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and the transition economies:
further evidence**

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Quaderno n. 64/aprile 2013

V&P VITA E PENSIERO

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Abstract

Based on the various works on the relevance of the institutional arrangements for a country's economic performance, this paper studies the role and the determinants of the reform policies for the development paths of the transition countries. Looking at the U.S.S.R breakdown as an extremely powerful "experiment" and considering the nature of its consequences, the paper investigates the importance of policy reforms for the productivity growth looking for possible structural break and differences among of the nations in transit. The paper studies the different patterns of reforms using a synthetic measure treated as endogenous and instrumented by the rents coming from the natural endowments, the extent of the democratic progress and the trade openness. The paper proves that these determinants have played a different role in explaining the pattern of reform policies of the transition countries, which in turn has affected their productivity growth paths. Empirically, the paper develops a dynamic approach implementing the more advanced econometric techniques.

JEL: C33, E02, O11, O43, P20, Q30.

Key words: economic growth, institutions, reforms, transition economies, dynamic models, panel analysis.

Introduction

One of the most remarkable results of the recent years of research is the positive relationship between institutions and development (North; Acemoglu, Johnson and Robinson; Hall and Jones; Rodrik; Easterly; among others). Several works have proved empirically the positive effect institutions have on the countries growth processes and the paths undertaken by the literature shows that working in a historical perspective is fruitful for several standpoints. In particular, it suggests the role of institutional arrangements could be further determined if we might observe a “structural” change of institutions and study what this has entailed for subsequent economic patterns.

Transition economies are an extraordinary case of structural change of institutions. These countries lived for many years under the Communist rule, which had its own political and economic imperatives, and when these regimes were removed they had to face a new “reality” demanding new governments, new institutions and a transition to market economies.

The literature¹ has studied thoroughly the economic challenges of these countries focusing theoretically on the causes of the initial output collapse (among others, Blanchard and Kremer, 1997; Calvo and Coricelli, 1996; Gaddy and Ickes, 1998; Marin and Schnitzer, 1999) and empirically on the role of initial conditions and reforms strategies (liberalisation) in explaining output performance (De Melo et al. 1996, 2001; Fischer, Sahay and Vegh, 1996, 2000; Selowsky and Martin, 1997; Staehr, 2005; Lee and Jeong, 2006). Moreover, considering that the variation of the economic performance of these countries could be also determined by the new created institutional environment, the literature on transition has dealt with the importance of institutions for their economic outcomes (Havrylyshyn and Van Rooden, 2003; Di Tommaso, Raiser, Weeks, 2007; Redek and Susjan, 2005, 2008; Pistor, Raiser, Gelfer, 2000; Hoff and Stiglitz, 2004).

¹ For a comprehensive review, see Campos and Coricelli, 2002.

Institutions in these works are defined in different ways and can be either various indicators of the extent of economic freedom or measures of the democratic process and protection of property rights. Although their results confirm the existence of a positive relationship between institutional arrangements and economic performance, none of them provides the basis for a conceptual framework to analyze the impact of institutions on the economic paths of the transition countries. Exceptions are Beck and Laeven (2006) and Eicher and Schreiber (2010), who tackle this issue providing respectively a first study of the determinants of the institutional variation across their economies and a first attempt to capture the contemporary short term effects of a precise set of institutions via a panel methodology.

Our paper, motivated by these approaches and their results, offers a novel explanation of why the so called transition economies exhibit such different stages in terms of institutional development (i.e. Estonia vs. Uzbekistan; Czech Republic vs. Moldova; Hungary vs. Turkmenistan, and so on) and provides further evidence on their importance for economic growth. Considering a specific part of the institutional environment (as Eicher and Schreiber, 2010), namely the institutions which rule the economic activity, those economic agents look at when they have to take economic decisions, we wonder about their status quo, about which forces have shaped their profile (as Beck and Laeven, 2006). Our hypothesis is that three main factors have affected the institutional development of the nations in transit. First, as communism means that everything is controlled, “commanded”, by the state, by what can be called political power, we conjecture that the countries, where the past elites remained in power, where authoritarian presidential administrations exist, where democratization process is very slow or even a “dream”, they also have known an equally slow institutional development. Second, some of the transition economies are endowed with the presence of natural resources, whose extraction is typically controlled by state authorities. Since this clearly leads to widespread rent-seeking behaviour on the part of the government, which in turn leads to corruption - in a system

where bribery was already endemic – we hypothesize that where there is abundance of natural resources, there is poor institutional development due to the incentives of the political elite to keep the economy “under control” in order to secure economic rents. Third, other incentives to reform the economic system are thought to come from the countries’ trade openness, from their trade relationships (Barlow, 2006). As the degree of trade openness of the transition economies, especially that of the Former Soviet Union ones, was very low, because their partners largely belonged to the Council for Mutual Economic Assistance (CMEA), we conjecture that the incentives coming from the trade relations with more advanced market economies have been another potential force for the institutional development. In other words, we hypothesize that the institutional arrangements of the countries engaged in trade relations with more advanced market economies are more developed.

This paper shows that among the transition economies, these three dimensions have affected the evolution of the institutional arrangements, which in turn has to a certain extent affected their growth paths. Our work offers a novel approach to the explanation of the endogeneity of the institutions building in the transition countries. Moreover, we investigate whether, among these countries, the new institutional arrangements have played a different role. Focusing on the historical perspective, we decide to make a distinction between Former Soviet Union (FSU) countries and Central Eastern European (CEE) ones. In fact, the former are heritage of the Soviet Union, the latter are the so called Eastern bloc, i.e. countries that have “just” experienced *Communism*. The former had a *common* history; the latter had a soviet influence *in common*, which however affected them differently. Due to this, we cannot think the CEE countries lived central planning in the same radical way. Since the U.S.S.R. breakdown is a unique and extraordinary event due to its seventy years history of systematic cohesion among political system, economic policy and economic structure, we examine whether this heritage has conditioned the importance of the new institutional landscape. For this reason, the

analysis of the institutional determinants and the study of their impact on the economic growth is done controlling also for country-group.

As Eicher and Schreiber, we follow the leading approach of the literature about the link between growth and institutions (Hall and Jones, 1999; Acemoglu et al., 2002, 2005) and focus only on the role of institutions to catch the economic change due to the institutional development.

The rest of the paper is organized as follows. Section 2 presents our theoretical framework. Starting from the data, we also provide some empirical evidence. Section 3 presents the specification of the model, our econometric methodology and describes the variables used. Section 4 shows the estimation results. Section 5 concludes.

1. Institutions, reform policies and their determinants

In the literature, during these years of research, the word “institution” has received different names; it has been related to different part of the institutional environment. Institution may refer to the political system, to the economic system or, generally speaking, to all the outcomes of the normative behaviour of the government. Moreover, it happens that the same measure is associated with different labels, according to the purpose of the study. However, although researchers have studied different features of the institutional structure and called them in different ways, we all know that institutions have an unique theoretical meaning, from which we start to explain our conceptual and empirical analysis.

North taught us that “institutions are the rules of the game of the society”. More precisely, “they define the choice set and determine transaction and production costs and, hence, the profitability and feasibility of engaging in economic activity”. At the beginning of the 1990s, the transition countries experienced the end (at least formally) of a specific set of institutions. The Communist

experiment ended and this automatically led to the collapse, for all of them², of a specific typology of “economic institutions”, *central planning*. This “change” had its extreme expression for the Former Soviet Republics, which were together characterized by the same administrative decisions, management and control, where the Plans were the main instrument of strategic development. This central and hierarchical planning of the economic activity, established with the Revolution (1917) and maintained during the years of the authoritarian-dictatorial regime (until 1990), inspired the economies of the States of Eastern Europe, which in turn became Communist regimes at around the end of the World War II. Twenty years ago, the U.S.S.R. breakdown engendered a great historical change that entailed a transition from something, the past, to something else, the new realities formed, which leapt into the unknown, the market economy system. From this common background, which can be analytically conceived as exogenous, the Former Soviet Republics and the countries of the Eastern bloc needed an institutional change, new “rules of the game” for the economic activity.

On this basis, we study the pattern of reform of these countries, whose outcome, the result of the reform policies implemented by each of them, is precisely what North means: that is, what economic agents see and take into account when they engage in the economic activity. Our measure of reform policies, following Eicher and Schreiber (2010)³, is a synthetic one and it is defined using the E.B.R.D. (European Bank for Reconstruction and Development) indices of assessment in nine areas: small and large-scale privatisation, governance and enterprise restructuring, price liberalisation, trade and foreign exchange system, competition policy, banking reform and interest rate liberalisation, securities market and non bank financial institutions, and infrastructure. They are concretely related to the functioning of the economic system and their values, measuring the degree of development (reform)

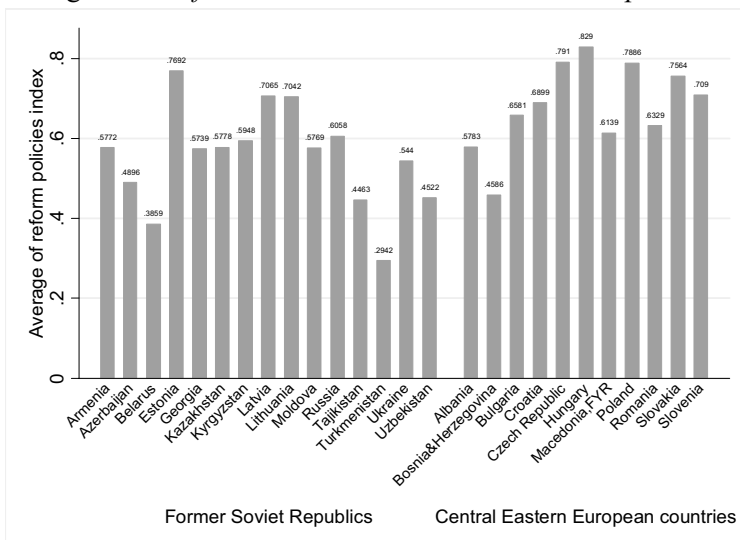
² The Former Soviet Republics and the former Communist states of Eastern and Central Europe.

³ They call them “structural policies”.

reached by a particular country in a given year, let necessarily think of the hands of the policy makers, of their efforts, and the quality of the policies implemented.

The E.B.R.D. grades, on a scale of 1 to 4+, each country in a given year along these nine dimensions. Because these indices are highly correlated, our measure is a composite index. For each country, we sum the value of each indicator in one year and normalize the aggregate index obtained, so that it ranges from 0⁴ to 1. This procedure gives an immediate sense of the level of the reform policies, with low values meaning persistence of the characteristics of the past and high values suggesting standards of the more advanced market economies. For instance, countries like Czech Republic, Hungary, Poland, Slovak Republic and Slovenia have reached a satisfying stage since their governments have boosted the reform policies; countries like Belarus, Tajikistan, Turkmenistan and Uzbekistan, instead, fall behind, with limited reform efforts.

Figure 1 - *Reform Policies Index over 1991-2008 period.*



⁴The minimum value is 0.23095.

On the whole, the transition countries have known different reforms paths, as the reform policies have been implemented at different speeds and with different commitments. Why some transition economies have spurred reforms, while others are reform hostile? Which are the reasons behind their *status-quo*? And, above all, is this institutional change necessary for growth for all these countries? May its effect decrease over time?

Our framework, studying the incentives of the ruling elites, features a novel account of the creation of these new institutional arrangements and provides evidence of their importance according to the group considered. We hypothesise that their key three determinants are the rents coming from the natural resources, the nature of the political system (autocracy versus democracy) and the extent of the trade openness.

Natural resources. The issue of natural resources is well-studied in literature (Sachs and Warner, 1995; Sala-i-Martin, 1997; Gylfason, 2001; Auty, 2001) and it is common to refer to it in terms of “curse of natural resources”: richly endowed countries tend to have bad economic performances.

In particular, the theoretical idea brought out by the literature is that the abundance of natural resources is likely to develop mechanisms which in turn lead to fall victim to the curse (Mikesell, 1997; Auty and Gelb, 2001). The natural resources phenomenon and the deterministic relationship between growth and natural resources have been studied also for the transition economies, finding evidence for the curse (Kronenberg, 2004; Esanov et al. 2001) and against it (Brunnschweiler, 2009). But what the literature does not say for the transition economies, which would be more relevant, is whether or not they have conditioned their reform policies and thus injured growth (as done for Sub-Saharan African countries by Dalmazzo and De Blasio, 2001). In other words, we wonder whether natural resources abundance has hampered the reform policies. Our hypothesis is that among transition economies the incentives of the government to reform decrease when the rents coming from natural resources increase. Reasoning in terms of the channels of transmission for the curse,

our insight is that the typical state control of the concessions related to the extraction of natural resources encourages corrupt and rent-seeking behaviour in the government and the political elites in order to protect their own interests, which in turn leads to a “massive distortion” (Kronenberg, 2004) of the economic system and to a block of reform.

Trade relations. The end of central planning means, at least theoretically, the simultaneous integration into the world economy and the relations with advanced market economies. Some papers have dealt with the importance of trade in transition (Kaminski, 1996; Kaminski et al., 1996) and the positive role of the trade reform policies on the economic outcome when followed by “external and internal reform” (Barlow, 2006). The openness to other countries and the commercial international relations are of great importance for the nations in transit. In fact, the centrally controlled system suppressed trade with market economies and allowed trade only between Communist countries (organized by the CMEA). In our paper, we aim at understanding whether the economic (trade) relations with advanced market economies have affected the reform processes. Since transition countries are likely to be diverse in terms of the nature of their trade relations, we can imagine that these commercial contacts have affected and conditioned the actions of the policy makers of these countries. More developed relations with advanced market economies require a progressive liberalization, namely to reform the institutional arrangements implementing reform policies. It is clear that the extent of the trade openness depends on whether or not there is a direct involvement in exports and imports by ministries and state-owned trading companies. Where it does exist, there will be very few commercial relations and a low trade openness. Where there are no administrative restrictions, the degree of openness will be greater and this will lead to a general and progressive improvement of the institutional structure. If to protect their economic interests, the government dictates restrictions on the international trade, the degree of openness to the advanced market economies will be reduced and this will penalize the reform process. If the

government has no particular economic interests to protect, it has no need to avoid the international competition and its policy measures will encourage the reform paths. The following table (Table 1) exhibits the correlation coefficients between the reforms index and the first two supposed determinants: natural resources are negatively correlated with reforms (the coefficient is higher for the Former Soviet Union countries), whereas trade relations with advanced economies are positively correlated with them. It is noteworthy that as for the former the degree of correlation is higher for the Former Soviet Republic; as for the latter, higher for the countries of the so called Eastern bloc.

Table 1 - *Pairwise Correlation Coefficients*

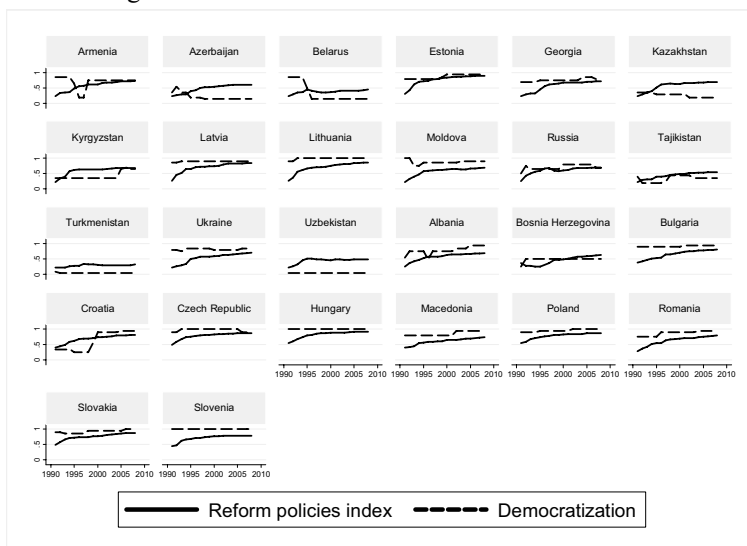
			All natural resources rents (% of GDP)	Oil & natural gas rents (% of GDP)	Share of Euro area imports by partner (%)	Share of Euro area exports by partner (%)
<i>Reform policies index</i>	<i>All sample</i>	<i>Correlation coefficient</i>	-0.3627	-0.3658	0.3473	0.4577
		<i>Significance level</i>	0.0000	0.0000	0.0000	0.0000
		<i>N</i>	468	468	468	468
	<i>Fsu countries</i>	<i>Correlation coefficient</i>	-0.5643	-0.5702	0.1393	0.1981
		<i>Significance level</i>	0.0000	0.0000	0.0220	0.0011
		<i>N</i>	270	270	270	270
<i>Cee countries</i>	<i>Correlation coefficient</i>	-0.3225	-0.2681	0.6209	0.6104	
	<i>Significance level</i>	0.0000	0.0001	0.0000	0.0000	
	<i>N</i>	198	198	198	198	

Democratization. Other incentives to reform the economy depend on how political power is allocated by one country's political institutions, namely if they allocate an excessive power to a small group or even to a single person (Acemoglu et al., 2005). It

becomes clear that if political power accrues to few people, their incentives will be to act in order to protect their particular interests and not to further those of the majority of the population. The literature on transition explains in different ways that the abandonment of past institutional arrangements, that is the abandonment of the centralized control of the economy in behalf of liberalization (De Melo et al. 2001, among others), has benefited these countries, their per capita GDP. Therefore, we can gather that in those countries where political power of the elite is not threatened by any political opposition or by institutions themselves, the elite will use its power to secure economic rents and income, and will have no incentive to reform the economic environment, which would automatically reduce their rents and benefit most people. Thus, we hypothesise that among transition countries, self-interested autocratic system and authoritarian political structure are another determinant of the reform policies path. It can be noticed (Figure 2) that reforms and democratization paths tend in most cases to coincide.

These three determinants are of course inevitably interrelated. The combination of non democratic institutions, which allocate political power to a small self-interested autocratic elite, with economic interests to protect (that are likely to come from both rents of natural resources and returns of state-owned dominant firms) drive the reform policies and shape the institutional development of these countries. Our analysis proves that these determinants have conditioned the reform policies of the transition countries (namely the Central Eastern European and the Former Soviet ones) and that their incremental evolution (North, 1990) has in turn affected their growth paths with some exceptions.

Figure 2 - *The Index and the Democratization Path.*



2. *Econometric Analysis*

Our analysis focuses on the twenty-six transition economies, over the 1991-2008 period, and examines the importance of the reform policies for the growth paths of the transition countries. Drawing on the evidence (Eicher and Schreiber, 2010) of positive relation between institutional development and economic growth, we like studying by means of several regressions whether the reform policies (synthesized in the composite index explained above) have shaped differently the growth paths of the transition economies according to the two identified groups and whether there exists a structural break after the first few years following the USSR breakdown. More specifically, regarding the countries group, considering their different historical experience of *central planning*, we believe that the proper distinction is that between Central Eastern European countries and the Former Soviet Republics. Regarding the structural break, it is worth noting that the period immediately after the collapse of the Soviet Union generally

saw a massive dislocation with GDP *per capita* collapsing, followed by a rapid recovery and then a steadier rate of growth. Hence, there may be a structural break that deserves investigation. To establish whether the “dislocation” period exists, the levels of GDP *per capita* were examined and because, as expected, the first few years after the breakdown (1991-1996) seem “abnormal”, we take account of this evidence introducing a dummy in the appropriate regressions.

Theoretically, talking about growth means reasoning in terms of production function, which implies to think of productivity. We employ two measures of economic performance: the GDP per person employed⁵, namely the gross domestic product divided by total employment in the economy, expressed in PPP terms (purchasing power parity GDP converted to 1990 constant international dollars using PPP rates) and our measure of TFP. Total Factor Productivity is defined in the usual way as $TFP = Y/[K^{1-\alpha}L^\alpha]$, where Y is output, K capital, L labour; $1 - \alpha$ is the capital share and α the labour share of income (a constant α equal to 0.66)⁶. Output is measured by GDP (constant 2000 US\$)⁷, labour by the labour force⁸ and physical capital stock by the inventory equation $K_t = I_t + (1 - \delta)K_{t-1}$, where I is investment and δ the depreciation rate⁹. Following the literature, the initial value of capital stock is set equal to $K_0 = I_0/(g + \delta)$, where I_0 is the value of investment the first available year, g the investment average growth rate over the estimation period¹⁰. To check the soundness and reliability of TFP measure, we regress the growth of

⁵ Source: World Development Indicators Database.

⁶ It is common in the literature to assume a constant labour share of two-thirds.

⁷ Source: World Development Indicators Database.

⁸ Labour Force, Total. Source: World Development Indicators Database.

⁹ As it is usual in the literature, we assume a depreciation rate of 6%.

¹⁰ As the time interval between the first year with available data and the first year of the estimation period (Caselli, 2005) is less than five years, Luintel and Khan (2004) are followed and the average growth rate of investment over the estimation period is used.

GDP on the growth of TFP and finding a close relationship¹¹ we use also these series to assess the growth of productivity.

But before proceeding with the core analysis of the paper, we like exploring the impact of the reform policies on the productivity growth of these countries first via a non parametric test and then via some preliminary cross-country regressions. The reform policies index is constructed by valuing the degree of structural change on a scale of 1 to 4+ and creating a composite index. In a sense, this is an ordinal measure than a cardinal one: a value of two shows greater market liberalisation than a value of one (an ordinal measure) but it is not twice as great (a cardinal measure). We treat the index as an ordinal measure and determine the strength of association between reforms and the growth paths by computing the *Spearman rank correlation* between the average growth rate of productivity (both measures) and the average value of the index. This is done over the whole period (1991-2008), the *dislocation* one (1991-1996) and the remainder of that¹² (Table 2). As the results reveal, the null of independence can be rejected only for the very first years since independence, whereas after 1996 and over the whole period there seem to be no relationship between them. This suggests it is worth investigating where the relationship breaks down and whether there exists a difference between the Central Eastern European countries and the Former Soviet Republics.

¹¹ The estimated coefficient is positive and high statistically significant (coefficient = 0.7560, standard error = 0.0316, t-statistics = 23.91) with and adjusted R-Squared of 0.5658.

¹² Figures are reported in tables (Appendix A, Table A1, Table A2, Table A3).

Table 2 - Spearman Rank Correlation

			1991-1996	1997-2008	1991-2008
Reform policies index	Average growth rate Gdp per person employed	<i>Spearman's rho</i>	0.6834 (0.1490)	-0.3361 (0.1923)	0.2752 (0.1962)
		<i>Test of H₀</i>	t(24)= 4.5862 p-val=0.00	t(24)= 1.7481 p-val =0.09	t(24)= 1.4024 p-val= 0.17
		<i>N</i>	26	26	26
	Average growth rate TFP	<i>Spearman's rho</i>	0.5494 (0.1706)	-0.3190 (0.1935)	0.1562 (0.2016)
		<i>Test of H₀</i>	t(24)= 3.2212 p-val= 0.00	t(24)= 1.6488 p-val= 0.11	t(24)= 0.7749 p-val= 0.44
		<i>N</i>	26	26	26

The next table (Table 3) provides evidence of the effect of the reform policies index at the beginning of the period on subsequent growth. We run cross-countries regressions of the growth rate of productivity over the 1991-2008 (measured either by GDP per person employed or by our computed measure of TFP) against the initial value of the index (1991). We also define a group dummy (Fsu, which takes value 1 if the country is a Former Soviet Republic) to discover potential differences between the two groups of transition countries. The estimation output shows that the initial effect of the reforms index differ significantly across countries. In particular, it is interesting to note that when the country dummy is included, the data reject the hypothesis that the slopes of the Central Eastern European Countries and the Former Soviet Republics are equal.

Then, to see whether there are cyclical fluctuations in the growth of productivity that generate noise and mask the time-series relationship between productivity growth and the level of the reform policies index, we calculate the growth rates over sub-periods of six years and run regressions of these average growth rates on the average value of the index over the same sub-periods (Table 4). The estimated coefficient is always statistically

significant. This confirms that there is a short-term relationship between the regressor and the productivity growth, and the slope dummies for the two sub-periods show that reforms policies have a different effect over time: reforms matter more at the beginning of transition than afterwards. The estimated slopes say that the reforms impact decreases over time (columns III and VI, Table 4). On the whole, these results show that the reforms policies seem to affect differently, across groups and over time, the economic performance of the nations in transit. Our next step is to check the insights arising from these preliminary results and estimating the annual impact of the reforms improvement.

Table3 - *Cross-Country Evidence of the Initial Effect of Reforms*

	Dependent variable			
	<i>Gdp per person employed</i>		<i>Total factor productivity</i>	
	$\hat{Y}_{1991-2008}$	$\hat{Y}_{1991-2008}$	$\hat{Y}_{1991-2008}$	$\hat{Y}_{1991-2008}$
<i>Fsu (dummy)</i>		.1271** (.0534)		.0811** (.0363)
<i>Index₁₉₉₁</i>	.0198 (.0124)	-.0318 (.0215)	.0015 (.0090)	-.0174 (.0151)
<i>Index₁₉₉₁ * Fsu</i>		.1139** (.0450)		.0655** (.0303)
<i>constant</i>	yes	yes	yes	yes
N	26	26	26	26
R-squared	0.0684	0.2314	0.010	0.0888
F-test p-value	0.1230	0.1043	0.8686	0.1679

Superscripts **/*/** denote 10, 5, and 1 percent significance levels.

Number in parenthesis are robust standard errors.

The reform index is expressed in logarithmic terms.

Table 4 - Long-term versus short-term relationships

	<i>Dependent variable</i>					
	<i>Gdp per person employed</i>			<i>Total factor productivity</i>		
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>
	\bar{Y}_{OLS}	\bar{Y}_{LSDV}	\bar{Y}_{LSDV}	\bar{Y}_{OLS}	\bar{Y}_{LSDV}	\bar{Y}_{LSDV}
<i>Perioda</i>			.1033** (.0408)			.0905 (.0552)
<i>Periodb</i>			.0220* (.0125)			.0094 (.0123)
\overline{Index}	.1205*** (.0228)	.2535*** (.0328)	.1188* (.0669)	.0978*** (.0283)	.2158*** (.0443)	.0610 (.0849)
\overline{Index} * <i>Perioda</i>			.1924*** (.0334)			.1919*** (.0459)
\overline{Index} * <i>Periodb</i>			.0435* (.0233)			.0353** (.0167)
<i>constant</i>	yes	yes	yes	yes	yes	yes
N	78	78	78	78	78	78
R-squared	0.3368	0.7035	0.8180	0.2352	0.5124	0.6232
F-test p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Superscripts */**/** denote 10, 5, and 1 percent significance levels. Number in parenthesis are robust standard errors. The dependent variables are the average growth rates of GDP per person employed and of TFP over 1991-1996 (1992 in case of TFP), 1997-2002, 2003-2008. The average values of the index are calculated over the same periods. The reform index is expressed in logarithmic terms.

2.1 Dynamic Panel Estimation

To get information about the effect of reforms policies development on economic performance, our analysis relies on panel methods. This methodology, taking into account both the cross-sectional and time variation, provides an exhaustive investigation of the ongoing incremental effect of reform policies on the countries' economic growth. In the literature on transition, this strategy has been completely followed only by Eicher and Schreiber (2010), who are the first to analyse the growth paths of the transition countries via a dynamic specification, over the 1991-2001 period.

As said before, our dataset consists of the twenty-six nations in transit studied over the 1991-2008 period and since the institutional arrangements, outcome of the reform policies implemented by the governments of these countries, are explicitly not recognized as exogenous in our framework, we develop formal econometric methods to deal with endogeneity.

To assess the different impact of the reform policies on growth rates, according to the group of countries considered, we use the system GMM estimator (Blundell and Bond, 1998; Bond et al., 2001; Bond, 2002), whose crucial feature among others is to deliver un-biased coefficients in presence of endogenous independent variables.

Our equation model is:

$$\hat{y}_{i,t} = \alpha + \beta x_{i,t-1} + \gamma y_{i,t-1} + \varphi_i + \tau_t + \varepsilon_{i,t} \quad (1)$$

where $\hat{y}_{i,t}$ is productivity growth (exponential growth rates, both measures) in country i at time t ; $x_{i,t-1}$ is the reform policies index for the country i at time $t-1$, expressed in logarithmic terms, to study the impact of the policies implemented on the following growth outcome; φ_i captures country-specific effects and τ_t the time trend¹³.

The model is first estimated considering all the transition countries and then defining a country-group dummy (Fsu dummy) and a slope dummy variable (period b, 1997-2008) for the period following the dislocation one (1991-1996) to look for possible different impacts between the Eastern European and Former Soviet countries and over time, respectively. Then, we follow our theoretical analysis of the determinants of governments' incentives to reform, based on the cross-sectional approach of Beck and Laeven (2006), and define *ad-hoc* instruments to develop in a panel setting a comprehensive explanation of the commitments to

¹³ Time fixed effects are not included. The rationale for that will be explained later on.

reform. Inspired by the *hierarchy of institutions* identification strategy of Eicher and Schreiber (2010), we regress our index of reform policies on the variables quantifying the rents coming from natural resources, the nature of the political institutions and the extent of the trade relations with advanced market economies. This allows to understand their particular role according to the group-specific transition path and provides the econometric foundation to get a differently instrumented weight of the reform policies implemented. From the empirical point of view, the importance of natural resources is measured both by *the total (oil, natural gas, coal, mineral and forest) natural resource rents* (as percentage of GDP) and the *oil and natural gas rents* (as percentage of GDP) from the World Development Indicators Database. Natural resources rents are defined as the difference between the value of the natural resource production at world prices and total costs of production. These variables explicitly assessing the rents accruing to the governments are the right measure of what leads to the rent-seeking behaviour of the political elites. The nature of the political institutions is caught by the holistic *polity2* variable of the Polity IV Project Database, which on a scale from -10 to +10 says the degree of democracy and autocracy, meaning -10 “full autocracy” and +10 “full democracy”. This perspective envisions a spectrum of governing authority that spans from fully institutionalized *autocracies* (-10 to -6), through mixed authority regimes, *anocracies* (-5 to +5), to fully institutionalized *democracies* (+6 to +10). Finally, since there is no available evidence for all the transition countries of their trade relations with the world advanced market economies, we determine their extent by the share (percentage) of imports or exports (of all products) of the euro area (12 countries) by trade partners¹⁴ (from the Eurostat Statistics Database¹⁵). We know this may not exhaust their trade connections with all the advanced economies, but it certainly tells their links

¹⁴ The partners selected are of course the 26 nations in transit.

¹⁵ Extra-Euro area trade by partner and by SITC product group Database.

with the “closest” ones and gives a less imperfect and biased information than the usual degree of openness indicators.

3. Estimation Results

We present the main estimation results concentrating first on the impact of the reform policies impact on the productivity growth of the transition countries (equation 1), and then on the study of the reforms determinants via a two-stages approach.

Table 5 presents estimation results for the equation (1) on the sample of the 26 transition countries. The annual productivity growth (the exponential growth rate of the GDP per person employed and of total factor productivity) is regressed on the lagged value of the logarithm of productivity and the lagged measure of the reform policies index, expressed in logarithmic terms. The first dynamic regression (columns I and V) proves a highly statistically significant and positive role of the reform policies for the growth paths of all the transition countries (in line with Eicher and Schreiber, 2010) and additionally it tells that the institutional arrangements, result of the policies implemented by the governments of these countries, affect the following economic outcome: a one percent increase of the reform policies index raises the growth of productivity by .28 or .30 respectively, according to the measure of productivity considered. We decide to control for the group-specific transition path (columns II and VI), studying the slope coefficient of the structural variable when the group dummy (Fsu) is added. The index effect is now measured as $\partial \hat{y}_t / \partial x_{t-1} = \tilde{\beta}_x$ for the Central and Eastern European Countries, but $(\tilde{\beta}_x + \tilde{\beta}_{xfsu})$ for the Former Soviet Republics. The difference between these values is the estimated coefficient $\tilde{\beta}_{xfsu}$, which is significantly different from zero and positive. This evidence thus confirms the hypothesis that the slopes of the country-groups profiles are different, suggesting that the synthetic index change its relevance whether we consider the Former Soviet Republics or the countries belonging to the Eastern bloc. Reform

policies have a strong influence on the productivity growth of the ex Soviet Republics, whereas it plays a weak role for the productivity rates of the former Communist states of Eastern Europe. This result may reflect the different meaning of *central planning* between these two sets of countries: just the economies that lived under the Soviet system experienced the central-hierarchical administration radically. Therefore, this evidence may be theoretically explained arguing that only where central planning had its “pure” expression, the progressive abandonment of its rules has played a significant role on the economic paths.

Concerning the estimation strategy, we estimate this model (equation 1) employing the system GMM¹⁶, which is recognised to be the most coherent when dealing with “ the time series dimension of the data, non-observable country specific effects, the inclusion of a lagged dependent variable among the regressors and the possibility that all explanatory variables are endogenous” (Vieira et al. 2012). As suggested by Blundell and Bond (1998) and Bond (2002), we use higher than two lags as instruments to control for measurement error and endogeneity, and because of the reduced dimension of our sample, we create one instrument for each variable and lag distance (rather than one for each time period, variable and lag distance) in order to avoid the over-fit bias, which happens when the number of instruments is large relative to the number of observations. In fact, analyses of the issues related to the use of weak and many instruments (Roodman, 2009; Vieira et al. 2012) have revealed that instruments proliferation does not succeed in wiping out the endogenous components of the endogenous regressors, causing biased coefficients. Also the Hansen and difference-in-Hansen tests can perform poorly in the presence of many instruments, resulting in high p-values (close or equal to one), whereas the Sargan (and of course the difference-in-Sargan) cannot be weakened by their proliferation. But the problem is that the latter assumes homoschedasticity of errors for

¹⁶ One-step System GMM. This choice is due to the small dimension of the sample.

consistency, which is not common and particularly it is not our case.

The empirical literature on the instruments proliferation has stressed that a rule of thumb to detect the use of an excessive number of instruments is to compare the number of countries with the number of instruments: there are too many instruments when the number of instruments is greater than the number of countries (Roodman, 2009). Therefore, given that the number of countries studied is low (26), to collapse the number of instruments but at the same time keep on assessing the proper impact of our endogenous regressor (reforms index) on the growth paths (which requires to use more than two lags), time dummies are not included in the specification of our model¹⁷. Anyhow, as preliminary regressions reveal that the estimated coefficients of the time dummies are all in all alike, a compromise to overcome this drawback is to assume the restriction that each year dummy would have exactly the same coefficient, which simply involves adding a new artificial variable τ_t to the equation model (Equation 1) with the property of increasing by the same constant amount each period. Table 5 reports the p-values for crucial specification tests, namely the Hansen test of over-identifying restrictions, the difference-in-Hansen test, and the Arellano-Bond test for second order serial correlation in the error terms, which all allow an assessment of validity of our estimation strategy.

¹⁷We are aware that time dummies are important as they make the assumption of no correlation across individuals more likely to hold, but we are obliged to exclude them in order to satisfy the conditions outlined above. In particular, their inclusion systematically leads to excessive number of instruments and high p-values for the Hansen test and the difference in ones.

Table 5 - Dynamic Panel Data Estimation, System GMM

	Dependent Variable: Productivity growth (\hat{y}_t)							
	Gdp per person employed				Total Factor Productivity			
	I	II	III	IV	V	VI	VII	VIII
<i>b</i> (Period)			-0.128 (.0237)	-0.013 (.0207)			-0.054 (.0210)	.0054 (.0192)
<i>fsu</i> (dummy)		.1678*** (.0478)		.1235*** (.0315)		.1410*** (.0527)		.0938* (.0532)
y_{t-1}	.02814 (.0467)	-.0084 (.0385)	-.0413 (.0280)	-.0613* (.0326)	.0889 (.0653)	-.0246 (.0461)	-.0271 (.0324)	-.0607 (.0572)
x_{t-1}	.2888*** (.0481)	.0285 (.0677)	.1476*** (.0490)	-.0438 (.0665)	.3098*** (.0664)	-.0329 (.0641)	.1151** (.0466)	-.0985 (.0589)
$x * fsu_{t-1}$		.2728*** (.0727)		.2730*** (.0552)		.2631*** (.0544)		.2810*** (.0479)
$x * b_{t-1}$			-.0890** (.0371)	-.0522 (.0416)			-.0870** (.0325)	-.0640 (.0399)
<i>time trend</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>constant</i>	yes	yes	yes	yes	yes	yes	yes	yes
N	442	442	442	442	442	442	442	442
Number of groups	26	26	26	26	26	26	26	26
N. of instruments	22	23	23	24	22	23	23	24
F testp-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Han testp-value	0.400	0.194	0.155	0.213	0.416	0.139	0.152	0.146
Diff in Hansen test p-value	0.887	0.291	0.249	0.679	0.721	0.297	0.321	0.761
AR(2) testp-value	0.450	0.565	0.479	0.576	0.270	0.298	0.361	0.338

Superscripts **/**/**/** denote 10, 5, and 1 percent significance levels. Number in parenthesis are robust standard errors.

Then, to explicitly test for any structural break in the model, we decide to include a dummy variable (period b) for the period following the dislocation one (1997 onwards). The regression results (Table 5, columns III and VII) show that $\partial \hat{y}_t / \partial x_{t-1} = \tilde{\beta}_x$ is the estimated impact of the index during the so called dislocation period, whereas $(\tilde{\beta}_x + \tilde{\beta}_{xperiodb})$ for the remainder of the series. The difference is given by $\tilde{\beta}_{xperiodb}$ that is statistically significant and negative, confirming the existence of a structural break in the model. This evidence proves that reforms matter in the very first years after the Soviet Union breakdown but then their importance becomes negligible. The last regressions (Table 5, columns IV-VIII) fully interact the core independent variable $x_{i,t-1}$ with both qualitative factors. The empirical tests reveal that there is no problem with second order autocorrelation and that the instruments are valid in all the estimated growth models, where we continue to control for the proliferation of instruments.

On the whole, which lessons can be drawn from this evidence? Firstly, that the result of the reform policies implemented, namely what economic agents see and take into account when they engage in the economic activity, matter for the growth paths of the transition countries in the very first years of transition. Secondly, that it is fair to say that reforms have affected differently the transition paths of these countries (i.e. Former Soviet Union Republics vs. Central Eastern European countries).

Dealing with the endogeneity of the institutional dimension, we now investigate its determinants and discover which forces drive the incentives to reform of the governments of these countries. Our strategy is to define *ad-hoc* instruments to give a theoretical and empirical explanation to the different commitments to reforms, which are reflected by different values of our index, according to the country considered.

To get an exhaustive picture of the relative importance of the supposed determinants according to the country-group considered, we start running some preliminary regressions (Tables 6a and 6b). Then, we proceed performing a sort of two-stages approach.

Table 6a - *Reforms Index Determinants*

	<i>Dependent Variable: Reform Policies Index (x_t)</i>					
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>
<i>fsu</i> (dummy)	-.1123*** (.0424)	-.0884** (.0408)	-.0614 (.0422)	-.0315 (.0273)	-.2052*** (.0437)	-.1655*** (.0384)
<i>all natural resources rents</i> _{<i>t</i>-1}	.0404 (.3139)	.0488 (.3062)	-.1015** (.0402)	-.1227*** (.0421)	-.1388*** (.0407)	-.1264*** (.0404)
<i>Euro12imports</i> _{<i>t</i>-1}	.4244*** (.1123)		.8547*** (.1961)		.6546*** (.1372)	
<i>Euro12exports</i> _{<i>t</i>-1}		.5543*** (.1420)		.9475*** (.1587)		.7552*** (.1434)
<i>Democratic institutions</i> _{<i>t</i>-1}	.1567*** (.0221)	.1600*** (.0212)	.1650*** (.0206)	.1787*** (.0231)	.0670* (.0366)	.0740** (.0349)
\hat{y}_{t-1}	-.0352 (.0543)	-.0411 (.0558)	-.0458 (.0578)	-.0597 (.0597)	-.0528 (.0566)	-.0563 (.0576)
<i>all natural resources rents</i> _{<i>t</i>-1} * <i>fsu</i>	-.1260 (.3112)	-.1382 (.3034)				
<i>Euro12imports</i> _{<i>t</i>-1} * <i>fsu</i>			-.5984*** (.1970)			
<i>Euro12exports</i> _{<i>t</i>-1} * <i>fsu</i>				-.5252*** (.1719)		
<i>Democratic institutions</i> _{<i>t</i>-1} * <i>fsu</i>					.1423*** (.0442)	.1358*** (.0416)
<i>constant</i>	yes	yes	yes	yes	yes	yes
<i>time dummies</i>	yes	yes	yes	yes	yes	yes
N	442	442	442	442	442	442
R-squared	0.8105	0.8136	0.8171	0.8694	0.8578	0.8644
Wald test p-value	0.00	0.00	0.00	0.00	0.00	0.00

The dependent variable is expressed in logarithmic terms. Superscripts */**/** denote 10, 5, and 1 percent significance levels. Number in parenthesis are panel corrected standard errors.

Table 6b - *Reforms Index Determinants*

	<i>Dependent Variable: Reform Policies Index (x_t)</i>					
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>
<i>fsu</i> (dummy)	-.1162*** (.0430)	-.0922** (.0413)	-.0606 (.0420)	-.0655 (.0430)	-.2059*** (.0438)	-.1661*** (.0384)
<i>oil&naturalgasrents_{t-1}</i>	-.2384 (.4304)	-.2195 (.4222)	-.1058*** (.0403)	-.1014** (.0403)	-.1485*** (.0410)	-.1367*** (.0407)
<i>Euro12imports_{t-1}</i>	.4208*** (.1123)		.8578*** (.1963)		.6533*** (.1380)	
<i>Euro12exports_{t-1}</i>		.5499*** (.1418)		.6941*** (.1684)		.7568*** (.1438)
<i>Democratic institutions_{t-1}</i>	.1557*** (.0221)	.1592*** (.0212)	.1644*** (.0205)	.1648*** (.0206)	.0666* (.0365)	.0738** (.0349)
\hat{y}_{t-1}	.0338 (.0544)	.0398 (.0560)	.0466 (.0578)	.0463 (.0576)	.0539 (.0565)	.0576 (.0575)
<i>oil&naturalgasrents_{t-1}</i> * <i>fsu</i>	.1499 (.4216)	.1269 (.4135)				
<i>Euro12imports_{t-1}</i> * <i>fsu</i>			-.6025*** (.1971)			
<i>Euro12exports_{t-1}</i> * <i>fsu</i>				-.3155 (.1946)		
<i>Democratic institutions_{t-1}</i> * <i>fsu</i>					.1428*** (.0444)	.1366*** (.0419)
<i>constant</i>	yes	yes	yes	yes	yes	yes
<i>time dummies</i>	yes	yes	yes	yes	yes	yes
N	442	442	442	442	442	442
R-squared	0.8107	0.8139	0.8177	0.8165	0.8616	0.8676
Wald test p-value	0.00	0.00	0.00	0.00	0.00	0.00

The dependent variable is expressed in logarithmic terms. Superscripts ***/**/* denote 10, 5, and 1 percent significance levels. Number in parenthesis are panel corrected standard errors.

The econometric outputs confirm that the hypothesized determinants have shaped the reforms paths of these countries: they are lagged as it is the past combination of political institutions with economic interests that drives the incentives to reform of the policy makers. In particular, allowing their slopes to differ (we interact each of them with the FSU dummy), we can understand whether they have a different importance depending on the country group considered. Concerning natural resources (when both all natural resources and just oil and gas are taken into account), as the coefficients of the interaction term and the single variable (Table 6a and 6b, first and second columns) are not statistically significant, we do not have evidence against the hypothesis that one slope over groups of countries suffices to express the effect of natural resources on the reforms index. Concerning trade openness and democratic institutions, instead, the proxies coefficients reveal

that relations with advanced market economies play a major role for the Central and Eastern European countries, whereas democratization has a greater effect among the Former Soviet Republics.

Discovered the relative effects of these forces for the reforms paths of these countries, we continue our study and develop a panel identification strategy that employs these new instruments¹⁸. At the first stage, we regress our reform policies index (expressed in logarithmic terms) on the lagged values of the rents coming from all the natural resources (and alternatively just from oil and natural gas), the nature of the political institutions, and the extent of the trade relations with advanced market economies (either the percentage of imports or the percentage of exports of the twelve core countries of the Euro area by trade partner). As preliminary tests reveal that heteroschedasticity, cross-sectional correlation and within panel AR(1) autocorrelation are important issues, we calculate panel-corrected standard error estimates of our linear cross-sectional time-series model. Then, at the second stage, we provide System-GMM estimates of the reforms index using the fitted series stemming from the first stage regression. In particular, the two stages approach is implemented taking into consideration the whole sample and then (as before) studying the impact of the reforms policies depending on the country-group and the stage of transition.

¹⁸ It is of course fundamental that these instruments influence economic development only via reforms policies. When specified as independent variables in Sys-GMM regressions, it seems they do not affect productivity growth significantly (Appendix B, Table B1).

Table 7a - Stage One

	<i>Prais-Winsten Regressions</i>			
	<i>Dependent Variable: Reform Policies Index (x_t)</i>			
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>
<i>all natural resources rents</i> _{<i>t</i>-1}	-.1022** (.0402)	-.0995** (.0403)		
<i>oil & natural gas rents</i> _{<i>t</i>-1}			-.1060*** (.0404)	-.1035*** (.0404)
<i>Euro12imports</i> _{<i>t</i>-1}	.4871*** (.1239)		.4869*** (.1239)	
<i>Euro12exports</i> _{<i>t</i>-1}		.6745*** (.1629)		.6745*** (.1627)
<i>Democratic institutions</i> _{<i>t</i>-1}	.1850*** (.0219)	.1779*** (.0206)	.1844*** (.0218)	.1773*** (.0205)
\hat{y}_{t-1}	.0421 (.0619)	.0451 (.0608)	.0427 (.0619)	.0458 (.0608)
<i>constant</i>	yes	yes	yes	yes
<i>time dummies</i>	yes	yes	yes	yes
	442	442	442	442
	R-squared	0.8050	0.8055	0.8100
	Wald test p-value	0.00	0.00	0.00

The dependent variable is expressed in logarithmic terms.
 Superscripts */**/** denote 10, 5, and 1 percent significance levels.
 Number in parenthesis are panel corrected standard errors.

Table 7b - Stage Two

	<i>Dependent Variable: Productivity growth (\hat{y}_t)</i>									
	<i>Gdp per person employed</i>					<i>Total Factor Productivity</i>				
	<i>Ia</i>	<i>I/b</i>	<i>IIIc</i>	<i>IVd</i>	<i>Va</i>	<i>V/b</i>	<i>V/c</i>	<i>VIIId</i>		
y_{t-1}	.0612 (.0481)	.0527 (.0456481)	.0598 (.0479)	.0514 (.0454)	.0008 (.0256)	-.0088 (.0242)	.0004 (.0256)	-.0092 (.0242)		
\tilde{x}_{t-1}	.2561*** (.0734)	.2430*** (.0724)	.2549*** (.0733)	.2420*** (.0723)	.1724*** (.0432)	.1614*** (.0429)	.1719*** (.0433)	.1609*** (.0431)		
<i>time trend</i>	yes	yes	yes	yes	yes	yes	yes	yes		
<i>constant</i>	yes	yes	yes	yes	yes	yes	yes	yes		
N	416	416	416	416	416	416	416	416		
Number of groups	26	26	26	26	26	26	26	26		
Number of instruments	22	22	22	22	22	22	22	22		
F test p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Hansen test p-value	0.250	0.228	0.241	0.222	0.169	0.203	0.170	0.204		
Diff in Hansen test p-value	0.716	0.690	0.672	0.667	0.341	0.539	0.346	0.540		
AR(2) test p-value	0.693	0.714	0.692	0.713	0.142	0.152	0.142	0.151		

Superscripts ***/**/* denote 10, 5, and 1 percent significance levels. Number in parenthesis are robust standard errors.

Tables 7a and 7b show the regressions results of our dynamic instrumented approach. In particular, the former exhibits that all the forces conjectured to have driven the reform paths of these countries are statistically significant. We see that the rents accrued at time $t-1$, both those coming from all natural resources and those coming just from oil and natural gas, have affected negatively the reform policies index; that the earlier extent of trade relations with the Euro area (measured either in terms of imports or in terms of exports) has encouraged the reform paths; and that the evolution of the political institutions toward a democratic allocation of political power has benefited the economic environment. The goodness of fit of the regressions (Table 7a) is considerable, as the three core determinants are highly statistically significant. The other table (Table 7b) exhibits the second-stage regressions, where the reform policies index \tilde{x}_{t-1} is the fitted series that comes from the correspondent column of the first-stage output. We can notice that the results are consistent with an estimated coefficient positive and statistically significant at one percent level.

Then, we check whether the evidence about the structural break and the existence of a different impact of reforms, according to the countries group considered, is confirmed implementing this “instrumented” system GMM estimator (Table 8b and 9b). The econometric output of Table 8b displays the second-stage estimated regressions depending on the instruments considered (columns *abc* and *d* of Table 7a), when productivity is measured by Gdp per person employed; Table 9b, when it is measured by TFP.

Table 8b - Stage two

		Dependent Variable: Productivity growth (\hat{y}_t) GDP per person employed										
	<i>la</i>	<i>llb</i>	<i>llc</i>	<i>ll'd</i>	<i>l'a</i>	<i>l'lb</i>	<i>l'lc</i>	<i>l'ld</i>	<i>l'la</i>	<i>l'lb</i>	<i>l'lc</i>	<i>l'ld</i>
<i>b</i> (Period)	2.383*** (.0717)	2.559*** (.0737)	2.371*** (.0715)	2.547*** (.0734)	-.0003 (.0187)	-.0004 (.0184)	-.0001 (.0187)	-.0005 (.0184)	.0074 (.0185)	-.00677 (.0183)	-.0072 (.0185)	.0066 (.0183)
<i>fsu</i> (dummy)									1.770*** (.0447)	1.942*** (.0470)	1.765*** (.0445)	1.934*** (.0468)
y_{t-1}	.0126 (.0446)	.0145 (.0451)	.0115 (.0446)	.0134 (.0451)	.0258 (.0271)	.0230 (.0272)	.0255 (.0272)	.0226 (.0272)	-.0097 (.0281)	-.0100 (.0279)	-.0104 (.0282)	-.0107 (.0280)
\tilde{x}_{t-1}	.0059 (.0590)	-.0011 (.0593)	.0047 (.0593)	-.0023 (.0596)	-.1065** (.0411)	-.1051** (.0404)	-.1068** (.0410)	-.1055** (.0404)	-.0928 (.0761)	-.0971 (.0749)	-.0931 (.0762)	-.0975 (.0749)
$\tilde{x} * fsu_{t-1}$	-.4050*** (.1011)	-.4305*** (.1022)	-.4050*** (.1008)	-.4296*** (.1018)					3.555*** (.0805)	3.820*** (.0827)	3.551*** (.0803)	3.813*** (.0824)
$x * b_{t-1}$					.0923** (.0342)	.0940** (.0338)	.0925** (.0342)	.0942** (.0338)	-.0581* (.0288)	-.0522* (.0283)	-.0583* (.0288)	-.0524* (.0283)
<i>time trend</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>constant</i>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	416	416	416	416	416	416	416	416	416	416	416	416
Number of groups	26	26	26	26	26	26	26	26	26	26	26	26
N. of instruments	23	23	23	23	23	23	23	23	24	24	24	24
F test p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Han test p-value	0.338	0.335	0.337	0.335	0.231	0.230	0.233	0.232	0.165	0.187	0.165	0.188
Diff in Han test p-value	0.877	0.814	0.880	0.817	0.441	0.565	0.451	0.576	0.375	0.413	0.376	0.414
AR(2) test p-value	0.727	0.766	0.729	0.768	0.710	0.712	0.710	0.712	0.748	0.785	0.749	0.787

Superscripts ***/**/* denote 10, 5, and 1 percent significance levels. Number in parenthesis are robust standard errors.

Table 9b - Stage two

		Dependent Variable: Productivity growth (\hat{Y}_t) Total Factor Productivity										
	Ia	IIf	$IIIc$	IVd	Va	VIb	$VIIc$	$VIII d$	IXa	Xb	XIc	$XII d$
b (Period)	2016*** (.0582)	2196*** (.0593)	2005*** (.0578)	2185*** (.0590)	-0003 (.0182)	-0014 (.0181)	-0004 (.0182)	-0015 (.0181)	.0113 (.0197)	.0090 (.0188)	.0113 (.0197)	.0101 (.0198)
fsu (dummy)									.1386*** (.0363)	.1501*** (.0327)	.1378 (.0362)	.1544*** (.0369)
Y_{t-1}	-0128 (.0335)	-0091 (.0335)	-0135 (.0334)	-0097 (.0334)	-0168 (.0200)	-0180 (.0195)	-0167 (.0200)	-0179 (.0195)	-.0436 (.0293)	-.0221 (.0326)	-.0439 (.0293)	-.0421 (.0291)
\tilde{x}_{t-1}	-.0049 (.0444)	-.0099 (.0432)	-.0058 (.0435)	-.0109 (.0435)	-.1158*** (.0309)	.1168*** (.0317)	.1159*** (.0308)	.1168*** (.0316)	-.1018 (.0654)	-.0624 (.0654)	-.1025 (.0654)	-.1009 (.0643)
$\tilde{x} * fsu_{t-1}$	.3586*** (.0679)	.3795*** (.0679)	.3579*** (.0678)	.3788*** (.0678)					.3362*** (.0615)	.3088*** (.0625)	.3357*** (.0615)	.3590*** (.0614)
$x * b_{t-1}$					-.0729*** (.0330)	-.0753** (.0326)	-.0732*** (.0330)	-.0755*** (.0327)	-.0465 (.0302)	-.0459 (.0348)	-.0468 (.0303)	-.0420 (.0299)
$timetrend$	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
$constant$	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	416	416	416	416	416	416	416	416	416	416	416	416
Number of groups	26	26	26	26	26	26	26	26	26	26	26	26
N	23	23	23	23	23	23	23	23	24	24	24	24
of instruments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F test p-value	0.224	0.222	0.222	0.220	0.227	0.220	0.226	0.220	0.174	0.153	0.172	0.172
Han testp-value												
Diff in Han test	0.889	0.897	0.886	0.895	0.949	0.935	0.948	0.933	0.639	0.632	0.634	0.723
p-value												
AR(2) testp-value	0.100	0.116	0.100	0.115	0.104	0.107	0.104	0.107	0.096	0.097	0.096	0.103

Superscripts */**/** denote 10, 5, and 1 percent significance levels. Number in parenthesis are robust standard errors.

We begin controlling for the group-specific dummy (Tables 8b and 9b, columns IaIbIIIcIVd), studying the slope coefficient of the core independent variable. The index estimated coefficient is statistically significantly and positive. This evidence is coherent with the results obtained before (Table 5) and proves that also when the instrumented estimates are used, the reform index has no considerable impact on the productivity growth paths of the countries belonging to the so called Eastern bloc. The second stage regressions cast doubts on the relevance of the reform process for the productivity growth paths of the Central Eastern European countries. Reform policies have instead a clear influence on productivity growth of the ex Soviet Republics: the relevance and positive impact of the reform policies are always stressed. We proceed testing for a structural break in the model, and as done before we include a dummy variable (period b) for the period following the dislocation one (1997 onwards). The regression results (Table 8b and 9b, columns VaVIbVIIc VIIIId) display the estimated coefficients of the various $\tilde{\beta}_{\tilde{x}_{periodb}}$ that are statistically significant and negative, which shows the existence of a structural break in the model. Also when instrumented, these estimation outputs prove that reforms matter during the dislocation period but then their importance decreases. The last regressions (Table 8b and 9b, columns IXaXbXIcXIId) fully interact the fitted reform policies $index_{i,t-1}$ with both dummies. In general, the estimated coefficients of the structural variable are consistent with those of Table 5. Only, when the index is interacted with the country-group dummy, this estimation approach gives a little bit overrated coefficient (mainly when productivity is assessed by GDP per person employed). The empirical tests reveal that the theoretical based identification strategy is supported by the results of both the Hansen and the Arellano-Bond test.

Conclusion

Starting from the previous evidence on the importance of reforms policy for the growth paths of transition economies, we investigate whether a different impact on productivity occurs between “types” of countries in transition and over time. Our estimation strategies prove that reforms commitment matter just for the countries that lived *central planning* in its pure and radical expression and that these policies help the productivity growth paths more in the first years after the Soviet Union breakdown than during the remainder of the period. Moreover, we document the reasons underlying the different stage of abandonment of communist institutions and examine why the Former Soviet Republics and the Central and Eastern European countries have made reforms at different speed and with different commitments. The natural resources endowments, the democratization paths and trade openness towards advanced market economies are identified as specific determinants, which largely explain the reforms development.

According to the employed estimation strategies that control for the endogeneity of institutions, our results show that (specific) structural reforms affect economic development when the change and the improvement entailed is radical but beyond some years their effect is not enough to boost the economy. This should be taken as a *caveat* for policy makers: the same type of reforms supports economic growth in the short term, but their contemporaneous effect decreases over time.

Appendix A

Table A1 - Rank over 1991-1996

country	Average growth rate of GDP per person employed (1)	Average growth rate of rate of TFP (2)	INDEX (3)	Rank (1)	Rank (2)	Rank (3)
Armenia	-0.583201	-0.0561684	.3906424	11	10	9
Azerbaijan	-1.1422668	-1.1602853	.3208451	3	2	3
Belarus	-0.392711	-0.0781441	.350594	14	7	5
Estonia	-0.0067247	-0.165106	.5901548	18	15	21
Georgia	-1.328526	-1.1522629	.3649816	4	3	7
Kazakhstan	-0.081452	-0.0537308	.4035155	8	11	10
Kyrgyzstan	-0.0922574	.1155255	.4689505	7	26	14
Latvia	-0.313678	-0.0398766	.5445214	15	13	20
Lithuania	-0.0614343	-0.0658564	.5289539	10	9	18
Moldova	-1.539077	-1.1478565	.4334531	2	4	11
Russia	-0.0634145	-0.0751289	.5019246	9	8	17
Tajikistan	-1.1821081	-1.1754695	.3264477	1	1	4
Turkmenistan	-0.0971379	-0.0991855	.2566504	6	6	1
Ukraine	-1.301968	-1.1352019	.363613	5	5	6
Uzbekistan	-0.0444583	-0.0437439	.3850398	12	12	8
Albania	.0142791	.0692267	.4448294	22	25	12
Bosnia Herzegovina	-0.098839	.0581859	.2950988	17	24	2
Bulgaria	-0.016379	-0.098578	.4832777	20	18	15
Croatia	-0.0410891	-0.160135	.5431956	13	16	19
Czech Republic	-0.0018942	.010832	.674707	19	19	24
Hungary	.0297542	.0181805	.6998546	24	21	26
Macedonia	-0.302298	-0.0347117	.4989308	16	14	16
Poland	.0471239	.0482972	.6757762	26	23	25
Romania	.0124266	.0132735	.4534257	21	20	13
Slovakia	.0303905	.0228293	.6473356	25	22	23
Slovenia	.0162989	-0.0156057	.5946882	23	17	22

Table A2 - Rank over 1997-2008

country	Average growth rate of GDP per person employed (1)	Average growth rate of TFP (2)	INDEX (3)	Rank (1)	Rank (2)	Rank (3)
Armenia	.1158894	.0823634	.6704516	25	24	13
Azerbaijan	.1512222	.1026121	.573903	26	26	6
Belarus	.0745753	.0653393	.4012488	24	20	2
Estonia	.0589874	.0326011	.858652	19	15	25
Georgia	.0717626	.0761911	.6783851	23	23	15
Kazakhstan	.0534564	.0723971	.6649987	17	22	12
Kyrgyzstan	.0235551	.0141058	.6577495	2	1	11
Latvia	.0517066	.0635659	.7874861	14	19	20
Lithuania	.0605821	.0678543	.7917629	20	21	21
Moldova	.053404	.052436	.6486186	16	14	9
Russia	.0485423	.0559281	.6577282	12	16	10
Tajikistan	.0525194	.0635297	.5061586	15	18	4
Turkmenistan	.0354018	.0887644	.3130399	7	25	1
Ukraine	.0581373	.0597269	.6342486	18	17	7
Uzbekistan	.0368279	.0296827	.4858224	9	9	3
Albania	.0671131	.033468	.6450475	21	10	8
Bosnia Herzegovina	.0715668	.0174095	.5403302	22	5	5
Bulgaria	.0362514	.043083	.7453307	8	13	17
Croatia	.0321365	.0150883	.7632153	5	2	18
Czech Republic	.0299289	.0230553	.8491147	3	6	24
Hungary	.0316758	.0255014	.8936147	4	7	26
Macedonia	.0185421	.0172084	.6713925	1	4	14
Poland	.0395077	.0295752	.8450517	10	8	23
Romania	.0511207	.0415338	.7226713	13	12	16
Slovakia	.0452105	.0378644	.8109657	11	11	22
Slovenia	.0350043	.0161198	.766209	6	3	19

Table A3 - Rank over 1991-2008

country	Average growth rate of GDP per person employed (1)	Average growth rate of TFP (2)	INDEX (3)	Rank (1)	Rank (2)	Rank (3)
Armenia	.0578196	-.0416188	.5771819	26	24	10
Azerbaijan	.0533925	.0252893	.4893504	25	13	6
Belarus	.0366265	.0231383	.3858524	18	11	2
Estonia	.0370834	.0322741	.7691529	19	17	23
Georgia	.0035575	.0089988	.5739173	7	8	8
Kazakhstan	.0084869	.0353007	.5778376	9	23	11
Kyrgyzstan	-.015049	.0439352	.5948165	3	25	13
Latvia	.0240152	.0331416	.7064979	15	18	20
Lithuania	.0199099	.0285276	.7041599	13	15	19
Moldova	-.0156999	-.0064736	.5768968	2	2	9
Russia	.0112233	.0173819	.6057936	11	9	14
Tajikistan	-.0256897	-.0067642	.4462549	1	1	3
Turkmenistan	-.0087781	.0334851	.2942434	4	21	1
Ukraine	-.0046407	.0023949	.5440367	5	4	7
Uzbekistan	.0097325	.0080866	.4522282	10	7	4
Albania	.0495018	.0439853	.5783081	24	26	12
Bosnia	.0444166	.0294026	.4585864	23	16	5
Herzegovina	.0236216	.0275122	.6581131	14	14	17
Bulgaria	.007728	.0059407	.6898754	8	5	18
Croatia	.0193212	.0194602	.7909788	12	10	25
Czech Republic	.0310353	.0233482	.829028	17	12	26
Hungary	.0022848	.0019378	.6139053	6	3	15
Macedonia	.0420465	.0350817	.7886266	22	22	24
Poland	.0382226	.033222	.6329228	20	19	16
Romania	.0402705	.0334423	.7564223	21	20	22
Slovakia	.0287692	.0067888	.7090354	16	6	21
Slovenia						

Appendix B
Table B1

	<i>Dependent Variable: Productivity growth (\hat{y}_t)</i>							
	<i>Gdp per person employed</i>				<i>Total Factor Productivity</i>			
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>	<i>VII</i>	<i>VIII</i>
<i>y_{t-1}</i>	.0285 (.0362)	.0271 (.0367)	.0283 (.0362)	.0268 (.0367)	.0015 (.0296)	.0005 (.0316)	.0018 (.0296)	.0009 (.0316)
<i>allnaturalresources rents</i>	.0084 (.0414)	.0080 (.0392)			-.0143 (.0363)	-.0088 (.0342)		
<i>oil&naturalgas rents</i>			.0056 (.0417)	.0053 (.0395)			-.0165 (.0363)	-.0110 (.0342)
<i>Euro12imports</i>	-.0144 (.0751)		-.0114 (.0747)		.0748 (.0699)		.0762 (.0697)	
<i>Euro12exports</i>		-.0833 (.08627)		-.0795 (.0865)		.0220 (.0852)		-.0234 (.0852)
<i>democracy_{t-1}</i>	-.0106 (.0436)	-.0074 (.0436)	-.0127 (.0434)	-.0093 (.0434)	-.0305 (.0336)	-.0249 (.0344)	-.0319 (.0333)	-.0263 (.0341)
<i>time trend</i>	yes	yes	yes	yes	yes	yes	yes	yes
<i>constant</i>	yes	yes	yes	yes	yes	yes	yes	yes
N	442	442	442	442	442	442	442	442
Number of groups	26	26	26	26	26	26	26	26
Number of instruments	24	24	24	24	24	24	24	24
F test p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hansen testp-value	0.177	0.116	0.179	0.116	0.220	0.207	0.220	0.208
Diff in Hansen testp-value	0.421	0.121	0.426	0.119	0.670	0.374	0.675	0.380
AR(2) test p-value	0.288	0.290	0.290	0.292	0.209	0.211	0.210	0.211

Superscripts ***/**/* denote 10, 5, and 1 percent significance levels. Number in parenthesis are robust standard errors.

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