MARKET REFORMS AND ECONOMIC GROWTH IN POST-COMMUNIST ECONOMIES: A PANEL DATA APPROACH[*]

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Abstract

The paper analyses a relationship between market reforms and economic growth in post-communist economies. Components of the EBRD reform index (EBRD transition indicators) were used as measures of reform progress. Based on the estimations of panel data for 25 transition economies for 1989–2003 it is shown that progress in market reforms have a positive impact on GDP growth. The main contributors to economic growth are governance and enterprise restructuring, banking sector reform, and trade and foreign exchange liberalization. Three groups of countries were specified: advanced reformers, partial reformers, and non-reformers. Non-reformers appeared to grow faster than partial reformers, but as they have repressed, soviet-type regimes, reliability of these countries' official statistics is very low, and GDP is likely to be overestimated. Hence, one can conclude that the gap between non-reformers and advanced reformers is widening or at least persists, while the partial reformers could reduce this gap implementing comprehensive reforms.

1. Introduction

Since the beginning of the economic transition in CEB and FSU countries there was a wide range of empirical research on factors of economic growth in these countries. There are two groups of the papers: first that analyses growth in single countries (these papers are usually based on neoclassical models of economic growth) and second that aimed to reveal determinants of cross-countries differences in growth performance. But neither first, nor second provided any explanation of GDP growth in Belarus. Moreover, some papers from the second group call economic growth in Belarus "a miracle" (Havrylyshin et al., 1998; Fischer and Sahay, 2000). "Growth accounting" papers also can explain neither recession nor recovery in Belarus (Chubrik, 2002).

This paper analyses determinants of cross-countries differences in GDP growth performance of transition economies. The main focus of the research is a relationship between economic growth and progress in reforms measured by the EBRD transition indicators). As the analyzed indicators (independent variables) are highly correlated, simple regressions were estimated based on the following approach. First, two models (with fixed and random effects) are estimated for a pair of variables (growth vs. EBRD transition indicator). Second, a choice of the model is made based on Hausman specification test statistics. Third, the selected model is tested for significance of individual effects (based on *F*-test and *LM*-test statistics for the models with fixed and random effects respectively), and the final model is chose.

The paper is organized as following. The second section provides a very brief review of the literature related to the subject. The choice of model specification is made in the third section. The main results of econometric analysis are presented in the final part of the paper.

2. The Literature Review

A large share of empirical research on transition economies' growth performance deals with explanation of cross-countries differences based on the political economy of growth. This theory states that the quality of institutions is important for growth. As it has many "dimensions" (bureaucratic efficiency, degree of corruption, protection of property rights, the rule of law, etc.) it could explain differences in per capita income and in GDP growth rates between different countries that neoclassical models refer to "total factor productivity". Additionally, empirical models based on the politi-

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cal economy of growth allow taking into account neoclassical assumptions including output per capita into a list of independent variables.

Very briefly, recent literature related to the subject of the paper (e.g. De Melo et al., 1997; Havrylyshyn et al., 1998, 2000; Fischer, Sahay 2000; Garibaldi et al., 2002, etc.) provides the following conclusions:

- The key determinants of economic growth in transition economies are macroeconomic stability, structural reforms, and minor state interference (small government expenditures);
- Market institutions development matters growth, but it is not the main factor of it;
- Initial conditions influence growth through the following channels. First, the more initial distortions of the economy's structure, the more time is needed to improve them, the deeper output decline is. Second, abundance of natural resources is conducive to investment attraction, but it slows reforms because it allows maintaining soft budget constraints. Third, the closer a country to the Western Europe and the smaller the period of socialism, the easier adaptation of economic agents to new institutional environment is and the more liberal economic reforms are.
- The biggest welfare growth occurred in the countries that aimed at EU accession.

At the beginning of transition period post-communist economies have soviet-type institutional environment and should change it to the new (capitalist) one. This should lead to increase of allocation efficiency. Hence, in the medium term economic growth performance depends on the quality of the new environment. The closer the new environment to the capitalist one, the more optimal resource allocation is, and the higher growth rate faces the country. Hence, the reforms progress should explain output behavior, or at least differences in growth rates of different economies. Transition indicators, calculated by the European Bank for Reconstruction and Development, could be used as measures of reform progress. The relationship between these indicators and economic growth in transition economies is analyzed further. The analysis captures 25 post-communist economies[1] for the period 1989–2003.

3. The Model Specification

A typical panel regression for transition economies has the following specification:

$$y_{it} = a_i + b' \cdot x_{it} + \varepsilon_{it}, \tag{1}$$

where there are the k regressors in x_{it} without constant term ($i = 1,\ldots, n$ (n – the number of cross-sections), $t = 1,\ldots, T$ (T – the number of periods)), y_{it} – GDP growth rate, a_i – individual effects, b' – vector of regression coefficients.

Table 1. Correlation between EBRD transition indicators

	BRIRL	CP	GER	LSP	OIR	PL	SMNB	SSP	TFES
BRIRL*	1.00								
CP	0.75	1.00							
GER	0.93	0.81	1.00						
LSP	0.86	0.79	0.88	1.00					
OIR	0.85	0.71	0.81	0.79	1.00				
PL	0.70	0.60	0.68	0.71	0.59	1.00			
SMNB	0.81	0.82	0.83	0.78	0.81	0.55	1.00		
SSP	0.81	0.69	0.81	0.82	0.72	0.80	0.70	1.00	
TFES	0.86	0.67	0.83	0.82	0.72	0.82	0.68	0.85	1.00

* BRIRL – banking reform and interest rate liberalization, CP – competition Policy, GER – governance and enterprise restructuring, OIR – overall infrastructure reform, LSP – large scale privatization, PL – price liberalization, SMNB – securities markets and non-bank financial institutions, SSP – small scale privatization, TFES – trade and foreign exchange system.
Source: author's calculations.

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[1] Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

As a rule, independent variables (x_{it}) include inflation or its natural logarithm, proxy for initial conditions, and different indicators of reforms' progress. There are two problems concerning this kind of specification. First, a number of early papers (e.g. Havlylyshyn et al., 1998, 2000) don't undertake any testing for fixed vs. random effects specification. Second, they include into regressors lists variables that are closely correlated[2]. Any of these problems could lead to misspecification of the model.

EBRD transition indicators closely correlate with each other (Table 1). Evidently, these indicators cannot be included in the right side of the growth equation simultaneously. Thus, in equation (1) the number of regressors k reduces to 1.

Further estimation is based on the following approach. First, two models (with fixed and random effects) are estimated for a pair of variables (GDP growth (y_{it}) vs. EBRD transition indicator (x_{it})). Second, based on Hausman specification test statistics, a choice of the model is made. Third, the selected model is tested for significance of individual effects (based on *F*-test and *LM*-test statistics for the models with fixed and random effects respectively). Thus, there three possible types of specification:

1) Model with fixed effects

$$y_{it} = a_i + b' \cdot x_{it} + \varepsilon_{it} . \tag{2}$$

2) Model with random effects

$$y_{it} = a_0 + b' \cdot x_{it} + \varepsilon_{it} + u_i , \tag{3}$$

where a_0 is a constant term, u_i – error component characterizing the ith observation and constant through time.

3) Model without individual effects

$$y_{it} = a_0 + b' \cdot x_{it} + \varepsilon_{it} . \tag{4}$$

In the most cases the models were specified as (2), i.e. include fixed individual effects (Table 2, columns 1-4). In order to exclude heteroskedasticity problem that appears in models with fixed effects and without individual effects, heteroskedasticity consistent *t*-statistics were used.

Table 2. GDP growth and EBRD transition indicators

	Hausman[1]	F^2	LM^3	Specification[4]	Coefficient	Intercept	Beta-coefficient	
							Value	Rank
	1	2	3	4	5	6	7	8
BRIRL	37.0**	2.0**	--	FE, h	6.2**	--	0.61	**2**
CP	19.9**	1.4	--	Pooled LS, h	4.3**	-8.3**	0.32	**8**
GER	35.2**	1.9**	--	FE, h	7.4**	--	0.62	**1**
OIR	29.6**	1.7*	--	FE, h	7.2**	--	0.58	**5**
LSP	34.7**	2.0**	--	FE, h	5.1**	--	0.57	**6**
PL	3.6	--	22.4**	RE	1.9**	-6.9**	0.24	**9**
SMNB	20.2**	1.3	--	Pooled LS, h	4.7**	-8.6**	0.38	**7**
SSP	28.6**	1.7*	--	FE, h	4.4**	--	0.59	**4**
TFES	39.3**	2.1**	--	FE, h	4.2**	--	0.61	**3**

[1] Hausman – Hausman specification test statistics for fixed/random effects (Hausman, 1978).

[2] *F* – *F*-statistics for presence of individual effects in the model with fixed effects (see, for instance, Greene, 1997).

[3] *LM* – *LM*-statistics for presence of individual effects in the model with random effects (Breush, Pagan, 1979).

[4] Specification – specification selected based on Hausman tests and tests for presence of individual effects:

FE, h – model with fixed effects; *t*-statistics are heteroskedasticity consistent;

Pooled LS, h – pooled OLS; *t*-statistics are heteroskedasticity consistent;

RE – model with random effects.

* – coefficient is significant at 5% level, ** – at 1% level.

Source: author's calculations.

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[2] To avoid the second problem one can use "general to specific approach" (see, for example, Garibaldi et al., 2002). But in the case of static model individual effects help to eliminate omitted variables problem. Thus, in order to estimate how *each* of the regressors relates to dependent variable, one can use simple regressions with one independent variable.

4. The Results

Regression coefficients of all EBRD transition indicators appeared to be significant at 1% level (Table 2, columns 5 and 6). In order to estimate a contribution of each variable to GDP growth, the beta-coefficients were estimated using the formula

$$\beta = b \cdot \frac{\sigma(x_{it})}{\sigma(y_{it})}, \tag{5}$$

where $\sigma(x_{it}), \sigma(y_{it})$ are mean-squares of an EBRD transition indicator and the GDP growth for i and t. This enabled to rank the regressors normalizing each coefficient b on variance of the dependent variable.

Governance and enterprise restructuring, banking sector reform, and trade and foreign exchange liberalization contributed most to economic growth in transition economies (Table 2, columns 7 and 8). Small contribution of price liberalization can be explained with the fact that most of the post-communist countries succeeded in implementation of this reform at the early stage of transition, whether they implemented other reforms or not. Creation of securities markets and non-bank financial institutions, as well as competition policy, did not progress much in the most economies, having rather small impact to economic growth too. One can anticipates the increase of their contribution to GDP growth in the medium term.

Another finding of this analysis is that the more comprehensive the reforms are, the faster the growth is. The general impact of the reforms on growth could be find regressing GDP growth on average of EBRD transition indicators (EBRD reform index). Evidently, more comprehensive reforms associate with higher EBRD reform index.

Using the same algorithm of specification choice the following regression with fixed effects were estimated:

$$GR_{it} = a_i + \underset{(9.0)}{6.3} \cdot EBRD_{it} + \varepsilon_{it}, \tag{6}$$

where GR_{it} – GDP growth rate, $EBRD_{it}$ – average of EBRD transition indicators, heteroskedasticity-consistent t-statistics is in parenthesis. It shows that higher EBRD reform index associates with higher GDP growth. Thus, the more progress in reforms is achieved, the faster economy growing.

According to the EBRD ranking methodology, the countries could be divided into 3 groups: advanced reformers (countries with EBRD reform index in 2003 above or equal 3.67 (4-)), intermediate/partial reformers (reform index in 2003 was less then 3.67 but above or equal 2.67 (3-)), and non-reformers (reform index in 2003 was less than 2.67). Countries from the first group have finished the first-stage reforms (i.e. reached Western economies' level in small scale privatization, price liberalization, and trade and foreign exchange liberalization), and other reforms are on a strong track. Partial reformers have a substantial progress in the first-stage reforms, but other reforms are still rather slow of was started in a recent years. Finally, non-reformers still lack almost all reforms, or started some of them in very recent years.

According to the results of the econometric analysis, growth rates in advanced reformers should be the highest, while in non-reformers – the lowest. The average growth rate in the first group of countries is 1.4 percentage points higher than in the last one (Table 3). This is equal to 23% of GDP growth during the 15 years. But the gap between advanced and partial reformers is much higher: 2.3 percentage points (41% during 15 years), and one can conclude (following, for example, Havrylyshyn et al., 1998) that absence of reforms was better than partial reforms.

At the same time low average growth rate in partial reformers was due to huge decline in three countries: Georgia, Moldova, and Ukraine. Excluding these countries gives the average growth rate for partial reformers at -0.6%, i.e. only 1 percentage point lower than in advanced reformers. Additionally, all non-reformers refers to non-free countries (concerning political rights) according to Freedom House rating methodology (Freedom House, 2004), and four of these countries (Belarus, Tajikistan, Uzbekistan, and Turkmenistan) are completely non-free in terms of economic freedom (Heritage Foundation, 2004). They occupy the 145th, 146th, 149th, and 150th places of 155 respectively. These countries have soviet-type regimes with restored system of central plan-

ning. Evidently, output statistics is likely to be substantially distorted (overestimated) in these countries. In addition to the soviet-type system of central planning, Belarus, for instance, has both conditions pointed by Khanin (Khanin, 1991) needed to overestimate GDP growth: high inflation and fast renewal of product families. Moreover, there is every reason that Belarusian authorities have been using this possibility since 1996 (Chubrik, 2003). Thus, the actual GDP growth in the non-reformers is likely to be lower than the reported one. Another case for partial reformers is that these economies often have a big shadow economy, while in non-reformers it is substantially lower due to repressed regimes. This could contribute GDP growth in partial reformers, and also in advanced reformers at the early stages of transition (Aslund, 2001).

Table 3. Reforms progress and GDP growth

	EBRD reform index in 2003	Average for 1989–2003	
		EBRD reform index[1]	GDP growth rate, %
Hungary	3.85	3.19	1.0
Poland	3.66	3.09	2.0
Czech Republic	3.67	3.00	0.6
Slovakia	3.48	2.81	1.0
Estonia	3.67	2.81	0.3
Slovenia	3.37	2.78	1.1
Croatia	3.33	2.62	-0.8
Latvia	3.48	2.59	-0.9
Lithuania	3.48	2.58	-1.1
Average for advanced reformers[2]	*3.55*	*2.83*	*0.4*
Bulgaria	3.26	2.40	-1.1
FYR Macedonia	2.93	2.39	-1.6
Romania	3.04	2.29	-1.0
Russia	2.92	2.27	-1.6
Kyrgyzstan	2.81	2.26	-1.4
Moldova	2.70	2.15	-5.3
Kazakhstan	2.89	2.14	-0.4
Albania	2.67	2.11	2.3
Armenia	2.96	2.10	0.1
Georgia	2.92	2.10	-6.1
Ukraine	2.74	1.97	-4.1
Average for partial reformers	*2.89*	*2.20*	*-1.9*
Without Moldova, Georgia, and Ukraine	*2.93*	*2.24*	*-0.6*
Azerbaijan	2.59	1.81	-2.5
Uzbekistan	2.08	1.77	0.7
Tajikistan	2.26	1.67	-3.3
Belarus	1.81	1.52	0.5
Turkmenistan	1.30	1.22	-0.4
Average for non-reformers	*2.01*	*1.60*	*-1.0*
Average	**2.96**	**2.31**	**-0.9**

[1] The countries are ranked at the *average* of the EBRD reform index for 1989–2003.
[2] All averages are simple arithmetical averages, except average GDP growth rates for the single countries.
Source: author's calculations.

4. Conclusions

The first-stage reforms – price liberalization, small-scale privatization and trade liberalization – are necessary, but not sufficient for sustained economic growth. Only comprehensive reforms, including enterprise restructuring, banking reform, large-scale privatization and other measures, are growth-enhancing. This is because they allow creating "right" incentives for all economic agents – the main "panacea" for long-run economic growth (Easterly, 2002). Hence, the gap between non-reformers and advanced reformers will widen or at least persist, while the partial reformers could overwhelm this gap implementing comprehensive reforms.

Reforms progress appeared to be a bad predictor of GDP growth in Belarus. Alternative estimates show that it was overestimated (Chubrik, 2003). But even primary output data in Belarus is

distorted (IMF, 2004), thus, official data couldn't be overestimated correctly. At the same time, a number of researches show that GDP growth leads to increase of household income, especially of the poorest' one (Easterly, 2002). Hence, welfare of the population in Belarus should be at the level of advanced reformers with similar GDP growth rates. But Belarus has much lower average wage than most of CEB countries; life expectancy at birth in Belarus is lower too. Thus, even if GDP growth in Belarus is as high as it is reported, its quality is less than one of GDP growth in advanced and even partial reformers. In order to catch-up Belarus has to implement the same reforms as these countries did.

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