How Much Do Institutions Matter in Transition?

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Abstract

There exists a gap in the current empirical literature on the determinants of transitional growth in Central Eastern Europe (CEE) and Former Soviet Union (FSU). This paper tries to fill this gap by providing an econometric analysis of the factors affecting transitional growth. The impact of institutional reform, along with the interaction effect between human capital stock and FDI, on the transitional growth performance of seventeen CEE and FSU is tested using a data set from 1989 to 2000. The empirical techniques used in this paper include principal component and panel data analysis. The empirical findings indicate that institutional development is very important to transitional growth and that its lagged effect on GDP growth is greater than the overall effect of liberalization policies. Moreover, school enrollment ratios in secondary education, as a proxy for human capital, was found to be significant in explaining growth variability among CEE and FSU economies. On the other hand foreign direct investment did not have much explanatory power over the GDP growth variability as opposed to the expectations raised in the beginning of transition. The results hold implications for policies designed to enhance the building of market-friendly institutions.

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1. Introduction

Motivation

In the beginning of the transition from planned to market economy, Central Eastern European (CEE) and Former Soviet Union (FSU) economies dealt with tremendous declines in output, high inflation rates, high unemployment rates and increasing poverty and inequality. This paper addresses the GDP growth performance of seventeen transition economies by identifying the most important determinants of growth variability across these economies throughout the first decade of transition. Important questions raised in this paper address the impact of market-friendly institutional building and the impact of reform policies such as liberalization policies on transitional growth. Can political reforms and political and social movements toward democratization have any effect on growth differences across countries? Is the large variation in economic policies mainly due to different rates of political change? Are there relevant economic, political and institutional circumstances that act as constraints or catalysts to economic reforms?

While the Institutional approach has received a lot of attention on theoretical transitional growth papers, empirically only minor contribution is given in this field by Havrylyshyn *et. al.*(2000) in a simple econometric analysis that tries to capture the impact of market-enhancing institutions to growth. Some empirical work has been done in explaining the variability of transitional growth through macroeconomic variables, structural reforms and initial conditions, the recent empirical literature on transition has dealt little with the interaction of political, institutional and social developments with the GDP growth rates in the CEE and FSU countries. Recent empirical analysis on growth in transition explains growth differences in terms of macroeconomic variables, such as the level of inflation and the size of the budget deficit (Fischer et. al. 1996a, 1996b and 2000), variables describing progress made with structural reforms particularly in liberalization and privatization (De Melo et. al. 1997a,1997b, Havrylyshyn et. al.1997 and Jaros 2001), variables characterizing initial conditions, such as the degree of macroeconomic distortions like repressed inflation, black market exchange rate premium, trade dependency and market memory and structural distortions like over-industrialization (De Melo

et. al.1997b). The latest category of factors to impact transitional growth, tested in a simple econometric regression analysis by Havrylyshyn et. al. (2000), has been institutional development. Their findings suggest that the development of an institutional framework indeed has a significant positive impact on growth, but that progress in achieving macroeconomic stabilization and implementing broad-based economic reforms remain the key determinants of growth in transition economies.

The empirical findings of most economists working on transitional economies, indicate that liberalization is an extremely important determinant in explaining growth variability among transition economies. De Melo *et. al*., Jaros and Havrylyshyn *et al*. in separate studies conclude that liberalization is the main determinant of growth variability among transition economies, and that there is nothing like it's explanatory power on growth variability. On the other hand these studies also seem to suggest that given the non-linear relationship that exists among liberalization policies and growth, a linear regression analysis in a panel data framework can only capture part of the effect of liberalization on growth. This is in part the reason why R^2 in the range of 40%-55%, present in most transitional growth regressions, are considered to represent a fairly good fit. Other studies that tried to take into account a number of initial conditions, found that these initial conditions do matter for transitional growth and that in some cases liberalization becomes insignificant. Moreover as Aslund, Boone and Johnson (1996) would conclude, overall attempts to link differences in output changes during transition to the cumulative liberalization index and to macro stabilization (rates of inflation) have not yielded any impressive results: it turned out that dummies, such as membership in the ruble zone (i.e. FSU) and war destruction, are much more important explanatory variables than either the liberalization index or inflation. Popov (2000) also concludes that after controlling for the non-policy factors namely initial conditions, the impact of liberalization becomes insignificant. However variations in inflation rates and institutional capacities of the state (as measured by the change in the share of government revenues in GDP) remain important determinants of performance. The above opposing results seem to be an indication that liberalization's effect on growth is more important when institutional framework is in place or it's being implemented successfully.

Political instability and corruption have been used widely in previous empirical work on the effect of institutional framework on growth. But political instability is surely too narrow a

definition of institutional development, and corruption too all encompassing and more a result of institutional conditions than a measure of those conditions. (Havrylyshyn et. al. 2000). In addition to the two distinct categories of market-friendly institutions that Havrylyshyn *et.al.* (2000) propose, another category of institutional development is used in this paper to capture the crucial aspect of the decreasing role of government and increasing role of market-friendly institutions which is the cornerstone in institutional terms of what transition is all about.

Given that the political and economic reforms took place simultaneously in CEE and FSU countries and markets and states were being built at the same time, the theoretical literature has emphasized that the overall performance of the new market-oriented economy has been affected by the institutional reform which in this paper is represented from the three categories of economic reforms, political reforms as movements toward democratization reforms and legal reforms.

This paper tests the impact of developments in the institutional reform, foreign direct investments and human capital on the transitional growth of seventeen CEE and FSU economies. Measuring the effect of institutional development supporting a market oriented economy on economic growth constitutes the main challenge of this paper. For this purpose it creates two unique institutional indicators, whose effect on transitional growth is then tested in a panel data framework. Furthermore this paper tries to answer to some extent the question: Why doesn't capital flow in CEE and particularly FSU? The last goal is to provide an explanation of how Borensztein, *et. al.*'s hypothesis could be applied in the case of transition economies: FDI is an important vehicle for the transfer of technology, contributing relatively more to growth then domestic investment and that higher productivity of FDI is hold only when the host country has an adequate stock of human capital. The paper is organized as follows. Section 2 provides a detailed literature review of the growth determinants with particular focus on transitional growth. Section 3 outlines a neo-classical endogenous growth model for transition countries in the presence of institutional development, serving as a guide for the empirical approach. Section 4 provides a general overview of data trends for GDP growth, inflation, liberalization policies, foreign and domestic direct investment and human capital as measured by school enrollment ratios. This section describes the creation of a dataset of institutional indicators, from which two principal component indicators are generated to represent the level of institutional development

across seventeen CEE and FSU economies. Section 5 outlines several econometric model specifications and section 6 reports the estimation results. Section 7 concludes.

2. Literature Survey

This section reviews the theoretical evidence of the importance of neo-classical as well as institutional determinants of transitional growth .

2.1. Transitional Growth Determinants – Is there a Transition Model of Growth?

According to the two best known theoretical models of transition presented in Kornai (1994) and Blanchard (1997), there follow some implications for growth that differentiate the transition economies from market economies: First, output will most likely decline initially under new buyer's market and hard budget constraint. The un-salable goods accumulate and signal the need for cutbacks in production. Further, elimination of waste under the old scheme necessarily precedes the creation of the new production, adding therefore to the production cuts. A second implication is that growth of the new production will not occur until the new incentives are in place and made credible. This means that the sooner reforms achieve a hard budget constraint and liberal price environment, the sooner the reallocation and the restructuring of the old production and the creation of new production can begin. Third, the proximate mechanisms in the early recovery period are not likely to depend so much on the conventional factor inputs that explain medium-term growth, such as investments including foreign direct investments and new technology. Rather than the above mentioned factors, the initial output expansion will come primarily from a variety of efficiency improvements. Havrylyshyn et. al. (1998) list five types of mechanisms conducive to increased output, which may be simultaneous or overlapping:
(i) recovery of underutilized capacity, (ii) elimination of egregious waste of labor, capital and materials (known as X-efficiency in theoretical terms), (iii) efficiency gains from a more appropriate combination of capital and labor known as factor efficiency, (iv) efficiency gains from resource reallocation toward goods in which a country has comparative advantage or in which there is unsatisfied consumer demand, and (v) output expansion via new net investment and employment increases. It is important to note that it is a simplification, in fact, to say that all the efficiency improvements (except the fifth item listed above) can come about without new net

investments. What is meant though is that often the investment required is small. Also, such efficiency improvements can take place at the sector or firm level even if aggregate net investment in the economy is zero, since new gross investment is directed not to replace depreciated stocks in "old" industries but to expand in the "new" ones.

2.2. Foreign Direct Investments and Human Capital Impact on Transitional Growth: Theoretical and Empirical Evidence

Borenstzein, De Gregorio, and Lee (1994) empirically tested for the effect of foreign direct investment on growth in 69 developing countries over a two-decade period: 1970-1989. Their results showed that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment and that higher productivity of FDI can be held only when the host country has an adequate stock of human capital. However, there exists a wide empirical literature on the relationship between human capital or education and growth. Denison (1962, 1967), using aggregate data, found that around 20 % of the growth of U.S. GDP between 1930 and 1962 could be attributed to the increase of the workforce's educational level. Nelson and Phelps (1966) stated that educated people make good innovators, so that education speeds the process of technological diffusion. Romer (1990) also claimed that the stock of human capital determines the rate of growth, that too little human capital is devoted to research in equilibrium and that integration into world markets will increase growth rates.

Barro (1991) showed that for 98 countries in the period 1960-1985, the growth rate of real per capita GDP is positively related to initial human capital and countries with higher human capital also have higher ratio of physical investment to GDP, which in turn enhances the growth rate. Barro and Lee (1993) empirically found that the overall years of workers' school attainment at a prior date impact the growth rates of real per capita GDP positively. Benhabib and Spiegel (1994) examined the relationship between the growth rate of total factor productivity and nation's human capital stock and results indicated a positive role for human capital. Greater openness to trade and investment provides a path for the international transfer of advanced production techniques and technical knowledge, thus enabling transition countries to close the technology gap with industrial countries.

Lucas (1998) and Romer (1986) have shown that there exists positive relationship between openness and economic growth. Barro and Sala-I-Martin (1995) have emphasized that

more open countries have a greater ability to absorb technological advances and new ideas from the rest of the world.

Recent studies of foreign direct investments (FDI) have focused on its potential to accelerate technological convergence and improve economic growth prospects. Barell and Holland (2000) point out that the purpose of FDI, which differs from other forms of international capital movement in the manner and duration of the commitments it involves, is to establish permanent commercial relations and to exert a noticeable managerial influence over a foreign company. The long-term nature of FDI motivates investors to take an active part in the decision-making process, and is likely to lead to some restructuring of the firm. On the other hand, inflows of FDI are also thought to improve growth prospects by acting as a supplement to domestic savings and increasing the total level of capital investment in the economy. In addition, FDI in tradable sectors would help to integrate the transition economies into the world economy, and foreign participation in the privatization process would also bring in much needed government revenues.

The above features gave rise to the expectations that FDI had an important role to play in the economic transition of CEE and FSU countries. A common view since transition started was that the inflows of FDI will improve efficiency and quality of the physical capital stock to a large degree for transition economies that have been isolated within the council for Mutual Economic Assistance (CMEA) over four decades. The qualities of both capital and labor (in terms of their potential contributions to output) can vary widely and improving the quality of both physical capital and individual skills (human capital, which need to be retrained in a market-oriented framework) is just as important for growth as increasing their quantity (EBRD 1997).

Increasing the efficiency with which inputs are used is vital especially when we think that CEE and FSU may not have the capacity to increase their quantities in the beginning of transition, and when it's economically sound to make use of old resources than to completely waste them.

In spite of relatively high investment rates (usually referred to as over-industrialization distortion in terms of initial conditions), the physical capital stock of the CEE and FSU countries in general is relatively obsolete and needs to be modernized through the introduction of new technologies. (World Bank Transition Report 2000). FDI is likely to play an important role in the

transfer of market-oriented technologies and business practices to the transition countries, and in the same time increasing the nation's stock of capital.

On the other hand, Havrylyshyn et. al. (1998) argues that investments in capital stock are less likely to bring positive growth rates in the beginning of transition and therefore shouldn't be considered as important determinants of growth. Instead, good policies and institutions have a higher explanatory power in addressing the variability of growth rates in transition. In trying to estimate the effect of institutions versus the effect of FDI in transition, definitely a key element stands in the fact that while FDI were thought of as being crucial in the initial stage of transition, institution building is a more long-term growth determinant, that has a broader impact on GDP growth than FDI. An implication for the role of government in transition follows from here, a role that has to do with the implementation of good policies and creating incentives for institutional building, where FDI could be seen as an element representing the success achieved in institutional building. This is particularly clear when we think that the amount of FDI that transition countries can attract depends a lot on their institutional capacity. (Reformulate this paragraph)

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2.3. Institutional Development in the Framework of Endogenous Growth Theory

The prevailing doctrine on economic growth, the "neoclassical" model of Solow-Swan and Cass-Koopmas from the 1950-60s, which attributed growth to the expansion of capital and labor, augmented by exogenous technological progress, sets the first stage of the synthesis of

Endogenous Growth Theory (Havrylyshyn et. al. 1998). The second element of this synthesis is the set of models developed in the mid-1980s, and synthesized in Romer (1990) and then Barro and Sala-I-Martin (1995). While retaining the role of factor inputs, these models added an explanation of technical progress based on increasing returns, research and development and imperfect competition, human capital, and government policies. A third element has been added from what might be considered political economy models of growth. Olson (1996) in particular, summarizes the conceptual basis for the role of policy areas such as property rights, the rule of law, institutions, and corruption.

While in the long run, initial conditions and the expansion of factor inputs play an important role in growth, policies - according to Havrylyshyn et. al. (2000) - are important determinants of the magnitude of such factor expansion, the efficiency with which factors are employed and the long-term technological improvements, which also increase the efficiency. Numerous empirical studies are based on models that explain the observed differences in growth pattern across countries through factor inputs including investment and human capital, government policies, institutional indicators of security of property rights, corruption, transparency, and political stability (Havrylyshyn et. al. 1998). The most recent empirical studies have tried to explain growth through political stability, government credibility, better institutional quality and indicators of market-friendly environment (check for citations).

2.4. Theoretical Evidence of the Institutional Development Impact on Transitional Growth

The theoretical literature has suggested that after the efforts for macroeconomic stabilization and the implementation of structural reforms on liberalization and privatization, the transition economies are challenged with the intermediate phase of the transition process: the establishment of market-oriented economic institutions, which are the foundation of the "transition bridge," responsible for a successful transition and allocation of natural and human resources more efficiently (than under the planned economy).

North (1993) emphasized the role of institutions in economic growth and discussed the problems of creating institutions. Poznanski (1996) argues that institutions are formed at a relatively slow pace and reliable institutions support the economic growth in the long term. Some contend that researchers shouldn't limit the span of factors effecting transitional growth by examining only economic factors and ignoring the impact of deep institutional transformations

(Roland 2002). In contrast with advanced economies whose successful institutions of capitalism are already in place, when reasoning on the economies in transition or on developing economies, we have to keep in mind that such institutions are absent. According to Roland (2002) the transition experience has very much reinforced the institutionalist perspective in economics and a shift in emphasis in economic thinking, from the analysis of markets and price theory to that of contracting and to the legal, social and political environment of contracting. He also asserts that transition has forced economists to think about institutions not as static, but in a dynamic way: how momentum for reform is created and how institutions can evolve, and how momentum can be lost and one can get stuck in inefficient institutions. Figure 3 shows the channels through which institutional reform impacts economic growth performance.

As transition countries are walking along the transition "bridge," the recent theoretical literature in transition has emphasized the role of economic institutions in achieving and maintaining positive growth rates. According to Heritage Foundation the quality of institutions supports the functioning of a market economy and low institutional capacity/building is a key constraint on growth in the long term. Without further advances in the building and reform of institutions, transition economies might not have sustainable growth and could fall behind the expected level. EBRD (1997) states that sustained growth requires investment in new plant and equipment and in new skills, as well as innovation in technology and business management. It is important to recognize that growth stems from the initiatives of entrepreneurs, managers and workers, and that their activities are shaped by an economy's "institutional infrastructure"

3. The Theoretical Model

This section develops an extension to Barro and Martin (1995) endogenous growth model of an economy with identical, rational agents and constant returns technology to explicitly take into account the role of institutions. There is only one good produced in the economy. At date t there are $N(t)$ individuals, which we could think of equivalently as total hours worked to production. The exogenous growth rate of $N(t)$ is h. The current (instantaneous) utility derived from consumption is presented by a constant relative risk aversion (CRRA) utility function given as:

$$U(c(t)) = \frac{c(t)^{1-s} - 1}{1-s} \qquad for \qquad s \neq 1$$

$$U(c(t)) = \ln\{c(t)\} \qquad for \qquad s = 1,$$

where σ is the coefficient of relative risk aversion. At each time t $0, the production of the single homogeneous good is represented by the general constant elasticity of substitution (CES) production function (1) as follows:

$$Y_t = F\{K(t), H(t), I(t), N(t)\} = A[aK(t)^{-r} + bH(t)^{-r} + gI(t)^{-r} + lN(t)^{-r}]^{-1/r} \qquad (1)$$

where α, β, γ and λ represent the corresponding input factor shares, and A is the total productivity and λ = 1 – (α + β + γ), which means constant returns technology is assumed and $r \geq 0$

In addition to Barro and Martin traditional determinants of growth represented by K(t), H(t) and N(t) as the physical and human capital stock and total labor force respectively, the I(t) is introduced to represent institutional development, as an important factor which distinguishes transitional growth, from traditional models of growth. Equation (1) can be expressed in intensive form as follows:

$$y(t) = f[k(t), h(t), i(t)\} = A[ak(t)^{-r} + bh(t)^{-r} + gi(t)^{-r} + l]^{-1/r} \qquad (2)$$

where *k(t)*, *h(t)* and *i(t)* are in per capita. Output, *y(t)* is devoted either to consumption *c(t)* or to investment *v(t)* and physical capital depreciates at a fixed rate $d \geq 0$.

Under the above assumptions the planner's problem can be written as

$$Max \quad U = \int_0^{\infty} e^{-(r-h)t} U\{c(t)\}\, dt$$

Subject to:

$$\dot{k}(t) = f\{(k(t), h(t), i(t)\} - (d + h)k(t) - c(t) \qquad (3)$$

$$c(t) \geq 0,\ k(t) \geq 0$$

$$k(0) = k_0 \ \ is \ \ gven \ \ and \ \ r - h > 0,$$

where c(t) is the stream of consumption per person, ρ > 0 is the constant rate of time

preference, and k(t) is the first time derivative. The planner's problem solutions will be derived from the following current value Hamiltonian function:

$$H\{c(t),k(t),p,t\} = [U(c(t)) + p(f\{k(t),h(t),i(t)\} - (d+h)k(t) - c(t))]e^{-(r-h)t} \qquad (4)$$

The Hamiltonian (4) above is the sum of the discounted utility of consumption at time t and the discounted value of the capital stock at time *t*, where *p* indicates the shadow price of the capital in terms of utility. The planner's problem has a unique, differentiable solution given from:

$$\{\dot{c}(t), \dot{k}(t)\}_{t\geq 0}$$

which can be derived from the following first order conditions:

$$U'\{c(t)\} = p \qquad (5)$$

$$p[f_k\{k(t),h(t),i(t)\} - (d+h)] = (r-h)r - \dot{p} \qquad (6)$$

where $f_k(.) = \dfrac{\partial f}{\partial k}$

$$\lim_{t\longrightarrow\infty} k(t)\, pe^{-(r-h)t} = 0 \qquad (7)$$

Equation 5 implies that the marginal utility of consumption should be equal to the shadow price of the capital in the equilibrium. Since marginal utility is decreasing with consumption, Equation 5 shows that consumption is a decreasing function of the shadow price of the capital stock, which can be written as*: c = c (p),* where *c'(p)* is negative.

Equation 6 can be rewritten as follows:

$$f_k(k,h,i) + \frac{\dot{p}}{p} = p + d \qquad (6)'$$

The left-hand side of this equation represents the rate of return from the capital in terms of utility, and the right hand side is the opportunity cost of postponing consumption for one unit of time. In equilibrium benefits and costs should be equalized. Using Equation 5, then 6' can be written as:

$$\frac{\dot{c}}{c} = \frac{1}{s}\left[f_k(k,h,i) - (r + d)\right] \quad (8)$$

We can interpret the left hand side of Equation 8 as the growth rate of GDP and denoted it by g. Therefore, the growth rate can be explained by the marginal product of capital, the coefficient of relative risk aversion, time preference and depreciation rate. The growth rate is positively affected by marginal product of capital and the effects of input variables and policy choices and institutional variables on growth through the marginal product of capita, will be estimated empirically in the following section. Denoting the growth rate of GDP by g, we have: $g = G(k,h,i)$, where, h and k are the human and physical capital and i represents institutions and policy variables. In the empirical specification model that follows in the next section, the change in the level of physical capital stock which includes both domestic and foreign investments is considered, as opposed to the level of physical capital stock itself.

4. Data Trends

This section discusses the following variables as used in the empirical specifications section: GDP growth rates, inflation, liberalization policies, institutional indicators, school enrollment ratios as a proxy for human capital and foreign and domestic direct investments across 17 transition economies. A unique data set of institutional indicators is created using data from several sources. These sources are summarized in Appendix 1, and provide data for 17 transition economies from CEE and FSU during the time period 1989 to 2000.

4.1. GDP growth rates

The negative growth rates the CEE and FSU experienced during the initial phase of transformation to a market economy were lower than most economists expected. By 1995, however, some of the more advanced economies were enjoying positive growth rates. Figures 1.1 to 1.4 show the trend for the growth rates of output throughout the first decade of transition. Explaining the great decline in output in the beginning of transition (or the U-shape pattern of GDP during 1991-96), has been the major theoretical challenge facing economists working on transition economies. The decline has been attributed to an institutional vacuum, low labor productivity, the collapse of CMEA trade flows , the decline in the demand for low-quality, domestically produced goods, and the decline in the output state-owned firms due to lack of

suppliers. By looking at Table 1, one can readily see that for Central Europe and the Baltics the growth rate performance has been much different from those of the FSU and especially Ukraine, which only in 2000 seem to have stooped the decline in output. Other countries like Romania, Bulgaria, Albania and Croatia experienced a premature burst of growth suffering a reversal in latest years, followed by prospects of positive growth. Moreover, growth recovery is just very recent. Only by 1995 did half of the 26 transition countries reached positive growth rates. However, even for the leading growing economies, with exceptions maybe of Poland, Slovenia and Armenia, growth rates are not high enough to catch-up quickly even with low income Western European countries. Fischer, Sahay and Vegh (1996) estimate that with a per-capita growth rate of 4.75% annually, it would take about 35-45 years to catch up with the average OECD level, and if the current investment rate is increased to 30%, it would take only 30 years. The best-placed countries though (Czech Republic and Estonia) would converge in around 20-25 years.

4.2. Inflation performance

Negative rates of growth of output in the beginning of transition were associated with high rates of inflation, which spiraled in hyperinflation in most FSU economies, making transition a very painful process for the Central and Eastern Europeans and especially for the Newly Independent Commonwealth States citizens. Table 2 shows that in CEE countries inflation reached its peak in 1992 and low rates of inflation were established by 1994. In FSU, this process took place on average one to two years later, in line with the start of reforms. What differentiates the performance of inflation in CEE and the Baltics from that of FSU countries is hyperinflation. Inflation was still on the three-digit level in Turkmenistan in 1996 and in Tajikistan in 1997. Belarus' inflation performance has been the worst since 1998, and with exception of Tajikistan and Belarus, all FSU countries reached inflation levels below 45% in 1999.

4.3. Liberalization Policies and the Liberalization Index

There are remarkably wide differences among transition economies in the pace and extent of liberalization policies. The starting point is the last year before the initial post-communist transitions, although Poland, Hungary and former Yugoslavia had previously initiated significant

reforms. The countries in CEE and the Baltics as well as Albania, Macedonia, Kyrgyzstan and Moldavia liberalized domestic prices very early in their transition and sustained these reforms. (EBDR Transition Report 2000). These countries also liberalized trade and access to foreign exchange, albeit more gradually than they freed domestic markets. According to EBRD transition Report 2000, these relatively early and sustained "liberalizers" have maintained markets and trade free of government administration for more than two-thirds of the period since the transition began for their respective countries. The rapid and sustained approach to liberalization stands in contrast to the more uneven progress in much of Southeastern European and the FSU. Among these countries, Bulgaria, and Russia attempted to liberalize both domestic and external markets relatively early in the transition, but temporarily backtracked on these reforms. However, towards the end of 1999 Russia had regained its 1997 level of price liberalization, following the abolition of most of the temporary restrictions on domestic flows of goods and services introduced after the crisis in August 1998. Foreign trade and access to foreign exchange have also been freed considerably from restrictions but this progress has been partially offset by the re-introduction of oil export quotas.

De Melo *et. al.* (1997) receive much credit in building a liberalization index, which can be compiled from EBRD indicators (for every following year after their calculations) by assigning them specific weights. Liberalization index as given by De Melo et. al. (1997) is constructed as a weighted 0.3 : 0.3 : 0.4 index of :

1) liberalization of domestic prices and abolition of state trading monopolies,
2) liberalization of the foreign trade regime, including elimination of export controls and taxes and substitution of low to moderate import duties for import quotas and high import tariffs and currency convertibility,
3) privatization of small-scale and large-scale enterprises and banking reform.

Weights on the components of LIB index reflect ranges from 0 to 1, with 0 representing an unreformed economy and 1 an extensively reformed economy.

4.4. Human Capital

According to the World Development Report 1996, high quality of and good access to basic education and health care were two of the proudest achievements of central planning. Given that a well-educated and healthy work force is essential for economic growth, transition

economies have a strong foundation on which to build. Nevertheless, both the health care and education systems that transition governments inherited were built to fit the rigid environment of a commanded economy. Education reform is viewed from the World Bank as needed to give workers more transferable and marketable skills and also to develop informed citizens, capable of participating actively in the post-communist civil societies. Some of the CEE countries are equipped with well-trained workforce and thus have a relatively high human capital stock. (World Bank Transition Report 1996). The proxy for human capital in this paper is represented by school enrollment ratios in both secondary and tertiary education level.

Table 4.1. shows the gross school enrollment ratios for secondary educational level as provided by World Bank. While most CEE countries have maintained their high (over 85%) enrollment ratios, and some of them like Poland and Hungary have experienced increases in the rates of enrollment, the most obvious decrease was observed in Albania. Among the FSU, Belarus seems to have maintained high enrollment ratios throughout the first decade of transition. The general trend shown in Table 4.1. is that of a decrease in the enrollment ratios from 1991-1994, followed by an increase, with the exception of Hungary (only increasing trend) and Albania (decreasing trend). As for tertiary enrollment ratios, shown in Table 4.2., FSU countries have kept very high enrollment ratios till 1996, Bulgaria and the rest of SEE countries seem to have experienced an increasing trend which has also been the case for Hungary.

4.5. Foreign Direct Investment

In the beginning of transition a lot of expectations were raised about the role of FDI as a vehicle for the transfer of technology, as described in section 2.3. However, in practice, the CEE and FSU have not been able to attract enough FDI since transition started. This has been the case for most of the countries shown in Table 6. Even among the front runners (Poland, Czech Republic, Hungary and the Baltics) the flows of FDI only after 1994 have reached levels of 4% of the respective GDPs. Azerbaijan and to some extend Armenia have attracted more FDI due to their richness in natural gas and oil resources. Hungary in 1995 and Czech Republic in 1999 have received FDI flows around 10% of their GDPs, but similar rates are not maintained. As for domestic investments, as shown in Table 5, the U shape trend is evident among CEE and the Baltics, with domestic investments reaching levels of 26% - 36% of GDP after 1997. Slovenia

has experienced an increasing trend, which is an exception from the decreasing trend of the rest of SEE countries as well as that of FSU.

4.6. Institutional Development

This section describes the generation of two institutional principal component indicators from a dataset that uses several sources as given in Table 1. The dimensionality of the set of nine institutional indicators is the first reason to necessitate principal component analysis. The other reason is the high correlations that exist among these institutional indicators as will be shown below.

The three broad categories chosen in this paper to represent institutional development include: Economic Freedom, Rule of Law and Democratization. Indicators characterizing Rule of Law and Democratization fit Havrylyshyn et. al. definition.[‡] While Democracy accountancy (DEMAC) is an institutional indicator, which captures developments of political parties along the democratization spectrum, while Democratization (DEM) is a more encompassing indicator including developments not only in the Political dimension, but also in the Civil Society, Independent Media and Public Administration Decentralization. Data for DEM is compiled from Freedom House in their "Nations in Transit" Report, a new institutional indicator - Economic Freedom – is used in this paper to better address the crucial aspect of the decreasing role of government and increasing role of market-friendly institutions, which is the cornerstone in institutional terms of what transition is all about. Data for Economic Freedom are compiled by Heritage Foundation/Wall Street Journal.

According to Heritage Foundation, the index of economic freedom (ECFREE), shown in the first column of Table 7, is more than just a dataset based on empirical analysis; it is a careful theoretical analysis of the factors that most influence the institutional setting of economic growth. Economic Freedom is defined as the absence of government coercion or constraint on the production, distribution, or consumption of goods and services beyond the extent necessary for citizens to protect and maintain liberty itself. All government action involves coercion. Some minimal coercion is necessary in order for the citizens of a community or nation to defend themselves, promote the evolution of civil society, and enjoy the fruits of their labor.

When government employees coercion beyond that minimalist standard, however, it risks

[‡] See Appendix 2 for a description of Harvrylyshyn et.al. 2000 definitions.

trampling on freedom. When it interferes in the market to effect ends other than the protection of person and property, it undermines economic freedom. Exactly where that line is crossed is an issue open to debate, and in the framework of transition economies, this debate is even more vivid with some economists arguing definitely pro and others definitely against an increased role of government in the economy.

Heritage Foundation/Wall Street Journal Index of Economic Freedom measures how well 161 countries score on a list of 50 independent variables divided into the following ten categories: Trade Policy, Fiscal Burden of Governments, Government Intervention in Economy, Monetary Policy, Capital Flows and Foreign Investment, Banking and Finance, Wages and Prices, Property Rights, Regulation and Black Market. Taken together they offer an empirical depiction of a country's level of economic freedom (Heritage Foundation), which is more over-encompassing that previous economic freedom indicators used in previous research (i.e. Havrylyshyn 2000).

It can be seen that ECFREE includes a broad array of institutional factors determining economic freedom (from the government intervention), which can be expressed in terms of the following categories:

- Corruption in the judiciary, customs service, and government bureaucracy;
- Non-tariff barriers to trade, such as import bans and quotas as well as strict labeling and licensing requirements;[§]
- The fiscal burden of government, which encompasses income tax rates, corporate tax rates, and government expenditures as percentage of output;
- The rule of law, reliability, impartiality, and efficiency of the judiciary, and the ability to enforce contracts;
- Regulatory burdens on business, including health, safety and environmental regulation;
- Restrictions on banks regarding financial services, such as selling securities and insurance;
- Labor market regulations, such as established work weeks and mandatory separation pay; and

[§] For a detailed discussion on the extend to which liberalization and institutional development can be overleaping, see Havrylyshyn et. al 2000.

- Black market activities, including smuggling, piracy of intellectual property rights, and the underground provision of labor and other services.

As for the weighting of the 10 above broad categories, the ECFREE treats the 10 factors as equally important in evaluating the level of economic freedom in any country. As for the grading scale, each country receives its overall ECFREE score based on the average of the 10 individual factor scores. Each factor is scored according to a grading scale that is unique for that factor. The scales run from 1 to 5, where a score of 1 signifies institutional or consistent set of policies that are most conducive to economic freedom.

In the original data set, the ratings for the categories of Economic Freedom and Property Rights and Regulations imply that the higher the score on a factor the greater the level of government interference in the economy and the less economic freedom a country enjoys. In this sense, along the transition (from planned to market economies), the market-enhancing institutional capacity is supposed to take the place of state's institutional capacity, and the building of these market-friendly institutions follows the developments in the government policy choices, which are in turn determined in large by political and socio-cultural factors, such as the degree of democratization (political freedom), the outcome of the first elections, the dominant religion, the ethnic composition of the population and the type of government (presidential versus parliamentary democracy).

In Table 7, ECFREE is rewritten in an increasing order so as 5 represents the highest value ECFREE takes and 1 the lowest, and then scaled in a 0 to 1 scale so as to make this index easy to read and compare with the rest of institutional indicators.

Interpretation of Principal component Analysis:

Tables 7.1. to 7.3. are constructed after the principal component analysis was conducted on the institutional indicators displayed in Table 7. Table 7.1. shows that Economic Freedom is positively correlated with all the other institutional indicators, except for Government Stability, but in this case the negative correlation is not significant. The highest correlation in this table is the one between Economic Freedom and Democratization. This clearly shows how movements toward democratization are correlated with the development of economic institutions. Positive

and significant correlations do exist between DEM on the one side and indicators of Legal Reform or Rule of Law, represented from Property Rights and Regulations and Law and Order. Positive correlation does exist between the Quality of Bureaucracy and Public Administration and Law and Order. Also the better the quality of bureaucracy in terms of professionalism and flexibility to change, the less the chances that it would get corrupted. This is supported by a significantly positive correlation of 0.65 between CORRUP and BURADM . (Note that the higher the indicator of corruption, the lower the level of corruption present in a given country).

The correlation between Corruption and Democratization is also significant and positive, but yet not higher than 60%, indicating that even among the most democratized countries, there is some degree of corruption. The correlations of corruption with the rest of the other indicators support the view that corruption in itself is a result of missing or not well-performing institutions. (North 1990). The high positive correlation between DEM and DEMAC, increases one's confidence on the credibility of these institutional indicators compiled from different sources. On the other hand if we would like to capture greater levels of variability in the institutional framework among the transition economies, the inclusion of civil society developments together with independent media and public administration decentralization does serve to this purpose, in the sense that it adds up to the variability explained from the political dimension of movements toward democratization.

Table 7.2 shows the proportion of the total variability of the nine Institutional Indicators explained from each principal component. The first two ITPCs explain between 69% and 78% of the total variability of the institutional indicators. Interpretation of principal components is not always easy and doesn't always provide a meaningful decomposition of initial indicators in broad categories of principal components. (Dunteman 1989). This is particularly true for the third up to the ninth principal components. Moreover, given that high positive correlations exist between all the Institutional Indicators and the first two principal components, ITPC1 and ITPC2 represent fairly well the total variability present in the nine Institutional Indicators. Therefore the rest of the ITPCs are left out of the regression analysis following in the next section.

As shown in Table 7.3., the first principal component ITPC1 has high positive correlations with all Institutional indicators except for GOVSTA for which this correlation is low. Therefore ITPC1 could be interpreted as an overall indicator of institutional development except for GOVSTA. Positive values of ITPC1 would indicate higher levels of overall

institutional development, and negative values imply lower levels of institutional development. Given that the only high correlation of ITPC2 is the positive one with GOVSTA, ITPC2 can be interpreted as an indicator of the institutional capacity of the state, which is different in nature with the market-enhancing overall institutional framework, which is an implication in fact of the nature of principal components (ITPC1 and ITPC2 are uncorrelated). To summarize, countries with higher scores on the three categories of Economic Freedom, Rule of Law and Democratization, will tend to have higher values for ITPC1, and countries with higher scores on Government Stability will tend to have higher values of ITPC2. Moreover, as shown in Table 7.3., ITPC1 explains from 63% to 90% of the variability of all institutional indicators except for GOVSTA, and ITPC2 explains about 96% of the variability of GOVSTA, so the exclusion of the rest of principal conditions, can be thought as fairly justified.

5. Empirical Model Specifications

The most used empirical models in the transition literature have been cross-country and panel data models. In trying to fit an econometric model to the previously elaborated theoretical model, it is crucial to understand what panel data models have to offer. While the common problem of "omitted variables" is always present with cross-sectional data, and therefore, the nature of results obtained from cross-country regressions is over-simplified, panel data models provide techniques that allow us to formally recognize the possible existence of unobservable heterogeneity in the model.

5.1. Fixed Effects Model

The key assumption in this category of models is that any characteristics of each country that cannot be observed are predetermined. Model specification is given as follows:

$$GDPGR_{it} = b_0 + ?_i + b_1 LIB_{it} + b_2 LIB_{i,t-1} + b_3 INFL_{it} + b_4 TDI_{it} + b_5 L4ITPC1_{it} + b_6 ITPC2_{it} + b_7 SEDGER_{it} + b_8 FDIS_{it} + e_{it}$$

Where ? i represents the fixed country-specific component is treated as a constant and e_{it} is the disturbance (error) term. LIB_{it} and $LIB_{i,t-1}$ are the contemporaneous and lagged liberalization index, INFL is inflation , TDI is Total Domestic Investment, which is decomposed into FDI and GDI in separate model specifications. L4ITPC1 and ITPC2 are two principal components generated from the principal component analysis applied on a set of 10 institutional development indicators. L4ITPC1 is the fourth lag of the ITPC1 which is the first principal component generated through PCA. SEDGER is the enrollment ratio in a secondary education level. Attempts are made in another specification model to include another variable – TEDGER – as the enrollment ratios in a tertiary education level.FDIS is an interaction variable created to measure the effect of FDI on growth for a given threshold stock of human capital, and therefore test the Borenstzen et. al.'s hypothesis.

5.2. Random Effects Model

The key assumption in this category of models is that the country-specific component is not a constant, but a random variable that is specific to that particular country, so that it may be more appropriate to think of it as an element of the model's residual in addition to the standard error term in the regression model. The specification model is given as follows:

$$GDPGR_{it} = b_0 + b_1 LIB_{it} + b_2 LIB_{i,t-1} + b_3 INFL_{it} + b_4 TDI_{it} + b_5 L4ITPC1_{it} + b_6 ITPC2_{it} + b_7 SEDGER_{it} + b_8 FDIS_{it} + e_{it} + ?_i$$

Where the residual is ($?_i + e_{it}$) and $?_i$ is treated as a random variable. In such models it is commonly assumed that the ?i part of the residual has a constant variance for different countries, so that var($?_i$) = ? for all i, but that the covariance of these residuals across countries is zero: cov($?_i$, $?_j$) = 0 $\forall$ i $\neq$j. In addition, it is also assumed that the individual (country-specific) component of the residual is uncorrelated with any of the included explanatory variables: cov($?_i$, X_{jt}) = 0, $\forall$ *i,j* and *t*. Even though panel data has several advantages in comparison with cross-country analysis, there are some limitations in this analysis as well. Starting with the fixed effects model, it's main disadvantage is that it requires estimation of a separate parameter for all 17 countries. This means that much of the variation that exists in the data is used up estimating

the dummy country specific variables. As a result it may be difficult to precisely estimate the coefficients on the other included explanatory variables. On the other hand, the random effects model disadvantages lie in the fact that it's assumptions are rather strict, particularly the assumption that the random effect is uncorrelated with all of the explanatory variables. This is problematic precisely because of the omitted-variable bias problem discussed above. It seems quite plausible that there may be characteristics of the countries that are not included in the regression model that may also be related to some of the included characteristics. This would violate the assumptions of the random effects model and estimates resulting from this model would be biased.

In order to choose between the fixed and random effects model, one test commonly used is the Hausman test, high probability values of which favor Fixed Effects versus Random Effects Model. Alternatively, many researchers simply use their intuition regarding whether it makes sense to model the entity-specific components as fixed or random. If the particular entity is countries instead of individuals for example, it seems intuitive to think of the differences across them to be fixed in nature and not the result if a random draw. As such, a fixed effects specification makes more sense to the dataset used for this paper.

6. Estimation Results

Balcerowitz and Gelb (1994) and Aslund 2000 conclude that before proceeding with any empirical research on transition, one should note very serious data weaknesses of which: output and especially the size of private sector tends to be under-reported. Inflation is also difficult to measure with sharp changes in the quality and composition of goods and a base period characterized by serious shortages at fixed official prices. Therefore empirical models with R2 of 50% or higher and coefficients significant at usual levels, shouldn't be interpreted as "poor".

A total of 13 model specifications were estimated in this paper to capture the effects of the policies of liberalization and inflation stabilization, institutional developments, gross domestic investment, foreign domestic investment, school enrollment ratios for secondary and tertiary educational levels, and their interaction with both FDI and GDI, on the GDP growth rates across seventeen transitional economies from 1989-2000. By looking at the results presented in Table 9, all of the coefficients have signs as expected, will almost all of them statistically

significant at 5% level of significance. The goodness of fit, measured by R^2 ranges from 35% to 40%. The overall encompassing specification for this group of models is:

$$GDPGR_{it} = b_0 + b_1 LIB_{it} + b_2 LIB_{i,t-1} + b_3 INFL_{it} + e_{it}$$

In the framework of panel-data analysis five models are estimated: Simple OLS or Classical Model (OLS), Fixed Effects with group dummy variables (FEG), Random Effects with group dummy variables (REG) models, Fixed Effects with group dummy variables and period effects (FEGP), and Random Effects with group dummy variables and period effects (REGP). The results shown in this and the following tables are the ones from the best models: the highest R^2 and t-statistics. The first regression estimated in Equations 9.1. – 9.4. include only contemporaneous and lagged liberalization as independent variables. Contemporaneous Liberalization (LIB) effect on growth given by b_1 is negative in all of the 4 equations above and statistically significant at 5% level . The sign of b_2 is positive and it's significance very high throughout Eqs. 9.1 – 9.4. Moreover it's absolute value is greater then that of b_1, implying that the overall effect of liberalization on growth is positive.

By including inflation in Eqs. 9.5. – 9.8., the R^2 of the model increases up by 1% for the Classical Regression Model (OLS), by 4% for the FEG, 2% for the FEGP model and 4% for the REGP model. Moreover the significance of LIB increases for all the models mentioned above. Same increase in the significance level is observed for b_2 as well. As for b_3, its sign is negative as expected and statistically significant throughout Eq. 9.5. – 9.8. This means that high levels of inflation hamper growth.

In Eq. 9.3-9.4 the Lagrange Multiplier (LM) probability value of $p = 0.839$ is in favor of either FEGP or REGP in comparison with OLS. On the other hand the Haussman probability value of $p = 0.564$ doesn't make our choice between the fixed/random effects models easier, therefore all the results except for the REG are presented in Table 9.

6.1. The Effect of Institutional Developments on GDP growth

Putting aside government liberalization policies and inflation stabilization, is there any other common legacy of these 17 transition economies that can have a significant explanatory power over the transitional growth performance variability? The estimation results shown in Table 10 try to answer this question as well as test the theoretically suggested effect of Institutional Developments on GGP growth. The two new variables introduced in this section are ITPC1 and ITPC2 represent Institutional Principal Components as explained in section 3. Given the assertions of many theorists economists working on the effects of the institutional developments on growth as well as the conclusions of Havrylyshyn et. al. (2000) on the effect of the institutional framework in transitional performance, one should expect the effects of ITPC1 and ITPC2 on growth to be lagged. Therefore four lagged variables of ITPC1 and two lagged variables for ITPC2 are introduced in Table 10. The most extended specification for this group of model includes:

$$GDPGR_{it} = d_0 + d_1 LIB_{it} + d_2 LIB_{i,t-1} + d_3 INFL_{it} + d_4 ITPC1_{it} + d_5 LITPC1_{it} + d_6 L2ITPC1_{it} + d_7 L3ITPC1_{it} + d_8 L4ITPC1_{it} + d_9 ITPC2_{it} + d_{10} LITPC2_{it} + d_{11} L2ITPC2_{it} + e_{it}$$

In equations 10.1 – 10.3., all the signs of parameters are still as expected and they are all statistically significant. The R^2 ranges from 40% to 46%. In all equations the coefficient d_8 is positive and significant at 10% significance level except for Eq.10.1, and significant at 5%level in all the models shown except for Eq.10.1 and Eq.10.3. This means that the development of a market-oriented institutional framework have a significantly high positive effect on growth. The contemporaneous as well as the first up to the third lag of ITPC1 are insignificant. For this reason they are not included in Eq.10.6 so as to reduce the dimensionality problem associated with the explanatory variables. ITPC2 is also positive and significant at 5% level in the three equations 10.4 – 10.6 shown in Table 10. This means that the institutional capacity of the state or the government stability influences transitional growth positively. The lagged variables of ITPC2 are not significant, therefore they are dropped out in the last specification (Eq. 10.6).

Another important estimation result to be pointed out is that the effect of market-oriented institutional developments on growth is greater than the overall effect of liberalization policies.

Eq. 10.5, clearly shows that d_8 is greater then $d_1 + d_2$ (Note: LIB and ITPC1 take values in the range {-1;1}, therefore the comparison of how a change in the same magnitude in LIB and ITPC1 could effect growth is not affected much by the units of measurement. Calculating respective elasticities yields the following results: under working process……..)

The third group of models in Table 11 tries to estimate the effect of human capital represented by secondary school enrollment ratios, and changes in the physical capital stock represented by domestic investment and foreign direct investment on transitional growth. The specification model in Eq.10.6 (Table 10) was used as a starting specification model:

$$GDPGR_{it} = d_0 + d_1 LIB_{it} + d_2 LIB_{i,t-1} + d_3 INFL_{it} + d_4 ITPC1_{it} + d_5 ITPC2_{it} + e_{it} \quad (*)$$

Gross Domestic Investment is the first additional explanatory variable to be estimated on the right hand side of model (*) above. In all the five models estimated in the framework of panel data analysis, school enrollment ratios for secondary educational level (SEDGER) have a highly significant positive effect on growth. The respective coefficient is statistically significant at 10% level for all the models estimated, and even at 5% level except for REGP. These robust results could be interpreted as countries whose work force is better educated at the secondary level, have achieved greater growth rates. Therefore, we could say that the empirical evidence points out that the quality of labor matters for transitional growth. School enrollment ratios at a tertiary level were also chosen as an explanatory variable, but none of the models would give significant coefficients. Results are available in the output appendix. One interpretation for this insignificance could be that in the first decade of transition highly educated people have not been able to utilize their skills as their human capital was "centrally-planned" oriented (as opposed to market economy oriented), and therefore the variability among tertiary school enrollment ratios could do little to explain the variability of GDP growth rates. The estimation results for GDI and FDI are highly insignificant. The sign of the GDI coefficient is positive in FEGP model (Eq. 11.1) and negative in REGP model (Eq.11.2).

It could be that at first place it is not the changes in the capital stock, but capital stock level at the beginning of transition that matters for growth. Data for the physical capital stock is usually very difficult to obtain, and in the framework of transitional economies with the great transformations that took place in the beginning of transition, this task is even harder.

Another explanation of the highly insignificant estimation results for both GDI and FDI could be that they do affect transitional growth indirectly through some other variables – identifying them sets the stage for further research in this field. Yet another explanation is that the data available so far is not sufficient to point in the direction that theory might suggest and that it might take maybe another decade or so for the changes in the stock of physical capital to explain part of the variability of growth rates among the countries under study. Table 11 shows the estimation results for both FDI and GDI only for the FEGP and REGP models. The rest of them being not of a different nature of the ones shown, are not presented in Table 11, but are available in the output appendix.

To test Borenszein's hypothesis four interaction variables were created using SEDGER, FDI and GDI. $FDIS80_{it}$ is an interaction variable created to measure the effect of FDI on growth for a threshold stock of human capital above 80% of secondary school enrollment ratios. Another threshold level of 85% was tried as well in the interaction variables $FDIS85_{it}$ and $GDIS85_{it}$. The estimation results for the coefficients of these variables are available in the output appendix. All the coefficients were not significant, and given the insignificance of both FDI and GDI coefficients, these results could be interpreted more as influenced by the previously explained insignificance of GDI and FDI.

7. Conclusions

This paper examines the effect of government policies, institutional reform, human capital and foreign direct investments and domestic investments on the transitional growth among 17 transition economies in CEE and FSU from 1989 - 2000. The econometric modeling techniques used in this thesis include: principal component analysis, cross-country and panel data analysis.

There is a wide consensus on the eventual positive impact on growth of liberalization policies and related structural reforms. The empirical evidence in this paper points to a significantly high explanatory power of overall liberalization policies on growth, as De Melo et. al. have stated earlier. Moreover this paper explores the effect of institutional developments in transitional growth and one of the most important findings is that especially on the second sub-period of the first decade of transition, institutional framework plays a much more important role

than liberalization policies, and that those economies, who have started building successful market-enhancing institutions, are enjoying positive growth rates, and the ones which are lacking the ability to build institutions are experiencing setbacks in growth performance. Another important conclusion is that the quality of labor matters for transitional growth, and that countries with higher enrollment ratios in a secondary educational level have been more successful in achieving positive growth rates.

In terms of obstacles to growth, the experience of the first decade of transition has shown that favorable initial conditions like the resource richness of countries of Central Asia in oil and gas, may permit governments to delay reforms like is the case in Azerbaijan and Turkmenistan. So while at first sight it might look like resources make the transition easier, but this hasn't really been the case so far. Despite unfavorable initial conditions the Baltic countries have made great progress since transition started. Among other factors, the greater degree of liberalization policies can be seen as an important factor. The building of institutions is another even more important and long-term growth providing factor.

The theoretical framework analysis in this paper together with the empirical results suggest that capital doesn't flow in Central Eastern European and FSU countries because the institutional framework is not complete, because even though adequate stocks of human capital do exist in these economies, the foundations of the "transition bridge" – the institutional framework – takes time to build up and to ensure an efficient reallocation of resources and re-orientation (re-training) of the working force.

The results from this paper hold implications for policies designed to enhance the building of market-friendly institutions. Since institutional change is rather a slow and gradual process, the implementation of this market-friendly institutional infrastructure should be emphasized as early as possible if sustainable growth is targeted.

Given the high stock of human capital and the need for its retraining towards the market oriented practices of businesses, another important conclusion of this paper is that the institutionalist approach rather then the traditional neoclassical models of growth, are most likely to be used in empirical work on issues related to transition economies.

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Appendix 1

The first source of data used in this research comes from EBRD's transition reports and updated for some countries with data from national authorities and IMF staff estimations. These data include: GDPGR which represents growth in real GDP (annual percentage change in real GDP) and INFL which represents inflation as change in year-end retail/consumer price level in percentage.

Data for the Liberalization index, are taken from de Melo et. al., and updated from EBRD transition indicators for 1998-2000. Liberalization index is constructed first by De Melo et. al. LIB_{it} is a weighted 0.3:0.3:0.4 index of :

1) liberalization of domestic prices and abolition of state trading monopolies,

2) liberalization of the foreign trade regime, including elimination of export controls and taxes and substitution of low to moderate import duties for import quotas and high import tariffs and currency convertibility,

3) privatization of small-scale and large-scale enterprises and banking reform.

LIB takes values from 0 to 1 with 1 being the highest degree of liberalization, one country can achieve.

Democratization Index:

The "Nations in Transit" report from Freedom House is a second source of data, used for the democratization indicator (DEM), which is based on an evaluation by outside experts.

DEM is a score index calculated by Freedom House only for the last 4 years:('96-'97 to '00-'01) as an average of Political Process, Civil Society, Independent Media and Governance and Public Administration ratings.

Political Process: this score/index examines national executive and legislative elections, the development of multiparty systems, and popular participation in the political process.

Civil Society: Assesses the growth of non-governmental organizations, their organizational capacity and financial sustainability, and the legal and political environment in

which they function; the development of free trade unions ; and interest group participation in the policy process.

Independent Media: Addresses the legal framework for and present state of press freedom, including libel laws, harassment of journalists, editorial independence, the emergence of a financially viable private press, and Internet access for private citizens.

Governance and public administration: Considers the authority of legislative bodies; decentralization of power; the responsibilities, election, and management of local government bodies; and legislative and executive transparency.

According to Freedom House, a country's ratings are determined by considering the practical effect of the state and non-governmental actors; business oligarchies, social movements, insurgencies, and other groups that function outside of the normal political and civic process. These ratings, which should not be taken as absolute indicators of the situation in a given country, are valuable for making general assessments of how democratic or authoritarian a country is.

Rating scores are based on a scale of 1 to 7, with 1 representing the highest level and 7 representing the lowest level of democratic development. The 2001 scores and ratings reflect the period July1, 1999 through October 31, 2000. Therefore they coincide with the data from 1996 – 2000 (the second sub-period) for the other variables.

DEM is modified by first rewriting it in an increasing order and then expressing it an a scale from 0 to 1, modification, which is done for each of the indicators in Table 7.

Data for Economic Freedom, Property Rights and Regulations indicators are taken from Heritage Foundation/Wall Street Journal dataset, and modified so as be easy to read and compare with the other data used in Table 7, and explained in details in Chapter 6.

Data for Law and Order, Government Stability, Corruption, Democracy Accountability (Political Party Development), and Bureaucracy (Public Administration) Quality are taken from the PRS Group/International Risk Guide dataset and scaled in a 0 to 1 scale.

FDI is Foreign Direct Investment as percentage of GDP. Data are taken from the World Bank, World Development Indicator CD-ROM.

GDI is Gross Domestic Investment (Gross capital Formation) as percentage of GDP. Data are taken from the World Bank, World Development Indicator CD-ROM.

SEDGER is the secondary education gross enrollment ratio and **TEDGER** $_{it}$ is the gross enrolment ratios in a tertiary education level. Data are taken from the World Bank, World Development Indicator CD-ROM.

FDIS80 and FDI85 and GDIS80 and GDI85 are four interaction variables, created to measure the effect of FDI and GDI on growth for a given threshold stock of human capital, and therefore test Borenstzen's hypothesis.

FDIS80 is constructed to detect the effect on growth of FDI for levels of school enrollment ratios in a secondary education above or under 80% (the threshold stock of human capital).FDIS85 differs from FDIS80 in the threshold stock of human capital, which in this case is 85%. Same thing applies to GDI85

Institutional Indicators:

Data Sources for this group of indicators are taken from Heritage Foundation Dataset, PRS/Group International Country Risk Guide and Freedom House. The ITPC1 and ITPC2 are principal components generated from Principal Component Analysis, and explained in section 4. The main three categories of institutional indicators used in this paper include:

1. Economic Freedom, which is an equally weighted index of;

* Trade Policy, Fiscal Burden of Governments, Government Intervention in Economy, Monetary Policy, Capital Flows and Foreign Investment, Banking and Finance, Wages and Prices, Property Rights, Regulation and Black Market

2. Rule of Law, which encompasses:

* Property Rights, Regulations and Low and Order

3. Democratization, which includes:

* Movements toward democratization of Political Process, Civil Society, Independent Media and Governance and Public Administration.

Appendix 2

Havrylyshyn *et. al*. propose two distinct categories of market-friendly institutions that are separately measurable in principle:

1) *Legal framework for economic activity*, which may include establishing

legislation for free economic activity, bankruptcy, contract law – and most important enforcing such legislation even-handedly and transparently; the last is what "rule of law" and "security of property rights" really mean.

2) *Political and civic freedom*, which includes democratic process, freedom of assembly and speech, equal treatment by political and judicial bodies, etc.

Economic liberalization - as described in section 3.?? – (including elimination of price distortions, opening markets to competition, deregulation, unifying exchange regimes, privatization, allowing and promoting private activity), could be regarded as a third distinct category of market institutions. However, structural reforms such as price and trade and exchange liberalization as well as privatization, are of a different nature than the development of market-enhancing institutions (Havrylyshyn et al). The main difference here is that while liberalization policies capture mostly measures that can be introduced within a short time frame, Institutional Reforms on the other hand, by their very nature, take much longer to develop.

Figure 1.1 Plots of GDP Series over Time

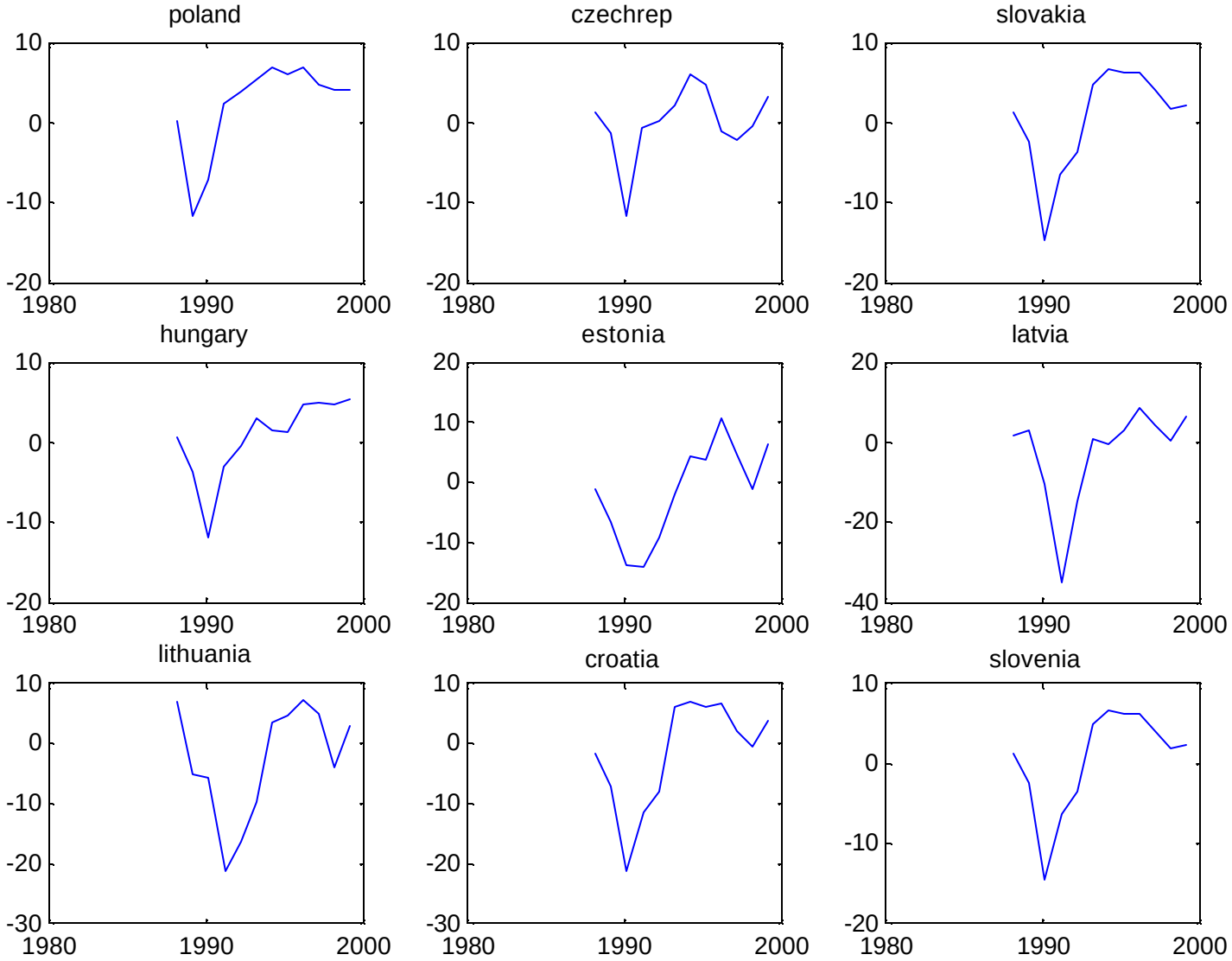

Figure 1.2 Plots of GDP Series over Time

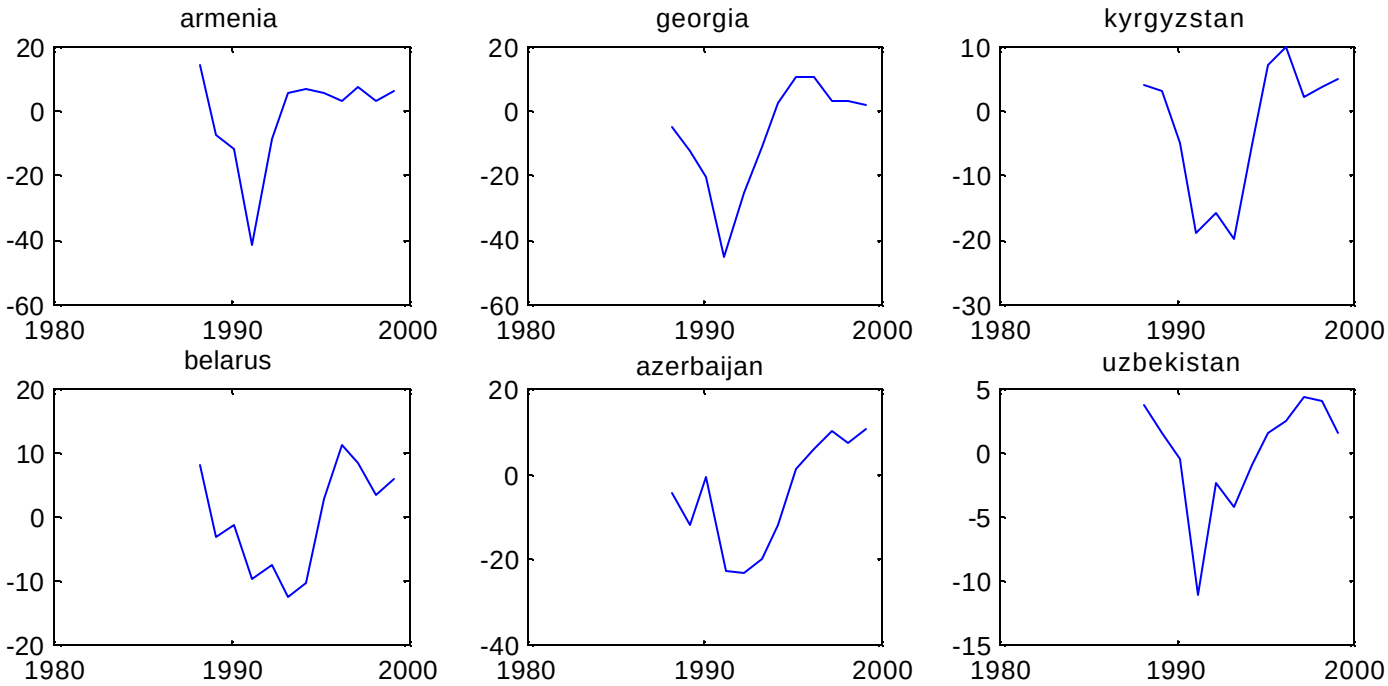

Figure 1.3 Plots of GDP Series over Time

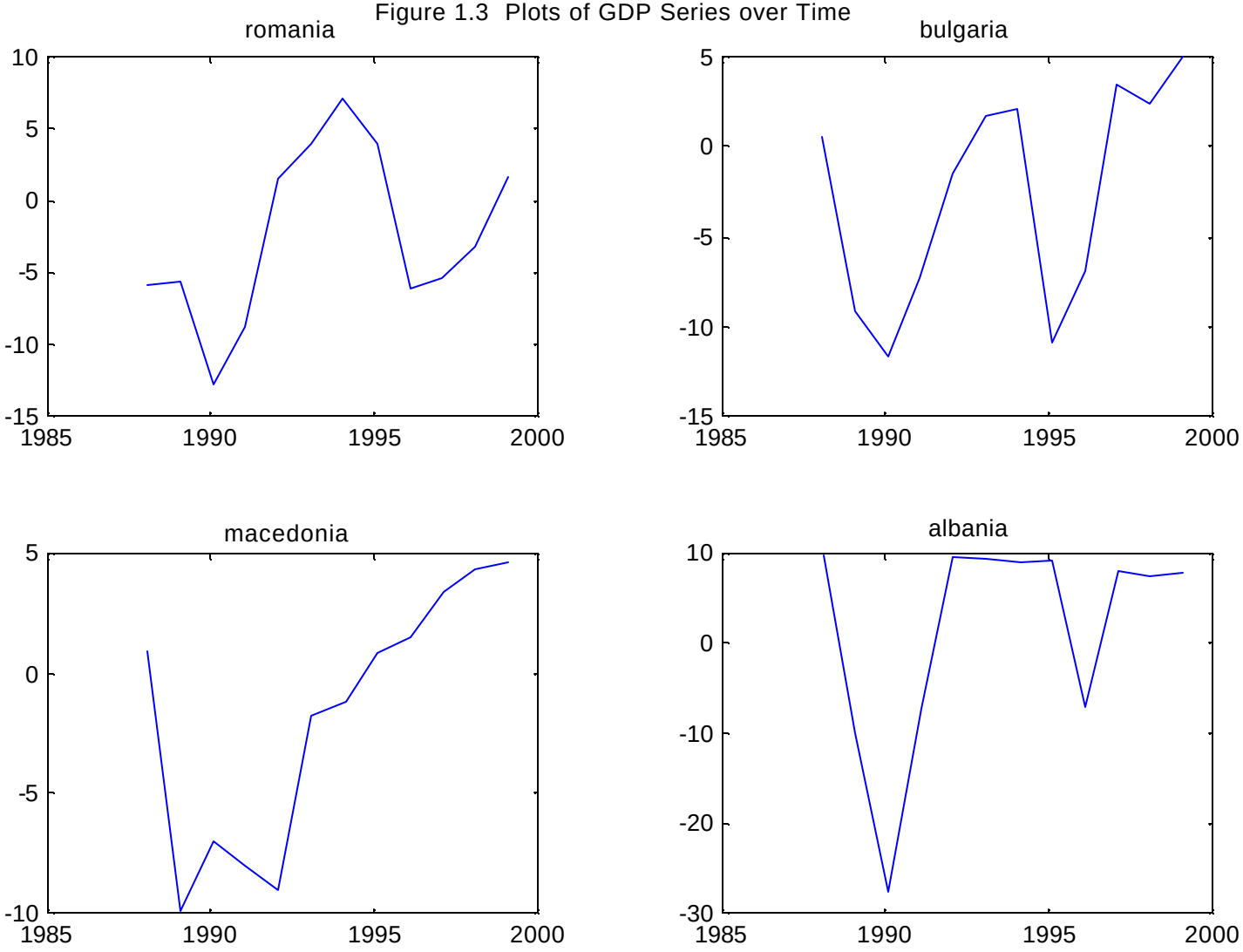

Figure 1.4 Plots of GDP Series over Time

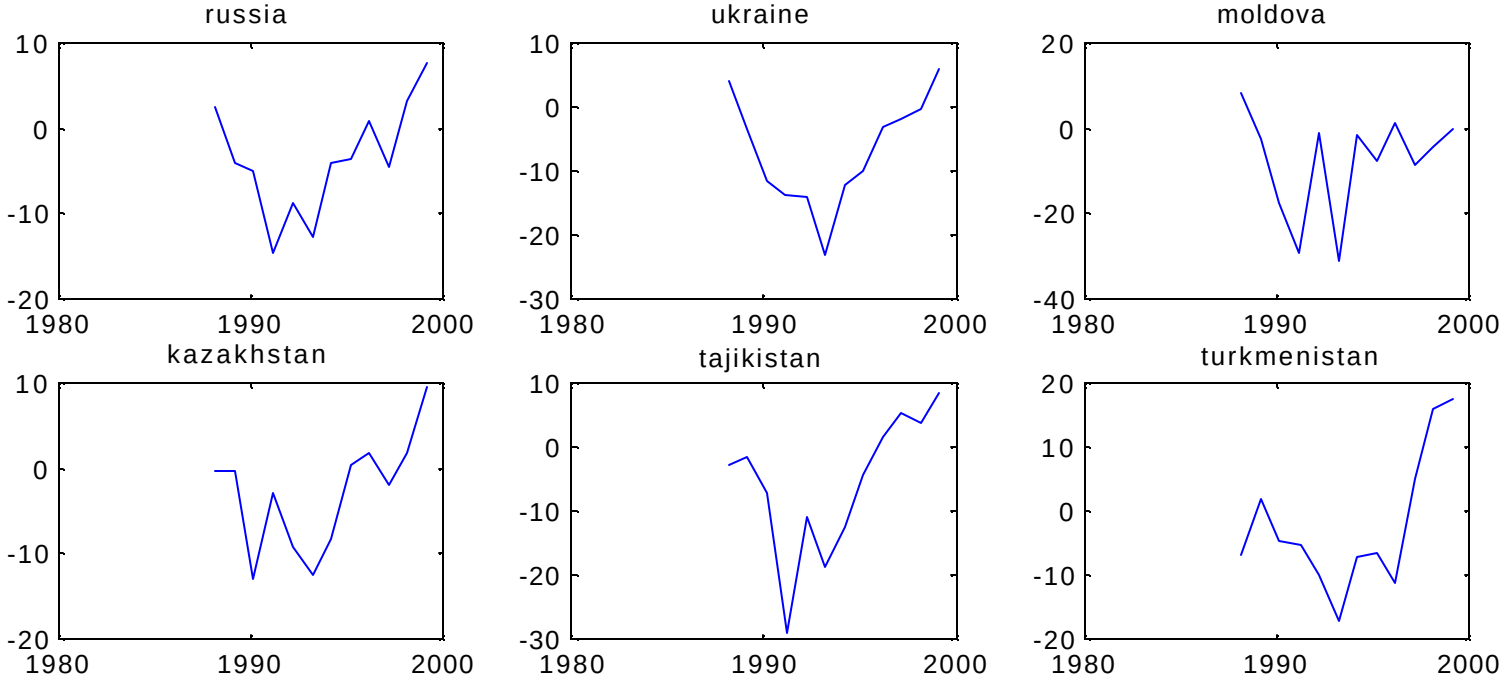

Table 7.1. Institutional Indicators Correlation Matrix

	ECFREE	PRORG	REGUL	LAWORD	GOVSTA	CORRUP	DEMAC	BURADM	DEM
ECFREE	1								
PRORG	0.73	1							
REGUL	0.78	0.56	1						
LAWORD	0.43	0.41	0.36	1					
GOVSTA	-0.097	0.11	-0.11	-0.02	1				
CORRUP	0.53	0.57	0.52	0.52	0.24	1			
DEMAC	0.58	0.44	0.37	0.29	0.03	0.52	1		
BURADM	0.67	0.65	0.56	0.63	-0.05	0.65	0.49	1	
DEM	0.83	0.70	0.59	0.48	0.07	0.60	0.72	0.75	1

Table 7.2. The Fit Measurements of Principal Components

Components	Proportion	Cumulative Proportion
ITPC1	0.56	0.56
ITPC2	0.13	0.69
ITPC3	0.09	0.78
ITPC4	0.07	0.85
ITPC5	0.05	0.90
ITPC6	0.04	0.94
ITPC7	0.03	0.97
ITPC8	0.02	0.99
ITPC9	0.01	1

Table 7.3. The Institutional Indicators – ITPCs Correlation Matrix

	ITPC1	ITPC2	ITPC3	ITPC4	ITPC5	ITPC6	ITPC7	ITPC8	ITPC9
ECFREE	0.89	-0.21	0.21	-0.15	0.05	-0.16	-0.03	-0.16	-0.21
PRORG	0.81	0.08	0.10	-0.26	0.39	0.21	-0.24	0.10	0.03
REGUL	0.75	-0.26	0.12	-0.43	-0.34	-0.15	0.02	0.14	0.08
LAWORD	0.63	0.02	-0.69	0.14	0.04	-0.27	-0.16	0.02	0.01
GOVSTA	0.03	0.96	0.10	-0.18	0.02	-0.19	0.08	0.04	-0.03
CORRUP	0.77	0.33	-0.17	0.01	-0.35	0.34	-0.09	-0.13	0.00
DEMAC	0.70	0.07	0.37	0.57	-0.12	-0.04	-0.10	0.15	-0.04
BURADM	0.86	-0.05	-0.26	0.06	0.12	0.16	0.37	0.12	-0.07
DEM	0.91	0.02	0.19	0.15	0.15	-0.12	0.14	-0.18	0.19

Table 9. Estimation Results of the Effects of Policies of Liberalization and Inflation Stabilization on GDP

	Growth Eq.9.1 (OLS)	Growth Eq.9.2 (FEG)	Growth Eq.9.3 (FEGP)	Growth Eq.9.4 (REGP)	Growth Eq.9.5 (OLS)	Growth Eq.9.6 (FEG)	Growth Eq.9.7 (FEGP)	Growth Eq.9.8 (REGP)
INT	-7.63	-	-12.75	-7.87	-5.65	-	-9.90	-6.42
	(-4.56)		(-4.59)	(-3.66)	(-3.29)		(-3.34)	(-2.51)
LIB	-22.23	-22.04	-13.75	-20.40	-24.80	-23.80	-17.93	-22.76
	(-3.85)	(-3.51)	(-1.93)	(-3.45)	(-4.40)	(-3.87)	(-2.49)	(-3.67)
LAGLIB	35.07	35.86	34.69	35.02	35.38	35.82	35.03	35.47
	(7.13)	(7.12)	(6.95)	(7.19)	(7.42)	(7.31)	(7.14)	(7.34)
INFL					-0.0016	-0.0015	-0.0013	-0.0015
					(-3.45)	(-3.09)	(-2.52)	(-3.02)
R^2	0.36	0.42	0.44		0.40	0.45	0.46	
Adj. R^2	0.35	0.35	0.36	0.36	0.39	0.38	0.39	0.40
No. Obs.	170	170	170	170	170	170	170	170

Note: t-statistics in parenthesis.

Table 10. Institutional Principal Components Effect on Growth

	Growth Eq.10.1 **(OLS)**	Growth Eq.10.2 **(FEGP)**	Growth Eq.10.3 **(REGP)**	Growth Eq.10.4 **(FEG)**	Growth Eq.10.5 **(FEGP)**
INT	-3.20	-1.17	-1.59	-	-2.97
	(-1.50)	(-0.33)	(-0.43)	-	(-0.82)
LIB	-26.08	-17.94	-22.66	-23.37	-15.36
	(-4.49)	(-2.59)	(-3.56)	(-4.00)	(-2.24)
LAGLIB	35.34	29.44	33.35	28.94	27.46
	(7.43)	(5.81)	(6.94)	(5.75)	(5.02)
ITPC1	-13.92	-7.06	-14.00	-17.20	-15.68
	(-1.26)	(-0.59)	(-1.22)	(-1.41)	(-1.29)
LITPC1	6.08	7.42	6.49	9.41	9.44
	(0.36)	(0.45)	(0.40)	(0.56)	(0.57)
L2ITPC1	-3.39	-7.17	-5.40	-3.72	-2.34
	(-0.19)	(-0.41)	(-0.31)	(-0.21)	(-0.13)
L3ITPC1	7.09	-10.56	-3.46	-9.56	-10.84
	(0.34)	(-0.50)	(-0.16)	(-0.46)	(-0.52)
L4ITPC1	8.51	43.95	28.97	45.18	49.33
	(0.53)	(2.30)	(1.61)	(2.32)	(2.55)
ITPC2				0.005	0.004
				(2.30)	(2.13)
LITPC2				-0.0035	0.004
				(-1.45)	-1.62
L2ITPC2				-0.002	-0.003
				(-1.11)	-1.30
INFL	0.0013	0.0008	0.001	0.0009	-0.0005
	(-2.84)	(-1.56)	(-2.11)	(-1.88)	(-1.13)
R^2	0.43	0.52		0.54	0.55
Adj. R^2	0.40	0.43	0.43	0.45	0.46
No. obs.	170	170	170	170	170

Note: t-statistics in parenthesis

Table 11. School Enrollment, FDI and GDI Effects on Growth

	Growth Eq.11.1 **(FEGP)**	Growth Eq.11.2 **(REGP)**	Growth Eq.11.3 **(FEGP)**	Growth Eq.11.4 **(REEG)**	Growth Eq.11.5 **(FEGP)**	Growth Eq.11.6 **(REGP)**
INT	-0.85	-0.19	-1.86	-1.33	2.43	2.67
	(-0.23)	(-0.05)	(-0.51)	(-0.37)	(0.64)	(0.66)
LIB	-17.66	-21.74	-17.47	-21.45	-14.94	-19.84
	(-2.56)	(-3.42)	(-2.55)	(-3.43)	(-2.17)	(-3.13)
LAGLIB	28.09	29.81	28.26	29.92	25.33	27.76
	(5.62)	(6.07)	(5.68)	(6.12)	(5.00)	(5.59)
L4ITPC1	25.61	10.42	22.55	8.32	29.18	13.14
	(2.78)	(1.86)	(2.44)	(1.55)	(3.28)	(2.21)
ITPC2	0.001	0.003	0.001	0.003	0.0037	0.005
	(0.68)	(2.10)	(0.68)	(2.03)	(1.82)	(2.70)
INFL	-0.0008	-0.001	-0.0008	-0.001	-0.001	-0.0012
	(-1.64)	(-2.27)	(-1.69)	(-2.32)	(-1.94)	(-2.50)
GDI	0.0003	-0.0007				
	(0.15)	(-0.33)				
FDI			-0.002	-0.003		
			(-0.97)	(-1.51)		
SEDGER					0.0037	0.003
					(2.17)	(1.79)
R^2	0.52		0.52		0.55	
Adj. R^2	0.44	0.45	0.44	0.46	0.46	0.45
No. obs.	170	170	170	170	170	170

Note: t-statistics in parenthesis