.473858	0.6364
ENROLSECOND	-0.017661	0.064978	-0.271803	0.7862
C	-93.30712	21.86958	-4.266526	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.776666	Mean dependent var	6.969813
Adjusted R-squared	0.714065	S.D. dependent var	4.269053
S.E. of regression	2.282786	Akaike info criterion	4.682733
Sum squared resid	687.8667	Schwarz criterion	5.383676
Log likelihood	-360.0323	Hannan-Quinn criter.	4.967167
F-statistic	12.40658	Durbin-Watson stat	1.857284
Prob(F-statistic)	0.000000		

Regressions 13 and 14

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 23
Total panel (unbalanced) observations: 140

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EIUVA	2.259814	3.325448	0.679552	0.4983
EIUPV	1.500413	3.822006	0.392572	0.6954
EIUGE	6.372203	3.832613	1.662626	0.0994
EIURQ	2.411376	4.204871	0.573472	0.5676
EIURL	-1.031592	4.769051	-0.216310	0.8292
EIUCC	-2.907079	2.474224	-1.174946	0.2427
FDIGROWTH	-0.050511	0.045330	-1.114305	0.2677
ENRBALANCEPC	2.139894	0.600563	3.563146	0.0006
EXPORTGROWTH	0.185688	0.024998	7.428096	0.0000
LFIXCAP	4.394397	1.149825	3.821798	0.0002
TIME	-0.266878	0.145085	-1.839468	0.0687
INFDEF	-0.090576	0.020547	-4.408261	0.0000
ENROLPRIM	-0.043514	0.060606	-0.717978	0.4744
ENROLSECOND	0.070964	0.068631	1.033989	0.3036
C	-94.90569	25.34954	-3.743883	0.0003

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.817656	Mean dependent var	6.873433
Adjusted R-squared	0.753924	S.D. dependent var	4.373320
S.E. of regression	2.169429	Akaike info criterion	4.608463
Sum squared resid	484.7615	Schwarz criterion	5.385897
Log likelihood	-285.5924	Hannan-Quinn criter.	4.924389
F-statistic	12.82964	Durbin-Watson stat	1.927673
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample (adjusted): 1998 2007
Periods included: 8
Cross-sections included: 24
Total panel (unbalanced) observations: 155

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WMOVA	-1.040824	4.532515	-0.229635	0.8188
WMOPV	-0.325989	3.163097	-0.103060	0.9181
WMOGE	12.45874	4.902162	2.541478	0.0123
WMORQ	-8.824979	5.553378	-1.589119	0.1147
WMORL	3.547186	5.249153	0.675763	0.5005
WMOCC	3.690513	3.664144	1.007196	0.3159
FDIGROWTH	-0.013241	0.044453	-0.297861	0.7663
ENRBALANCEPC	1.864947	0.553568	3.368960	0.0010
EXPORTGROWTH	0.147752	0.021280	6.943364	0.0000
LFIXCAP	4.116969	1.250473	3.292330	0.0013
TIME	-0.078764	0.154229	-0.510693	0.6105
INFDEF	-0.025851	0.015887	-1.627197	0.1064
ENROLPRIM	-0.012294	0.056742	-0.216663	0.8288
ENROLSECOND	0.082840	0.073188	1.131878	0.2600
C	-94.06099	25.93763	-3.626430	0.0004

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.786984	Mean dependent var	7.218386
Adjusted R-squared	0.719620	S.D. dependent var	4.164592
S.E. of regression	2.205190	Akaike info criterion	4.628576
Sum squared resid	568.9549	Schwarz criterion	5.374706
Log likelihood	-320.7146	Hannan-Quinn criter.	4.931637
F-statistic	11.68255	Durbin-Watson stat	2.048192
Prob(F-statistic)	0.000000		

Regressions 15 and 16

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/04/10 Time: 01:53
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 19
Total panel (unbalanced) observations: 135

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRSVA	0.048932	3.806591	0.012855	0.9898
PRSPV	3.137146	5.400984	0.580847	0.5626
PRSGE	3.555798	3.586290	0.991498	0.3238
PRSRQ	5.626033	2.591637	2.170842	0.0323
PRSRL	5.138069	3.964351	1.296068	0.1979
PRSCC	-2.304966	4.189499	-0.550177	0.5834
FDIGROWTH	-0.044572	0.048027	-0.928058	0.3556
ENRBALANCEPC	1.858402	0.602448	3.084748	0.0026
EXPORTGROWTH	0.155978	0.025806	6.044180	0.0000
LFIXCAP	4.558611	1.361373	3.348540	0.0011
TIME	-0.216533	0.225919	-0.958452	0.3401
INFDEF	-0.037409	0.013456	-2.780097	0.0065
ENROLPRIM	0.026963	0.058837	0.458268	0.6477
ENROLSECOND	-0.006426	0.078419	-0.081948	0.9348
C	-106.3468	28.25730	-3.763517	0.0003

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.792753	Mean dependent var	7.346411
Adjusted R-squared	0.727734	S.D. dependent var	4.425233
S.E. of regression	2.309047	Akaike info criterion	4.720133
Sum squared resid	543.8330	Schwarz criterion	5.430312
Log likelihood	-285.6090	Hannan-Quinn criter.	5.008730
F-statistic	12.19269	Durbin-Watson stat	1.878890
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Two-Stage Least Squares
Sample (adjusted): 1998 2007
Periods included: 8
Cross-sections included: 19
Total panel (unbalanced) observations: 129
White period standard errors and covariance (no d.f. correction)
Instrument list: C GDPPCPPPGROWTH(-1) PRSPV PRSGE PRSRQ PRSRL PRSCC FDIGROWTH ENRBALANCEPC EXPORTGROWTH LFIXCAP TIME INFDEF ENROLPRIM ENROLSECOND

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRSVA	-32.20275	20.37585	-1.580437	0.1173
PRSPV	18.75745	6.539541	2.868314	0.0051
PRSGE	3.788510	8.510895	0.445137	0.6572
PRSRQ	8.869916	2.937257	3.019796	0.0032
PRSRL	-10.63791	5.984996	-1.777430	0.0787
PRSCC	8.129466	4.476427	1.816061	0.0725
FDIGROWTH	-0.070886	0.063858	-1.110064	0.2697
ENRBALANCEPC	1.589662	0.533144	2.981677	0.0036
EXPORTGROWTH	0.171366	0.026912	6.367665	0.0000
LFIXCAP	-0.522319	1.716552	-0.304284	0.7616
TIME	0.534544	0.313416	1.705542	0.0913
INFDEF	-0.000182	0.007452	-0.024370	0.9806
ENROLPRIM	-0.015015	0.113132	-0.132721	0.8947
ENROLSECOND	-0.000774	0.085458	-0.009053	0.9928
C	21.63297	41.06735	0.526768	0.5996

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.660981	Mean dependent var	7.543066
Adjusted R-squared	0.547974	S.D. dependent var	4.229624
S.E. of regression	2.843696	Sum squared resid	776.3144
F-statistic	15.21554	Durbin-Watson stat	2.338123
Prob(F-statistic)	0.000000	Second-Stage SSR	377.1313
Instrument rank	33.000000		

Regression 17

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 12/04/10 Time: 02:53
Sample (adjusted): 2000 2007
Periods included: 7
Cross-sections included: 19
Total panel (unbalanced) observations: 110
White period instrument weighting matrix
White period standard errors and covariance (no d.f. correction)
Instrument list: @DYN(GDPPCPPPGROWTH,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPCPPPGROWTH(-1)	0.329394	0.394017	0.835991	0.4053
PRSVA	0.743303	15.83167	0.046950	0.9627
PRSPV	15.58101	11.86817	1.312840	0.1924
PRSGE	-4.834796	21.49180	-0.224960	0.8225
PRSRQ	-0.838449	8.972191	-0.093450	0.9257
PRSRL	13.57729	26.53178	0.511737	0.6100
PRSCC	-26.53200	16.81590	-1.577792	0.1179
FDIGROWTH	-0.051042	0.077598	-0.657782	0.5123
ENRBALANCEPC	0.704131	8.375537	0.084070	0.9332
EXPORTGROWTH	0.095515	0.076296	1.251902	0.2137
LFIXCAP	6.871279	7.881286	0.871847	0.3855
TIME	-0.170819	0.993596	-0.171919	0.8639
INFDEF	0.030771	0.112331	0.273933	0.7847
ENROLPRIM	0.130352	0.327821	0.397631	0.6918
ENROLSECOND	-0.363270	0.286734	-1.266923	0.2083

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	0.488478	S.D. dependent var	3.002903
S.E. of regression	3.959883	Sum squared resid	1489.664
J-statistic	1.330489	Instrument rank	19.000000

Appendix 6

Pairwise Granger Causality Tests
Sample: 1996 2009
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
WGIAVER does not Granger Cause GDPPCPPPGROWTH	254	5.00516	0.0074
GDPPCPPPGROWTH does not Granger Cause WGIAVER		0.97333	0.3793
PRSAVER does not Granger Cause GDPPCPPPGROWTH	178	1.97599	0.1417
GDPPCPPPGROWTH does not Granger Cause PRSAVER		0.86296	0.4237
WMOAVER does not Granger Cause GDPPCPPPGROWTH	222	3.90247	0.0216
GDPPCPPPGROWTH does not Granger Cause WMOAVER		0.38861	0.6785
EIUAVER does not Granger Cause GDPPCPPPGROWTH	198	4.89314	0.0085
GDPPCPPPGROWTH does not Granger Cause EIUAVER		0.69753	0.4991

Pairwise Granger Causality Tests
Sample: 1996 2009

Null Hypothesis:	Obs	F-Statistic	Prob.
PRSVA does not Granger Cause GDPPCPPPGROWTH	178	4.62756	0.0110
GDPPCPPPGROWTH does not Granger Cause PRSVA		5.89383	0.0033
PRSPV does not Granger Cause GDPPCPPPGROWTH	178	1.07748	0.3427
GDPPCPPPGROWTH does not Granger Cause PRSPV		0.43655	0.6470
PRSGE does not Granger Cause GDPPCPPPGROWTH	178	0.82137	0.4415
GDPPCPPPGROWTH does not Granger Cause PRSGE		0.48614	0.6158
PRSRQ does not Granger Cause GDPPCPPPGROWTH	178	3.25873	0.0408
GDPPCPPPGROWTH does not Granger Cause PRSRQ		4.58216	0.0115
PRSRL does not Granger Cause GDPPCPPPGROWTH	178	0.08502	0.9185
GDPPCPPPGROWTH does not Granger Cause PRSRL		1.81486	0.1659
PRSCC does not Granger Cause GDPPCPPPGROWTH	178	0.27884	0.7570
GDPPCPPPGROWTH does not Granger Cause PRSCC		4.80592	0.0093

Appendix 7

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	43.873280	8	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
FDIGROWTH	-0.040839	-0.044347	0.000070	0.6758
ENRBALANCEPC	2.086818	1.147783	0.224868	0.0477
EXPORTGROWTH	0.133270	0.138570	0.000040	0.4038
LFIXCAP	5.155734	0.384359	0.873073	0.0000
TIME	-0.176524	0.307893	0.008931	0.0000
INFDEF	-0.038341	-0.032534	0.000011	0.0796
ENROLPRIM	-0.004419	0.073854	0.000461	0.0003
ENROLSECOND	-0.006814	0.011166	0.001201	0.6039

Cross-section random effects test equation:
Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/06/10 Time: 05:31
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 24
Total panel (unbalanced) observations: 170

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-103.5089	21.17414	-4.888460	0.0000
FDIGROWTH	-0.040839	0.047722	-0.855787	0.3936
ENRBALANCEPC	2.086818	0.570817	3.655843	0.0004
EXPORTGROWTH	0.133270	0.021788	6.116779	0.0000
LFIXCAP	5.155734	1.001617	5.147413	0.0000
TIME	-0.176524	0.119475	-1.477494	0.1418
INFDEF	-0.038341	0.012995	-2.950395	0.0037
ENROLPRIM	-0.004419	0.054109	-0.081660	0.9350
ENROLSECOND	-0.006814	0.064824	-0.105119	0.9164

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.737170	Mean dependent var	6.969813
Adjusted R-squared	0.678128	S.D. dependent var	4.269053
S.E. of regression	2.421993	Akaike info criterion	4.774984
Sum squared resid	809.5146	Schwarz criterion	5.365252
Log likelihood	-373.8736	Hannan-Quinn criter.	5.014508
F-statistic	12.48562	Durbin-Watson stat	1.830619
Prob(F-statistic)	0.000000		

Appendix 8

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	44.430957	14	0.0001

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
PRSVA	0.048932	-8.693767	6.675767	0.0007
PRSPV	3.137146	9.779795	8.975233	0.0266
PRSGE	3.555798	-2.162904	6.131799	0.0209
PRSRQ	5.626033	3.311170	1.570994	0.0648
PRSRL	5.138069	0.126425	6.170164	0.0436
PRSCC	-2.304966	3.741504	6.048336	0.0139
FDIGROWTH	-0.044572	-0.059598	0.000106	0.1445
ENRBALANCEPC	1.858402	0.614519	0.269448	0.0166
EXPORTGROWTH	0.155978	0.160770	0.000102	0.6353
LFIXCAP	4.558611	-0.252212	1.666674	0.0002
TIME	-0.216533	0.486469	0.034453	0.0002
INFDEF	-0.037409	-0.034240	0.000021	0.4880
ENROLPRIM	0.026963	0.086337	0.000565	0.0125
ENROLSECOND	-0.006426	-0.002302	0.002543	0.9348

Cross-section random effects test equation:
Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Date: 12/06/10 Time: 05:35
Sample (adjusted): 1996 2007
Periods included: 9
Cross-sections included: 19
Total panel (unbalanced) observations: 135

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-106.3468	28.25730	-3.763517	0.0003
PRSVA	0.048932	3.806591	0.012855	0.9898
PRSPV	3.137146	5.400984	0.580847	0.5626
PRSGE	3.555798	3.586290	0.991498	0.3238
PRSRQ	5.626033	2.591637	2.170842	0.0323
PRSRL	5.138069	3.964351	1.296068	0.1979
PRSCC	-2.304966	4.189499	-0.550177	0.5834
FDIGROWTH	-0.044572	0.048027	-0.928058	0.3556
ENRBALANCEPC	1.858402	0.602448	3.084748	0.0026
EXPORTGROWTH	0.155978	0.025806	6.044180	0.0000
LFIXCAP	4.558611	1.361373	3.348540	0.0011
TIME	-0.216533	0.225919	-0.958452	0.3401
INFDEF	-0.037409	0.013456	-2.780097	0.0065
ENROLPRIM	0.026963	0.058837	0.458268	0.6477
ENROLSECOND	-0.006426	0.078419	-0.081948	0.9348

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.792753	Mean dependent var	7.346411
Adjusted R-squared	0.727734	S.D. dependent var	4.425233
S.E. of regression	2.309047	Akaike info criterion	4.720133
Sum squared resid	543.8330	Schwarz criterion	5.430312
Log likelihood	-285.6090	Hannan-Quinn criter.	5.008730
F-statistic	12.19269	Durbin-Watson stat	1.878890
Prob(F-statistic)	0.000000		

Appendix 9

Tests for robustness:

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample: 1996 2005
Periods included: 7
Cross-sections included: 19
Total panel (unbalanced) observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRSVA	-2.034955	4.816550	-0.422492	0.6740
PRSPV	-3.460896	5.465092	-0.633273	0.5287
PRSGE	-1.705876	3.591479	-0.474979	0.6364
PRSRQ	8.565730	2.653088	3.228589	0.0019
PRSRL	5.163619	4.445396	1.161566	0.2496
PRSCC	-4.478244	4.256533	-1.052087	0.2966
FDIGROWTH	-0.336146	0.159017	-2.113906	0.0383
ENRBALANCEPC	2.705902	0.911693	2.967996	0.0042
EXPORTGROWTH	0.143732	0.025707	5.591137	0.0000
LFIXCAP	5.665855	1.473486	3.845204	0.0003
TIME	-0.625228	0.267784	-2.334821	0.0226
INFDEF	-0.040183	0.012660	-3.174133	0.0023
ENROLPRIM	-0.035378	0.059545	-0.594147	0.5544
ENROLSECOND	0.002389	0.076671	0.031162	0.9752
C	-113.3445	30.14595	-3.759857	0.0004

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.813653	Mean dependent var	6.765045
Adjusted R-squared	0.723303	S.D. dependent var	3.781682
S.E. of regression	1.989238	Akaike info criterion	4.474582
Sum squared resid	261.1666	Schwarz criterion	5.339622
Log likelihood	-188.4918	Hannan-Quinn criter.	4.824579
F-statistic	9.005582	Durbin-Watson stat	2.117018
Prob(F-statistic)	0.000000		

Dependent Variable: GDPPCPPPGROWTH
Method: Panel Least Squares
Sample: 1996 2006
Periods included: 8
Cross-sections included: 19
Total panel (unbalanced) observations: 117

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRSVA	-1.729350	4.045233	-0.427503	0.6701
PRSPV	-1.458975	5.555408	-0.262622	0.7935
PRSGE	-0.073863	3.572029	-0.020678	0.9836
PRSRQ	7.687316	2.643267	2.908263	0.0046
PRSRL	3.775854	4.124312	0.915511	0.3625
PRSCC	0.391461	4.255389	0.091992	0.9269
FDIGROWTH	-0.052975	0.049382	-1.072767	0.2864
ENRBALANCEPC	3.620618	0.802561	4.511328	0.0000
EXPORTGROWTH	0.160991	0.025211	6.385623	0.0000
LFIXCAP	5.024531	1.457780	3.446702	0.0009
TIME	-0.322929	0.247823	-1.303065	0.1961
INFDEF	-0.039684	0.013189	-3.008942	0.0035
ENROLPRIM	-0.025883	0.061120	-0.423472	0.6730
ENROLSECOND	0.022242	0.078817	0.282198	0.7785
C	-106.8250	30.16653	-3.541175	0.0007

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.817971	Mean dependent var	7.187364
Adjusted R-squared	0.748627	S.D. dependent var	4.372029
S.E. of regression	2.192010	Akaike info criterion	4.640261
Sum squared resid	403.6124	Schwarz criterion	5.419335
Log likelihood	-238.4553	Hannan-Quinn criter.	4.956555
F-statistic	11.79579	Durbin-Watson stat	1.680818
Prob(F-statistic)	0.000000		

Appendix 10

Table 10.1 Cross correlation table

	GDPPCPPPGROWTH	WGIAVER	PRSAVER	EIUAVER	WMOAVER	THE EBRDAVER	EUACCESS	FDIGROWTH	ENRBALANCEPC	EXPORTGROWTH	LFIXCAP	GOVCONSRATIO	TIME	INFDEF	ENROLPRIM	ENROLSECOND
GDPPCPPPGROWTH	1.00	-0.36	-0.44	-0.33	-0.37	-0.33	-0.04	-0.03	0.37	0.47	-0.12	-0.15	0.28	0.11	0.31	-0.13
WGIAVER	-0.36	1.00	0.90	0.98	0.97	0.89	0.54	-0.12	-0.60	-0.04	0.17	0.39	-0.02	-0.48	-0.29	0.57
PRSAVER	-0.44	0.90	1.00	0.87	0.88	0.82	0.42	-0.11	-0.46	-0.01	0.27	0.37	-0.16	-0.46	-0.34	0.45
EIUAVER	-0.33	0.98	0.87	1.00	0.95	0.88	0.59	-0.07	-0.60	-0.06	0.22	0.35	0.09	-0.51	-0.34	0.56
WMOAVER	-0.37	0.97	0.88	0.95	1.00	0.88	0.53	-0.12	-0.58	-0.03	0.21	0.37	0.08	-0.45	-0.26	0.56
THE EBRDAVER	-0.33	0.89	0.82	0.88	0.88	1.00	0.54	-0.05	-0.37	-0.05	0.31	0.15	0.13	-0.36	-0.22	0.49
EUACCESS	-0.04	0.54	0.42	0.59	0.53	0.54	1.00	-0.04	-0.33	0.03	0.19	0.10	0.45	-0.28	-0.33	0.37
FDIGROWTH	-0.03	-0.12	-0.11	-0.07	-0.12	-0.05	-0.04	1.00	0.20	-0.06	0.21	-0.08	0.09	0.10	-0.08	-0.15
ENRBALANCEPC	0.37	-0.60	-0.46	-0.60	-0.58	-0.37	-0.33	0.20	1.00	0.13	0.18	-0.40	0.04	0.37	0.30	-0.28
EXPORTGROWTH	0.47	-0.04	-0.01	-0.06	-0.03	-0.05	0.03	-0.06	0.13	1.00	-0.03	0.03	-0.15	0.10	0.21	-0.12
LFIXCAP	-0.12	0.17	0.27	0.22	0.21	0.31	0.19	0.21	0.18	-0.03	1.00	-0.03	0.20	0.03	0.02	0.27
GOVCONSRATIO	-0.15	0.39	0.37	0.35	0.37	0.15	0.10	-0.08	-0.40	0.03	-0.03	1.00	-0.23	-0.51	-0.18	0.39
TIME	0.28	-0.02	-0.16	0.09	0.08	0.13	0.45	0.09	0.04	-0.15	0.20	-0.23	1.00	0.02	-0.06	0.15
INFDEF	0.11	-0.48	-0.46	-0.51	-0.45	-0.36	-0.28	0.10	0.37	0.10	0.03	-0.51	0.02	1.00	0.22	-0.36
ENROLPRIM	0.31	-0.29	-0.34	-0.34	-0.26	-0.22	-0.33	-0.08	0.30	0.21	0.02	-0.18	-0.06	0.22	1.00	-0.07
ENROLSECOND	-0.13	0.57	0.45	0.56	0.56	0.49	0.37	-0.15	-0.28	-0.12	0.27	0.39	0.15	-0.36	-0.07	1.00