OUTPUT PERFORMANCE, INSTITUTIONS AND STRUCTURAL POLICY REFORMS FOR TRANSITION ECONOMIES

by

FJORENTINA ANGJELLARI-DAJCI

B.S., University of Tirana, Albania, 1999
M.S., Kansas State University, 2002

AN ABSTRACT OF A DISSERTATION

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ABSTRACT

This dissertation explores the relationships between three groups of variables in the transition economies of Central and Eastern Europe (CEE) and Commonwealth of Independent States (CIS), from 1989 to 2003. The first group consists of output level and output growth as measured by gross domestic product index (GDPI) and gross domestic product growth (GDPG). The second group consists of two categories of institutional development (INST), and the third group of variables is structural policy reforms (SPR), often known as liberalization policies.

This dissertation's theoretical and empirical framework explicitly account for the endogeneity between output performance variables, the measures of institutional development and SPR. Several empirical specification models of the theoretical simultaneous system of three equations are estimated. In the first group of specification models the dependent endogenous variables are GDPG, SPR and INST, while in the second group the dependant endogenous variables are GDPI, SPR and INST. Moreover, two datasets are used. The first dataset has data from 1989 to 2003, thus covering the whole transition period, while the second dataset is a subset of the first one, containing data for the recovery stage of transition only.

The empirical methods used in this dissertation include panel data analysis, principal component analysis, two stages least squares approach and three stage least squares approach in the presence of a SUR modeling procedure.

With respect to the output performance equation, the findings of this research indicate that institutional reform (INSTREF), and property rights and contract enforcement institutions (PCINST and ROLINST) are very important determinants of output levels when the whole transition period dataset is used, and very important determinants of both the output levels and output growth rates when the recovery stage dataset is used. While the effect of current SPR is ambiguous, the effect of lagged SPR on output and output growth is positive. Moreover, SPR continue to affect output performance via their indirect effect on institutional development.

With respect to the institutional reforms, and property rights and contract enforcement institutions, two sets of determinants were found to be important. On the side of the demand factors, SPR, and especially lagged SPR is found to be an important determinant of both institutional reforms and property rights and contract enforcement institutions. On the side of supply factors, macroeconomic stabilization, a measure of the state's capacity to implement

institutional reform, resulted very important in explaining the variation in institutional reform and property rights and contract enforcement institutions. Political reform, in terms of a shift from the autarkic political regime to a democratic political regime, is found to positively affect institutional development in the recovery stage.

With respect to the structural policy reforms' equations, this dissertation's main finding is that political reform positively affects SPR in both datasets. Moreover, lagged SPR is found to positively affect SPR, which is an indication of transition governments' maintained commitment to a package of SPR-s.

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E. Wayne Nafziger, Ph.D.

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Introduction, Motivation and Goals

Analyzing the process of *transition* from *planned* to *market* economies is a complex and multidimensional process encompassing not only economic changes but also profound changes in political and social relations. The term "transition" in this dissertation refers to the systematic transformation of centrally planned economies in Central and Eastern Europe (CEE) and the former Soviet Union (FSU) into market economies. It has been more than a decade since transition started. CEE countries started the transition process in 1989 and 1990 while the countries in the area of the former Soviet Union that form the Commonwealth of Independent States (CIS) started in 1991 and 1992. While some economies resemble more and more market economies, others are lagging behind in this transformation process. On average, there seems to be a clear divide between the more advanced countries that constitute the most serious candidates for European Union (EU) enlargement and the rest of the region, notably South-eastern European (SEE) countries and the CIS. Most authors contend that for the SEE and CIS countries, transition cannot be said to be over, while for the rest of the CEE countries transition is almost complete.[1]

Output performance and especially GDP growth rates have been of a particular interest to researchers working on the transition phenomena. One reason for this interest lies in the objective of improving economic well-being of the transition countries citizens via positive economic growth rates (Havrylyshyn *et al.* 1998). Another reason is the spectacular and universal decline in output at the beginning of transition. However, the experience of the CEE and CIS countries has varied a lot in terms of the collapse in measured output at the beginning of transition. While the output paths of most countries are qualitatively similar, an asymmetric "U" or "V" shape, with a sharp initial decline giving way to a gradual recovery, transition countries have differed greatly both in terms of the magnitude of the initial decline and the timing and strength of the recovery (Berg *et al.* 1999). On average, FSU countries have experienced sharper declines and slower recoveries than transition countries in CEE, although there are large differences within these groups as well (See Table 1 and Figures 1.1-1.4).

The early years of transition have been characterized by a sharp contraction in output following the disruption of traditional trade and financial links and the abandonment of the

[1] See for example Gros and Suhrcke, 2000.

centrally planned lines of production (Havrylyshyn *et al.* 1998). This was generally followed by attempts to maintain production and employment at previous levels by running large fiscal deficits, resulting in high rates of inflation, particularly after countries had introduced their own currencies, and further collapses in output. After this common experience, most transition countries engaged in comprehensive stabilization and reform programs, often supported by the International Monetary Fund (IMF). Although countries that implemented such programs generally succeeded in bringing down inflation to low levels, the success in achieving sustained growth has varied a lot across transition economies. Pinning down the factors determining the variation of output growth rates during the first decade of transition has been a challenge for both IMF and World Bank scholars as well as independent researchers.

The current literature on output and output growth determinants in transition economies has only recently tried to empirically measure the effect of the market-oriented institutional framework on output and output growth. Data deficiencies, together with a lack of a clear conceptual framework on how institutions affect output performance in transition, are serious challenges to any attempt to untangle this relationship.

There exist several papers that provide empirical evidence that institutions (usually taken for granted or unable to measure) are the missing ingredient of cross-country differences in economic growth.[2] The recent historical experience of CEE and CIS economies may constitute another candidate to the list of historical examples elaborated in Acemoglu *et al.* (2004) as "quasi-natural experiments" in support of the view that institutions are the fundamentals of long run economic growth. Acemoglu *et al.*'s (2004) "quasi-natural experiments" in history consist of the division of Korea into two parts with very different economic institutions and the colonization of much of the world by European powers starting in the fifteenth century.

Chapters 1 and 2 of this dissertation summarize existing theoretical and stylized empirical regression papers showing that *institutions* matter for output performance in transition. But, how much do they matter and what is the relationship between *structural reform policies* (SPR), also known as liberalization policies, and *institutions* in transition economies remain open questions. While the main focus of this dissertation is to identify the underlying factors associated with output growth recovery or lack of it in transition economies, so as to draw some conclusions for appropriate policy implications to promote sustained growth, another open question is whether

[2] See for example Acemoglu *et al.* (2003a) and (2004), Olson *et al.* (2000), Knack and Keefer (1995).

political and social movements toward democratization have any direct or indirect effects on output and output growth differences across transition countries.

From a personal standpoint, in the beginning of this research I was trying to identify the causes of the 1997 Albanian Pyramid Scheme crisis and its impacts on the Albanian economy. The deeper I went searching, I realized that the extreme financial, social and political crisis that the Albanian transitional economy was faced with, was a result of the lack of institutions securing property rights and enforcing contracts. It was as if economic structural reforms in general and financial liberalization in particular were taking place without the property rights and contract enforcement institutions to support and monitor them.

This dissertation addresses more explicitly and more in depth than other studies the impact of institutional reform and property rights and contract enforcement institutions on output and output growth performance for transition economies up to date. It seeks to empirically measure the effect that the institutional reform and measures of property rights and contract enforcement institutions have on output performance during the transition period as a whole and during the recovery stage of the transition period. Moreover, this dissertation explores the relationship between each of the above categories of institutions with measures of structural policy reform to draw some conclusions on the expectations that were raised in the beginning of transition from World Bank scholars and independent researchers. According to these expectations, structural policy reforms, namely price and trade liberalization and privatization, would facilitate the creation of markets, which would then in turn result in some endogenous adaptation of institutions and make institutional reform easier further down the transition road.

In order to be able to measure the impact of institutions on output performance in transition countries, we have to rely on a conceptual framework adapted so far from researchers working on output and output growth performance in transition economies, over which some consensus has emerged. After the most important factors impacting output performance in transition are identified from the relevant literature, the econometric analysis focuses on determining the suitable econometric techniques for measuring the impact of two categories of institutions on output and output growth performance in transition economies using a panel data framework.

This dissertation is organized as follows. Chapter 1 first engages in a discussion of the conceptual theoretical framework of growth in transition. Then it seeks to provide a detailed

literature review of the growth determinants in general and transitional growth determinants in particular, as it relates to the first transition decade in CEE and CIS. Last, it highlights some of the main unresolved questions. The purpose of chapter 2 is twofold. First it focuses on the role of institutions as the fundamentals of long-run economic growth, exploring both the theoretical background and the empirical findings of studies using a variety of institutional measures. Second, it establishes a framework of institutional reform analysis for transition economies and discusses recent empirical work on the impact of various institutional measures on economic performance in transition economies. Chapter 3 presents the methodology employed in transition related growth related papers, while chapter 4 presents the theoretical model and empirical model specifications. Chapter 5 discusses some issues with transition data and provides a general overview of data trends for GDP and GDP growth performance, initial conditions, inflation, structural policy reform, institutional reform, property rights and contract enforcement institutions, and political reform. Chapter 6 outlines the econometric estimation results. Chapter 7 concludes and outlines some policy recommendations.

I. Determinants of Output Performance in Transition Economies

1.1 Building a Theoretical Conceptual Framework for Output and Output Growth in Transition Economies

Fifteen years ago there was no theory to guide the various economic phenomena associated with the political and economic process of transition, but only separate theories of capitalism and socialism (Havrylyshyn *et al.* 1999). In their 1999 paper Havrylyshyn *et al*. pointed out to the absence of such a general theory of transition even after almost a decade of transition experience. However, we may point to several elements that such a theory would contain. One would be that the "transformational recession" that accompanies transition requires a *reorientation* from a seller's to a buyer's market and the imposition of a *hard budget constraint* (via privatization and elimination of various government support mechanisms) on producers in order to succeed (Kornai 1994). At the same time, transition requires the *reallocation* of resources from the old to the new activities through the closure of inefficient state enterprises and the establishment of new firms in the private sector, as well as the *restructuring* of those firms that survive (Blanchard 1997). Blanchard's (1997) reallocation and restructuring can be thought of as the dynamic movements resulting from the establishment of the new incentives and are reminiscent of the Schumpeterian concept of "creative destruction" by entrepreneurial activity, but with much larger impacts than what the Schumpeter's model predicted (Havrylyshyn *et al.* 1999).

Havrylyshyn *et al.* (1999) summarizes the policy actions needed to put in place both Kornai's new incentives and Blanchard's Schumpeterian changes in economic activity as encompassing the following measures of reform: (a) macroeconomic stabilization; (b) price and market liberalization; (c) liberalization of the exchange and trade system; (d) privatization; (e) establishing a competitive environment with few obstacles to market entry and exit; and (f) redefining the role of the state as the provider of macro stability, a stable legal framework, enforceable property rights, and occasionally as a corrector of market imperfections. Such a core concept of transformation yields implications for output performance that differentiate transition economies from market economies. First, output will decline initially under a new buyer's market and hard budget constraints. The accumulation of un-salable goods signals the need for

cutbacks in production. 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 structural policy 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. Liberalization includes the freeing of prices and resource allocation, so that enterprise managers respond to changing price signals by allocating resources accordingly, corresponding this way to underlying shifts in demand and supply. Since the liberalization of prices can occur virtually overnight, but resource reallocation takes time, some initial decline in output is likely to happen, but the extent of this decline will depend on several factors, including the degree of price distortions carried over from the centrally planned economy, and the extent to which aggregate demand falls in the initial period. 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, but rather, the initial output expansion will come primarily from a variety of efficiency improvements.

Havrylyshyn *et al.* (1998, 1999) 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 to say that all of the efficiency improvements (except the fifth item listed above) need no new net investments. What Havrylyshyn *et al.* (1998, 1999) means, 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. Summarizing, the proximate sources of output growth in transition, as given by Havrylyshyn *et al.* (1998, 1999) could be grouped in three categories: reallocation, efficiency improvements and investment. While the first two sources are expected to generate output

growth in the short run and the medium run, investment is thought of as a long-run source of output growth for transition economies.

1.2 Main Factors Associated with GDP Growth in Transition and Non-Transition Economies: A Literature Review

This section includes three sub-sections. The first one provides a summarized literature survey of the way economists' views on the determinants of economic growth have evolved throughout the last five decades, and what part the institutional approach plays in it today. In the second section, the special circumstances of transition economies are discussed so as to see the relevance of growth theory to the transition countries case. This part summarizes some theoretical aspects of the literature on growth in transition economies, aiming at providing a conceptual framework of why negative growth rates were present among all transition economies at the beginning of the past decade and how economic policy reforms, and institution building could be crucial in achieving positive growth rates. The third section summarizes recent empirical work on output growth performance in transition economies.

1.2.1 Evolution of Economic Growth Theory

What follows is a brief summary of how economic growth theory has changed over the last five decades, focusing on the latest contributions. Its purpose stands in identifying potential factors and variables that could impact output growth determinants in transition economies as well as find evidence on the impact of institutions in the framework of endogenous growth theory.

A crucial question in the field of economic growth and development raised by many economists, including Olson (1996) and Acemoglu *et al.* (2004), is, Why are some countries much poorer than others? Parente and Prescott (2002, p.1) raise a similar question, "Why isn't the whole world as rich as the United States and Switzerland?" To address such questions from different angles, a condensed review of the growth theory is provided below.

Traditional neoclassical growth models following Solow (1956), Cass (1965) and Koopmans (1965), explain differences in income per capita in terms of different paths of factor

accumulation (Barro and Sala-I-Martin, 2004). In these models, cross-country differences in factor accumulation are due either to differences in saving rates (Solow), preferences (Cass-Koopman) or other exogenous parameters, such as total factor productivity growth. These neoclassical growth models set the first stage of the synthesis of growth theory. The second element of this synthesis is the set of models developed in the mid-1980s, elaborated in Romer (1986) and (1990), and Barro and Sala-I-Martin (2004). These models add to the role of factor inputs an explanation of technical progress based on increasing returns, research and development and imperfect competition, as well as human capital and government policies. Motivated by the work of Romer (1986) and Lucas (1998), the growth theories that developed afterwards, endogenized the steady-state growth and technical progress, but their explanation for income differences is similar to that of older theories (Acemoglu *et al.* 2004). For instance, in the model of Romer (1990), a country that allocates more resources to innovation may be more prosperous than another, but it is basically the type of preferences and the properties of the technology employed in the creation of ideas that determine the allocation of such resources (Acemoglu *et al.* 2004). In another recent contribution, Parente and Prescott (2002, pp.1-2) assert that "differences in international incomes are the consequences of differences in the knowledge individual societies apply to the production of goods and services. These differences do not arise because of some fundamental difference in the stock of usable knowledge from which each society can draw. Rather, these differences are the primary result of country-specific policies that result in constraints on work practices and on the application of better production methods at the firm level." Many of these barriers, namely monopoly rights, exist to protect the vested interests of lobbies involved in production processes. Moreover, Parente and Prescott (2002) contend that poor countries need not create new ideas to increase their standard of living, but rather apply the existing ideas to the production of goods and services. It is exactly due to the presence of barriers to the adoption and efficient use of more productive technologies that poor countries remain poor, by not using this existing stock of useable knowledge.

Although recent contributions to growth theory, such as Parente and Prescott (2002), emphasize the importance of economic policies, including taxes or barriers to technology adoption they do not present an explanation for why these differences exist (Acemoglu *et al.* 2004). The growth theory tradition summarized above has explained economic growth via several insightful mechanisms that, however, cannot provide a *fundamental* explanation for

economic growth (Acemoglu *et al.* 2004). The search for these fundamental explanations started with North and Thomas (1973), who pointed out that economic growth explanatory variables such as innovation, economies of scale, education and capital accumulation are not causes of growth, but rather growth itself (Acemoglu *et al.* 2004). Moreover, Acemoglu *et al.* (2004, p. 1) contends that "Factor accumulation and innovation are only *proximate* causes of growth. In North and Thomas's view the fundamental explanation of comparative growth lies in differences in *institutions.*"

"Even though many scholars, including John Locke, Adam Smith, John Stuart Mill, Douglas North, and Robert Thomas, have emphasized the importance of economic institutions, there has been a vacuum in the institutional economics literature in providing a useful framework for thinking about how economic institutions are determined and why they vary across countries" (Acemoglu *et al.* 2004, p. 2). While the economists belonging to New Institutional Economics (NIE) school of thought have good reasons to believe that economic institutions matter for economic growth, "there has been a lack of crucial *comparative static* results that explain why equilibrium economic institutions differ. This is part of the reason why much of the economics literature has focused on *proximate* causes of economic growth, largely neglecting the *fundamental* institutional causes (Acemoglu *et al.* 2004, p. 2).[3]

Prior to the work of Acemoglu *et al.* (2004) there have been some other major contributions in the field of economic growth, pertaining to what is known as the *political economy* models of growth. Olson (1996) in particular summarizes the conceptual basis for the role of institutions such as property rights, the rule of law and corruption. Clague *et al.* 1997 also investigate how societal differences in property rights and contract enforcement mechanisms are an important part of the explanation of why some countries prosper while others do not. Olson (1996) put forth the explanation that many countries are poor because they waste a lot of resources and that there exists a negative relationship between this waste and the institutional bases of property rights and rule of law. The weaker the institutional bases, the higher the waste, and the higher the degree of resulting corruption.

The standard growth models identify two sources of output growth. The first source comes from the accumulation of labor and capital, or more generally from the accumulation of

[3] Acemoglu *et al.* (2004) have tried to fill this vacuum by providing a theoretical framework explaining the channels through which economic institutions, as the fundamental causes of economic growth, affect economic performance. This approach is discussed in detail in section 2.2 of this dissertation.

production factors. The second source of output growth is attributed to total factor productivity, TFP. "Economists have historically taken TFP as due to technological change or increases in the stock of knowledge that is not explicitly attributable to any particular factor of production… From this perspective (of a broader view of TFP), causes of growth in TFP would include institutional changes that strengthen property rights, increase the flexibility of goods and factor markets, improve the quality and productivity of government goods and services delivery, and raise the quality of government policy" (Zinnes *et al.* 2001, p. 318). Olson *et al.* (2000) sets forth the hypothesis that differences in institutional governance and economic policies explain cross-country differences in TFP. Like Parente and Prescott (2002), Olson *et al.* (2000, p. 344) argue that "the per capita incomes of the poor countries are only a small fraction of what they could be. Because of the same shortcomings in governance that largely account for their low incomes, most of these countries do not take advantage of their opportunities for exceptional growth and thus fail to converge." Moreover, Olson *et al.* (2000) contends that it is the fundamental changes in their policy regimes and institutions, and their better governance that enables some developing countries to exploit the opportunities for catch-up growth that poor countries have. Olson (1996) elaborates on a number of historical facts indicating how the fastest-growing countries have never been the ones with the highest per capita incomes but always a subset of the lower-income countries. Olson (1996, p. 20) documents that "During the 1970s South Korea grew seven times as fast as the United States. During the 1970s, the four countries (apart from the oil exporting countries) that had the fastest rates of growth of per capita income grew on average 6.9 percentage points faster per year than the United States. In the 1980s, the four fastest growers grew 5.3 percentage points faster per year than United States. They outgrew the highest income countries as a class by similarly large multiples. All of the four of the fastest-growing countries in each decade were low-income countries."

Olson *et al.* (2000) empirically test their hypothesis, using a methodology that allows them to separately measure the effect of the structure of incentives given by the institutions and economic policy regimes on the growth rate of output, after controlling for factor accumulation, as it is randomly done in empirical growth regressions as well as other control variables. Olson *et al.* (2000) findings indicate that a country's structure of incentives, given by good institutional governance and economic policy regimes, is a major determinant of their rates of growth of productivity (TFP) and economic performance. Olson *et al.* (2000, p. 360) conclude that

"Valuable as both the neoclassical and endogenous growth theories are, they do not by themselves provide a simple and straightforward explanation of the general failure of convergence at the same time that a subset of developing countries has much the fastest rates of economic growth." The governance and growth hypothesis that they set forth and empirically test, seem to provide a better explanation of the facts actually observed.

1.2.2. Empirical Findings of Non-Transition Studies

The past decade has seen numerous empirical studies seeking to explain the observed wide differences in output growth patterns across countries and over time, including as determinants *factor inputs* (investment, human capital); *government policies* (monetary and fiscal policy, price distortions); and *the legal, political and institutional framework* (indicators of property rights security, tax burden and its fairness, corruption, transparency, political stability, etc). The list of factors is long, and a good summary and discussion can be found in Barro (1997). Sala-I-Martin *et al.* (1997, 2004) summarize the empirical findings of previous studies and identify a broad set of variables that pass the robustness tests. Out of 67 variables subjected to testing, 18 appear to be significantly and robustly partially correlated with long-term growth. The variables analyzed in their (1997) study can be grouped into nine categories: (1) regional variables, (2) political variables, (3) religious variables, (4) market distortions and market performance, (5) types of investment, (6) primary sector production, (7) openness, (8) type of economic organization, and (9) former Spanish colonies. Transition economies, due to data limitations, were not included in either of Sala-I-Martin *et al.* (1997, 2004) studies. A discussion worth pursuing here is related to the robustness of the binary variables (dummies) for East Asian countries, Sub-Sahara African, and Latin American countries, as well as Spanish colonies. What lies underneath this robustness? The robust presence of country dummies in itself only makes us ask deeper questions. What is it that makes these groups of countries so different and drives the prevailing divergence in their long-run growth rates? Is it *institutions*, *geography*, or *culture*, the fundamentals behind long-run growth? Rodrick *et al.* (2004) estimate the relative contributions of institutions, geography, and trade in determining income levels around the world using in instrumental variables for institutions and trade. Their results suggest that the quality of

institutions “trumps” everything else. Once institutions are controlled for, geography and trade have weak direct effects on income levels (Rodrick *et al*., 2004).

The security of property rights, the enforcement of contracts, governments’ efficiency in managing the provision of public goods and good economic policies are important determinants of economic growth (Knack and Keefer 1995, Olson 1996 and Olson *et al.* 2000). Nevertheless, mainly because of data limitations, the empirical research on sources of economic growth has been restricted to a narrow examination of the role of institutions (Knack and Keefer 1995 and Olson *et al.* 2000). This has made it difficult to robustly test North’s proposition that an important part of the cross-country differences in economic growth is due to different levels of institutional development. (Knack and Keefer 1995 and Olson *et al.* 2000). The lack of direct measures of institutional data has made researchers rely upon measures of political stability, such as Barro (1991), including coups and revolutions and political assassinations. Knack and Keefer (1995) compare more direct measures of the institutional environment with the political instability measures used by Barro (1991), comparing their effects on both growth and private investment. Knack and Keefer (1995) use indicators provided by country risk evaluators to potential foreign investors (ICRG indicators), including evaluations of contract enforceability and risk of expropriation. Using such variables, property rights and contract enforcement institutions were found to have a greater impact on investment and growth than was previously found using less direct institutional measures, such as coups and revolutions and political assassinations. Rodrick (1999) also uses more direct measures of institutions of conflict management (proxied by indicators of the quality of governmental institutions, rule of law, democratic rights and social safety nets) to provide econometric evidence that countries that experienced the sharpest drops in growth after 1975 were those with divided societies (as measured by indicators of inequality and ethnic fragmentation) and with weak institutions of conflict management.

1.2.3 Empirical Literature Survey of Transition Studies

Though positive GDP growth in transition economies is a very recent phenomenon, a considerably large number of studies have used econometric analysis to analyze the determinants of growth in transition. After more than a decade since transition started, some consensus began

to emerge from the transition literature on output growth determinants. Even though the institutional approach has received a lot of attention in theoretical papers on transition (see for example Kornai, 2000, Popov, 2000, and Roland, 2000), empirically, only minor contributions have been made to test the impact of institutional building as a potential growth determinant. The unavailability of data made Berg *et al.* (1999, p. 21) assert that "the most obvious absentee from our list of right-hand side variables is a measure of property rights and the quality of the legal framework. Several sources have recently constructed related indices, but they are only available for the last few years of our sample period (typically from 1994 or 1995 onward) and do not exist for all countries." Havrylyshyn *et al.* (2000) provide a simple econometric analysis that tries to capture the impact of market-enhancing institutions on growth. Their findings indicate that institutions matter for output growth in transition economies, but the effect of liberalization policies dominates that of institutional measures. [4]

While some empirical work has been done in explaining the variation in GDP growth rates in the CEE and CIS economies through macroeconomic variables, structural policy reforms and initial conditions, the recent empirical literature on transition has dealt little with the interaction of institutional, political, and social developments with GDP growth rates in transition 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* (see for example Fischer *et al.* 1996a, 1996b and 2000, Berg *et al.* 1999, Radulescu *et al.* 2002 and Falcetti *et al.* 2002), variables describing progress made with structural reforms, particularly *liberalization* and *privatization*, (see for example De Melo *et al.* 1997a, 1997b, Havrylyshyn *et al.*1997, Jaros, 2001, Radulescu *et al.* 2002, Falcetti *et al.* 2002 and Merlevede, 2003) and variables characterizing *initial conditions*, such as the degree of macroeconomic distortions like *repressed inflation*, *black market exchange rate premium*, and *trade dependency*, structural distortions, like *over-industrialization* and measures of general level of development, like *per capita income* and *urbanization rates* (De Melo *et al.* 1997b, Berg *et al.* 1999, Falcetti *et al.* 2002 and Merlevede, 2003). The latest category of factors to impact growth

[4] Havrylyshyn *et al.* (2000) estimation results pertain to the transition period up to 1998 and yield different implications for the impact on output growth that liberalization policies have versus measures of institutions, when compared to the estimation results in this dissertation.

in transition, tested in a simple econometric regression analysis by Havrylyshyn *et al.* (2000), has been *institutional development*.

The empirical findings of De Melo *et al.* (1997a, 1997b), Jaros (2001) and Havrylyshyn *et al.* (1998, 2000) indicate that liberalization policies are the main determinant of GDP growth variation among transition economies. In all these and other more recent studies structural policy reforms (known as liberalization policies) enter the growth regression analysis in a non-linear fashion. De Melo *et al.* (1997a, 1997b), Jaros (2001) and Havrylyshyn *et al.* (1998, 2000) find that liberalization policies have a negative contemporaneous impact on GDP growth, but a stronger positive effect on growth over time (i.e., the coefficient on the lagged liberalization index is positive and greater than the absolute value of the negative coefficient on the contemporaneous liberalization index).

On the other hand, Falcetti (2002) and Merlevede (2003) model structural reforms and growth as simultaneously affecting one another, and thus use a simultaneous equation system approach as opposed to a singe growth regression analysis. Falcetti (2002) and Merlevede (2003) find that the positive impact of structural policy reforms on output growth in transition economies is less robust than previously thought and that, due to simultaneity bias, previous studies have exaggerated the positive impact of the lagged liberalization index on growth. Radulescu *et al.* (2002) arrive at similar conclusions, that robustness with respect to structural policy reforms is not confirmed, employing both a general-to-specific methodology (Hendry, 1980, 1995) and extreme bounds analysis (Leamer, 1983) to check the robustness of the relationship between growth and variables used in previous studies. The reason for this lack of robustness could rest in imperfections in constructing the reform index, in particular the exclusion of measures of institutional performance (Radulescu *et al.* 2002, p. 740). Stigliz (1999) reports that simple cross-sectional results show growth in transition economies is positively influenced by progress in privatization only if there has been concomitant improvement in governance. The most recent empirical studies mentioned above suggest that the results of empirical growth studies undertaken prior to year 2000 must be regarded with caution. Moreover, these later studies point to the need for widening the perspective to take into account the creation and functioning of market supporting institutions (see for example Radulescu *et al.* 2002).

As outlined above, the existing literature has pointed out two other important factors explaining output growth variation in transition economies, apart from structural policy reform variables. These variables are initial conditions and macroeconomic variables. With respect to initial conditions, most studies find their positive effect on output growth to be statistically significant. Better initial conditions lead to better output growth performance. Moreover, De Melo *et al.* (1997b) and Havrylyshyn *et al.* (1998, 2000) find a decreasing role of initial conditions over time. Apart from their direct effect on growth, initial conditions are found to impact growth indirectly through structural policy reforms (De Melo *et al.* 1997b, Falcetti, 2002 and Merlevede, 2003).

Last, macroeconomic variables, such as the level of inflation and the size of the budget deficit, have been widely used in empirical papers as determinants of growth in transition. Fischer *et al.* (1996a), (1996b) and (2000) focus more than other papers on the role of inflation on growth in transition and finds that high inflation rates impede growth and that macroeconomic stabilization is a prerequisite for positive output growth to occur. [5]

The above three groups of variables (initial conditions, structural policy reforms and macroeconomic variables) constitute the "consensus" set of variables to affect output growth in transition. Other variables used in growth regression analysis, and found to significantly affect growth, include regional tensions, wars and conflicts (see for example De Melo *et al.* 1997a, 1997b, and Popov, 2000) and membership in the ruble zone (Popov, 2000). Depending on the research question at hand, different studies have emphasized one or another variable, often creating other related variables to their variables of interest, but the main approach has been that of parsimonious models with a few variables, including the three "consensus" variables described above. However, some controversy over these "consensus" variables has not ceased since transition started. Studies that took into account a number of initial conditions found that these initial conditions do matter for growth in transition, and that in some cases liberalization policies become insignificant. Aslund, Boone and Johnson (1996) contend that overall attempts to link differences in output changes during transition to the cumulative liberalization index and to macro stabilization (rates of inflation) did not yield any impressive results. It turned out that binary variables, such as membership in the ruble zone (i.e., FSU) and war destruction, were much more important explanatory variables than either the liberalization index or inflation.

[5] Berg *et al.* (1999) also pays close attention to macroeconomic variables, particularly the role of budget deficits.

Popov (2000) similarly concludes that after controlling for the non-policy factors, namely initial conditions, the impacts of liberalization policies become insignificant. Furthermore, 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 the growth performance (Popov 2000). The above findings seem to indicate that liberalization policies' effect on growth is more important in the presence of a market supporting institutional framework.

Several theoretical papers have pointed out the role of market supporting institutions as the missing ingredient for the explanation of output performance variation across transition economies. The theoretical literature on transition seems to suggest that after the efforts for macroeconomic stabilization and the implementation of structural policy reforms (such as liberalization and privatization policies), the transition economies are challenged with the intermediate phase of the transition process, the establishment of market-oriented economic institutions via the institutional reform. We can think of the institutional reform as the foundations of the 'transition bridge,' responsible for a successful transition and a more efficient allocation of natural and human resources (than under the planned economy).

Researchers working on transition issues should not limit the span of factors effecting output performance by examining only economic factors and ignoring the impact of politics, ideology, culture and especially deep institutional transformations (Marangos, 2004 and Roland 2002). In contrast with the advanced economies that already have the successful institutions of capitalism in place, when analyzing the transition economies or developing economies in general, one should keep in mind that such institutions are in an embryonic state or even absent. Roland (2002, p. 49) contends that "the transition experience has very much reinforced the institutional 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. 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." This is in line with North (1990) and Acemoglu *et al.* (2004) discussions on the two possible sets of institutions that can emerge and perpetuate themselves, efficient institutions and inefficient (wasteful of a country's human and natural resources) institutions.

As transition countries are walking along the 'transition bridge,' several institutions and organizations, such as the World Bank, the International Monetary Fund (IMF), the European Bank for Reconstruction and Development (EBRD) and the Heritage Foundation/Wall Street Journal, have tried to emphasize on and to some extent quantify the building of several dimensions of new economic, political and legal institutions in transition economies. According to World Bank, IMF and Heritage Foundation, it is the good quality of institutions that supports the functioning of a market economy and low institutional capacity is a key constraint on growth in the long term. Without further advances in the building of institutions, transition economies might not have sustainable economic growth and could fall behind the expected level (Heritage Foundation/Wall Street Journal, 2005). EBRD and World Bank Transition Reports also put great emphasis on institutional building and consider it a major factor in achieving positive GDP growth rates. It is because of these views that in recent years these organizations and others have increased their efforts and resources devoted to gathering more institutional data and compiling several indicators of institutional development for developing and transition countries. The resulting availability of the data in the recent years, together with a better understanding of the channels through which institutions (particularly property rights and contract enforcement institutions) impact output and output growth performance, is used in this dissertation to measure the extent to which institutions can explain differences in economic performance across transition economies.

II. The Role of Institutions in Economic Performance

2.1 Theoretical Background and Definition of Institutions

Douglas North's pioneering work sets the analytical framework that integrates institutional analysis into economics. "Institutions are the humanly devised constraints that structure human interaction. They are made up of formal constraints (e.g., rules, law, constitutions), informal constraints (e.g., norms of behavior, conventions, self-imposed codes of conduct), and their enforcement characteristics" (North 1994, p. 360). Together they define the incentive structure of societies and economies. Institutions may be created, as was the United States Constitution; or they may simply evolve over time, as does the common law (North, 1990, p. 4).

Institutional arrangements constitute under what conditions individuals are allowed to undertake certain activities. In the same way institutions set the constraints on what individuals are prohibited from doing. Clague *et al.* 1997a describe how obeying to institutional constrains could be liberating rather than constraining at the community level, when compared to the individual level. "Defining institutions as the constraints that human beings impose on themselves makes the definition complementary to the choice theoretical approach of neoclassical economic theory… Institutions are a creation of human beings. They evolve and are altered by human beings" (North, 1990, p. 5). Hence, North's theory of institutions begins with the individual and the integration of individual choices with the constraints institutions impose on the choice sets, making this way a contribution in unifying social science research.
If we look at a broader definition of institutions we understand that institutions can be many things. According to Nabli and Nugent (1989), institutions can be organizations or sets of rules within organizations; they can be markets or particular rules about the way a market operates; or they can refer to the set of property rights and rules governing exchanges in a society. North, however, distinguishes between institutions and organizations. As defined by North (1990, p. 4) "institutions are perfectly analogous to the rules of the game in a competitive team sport. If institutions are the rules of the game, organizations and their entrepreneurs are the players".

Different authors have used quite different definitions of institutions, emphasizing different characteristics of institutions. “Among the characteristics of institutions which vary, are the degree to which they are (a) organizational, i.e., the extent to which organizations and institutions coincide, (b) formal, (c) created at a specific time and place by a specific means, as opposed to having evolved from more diffuse sources, (d) embedded in, as opposed to differentiated from other institutions, (e) universal, as opposed to particularistic, in the interests they serve, (f) creating, as opposed to simply maintaining a certain public good, and (g) technology linked” (Nabli and Nugent, 1989, p. 1334). In any case, in most definitions of institutions there appear to be three more or less explicitly stated characteristics that may be considered basic to the concept of a social institution. The first such characteristic is the *rules* and *constraints* nature of institutions. Moreover, “it is as sets or configurations that rules are considered as basic characteristics of institutions” (Nabli and Nugent 1989, p. 1335). The second characteristic of institutions is their ability to govern the relations among individuals and groups, which implies obedience and applicability in social relations (Nabli and Nugent 1989, and Clague *et al.*, 1997a). Last, institutions are predictable. This constitutes their third characteristic. “The rules and constraints have to be understood, at least in principle, as being applicable in repeated and future situations. Agents should expect these rules and constraints to have some degree of stability, otherwise, they would not have an institutional character (Nabli and Nugent 1989, p. 1335).

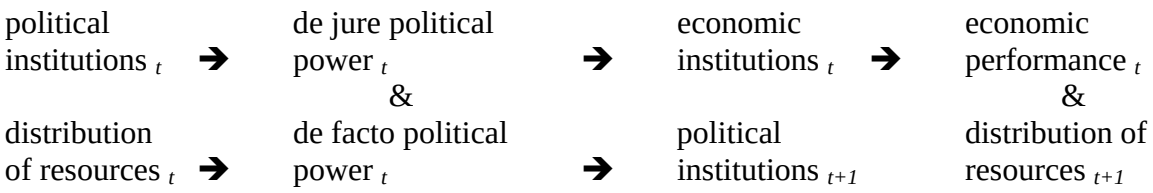
Examples of institutions range from formal organizations, such as labor unions and employers’ organizations, markets such as stock exchanges, labor markets, credit markets or wholesale markets, contracts, cultural rules and codes of conduct (Nabli and Nugent 1989). They are all institutions in that they lay down sets of rules governing specified activities of the parties involved. It is useful, however, to distinguish between the different categories of institutions. Following North (1981), Clague *et al.* (1997a) identify three broad categories of institutions: (1) the constitutional order, containing the fundamental set of written and unwritten rules; (2) cultural endowments, which include the normative behavioral codes of society and the mental models that people use to interpret their experience; and (3) the institutional arrangements. Given that the constitutional order and the cultural endowments of a society change slowly, except during revolutionary periods, most of the institutional analyses focuses on institutional arrangements (Clague *et al.*, 1997a).

2.2 Economic Institutions

Acemoglu *et al.* (2004) set forth the hypothesis that differences in economic institutions are the fundamental cause of different patterns of economic growth and development by providing a general conceptual framework of what determines economic institutions, and what are the channels through which economic institutions in turn affect economic performance. At its core, this hypothesis is based on the notion that it is the way that humans themselves decide to organize their societies that determines whether or not they prosper. The importance of economic institutions stands in that they influence the structure of economic incentives in society. "Without property rights individuals will not have the incentive to invest in physical or human capital or adopt more efficient technologies." (Acemoglu *et al.*, 2004, p. 2). On the other hand, the importance of economic institutions stands in that they help to allocate resources to their most efficient uses, reduce transaction costs and determine who gets the profit, revenues and the rights of control. (Acemoglu *et al.,* 2004 and North, 1990). When markets are missing or ignored (as they were in the Soviet Union and CEE countries) the gains from trade, as elaborated in North (1990) and Acemoglu *et al.* (2004), are not exploited and resources not allocated efficiently. Basically, economic institutions facilitate and encourage factor accumulation, innovation and the efficient allocation of resources (Acemoglu *et al.*, 2004).

But what are the channels through which institutions affect economic performance? To address this question Acemoglu *et al.* (2004, p. 3) start their analysis by contending that "economic institutions not only determine the aggregate economic growth potential of a country, but also other economic outcomes, including the distribution of resources in the future (i.e., the distribution of wealth, of physical capital or human capital)." Schematically, denoting t as the current period and $t+1$ as the future period, the condensed framework in Acemoglu *et al.* (2004, p. 6) is given as:

Figure 1



"The two state variables are political institutions and the distribution of resources, and the knowledge of these two variables at time *t* is sufficient to determine all of the other variables in the system. While political institutions determine the distribution of de jure political power in society, the distribution of resources influences the distribution of de facto political power at time *t*. These two sources of political power, in turn, affect the choice of economic institutions and influence the future evolution of political institutions. Economic institutions determine economic outcomes, including the aggregate growth rate of the economy and the distribution of resources at time *t + 1*. Although economic institutions are the essential factor shaping economic outcomes, they are themselves endogenous and determined by political institutions and distribution of resources in society." (Acemoglu *et al.* (2004, p. 6).

This abstract, but highly simple framework enables Acemoglu *et al.* (2004) to answer the question, Why do some societies choose "good economic institutions"? In discussing what good economic institutions are, Acemoglu *et al.* (2004) try to avoid the danger of defining good economic institutions as those that generate economic growth, potentially leading to a tautology. "This danger arises because a given set of economic institutions may be relatively good during some periods and bad during others. For example, a set of economic institutions that protects the property rights of a small elite might not be inimical to economic growth when all major investment opportunities are in the hands of this elite, but could be very harmful when investments and participation by other groups are important for economic growth." (Acemoglu *et al*., 2004, p. 9). To avoid such a tautology and to simplify and focus the discussion, Acemoglu *et al.* (2004) provide a definition of good economic institutions as "those that provide security of property rights and relatively equal access to economic resources to a broad cross-section of society. Although this definition is far from requiring equality of opportunity in society, it implies that societies where only a very small fraction of the population have well-enforced

property rights do not have good economic institutions." (Acemoglu *et al.,* 2004, p. 9). Moreover, Acemoglu *et al.* (2004, p. 13) believe that the structure of markets itself is partly determined by property rights, contending that "Once individuals have secure property rights and there is equality of opportunity, the incentives will exist to create and improve markets (even though achieving perfect markets would be typically impossible). Thus we expect differences in markets to be an outcome of differing systems of property rights and political institutions, not unalterable characteristics responsible for cross-country differences in economic performance. This motivates our focus on economic institutions related to the enforcement of property rights of a broad cross-section of society."

Good economic institutions can be a cluster of interrelated things. The search for what constitutes a good set of economic institutions needs to start from North's (1981) pioneering work. North (1981, pp. 20-27) distinguishes between a "contract theory" of the state and a "predatory theory" of the state. A summarized notion of the "contract theory" of the state corresponds to the situation where the state and associated institutions provide the necessary legal framework for the private contracts to emerge and in turn facilitate economic transactions via the reduction in transaction costs. Moreover, North's "contract theory" implies that good institutions, apart from supporting private contracts, provide checks against expropriation by the government or other politically powerful groups. Instead, the "predatory theory" of the state implies that the state is an instrument for transferring resources from one group to another. Similarly, Acemoglu *et al.* (2001) distinguish between the *institutions of private property,* a cluster of economic institutions, including the *rule of law* and the *enforcement of property rights*, and the *extractive institutions,* defined as institutions under which the rule of law and property rights are absent for large majorities of the population. In Clague *et al.*'s (1997) definition, the good economic institutions of a market economy include the legal provision for rights to property, the mechanisms to enforce contracts, and the government entities that can provide physical security of property and impartial enforcement of contracts. This implies that the rights must exist on paper, and government entities (such as police and courts) must be capable of enforcing them. The existence of these rights depends on a set of political arrangements.[6] If these political arrangements are property rights and contract enforcement institutions friendly, then

[6] Acemoglu *et al.* (2004) provide a framework for understanding the relationship between political arrangements and property rights and contract enforcement institutions.

they give government officials the incentives to use their power to protect the members of the private sector from one another, and not to expropriate or defraud private parties (Clague *et al.* 1997). Similarly, addressing the issue of what good economic institutions consist of, Murrell (1996) points at one particular set of institutions central to capitalism, those pertinent to property rights, contract enforcement, corporate governance and creditors' rights. Some contributions to the growth literature have incorporated stylized notions of property rights into formal growth models. Tornell (1997) introduces endogenous institutional change (in the form of property rights) into a neoclassical growth model to explain the growth paths of most developing and developed countries.

Olson (1996) is concerned with finding the sources of poor economic performance in developing countries. The absence of institutions that enforce contracts impartially, and make property rights secure over the long run make developing countries lose most of the gains from trade (where third-party impartial enforcement is needed), and most of the gains from capital-intensive production (Olson, 1996). Similarly, Clague *et al.* (1997) contend that differences in property rights and contract enforcement mechanisms are an important part of the explanation of why some countries prosper while others do not.

The contemporary literature has documented the importance of a "cluster" of institutions that include both contract enforcement and private property protection elements (Acemoglu *et al.*, 2004)[7]. This is the approach used in this dissertation as well, mainly due to data discrepancies and the conceptual and empirical challenges in measuring these two categories of institutions separately. Acemoglu *et al.* (2003a), however, are among the first authors to unbundle this cluster of institutions, using historical European colonies data and employing an instrumental variable approach to find that property rights institutions are the driving element of the cluster that matters for economic growth.[8]

2.3 Review of Empirical Studies Using Institutional Measures

History has performed some experiments that lead to some important conclusions about the role of institutions in explaining income differences across countries. During most of the

[7] These categories of institutions often have been measured together using as proxies, indicators of *rule of law* (known also as *rules* and *regulations)*.

[8] Acemoglu *et al.* (2003a, p. 4) find that once they control for the effects of property-rights institutions, contracting institutions seem to have no impact on income per capita, but rather only affect the form of financial intermediaries.

postwar period, China, Germany and Korea have been divided, so that different parts of nations with about the same culture and geography have had different institutions and economic policies. The economic performances of Hong Kong and Taiwan, West Germany and South Korea have been incomparably better than the performances of mainland China, East Germany and North Korea. These examples are cited by Olson *et al.* (1996) and Acemoglu *et al.* (2004) as typical historical examples in support of the hypothesis that differences in institutions and economic policies account for much of the unexplained variation in per capita incomes across countries.

When we look over a wider range of countries, it is more difficult to find clear-cut examples as the ones above. Nevertheless, research focusing on the relative importance of institutional measures in explaining the variability of economic performance, such as per capita incomes or per capita growth rates, across countries, has been abundant. In their pioneering empirical work of the new growth theory, Barro and Sala-I-Martin (1994) include a variable measuring political instability. Their results show that an increase of political instability by one standard deviation from the mean in a sample of 97 countries lowers the growth by a substantial amount, 0.4 percentage points per year. Easterly and Levine (1998) also find statistical significance of political instability on growth for African countries.

Other studies have focused on the effect of corruption on economic growth. Tanzi and Davoodi (1997) show how corruption results in low expenditures on health and education (where bribery opportunities are limited), and large but poorly executed public investment projects (where bribery opportunities are legion). Mauro (1997) has summarized how corruption indexes explain statistically various performance measures such as growth or investment ratios. “But political instability is surely too narrow a definition of institutional development, and corruption too all encompassing and more of a result of institutional conditions than a measure of those conditions” (Havrylyshyn *et al.* 2000, p. 5). A few other studies go well beyond the use of political instability or corruption indices. Among the earlier ones are Keefer and Knack (1995), who use several different measures of effective governance from the privately compiled International Country Risk Guide (ICRG). Olson *et al.* (2000) explain growth in 68 countries over the period 1960-87 by conventional neo-classical and new growth theory variables, and then explain the remaining productivity growth residual using several measures of institutional governance: the risk of expropriation, risk of contract repudiation, quality of bureaucracy, level of government corruption, and rule of law.

An area of increasing interest to economists has become the investigation of the channels through which institutions and economic performance are interrelated. Glaser *et al.* (2004) question the reverse causation between political institutions and growth and argue that it is in fact output growth and human capital that lead to political institutional improvements. Moreover, Glaser *et al.* (2004) raise the concern that most indicators of institutional quality are "outcome" measures suffering from the subjectivity of their creators.

Fewer studies have tried to measure the effect of institutional measures on output and output growth performance in transition countries. Havrylyshyn *et al.* (2000) are among the first authors attempting to empirically measure the impact of market-friendly institutions on output growth across transition economies. Havrylyshyn *et al.* (2000, pp. 5-6) propose three categories of market friendly institutions that are separately measurable in principle and that have separate effects on economic performance. The first category consists of the *legal framework for economic activity*, which includes the establishment of the legislation for free economic activity, bankruptcy, contract law and most importantly the enforcement of such legislation even-handedly and transparently. This first category is analogous to the "rule of law" and "security of property rights" categories used in institutional literature papers. Havrylyshyn *et al.* (2000) second category of institutions is *political and civic freedom*, which is a category of political institutions consisting of the democratic processes, freedom of assembly and speech, equal treatment by political and judicial bodies, etc. Last, and particularly in the context of transition economies, Havrylyshyn *et al.* (2000) list a third category of *institutional reform* as it relates to economic decentralization and liberalization. We can think of this third category of institutional reform as one that enhances enterprise restructuring, governance, competition policy, and restructuring of the financial sector. Havrylyshyn *et al.* (2000, p.6) are among the first to make a distinction between structural policy reforms (SPR), consisting of price and trade liberalization policies and small and large scale privatization policies, and institutional reforms leading to the development of market-enhancing institutions. Moreover, Havrylyshyn *et al.* (2000, p.6) argue that structural policy reforms (labeled by them as "good policies") capture measures that can be introduced within a short time frame, while institutional reforms, by their very nature, take much longer to develop. "Consistent with the institutional approach, the effect on performance of the above three categories of institutions is not a simple one, but involves a rather more complex model where the pace of development of each could be different, where the three interact in both

a substitution and complementary fashion, and one in which threshold effects may exist" (Havrylyshyn *et al.* 2000, p. 6). Even though Havrylyshyn *et al.* (2000) do not build a clear-cut model of the sort they refer to, they argue that it is useful to have the three different categories of institutional development

measured separately whenever possible.[9] Havrylyshyn *et al.* (2000) empirical findings suggest that the development of an institutional framework indeed has a significantly positive impact on growth, but that progress in achieving macroeconomic stabilization and implementing broad-based economic reforms remain (up to year 1998) the key determinants of growth in transition economies.

A study by Poirson (1998) uses the same approach as Havrylyshyn *et al.* (2000), which is to add to the conventional variables several institutional measures of "economic security." These measures are taken from the ICRG and are similar to those used by Olson *et al*. (1998), but also include the degree of civil liberty from Freedom House publications.

Pfefferman and Kisunko (1999) use recent World Bank survey data of what managers see as obstacles to doing business in different countries. Their results demonstrate that the level of private investment is greater where the predictability of the judiciary is highest and regulations for starting new operations are simple.

Johnson *et al.* (2000) use survey data to examine new firms in Poland, Slovakia, Romania, Russia and Ukraine. Their findings suggest that a lack of bank finance does not seem to prevent private-sector growth and that more inhibiting than inadequate finance are insecure property rights.

[9] Contrary to this argument, in their paper Havrylyshyn *et al.* (2000) use principal component analysis to compile an overall institutional indicator and test its significance in a growth regression framework.

III. Methodology

Modeling the evolution of output in transition as a function of its many possible determinants gives rise to a number of methodological problems. The main empirical methodology employed by researchers working on output performance in transition has been stylized growth regression analysis. It is clear, however, that with little guidance from economic theory, there is a large potential for misspecifying the regression model by omitting relevant variables (Berg *et al.* 1999). This suggests the need to either "test down" from more general to more specific structures following Hendry's approach,[10] or to explore the robustness of the estimated coefficients in a systematic way, using the Extreme Bounds analysis, as it has been done in the empirical literature on long-term growth,[11] or to do both, as it is the case in Radulescu *et al.* (2002). As a result of these studies and the others cited in the previous chapters, some consensus regarding the determinants of output growth in transition has emerged. We take this consensus as a starting point in the theoretical model and the empirical specifications and proceed with addressing other unresolved methodology concerns.

First, medium-run growth rates in transition might not be the only and best representation of economic performance. As some researchers have argued, there are no conclusive test results whether the depended variable should be GDP growth rate or GDP level, particularly as the GDP level (GDPI) relates to the pre-transition level (Berg *et al.* 1999). If we think of the transition process in terms of a heuristic model, we realize that medium run growth rates, observed throughout the first 13-15 years of transition so far, are not more indicative than the level of output compared to the pre-transition level for the purposes of intermediate economic performance (Sachs *et al.* 2000a, 2000b). Thus, both output and output growth rates will be the main dependent variables in this dissertation.

Second, we are faced with potential endogeneity problems, both through the presence of unaccounted country-specific effects and because some of the right-hand side determinants of

[10] Berg *et al.* (1999) employee such an approach and label it the 'Hendry's approach', in honor of Prof. David Hendry's work (Hendry, D. 1995, "Dynamic Econometrics," Oxford; New York: Oxford University Press).
[11] Levine and Renelt 1992, and Sala-I-Martin 1997 and 2004 employ such an approach known as the Extreme Bounds Analysis (EBA), which was first advocated by Leamer (1983). It consists of starting with a small number of 'free variables' which appear in all regressions and testing up by adding combinations of the 'doubtful variables.' Coefficients on the variables of interest are monitored across growth regressions and the extreme bounds of each coefficient are calculated taking into account the sampling uncertainty.

output and output growth could depend on output performance (Berg *et al.* 1999, Merlevede, 2003 and Falcetti *et al.* 2002). The endogeneity of both structural policy reforms and institutional measures with respect to output growth is a crucial issue for the growth literature in transition economies. Some studies, such as De Melo *et al.* (1997b), Havrylyshyn *et al.* (2000) and Radulescu *et al.* (2002) take structural policy reforms (SPR) to be exogenous to growth. This is problematic because failure to account for the feedback of growth to SPR biases the estimates of structural policy reforms' changes on growth. Heybey and Murell (1999) and Wolf (1999) recognize this problem and allow for feedback of growth to structural policy reforms, using a cross-country analytical framework. Merlevede (2003) models structural policy reforms as endogenous to growth, with output growth and structural policy reforms jointly determining and affecting one-another. On the other hand, there is a lack of studies that address the endogeneity of institutional development to output performance. Havrylyshyn *et al.* (2000) are among the first authors to empirically estimate the impact of the market-friendly institutional framework on output growth in transition economies and make a clear distinction between structural reform policies and institutions. However, they fail to take into account potential endogeneity problems arising from better economic performance (expressed, among other variables, through GDP growth rates) to increased resources and efforts of transition governments to devote more of these resources to institutional building, resulting in higher scores for institutional indicators.

Third, while most papers treat the transition experience, encompassing a decline stage and a recovery stage, as only one period, with transition countries starting the transition process at the same transition year base (corresponding to different calendar years for CEE and FSU countries),[12] an alternative method is to consider the two stages of the transition process separately. The transition period covered up to date is long enough to allow separate econometric analysis of two sub-periods. Havryslyshyn *et al.* (1999) use a somehow ad hoc definition of these two sub periods defining the decline period as encompassing years 1989-1993 and the recovery period encompassing years 1994 and on. Their specifications include measures of institutional reform only under the recovery stage, while the rest of the determinants in the two stages are overlapping.

We might think that the determinants of the decline and the recovery stages in transition are overlapping, but when it comes to variables measuring progress with institutional reform and

[12] See Table 4 for more details.

property rights and contract enforcement institutions, it is reasonable to think that their effect on output performance comes into play mostly during the recovery stage. This is in line with the very nature of institutions taking time to develop. Keeping in mind that in transition economies a market-oriented institutional framework was missing in the beginning of transition and during most of the decline stage, it makes sense to focus mainly on the recovery stage if we are interested in exploring the relationship between output performance and institutions. Therefore, first this dissertation estimates the empirical specification system (presented in Chapter 4) using the whole transition period dataset, and then it uses only the recovery stage period dataset to estimate the same system.

Fourth, there exist other potential explanatory variables that could gain more explanatory power over output performance as transition proceeds. Several papers, such as De Melo *et al.* (1997b), Jaros (2001) and Havrylyshyn *et al.* (2000) have already shown that structural policy reforms, initial conditions and macroeconomic stabilization policies have a great explanatory power over output and output growth variation when the transition dataset covers data through year 1998. Such a period covers both the decline and the recovery stages. As the transition of centrally planned economies to market economies proceeds, differences in institutional reforms are expected to acquire more importance as determinants of economic performance compared to measures of market liberalization and small scale privatization (Falcetti *et al.*, 2002). Other factors that are expected to acquire importance are conventional growth determinants such as investment, labor and human capital expansion, trade openness and foreign direct investment. It is questionable, however, when these factors will have a significant explanatory power over output performance in general, and output growth rates in particular. If we are referring to the long run, most likely these factors will play a crucial role. But, when studying the determinants of output performance in transition economies, with only 13 to15 years of data available, the focus shifts from long-term growth to the short term, or at the best to the medium term (Radulescu *et al.*, 2002). Thus, even though the existing literature has not found an important effect of conventional growth determinants yet, this doesn't mean that these determinants will not gain explanatory power over output performance as the transition process reaches its completion and transition economies fully become market economies. These determinants could have already started to play an important role on the output performance of the more advanced transition economies of CEE, but the purpose of this dissertation will not include the empirical

testing of this hypothesis. The existing transition literature suggests that for the over-industrialized, distorted, and inefficient transition economies, output recovery comes only after some elimination of the wasteful old production. Moreover, this output recovery usually cannot be based on a large investment effort to build the new product, before the necessary incentives for efficient resource use are in place (Hernandez-Cata, 1999). Thus, investment, one of the conventional growth determinants, does not seem to be a candidate in the list of transition growth determinants. Trade openness is another popular conventional growth determinant. Wolf (1997) tests for the effect of trade (export) openness on GDP growth and finds no significant effect. The explanation for this lack of significance may be that almost all transition economies implemented trade and exchange rate liberalization policies and became relatively open quickly. Moreover, those countries that achieved earlier restructuring were able to reorient their trade quickly to new markets, which means that exports may not so much have led to growth, but rather restructuring, which was necessary for recovery, tended to promote exports (Havrylyshyn *et al.*, 1999).

At the beginning of transition several expectations were raised regarding the effect of foreign direct investments on output performance. Havrylyshyn *et al.* (1998) have argued and Wolf (1999) has tested that foreign direct investment has not had the expected explanatory power on output growth during the first 7-8 years of transition. The reason for this finding may be that the relationship between growth and foreign direct investments is mutually reinforcing. While there is little doubt that foreign direct investment promotes growth, those factors that promote greater structural policy reforms and macroeconomic stabilization also attract foreign direct investments (Havrylyshyn *et al.*, 1999). It is due probably to this simultaneity that the econometric analysis of growth in transition has been unable to isolate the foreign direct investment as an explanatory factor, in the sense that once structural policy reforms and macroeconomic stabilization are accounted for, controlling for the effect of foreign direct investment doesn't yield any important results.

Other conventional growth determinants include changes in the labor force participation and human capital that usually take place over long periods of time. If we closely observe changes in population during the first decade of transition we might agree that significant population changes have not occurred. A common phenomenon, however, has been the *brain drain*, which in terms of population numbers is compensated by population growth. Nevertheless, it cannot be said that human capital has remained unaffected by this brain drain,

especially in countries like Albania, Romania, Bulgaria or countries in the CIS. Thus, we may think that while significant changes in the quantity of labor force in transition economies have not occurred, the quality of the labor force has been affected due to the brain drain phenomena. On the other hand, changes in human capital have occurred as a result of the decentralization of health care and education systems in transition countries. Education and health care were among the proudest achievements of socialism.[13] As a result of a significant change in the state's control over health and education expenses (as compared to the pre-transition period), these sectors have undergone significant changes. Lack of studies quantifying the effect of health or human capital indicators on output performance in transition makes the task of including such measures in an empirical analysis daunting.

Fifth, most transition studies focusing on the impact of structural policy reforms on growth use average (or weighted) structural policy reforms indices developed by EBRD and World Bank. A number of recent studies have divided these indices into their subcomponents (Radulescu *et al.* 2002, Raiser *et al.* 2001, Falcetti *et al.* 2002 Merlevede *et al.* 2003). This allows us to test which of these SPR indices best explains growth performance in transition. Radulescu *et al.* (2002) show that growth over the first decade of transition is best explained by a simple average of all EBRD's reform indices, and that none of the subcomponents by itself has any greater explanatory power than this average. This is consistent with Havrylyshyn *et al.* (1999) who contend that it has not been possible to isolate one subcomponent as more important than others. Similarly, for non-transition economies, Aziz and Wescott (1997) show that it is a combination of policies that is more critical for growth than any individual type of policy. On the other hand, Falcetti *et al.* 2002 assert that a narrower definition of reforms, including only price and trade liberalization and small scale privatization has the most explanatory power over GDP growth performance in transition economies. In this dissertation, both a broad and a narrow definition of an average indicator of structural policy reforms are used and experiments are run with individual SPR indicators as well.

Sixth, the way in which initial conditions are to enter the regression model poses some questions. In particular, one would like a specification that allows for the possibility that the same initial conditions might have quite different effects at the beginning of transition or well into the transition (De Melo *et al.* 1997b and Berg *et al.* 1999). Imposing that initial conditions

[13] See World Bank (1996) for more details.

continue to play the same role throughout the transition process is not accurate (De Melo *et al.*, 1997b). In order to account for the changing effects that initial conditions play on output performance, institutional development and SPR, an interaction variable of initial conditions with a time trend is included in the three equations of the empirical specification system.

IV. Theoretical Model and Empirical Model Specifications

4.1 The Theoretical Model

Suppose the structural model of aggregate output and output growth during transition is as follows:

$$Y_{i,t} = F(SPR_{i,t}, SPR_{i,t-1}, \ldots; I_{i,t}; M_{i,t}; X_i) + Z_i + \varepsilon_{i,t} \quad (1)$$

$$SPR_{i,t} = G(Y_{i,t}, Y_{i,t-1}\ldots; SPR_{i,t-1}; P_{i,t}; X_i) + Z_i + \eta_{i,t} \quad (2)$$

$$I_{i,t} = H(Y_{i,t}, Y_{i,t-1},\ldots; SPR_{i,t}, SPR_{i,t-1}, \ldots; P_{i,t}; S_{i,t}; X_i) + Z_i + \upsilon_{i,t} \quad (3)$$

In equation (1), Y_{it} is the main dependent variable, either output or output growth rate. $SPR_{i,t}$ represents structural policy reform variables, such as price and trade liberalization and privatization. $M_{i,t}$ denotes macroeconomic policy variables, such as inflation stabilization or government fiscal balance. $I_{i,t}$ represents the institutional development, which is different in nature from $SPR_{i,t}$.[14] X_i denotes observable country-specific effects (including initial conditions), and Z_i stands for the unobservable country-specific effects. Last, ε is the disturbance term and t and i index the time period and the country, respectively.

In equation (2), $SPR_{i,t}$, representing structural policy variables such as market and trade liberalization and privatization, is a function of current and past output level or output growth, political reform, $P_{i,t}$, as well as observable and unobservable country-specific characteristics.

In equation (3) institutional development, $I_{i,t}$ (representing either the institutional reform, or property rights and contract enforcement institutions) is a function of current and past output level or output growth, a vector of institutional demand factors, consisting of political reform, and structural policy reforms, a vector of institutional supply factors, $S_{i,t}$, as well as observable and unobservable country-specific characteristics.

In the above system, the three equations are identified and can in principle be consistently estimated, provided that we take care of potential fixed effects problems entering through the correlation of Z_i (the unobservable country effect) with the remaining right-hand side variables,

[14] This is in line with Havrylyshyn *et al.* (2000) distinction.

and the endogeneity of SPR and institutional development on output performance. In addition, in order to address the presence of fixed effects, a large set of initial conditions (i.e., observable X_i) are included in the model. Another way to address the latter problem would be to explicitly estimate the model including binary variables (country dummies).

4.2 Estimation Techniques

The most general empirical model specification used in this dissertation is drawn from the theoretical system of equations model presented in (1), (2) and (3) and is given below.

$$GDPG_{i,t} = \alpha_0 + \mu_i + \alpha_1 SPR_{i,t} + \alpha_2 SPR_{i.t-1} + \alpha_3 INST_{i,t} + \alpha_4 Time_t + \alpha_5 Time_t^2 + \\ + \alpha_6 IC_i xTime_t + \alpha_7 INFL_{i,t} + \alpha_8 RT_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$SPR_{i,t} = \beta_0 + \varphi_i + \beta_1 GDPG_{i,t} + \beta_2 GDPG_{i,t-1} + \beta_3 SPR_{i.t-1} + \beta_4 POLREF_{i,t} + \\ + \beta_5 Time_t + \beta_6 Time_t^2 + \beta_7 IC_i xTime_t + \eta_{i,t} \quad (5)$$

$$INST_{i,t} = \delta_0 + \rho_i + \delta_1 GDPG_{i,t} + \delta_2 GDPG_{i,t-1} + \delta_3 SPR + \delta_4 SPR_{i.t-1} + \delta_5 POLREF_{i,t} + \\ + \delta_6 Time_t + \delta_7 Time_t^2 + \delta_8 IC_i xTime_t + \delta_9 STAB_{i,t} + \delta_{10} GOVEXP_{i,t} + \gamma_{i,t} \quad (6)$$

In matrix form (4) (5) and (6) could be written as:

$$Y^1{}_{NTx1} = \alpha_0 \iota_{NT} + X^1{}_{NTxK} \alpha^1{}_{Kx1} + Z_{\mu\ NTXN} \mu_{Nx1} + \varepsilon_{NTx1} \quad (4')$$

$$Y^2{}_{NTx1} = \beta_0 \iota_{NT} + X^2{}_{NTxK} \beta^1{}_{Kx1} + Z_{\varphi\ NTXN} \varphi_{Nx1} + \eta_{NTx1} \quad (5')$$

$$Y^3{}_{NTx1} = \delta_0 \iota_{NT} + X^3{}_{NTxK} \delta^1{}_{Kx1} + Z_{\rho\ NTXN} \rho_{Nx1} + \gamma_{NTx1} \quad (6')$$

Let g^* be the number of endogenous variables in each of the above equations. Let k^* be the number of exogenous variables in each of the above equations and let K^* be the total number of exogenous variables in the above simultaneous equation system.

In (4'), $g^* + k^* - 1 = 3 + (7 + 24) - 1 = 33 < [11 + 24] = 35 = K^*$, which means (4') is over-identified.

In (5'), $g^* + k^* - 1 = 2 + (6 + 24) - 1 = 31 < [11 + 24] = 35 = K^*$, which means (5') is over-identified.

In (6'), $g^* + k^* - 1 = 3 + (8 + 24) - 1 = 34 < [11 + 24] = 35 = K^*$, which means (6') is over-identified.

Condensing the matrix notations we get:

$$Y_1 = Z_1\alpha_2 + Z_\mu\ \mu + \varepsilon \qquad (4'')$$

$$Y_2 = Z_2\beta_2 + Z_\varphi\varphi + \eta \qquad (5'')$$

$$Y_3 = Z_3\delta_2 + Z_\rho\ \rho + \gamma \qquad (6'')$$

If we explicitly introduce *N-1* country binary (dummy) variables to capture the fixed effects, then we can rewrite the above system as:

$$Y_1 = Z_4\alpha + \varepsilon \qquad (4'')$$

$$Y_2 = Z_5\beta + \eta \qquad (5'')$$

$$Y_3 = Z_6\delta + \gamma \qquad (6'')$$

$$Z_4 = [Z_1 \quad Z_\mu],\ Z_5 = [Z_2 \quad Z_\varphi], \text{ and } Z_6 = [Z_3 \quad Z_\rho]$$

$$\alpha = \begin{bmatrix} \alpha_2 \\ \mu \end{bmatrix},\ \beta = \begin{bmatrix} \beta_2 \\ \varphi \end{bmatrix} \text{ and } \delta = \begin{bmatrix} \delta_2 \\ \rho \end{bmatrix}$$

Let X be a matrix of exogenous and predetermined variables as shown in Figure 3. A simple Instrumental Variable estimator (IV) could be used to estimate (4''), (5'') and (6'') provided that each equation of the system is at least identified (Greene 2003, Chapter 15, sections 15.3 and 15.5)

The simple IV estimators for each of the three equations are given by the following:

$$\hat{\alpha}_{IV} = \left[\mathrm{X}'\mathrm{Z}_4\right]^{-1}\mathrm{X}'\mathrm{Y}_1$$
$$\hat{\beta}_{IV} = \left[\mathrm{X}'\mathrm{Z}_5\right]^{-1}\mathrm{X}'\mathrm{Y}_2$$
$$\hat{\delta}_{IV} = \left[\mathrm{X}'\mathrm{Z}_6\right]^{-1}\mathrm{X}'\mathrm{Y}_3$$

If equations (4''), (5'') and (6'') are over-identified, like in our case, then the Generalized IV estimator known also as the two stage least squares estimator (2SLS), could be used to get:

$$\hat{\alpha}_{GIV} = \left[Z_4'\mathrm{X}(\mathrm{X}'\mathrm{X})^{-1}\mathrm{X}'\mathrm{Z}_4\right]^{-1}Z_4'\mathrm{X}(\mathrm{X}'\mathrm{X})^{-1}\mathrm{X}'\mathrm{Y}_1$$
$$\hat{\beta}_{GIV} = \left[Z_5'\mathrm{X}(\mathrm{X}'\mathrm{X})^{-1}\mathrm{X}'\mathrm{Z}_5\right]^{-1}Z_4'\mathrm{X}(\mathrm{X}'\mathrm{X})^{-1}\mathrm{X}'\mathrm{Y}_2$$
$$\hat{\delta}_{GIV} = \left[Z_6'\mathrm{X}(\mathrm{X}'\mathrm{X})^{-1}\mathrm{X}'\mathrm{Z}_6\right]^{-1}Z_4'\mathrm{X}(\mathrm{X}'\mathrm{X})^{-1}\mathrm{X}'\mathrm{Y}_6$$

If we assume that the error terms have some common element, than a Seemingly Unrelated Regressions (SUR) technique can improve the efficiency of the 2SLS instrumental variable estimator (Greene, 2003, Chapter 14). The structure of the error terms is given below:

$$e = \begin{bmatrix}\varepsilon\\ \eta\\ \gamma\end{bmatrix} = \begin{bmatrix} & \psi_{11}I_{NT} & \psi_{12}I_{NT} & \psi_{13}I_{NT}\\ 0\ , & \psi_{21}I_{NT} & \psi_{22}I_{NT} & \psi_{23}I_{NT}\\ & \psi_{31}I_{NT} & \psi_{32}I_{NT} & \psi_{33}I_{NT}\end{bmatrix} = \left[0\ ,\quad \Omega\right]$$

The three stages least squares (3SLS) estimation procedure (Greene 2003, Chapter 15.6) consists in first using the 2SLS estimator to estimate:

$$\hat{\mathrm{Y}}_1 = \mathrm{Z}_4\hat{\alpha}_{2SLS} \tag{7}$$
$$\hat{\mathrm{Y}}_2 = \mathrm{Z}_5\hat{\beta}_{2SLS} \tag{8}$$
$$\hat{\mathrm{Y}}_3 = \mathrm{Z}_6\hat{\delta}_{2SLS} \tag{9}$$

Next we can recover:

$\hat{e} = \begin{bmatrix} \hat{\varepsilon} \\ \hat{\eta} \\ \hat{\gamma} \end{bmatrix}$ and use these residuals to estimate the following:

$\hat{\psi}_{11} = \frac{\hat{\varepsilon}'\hat{\varepsilon}}{NT}$, $\hat{\psi}_{22} = \frac{\hat{\eta}'\hat{\eta}}{NT}$, $\hat{\psi}_{33} = \frac{\hat{\gamma}'\hat{\gamma}}{NT}$, $\hat{\psi}_{12} = \hat{\psi}_{21} = \frac{\hat{\varepsilon}'\hat{\eta}}{NT}$, $\hat{\psi}_{13} = \hat{\psi}_{31} = \frac{\hat{\varepsilon}'\hat{\gamma}}{NT}$ and

$\hat{\psi}_{23} = \hat{\psi}_{32} = \frac{\hat{\eta}'\hat{\gamma}}{NT}$

$\hat{\psi}_{kl}$ are consistent estimates for ψ_{kl} for *k = 1,2,3* and *l = 1,2,3* and we can use them to formulate the 3SLS estimator.

Now we have the stacked model:

$$\overline{\mathrm{Y}} = \begin{bmatrix} \mathrm{Y}_1 \\ \mathrm{Y}_2 \\ \mathrm{Y}_3 \end{bmatrix} = \begin{bmatrix} \mathrm{Z}_4 & 0 & 0 \\ 0 & \mathrm{Z}_5 & 0 \\ 0 & 0 & \mathrm{Z}_6 \end{bmatrix} \begin{bmatrix} \alpha \\ \beta \\ \delta \end{bmatrix} + \begin{bmatrix} \varepsilon \\ \eta \\ \gamma \end{bmatrix} = \mathrm{Z}\xi + e \qquad (10)$$

And we are assuming that:

$\psi_{12} \neq 0$, $\psi_{13} \neq 0$, $\psi_{23} \neq 0$

Next, we multiplying (10) by $\overline{\mathrm{X}} = \begin{bmatrix} \mathrm{X} & 0 & 0 \\ 0 & \mathrm{X} & 0 \\ 0 & 0 & \mathrm{X} \end{bmatrix}$,

where X is the IV matrix shown in Appendix 1, containing the exogenous and the predetermined variables that are not contemporaneously correlated with the error term.

After the multiplication we get:

$$\begin{bmatrix} X'Y_1 \\ X'Y_2 \\ X'Y_3 \end{bmatrix} = \begin{bmatrix} X'Z_4 & 0 & 0 \\ 0 & X'Z_5 & 0 \\ 0 & 0 & X'Z_6 \end{bmatrix} \begin{bmatrix} \alpha \\ \beta \\ \delta \end{bmatrix} + \begin{bmatrix} X'\varepsilon \\ X'\eta \\ X'\gamma \end{bmatrix}$$

$$\begin{bmatrix} X'\varepsilon \\ X'\eta \\ X'\gamma \end{bmatrix}_{3K^*x3K^*} \approx \begin{bmatrix} 0 \ , & \begin{bmatrix} X' & 0 & 0 \\ 0 & X' & 0 \\ 0 & 0 & X' \end{bmatrix}_{3K^*x3NT} & \Omega_{3NTx3NT} \begin{bmatrix} X & 0 & 0 \\ 0 & X & 0 \\ 0 & 0 & X \end{bmatrix}_{3NTx3K^*} \end{bmatrix}$$

The 3SLS estimator is given as follows:

$$\hat{\xi}_{3SLS} = \left\{ \begin{bmatrix} X'Z_4 & 0 & 0 \\ 0 & X'Z_5 & 0 \\ 0 & 0 & X'Z_6 \end{bmatrix}' \left[\begin{bmatrix} X' & 0 & 0 \\ 0 & X' & 0 \\ 0 & 0 & X' \end{bmatrix} \Omega \begin{bmatrix} X & 0 & 0 \\ 0 & X & 0 \\ 0 & 0 & X \end{bmatrix} \right]^{-1} \begin{bmatrix} X'Z_4 & 0 & 0 \\ 0 & X'Z_5 & 0 \\ 0 & 0 & X'Z_6 \end{bmatrix} \right\}^{-1} *$$

$$* \begin{bmatrix} X'Z_4 & 0 & 0 \\ 0 & X'Z_5 & 0 \\ 0 & 0 & X'Z_6 \end{bmatrix}' \left[\begin{bmatrix} X' & 0 & 0 \\ 0 & X' & 0 \\ 0 & 0 & X' \end{bmatrix} \Omega \begin{bmatrix} X & 0 & 0 \\ 0 & X & 0 \\ 0 & 0 & X \end{bmatrix} \right]^{-1} \begin{bmatrix} X'Y_1 \\ X'Y_2 \\ X'Y_{31} \end{bmatrix}$$

Let $\overline{\Omega} = \begin{bmatrix} X' & 0 & 0 \\ 0 & X' & 0 \\ 0 & 0 & X' \end{bmatrix} \Omega \begin{bmatrix} X & 0 & 0 \\ 0 & X & 0 \\ 0 & 0 & X \end{bmatrix}$ and $\overline{Z} = \begin{bmatrix} Z_4 & 0 & 0 \\ 0 & Z_5 & 0 \\ 0 & 0 & Z_6 \end{bmatrix}$

We can rewrite the three stages least squares estimator as:

$$\hat{\xi}_{3SLS} = \left\{ \left(\overline{X}'\overline{Z}\right)' \left(\overline{\Omega}\right)^{-1} \left(\overline{X}'\overline{Z}\right) \right\}^{-1} \left(\overline{X}'\overline{Z}\right)' \left(\overline{\Omega}\right)^{-1} \left(\overline{X}'\overline{Y}\right) = \left\{ \left(\overline{Z}'\overline{X}\right) \left(\overline{\Omega}\right)^{-1} \left(\overline{X}'\overline{Z}\right) \right\}^{-1} \left(\overline{Z}'\overline{X}\right) \left(\overline{\Omega}\right)^{-1} \left(\overline{X}'\overline{Y}\right)$$

The variance of $\hat{\xi}_{3SLS}$ is given by:

$$Var\left(\hat{\xi}_{3SLS}\right) = E\left[\left(\hat{\xi}_{3SLS} - E\left(\hat{\xi}_{3SLS}\right)\right)\left(\hat{\xi}_{3SLS} - E\left(\hat{\xi}_{3SLS}\right)\right)^{-1}\right] =$$

$$= \left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\left(\overline{X}'\overline{Z}\right)\right\}^{-1}\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\overline{X}'ee'\overline{X}\left(\overline{\Omega}\right)^{-1}\overline{X}'\overline{Z}\left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\left(\overline{X}'\overline{Z}\right)\right\}^{-1} =$$

$$= \left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\left(\overline{X}'\overline{Z}\right)\right\}^{-1}$$

As shown below $\hat{\xi}_{3SLS}$ is consistent:

$$P\lim\hat{\xi}_{3SLS} = P\lim\left\{\left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\left(\overline{X}'\overline{Z}\right)\right\}^{-1}\left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\overline{X}\left(\overline{Z}\xi + e\right)\right\}\right\} =$$

$$= P\lim\xi + NT * P\lim\left\{\left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\left(\overline{X}'\overline{Z}\right)\right\}^{-1}\left\{\left(\overline{Z}'\overline{X}\right)\left(\overline{\Omega}\right)^{-1}\frac{\overline{X}e}{NT}\right\}\right\} = \xi$$

4.3 Empirical Models Used by Other Authors

The purpose of this section is to highlight some of the most related empirical specifications to the one that we use in the next section (section 4.4). We use these empirical specifications as a starting point for the empirical specifications (4), (5) and (6), and relate to them in Chapter 6, when we present and compare our estimation results to the findings of these authors.

The first related empirical specification model is the one given by De Melo *et al.* (1997b), who analyze how the degree of political freedom determines structural policy reform, which in turn is a very important determinant of GDP growth.[15] De Melo *et al.* (1997b) estimate a recursive system of two equations, assuming that the error terms are not correlated.[16] De Melo *et al.* (1997b, p. 18) model economic performance (GDP growth and inflation) and structural policy reforms (labeled as liberalization policies, LIB), in the following fashion:

[15] Wolf (1997) uses a similar approach by first identifying some underlying factors (or initial conditions such as distance to market economies, years of communism, Lutheran/Catholic/Orthodox influence) which explain the amount of "correct" policy effort in transition countries, and then measuring the effect of the resulting good policies on growth.

[16] Thus, they estimate each regression separately using OLS.

$$LIB_{i,t} = a + b_0 LIB_{i,t-1} + b_1 PRIN1_i + b_2 PRIN2_i + b_3 FREEDOM_{i,t} + b_4 RT_{i,t} + \varepsilon_1 \quad \text{(D-1)}$$

$$PERFORMANCE_{i,t} = z + y_0 PRIN1_i + y_1 PRIN2_i + y_2 LIB_{i,t} + y_3 LIB_{i,t-1} + y_4 RT_{i,t} + \varepsilon_2 \quad \text{(D-2)}$$

In (D-1), *LIB* is the liberalization index (a weighted average of price liberalization, trade and exchange liberalization, privatization and reform of the banking sector), *PRIN1* and *PRIN2* the two time-invariant principal component indicators for initial conditions, *RT* is a binary variable recording the presence of regional tensions such as wars and other conflicts, and *PERFORMANCE* represents economic performance captured by GDP growth and inflation.[17] In our empirical specifications, we rely on (D-1) to model structural policy reforms (equivalent to the LIB index), and partially on (D-2) to model GDP growth (GDPG).

The other group of related empirical specifications is found in Falcetti *et al.* (2002) and Merlevede (2003), who argue that growth and structural policy reforms (referred to simply as "reforms") are jointly determined and affect one another. Merlevede (2003, p. 656) estimates the following system:

$$\Delta GDP_{i,t} = \alpha_0 + \alpha_i + \alpha_1 RI_{i,t} + \alpha_2 RI_{i.t-1} + \alpha_3 \Delta RI_{i,t} D_{i,t} + \alpha_4 t + \alpha_5 t^2 + \alpha_6 tIC1_i + \alpha_7 tIC2_i + \\ + \alpha_8 STAB_{i,t} + \varepsilon_{i,t} \quad \text{(M-1)}$$

$$RI_{i,t} = \beta_0 + \beta_i + \beta_1 \Delta GDP_{i,t} + \beta_2 \Delta GDP_{i,t-1} + \beta_3 FS_{i,t} + \beta_4 tIC1_i + \beta_5 tIC2_i + \eta_{i,t} \quad \text{(M-2)}$$

In (M-1), real GDP growth (ΔGDP) is related to a constant, a country effect, a quadratic time trend, initial conditions IC1 and IC2 multiplied by a linear time trend, a stabilization variable, $STAB_{i,t}$,[18] current and lagged aggregate reform,[19] and finally a reversal variable, constructed as $\Delta RI_{i,t} D_{i,t}$.[20]

[17] De Melo *et al.* (1997b) estimate a recursive system of three equations with *LIB*, *GROWTH* and *INFLATION* as the left-hand side dependent variables.

[18] Inflation and fiscal balance are the two variables used as proxies for stabilization.

[19] Merlevede (2003) uses both structural policy reform indexes and institutional reform indexes in an aggregate reform index, *RI*, just like Radulescu *et al.* (2002). Raiser *et al.* (2001) distinguish between these two types of indicators and use structural policy reform indicators as explanatory variables for the simple average indicator of institutional reform.

[20] $\Delta RI_{i,t}$ is the change in the aggregate reform index and $\Delta RI < 0$ is defined as reform reversal. The dummy variable $D_{i,t}$ takes the value 1 if a reversal occurs and 0 otherwise.

The level of the reform index, *RI*, is specified as a function of a country's specific effect, current and lagged real GDP growth, initial conditions interacted with a time trend, and the freedom status, *FS*.[21] Merlevede's system above is closely related to the panel specification in Falcetti *et al*. (2002). If α_3 is set to zero, only one initial condition index is selected, and this initial condition index enters once by itself and once interacted with the time variable, then the Falcetti *et al.* (2002, p. 240) system is obtained[22].

4.4 Empirical Model Specifications

In our empirical specifications, following from the theoretical model, we allow output performance, institutional development and SPR to jointly determine and affect one another. The following general empirical model was first introduced in section 4.2 and is provided again below for reference purposes.

$$GDPG_{i,t} = \alpha_0 + \mu_i + \alpha_1 SPR_{i,t} + \alpha_2 SPR_{i.t-1} + \alpha_3 INST_{i,t} + \alpha_4 Time_t + \alpha_5 Time_t^2 + \\ + \alpha_6 IC_i xTime_t + \alpha_7 INFL_{i,t} + \alpha_8 RT_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$SPR_{i,t} = \beta_0 + \varphi_i + \beta_1 GDPG_{i,t} + \beta_2 GDPG_{i,t-1} + \beta_3 SPR_{i.t-1} + \beta_4 POLREF_{i,t} + \\ + \beta_5 Time_t + \beta_6 Time_t^2 + \beta_7 IC_i xTime_t + \eta_{i,t} \quad (5)$$

$$INST_{i,t} = \delta_0 + \rho_i + \delta_1 GDPG_{i,t} + \delta_2 GDPG_{i,t-1} + \delta_3 SPR + \delta_4 SPR_{i.t-1} + \delta_5 POLREF_{i,t} + \\ + \delta_6 Time_t + \delta_7 Time_t^2 + \delta_8 IC_i xTime_t + \delta_9 STAB_{i,t} + \delta_{10} GOVEXP_{i,t} + \gamma_{i,t} \quad (6)$$

The above equations constitute one set of specifications. The other set is similar to the one shown except it has GDPI instead of GDPG. Following Berg *et al.* (1999) I use GDPI, the level of output compared to the pre-transition level (GDP_{1989} or GDP_{1991} = 100%) as another variable of economic performance. Thus, we can think of the above empirical specification system as representing both sets.

[21] The freedom status is calculated as the average of the ratings of the Freedom House political liberties and civil rights indices.

[22] In the empirical specifications reported, Falcetti *et al.* (2002) use country binary variables (dummies) instead of IC_i to account for specific country effects.

While (4) could be thought as a combination of (M-1) and (D-2) adding the presence of institutions, and (5) as a combination of (D-1) and (M-2), specification (6) is based on the work of Raiser *et al.* (2001), who identifies the (6) right hand side variables as the main explanatory variables of institutional change (reform) in their model. In addition to Raiser *et al.* (2001) determinants, in (6) we allow for the presence of output/output growth and the presence of a uniform non-linear time trend.

In (4), *GDPG* stands for GDP growth, *SPR* represents structural policy reforms, *INST* represents institutional development (either institutional reform, or property rights and contract enforcement institutions), *Time* and $Time^2$ represent a quadratic time trend, *IC1* is the first principal component indicator of initial conditions indicator, representing the degree of macroeconomic and structural distortions (i.e., repressed inflation, black market exchange rate premium, trade dependency, and over-industrialization) at the beginning of the transition process. *IC1xTime* is an interaction term between the first principal component indicator of initial conditions and time, included to capture the changing effect of initial conditions on output performance over time. Either *IC1* or 24 country binary variables (to avoid the dummy trap, we should drop one dummy variable) could be used to capture the individual country effects of the 25 transition economies, as modeled by Z_i. In the presence of a fixed effects model, the direct effect of initial conditions on growth is captured by the country fixed effects. Following Falcetti *et al.* (2002) we have omitted *IC1* from the above specification and include only *IC1xTime* to measure the changing effect of initial conditions on output performance through time.

INFL represents inflation and *RT* represents regional tensions, wars and conflicts. Lastly, μ_i represents the fixed country-specific error component, treated as a constant, and $\varepsilon_{i,t}$ is the remaining disturbance (error) term.

In (4), both SPR and institutional development (including institutional reforms and property rights and contract enforcement institutions) are not exogenous to output performance. If De Melo *et al*.'s (1997b) assumptions of exogeneity of SPR to growth in the first 5 years of transition could be somehow maintained, the further each country moves away from its transition year base the more reasonable it is to assume that reforms are endogenous to growth. This is also the view that Falcetti *et al.* (2002) and Merlevede *et al.* (2003) share. Higher growth may ease resistance against structural and especially institutional reforms and increase resources available

to compensate losers from measures of liberalization or institutional reform. Thus, we take both structural policy reforms and institutional development to be endogenous to growth.

Most researchers have argued about the non-linear relationship between structural policy reforms and output growth. Greater degrees of structural policy reforms as represented by SPR are expected to have a positive overall effect on growth (De Melo *et al.*, 1997b, Berg *et al.*, 1999 and Havrylyshyn *et al.*, 2000). Earlier empirical studies have shown that reforms may have at first a negative effect on growth, known as the Schumpeter's "destruction", but after a lag, the effect becomes positive. This lagged effect increases in proportion to the accumulated stock of reforms, resembling to the Schumpeter's "creation" effect (De Melo *et al.*, 1997b). Hence, while we expect contemporaneous SPR to have a negative effect on growth ($\alpha_1 < 0$), lagged SPR is expected to have a positive effect on growth ($\alpha_2 > 0$). Other theoretical grounds supporting this expectation come from Gomulka (1992) and Kornai (1993) who argue that the output contraction in sectors experiencing a decline in relative prices is not compensated by an output increase (which takes more time) in sectors where relative prices go up. Roland and Verdier (1999) provide other micro-founded explanations of why liberalization initially leads to short-term macroeconomic contractions.[23]

The expected effect of institutional development (INST) is positive, i.e., $\alpha_3 > 0$. The channels through which a market oriented institutional framework and property rights and contract enforcement institutions affect output performance were explained broadly in Chapter 2. Summarizing, progress with competition policy, governance and enterprise restructuring, and banking reform would complement liberalization and privatization policies towards the transformation of formally planned economies into market economies. Property rights and contract enforcement institutions, on the other hand, could be viewed as measures of long-term institutional development expected to positively affect output performance as the transition process comes towards its completion for all the transition economies.

[23] Assuming markets in transition economies do not yet exist when prices are liberalized, Roland and Verdier (1999) put forward an explanation for the output fall based on a search model. According to this model liberalization policies create the freedom of the enterprises to search for new clients and suppliers. This search process involves externalities, as search by many bad clients may reduce the quality of the overall matches. Assuming relation-specific investments in the Williamsons sense, Roland and Verdier (1999) argue that investments will only take place when a new long-term partner is found. If many enterprises prefer to keep on searching for at least one more period, they will not invest while searching and as a result aggregate output may fall after liberalization due to the failure of enterprises to replace the obsolete capital in the immediate period and due to a fall in investment demand.

The effect of initial conditions on output performance over time is expected to decrease. Recalling that the more negative the value of initial conditions indicator, the better (more favorable) initial conditions are, we expect α_6>0. Moreover, although the direct effect of bad initial conditions on output performance is expected to diminish, initial conditions continue to affect output performance negatively through their impact on SPR and INST.

In general, one would expect higher inflation to have a negative impact on growth ($\alpha_7 < 0$).

Last, regional tensions, wars and conflicts (RT) are expected to negatively affect output performance ($\alpha_8 < 0$).

In (5), structural policy reforms (SPR) are determined by current and lagged output performance, lagged SPR, initial conditions and political reform (POLREF).

It is difficult to form expectations on the sign of current and lagged output performance on SPR. This will depend largely on whether transition governments will be committed to a package of structural policy reforms regardless of output performance or whether output performance surprises lead to revisions of SPR plans. It is reasonable to assume that in the beginning of transition, most transition governments were committed for political reasons as well as economic grounds to a package of structural policy reforms often under the support of the IMF. Under this assumption both current and lagged output performance will affect SPR negatively. The lower the past output performance, the higher the commitment of transition governments to implement higher levels of structural policy reforms in order to improve output performance in the future. This expectation is based on a forward looking behavior of transition governments, which places greater value on future benefits making it easier to bear any immediate cost of liberalization policies in expectation of its future benefits. Another potential outcome is that especially after structural policy reforms have been implemented for a couple of years, and their effects on output performance are made noticeable, output performance surprises might lead transition governments to revise SPR plans. Thus, we may think the better current and lagged output performance, the greater the commitment of transition governments to a set of SPR-s and the greater the tolerance on the part of the populace for higher levels of SPR-s. On the other hand, a negative output performance might also lead to a reversal in structural policy reforms. Thus, we can think of a positive effect of current and lagged output performance on SPR, especially during the recovery stage.

The hypothesis that output performance depends negatively on the level of contemporaneous SPR, but positively on the accumulated stock of SPR, also has implications for the effect of past SPR on current SPR, in the context of output smoothing behavior (De Melo *et al.* 1997b). Given this trade-off, a higher level of achieved SPR allows a larger contemporaneous SPR step for a targeted GDP growth rate. Thus, we would expect contemporaneous SPR to depend positively on the extent of past SPR ($\beta_3 > 0$).

Radical political change from autocracy to democracy may be associated with greater tolerance on the part of the population to economic hardships in the short run. Political reform can therefore support more forward-looking behavior which places greater value on future benefits making it easier to bear any immediate cost of liberalization policies or privatization. Thus, we expect $\beta_4 > 0$.

Initial conditions negatively affect SPR, while their effect on SPR over time is expected to decrease over time ($\beta_7 > 0$). Lastly, the linear and quadratic time trend is used in (5) to check for any spurious relationships.

In (6) institutional development (INST) is determined by three main categories of exogenous variables; initial conditions, demand factors and supply factors and the endogenous output performance (either GDP level or GDP growth rate). Better output performance means more resources for transition governments to allocate to institutional reform, or the building of property rights and contract enforcement institutions. We expect $\delta_1 > 0$ and $\delta_2 > 0$.

Institutions are historically specific[24] and for this reason it is necessary to be sensitive to the historical context. The inclusion of initial conditions among the causal factors of institutional reform in the transition economies reflects the possibility that history could matter a lot for institutional development trajectories followed by transition countries since the early 1990s (Raiser *et al.* 2001). The set of initial conditions used in specification (6) is the same as the one used in specifications (4) and (5). Details of the preparation of the principal component indicator for initial conditions are found in Chapter 5, section 5.2.4 of this dissertation. Of particular interest, from the set of initial conditions are geographical factors, such as location in terms of proximity to a thriving market economy (LOCAT) and natural resources (NRES). Proximity to

[24] "History matters. It matters not just because we can learn from the past, but because the present and the future are connected to the past by the continuity of a society's institutions. Today's and tomorrow's choices are shaped by the past. And the past can only be made intelligible as a story of institutional evolution. Integrating institutions into economic theory and economic history is an essential step in improving that theory and history" (North, 1990, p. vii)

the modern, democratic and business-oriented societies of the European Union could help in the process of institutional adoption through spill over effects, learning and cultural familiarity. Richness in natural resources, on the other hand, may slow down the institutional reforms, as natural resource abundance tends to diminish the perceived need for institutional reform, while vested interests gain control over the policy agenda (Raiser *et al.* 2001).

Another group of factors relates to the legacy of central planning, which may affect institutional reform primarily by shaping individual behavior. The number of years spent under central planning (YUPLAN) and a categorical variable for the degree of established national sovereignty (STATE) are among the initial conditions indicators that would affect institutional reform substantially. The STATE indicator captures the fact that new nations would need to spend considerable resources on consolidation, leaving less resources available for institutional reform.

Rather than separately measuring the effect of each category of initial conditions on institutional development, in (6) we only investigate how the effect of the overall principal component indicator of initial conditions (*IC1*) changes through time. Either *IC1* or 24 country binary variables could be used to capture the individual country effects of the 25 transition economies, as modeled by Z_i in the theoretical structural equation (3). In the presence of a fixed effects empirical specification model, such as (6), we capture the direct effect of initial conditions on institutional development by the country fixed effects. Just like in (4) and (5), we have omitted *IC1* from (6) and include only *IC1 x Time* to control for the changing effect of initial conditions on institutional development through time. Following North (1989) and (1991) and Acemoglu *et al.* 2004, we expect $\delta_8 < 0$, which means an increasing effect of initial conditions over time. (The more negative the value of initial conditions indicator, the more favorable initial conditions are).

Variables on the demand factors' side include the structural policy reforms (including liberalization and privatization) and the political reform.[25] Structural policy reforms determine institutional development, and not vice-versa. Most transition economies engaged in structural reforms either in shock therapy or gradual fashion, but in both instances institutional reforms took place after structural reforms and macro stabilization were achieved (Marangos, 2004). The

[25] The terms "demand factors" and "supply factors" come from Raiser *et al.* (2001), who identify liberalization and privatization policies, and political reform among their set of demand factors, and government expenditures and macroeconomic stabilization as representative variables of the supply factors.

dominant view among reformers and their advisors during the early transition period was that because institutions would necessarily take time to develop, it was best to focus first on liberalization and privatization. Moreover, this advice was predicated on the expectation that the creation of markets would result in some endogenous adaptation of institutions and at least make institutional reform easier further down the road (Raiser *et al.* 2001). Thus we expect $\delta_3 > 0$ and $\delta_4 > 0$. Political reform (as captured by *Polity*) is the other demand factor used to model economic institutional development. This variable represents Acemoglu *et al.*'s (2004) de jure political power which refers to power that originates from the political institutions in society.[26] The demand for economic institutions by economic actors will to some extent be determined by the political reform process. If the political institutions in a given country do not grant individuals the political rights to express their views and the civil liberties to follow new opportunities in line with their preferences, the impact of market liberalization and privatization on the demand for institutions may be fundamentally altered (Raiser *et al.* 2001). Thus, we expect $\delta_5 > 0$.

Among the supply factors for institutional reform, (6) contains two variables; *GOVEXP* and *STAB.* Institutional reform would be impossible without a state that enacts and enforces new rules and regulations. Thus, the role of the state as the "supplier" of institutional reform and its capacity to implement the necessary legal framework are of primary importance to the institutional reform. Following Popov (2000) and Raiser *et al.* (2001) the ratio of general government expenditures to GDP (*GOVEXP*) captures the time varying aspects of the state's capacity. We expect $\delta_{10} > 0$. The other variable used to measure changes in state's capacity over time is macroeconomic stability. For many transition economies, macroeconomic stabilization was the primary task at the beginning of the transition and institutional reforms only started to be considered once macroeconomic stabilization had been successfully secured. Hence, it may be argued that a state's capacity for institutional reform is higher in countries that have successfully stabilized inflation. Following Raiser *et al.* (2001) we create a macroeconomic stability variable, *STAB*, which gives the number of years for each country since transition started in which inflation rate was below 30% and budget deficit below 5%. We expect $\delta_9 > 0$.

Lastly, a non-linear time trend is included in (6) to check for any spurious relationships.

[26] See section 2.1.4 for more details.

V. Data

5.1. Methodological Issues with Transition Data

5.1.1 The Presence of an Unofficial Economy

Before discussing data trends for transition economies five issues related to data need to be mentioned. First, data on output and output growth in transition economies should be treated with caution. Statistical measurement remains poor in many cases especially when dealing with the new private sector, much of which may be operating in the informal economy (Falcetti *et al.*, 2002). Filer and Hanousek (2000) argue that if more accurate data were available, they might reveal that the severity of the transition recession was greatly exaggerated. By taking into account estimates of the size of the unofficial economy, the variation of economic performance in general and growth rates in particular tends to be reduced. The only practical alternative to using official GDP data is to use output measures based on electricity consumption as suggested by Kaufman and Kaliberda (1996). This approach seems even more problematic not only because electricity consumption data are not available for all transition countries, but because in the case of transition economies other problems arise if we try to use electricity consumption data. Studies using electricity consumption-based estimates point out two assumptions that should hold: first, these studies assume constant output elasticities of electricity consumption along time, and second, these studies involve arbitrary assumptions about the magnitude of this elasticity across countries (see for example Koen, 1995). These are implausible assumptions for transition economies undergoing fundamental structural changes, including drastic changes in relative prices, a large potential for energy savings, and substantial shifts in the structure of production (i.e., strong growth in service sectors) (Koen, 1995). However, Loungani and Sheets (1997) and Selowsky and Martin (1997) correct GDP data with electricity consumption data as suggested by Kaufman and Kaliberda (1996). After testing the sensitivity of their results regarding the determinants of output growth after such a correction, Loungani and Sheets (1997) find no significant effect. Moreover, this kind of correction does not work well for the post 1995 period when electricity consumption was falling dramatically as a result of reforms in a number

of countries. This correction leads to negative growth estimates for the unofficial economy, and as such is avoided by most authors. In this dissertation we use official GDP and GDP growth data because there are no satisfactory time series estimates for the unofficial economy beyond 1995.

5.1.2 Transition Period and Transition Recovery Stage

The data set used in this dissertation starts in 1989 for all countries, thus all regressions could be estimated over the same period for each country. However, the introduction of reforms took place at different times across countries. Hungary and Poland, for example, introduced key reforms 2 or 3 years before countries in the FSU (Marangos, 2004). Recent studies, such as Falcetti *et al.* (2002), Merlevede *et al.* (2003) prefer a definition of transition time based on the year in which the break with the past political regime occurred. For CEE countries this was the year of the democratic revolutions and the election of a new government. The transition base year is 1989 for Hungary, Poland, Bulgaria, the Czech and Slovak Republics, and Romania, 1990 for Albania and 1991 for Croatia Slovenia. The first transition year is the one following the transition year base T(0), as shown in Table 6. For the CIS and the Baltic states, most papers define the start of transition in 1991. However, given that independence was achieved only late in 1991, for most countries the true beginning of transition in CIS is considered 1992, and thus we consider T(1) to be the year 1992 for the CIS economies.

The transition period from 1989 to 2003 is long enough to allow for a separation in two sub-periods, namely the decline stage and the recovery stage. During the decline stage almost all GDP growth rates observed were negative. In this dissertation, the recovery stage dataset contains series of observations for each transition economy, where positive GDP growth rates were registered for at least the first two years. This definition of recovery stage only requires the positive GDP growth rates to be maintained for the first two consecutive years. Negative growth rates may occur thereafter. The negative growth rates that occurred in the beginning of transition were due to factors explained in Kornai (1994) and Blanchard (1997) and described in Chapter 1, (section 1.1). Institutional reform, on the other hand, was not implemented until after these countries had stabilized inflation, kept budget deficits under some control, and liberalized prices and trade. Moreover, because of the very nature of institutions, it takes time for institutional

change to take place and in turn affect economic performance. Thus, it might be inappropriate to measure the effect of institutional reforms and even more so the effect of property rights and contract enforcement institutions on output growth, considering the whole transition period. Instead, it makes more sense to investigate whether institutional reforms and property rights and contract enforcement institutions have any important effect on output performance using only the transition recovery stage data. The length of the recovery stage differs across transition economies. Moreover, for countries like Albania, Bulgaria and Romania that have experienced growth reversals, negative growth rates were observed during the recovery stage for two or more consecutive years (from 1995-1998), while for other transition countries, negative growth rates have typically been recorded only for a year, followed by positive rates for the rest of the recovery stage. Hence, even in the recovery stage, negative growth rates were observed, but their nature is different from the nature of negative growth rates observed during the decline stage. Under the decline stage institutional reform was in an embryonic state, while property rights and contract enforcement institutions were almost nonexistent.

5.2 Data Trends

The data used in this dissertation are gathered or compiled from a number of sources. Detailed data definitions are provided in the Appendix, while data sources, data coverage and summary statistics are provided in Table 1.

5.2.1 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 2, 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 stopped the decline in output. Other countries like Romania, Bulgaria, Albania and Croatia experienced a premature burst of growth suffering a reversal in later years, followed by prospects of positive growth. Moreover, growth recovery is just very recent. Only by 1995 had half of the 25 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, Czech Republic and Estonia, would converge in around 20-25 years.

5.2.2 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. In CEE, inflation reached its peak in 1992 and low rates of inflation were established by 1994. In CIS, 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 CIS 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 CIS countries reached inflation levels below 45% in 1999.

5.2.3 Structural Policy Reforms

There are remarkably wide differences among transition economies in the pace and extent of structural policy reforms. 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. Also, foreign trade and access to foreign exchange have 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) have received most of the credit in building a structural policy reform index that they labeled "liberalization index," which can be compiled from EBRD indicators for every following year after their calculations, by assigning them specific weights. The original liberalization index created by De Melo *et al.* (1997) was 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, and (3) privatization of small-scale and large-scale enterprises and banking reform. EBRD publishes annual indices of structural policy reform and institutional reform grouped in eight categories: price liberalization, trade and foreign exchange system liberalization, small-scale privatization and large-scale privatization, competition policy, governance and enterprise restructuring banking reform and interest rate liberalization and securities markets and non-bank financial institutions liberalization. Later studies have distinguished between the first four indices listed above and the last four.[27] In this dissertation

[27] See for example Raiser *et al*. (2001)

we use a simple average of price liberalization, trade and foreign exchange system liberalization, small-scale privatization to create the indicator of narrow structural policy reforms (SPR Narrow), and a simple average of all the above and large-scale privatization to create the indicator of broad structural policy reforms (SPR Broad). Each of the four indices mentioned above takes values between 1 implying little progress and 4.3 implying standards and performance typical of advanced market economies. Table 4 reports the value of each of the indices used to compile SPR for year 2003 and for year 1991, the first year in which they were reported by EBRD, revealing considerable differences in structural policy reform, since transition started.

5.2.4 Initial Conditions

The transition economies started the transition process under different circumstances. Substantial differences include differences in the initial level of development, macroeconomic distortions, integration into the trading system of the socialist countries and extent of prior reforms (De Melo *et al.* 1997b). While in Eastern Europe, the beginning of the transition process followed the peaceful political revolutions in 1989, for the CIS republics, the collapse of the Soviet Union in 1991 was the defining political and economic event, as a result of which these countries gained their independence and began their transition to market economies.

Table 6 presents the transition base year for all CEE and FSU. According to De Melo and Gelb (1996), transition year base for CEE was 1989, for Albania 1990 and for the FSU including the Baltics 1991. We could consider the transition year base as another important difference in initial conditions among CEE and CIS economies.

Table 7 summarizes the set of initial conditions for transition economies, as it was originally given by de Melo *et. al*. (1997b) and used by most other authors. Table 7 presents indicators for initial levels of development like per capita income levels (INC), measured in 1989 US$ but reflecting purchasing power parity incomes in the base year, and urbanization (URB) as a proxy for level of development, with lower income countries being on average more rural. Industrialization (IND) is another indicator of development. Over-industrialization or the industrial distortion (INDO), as defined by the difference between the actual share of industry in GDP and the share predicted by the regression analysis in Chenery and Syrquin (1989) given

from PIND, was common in socialist countries. According to De Melo *et al.* (1997b), industrial shares were often high because, trade financial services and business and consumer services were typically repressed in socialist countries. The resource indicator (NRESD) considered encompasses the richness of natural and energy resources characterized by poor (1), moderate (2) and rich (3). Location (LOCAT) is defined as geographical proximity to thriving market economies, and is considered to be especially important during transition because it facilitates the import of market institutions and the adjustment of trade patterns. In this context, countries from Central Europe and the Baltics may have benefited from better access to Western markets as well as stronger incentives to adopt the institutional framework of the European Union because of prospective membership. At the other end of the spectrum are the remote and landlocked countries from Central Asia and the Tran Caucasus, with essential connections routed through Russia. A binary variable is used to indicate whether a country has a thriving market economy as a neighbor or not. The AVGR indicator in Table 7 presents prior economic growth rates in CEE and FSU during the second half of the 1980s, which were mostly positive. Growth tended to be higher in the poor economies (Moldova, Kyrgyzstan and Turkmenistan). This indicator is included to capture the ranking of the socialist economies along the different stages of the process of socialist accumulation (De Melo *et al.,* 1997b). The more mature economies were experiencing stagnation, if not declining growth, whereas poor countries were still benefiting from higher growth. Other variables that table 7 summarizes reflect initial economic distortions and institutional characteristics. Open inflation was chronic only in Poland and Yugoslav Republics in 1989, but repressed inflation (REPINFL), in the form of a monetary overhang, was high in most of the CEE and FSU (De Melo *et al.,* 1997b). The indicator of repressed inflation used is computed as the increase in deflated wages less the change in real GDP from 1987 through 1990. Repressed inflation was high in Bulgaria, Romania and Poland but the highest was in FSU republics. Trade share in GDP (TDEP) is another indicator of macroeconomic distortion. These shares were high for most CEE and FSU countries and trade flows were concentrated within the CMEA area, while trade outside this area was very small (De Melo *et al.* 1997b). The breakdown of CMEA and the collapse of the USSR caused tremendous disruptions in the international trade and payments of these countries. The CEE countries were less dependent on CMEA than the FSU countries, and therefore suffered less from these disruptions (De Melo *et al.* 1997b). Another measure of economic distortions is the black market

exchange rate premium (BLMKT). A high black market exchange rate premium is an indicator of expectations of depreciation. A high difference between the official and the free exchange rate can also be interpreted as a distortionary tax on exports and subsidy on imports (De Melo *et al.* 1997b). It stimulates the diversion of resources from the official to the informal sector, a process, which is often associated with consumption of real resources in directly unproductive activities. Black market premium was especially high in FSU, Bulgaria and Romania and relatively modest in countries that had some previous experience with reforms like Hungary and the former Yugoslav republics of Croatia, Slovenia and Macedonia (De Melo *et al.*, 1997b).

Table 7 includes two other variables reflecting initial institutional characteristics. STATE is a categorical variable differentiating among countries that were independent states prior to 1989, those that were members of decentralized states, like the former Yugoslav republics or core countries of centralized federal states like Russia, and the newly born FSU states. This variable takes values from 0 to 2 with 0 representing the newly born states and 2 those who were independent prior to 1989. The need to differentiate between the second and third groups described above follows from the difference in national political institutions between the non-Baltic FSU republics which were territories in a highly centralized political union and the new nation states arising from the former Yugoslavia and former Czechoslovakia. The last ones were not faced with the same problems, because the federal systems in these countries gave substantial powers and responsibilities to the constituent republics (De Melo *et al*,. 1997b). Moreover, the historical ties and political affiliation of CEE countries with Western Europe have given them a sense of direction that was lacking to the newly born states of FSU. The other institutional variable, years under central planning (YUPLAN), captures in fact the so called “market memory”. In particular, the lack of familiarity of the non-Baltic FSU economies with market institutions is associated with their longer period under central planning. De Melo *et al.* (1997b) argue that it is likely for market memory to have an important influence on the reform process, particularly on the ability of societies to deal with the disequilibria of the transition. The decision of the Baltic countries to leave the ruble zone quickly illustrates this argument very well. Last, the importance of market memory for transition economies could be further emphasized if we view the transition process, mainly as a process of large scale institutional change, which is the approach used in this dissertation.

The eleven initial condition variables can be used individually in regression equations,

but the interpretation of any individual coefficient is only meaningful when everything else is held constant. On the other side, the previously described initial conditions often are related to each other and exert their effect jointly, so that if we try to include them individually in a regression analysis, our estimation coefficients will be biased because of the omitted variables problem. If we would try to use all the eleven initial conditions (ICs) together in the same regression, then the correlations that exist among some of them makes the estimation impossible. The principal component analysis helps to address the above two problems. First it reduces the dimensionality of the ICs and second, it deals with the multicollinearity problem present in the eleven indicators of initial conditions.

Table 7.1 shows the correlations among all of the ICs. High positive correlations exist between INC and URB, REPINF and BLKMAR, REPINF and TRADEP, REPINF and YUPLAN (MARMEM), BLKMAR and TRADEP, BLKMAR and YUPLAN. High negative correlations exist between BLKMAR and STATE, TRADEP and STATE and some significant negative correlation between YUPLAN and STATE.

Table 7.2 shows the proportion of the overall variability of eleven ICs explained by each principal component as well as the cumulative proportion. There exist several possible criteria which determine elimination rules for the latter principal components (Dunteman, 1989). One criterion is that the cumulative proportion of variance explained is above a threshold level, usually set to 70%. INPC1 and INPC2 together explain 65 per cent of the total variability of initial conditions. Given this relatively high overall total variability explained and constrained by a limited number of observations available for this study, we can focus only on INPC1 and INPC2 for the rest of the analysis. Table 7.3 shows the correlations of INPC1 and INPC2 with the eleven ICs. INPC1 has high positive correlations with macroeconomic distortions (TRADEP, REPINF, BLKMAR) and YUPLAN (MARMEM). Therefore INPC1 can be interpreted as an index of the degree of macroeconomic distortions at the beginning of transition and a measure of unfamiliarity with market processes. On the other hand, the correlations of INPC1 with STATE, LOCAT and INDO (industrial overhang) are negative. Most transition countries reached diminishing returns to investment before transition began, because of structural distortions reflected in over-industrialization. (De Melo *et al.* 1997b) Thus, we can think of over-industrialization, also known as the socialist development overhang, as another type of structural distortion that transition economies were faced with at the start of transition. This typical

distortion for transition economies is captured to some degree from INPC1, with a correlation between INDO and INPC1 of -0.45. INPC2 has a negative correlation of -0.34 with INDO as well, but the principal component that would best capture the over-industrialization distortion is clearly INPC4 with a correlation of -0.74. Moreover, INPC4 has very low correlations with the rest of initial conditions except LOCAT, which is not the case for either INPC1 or INPC2, making this way difficult the interpretation of INPC1 or INPC2 in the presence of INDO. An alternative to this interpretation challenge would be to not include INDO in the set of 11 initial conditions, which is then used to draw the principal component indicators, but rather use INDO as a separate initial conditions indicator, together with the other resulting INPC1 and INPC2.

Summarizing, countries with higher scores on trade dependence, black market exchange rate premium, repressed inflation and market memory, and with lower values for STATE, LOCAT, and INDO will tend to have higher values for INPC1. Indeed, all of the non-Baltic FSU countries have values for INPC1 in the range of 0.09 (Russia) to 0.55 (Uzbekistan) as shown in Table 4.6, and Figure 2.

INPC2 has high negative correlations with per capita income (INC) and urbanization (URBAN), and a lower negative correlation with over-industrialization (INDO). INPC2 might be interpreted as an index of the overall level of development. Countries with higher initial per capita income, higher urbanization rates, and over-industrialization, will tend to have lower values for INPC2. This is true for Poland and Hungary, both developed and over-industrialized socialist economies prior to year 1989, and especially Slovenia, Czech and Slovak Republics, Russia, Belarus and Ukraine, Estonia and Latvia, Lithuania and Armenia.

INPC1 and INPC2 can be thought of as two measures of initial conditions grouping the transition economies along the two dimensions of macroeconomic distortions and general level of development, including over-industrialization. While the non-Baltic FSU countries had high values for macroeconomic distortions, some of the CEE had high values for general level of development and over-industrialization. Table 7.4 lists values of INPC1 and INPC2 for the 25 transition economies at the beginning of transition, calculated using principal component analysis, and compares them to the EBRD staff calculations (see EBRD Transition Report 1999, Box 2.1) used in Falcetti *et al.* (2002). Given that among the INPC1 and INPC2, INPC1 captures both the dimensions of macroeconomic distortions and over-industrialization distortions present in the set of initial conditions we can refer to INPC1 as the most representative principal

component indicator of initial conditions.

Angjellari (2002) and EBRD's staff calculations of principal component indicators of initial conditions in Table 7.4 are highly correlated. The correlation coefficient between INPC1 and IC1 is 0.97, while the correlation coefficient between INPC2 and IC2 is -0.92. Moreover IC1 explains almost 50% of the total variance of the set of initial conditions given in De Melo *et al.* (1997b), while INPC1 explains only 46% of the total variation. Given the additional total variability explained by IC1 (compared to INPC1) and for comparative purposes with previous studies, the empirical specifications of this dissertation use the EBRD's staff calculations, IC1, following the Falcetti *et al.* (2002) claim that using only IC1 will suffice in significantly capturing the dimensionality of the set of eleven initial conditions to influence output growth and structural policy reforms.[28]

Using the two principal components for initial conditions INPC1 and INPC2, we can plot the 25 transition economies in the two-dimensional space as shown in Figure 2. The first quadrant has positive values for both INPC1 and INPC2, thus including those FSU countries that at the beginning of transition had high macroeconomic distortions and lower general level of development. According to the interpretations provided above, high (positive) values of INPC1 correspond to "bad" initial conditions. High values imply high distortions, and low (negative) values represent low distortions.

On the other hand, higher values of INPC2, correspond to lower levels of per capita income and urbanization (unfavorable initial conditions) and lower levels of industrial overhang (favorable initial conditions). In the second quadrant is placed the other group of FSU countries, together with the Baltic countries, differing from the countries positioned in the first quadrant, by having negative values for INPC2, which means higher levels of per capita income and urbanization, but also more industrial overhang. In the fourth quadrant we find the CEE economies characterized by smaller macroeconomic distortions (negative INPC1) when compared to countries in the first and second quadrants. The third quadrant includes the Czech and Slovak Republics and Slovenia, countries that differ from the fourth quadrant countries by having higher general levels of development, especially when compared to Albania, Romania and Macedonia.

[28] Falcetti *et al.* (2002) compute the simple cross-sectional correlations between the second principal component on the one hand, and output growth and structural policy reforms on the other, and found that both were statistically insignificant at the 10% level, with correlation coefficients of -0.22 and 0.11, respectively.

Summarizing, the first quadrant economies at the beginning of transition had the worst initial conditions, characterized from both macroeconomic distortions and lower general level of development. The third quadrant economies had the best initial conditions, with lesser macroeconomic distortions and greater general level of development. Countries like Hungary, Poland Croatia and Bulgaria also had very good initial conditions compared to the rest of transition economies. Figure 2 illustrates the positions that transition economies were holding at the beginning of the 'transition race', as they were carrying over their macroeconomic and socialist industrial overhang distortions. At the beginning of transition, Belarus and Turkmenistan were placed in the 'back stage' or on the very last spot. Most of the CIS economies can be thought of as in pretty much the same starting position, with the exception of maybe Russia and Estonia as being positioned somehow better. At the beginning of the 'transition race' the CIS economies are so far away from the CEE economies, as if their geographical distance together with their late calendar transition year (1991 as opposed to 1989) had already predetermined their starting spots. Among the CEE countries, Bulgaria, Romania, Albania and Macedonia are the ones holding less favorable spots. The 'front runners' at the beginning of transition seem to be Czech and Slovak Republics, Slovenia, Hungary, Poland and Croatia. Comparing the latest economic performance (in terms of GDPG and GDPI) of the transition economies, it is sparkling to see that the transition race results in year 2003, place Hungary and Czech Republic among the front runners, the same as they were in 1989, which is a clear indication that initial conditions do matter for GDP growth performance. But, if we look at the economic performance of the Baltic countries throughout the 12 years of transition, we would agree that this performance definitely does not match the initial conditions position, the Baltic countries were holding in 1991. This is an indication that there are other factors influencing the economic performance of transition countries in general (such as SPR, institutional development, and macroeconomic stabilization) and accelerating the speed of the Baltic transition in particular.

5.2.5 Institutional Indicators

Before discussing the set of institutional indicators used in this dissertation, it is important to realize that finding or compiling such indexes from available sources is a daunting

task. Glaser *et al.* (2004) particularly addresses the problems related to the quality and potential subjectivity, present in most of the institutional indicators used to establish the effect of political institutions on long-run economic growth. Havrylyshyn *et al.* (2000) also point out at the potential subjectivity of the institutional indices used in their study. But, the high correlations between institutional indices compiled by different agencies yield some assurance that they cannot all be subjective. Partly for this reason, Havrylyshyn *et al.* (2000) use principal component analysis to compile principal component indicators of institutional development. While the advantages of this approach stand in that it addresses both the dimensionality and the correlations of a potentially large number of institutional indicators, as well as it eliminates some of the subjectivity concerns, the interpretation of principal components is not always clear cut. Moreover, it is more important to separately measure the effect of each category of institutions on economic performance, than to measure the overall effect of an institutional principal component when it comes to policy recommendations. A principal component approach was chosen in Angjellari (2002) to measure the effect of two institutional principal components on output growth in transition economies from 1989 to 2000.

The first category of institutional development used is the institutional reform measured by European Bank for Reconstruction and Development (EBRD) indices of institutional reform (INSTREF). The second category is property rights and contract enforcement institutions. Two proxies are used to measure this category of institutions. The first one is a compiled indicator of contract intensive money, defined by Clague *et al.* (1997) as the ratio of non-currency money to the total money supply. The higher this ratio, the more favorable the contract enforcement and property rights institutions are judged to be. This index is compiled using the data available from the IMF CD-RAM 2004 for 19 transition countries and is labeled PCINST. We also use the International Risk Country Guide (ICRG) political risk indicator *rule of law* (ROLINST) as a proxy for property rights and contract enforcement institutions.

5.2.5.1 EBRD Indicators of Institutional Reform

The first group of institutional indicators considered in this dissertation is an average indicator of the EBRD institutional reform indices. Apart from the four institutional reform indices that EBRD has constructed for transition economies, there exist two other ones, the

overall legal effectiveness and overall legal extensiveness, which we did not use because of lack of sufficient data.[29] There exists a distinction between these five dimensions of institutional performance and the indicators of structural reform, presented by market and trade liberalization, and small scale and large scale privatization. The distinction arises from the fact that while in all of the five institutional dimensions, new rules need to be created and credibly enforced by the state, market and trade liberalization and privatization of a state's assets require predominantly that the state relinquish control (Raiser *et al.,* 2001).We use a simple average of competition policy, governance and enterprise restructuring banking reform and interest rate liberalization and securities markets and non-bank financial institutions liberalization to compile the institutional reform index (INST). We can think of this indicator as capturing the extent of a market-friendly institutional framework creation for the 25 transition countries. Each of the four indices used to compute INST takes values between 1, implying little progress, and 4.3, implying standards and performance typical of advanced market economies. Table 5 reports the value of each of the indices used to compile the institutional reform indicator for 2003 and for 1991.

5.2.5.2 Property Rights and Contract Enforcement Institutions: Contract-Intensive Money (PCINST)

Clague *et al.* (1997a) are among the first authors that use contract-intensive money to measure the effect of institutional quality on investments and per capita income growth in a cross-country regression analysis. The reason for using such a measure stands in the belief that the same property rights and contract enforcement institutions that support complex and non-self-enforcing transactions also influence the form in which people hold their assets. In societies where an unstable legal and policy environment makes it sensible to conceal one's activities and assets from the government, people will make extensive use of currency to carry out their transactions. Currency is frequently less convenient than checks, credit cards, or other formal means of payment, but the risks of government confiscation or taxation can easily outweigh

[29] While for the first four institutional measures data availability ranges from 1991 – 2003, data for the two legal indicators are available only from 1997-2001 for most transition economies, except Kyrgyzstan, with data coverage from 1997-2000, Turkmenistan with only the 2001 observation, and Tajikistan with the 1998, 2001 and 2001 observations.

these considerations. Moreover, if formal contracts are of little advantage because they cannot be reliably enforced in court, or are avoided because they leave written records of transactions that one wishes to conceal from the government, then currency becomes more attractive because it completes the concealment of the transaction. People may also prefer to hold assets in the form of currency rather than financial claims because they lack confidence in the integrity of banks or other issuers of financial claims or because they doubt the government's competence in the prudential regulation of financial institutions (Clague *et al.*, 1997a). On the other hand, in societies with secure property rights and contract enforcement, people have little reason to either use or maintain currency for large transactions. In such a case, "they prefer that transactions be formally recorded in case there is a dispute to be resolved, and they are relieved of the inconvenience and danger of dealing in large amounts of currency." (Clague *et al.*, 1997a, p. 70). Such a discussion motivates the finding of measures that capture how conducive the institutional environment is for contract intensive activity. Clague *et al.* (1997a, 1997b) use the contract-intensive money ratio, or CIM, as a measure of the state of contract compliance and security of property rights in a country. The Clague *et al.* (1997a) line of reasoning, presented above, suggests that this ratio is a reflection of the state of both contract enforcement and property rights institutions in a society. This variable is defined as the ratio of non-currency money to the total money supply, or $(M_2 - C)/M_2$, where M_2 is a broad definition of the money supply and C is currency held outside banks. The numerator of this ratio consists of financial assets such as checking accounts, time deposits, and other financial claims on financial institutions, while the denominator is the sum of these assets and currency holdings. The higher this ratio, the more favorable these contract enforcement and property rights institutions are judged to be. [30]

5.2.5.3 Property Rights and Contract Enforcement Institutions: Political Risk Indicators (ROLINST)

The third group of institutional indicators used also falls under the property rights and contract enforcement institutions. Knack and Keefer (1995) were among the first authors to use

[30] "The CIM measure may be confused with measures of financial development, but it is quite distinct. A country may have a simple financial system, with the bulk of financial assets in the form of savings deposits and without a stock market or other manifestations of a modern financial system, and yet have a high CIM ratio. Finland, Iceland and Botswana are examples of such countries. The simple correlation of CIM with M2/GDP (a common measure of financial development) is only 0.44 in our sample of countries" (Clague *et al.*, 1997a, p. 71)

institutional indicators obtained from two private international investment risk services, International Country Risk Guide (ICRG) and Business Environmental Risk Intelligence (BERI). While these companies publish cross-country ratings for investor risk, the virtue of these two sources is the detailed ratings provided for large samples on various dimensions of investment climate that are closely related to those institutions emphasized by North (1990) and Olson (1996) (Knack and Keefer, 1995). We can interpret the ICRG variable *rule of law* as a proxy for the security of property rights and contract enforcement (Knack and Keefer, 1995). "If countries score low on these dimensions, they are likely to suffer a reduction in the quantity and efficiency of physical and perhaps even human capital investment. As the probability increases that an investor will lose the proceeds from the investment, or even the original investment itself, investors reduce their investment and channel their resources to activities that are more secure from the threat of expropriation, although they may be less profitable." (Knack and Keefer, 1995, p. 210).

5.2.6 Political Reform

Political reform has been modeled by most researchers as a determinant of structural policy reforms (see for example De Melo *et al.* 1997b). Freedom House indexes of political freedom and civil liberties, combined together, have been used as a proxy for political freedom and political reform. While political freedom itself could be used as a proxy for political reform, we use *Polity*, a variable that captures changes in the political reform more in depth than indexes political freedom, as a proxy for political reform and a determinant of both *SPR* and institutional development. This variable captures Acemoglu *et al.*'s (2004*) de jure* political power, which refers to power that originates from the political institutions in society.[31]

Polity IV is a dataset that includes constructed annual measures for both institutionalized democracy (DEMOC) and autocracy (AUTOC), as many polities exhibit mixed qualities of both of these distinct authority patterns. Table 8 contains transition countries' data for polity. Acemoglu *et al.* (2003b) and (2004) use the Polity IV dataset to investigate the relationship between political power, institutions and income levels. The Polity IV measures are composite indices derived from the coded values of authority characteristic component variables. (See the

[31] See section 2.1.4. for more details.

2004 Polity IV Project manual for a detailed description of how the polity score is derived). Polity is derived by subtracting the autocracy value from the democracy, thus providing a single regime score that ranges from +10 (full democracy) to -10 (full autocracy).

VI. Empirical Estimation Results

6.1 Estimation Results for the Whole Transition Period

6.1.1 Fixed Effects Estimation Results for the GDP Growth Equation

Table 11 presents the estimation results when the single equation fixed effects estimator is used to estimate the GDP growth equation in (4). The reason for estimating this equation separately from (5) and (6) is to see whether there is a need for other estimation techniques, such as the two stages least squares (2SLS) and the three stages least squares (3SLS). Table 11 presents estimation results for the four empirical specifications FE(1) through FE(4). Depending on whether the broad definition of structural policy reforms (SPR), or the narrow one were used, two groups of empirical models were estimated. FE(1) and FE(2) use the broad definition of SPR, while FE(3) and FE(4) use the narrow definition. Moreover what distinguishes FE(1) from FE(2) and FE(3) from FE(4) is the presence of the uniform non-liner time trend (*Time* and *Time Squared*). The SPR Broad coefficient is positive while the SPR Narrow coefficient is negative, but in both cases coefficients are statistically insignificant. As expected, Lagged SPR Broad and Lagged SPR Narrow are positive and significant, indicating that structural policy reforms do bring positive growth rates after a one year lag.

Empirical specifications FE(2) and FE(4) control for a non-linear time pattern. Time and Time Squared are significant and their inclusion reduces the positive effect of Lagged SPR (under both narrow and broad definitions) on GDP growth. This is in line with Falcetti *et al*. (2002) findings. The Time coefficient is positive and the time squared coefficient is negative, indicating steeper growth at the beginning of transition followed by a slowdown towards the later period. This also is in line with Hernandez-Cata (1997), who introduces a similar non-linear time trend to capture the falling productivity of the inherited capital stock. Thus we could interpret this decreasing trend both as the decreasing role of SPR on growth and as the falling productivity of the inherited capital stock.

The regional tension dummy that accounts for the disruptions of economic activity caused by regional tensions has a negative sign as expected but its statistical significance is confirmed only under FE(3) and FE(4).

Initial conditions appear as interacted with Time in the four empirical specifications of Table 11. There are two approaches to account for country specific characteristics. The first one is to use the index of initial conditions and the second one is to use country fixed effects (country dummies).[32] The preferred specification in this dissertation is to use the second approach, and include *Initial Conditions x Time* to investigate whether the impact of differences in initial conditions is declining over time. The positive coefficient on the interaction between initial conditions and time shows that countries with weak initial conditions, i.e., high values of initial conditions, have their recovery later and are now catching up. Thus we can say that the effect of initial conditions on GDP growth is declining over time. This is in line with the findings of most researchers (see for example De Melo *et al*., 1997b, and Berg *et al*.,1999)

The coefficient of inflation is negative as expected but statistically insignificant in all the reported specifications of Table 11.

The coefficient of institutional reform is positive but insignificant in FE(1) and FE(3), but contrary to our expectations is negative (and significant at the 10% level) in FE(2) and FE(4). Keeping in mind that growth rates were negative in the first 3 years for the CEE economies and in the first 6 to seven years for the CIS economies, these results, more than anything, could indicate the need for a separation of the decline stage of transition from the recovery one. Estimations of the recovery stage are presented in sections 6.2.1 through 6.4.4 of this chapter. Indeed these estimations show a positive effect of institutional reform and property rights and contract enforcement institutions on GDP growth.

6.1.2 Fixed Effects Estimation Results for the GDPI Equation

Table 12 contains single equation estimations using the fixed effects estimator with GDPI as the dependant variable. The SPR (under both definitions) coefficient is negative as expected, while the Lagged SPR coefficient is positive, except in FE(8), but statistically insignificant in the four specifications of Table 12. Only in FE(5) this coefficient is significant at 10% level. The

[32] Country effects are not reported, but are available

coefficient of institutional reform is positive and significant in all the specifications reported. When the time trend is introduced, the magnitude of the institutional reform coefficient decreases significantly as does the magnitude of the (negative) SPR coefficient. If we were to combine the effects of institutional reform and SPR on GDPI, we would notice that the institutional reform gains outweigh SPR losses in terms of GDP levels, yielding a net effect close to zero, and that without institutional reforms, structural policy reforms alone cannot bring positive effects on output.

The Time coefficient is negative and significant, while the Time Squared coefficient is positive and significant. This increasing time trend indicates that on average, output levels in transition initially declined and later kept increasing more than the observed decline. The significant effect of this time trend on GDPI is an indication that there exist other underlying factors accounting for GDPI path not captured by the variables included in the four specifications of Table 12, that are correlated with the time pattern introduced. Domestic investment together with foreign direct investment in physical and human capital could be thought of as potential variables correlated with this time trend.

The regional tension dummy has a negative sign as expected and is statistically significant.

The negative coefficient on the interaction between initial conditions and time shows that countries with weak initial conditions, i.e., high values of initial conditions, are doing more poorly than countries with better initial conditions in terms of reaching pre-transition levels. There seems to be a divergence over time in GDP levels across transition countries with different initial conditions.

The coefficient of inflation is negative, but statistically insignificant in the four specifications reported.

6.1.3 Three Stage Least Squares Estimation Results for the GDPG, SPR and Institutional Reform (INSTREF) Equations

Table 13 shows the estimation results for the three equations (4), (5) and (6) estimated jointly using a three stage least square (3SLS) procedure in the presence of a Seemingly Unrelated Regressions (SUR) methodology that improves the estimation efficiency when the

error terms of the three equations are correlated. Four 3SLS models are reported. 3SLS(1) and 3SLS(2) use the broad definition of SPR while 3SLS(3) and 3SLS(4) use the narrow definition. 3SLS(1) and 3SLS(3) use only current GDP growth as an independent variable for the SPR and institutional reform equations, while 3SLS(2) and 3SLS(4) use the current and lagged GDP growth. By looking at the estimation results for the GDPG equation it can be noticed that 3SLS(1) corrects the sign of SPR Broad to negative as expected, but the SPR coefficient is statistically insignificant. Moreover, the magnitude of the Lagged SPR Broad coefficient is smaller compared to the one obtained in the corresponding single equation specifications FE(1) and FE(2) of Table 11. This is in line with Falcetti *et al.* (2002) warning that the presence of endogeneity, causes the Lagged SPR coefficient to be upward biased in single equation specifications.

The institutional reform coefficient is negative, contrary to our expectations. We interpret this result as an indication that the whole transition period dataset is inappropriate for measuring the effect of the institutional reform on GDP growth. [33]

The uniform non-liner time trend was added to all four GDP growth equations. The Time coefficient is positive and the Time squared coefficient is negative, just like in the single equation case, indicating steeper growth at the beginning of transition followed by a slowdown towards the later period.

By looking at the estimations for the SPR equation, a couple of striking results emerge. Both the GDP growth coefficient and the Lagged GDP growth coefficient are negative in all the four reported specifications. These estimation results point at a statistically significant negative effect of lagged GDPG on SPR, while the negative contemporaneous effect of GDPG is statistically significant at the 5% level only in 3SLS(3). An interpretation for the negative relationship between SPR and lagged GDP growth could be that the lower past GDP growth rates, the higher the commitment of transition governments to implement higher levels of structural policy reforms. Or put it differently, the higher the cost of non-reforming in terms of GDP growth, the higher the incentives of governments to commit to structural policy reforms to bring positive growth. On the other hand, the higher GDP growth in the past year, the lower the incentives of governments to commit to more structural policy reforms, which are well known for their immediate negative effect on output growth rates.

[33] See Chapter 5, section 5.1.2, for more details.

The most important determinants of SPR seem to be Lagged SPR and polity. Lagged SPR and polity positively affect current SPR even at the 1% significance level. This is in line with De Melo *et al.* (1997b). These findings indicate that commitments to structural policy reforms on average have been steady. Political reform, on the other hand, seems to determine the remaining component of the variation in the current year's level of structural reforms that transition governments have decided to commit to. An increase in the polity index, which implies a movement from the autocracy extreme towards the democracy extreme of the polity spectrum, positively impacts current SPR. The more democratic and multiparty composed the transition governments become, the more they are willing to commit to structural policy reforms.

The third equation estimated in Table 13 is that of institutional reform. In models 3SLS(2) and 3SLS(4) where lagged GDP growth rates are included, the contemporaneous GDPG coefficient is negative, while the lagged GDPG coefficient is positive, but statistically insignificant. The positive Lagged GDPG coefficient in the INSTREF equation could be interpreted as positive association of past GDP growth rates with higher commitments of transition governments to implement institutional reforms. This result is intuitive as higher past GDP growth rates, mean more resources available for institutional reforms. Comparing this effect with the effect of lagged GDPG on the SPR, an interesting finding emerges regarding the different ways past GDP growth rates affect structural policy reforms and institutional reforms. While SPR can be thought of as short-run policies, institutional reforms are long-run commitments.

SPR and Lagged SPR positively affect institutional reform. This is in line with World Bank's hypothesis, and could be regarded as empirical evidence that SPR do affect institutional reform positively as expected. The World Bank's hypothesis elaborated in (Raiser *et al*., 2001) states that structural policy reforms, including price and trade liberalization and privatization would lead to the creation of markets, which would then result in some endogenous adaptation of institutions. Moreover, the successful implementation of SPR was thought of as making the institutional reform easier further down the road (Raiser *et al*. 2001). The empirical evidence from this study leads us to believe that as considerably high levels of SPR accumulate, this determines a series of incentives for sound institutional reform building.

The significant negative coefficient of the interaction term between initial conditions and time indicates divergence over time in institutional reform levels across transition countries with

different initial conditions. This is in line with North's (1990) and Acemoglu's *et al.* (2004) approaches of the historic context of institutional building.

Macroeconomic stability (STAB) and government expenses (GOVEXP), the factors determining institutional reform supply, positively affect institutional reform as expected.

Last, the polity coefficient is negative in all four empirical specifications, contrary to our expectations.

6.1.4. Three Stage Least Squares Estimation Results for the GDPI, SPR and Institutional Reform Equations

Table 14 differs from Table 13 in one of the dependent endogenous variables used. In Table 14 this dependent variable is GDPI, instead of GDPG used in Table 13. When compared to Table 12, the first part of Table 14, covering estimations of the GDPI equation, offers the following results. The negative effect of SPR on GDPI is greater than in Table 12, followed also by a greater positive effect of institutional reform on GDPI. The net effect of SPR and institutional reforms on GDPI is positive when the system of equations is estimated jointly, as compared to the close-to-zero net effect in FE(6) and FE(8) in Table 12.

The second part of Table 14 covers estimations for the SPR regression. Current GDPI negatively affects institutional reform, while the Lagged GDPI coefficient is positive, but insignificant. Lagged SPR and polity remain the most important determinants of SPR.

The third part of Table 14 covers estimations for the institutional reform regression. Current GDPI is positively affecting institutional reform, while the Lagged GDPI coefficient is positive, but insignificant. Thus, current GDPI seems to be an important determinant of both SPR and institutional reform, supporting the assumption of endogeneity of SPR and institutional reforms to GDP level. SPR and Lagged SPR continue to positively impact institutional reform in all the specifications reported in Table 14, supporting the World Bank's hypothesis.

Macroeconomic stability and government expenses positively affect institutional reform as expected.

Last, the polity coefficient is negative in specifications 3SLS(5) and 3SLS(5) and positive in 3SLS(5) and 3SLS(5), but statistically insignificant in either case.

6.2 Estimation Results for the Transition Recovery Stage Using INSTREF as a Measure of Institutional Development

6.2.1 Fixed Effects Estimation Results for the GDPG Equation

Estimating (4) separately, using the recovery stage dataset, we get the estimation results presented in Table 15 under FE(9). In comparison with the single equation estimations of the whole transition period, these estimations show a clear distinction with respect to the effect of institutional reform (INSTREF) on GDPG. This effect is positive and significant, as expected. Given concerns over endogeneity of SPR and institutional reform to GDPG, the results in FE(5) and FE(9) should be treated with considerable caution. The inflation coefficient remains negative and is now statistically significant even at the 1% significance level. The signs of SPR and Lagged SPR coefficients are the opposite of what was found when the whole transition period was used. However, the SPR and Lagged SPR coefficients are not significant, except maybe in 3SLS(9).

Given the fact that the regional tension binary variable was 1 mostly in the beginning of transition, the recovery stage includes only a few observations where this variable takes the value 1. Moreover, institutional data (especially the CIM indicator) for some transition countries that have experienced wars and civil conflicts such as Albania, Azerbaijan, Georgia, Tajikistan Turkmenistan and Uzbekistan were not available, which renders the inclusion of the regional tensions variable even more questionable when the CIM indicator is used as a proxy for property rights and contract enforcement institutions in Table 16. Thus, it makes sense not to include the *RT* variable in the estimations of the recovery stage. However, experiments were run with the presence of *RT*, and whenever it was included, its coefficient was insignificant.

6.2.2 Two Stages and Three Stages Least Squares Estimation Results

The second column of Table 15, 2SLS(9), lists estimation results of the transition recovery stage, when the EBRD institutional reform indicator is used as a measure of institutional development for the GDPG equation. Using the matrix of exogenous and predetermined variables, shown in Figure 3, we obtain the 2SLS estimation results.

In comparison to the estimation results under FE(9), the 2SLS estimator yields generally inflated standard errors. In particular, the institutional reform coefficient in 2SLS(9) is greater than the same coefficient in FE(9), but its standard deviation is also greater (smaller t-statistics). This result is to be expected in the presence of seemingly unrelated regression, like in our case. The existing correlations between the error terms of equations (4), (5) and (6) call for the use of a 3SLS estimator, in the presence of a Seemingly Unrelated Regressions (SUR) modeling procedure. Indeed, when the 3SLS-SUR estimation technique explained in Chapter 4, section 4.2, is used, as under the 3SLS(9) specification, standard errors are generally smaller (all coefficients except Lagged SPR Broad are statistically significant at least at 5% level). The 3SLS estimation results for the GDPG equation, when the INSTREF is used as a measure of institutional development are found under 3SLS(9) and 3SLS(10). In comparison to Table 13, the most striking difference is the positive and significant (even at the 1% level) effect of institutional reform on GDPG. These results clearly indicate that if we focus only on the transition recovery stage, institutional reform is an important determinant of GDP growth variation across transition economies. Given the fact that economic institutions take time to build, we might think that before INSTREF affect GDP growth, a threshold level of institutional reform must be reached. Once this level is reached, further increases in INSTREF positively affect GDP growth.

Positive and significant is the effect of SPR Broad on GDPG, while the coefficient of Lagged SPR Broad is negative, but statistically insignificant. Hence, the nonlinear relationship of SPR reforms (a positive lagged SPR followed by a negative current SPR) is no longer supported when the recovery stage dataset is used.

The time trend is significant, with the Time coefficient being negative and the Time Squared coefficient positive. This increasing time trend during the recovery stage might represent the increasing effect that factors like investments in physical capital, including both domestic and foreign direct investments, and a reorientation of already high human capital levels, could be attaining during the recovery stage.

The interaction variable Initial Conditions x Time is positive and significant, indicating that the effect of initial conditions on GDP growth is declining over time.

Last, inflation negatively affects recovery stage growth as expected.

The 3SLS estimation results for the SPR equation are found in the second section of Table15 (under the second and third columns). GDPG positively affects SPR. Lagged SPR positively determines current SPR, like in the whole transition period dataset was used, but now the respective coefficient is somehow smaller (0.58 versus 0.68).

The effect of polity on SPR is positive as expected and greater under the recovery stage compared to the whole transition period.

The time trend is decreasing and significant and the interaction variable between IC1 and Time is positive, but insignificant.

The estimation results for the INSTREF equation are found in the third section of Table 15 (under the second and third columns). GDPG is indeed positively affecting INSTREF significantly indicating the existence of endogeneity between INSTREF and GDPG.

While the current SPR coefficient is positive but statistically insignificant, the Lagged SPR coefficient is positive and significant even at the 1% level under the 3SLS(10) specification. 3SLS(10) is similar to the 3SLS(9) except it excludes the current SPR and the time trend. The significant positive effect of Lagged SPR Broad on INSTREF may be an indication that once a certain level of SPR-s is accumulated, this level affects INSTREF positively. Hence, there exists some evidence that SPR affect INSTREF by a one year lag, rather than contemporaneously.

The interaction variable Initial Conditions x Time is negative and statistically significant even at the 1% level, indicating an increasing effect of initial conditions on institutional reform. Transition countries with different initial conditions are diverging in terms of their institutional reform levels.

The time trend is significant and decreasing (the Time coefficient is positive and the Time squared coefficient is negative).

The effect of polity on INSTREF is positive as expected, and significant even at the 1% level in 3SLS(10). Compared to the whole transition period, the effect of polity on INSTREF is as expected when the transition recovery stage dataset is used. This gives us some assurance that it was probably the inappropriate use of the whole transition period dataset, yielding estimation results for the effect of polity to INSTREF that were contrary to our expectation.

Macroeconomic stabilization (STAB) and government expenditures (GOVEXP) coefficients are positive as expected, but GOVEXP is not statistically significant.

6.2.3 3SLS Estimation Results for the GDPI, SPR and INSTREF Equations

The fifth column of Table 14 lists the estimation results for the GDPI, SPR and INSTREF equations, jointly estimated using the transition recovery stage dataset, with the EBRD institutional reform indicator used as a measure of institutional change. The estimation results for the GDPI equation are found in the first section of Table 14 under 3SLS(Rec).

In comparison with 3SLS(5) and 3SLS(6), the estimations when the recovery stage data set are used yield a smaller negative effect of SPR (under the broad definition). Moreover, the Lagged SPR coefficient is also negative, but statistically insignificant.

Institutional reform again positively affects GDPI, but its effect is smaller when compared to and 3SLS(5) and 3SLS(6). The net effect of SPR and INSTREF on GDPI is not very different from zero, implying that without institutional reforms, SPR alone would result in further declines in output.

The time trend during the recovery stage is significant and increasing.

The interaction variable Initial Conditions x Time is positive indicating that the effect of initial conditions on GDP level is declining over time.

Last, inflation negatively affects recovery stage output as expected, but its coefficient is not statistically significant.

The estimation results for the SPR equation are found in the second section of the fifth column of Table 14. GDPI significantly affects SPR negatively, indicating the existence of endogeneity between SPR and GDPI.

Lagged SPR positively determines current SPR, as expected, indicating steadiness of commitments (of transition governments) to structural policy reforms in the recovery stage as well as under the whole transition period.

The effect of polity on SPR is positive as expected.

The coefficient on the interaction variable Initial Conditions x Time is negative and significant, indicating that the effect of initial conditions on SPR is increasing over time.

The estimation results for the INSTREF equation are found in the fifth column of the third section of Table 14. GDPI is indeed significantly affecting INSTREF positively like in 3SLS(5) and 3SLS(6), indicating the existence of endogeneity between INSTREF and GDPI.

Both current SPR and Lagged SPR positively affect INSTREF.

The interaction variable Initial Conditions x Time is negative and statistically significant, indicating an increasing effect of initial conditions on institutional reform. This means that transition countries with different initial conditions are diverging in terms of their institutional reform levels.

The effect of polity on INSTREF is significant and positive as expected, compared to the negative but insignificant whole transition period estimations in 3SLS(5) and 3SLS(6).

Macroeconomic stabilization (STAB) and government expenditures (GOVEXP) coefficients are positive as expected, but GOVEXP is not statistically significant.

6.3 Estimation Results for the Transition Recovery Stage Using Property Rights and Contract Enforcement Institutions as Measures of Institutional Development

6.3.1 Estimation Results Using Contract Intensive Money (PCINST) as a Proxy for Property Rights and Contract Enforcement Institutions

Estimating (4) separately we get the estimation results presented in Table 16, under FE(10). The signs of all coefficients are as expected, but they are all insignificant.

When included, the non-linear time trend was insignificant, and the estimations shown are the ones when this trend was removed.

The 2SLS estimator in comparison to the FE estimator of Table 16 yields a higher effect of PCINST on GDPG, but higher standard errors when compared to the 3SLS estimator. Thus in what follows, comments will be made to the 3SLS estimator results.

In comparison with the 3SLS estimations of the whole transition period, these estimations, like the ones when the INSTREF was used, show a positive and significant effect of property rights and contracting institutions (using the indicator of contract intensive money (CIM) as a proxy) on GDPG.

The estimation results of the transition recovery stage, when the CIM indicator is used as a proxy for property rights and contracting institutions (PCINST) are listed in the second column of Table 16 (section 1) under 3SLS(10). In comparison with the single equation estimations in FE(10), the PCINST coefficient is positive and significant. Negative and significant is the

coefficient of SPR Broad, while the coefficient of Lagged SPR Broad is positive and significant. Thus, the expected nonlinear relationship of SPR reforms (a negative current SPR followed by a positive lagged SPR) is supported by the recovery stage data, when PCINST is used, as opposed to when INSTREF is used. When included, the time trend was insignificant. This trend was removed in the reported empirical specifications.

The interaction variable Initial Conditions x Time is positive and significant indicating that the effect of initial conditions on GDP growth is declining over time.

The 3SLS estimation results for the SPR equation are found in the second section of Table 16 (second column). GDPG affects SPR negatively. Lagged SPR positively determines current SPR. The effect of polity on SPR is negative but statistically insignificant. The interaction variable Initial Conditions x Time is positive, and significant, indicating that the effect of initial conditions on SPR is declining over time.

The 3SLS estimation results for the PCINST equation are found in the third section of Table 16 (second column). The GDPG coefficient is positive, but statistically insignificant. While current SPR is negatively affecting PCINST, the Lagged SPR coefficient is positive and the net effect of SPR on PCINST is close to zero. The interaction variable Initial Conditions x Time is positive and significant, indicating a decreasing impact of initial conditions on property rights and contract enforcement institutions. The effect of polity on PCINST is positive as expected. Macroeconomic stabilization (STAB) and government expenditures (GOVEXP) coefficients are also positive as expected and statistically significant at the 10% and 5% levels, respectively.

6.3.2 Estimation Results Using ICRG Rule of Law Indicator (ROLINST) as a Proxy for Property Rights and Contract Enforcement Institutions

Estimating (4) separately we get the estimation results presented in Table 16, under FE(11). Just like the case with FE(10), the signs of all coefficients are as expected, but they are all insignificant. The only significant coefficient is the one belonging to the interaction variable Initial Conditions x Time. This coefficient is positive, indicating divergence between transition countries with different initial conditions in terms of GDP growth.

Similar to the case when the PCINST was used to proxy property rights and contract enforcement institutions, the 2SLS estimator in the 2SLS(11) specification compared to the FE estimator yields a higher effect of ROLINST on GDPG, but higher standard errors when compared to the 3SLS estimator. Thus what follows, describes the 3SLS estimator results.

In comparison with the 3SLS estimations of the whole transition period, the estimations when ROLINST are used to capture changes in institutional development, like the ones when the INSTREF and the PCINST were used, show a positive and significant effect of property rights institutions on GDPG. The first section of the fourth column of Table 16 under 3SLS(11), lists estimation results of the transition recovery stage, when the ICRG index of rule of law is used as a proxy for property rights and contract enforcement institutions. The negative and significant effect of SPR is compensated by the positive effect of Lagged SPR, so that the net effect of SPR on GDPG is close to zero. Thus, the expected nonlinear relationship of SPR reforms (a negative current SPR followed by a positive lagged SPR) is supported by the recovery stage data, when ROLINST (and PCINST) is used, as opposed to the case when INSTREF is used.

The interaction variable Initial Conditions x Time is positive and significant, indicating that the effect of initial conditions on GDP growth is declining over time.

The estimation results for the SPR equation are found in the second section of Table 16's fourth column, under 3SLS(11). GDPG affects SPR negatively. Lagged SPR positively determines current SPR, as in previous specifications. The effect of polity on SPR is positive, but statistically insignificant. The interaction variable Initial Conditions x Time is positive and significant, indicating that the effect of initial conditions on SPR is declining over time.

The estimation results for the ROLINST equation are found in the third section of Table 16's fourth column. The GDPG coefficient is positive, but statistically insignificant. The current SPR coefficient is negative, but statistically insignificant, while the Lagged SPR coefficient is positive and significant. Thus, lagged SPR affect ROLINST positively as expected. The interaction variable Initial Conditions x Time is negative and significant indicating an increasing effect of initial conditions on property rights institutions. The effect of polity on ROLINST is negative, contrary to our expectations. Macroeconomic stabilization (STAB) positively affects ROLINST, while the government expenditures (GOVEXP) coefficient, contrary to our expectations, is negative.

6.4 Estimation Results for the Transition Recovery Stage Using Both Categories of Institutions

An important question worth addressing is whether the two categories of institutions used in this dissertation have separate measurable effects on GDP growth. Institutional reform, (INSTREF), as given by a simple average indicator of the EBRD indices of competition policy, enterprise restructuring and governance, and banking reform and non-bank financial institutions reform is overlapping with measures of property rights and contract enforcement institutions, PCINST and ROLINST. It is worth, however, investigating whether these two categories of institutions cover institutional development areas that are not overlapping. The presence of both INSTREF and ROLINST in the list of right hand side variables of the GDPG equation, requires additional modeling techniques to the 3SLS-SUR technique used so far. The apparent overlap between INSTREF and ROLINST or PCINST makes the addition of a forth equation into our system questionable. Thus, a simpler approach would be to estimate the GDPG equation via a single equation approach using both the FE and 2SLS estimator. Given the existing endogeneity of SPR and institutional development to GDPG, the results of Table 17 should be treated with caution. These estimation results show a positive and significant effect of INSTREF on GDPG, and a positive but statistically insignificant (except for maybe 2SLS(12)) effect of ROLINST.

The SPR effect on GDPG is negative and statistically significant in FE(13) and especially 2SLS(13), while the Lagged SPR coefficient is positive, but statistically insignificant. Thus, the expected nonlinear relationship of SPR reforms is supported by Table 17's specifications. The interaction variable Initial Conditions x Time is positive and significant, indicating that the effect of initial conditions on GDP growth is declining over time.

When PCINST was included instead of ROLINST, the effect of PCINST on GDPG was negative, but statistically insignificant. Our interpretation of this result is that INSTREF and PCINST have more overlapping areas than INSTREF and ROLINST. Thus once INSTREF is controlled for, the presence of PCINST does not seem to yield any significant results.

Last, Table 18 is prepared to summarize the empirical findings of this dissertation, and conclusions on these findings are drawn in Chapter 7.

VII. Summary, Conclusions and Policy Recommendations

This dissertation has explored the relationships between three groups of variables in the transition economies of Central and Eastern Europe (CEE) and Commonwealth of Independent States (CIS), from 1989 to 2003. The first group consists of output level and output growth as measured by gross domestic product index (GDPI) and gross domestic product growth (GDPG). The second group consists of two categories of institutional development. The first category is the institutional reform (INSTREF), measured by the European Bank for Reconstruction and Development (EBRD) indices of institutional reform. The second category is property rights and contract enforcement institutions. Two proxies are used to measure this category of institutions. The first proxy is a compiled indicator of contract intensive money, defined by Clague et al. (1997) as the ratio of non-currency money to the total money supply. The higher this ratio, the more favorable the contract enforcement and property rights institutions (PCINST) are judged to be. The second indicator used as a proxy for property rights and contract enforcement institutions is the International Risk Country Guide (ICRG) political risk indicator rule of law (ROLINST). The third group of variables studied in this dissertation consists of EBRD indices of structural policy reform, often known as liberalization policies. These indices are combined under a broad and a narrow definition to create SPR Broad and SPR Narrow.

This dissertation's theoretical and empirical framework explicitly account for the endogeneity between output performance variables, the measures of institutional development and SPR. Several empirical specification models of the theoretical simultaneous system of three equations are estimated. In the first group of specification models the dependent endogenous variables are GDPG, SPR and INST (either INSTREF, PCINST, or ROLINST), while in the second group the dependant endogenous variables are GDPI, SPR and INST. Moreover, two datasets are used. The first dataset has data from 1989 to 2003, thus covering the whole transition period, while the second dataset is a subset of the first one, containing data for the recovery stage of transition only. The recovery stage data series are data for which a positive growth rate is maintained consecutively for at least the first two years of the period for each transition economy.

The empirical methods used in this dissertation include panel data analysis, principal component analysis, two stages least squares approach and three stage least squares approach in the presence of a SUR modeling procedure.

With respect to the output performance equation, the findings of this research, indicate that institutional reform (INSTREF), and property rights and contract enforcement institutions (PCINST and ROLINST) are very important determinants of output level when the whole transition period dataset is used, and very important determinants of both the output level and output growth when the recovery stage dataset is used. Table 18 shows that the expected positive effect of institutional development (either INSTREF, PCINST, or ROLINST) on GDPG and GDPI is confirmed 100 percent of the times when the transition recovery period dataset is used. While the effect of current SPR is ambiguous, the effect of lagged SPR on output and output growth is positive. Moreover, SPR continue to affect output performance via their indirect effect on institutional development.

With respect to the institutional reforms, and property rights and contract enforcement institutions, two sets of determinants were found to be important. On the side of the demand factors, SPR, and especially lagged SPR is found to be an important determinant of both institutional reforms and property rights and contract enforcement institutions. As shown in Table 18, the expected positive signs of SPR and Lagged SPR in the equations having institutional development (either INSTREF, PCINST, or ROLINST) as the dependent endogenous variable, is confirmed in all estimated specifications (100 percent of times). On the side of supply factors, macroeconomic stabilization, a measure of the state's capacity to implement institutional reform, was especially important in explaining the variation in institutional reform and property rights and contract enforcement institutions. Political reform, in terms of a shift from the autarkic political regime to a democratic political regime, is found to positively affect institutional reforms and property rights and contract enforcement institutions in the recovery stage, but this effect was not statistically significant in all of the specification models. Moreover, in the set of institutional development equations using GDPG (versus GDPI) as one of the explanatory variables, the expected positive sign of Polity is confirmed 90 percent of the times, when the transition recovery period dataset is used, and only 50 percent of times when the whole transition period dataset is used.

With respect to the structural policy reforms' equations, this dissertation's main finding is that political reform positively affects SPR in both datasets, in all of the empirical specifications estimated (100 percent of times). Moreover, lagged SPR is found to positively affect SPR, which is an indication of transition governments' maintained commitment to a package of SPR-s.

This dissertation has also explored the interaction of political reforms with structural policy reforms, institutional reforms and property rights and contract enforcement institutions in transition economies. The empirical findings suggest that a political economy approach embodied in both the SPR and institutions development equations is appropriate for analyzing and understanding the economic performance of transition economies. The political reform dimension is too important not to be taken into consideration. Movements toward democratization have positive direct effects on institutional development and structural policy reforms, and several indirect effects on output performance. Thus, if we were interested in achieving higher levels of institutional development, one way to achieve this target is via increased efforts of transition governments to first of all further democratize themselves. In the presence of vested interests of transition governments' officials in the political-economic processes, an altruistic and forward looking behavior is needed to overcome lack of progress with political reform. The development of political institutions that place checks on those who hold political power, is a useful tool for the emergence of good economic institutions, as it is the situation when political power is in the hands of a relatively broad group with significant investment opportunities (see for example Acemoglu *et al.* 2004).

Some implications for the important role of government in transition economies follow from this dissertation. On the one side, the government has to initiate the structural policy reforms, which tend to decentralize the government's power. Since transition started, international organizations such as World Bank and IMF, as well as independent researchers have emphasized how transition governments need to pull back from economic involvement in enterprises, price intervention, taxation, and external and domestic trade regulation. The general progress with price and trade liberalization and privatization in all transition economies, has shown that most transition governments have been committed to a package of structural policy reforms, often supported by IMF programs. On the other side, the transition government has to be leading the institutional reform by establishing the necessary legal framework that ensures the security of property rights and the enforcement of contracts. The indicators of institutional

development used in this dissertation have shown a great variation in levels of institutional development across transition economies. There seems to be an institutional divide between countries such as Poland, Czech Republic and Hungary which have high scores for institutional development, and other countries, especially the ones in the CIS, which generally score much lower. This is an indication that the CIS transition governments are doing too little to ensure security of property rights and the enforcement of contracts. At the same time that transition governments are advised to pull back from a direct intervention in the economy, they seem not to be doing enough in terms of institutional legal effectiveness and implementation. Thus it is clear that the role of governments in transition is as crucial and delicate as it could be. We can say that a successful transition to a market economy depends a lot on the balance between the non-intervention in economy and the ensuring of property rights and contract enforcement that transition governments should maintain. On the other hand, the continuous technical and financial support that World Bank, IMF, EBRD and other international organizations give to the institutional reform programs that transition governments are implementing is another important element that could enhance the so much needed institutional development in transition economies. This dissertation has shown that institutional reform and property rights and contract enforcement institutions are important determinants of the variation of output performance in the transition recovery stage. The failure of economists to take institutions into account has been blamed for the poor performance of several transition countries (Zinnes *et al.* 2001). Russia, Albania and Bulgaria experienced severe financial crises in 1997 – 1998. These examples indicate that lack of progress with institutional reform and the building of property rights and contract enforcement institutions weakens the macroeconomic performance gains from liberalization and privatization. While structural policy reforms are a necessary condition for the transition output growth recovery to occur, they are not sufficient to ensure growth sustainability. On the other hand, structural policy reforms are an important determinant of institutional development. This dissertation has shown that countries that quickly and consistently adopted a package of SPR-s were the ones that also achieved higher levels of institutional development. Thus it seems that SPR-s are a precondition for institutional change to occur, and in a complimentary fashion, SPR and institutional development affect output performance in transition, with the latter gaining more explanatory power over the variation in output growth rates and output levels as transition proceeds.

This dissertation also has explored the effect of initial conditions through time on the three endogenous variables of the system, and important findings were drawn in each case. Transition economies generally had similar initial conditions of macroeconomic distortions and industrial overhang inherited from the centrally planned economic system. However, initial condition differences across transition economies were apparent at the beginning of transition. On the other hand, output growth performance during the transition period has varied greatly across countries and time and different levels of institutional development (including differences in institutional reform and property rights and contract enforcement institutions) were registered across transition countries throughout the transition period as well. This dissertation has shown that the effect of initial conditions over time has declined in the output performance equations, meaning that countries are converging in terms of growth rates regardless of their initial conditions. Different results were found regarding the institutional development equations. The effect of initial conditions over time has increased in the institutional development equations, indicating divergence across countries with different initial conditions.

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Appendix Data Definitions

GDPG – Real GDP growth: annual percentage change in real GDP)

GDPI - Real GDP level: annual percentage change from transition base year

INFL – Inflation: percentage change in year-end retail/consumer price level

SPR - EBRD ratings of structural policy reforms ranging from 1 (no reform) to 4.3 (standards typical of market economies). See for example EBRD Transition Report 1998 for a detailed score definition of each indicator.

SPR Broad – The simple average of EBRD reform ratings for price liberalization, trade and exchange rate liberalization, small-scale and large scale privatization.

SPR Narrow - The simple average of EBRD reform ratings for price liberalization, trade and exchange rate liberalization and small-scale privatization.

INSTREF – EBRD ratings of institutional reform, ranging from 1 (no reform) to 4.3 (standards typical of market economies). INSTREF is the simple average of reform ratings for competition policy, enterprise restructuring and governance, banking reform and non-bank financial institutions reform. See various issues of EBRD Transition Reports for a detailed score definition of each indicator.

PCINST - A compiled indicator of contract intensive money, defined by Clague *et al.* (1997) as the ratio of non-currency money to the total money supply, used as a proxy for property rights and contract enforcement institutions.

ROLINST – The International Risk Country Guide (ICRG) political risk indicator rule of law used as a proxy for property rights and contract enforcement institutions.

AVGR – Average Real GDP growth 1985-1989.

INC – 1989 per capita GDP at PPP.

BLKMAR – Black market exchange rate premium.

INDO – Industrial overhang calculated as the difference between the actual and predicted share of industry in GDP.

LOCAT – A binary variable taking the value 1 if a country has a thriving market economy as a neighbor, and 0 otherwise.

NRESD – A categorical variable measuring the richness of natural and energy resources, taking values 1 (poor), 2 (moderate) and 3 (rich).

REPINF – A measure of repressed inflation, calculated as the difference between growth of real wages and real GDP growth over 1987-1990.

STATE – A categorical variable taking the value 2 if a country was an independent state at the beginning of reform, 1 if a country was a member of a decentralized federal state (such as the Yugoslav republics) or was the core state of a centralized federal state (such as Russia and Czech Republic), and 0 otherwise.

TRADEP – A measure of trade dependency, calculated as the ratio between the average of exports and imports and GDP.

URB – Share of urban population to total population.

YUPLAN – The number of years a transition country has been under central planning related to the market memory.

INPC1 – Country score calculations from the first principal component of a cluster analysis over the 11 initial conditions explained above. The country score is calculated by multiplying each initial condition variable with a factor loading. INPC1 measures macroeconomic distortions at the beginning of transition.

INPC2 - Country score calculations from the second principal component of a cluster analysis over the 11 initial conditions explained above. The country score is calculated by multiplying each initial condition variable with a factor loading. INPC2 measures the general level of development.

IC1 – EBRD staff calculations of country score calculations from the first principal component similar to INPC1, used in Falcetti *et al.* (2002).

IC2 – EBRD staff calculations of country score calculations from the second principal component similar to INPC2, used in Falcetti *et al.* (2002).

Time – Number of years since transition (or transition recovery stage) started.

Time^2 – Time squared.

IC1 x Time – An interaction variable obtained by multiplying IC1 with Time.

RT – Regional tensions, a binary variable taking the value 1 if a country has experienced war, or blockade in a particular year.

Polity – A proxy for political reform, a combined score computed by subtracting the AUTOC (autocracy) score from the DEMOC (democracy) score. The resulting unified polity scale ranges

from +10 (strongly democratic) to -10 (strongly autocratic). For a detailed description of how the polity score is derived, see the Polity IV Project, 2004, manual. URL: www.cidcm.umd.edu/inscr/polity

STAB - Macroeconomic stabilization, measured by number of years when inflation was below 30% and government budget deficit below 5%.

GOVEXP - Ratio of government expenditures over GDP.

Figure 1.1 Plots of GDPG Series over Time

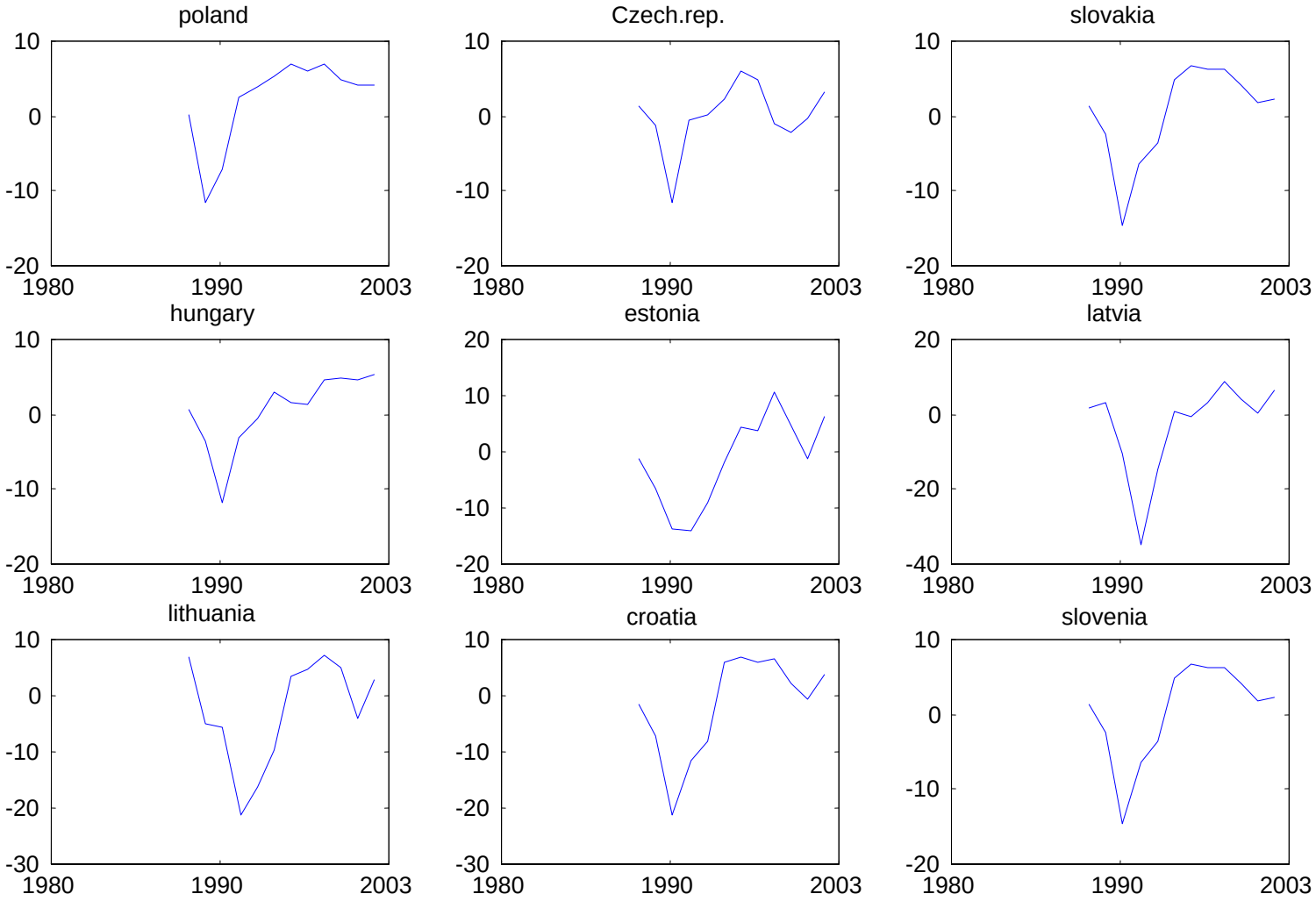


Figure 1.2 Plots of GDPG Series over Time

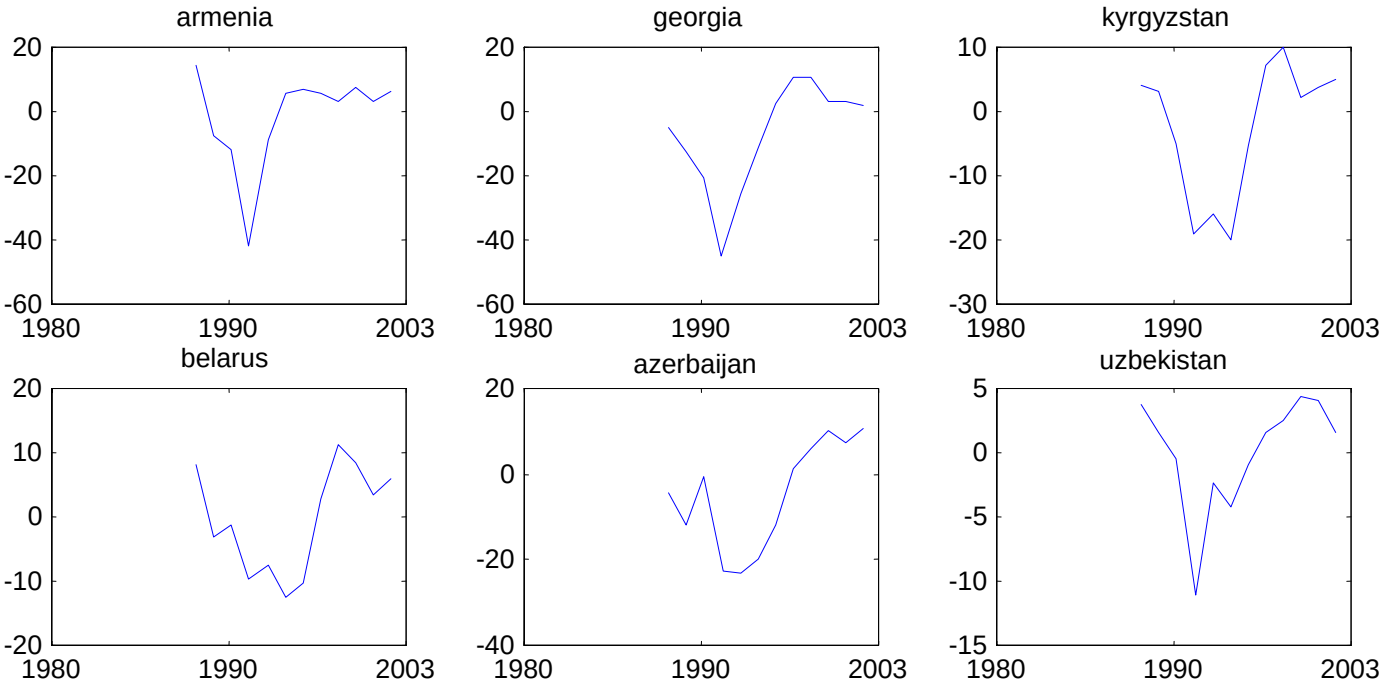


Figure 1.3 Plots of GDPG Series over Time

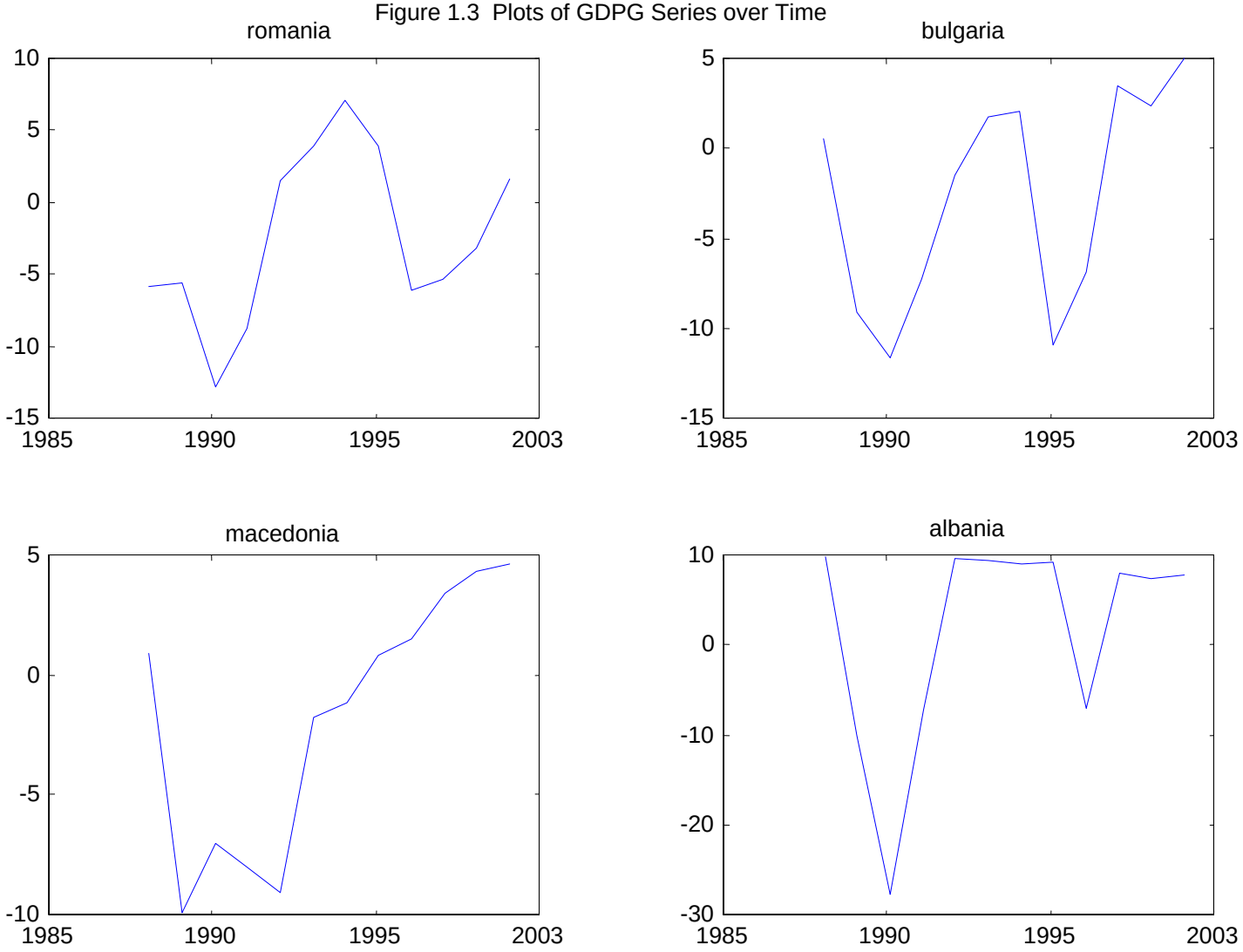
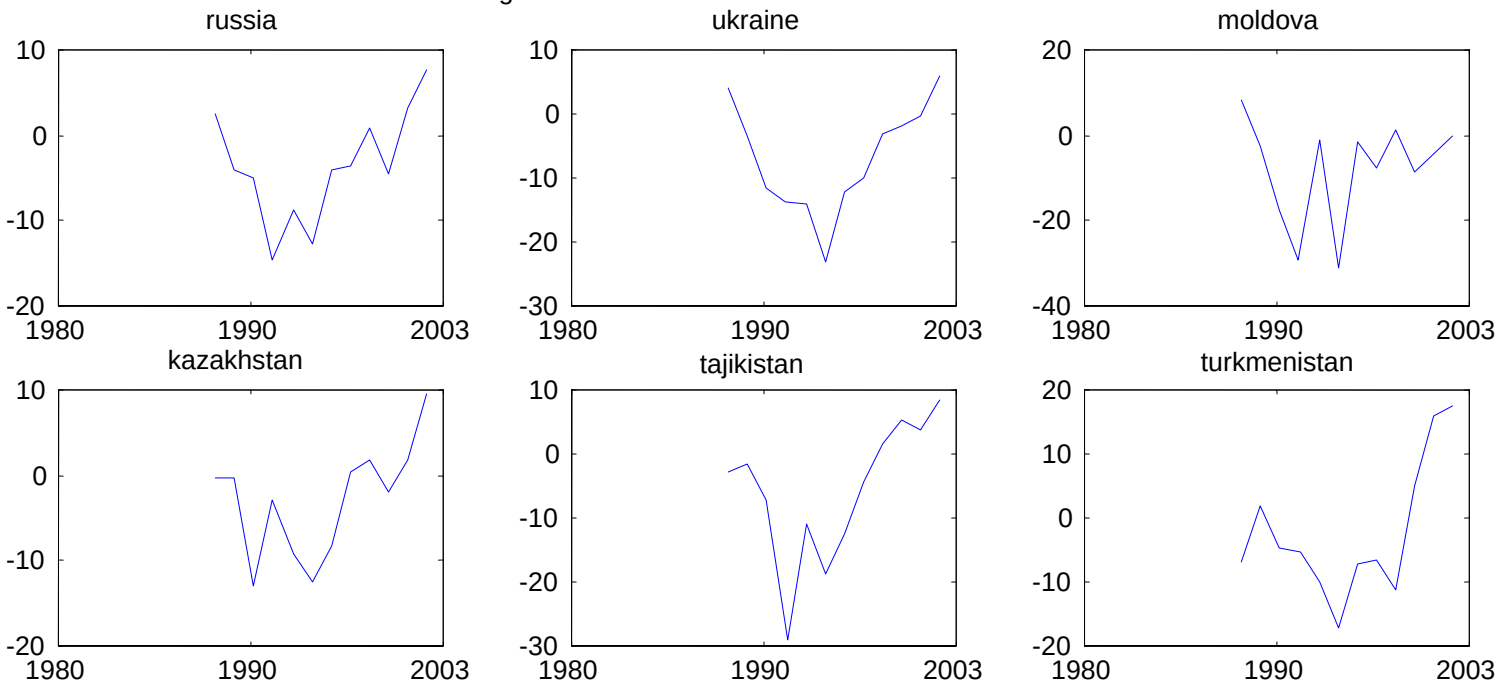
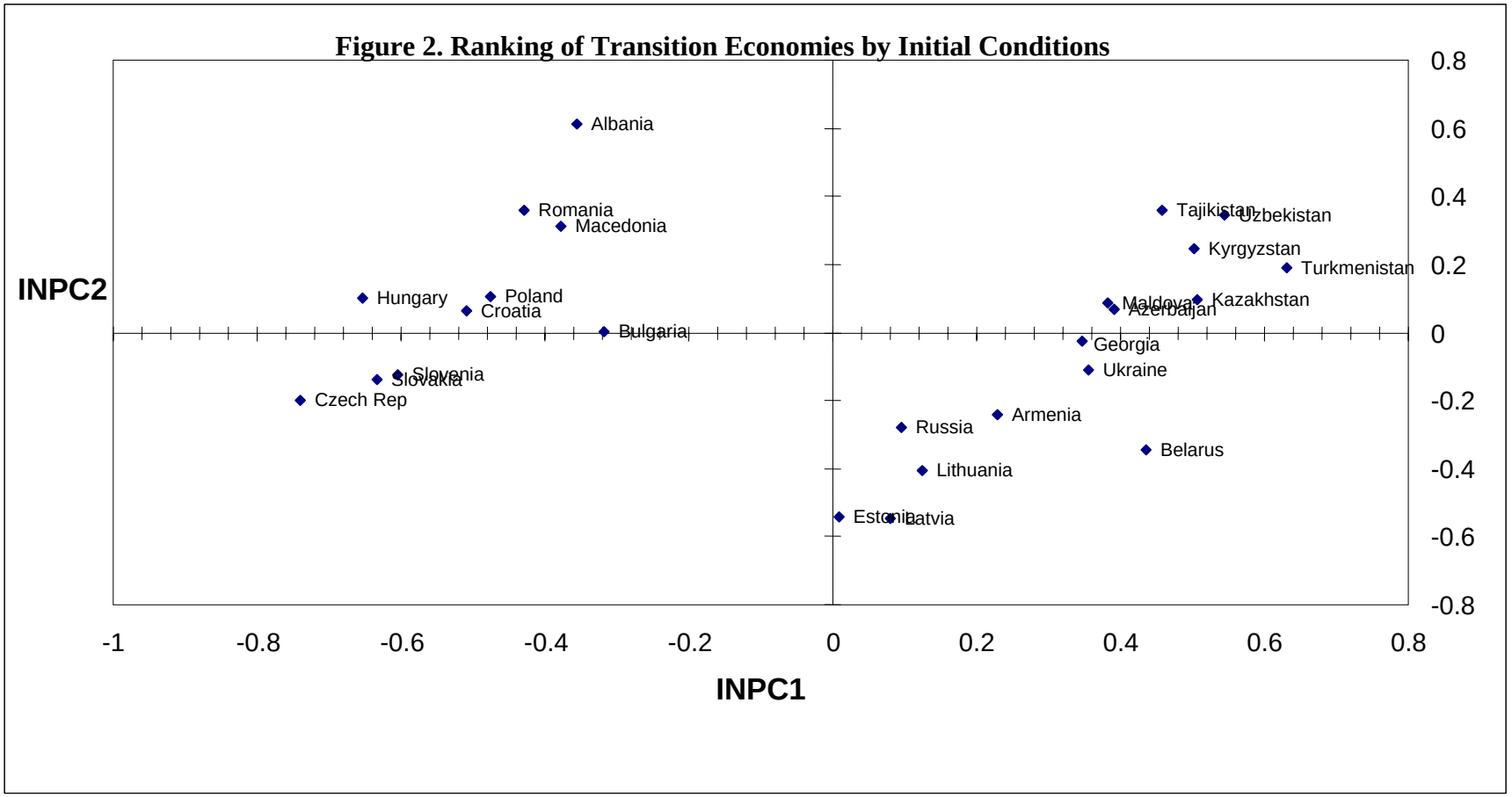


Figure 1.4 Plots of GDPG Series over Time





Note: Higher values of INPC1 indicate higher levels of macroeconomic distortions, while higher values of INPC2 indicate lower general levels of development, corresponding (in both cases) to unfavorable (bad) initial conditions.

Figure 3

$$
X = \begin{bmatrix}
LSPR_{11} & INFL_{11} & RT_{11} & LGDPG_{11} & POLREF_{11} & STAB_{11} & GOVEXP_{11} & ICT_{11} & T_{11} & TSQ_{11} & ALLD_{11} \\
LSPR_{12} & INFL_{12} & RT_{12} & LGDPG_{12} & POLREF_{12} & STAB_{12} & GOVEXP_{12} & ICT_{12} & T_{12} & TSQ_{12} & ALLD_{12} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
LSPR_{1T} & INFL_{1T} & RT_{1T} & LGDPG_{1T} & POLREF_{1T} & STAB_{1T} & GOVEXP_{1T} & ICT_{1T} & T_{1T} & TSQ_{1T} & ALLD_{1T} \\
LSPR_{21} & INFL_{21} & RT_{21} & LGDPG_{21} & POLREF_{21} & STAB_{21} & GOVEXP_{21} & ICT_{21} & T_{21} & TSQ_{21} & ALLD_{21} \\
LSPR_{22} & INFL_{22} & RT_{22} & LGDPG_{22} & POLREF_{22} & STAB_{22} & GOVEXP_{22} & ICT_{22} & T_{22} & TSQ_{22} & ALLD_{22} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
LSPR_{2T} & INFL_{2T} & RT_{2T} & LGDPG_{2T} & POLREF_{2T} & STAB_{2T} & GOVEXP_{2T} & ICT_{2T} & T_{2T} & TSQ_{2T} & ALLD_{2T} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
LSPR_{NT} & INFL_{NT} & RT_{NT} & LGDPG_{NT} & POLREF_{NT} & STAB_{NT} & GOVEXP_{NT} & ICT_{NT} & T_{NT} & TSQ_{NT} & ALLD_{NT}
\end{bmatrix}
$$

Note: For lack of space *ALLD* represents the 24 vectors (to avoid the dummy variable trap) of country binary variables

Table 1. Data Sources, Data Coverage and Summary Statistics

Variable	Source	Coverage	Mean	Standard Deviation
GDPG	EBRD Transition Reports	CEE 1989-2003 CIS 1991-2003	-0.61	9.48
GDPI	EBRD Transition Reports	CEE 1989-2003 CIS 1991-2003	81.31	21.97
INFL	EBRD Transition Reports	CEE 1989-2003 CIS 1991-2003	285.06	1036.88
SPR Broad	EBRD Transition Reports	CEE 1989-2003 CIS 1991-2003	3.04	1.01
SPR Narrow	EBRD Transition Reports	CEE 1989-2003 CIS 1991-2003	3.26	1.01
INST	EBRD Transition Reports	CEE 1989-2003 CIS 1991-2003	1.93	0.67
PCINST	IFS CD RAM	Data available for 19 transition economies, from 1994-2003	0.77	0.15
ROLINST	International Country Risk Guide (ICRG) dataset	1991-2003	2.21	0.89
IC1 x Time	De Melo *et al.* 1997b, EBRD staff calculations, and author's calculations	1989 and 1991	0.003	18.23
RT	De Melo and Gelb1996, and EBRD Transition Report 2003	1989 - 2003	0.13	0.34
Polity	University of Maryland	1989-2003	3.25	6.33
STAB	EBRD Transition Reports	1989-2003	1.66	2.39
GOVEXP	EBRD Transition Reports	1989-2003	0.38	0.11

Table 1.1 Pair-Correlations of Variables in Table 15

	SPR	INSTREF	LSPR	POLITY	STAB	GOVEXP	INFL	TIME	TIMESQ	IC1	GDPG	GDPI
SPR	1.00											
INSTREF	0.65	1.00										
LSPR	0.92	0.72	1.00									
Polity	0.65	0.69	0.66	1.00								
STAB	0.25	0.55	0.33	0.28	1.00							
GOVEXP	0.21	0.67	0.28	0.47	0.29	1.00						
INFL	-0.17	-0.12	-0.26	-0.04	-0.24	0.004	1.00					
TIME	0.14	0.36	0.29	0.27	0.50	0.08	-0.15	1.00				
TIMESQ	0.10	0.35	0.26	0.29	0.47	0.09	-0.15	0.98	1.00			
IC1	-0.33	-0.63	-0.42	-0.67	-0.33	-0.70	0.02	-0.34	-0.37	1.00		
GDPG	-0.23	-0.31	-0.25	-0.33	-0.02	-0.35	-0.25	-0.07	-0.05	0.40	1.00	-0.13
GDPI	0.09	0.53	0.21	0.24	0.47	0.58	-0.12	0.46	0.45	-0.60	-0.133	1.00

Table 1.2 Pair-Correlations of Variables in Table 16

	SPR	LSPR	INSTREF	PCINST	ROLINST	POLITY	STAB	GOVEXP	INFL	TIME	TIMESQ	IC1	GDPG	GDPI
SPR	1.00													
SPR	0.89	1.00												
INSTREF	0.57	0.65	1.00											
PCINST	-0.01	0.08	0.52	1.00										
ROLINST	0.36	0.40	0.70	0.32	1.00									
POLITY	0.46	0.49	0.64	0.41	0.50	1.00								
STAB	0.38	0.49	0.66	0.39	0.47	0.49	1.00							
GOVEXP	-0.02	0.04	0.52	0.70	0.33	0.32	0.30	1.00						
INFL	-0.25	-0.36	-0.19	0.01	-0.07	-0.078	-0.26	-0.04	1.00					
TIME	0.06	0.22	0.37	0.24	0.22	0.25	0.54	0.01	-0.15	1.00				
TIMESQ	0.00	0.17	0.35	0.22	0.22	0.26	0.52	0.01	-0.15	0.98	1.00			
IC1	-0.18	-0.29	-0.59	-0.67	-0.38	-0.58	-0.54	-0.65	0.05	-0.38	-0.384	1.00		
GDPG	-0.06	-0.03	-0.08	-0.23	0.004	-0.22	0.02	-0.24	-0.04	0.04	0.05	0.36	1.00	-0.03
GDPI	0.22	0.30	0.62	0.67	0.38	0.24	0.61	0.47	-0.17	0.49	0.45	-0.61	-0.03	1.00

Table 2. Growth in Real GDP (Annual Percentage Change in GDP)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Central Europe															*estimate*	*projection*
Poland	0.2	-11.6	-7	2.6	3.8	5.2	7	6	6.8	4.8	4.1	4	1	1.4	3.7	4.5
Check Republic	1.4	-1.2	-11.6	-0.5	0.1	2.2	5.9	4.3	-0.8	-1	0.5	3.3	3.1	2	2.9	4
Slovakia	1.4	-2.5	-14.6	-6.7	-3.7	5.2	6.5	5.8	5.6	4	1.3	2.2	3.3	4.4	4.2	4.4
Hungary	0.7	-3.5	-11.9	-3.1	-0.6	2.9	1.5	1.3	4.6	4.9	4.2	5.2	3.7	3.3	2.9	4
South-East Europe																
Romania	-5.8	-5.6	-12.9	-8.8	1.5	3.9	7.1	4	-6.1	-4.8	-1.2	1.8	5.3	4.9	4.9	5
Bulgaria	0.5	-9.1	-11.7	-7.3	-1.5	1.8	2.9	-9.4	-5.6	4	2.3	5.4	4	4.8	4.5	4.8
Croatia	-1.6	-7.1	-21.1	-11.7	-8	5.9	6.8	6	6.5	2.5	-0.9	2.9	3.8	5.2	4.5	3.5
Slovenia	-1.8	-4.7	-8.9	-5.5	1.7	5.8	4.9	3.5	4.6	3.8	5.2	4.6	3	2.9	2.3	3.1
Macedonia	0.9	-9.9	-7	-8	-9.1	-1.8	-1.2	1.2	1.4	3.4	4.3	4.5	-4.5	0.7	2.8	3
Albania	9.8	-10	-27.7	-7.2	9.6	8.3	13.3	9.1	-7	12.7	8.9	7.7	6.8	4.7	6	6
Baltics																
Estonia	-1.1	-6.5	-13.6	-14.2	-8.8	-2	4.3	3.9	9.8	4.6	-0.6	7.3	6.5	6	4.7	5.5
Latvia	1.5	2.9	-10.4	-34.9	-14.9	2.2	-0.9	3.7	8.4	4.8	2.8	6.8	7.9	6.1	7.5	6
Lithuania	6.8	-5	-5.7	-21.3	-16.2	-9.8	3.3	4.7	7	7.3	-1.8	4	6.5	6.8	8.9	6.5
CIS (FSU)																
Russia	2.4	-4	-5	-14.8	-8.7	-12.7	-4	-3.6	1.4	-5.3	6.4	10	5.1	4.7	7.3	5.5
Belarus	8	-3	-1.2	-9.6	-7.6	-12.6	-10.4	2.8	11.4	8.4	3.4	5.8	4.7	4.7	6.8	4.5
Ukraine	4	-3.4	-11.6	-9.7	-14.2	-22.9	-12.2	-10	-3	-1.9	-0.2	5.9	9.2	4.8	9.3	6
Moldova	8.5	-2.4	-17.5	-29.1	-1.2	-30.9	-1.4	-5.9	1.6	-6.5	-3.4	2.1	6.1	7.2	6.3	5.5
Armenia	14.2	-7.4	-11.7	-41.8	-8.8	5.4	6.9	5.9	3.3	7.3	3.3	6	9.6	12.9	13.9	7
Azerbaijan	-4.4	-11.7	-0.7	-22.6	-23.1	-19.7	-11.8	0.8	6	10	9.5	11.1	9.9	10.6	11.2	8.5
Georgia	-4.8	-12.4	-20.6	-44.8	-25.4	-11.4	2.4	10.5	10.8	2.9	3	1.9	4.7	5.6	7	5
Kazakhstan	-0.4	-0.4	-13	-5.3	-9.3	-12.6	-8.2	0.5	1.7	-1.9	2.7	9.8	13.5	9.8	9.2	7
Kyrgyzstan	4	3	-5	-19	-15.5	-20.1	-5.4	7.1	9.9	2.1	3.7	5.4	5.3	0	6.7	4.1
Tajikistan	-2.9	-1.6	-7.1	-29	-11	-18.9	-12.5	-4.4	1.7	5.3	3.7	8.3	10.3	9.1	10.2	6
Turkmenistan	-6.9	2	-4.7	-5.3	-10	-17.3	-7.2	-6.7	-11.3	7	16.5	17.6	11.8	5.1	11.4	9.1
Uzbekistan	3.7	1.6	-0.5	-11.1	-2.3	-4.2	-0.9	1.6	2.5	4.3	4.3	3.8	4.2	4.2	1	2.5

Source: European Bank for Reconstruction and Development, Transition Report Update 2004, April 2004

Table 3. Real GDP Level (Annual Percentage Change from Transition Base Year)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Central Europe															
Poland	100	90	84	86	89	94	101	107	114	119	124	129	130	132	137
Check Republic	100	99	87	87	87	89	94	98	97	96	97	100	103	105	108
Slovakia	100	97	83	78	79	84	89	95	99	103	105	107	111	116	121
Hungary	100	93	82	80	79	82	83	84	88	92	96	101	105	108	112
South-East Europe															
Romania	100	89	78	71	72	75	80	83	78	74	74	75	80	83	87
Bulgaria	100	89	82	76	75	76	78	71	67	69	71	75	78	82	85
Croatia			100	88	81	86	92	97	104	107	106	109	114	119	124
Slovenia			100	95	97	102	107	111	116	120	127	132	135	140	143
Macedonia			100	93	86	85	84	85	86	89	93	97	93	94	97
Albania		100	72	67	73	79	90	98	88	99	108	116	124	130	137
Baltics															
Estonia			100	86	79	77	81	84	93	98	98	106	113	121	127
Latvia			100	68	60	62	61	63	68	72	74	79	85	91	98
Lithuania			100	79	66	60	63	66	70	75	74	77	82	87	95
CIS (FSU)															
Russia			100	85	78	68	65	63	64	60	64	71	74	78	84
Belarus			100	90	84	74	66	68	76	82	85	90	94	99	105
Ukraine			100	90	77	60	52	47	46	45	45	47	52	54	60
Moldova			100	71	70	48	48	45	46	43	41	42	45	48	51
Armenia			100	58	53	56	60	63	65	70	72	77	84	97	110
Azerbaijan			100	77	60	48	42	43	45	50	53	59	65	72	80
Georgia			100	55	39	35	36	40	44	45	47	47	50	53	58
Kazakhstan			100	95	86	75	69	69	70	69	71	78	89	97	106
Kyrgyzstan			100	86	73	58	55	59	65	66	69	72	76	76	81
Tajikistan			100	68	57	45	39	32	33	35	36	39	43	47	52
Turkmenistan			100	85	86	71	66	71	63	67	78	86	93	101	110
Uzbekistan			100	89	87	82	82	83	87	91	95	99	103	108	112

Source: European Bank for Reconstruction and Development and author's calculations.
Note: Transition base year for each transition country corresponds to the year for which real GDP level is 100%.

Table 4. EBRD Structural Policy Reform Indicators

Countries	Index of price liberalization		Index of foreign exchange and trade liberalization		Index of small scale privatization		Index of large scale privatization	
	1991	2003	1991	2003	1991	2003	1991	2003
Albania	1.0	3.7	1.0	4.3	2.0	4.0	1.0	2.3
Armenia	1.0	4.3	1.0	4.3	1.0	3.7	1.0	3.3
Azerbaijan	1.0	4.0	1.0	3.7	1.0	3.7	1.0	2.0
Belarus	1.0	2.7	1.0	2.3	1.0	2.3	1.0	1.0
Bulgaria	2.0	4.3	3.0	4.3	1.0	3.7	1.0	3.7
Croatia	3.0	4.0	3.0	4.3	3.0	4.3	1.0	3.3
Czech Republic	3.0	4.3	3.0	4.3	3.0	4.3	1.0	4.0
Estonia	2.0	4.0	2.0	4.3	1.0	4.3	1.0	4.0
Macedonia	3.0	4.0	3.0	4.3	3.0	4.0	1.0	3.0
Georgia	1.0	4.3	1.0	4.3	1.0	4.0	1.0	3.3
Hungary	3.0	4.3	4.0	4.3	1.0	4.3	2.0	4.0
Kazakhstan	1.0	4.0	1.0	3.3	1.0	4.0	1.0	3.0
Kyrgyzstan	1.0	4.3	1.0	4.3	1.0	4.0	1.0	3.0
Latvia	2.0	4.3	1.0	4.3	1.0	4.3	1.0	3.3
Lithuania	2.0	4.3	1.0	4.3	1.0	4.3	1.0	3.7
Moldova	1.0	3.7	1.0	4.3	1.0	3.3	1.0	3.0
Poland	3.0	4.3	3.0	4.3	3.0	4.3	2.0	3.3
Romania	2.0	4.3	1.0	4.0	1.0	3.7	1.7	3.3
Russia	1.0	4.0	1.0	3.3	1.0	4.0	1.0	3.3
Slovak Republic	3.0	4.3	3.0	4.3	3.0	4.3	1.0	4.0
Slovenia	3.0	4.0	3.0	4.3	3.0	4.3	1.0	3.0
Tajikistan	1.0	3.7	1.0	3.3	1.0	3.7	1.0	2.3
Turkmenistan	1.0	2.7	1.0	1.0	1.0	2.0	1.0	1.0
Ukraine	1.0	4.0	1.0	3.0	1.0	4.0	1.0	3.0
Uzbekistan	1.0	2.7	1.0	1.7	1.0	3.0	1.0	2.7

Sources: EBRD Transition Reports

Table 5. EBRD Indicators of Institutional Reform, and Property Rights and Contract Enforcement Institutions

Countries	Governance and enterprise restructuring		Competition policy		Banking reform and interest rate liberalization		Securities markets and non-bank financial institutions		PCINST		ROLINST	
	1991	2003	1991	2003	1991	2003	1991	2003	R(1)	2003	1991	2003
Albania	1.0	2.0	1.0	1.7	1.0	2.3	1.0	1.7	n.a.	n.a.	1	2
Armenia	1.0	2.3	1.0	2.3	1.0	2.3	1.0	2.0	0.6	0.63	1	3
Azerbaijan	1.0	2.3	1.0	2.0	1.0	2.3	1.0	1.7	n.a.	n.a.	1	2
Belarus	1.0	1.0	1.0	1.0	1.0	1.7	1.0	2.0	0.77	0.85	1	2
Bulgaria	1.0	2.7	2.0	2.3	1.0	3.3	1.0	2.3	0.91	0.74	1.5	3
Croatia	1.0	2.7	1.0	2.3	1.0	3.7	1.0	2.7	0.85	0.92	1	2
Czech Republic	2.0	3.3	2.0	3.0	2.0	3.7	1.0	3.0	0.92	0.87	1.5	4
Estonia	1.0	3.3	1.0	2.7	1.0	3.7	1.0	3.3	0.73	0.87	1	4
Macedonia	1.0	2.3	1.0	2.0	1.0	3.0	1.0	1.7	0.65	0.78	1	2
Georgia	1.0	2.0	1.0	2.0	1.0	2.3	1.0	1.7	n.a.	n.a.	1	2
Hungary	2.0	3.3	2.0	3.0	2.0	4.0	2.0	3.7	0.82	0.85	1.5	4
Kazakhstan	1.0	2.0	1.0	2.0	1.0	3.0	1.0	2.3	0.51	0.76	1	2
Kyrgyzstan	1.0	2.0	1.0	2.0	1.0	2.3	1.0	2.0	0.24	0.37	1	2
Latvia	1.0	3.0	1.0	2.7	1.0	3.7	1.0	3.0	0.62	0.76	1	3
Lithuania	1.0	3.0	1.0	3.0	1.0	3.0	1.0	3.0	0.68	0.74	1	3
Moldova	1.0	1.7	1.0	2.0	1.0	2.3	1.0	2.0	0.58	0.66	1	3
Poland	2.0	3.3	2.0	3.0	2.0	3.3	2.0	3.7	0.81	0.86	1.5	4
Romania	1.0	2.0	1.0	2.3	1.0	2.7	1.0	2.0	0.77	0.88	1.5	2
Russia	1.0	2.3	2.0	2.3	1.0	2.0	1.0	2.7	0.62	0.64	1	2
Slovak Republic	2.0	3.0	2.0	3.0	2.0	3.3	1.0	2.7	0.92	0.88	1.5	3
Slovenia	1.0	3.0	1.0	2.7	1.0	3.3	2.0	2.7	0.93	0.94	1	4
Tajikistan	1.0	1.7	1.0	1.7	1.0	1.7	1.0	1.0	n.a.	n.a.	1	2
Turkmenistan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	n.a.	n.a.	1	2
Ukraine	1.0	2.0	1.0	2.3	1.0	2.3	1.0	2.0	0.6	0.65	1	2
Uzbekistan	1.0	1.7	1.0	1.7	1.0	1.7	1.0	2.0	n.a.	n.a.	1	2

Sources: EBRD, ICRG, IMF CD-Ram and author's calculations. Note: R(1) is the first year of transition recovery stage.

Table 6. Transition Year Base (TYB) and First Transition Recovery Year (FTRY)

Countries	TYB T(0)	FTRY R(1)
Central Europe		
Poland	1989	1992
Check Republic	1989	1993
Slovakia	1989	1994
Hungary	1989	1994
South-East Europe		
Romania	1989	1993
Bulgaria	1989	1994
Croatia	1991	1994
Slovenia	1991	1993
Macedonia	1991	1996
Albania	1990	1993
Baltics		
Estonia	1991	1995
Latvia	1991	1996
Lithuania	1991	1995
CIS (FSU)		
Russia	1991	1999
Belarus	1991	1996
Ukraine	1991	2000
Moldova	1991	2000
Armenia	1991	1994
Azerbaijan	1991	1996
Georgia	1991	1995
Kazakhstan	1991	1996
Kyrgyzstan	1991	1996
Tajikistan	1991	1997
Turkmenistan	1991	1998
Uzbekistan	1991	1996

Sources: EBRD Transition Reports and author's calculations.

Table 7. Initial Level of Development, Resources and Growth

Country	Income per capita at PP US$ 1989	URB (%)	IND	PIND	AVG GR ('85 - '89)	NRES	NRESD	LOCAT
CEE								
Poland	5150	62	0.52	0.39	2.8	moderate	2	1
Check Republic	8600	65	0.58	0.37	1.6	poor	1	1
Slovakia	7600	57	0.59	0.36	1.6	poor	1	1
Hungary	6810	62	0.36	0.37	1.6	poor	1	1
Romania	3470	53	0.59	0.37	-0.8	moderate	2	0
Bulgaria	5000	68	0.59	0.36	2.7	poor	1	0
Croatia	6171	62	0.35	0.34	0.2	poor	1	1
Slovenia	9200	62	0.44	0.39	-0.4	poor	1	1
Macedonia	3394	59	0.43	0.34	0.2	poor	1	0
Albania	1400	37	0.37	0.34	3.6	poor	1	1
Baltics								
Estonia	8900	72	0.44	0.34	2.7	poor	1	1
Latvia	8590	71	0.45	0.35	3.5	poor	1	1
Lithuania	6430	68	0.45	0.35	2.9	poor	1	1
CIS (FSU)								
Russia	7720	74	0.48	0.41	3.2	rich	3	1
Belarus	7010	66	0.49	0.37	5.2	poor	1	0
Ukraine	5680	67	0.44	0.4	2.4	moderate	2	0
Moldova	4670	47	0.37	0.35	5.7	poor	1	0
Armenia	5530	68	0.55	0.35	2.7	poor	1	0
Azerbaijan	4620	54	0.44	0.36	0.8	rich	3	0
Georgia	5590	56	0.43	0.35	2.4	moderate	2	0
Kazakhstan	5130	57	0.34	0.38	4.3	rich	3	0
Kyrgyzstan	3180	38	0.4	0.34	5.2	poor	1	0
Tajikistan	3010	32	0.34	0.34	1.9	poor	1	0
Turkmenistan	4230	45	0.34	0.35	5	rich	3	0
Uzbekistan	2740	41	0.33	0.37	3.9	moderate	2	0

Source: De Melo *et al.* (1997b)
Note: PIND stands for predicted share of industry as derived from using the regression results in Syrquin and Chenery (1986)
INDO stands for industrial overhang given as the difference between the share of industry in GDP and the PIND.

Table 7 (cont). Initial Economic Distortions and Institutional Characteristics

Country	REPINFL (87-90)	BLKMARP 1990 (%)	TRADEP 1990 (%)	YUPLAN	STATE
Central Europe					
Poland	13.6	277	8.4	41	2
Check Republic	-7.1	185	6	42	1
Slovakia	-7.1	185	6	42	0
Hungary	-7.7	46.7	13.7	42	2
South-East Europe					
Romania	16.8	728	3.7	42	2
Bulgaria	18	921	16.1	43	2
Croatia	12	27	6	46	1
Slovenia	12	27	4	46	1
Macedonia	12	27	6	47	1
Albania	4.3	434	6.6	47	2
Baltics					
Estonia	25.7	1828	30.2	51	0
Latvia	25.7	1828	36.7	51	0
Lithuania	25.7	1828	40.9	51	0
CIS (FSU)					0
Russia	25.7	1828	11.1	74	1
Belarus	25.7	1828	41	72	0
Ukraine	25.7	1828	23.8	74	0
Moldova	25.7	1828	28.9	51	0
Armenia	25.7	1828	25.6	71	0
Azerbaijan	25.7	1828	29.8	70	0
Georgia	25.7	1828	24.8	70	0
Kazakhstan	25.7	1828	20.8	71	0
Kyrgyzstan	25.7	1828	27.7	71	0
Tajikistan	25.7	1828	31	71	0
Turkmenistan	25.7	1828	33	71	0
Uzbekistan	25.7	1828	25.5	71	0

Source: De Melo *et al.* (1997b)

Table 7.1 Initial Conditions Correlation Matrix

ICs	INC	URB	INDO	AVGR	NRESD	LOCAT	REPINF	BLKMAR	TRADEP	YUPLAN	STATE
INC	1										
URB	0.78	1									
INDO	0.29	0.44	1								
AVGR	-0.17	-0.21	-0.30	1							
NRESD	-0.17	-0.05	-0.29	0.11	1						
LOCAT	0.59	0.40	0.11	-0.25	-0.29	1					
REPINF	-0.20	-0.04	-0.28	0.44	0.37	-0.55	1				
BLKMAR	-0.11	-0.08	-0.25	0.62	0.37	-0.50	0.87	1			
TRADEP	0.00	-0.04	-0.24	0.62	0.05	-0.36	0.71	0.85	1		
YUPLAN	-0.23	-0.21	-0.41	0.46	0.52	-0.59	0.71	0.80	0.58	1	
STATE	-0.12	0.09	0.24	-0.41	-0.12	0.34	-0.57	-0.72	-0.72	-0.66	1

Table 7.2 The Fit Measures of Principal Components

Components	Proportion	Cumulative Proportion
INPC1	0.46	0.46
INPC2	0.19	0.65
INPC3	0.10	0.75
INPC4	0.09	0.84
INPC5	0.06	0.90
INPC6	0.04	0.93
INPC7	0.02	0.96
INPC8	0.02	0.97
INPC9	0.01	0.98
INPC10	0.01	0.99
INPC11	0.00	1.00

Table 7.3 Initial Conditions and Principal Components Correlation Matrix

IC-s	INPC1	INPC2	INPC3	INPC4	INPC5	INPC6	INPC7	INPC8	INPC9	INPC10	INPC11
INC	-0.33	-0.87	0.07	0.21	-0.12	-0.10	0.09	-0.05	0.05	-0.21	0.01
URB	-0.32	-0.82	0.32	-0.06	0.14	0.17	0.21	-0.02	-0.03	0.16	-0.03
INDO	-0.45	-0.34	0.06	-0.74	0.17	-0.24	-0.17	0.07	-0.01	-0.01	0.03
AVGR	0.66	-0.08	-0.40	0.18	0.55	-0.21	0.13	0.00	0.09	0.01	0.02
NRESD	0.43	0.15	0.79	0.25	0.18	-0.18	-0.15	-0.15	0.00	0.01	0.02
LOCAT	-0.66	-0.38	-0.14	0.52	0.09	0.02	-0.29	0.18	-0.03	0.06	0.02
REPINF	0.85	-0.17	0.16	-0.14	0.04	0.37	-0.09	0.09	0.20	-0.03	0.07
BLKMAR	0.93	-0.27	0.02	-0.07	0.09	0.04	-0.13	0.06	-0.03	-0.05	-0.16
TRADEP	0.80	-0.37	-0.31	-0.05	0.02	0.13	-0.11	-0.19	-0.22	0.00	0.06
YUPLAN	0.88	-0.01	0.24	0.05	-0.12	-0.14	0.15	0.27	-0.16	-0.01	0.05
STATE	-0.74	0.37	0.17	-0.02	0.42	0.27	0.06	0.05	-0.14	-0.13	0.00

Table 7.4 Principal Components for Initial Conditions

	Angjellari (2002)		EBRD (1999)	
	INPC1	INPC2	IC1	IC2
Proportion of total variance explained	0.46	0.19	0.497	0.177
Correlation between INPC1 (INPC2) and IC1 (IC2)	0.97	-0.92	0.97	-0.92
Central Europe				
Poland	-0.48	0.10	-1.87	-0.68
Check Republic	-0.74	-0.20	-3.53	0.6
Slovakia	-0.63	-0.14	-2.95	-0.03
Hungary	-0.65	0.10	-3.25	-0.69
South-East Europe				
Romania	-0.43	0.36	-1.69	-0.88
Bulgaria	-0.32	0.00	-2.12	-0.01
Croatia	-0.51	0.06	-2.54	-0.15
Slovenia	-0.60	-0.12	-3.18	0.49
Macedonia	-0.38	0.31	-2.51	-0.29
Albania	-0.36	0.61	-2.09	-3.08
Baltics and CIS (FSU)				
Estonia	0.01	-0.54	0.4	1.72
Latvia	0.08	-0.55	0.24	1.85
Lithuania	0.12	-0.41	0.01	1.53
Russia	0.10	-0.28	1.09	1.91
Belarus	0.43	-0.34	1.07	1.94
Ukraine	0.36	-0.11	1.4	1.54
Moldova	0.38	0.09	1.09	-0.31
Armenia	0.23	-0.24	1.11	1.44
Azerbaijan	0.39	0.07	3.24	0.07
Georgia	0.35	-0.02	2.2	0.56
Kazakhstan	0.51	0.10	2.54	-0.04
Kyrgyzstan	0.50	0.25	2.27	-1.94
Tajikistan	0.46	0.36	2.87	-2.22
Turkmenistan	0.63	0.19	3.43	-1.07
Uzbekistan	0.55	0.35	2.78	-1.94

Sources: Angjellari (2002) and EBRD staff calculations.

Table 8. Polity (The Political Reform Proxy)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Central Europe															
Poland	5	5	8	8	8	8	9	9	9	9	9	9	9	10	10
Check Republic	-6	8	8	8	10	10	10	10	10	10	10	10	10	10	10
Slovakia	-6	8	8	8	7	7	7	7	7	9	9	9	9	9	9
Hungary	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10
South-East Europe															
Romania	-2	5	5	5	5	5	5	8	8	8	8	8	8	8	8
Bulgaria	-7	8	8	8	8	8	8	8	8	8	8	8	9	9	9
Croatia			-3	-3	-3	-3	-5	-5	-5	-5	1	7	7	7	7
Slovenia			10	10	10	10	10	10	10	10	10	10	10	10	10
Macedonia			6	6	6	6	6	6	6	6	6	6	6	9	9
Albania		1	1	5	5	5	5	0	5	5	5	5	5	7	7
Baltics															
Estonia			6	6	6	6	6	6	6	6	6	6	6	6	6
Latvia			8	8	8	8	8	8	8	8	8	8	8	8	8
Lithuania			10	10	10	10	10	10	10	10	10	10	10	10	10
CIS (FSU)															
Russia			6	6	4	4	4	4	4	4	4	7	7	7	7
Belarus			7	7	7	7	0	-7	-7	-7	-7	-7	-7	-7	-7
Ukraine			6	6	6	6	6	7	7	7	7	7	7	7	7
Moldova			5	5	7	7	7	7	7	7	7	7	8	8	8
Armenia			7	7	7	7	3	-6	-6	5	5	5	5	5	5
Azerbaijan			-3	1	-3	-3	-6	-6	-6	-7	-7	-7	-7	-7	-7
Georgia			4	4	4	4	5	5	5	5	5	5	5	5	5
Kazakhstan			-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-6	-6
Kyrgyzstan			-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
Tajikistan			-2	-6	-6	-6	-6	-6	-5	-1	-1	-1	-1	-1	-3
Turkmenistan			-8	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Uzbekistan			-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9

Source: Political IV Project, INSCR and CIDCM, University of Maryland.

Table 9. Macroeconomic Stabilization (An Institutional Supply Factor)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Central Europe															
Poland	0	0	0	0	0	0	1	2	3	4	5	6	6	6	6
Check Republic	0	0	0	1	2	3	4	5	6	7	8	9	9	9	9
Slovakia	0	0	0	0	0	1	2	3	3	4	4	4	4	4	5
Hungary	0	0	0	0	0	0	0	1	2	3	4	5	6	6	6
South-East Europe															
Romania	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Bulgaria	0	0	0	0	0	0	0	0	0	1	2	3	4	5	6
Croatia			0	0	0	0	1	2	3	4	4	4	4	5	6
Slovenia			0	0	0	1	2	3	4	5	6	7	8	9	10
Macedonia			0	0	0	0	1	2	3	4	5	6	6	6	7
Albania		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baltics															
Estonia			0	0	0	0	1	2	3	4	5	6	7	8	9
Latvia			0	0	0	0	1	2	3	4	5	6	7	8	9
Lithuania			0	0	0	0	0	1	2	2	2	3	4	5	6
CIS (FSU)															
Russia			0	0	0	0	0	0	0	0	0	1	2	3	4
Belarus			0	0	0	0	0	0	0	0	0	0	0	0	1
Ukraine			0	0	0	0	0	0	0	1	2	3	4	5	6
Moldova			0	0	0	0	0	0	0	0	0	1	2	3	4
Armenia			0	0	0	0	0	0	0	1	1	1	2	3	4
Azerbaijan			0	0	0	0	0	1	2	3	4	5	6	7	8
Georgia			0	0	0	0	0	0	0	0	0	1	2	3	4
Kazakhstan			0	0	0	0	0	0	0	0	0	1	2	3	4
Kyrgyzstan			0	0	0	0	0	0	0	0	0	0	0	0	0
Tajikistan			0	0	0	0	0	0	0	0	1	1	1	2	3
Turkmenistan			0	0	0	0	0	0	0	1	2	3	4	5	6
Uzbekistan			0	0	0	0	0	0	0	1	2	3	4	5	6

Source: EBRD Reports and author's calculations.

Table 10. Government Expenditures as Percentage of Real GDP (An Institutional Supply Factor)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Central Europe															
Poland	0.51	0.50	0.49	0.50	0.51	0.49	0.48	0.46	0.46	0.43	0.43	0.42	0.44	0.44	0.45
Check Republic	0.55	0.55	0.54	0.53	0.42	0.42	0.42	0.42	0.42	0.41	0.42	0.44	0.44	0.47	0.46
Slovakia	0.55	0.55	0.54	0.53	0.51	0.48	0.47	0.47	0.46	0.43	0.43	0.45	0.48	0.47	0.48
Hungary	0.54	0.54	0.52	0.54	0.55	0.52	0.49	0.49	0.50	0.50	0.45	0.47	0.52	0.54	0.49
South-East Europe															
Romania	0.40	0.40	0.39	0.42	0.34	0.34	0.35	0.34	0.34	0.35	0.35	0.35	0.33		
Bulgaria	0.48	0.46	0.46	0.44	0.48	0.46	0.41	0.42	0.33	0.37	0.40	0.40	0.39	0.37	0.37
Croatia			0.38	0.36	0.35	0.41	0.45	0.45	0.44	0.47	0.57	0.53	0.52	0.50	0.50
Slovenia			0.41	0.46	0.47	0.46	0.46	0.43	0.44	0.44	0.45	0.42	0.43	0.43	0.42
Macedonia			0.50	0.48	0.55	0.51	0.43	0.37	0.35	0.35	0.35	0.35	0.42	0.42	0.36
Albania		0.63	0.62	0.44	0.35	0.31	0.34	0.30	0.30	0.34	0.35	0.32	0.30	0.29	0.29
Baltics															
Estonia			0.35	0.35	0.40	0.39	0.41	0.41	0.38	0.41	0.44	0.39	0.37	0.38	0.34
Latvia			0.30	0.28	0.35	0.38	0.38	0.40	0.41	0.43	0.44	0.42	0.37	0.39	0.39
Lithuania			0.39	0.32	0.35	0.39	0.37	0.34	0.34	0.38	0.40	0.34	0.32	0.31	0.36
CIS (FSU)															
Russia			0.74	0.71	0.45	0.46	0.37	0.45	0.48	0.43	0.37	0.34	0.35	0.37	0.36
Belarus			0.47	0.46	0.56	0.47	0.43	0.41	0.46	0.45	0.47	0.46	0.47	0.42	0.46
Ukraine			0.59	0.58	0.55	0.46	0.36	0.40	0.44	0.38	0.34	0.35	0.35	0.36	0.34
Moldova			0.25	0.57	0.29	0.41	0.40	0.39	0.43	0.40	0.33	0.34	0.29	0.32	0.30
Armenia			0.28	0.47	0.83	0.43	0.27	0.26	0.26	0.26	0.27	0.23	0.21	0.20	0.19
Azerbaijan			0.58	0.56	0.56	0.46	0.22	0.17	0.19	0.24	0.24	0.21	0.20	0.28	0.30
Georgia			0.33	0.36	0.36	0.24	0.12	0.21	0.21	0.19	0.22	0.19	0.18	0.18	0.18
Kazakhstan			0.33	0.32	0.25	0.26	0.20	0.19	0.20	0.26	0.23	0.23	0.23	0.22	0.24
Kyrgyzstan			0.30	0.34	0.37	0.29	0.33	0.33	0.33	0.34	0.34	0.29	0.26	0.28	0.27
Tajikistan			0.50	0.66	0.61	0.61	0.29	0.19	0.17	0.16	0.17	0.14	0.15	0.17	0.16
Turkmenistan			0.38	0.42	0.19	0.10	0.13	0.16	0.25	0.25	0.23	0.29	0.24	0.25	0.25
Uzbekistan			0.53	0.43	0.46	0.35	0.39	0.42	0.32	0.34	0.32	0.30	0.27	0.27	0.25

Source: European Bank for Reconstruction and Development, Transition Report update, April 2004.

Table 11. GDPG Determinants: Fixed Effects Results

	FE(1)	FE(2)	FE(3)	FE(4)
Dependant variable GDPG				
Inflation	-0.0001	-0.00004	-0.0004	-0.0002
	(-0.28)	(-0.10)	(-0.99)	(-0.66)
SPR Broad	0.209	0.601		
	(0.14)	(0.40)		
Lagged SPR Broad	7.651***	4.724***		
	(6.27)	(3.62)		
SPR Narrow			-1.274	-0.763
			(-0.91)	(-0.55)
Lagged SPR Narrow			8.324***	5.672***
			(7.23)	(4.53)
Regional Tensions	-2.543	-2.338	-3.447**	-2.976**
	(-1.64)	(-1.56)	(-2.26)	(-2.01)
Initial Conditions x Time	0.366***	0.293***	0.326***	0.271***
	(7.32)	(5.86)	(6.46)	(5.40)
Institutional Reform	0.201	-3.973*	0.189	-3.677*
	(0.10)	(-1.92)	(0.10)	(-1.84)
Time		3.652***		3.277***
		(4.41)		(3.89)
Time Squared		-0.167***		-0.148***
		(-3.77)		(-3.27)
Constant	-23.669***	-23.824***	-22.235***	-22.322***
	(-10.16)	(-9.95)	(-9.36)	(-9.08)
R-squared	0.638	0.670	0.649	0.675
Number of observations	300	300	300	300

Note: i) These single equation estimations are obtained using the whole transition period dataset. ii) Fixed country effects are included in all regressions, but not reported; iii) t-statistics are reported in parenthesis.

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test).

Table 12. GDPI Determinants: Fixed Effects Results

	FE(5)	FE(6)	FE(7)	FE(8)
Dependant variable GDPI				
Inflation	-0.0006 (-0.85)	-0.0004 (-0.77)	-0.0001 (-0.10)	-0.000002 (0.00)
SPR Broad	-17.004*** (-6.13)	-11.322*** (-5.27)		
Lagged SPR Broad	3.803* (1.71)	0.811 (0.43)		
SPR Narrow			-15.214*** (-5.91)	-10.341*** (-5.21)
Lagged SPR Narrow			2.199 (1.04)	-0.154 (-0.09)
Regional Tensions	-9.966*** (-3.54)	-5.603** (-2.59)	-8.328*** (-2.98)	-4.385** (-2.05)
Initial Conditions x Time	-0.063 (-0.70)	-0.191*** (-2.64)	-0.034 (-0.37)	-0.174** (-2.41)
Institutional Reform	23.036*** (6.51)	10.928*** (3.66)	23.682*** (6.96)	10.649*** (3.69)
Time		-3.816*** (-3.20)		-3.279*** (-2.70)
Time Squared		0.390*** (6.08)		0.361*** (5.54)
Constant	77.908*** (18.38)	94.466*** (27.37)	78.301*** (17.96)	94.774*** (26.74)
R-squared	0.265	0.578	0.275	0.585
Number of Observations	300	300	300	300

Note: i) These single equation estimations are obtained using the whole transition period dataset. ii) Fixed country effects are included in all regressions, but not reported; iii) t-statistics are reported in parenthesis.

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test).

Table 13. GDPG, SPR and INSTREF Determinants: 3SLS Results

	3SLS(1)	3SLS(2)	3SLS(3)	3SLS(4)
Dependent variable GDPG				
Inflation	-0.0002	-0.0002	-0.0003	-0.0003
	(-0.69)	(-0.69)	(-1.03)	(-1.03)
SPR Broad	-0.961	-0.889		
	(-0.72)	(-0.66)		
Lagged SPR Broad	5.120***	5.077***		
	(4.13)	(4.09)		
SPR Narrow			-2.714**	-2.641**
			(-2.15)	(-2.09)
Lagged SPR Narrow			6.672***	6.637***
			(5.62)	(5.59)
Regional Tensions	-2.355*	-2.350	-2.851**	-2.839**
	(-1.65)	(-1.64)	(-2.03)	(-2.02)
Initial Conditions x Time	0.288***	0.287***	0.261***	0.260***
	(6.07)	(6.06)	(5.52)	(5.51)
Institutional Reform (INSTREF)	-4.030**	-4.067**	-4.173**	-4.243**
	(-2.16)	(-2.18)	(-2.28)	(-2.32)
Time	4.191***	4.192***	3.749***	3.756***
	(5.35)	(5.36)	(4.71)	(4.72)
Time Squared	-0.194***	-0.194***	-0.171***	-0.171***
	(-4.63)	(-4.63)	(-4.01)	(-4.01)
Constant	-28.363***	-28.396***	-26.333***	-26.376***
	(-10.52)	(-10.53)	(-9.56)	(-9.57)
R-square	0.676	0.676	0.682	0.682
Chi-square	632.24	632.21	657.54	657.41
Number of observations	300	300	300	300

Note: i) These joint estimations are obtained when the whole transition period dataset is used. ii) Fixed country effects are included in all regressions, but not reported; iii) z-statistics are reported in parenthesis; iv) the Chi-square statistics indicates the overall significance of the model; v) 3SLS(2) and 3SLS(4) specifications differ from 3SLS(1) and 3SLS(3) respectively, only by the presence of Lagged GDPG in the SPR and INSTREF equations.

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test)

Table 13 (cont). GDPG, SPR and INSTREF Determinants: 3SLS Results

	3SLS(1)	3SLS(2)	3SLS(3)	3SLS(4)
Dependant variable SPR				
GDPG	-0.002 (-0.69)	-0.0003 (-0.10)	-0.006** (-2.21)	-0.005* (-1.67)
Lagged GDPG		-0.005** (-2.36)		-0.004* (-1.78)
Lagged SPR Broad	0.678*** (17.12)	0.679*** (17.31)		
Lagged SPR Narrow			0.687*** (17.39)	0.681*** (17.31)
Time	0.095*** (2.73)	0.105*** (3.01)	0.092** (2.51)	0.103*** (2.79)
Time Squared	-0.005*** (-2.87)	-0.006*** (-3.00)	-0.005*** (-2.61)	-0.006*** (-2.79)
Initial Conditions x Time	0.0004 (0.18)	0.0012 (0.61)	0.00005 (0.02)	0.0007 (0.32)
Polity	0.018*** (3.49)	0.017*** (3.32)	0.016*** (3.10)	0.016*** (3.00)
Constant	0.719*** (5.91)	0.630*** (4.97)	0.845*** (6.72)	0.781*** (5.96)
R-square	0.926	0.928	0.914	0.915
Chi-square	3765.010	3841.200	3204.580	3242.660
Number of observations	300	300	300	300

Table 13 (cont). GDPG, SPR and INSTREF Determinants: 3SLS Results

	3SLS(1)	3SLS(2)	3SLS(3)	3SLS(4)
Dependent variable INSTREF				
GDPG	-0.004**	-0.004**	-0.0037**	-0.004**
	(-2.30)	(-2.51)	(-2.15)	(-2.49)
Lagged GDPG		0.002		0.002
		(1.08)		(1.54)
SPR Broad	0.265***	0.271***		
	(6.89)	(6.98)		
Lagged SPR Broad	0.098***	0.093**		
	(2.69)	(2.56)		
SPR Narrow			0.212***	0.218***
			(5.55)	(5.70)
Lagged SPR Narrow			0.121***	0.119***
			(3.33)	(3.30)
Time	0.138***	0.135***	0.139***	0.132***
	(5.97)	(5.79)	(5.71)	(5.37)
Time Squared	-0.006***	-0.006***	-0.006***	-0.006***
	(-4.88)	(-4.78)	(-4.67)	(-4.47)
Initial Conditions x Time	-0.008***	-0.009***	-0.009***	-0.009***
	(-6.12)	(-6.22)	(-6.39)	(-6.58)
Polity	-0.010***	-0.009***	-0.006*	-0.006*
	(-2.75)	(-2.69)	(-1.81)	(-1.75)
STAB	0.030***	0.029***	0.033***	0.032***
	(3.48)	(3.38)	(3.69)	(3.58)
GOVEXP	0.562***	0.566***	0.465***	0.469***
	(4.06)	(4.10)	(3.30)	(3.34)
Constant	0.005	0.026	0.004	0.034
	(0.05)	(0.24)	(0.03)	(0.30)
R-square	0.941	0.941	0.938	0.938
Chi-square	4819.890	4839.260	4517.840	4555.08
Number of observations	300	300	300	300

Table 14. GDPI, SPR and INSTREF Determinants: 3SLS Results

	3SLS(5)	3SLS(6)	3SLS(7)	3SLS(8)	3SLS(Rec)
Dependent variable GDPI					
Inflation	-0.001*	-0.001*	-0.001	-0.001	-0.005
	(-1.93)	(-1.88)	(-1.26)	(-1.24)	(-0.97)
SPR Broad	-29.162***	-29.105***			-21.146***
	(-13.70)	(-13.67)			(-10.40)
Lagged SPR Broad	4.287**	4.271**			-2.261
	(2.14)	(2.13)			(-1.05)
SPR Narrow			-26.591***	-26.612***	
			(-12.72)	(-12.73)	
Lagged SPR Narrow			3.025	3.050	
			(1.52)	(1.53)	
Regional Tensions	-4.424**	-4.480**	-2.856	-2.881	
	(-2.08)	(-2.10)	(-1.30)	(-1.31)	
Initial Conditions x Time	0.048	0.047	0.059	0.059	0.082*
	(0.63)	(0.62)	(0.76)	(0.75)	(1.81)
Institutional Reform (INSTREF)	33.392***	33.286***	31.888***	31.840***	22.610***
	(11.90)	(11.84)	(11.10)	(11.07)	(5.58)
Time	-3.526***	-3.508***	-3.216**	-3.204**	-5.764***
	(-2.75)	(-2.74)	(-2.38)	(-2.37)	(-5.39)
Time Squared	0.342***	0.341***	0.322***	0.321***	0.381***
	(4.96)	(4.95)	(4.42)	(4.41)	(5.70)
Constant	87.181***	87.149***	93.739***	93.765***	91.548***
	(20.31)	(20.29)	(20.53)	(20.54)	(18.43)
R-square	0.82	0.82	0.81	0.81	0.93
Chi-square	1727.77	1725.62	1630.37	1630.03	3083.27
Number of observations	300	300	300	300	190

Notes: i) These joint estimations are obtained when the whole transition period dataset is used. ii) Fixed country effects are included in all regressions, but not reported; iii) z-statistics are reported in parenthesis; iv) the Chi-square statistics indicates the overall significance of the model; v) 3SLS(6) and 3SLS(8) specifications differ from 3SLS(5) and 3SLS(7) respectively, only by the presence of Lagged GDPI in the SPR and INSTREF equations.

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test).

Table 14 (cont). GDPI, SPR and INSTREF Determinants: 3SLS Results

	3SLS(5)	3SLS(6)	3SLS(7)	3SLS(8)	3SLS(Rec)
Dependent variable SPR					
GDPI	-0.011***	-0.011***	-0.011***	-0.014***	-0.007***
	(-7.72)	(-3.69)	(-7.60)	(-4.52)	(-6.38)
Lagged GDPI		0.0001		0.003	
		(0.03)		(1.01)	
Lagged SPR Broad	0.601***	0.602***			0.609***
	(15.91)	(15.38)			(12.72)
Lagged SPR Narrow			0.586***	0.598***	
			(15.45)	(15.01)	
Time	0.068**	0.069**	0.061*	0.070*	0.063*
	(2.06)	(1.98)	(1.76)	(1.95)	(1.89)
Time Squared	-0.001	-0.001	-0.001	-0.002	-0.02
	(-0.78)	(-0.76)	(-0.56)	(-0.79)	(-0.64)
Initial Conditions x Time	-0.004**	-0.004*	-0.005***	-0.004**	-0.009***
	(-2.04)	(-1.87)	(-2.78)	(-2.17)	(-3.56)
Polity	0.006	0.006	0.005	0.005	0.026***
	(1.11)	(1.12)	(0.97)	(0.93)	(4.08)
Constant	1.664***	1.660***	1.955***	1.846***	1.642***
	(11.56)	(9.41)	(13.06)	(9.93)	(8.67)
R-square	0.93	0.93	0.92	0.92	0.91
Chi-square	4070.40	4071.92	3451.46	3459.47	1931.47
Number of observations	300	300	300	300	190

Table 14 (cont). GDPI, SPR and INSTREF Determinants: 3SLS Results

	3SLS(5)	3SLS(6)	3SLS(7)	3SLS(8)	3SLS(Rec)
Dependent variable INSTREF					
GDPI	0.009***	0.007***	0.009***	0.007***	0.007***
	(9.59)	(3.80)	(9.28)	(3.36)	(7.53)
Lagged GDPI		0.002		0.0030	
		(1.26)		(1.56)	
SPR Broad	0.349***	0.349***			0.079**
	(9.25)	(9.27)			(2.13)
Lagged SPR Broad	0.078**	0.086**			0.089***
	(2.27)	(2.47)			(2.70)
SPR Narrow			0.300***	0.297***	
			(8.02)	(7.95)	
Lagged SPR Narrow			0.103***	0.117***	
			(3.02)	(3.33)	
Time	0.132***	0.139***	0.129***	0.138***	0.156***
	(6.04)	(6.18)	(5.64)	(5.88)	(4.87)
Time Squared	-0.008***	-0.008***	-0.008***	-0.008***	-0.007***
	(-6.22)	(-6.35)	(-5.84)	(-6.06)	(-5.34)
Initial Conditions x Time	-0.008***	-0.007***	-0.008***	-0.007***	-0.006***
	(-6.28)	(-5.47)	(-6.49)	(-5.58)	(-4.46)
Polity	-0.002	-0.002	0.001	0.001	0.011***
	(-0.44)	(-0.52)	(0.32)	(0.27)	(3.26)
STAB	0.015**	0.015**	0.018**	0.018**	0.027***
	(1.95)	(1.92)	(2.24)	(2.22)	(4.01)
GOVEXP	0.368***	0.348***	0.286**	0.259**	0.290
	(2.89)	(2.72)	(2.18)	(1.97)	(1.10)
Constant	-0.599***	-0.671***	-0.650***	-0.743***	-0.894***
	(-5.2)	(-5.18)	(-5.33)	(-5.44)	(-5.83)
R-square	0.94	0.94	0.94	0.94	0.97
Chi-square	5250.22	5293.04	4922.67	4972.32	7559.74
Number of observations	300	300	300	300	190

Table 15. GDPG, SPR and INSTREF Determinants: Fixed Effects, 2SLS and 3SLS Results

Section 1	FE(9)	2SLS(9)	3SLS(9)	3SLS (10)
Dependent variable GDPG				
Inflation	-0.011***	-0.011***	-0.010***	-0.009***
	(-3.36)	(-3.28)	(-3.49)	(-3.40)
SPR Broad	1.053	0.943	2.201**	1.185*
	(0.77)	(0.66)	(2.07)	(1.65)
Lagged SPR Broad	-0.687	-0.830	-1.224	
	(-0.56)	(-0.62)	(-1.12)	
Initial Conditions x Time	0.126***	0.135**	0.135***	0.134***
	(2.60)	(2.35)	(3.06)	(3.04)
Institutional Reform (INSTREF)	5.587**	7.545	8.704***	7.151***
	(2.33)	(1.03)	(4.06)	(3.34)
Time	-1.555***	-1.667**	-1.968***	-1.817***
	(-2.88)	(-2.48)	(-4.24)	(-3.94)
Time Squared	0.116***	0.117***	0.138***	0.130***
	(2.67)	(2.68)	(3.76)	(3.55)
Constant	-4.257	-7.312	-10.630***	-8.822**
	(-0.79)	(-0.60)	(-2.75)	(-2.28)
R-square	0.14	0.14	0.46	0.46
Chi-square			176.57	170.19
Number of observations	190	190	190	190

Notes: i) These estimations are obtained when the transition recovery period dataset is used.
ii) Fixed country effects are included in all regressions, but not reported; iii) z-statistics are reported in parenthesis (t-statistics for FE(9)); iv) the Chi-square statistics indicates the overall significance of the model; v) 3SLS(9) differs from the 3SLS(10) specification only by the presence of Lagged SPR Broad in the GDPG equation and the presence of the non-linear time trend in the INSTREF equation.

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test).

Table 15 (cont). GDPG, SPR and INSTREF Determinants: Fixed Effects, 2SLS and 3SLS Results

Section 2	FE(9)	3SLS(9)	3SLS (10)
Dependant variable SPR			
GDPG	0.003	0.007*	0.006
	(0.67)	(1.69)	(1.40)
Lagged SPR Broad	0.455***	0.576***	0.575***
	(7.79)	(10.91)	(10.88)
Initial Conditions x Time	0.0034	0.0039	0.0041
	(1.19)	(1.40)	(1.47)
Time	0.1324***	0.1029***	0.1028***
	(4.52)	(3.63)	(3.63)
Time Squared	-0.012***	-0.011***	-0.011***
	(-5.13)	(-4.61)	(-4.59)
Polity	0.005	0.035***	0.035***
	(0.62)	(5.79)	(5.82)
Constant	1.668***	1.182***	1.189***
	(9.19)	(7.34)	(7.39)
R-square	0.51	0.91	0.91
Chi-square		2024.03	2022.61
Number of observations	190	190	190

Table 15 (cont). GDPG, SPR and INSTREF Determinants: Fixed Effects, 2SLS and 3SLS Results

Section 3	FE(9)	3SLS(9)	3SLS(10)
Dependent variable INSTREF			
GDPG	0.004	0.007***	0.005**
	(1.60)	(3.32)	(2.00)
SPR Broad	0.042	0.001	
	(0.95)	(0.03)	
Lagged SPR Broad	0.067*	0.052	0.097***
	(1.80)	(1.53)	(3.61)
Initial Conditions x Time	-0.004**	-0.004***	-0.005***
	(-2.56)	(-2.93)	(-3.51)
Time	0.042**	0.059***	
	(2.32)	(3.64)	
Time Squared	-0.001	-0.002*	
	(-0.79)	(-1.82)	
Polity	0.014***	0.006*	0.010***
	(2.94)	(1.70)	(2.89)
STAB	0.028***	0.028***	0.063***
	(3.24)	(3.54)	(13.65)
GOVEXP	0.154	0.385	0.350
	(0.48)	(1.36)	(1.23)
Constant	1.525***	1.360***	1.422***
	(8.29)	(9.58)	(11.19)
R-square	0.72	0.97	0.97
Chi-square		7673.41	6653.71
Number of observations	190	190	190

Table 16. GDPG, SPR, PCINST and ROLINST Determinants: Fixed Effects, 2SLS and 3SLS Results

Section 1	PCINST			ROLINST		
	FE(10)	2SLS(10)	3SLS(10)	FE(11)	2SLS(11)	3SLS(11)
Dependent variable GDPG						
Inflation	-0.001	-0.001	-0.001	-0.0001	-0.0001	-0.0002
	(-1.19)	(-1.54)	(-1.31)	(-0.41)	(-0.11)	(-0.37)
SPR Broad	-1.775	-1.147	-3.345***	-1.195	-1.436	-2.217*
	(-1.40)	(-0.86)	(-2.87)	(-0.93)	(-1.03)	(-1.88)
Lagged SPR Broad	2.019	1.010	2.925***	1.843	0.619	2.232**
	(1.72)	(0.77)	(2.70)	(1.54)	(0.41)	(2.04)
Institutions	6.287	18.751**	9.619**	0.596	3.784*	1.110*
	(1.28)	(2.29)	(2.14)	(0.89)	(1.79)	(1.81)
Initial Conditions x Time	0.062	0.031	0.074*	0.165***	0.227***	0.182***
	(1.46)	(0.67)	(1.91)	(3.26)	(3.39)	(3.93)
Time				-0.447	-0.545	-0.389
				(-1.14)	(-1.27)	(-1.08)
Time Squared				0.063*	0.072*	0.057*
				(1.86)	(1.94)	(1.84)
Constant	-0.875	-9.227	---	1.380	-1.704	-2.320
	(-0.18)	(-1.41)	---	(0.37)	(-0.38)	(-0.57)
R-square	0.07	0.12	0.31	0.11		0.35
Chi-square		---	503.2		---	96.07
Number of observations	166	166	166	166	166	166.000

Notes: i) These estimations are obtained when the transition recovery period dataset is used.
ii) Fixed country effects are included in all regressions, but not reported; iii) z-statistics are reported in parenthesis (t-statistics for FE(10)and FE(11); iv) the Chi-square statistics indicates the overall significance of the model; v) In FE(10), 2SLS(10) and 3SLS(10) there is no time trend included. When the time trend was included, the Time and Time Squared coefficients were insignificant. The specifications reported are the ones without the non-linear time trend.

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test).

Table 16 (cont). GDPG, SPR, PCINST and ROLINST Determinants: Fixed Effects, 2SLS and 3SLS Results

Section 2	PCINST		ROLINST	
	FE(10)	3SLS(10)	FE(11)	3SLS(11)
Dependent variable				
GDPG	-0.008	-0.016***	-0.005	-0.009*
	(-1.51)	(-3.19)	(-0.80)	(-1.73)
Lagged SPR Broad	0.671***	0.682***	0.595***	0.602***
	(13.13)	(14.40)	(9.86)	(10.82)
Initial Conditions x Time	0.0120***	0.0130***	0.008**	0.009***
	(4.51)	(5.06)	(2.40)	(2.82)
Time			0.074***	0.071***
			(2.89)	(3.03)
Time Squared			-0.007***	-0.007***
			(-3.22)	(-3.34)
Polity	-0.002	-0.001	0.0007	0.0004
	(-0.18)	(-0.14)	(0.08)	(0.05)
Constant	1.359***	1.124***	1.452***	1.416***
	(7.44)	(5.37)	(7.60)	(6.46)
R-square	0.55	0.87	0.58	0.88
Chi-square		1141.83		1234.77
Number of observations	166	166	166	166

Table 16 (cont). GDPG, SPR, PCINST and ROLINST Determinants: Fixed Effects, 2SLS and 3SLS Results

Section 3	PCINST		ROLINST	
	FE(10)	3SLS(10)	FE(11)	3SLS(11)
Dependent variable				
GDPG	-0.0003	0.001	0.002	0.011
	(-0.23)	(0.70)	(0.24)	(1.14)
SPR Broad	-0.047***	-0.045***	-0.137	-0.004
	(-2.70)	(-2.82)	(-0.09)	(-0.03)
Lagged SPR Broad	0.043***	0.040***	0.364**	0.347***
	(2.72)	(2.80)	(2.60)	(2.72)
Initial Conditions x Time	0.006***	0.006***	-0.022***	-0.023***
	(8.76)	(9.37)	(-3.41)	(-3.95)
Time			0.025	0.03
			(0.50)	(0.63)
Time Squared			-0.004	-0.05
			(-1.06)	(-1.30)
Polity	0.008***	0.007***	-0.038**	-0.037**
	(4.17)	(4.52)	(-2.26)	(-2.46)
STAB	0.019***	0.018***	0.047	0.047
	(7.74)	(8.37)	(1.47)	(1.61)
GOVEXP	0.290**	0.291**	-2.502**	-2.474**
	(2.22)	(2.42)	(-2.10)	(-2.28)
Constant	0.609***	0.687***	2.484***	---
	(7.32)	(7.64)	(3.18)	---
R-square	0.46	0.94	0.39	0.85
Chi-square		2483.88		14115.79
Number of observations	166	166	166	166

Table 17. GDPG Determinants: Fixed Effects and 2SLS Results

	FE(12)	2SLS(12)	FE(13)	2SLS(13)
Dependent variable GDPG				
Inflation	-0.0002	0.0005	-0.0004	-0.00002
	(-0.3)	(0.51)	(-0.62)	(-0.03)
SPR Broad	-1.391	-2.830	-2.308*	-2.788**
	(-1.07)	(-1.56)	(-1.86)	(-2.05)
Lagged SPR Broad	1.637	-0.991	1.427	-0.705
	(1.35)	(-0.5)	(1.19)	(-0.44)
INSTREF	1.978	13.679	2.958**	6.003***
	(1.02)	(1.57)	(2.13)	(2.65)
ROLINST	0.567	4.062*	0.489	3.461
	(0.84)	(1.69)	(0.72)	(1.54)
Initial Conditions x Time	0.17***	0.26***	0.13***	0.23***
	(3.32)	(3.32)	(2.80)	(3.43)
Time	-0.587	-1.525*		
	(-1.41)	(-1.93)		
Time Squared	0.065*	0.086**		
	(1.92)	(2.01)		
Constant	-1.255	-20.385	-0.222	-6.005
	(-0.28)	(-1.57)	(-0.06)	(-1.26)
R-square	0.22	---	0.39	---
Number of observations	166	166	166	166

Notes: i) These single equation estimations are obtained using the transition recovery period dataset. ii) Both INSTREF and ROLINST are included in the single equation estimation of the GDPG equation, in order to measure their separate effects on GDPG. iii)Fixed country effects are included in all regressions, but not reported; iv) z-statistics are reported in parenthesis (t-statistics for FE(12) and FE(13); v) In FE(13) and 2SLS(13) there is no time trend included as compared to FE(12) and 2SLS(12).

* Statistically significant at the 10 percent level (two-tailed test).
** Statistically significant at the 5 percent level (two-tailed test).
*** Statistically significant at the 1 percent level (two-tailed test).

Table 18. Summary of Empirical Findings

	Endogenous Dependent Variable					
	GDPG(1)	GDPG(2)	SPR(1)	SPR(2)	INST(1)	INST(2)
Explanatory Variables						
Inflation	100	100				
SPR	75	0			100	100
Lagged SPR	100	0	100	100	100	100
Institutional Development	25	100				
Regional Tensions	100					
Initial Conditions x Time	100	100	100	100	100	100
Time	100	100	100	100	100	100
Time Squared	100	100	100	100	100	100
GDPG			60	100	90	100
Lagged GDPG			70		100	
Polity			100	100	30	80
STAB					100	100
GOVEXP					100	90

Table 18 (cont). Summary of Empirical Findings

	Endogenous Dependent Variable					
	GDPI(1)	GDPI(2)	SPR(1)	SPR(2)	INST(1)	INST(2)
Explanatory Variables						
Inflation	100	100				
SPR	100	100			100	100
Lagged SPR	100	50	100	100	100	100
Institutional Development	100	100				
Regional Tensions	100					
Initial Conditions x Time	100	100	100	100	100	100
Time	100	100	100	100	100	100
Time Squared	100	100	100	100	100	100
GDPI			100	100	100	100
Lagged GDPI			100		100	
Polity			100	100	50	90
STAB					100	100
GOVEXP					100	100

Notes: i) This table gives the percentage of times each coefficient had the expected sign in all the empirical specification models estimated, including the ones that were not reported in Table 11 through Table 16. ii) Two sets of three equation systems were estimated, depending on whether GDPG or GDPI was used to measure output performance. Each of these sets separately uses the three institutional development indicators, INSTREF, PCINST and ROLINST, thus yielding a total of six estimated sets of systems. Several empirical specifications were estimated for each set. iii) The index (1) in each of the endogenous dependent variables refers to the estimation results when the whole transition period dataset is used, while the index (2) refers to the estimation results when the transition recovery stage dataset is used.