Growth for all?

Economy of Belarus: Challenges ahead

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Economy of Belarus: Challenges Ahead

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Introduction

A Vanishing Miracle? Limits to the 'Belarusian Economic Model'

Economic miracles and disasters

The world's economic history is full of 'miracles'. The list includes post-war transformations of Western Europe (like Germany's *wirtschaftswunder*) and Japan, South Korea's 'Miracle of the Han River' (lasting from the mid-1950s until the 1997 Asian economic crisis), the Taiwanese miracle of the 1960–1970s, and the dynamic development of Singapore and Hong Kong. Miracles have also occurred not only across countries, but also within them. For instance, in the 1980s, the state of Massachusetts witnessed reduction of unemployment and re-industrialization after a decade of economic enfeeblement. Economic history is also full of disasters. 'Catching-up' goes hand in hand with 'falling-back'. For instance, Argentina, Uruguay, and Venezuela had incomes four or five times as large as those of South Korea and Taiwan in 1960, but by 1998 had fallen far behind (Knack (2003)). Indeed, head starts can come to a grinding halt.

At the beginning of the 21st century many miraculous economic achievements have been investigated by William Easterly (who was fired from the World Bank for criticizing its policies towards the least developed countries) in his book 'Elusive Quest for Growth' (Easterly (2002)). In this book, he unveils a series of 20th-century myths about the 'wonder-working' sources of economic growth distilled into theoretical panaceas of converting poor to rich. However, the prescribed medicine has often been detrimental to the 'economic health' of developing countries. Perhaps, Easterly could have been puzzled by the remarkable growth achievements of the Belarusian economy, but the experience of the transition economies is not in the Easterly's field of view, as well as reforms–growth nexus. This nexus is explored in Chapter I of this book.

Rapid economic growth is indeed considered as a 'puzzling' achievement. This is partly because high GDP growth rates are recorded in countries characterized by very different constellations of macroeconomic and institutional factors. As a result, it is hard to detect even a few invariable sources of economic growth. Endogenous growth theories have offered the routes to accounting for the 'qualitative' aspects of economic growth. The World Bank (1993) study of the East Asian miracles stresses not only the importance of a stable macroeconomic environment, high savings and interest rates and high quality of human capital, but also a merit-based bureaucracy and growth-promoting institutions.

The institutional side of the debate has generated a broad consensus that 'institutions matter'. The fundamental point of the theory is that the difference in performance has little to do with resource endowment, climate, aid, or history. It is 'a function of whether incentives within a given society steer wealth-maximizing individuals towards producing new wealth or towards diverting it from others' (Knack

(2003); North (1990)). But when the experience of particular countries is considered more closely, controversies about *what kind* of institutions matter immediately arise. For instance, the miracles of East Asia (Kim (1998)) and post-war Western Europe (Eichengreen and Iversen (1999)) have occurred under distinct institutional structures. As for Belarus, its institutional setting is yet to be explored. Some light is shed onto this *problematique* in Chapters II and III when redistributional effects and channels are investigated. Accordingly, a quantitative economic analysis is enriched by an exploration of political-economic aspects of growth.

Economic 'miracles' can last as long as economic policies are modified to nourish uninterrupted economic growth. But economic policy change is a particularly hard task given the path-dependency many economic systems display (North (1990)). As for Belarus, it has been argued that switching to a more durable, growth-promoting macroeconomic policy constellation is a tall order because of the unfavorable legacy of high inflation and dollarization (Haiduk et al. (2005)), and also Chapter III of this book). This legacy creates vicious circles that require efficient solutions to break with. But the new challenges can provide necessary impulses for action (see Chapter IV).

Who benefits from miracles?

An important question to be addressed is which economic actors reap the harvest of economic growth and how they do it. The benefits can be quite substantial, but are distributed unevenly. Inequality of income distribution manifested in a faster growth of average income over the median one creates an incentive for the majority to support policies of redistribution from rich to poor (see, for instance, Alesina, Rodrick (1994)). In Belarus, the rate of median income growth overtakes the rate of average income growth so public discontent is thwarted. In doing so, a number of context-specific channels of redistribution are utilized (see Chapter III for details). Economic theory has traditionally been suspicious towards redistribution policies since they might hamper economic growth. It is even more puzzling to understand how Belarusian economic growth could go together with growth of welfare partly based on redistribution (Chapter II) without any large-scale reforms.

Continuous economic growth has been one of the notable features of the Belarusian economy. Over 1996–2006, GDP and productivity growth rates in Belarus have been above the same indicators displayed by the majority of the transition economies. Nevertheless, wages and incomes substantially lag behind the levels observed in more advanced reformers of Baltic and Central and Eastern Europe. It might appear that lower wages could result from the burden of financing 'the socially-oriented' economy of Belarus. Indeed, the level of taxes to GDP appears to be rather high, although quite close to such high-tax economies as Denmark and Sweden.

The 'socially-oriented character' of the economy of Belarus has been widely stressed in the state-owned media by referring to continuously rising expenditures on education and health care and 'socially-important' facilities. The images of renovated schools, newly-equipped hospitals, and athletic arenas have been dis-

played by the media as credible signs of the social successes the economy of Belarus is able to deliver, when properly 'guided' or even controlled. There was a more palpable element of 'social orientation' of the eponymous economy, namely the provision of a range of benefits to the population. However, these benefits (e.g. cuts in prices for transport, medicine, etc) used to be granted often without a real need for them. Some rationalization of benefits provision has been made at the end of 2007. Nevertheless, social expenditures have not been excessively high in Belarus over the last decade. This partially reflects a macroeconomic context shaped by a low quality of the national currency (resulting in high, but declining level of dollarization) that makes devaluation very costly not only in economic, but also in political terms (Chapters III and IV).

In order to understand the limits to redistribution policies in Belarus, its domestic macroeconomic context has to be explored. Before we go into the details of the provision of social benefits and market regulation (whose studies can be an extremely laborious, but still unilluminating endeavor), we should understand the macroeconomic mechanisms, channels, and policy measures behind redistribution. These are investigated in the Chapter II by employing econometric tools. In general, using quantitative techniques allows higher-quality modeling of economic development scenarios. This task is performed in Chapter IV. The discussion of the possible development trends is particularly important since the unreformed status of the Belarusian economy feeds both the contradictory beliefs in its inherent non-sustainability and the perception of its growth as 'miraculous' or 'puzzling'.

Miracle in the making or in decline? The case of Belarus

The 'miraculous' nature of economic growth in Belarus has been studied by domestic experts and economists associated with international organizations. However, both groups of specialists have been facing certain boundaries. In particular, the UN publications on Belarus tend to produce 'politically-correct' conclusions similar to those appearing in the officially-approved papers. In their turn, domestic experts sometimes display certain biases rooted in their personal likes and dislikes and/or theoretical affiliation.

Notable contributions to the study of economic growth have been made by the World Bank (specifically, its Country Economic Memorandum of 2005 (World Bank (2005))), the International Monetary Fund (IMF (2005)), and a range of other studies (Bakanova, Freinkman (2006); Chubrik (2005); Kruk, Pelipas, Chubrik (2006)). These papers have explored the factors behind economic growth and the limits to it by using the means of both quantitative and qualitative analysis. At the same time, 'social effects' of GDP growth as well as various distributional features have not been properly explored. *This book written by the experts of the IPM Research Center is indented to fill this gap by performing theoretically-informed qualitative and quantitative analysis grounded in modern econometric techniques.*

The Chapter I traces the relationship between market reforms and economic growth by using panel co-integration techniques and the equilibrium correction mechanism. The results of econometric analysis suggest that there is a one-direc-

tional influence of market reforms in economic growth in post-socialist countries. However, the economy of Belarus has been capable to achieve relatively high rates of economic growth without conducting major reforms. This is not because of the 'socially-devastating' consequences of market-augmenting change, but because of the absence of serious challenges to the existing model.

The Chapter II analyzes whether economic growth has been favorable to the poor in Belarus and deals with the issue of distribution of positive effects of growth across households classified according to their income levels. An important question is how far the demand for redistribution could constrain economic growth in Belarus. Indeed, at the end of the 1990s, poverty was a serious problem in Belarus (50% of the population were poor, earning less than the subsistence minimum), but by 2006–2007 its level had strongly declined (to reach just 10% of the population). Accordingly, such decline in poverty reduced the pressure to use redistribution as a tool for poverty alleviation. The analysis of redistribution requires studying the political economy of economic growth. The Chapter III explores these issues in detail by emphasizing a context-specific political business cycle run in the Belarusian economy.

Understanding macroeconomic mechanisms, channels, and economic policy measures allows us to detect some invariable features of the Belarusian model. This detection is a way to considerably improve quantitative modeling. Chapter IV of this book paints four likely scenarios of economic performance over a period of 2008–2011. Modeling trajectories of development and growth is a key to comparing the expected results of two types of policy measures: market-oriented and government-oriented ones. This chapter suggests that good starting conditions and a favorable external environment do not deliver continuous economic growth. So it is very likely that sooner or later structural economic reforms would have to be implemented. The pressures for reforms could become more acute due to externally-induced conditions, such as an energy price hike and an expected deterioration of competitiveness of Belarusian exporters to Russian markets.

The analysis made in Chapters I–IV is compounded by the study of public attitudes that directly affect the behavior of economic actors (Chapter V). The political-economic mechanisms explored in Chapters II and III are in fact shaped by the public attitudes accounted for by the architects and implementators of economic policy measures. More fundamental (and more subtle) values are also important since they define implicit motives guiding the behavior of economic actors. By detecting and analyzing certain regularities of economic policies – qualitatively, quantitatively, and ideationally – and their distributive implications, it is possible to address the question of sustainability of the 'Belarusian miracle' over the medium term.

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Chapter I

Market Reforms and Economic Growth in Post-Socialist Countries

Igor Pelipas, Alexander Chubrik

1. INTRODUCTION

Over the last decades, the empirical relationship between economic freedom and growth has been extensively studied. Theoretically, the analysis is grounded on the classical liberalism of Adam Smith, and the works of Hayek (1960), Friedman (1962), Buchanan (1975), and some other authors. These authors share a view that economic freedom promotes profit-seeking resulting in bigger 'wealth of nations'. In contrast, economic policies repressing economic freedom restrict economic growth and development. This argument is supported empirically by numerous studies used various indexes of economic freedom. The superiority of market economy over centralized planning has been historically 'verified' by the collapse of socialism in the countries of Central and Eastern Europe and the former USSR. Additionally, the transition of the former socialist countries to a market economy provides additional empirical evidence of the impact of economic freedom on economic growth.

Currently a dataset needed to explore the impact of market reforms on economic growth in post-socialist countries is sufficiently large. For these countries various indexes characterizing the level of economic freedom are also available. In this study we take only one of them, namely the index of transformation of the European Bank for Reconstruction and Development (EBRD), characterizing progress in market reforms. We do not discuss whether this index and its components adequately characterize the depth of market reforms. The aim of this study is to analyze the relationship between the progress in market reforms and real GDP per capita taking into consideration the properties of the available time series and using state of the art econometric techniques.

Despite the voluminous body of econometric studies pointing to the positive influence of economic reforms on growth (see, for instance, Falcetti, Lysenko and Sanfey (2006) for a review), there are still controversies over several aspects of this issue. In particular, Babetskii and Campos (2007) considered the results of 43 econometric studies of the relationships between market reforms and growth in transition economies using meta-regression analysis. The results of this analysis shows that of 321 coefficients characterizing the effects of reforms on economic growth, approximately one third is positive and statistically significant, another third is negative and statistically significant, and the final third of these coefficients is statistically insignificant. The authors explain such evidence by a range of factors, including the model specification, modeling techniques, and the endog-

eneity problem of reforms vis-a-vis economic growth. In our study, special attention is paid to these issues.

The peculiarity of practically all studies of reforms-growth nexus is that dynamic characteristics of the data are not taken into consideration (with exception of the papers by Staehr (2006) and Fish, Choudhry (2007)) dealing with the relationship between political and economic reforms). In this study, we attempt to fill this gap. This task has required an essential revision of methods of econometric modeling, specification of regression models, and approach to the analysis of endogeneity of analyzed variables.

A distinctive and novel feature of our study is the application of the concept of cointegration and equilibrium correction model (Engle, Granger (1987)) for the panel data for analysis of 'reforms-growth' nexus. This approach enables, on the one hand, a more correct specification of appropriate regression models and, on the other hand, consideration of both the short-run and long-run relationship between market reforms and economic growth.

This chapter offers solutions to the following tasks: (1) estimation of the dynamic characteristics of the data (the panel tests for unit root and stationarity) and choice of a method of econometric analysis; (2) analysis of the long-run relationship between market reforms and economic growth (panel cointegration test); (3) choice of the specification of the econometric model characterizing the relationship between market reforms and economic growth (equilibrium correction model) and an estimation of short-run and long-run impact of market reforms on economic growth; (4) analysis of the interrelationship between market reforms and economic growth (problem of endogeneity of the analyzed variables).

Our analysis establishes that the level of the EBRD index of market reforms and the level of real GDP per capita are integrated variables with an order of integration $I(1)$. Moreover, these variables are cointegrated, which indicates the existence of a long-run relationship between them and an equilibrium trajectory of economic growth determined by market reforms. Accordingly, an equilibrium correction model can be utilized in order to analyze the relationships between market reforms and economic growth. In the regression models, the equilibrium correction mechanism reflects the discrepancy between the level of market reforms and the level of economic growth and a movement towards the steady-state trajectory correcting disequilibrium states as well. In our view, this approach to the modeling of the relationship between market reforms and economic growth consistently describes a phenomenon of high growth rates in some countries, including Belarus, which displayed weak progress with respect to market reforms (as measured by the EBRD index of market reforms).

The main findings of our study are as follows. First, market reforms exert a statistically significant positive influence upon economic growth in the long run. At the same time, a positive influence of market reforms on economic growth in the short run is also found, with a one-year lag. However, in contrast to some other studies where different a methodology is used, we have found no statistically significant feedback between market reforms and economic growth. In other words, economic growth does not influence market reforms, both in the long-run, and in short-run.

The chapter has the following structure. In the second section we offer a critical review of existing approaches to the modeling of the relationships between market reforms and growth, we explicate our analytical framework, and formulate major hypotheses. In the third section, the empirical data are described and their dynamic characteristics investigated by using panel tests for unit root and stationarity. The fourth section discusses the results of econometric analysis of the relationships of reforms-growth nexus. The final section concludes.

2. METHODOLOGY AND HYPOTHESES

The empirical analysis of the relationships between market reforms and economic growth in the transition economies goes back to 1996. Falcetti, Lysenko, and Sanfey (2006) provide a comprehensive survey of the literature on the topic. Early studies stress a number of essential preconditions for a sustainable economic growth: (1) starting conditions; (2) macroeconomic stabilization leading to low inflation; (3) comprehensive economic reforms, including price and trade liberalization, small-scale privatization, and deep institutional reforms, such as enterprise restructuring, financial sector policy, and competition policies (Fischer et al. (1996); Fischer, Sahay (2000; 2004); De Melo et al. (2001); Havrylyshyn, van Rooden (2003)). A number of authors pay attention to the problem of endogeneity (Heybey, Murrell (1999); Berg et al. (1999)) suggesting that not only reforms affect economic growth, but also reverse relationships are observed, in particular, higher rates of growth induce further economic reforms.

Recently, there is a consensus on at least three major points. First, macroeconomic stabilization is considered to be a necessary condition for recovery and growth. Second, the role of starting conditions seems to be declining over time. Third, the influence of structural reforms is strong and robust. Nevertheless, controversies over 'reforms-growth nexus' still exist (Falcetti, Lysenko and Sanfey (2006); Babetskii, Campos (2007)).

The most recent publications that use the latest available data are the most interesting to look at. One of such papers by EBRD researchers (Falcetti, Lysenko and Sanfey (2006)) concludes that a robust relationship between reforms and growth exists in transition economies with a one-year lag. Although similar results are typical for many other studies, in several papers such a relationship is called into question (see, for example, Radulescu, Barlow (2002)). However, in their paper, Falcetti, Lysenko and Sanfey (2006) emphasize that such skepticism is subject to wrong specification of the models; in particular, when different indexes of reforms are included in the model, this leads to the multicolinearity problem. They also stress that the relationship 'market reforms – economic growth' in transition countries is complex: besides market-oriented reforms other factors affect economic growth. Additionally, Falcetti, Lysenko and Sanfey (2006) conclude that there is probably an interrelationship between market reforms and economic growth, i.e. reforms have a positive influence on economic growth which, in turn, leads to further economic liberalization. Since the paper of Falcetti, Lysenko and Sanfey (2006), in our view, is one of the most comprehensive on this issue (in the context of the used

data set, and utilized econometric methods), we will consider this paper as a starting point of our further analysis.

The vast majority of papers dealing with the 'reforms-growth' interrelationship usually employ the following specification of panel regression equations:

$$(\Delta Y/Y)_{i,t} = a_0 + a_1 ref_{i,t-1} + (\textit{control and dummy variables}) + \varepsilon_{i,t}, \quad (1)$$

$$(\Delta Y/Y)_{i,t} = a_0 + a_1 ref_{i,t-1} + a_2 \Delta ref_{i,t} + (\textit{control and dummy variables}) + \varepsilon_{i,t}, \quad (2)$$

$$(\Delta Y/Y)_{i,t} = a_0 + a_1 \Delta ref_{i,t-1} + (\textit{control and dummy variables}) + \varepsilon_{i,t}, \quad (3)$$

where $Y_{i,t}$ is real GDP per capita of country i at time t; $(\Delta Y/Y)_{i,t}$ is annual growth of real GDP per capita of country i at time t; $ref_{i,t-1}$ is index of market reforms of country i at time t–1; $\Delta ref_{i,t}$ and $\Delta ref_{i,t-1}$ are growth of index of market reforms of country i at time t and t–1, respectively; a_0, a_1, a_2 are regression coefficients; $\varepsilon_{i,t}$ are regression residuals. Control variables can include indicators characterizing starting conditions and macroeconomic environment as well as other factors affecting economic growth.

The use of both levels and growth rates of variables in the regression equations (equation (2)) has already been criticized in De Haan, Lundstrom, and Sturm (2005). However, in our view there is another important aspect concerning model specification, namely the problem of a balanced regression. In particular, the left-hand and the right-hand left variables of the regression model should have the same order of integration. For instance, in the equation (1) annual growth rate of real GDP per capita can be a stationary variable. At the same time, the level of market reforms index can appear to be non-stationary. It is well-known that the use of level variables in the regression model could lead to the problem of 'spurious regression'. In addition, if only growth rates of variables are included in regression, then there is a danger of loss of long-run information contained in the data. All these issues lead us to utilize the concept of cointegration in order to investigate the relationships between reforms and growth.

If the level of real GDP per capita ($Y_{i,t}$) and the level of market reforms index ($ref_{i,t}$) are variables with order of integration $I(1)$, then it is very likely that a long-run relationship can exist between them. Let $Y_{i,t}$ be a function of $ref_{i,t}$, then the relationship between them can be expressed as $Y_{i,t} - f(ref_{i,t}) = \varepsilon_{i,t}$. If variables $Y_{i,t}$ and $ref_{i,t}$ are non-stationary with order of integration $I(1)$, while the residuals $\varepsilon_{i,t}$ are stationary, then the variables $Y_{i,t}$ and $ref_{i,t}$ are cointegrated. The concept of cointegration is the statistical expression of the economic concept of equilibrium, so it can be applied to investigate long-run relationship between economic growth and market reforms. The residuals $\varepsilon_{i,t}$ characterize deviations of a level of real GDP per capita from the equilibrium trajectory. Their stationarity denotes the existence of the equilibrium correction mechanism that restores the equilibrium level of real GDP per capita.

In the long run, a positive impact of economic liberalization on economic growth can be explained by using the endogenous growth theory. Let us suppose that the economy has the Cobb-Douglas production function $Y_t = AK_t^{\alpha}L_t^{\beta}$, where A is a coefficient, which reflects the level of technological progress (efficiency of allocation of

production factors); Y is output; K is capital; L is labor; and α and β are factor elasticities. Market reforms increase efficiency in allocation and utilization of the factors of production. Therefore, an increase of efficiency in allocation would lead to an increase in the value of coefficient A. Accordingly, an increase of efficiency of utilization of the factors of production leads to increase of the value of coefficients α and β. Thus, *ceteris paribus*, deepening of reforms increases returns to the scale of the production function, thereby driving rates of economic growth up against the background of unchanged growth rates of factors of production.

Cointegration between economic growth and market reforms supposes causality at least in one direction, and the existence of an appropriate equilibrium correction model (Engle, Granger (1987)). Accordingly, this model allows us to conduct an analysis of both long-run and short-run relationships between market reforms and economic growth. In contrast to the paper by Falcetti, Lysenko and Sanfey (2006) that uses specification (1), we suggest to model and analyze the 'reforms-growth' nexus in the following way:

1. The analysis of the order of integration of the data used (panel tests for unit root and stationarity).

2. If variables have the order of integration $I(1)$, i.e. they are non-stationary in the levels and stationary in the first differences, the following model is applied to test for cointegration and to estimate the parameters of the long-run relationship:

$$y_{i,t} = a_i + \delta_t + \beta ref_{i,t} + \varphi RECOV_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where $y_{i,t}$ – the level (logarithmic) of real per capita GDP of country i at time t, α_i are individual effects, δ_t are period effects, $ref_{i,t}$ is the value of market reforms index of country i at time t, β_i is regression coefficient which characterizes an impact of $ref_{i,t}$ on $y_{i,t}$ in the long-run, $RECOV_{i,t}$ is a variable, characterizing the influence of factors affected in the period of recovery growth, and $\varepsilon_{i,t}$ are the regression residuals.

If the residuals $\varepsilon_{i,t}$ are stationary, then $y_{i,t}$ and $ref_{i,t}$ are cointegrated, i.e. there is a long-run relationship between them. The residuals $\varepsilon_{i,t}$ characterize deviations of $y_{i,t}$ from an equilibrium trajectory.

3. If there is a cointegration between the logarithmic level of real GDP per capita and the value of market reforms index, the analysis of the relationships between market reforms and economic growth can be carried out within the framework of the following equilibrium correction model:

$$\Delta y_{i,t} = \mu_i + \varphi \Delta y_{i,t-1} + \gamma \Delta ref_{i,t-1} + \delta \Delta RECOV_{i,t} + \alpha \varepsilon_{i,t-1} + u_{i,t}, \quad (5)$$

where $\Delta y_{i,t} = y_{i,t} - y_{i,t-1}$; $\Delta ref_{i,t} = ref_{i,t} - ref_{i,t-1}$; $\Delta RECOV_{i,t} = RECOV_{i,t} - RECOV_{i,t-1}$; $\varepsilon_{i,t-1}$ is equilibrium correction mechanism; α_i are the feedback coefficients, characterizing the speed of equilibrium correction; μ_i, φ_i, γ_i, δ_i are the regression coefficients; u_i are the regression residuals.

The equation (5) is the balanced regression, in which all of the variables (both the left-hand and the right-hand ones) are stationary. In the case of cointegration, coefficient α_i at the equilibrium correction mechanism is both negative and statis-

tically significant. If $\alpha_{2i} \neq 0$ (equation (5)), then market reforms produce an impact on economic growth over the long-run; if $\gamma_i \neq 0$, the impact lasts only in the short run. When $\alpha_{2i} \neq 0$ and $\gamma_i \neq 0$, market reforms influence economic growth *both* in the long-run and short-run.

4. If there is no cointegration between $y_{i,t}$ and $ref_{i,t}$, the analysis of 'reforms-growth nexus' should be carried out using the following specification:

$$\Delta y_{i,t} = \mu_i + \varphi \Delta y_{i,t-1} + \gamma \Delta ref_{i,t-1} + \delta \Delta RECOV_{i,t} + u_{i,t}. \quad (6)$$

In this case regression is also a balanced one, thereby reflecting the existence of a short-run relationship only.

5. In case of cointegration between $y_{i,t}$ and $ref_{i,t}$ the analysis of exogeneity (endogeneity) and causality between the variables is carried out by using the Granger test within the following system the regression equations:

$$\Delta y_{i,t} = \mu_{1i} + \varphi_1 \Delta y_{i,t-1} + \gamma_1 \Delta ref_{i,t-1} + \delta_1 \Delta RECOV_{i,t} + \alpha_1 \varepsilon_{i,t-1} + u_{1i,t}, \quad (7a)$$

$$\Delta ref_{i,t} = \mu_{2i} + \varphi_2 \Delta y_{i,t-1} + \gamma_2 \Delta ref_{i,t-1} + \delta_2 \Delta RECOV_{i,t} + \alpha_2 \varepsilon_{i,t-1} + u_{2i,t}. \quad (7b)$$

If in the equation (7b) $\varphi_2 \neq 0$, and $\alpha_2 = 0$, the variable is $ref_{i,t}$ is weakly exogenous relative to $y_{i,t}$. It means that the value of the market reforms index does not depend on the level of real GDP per capita in the long-run, but in the short-run the relationship still exists. When $\varphi_2 = 0$, and $\alpha_2 = 0$, then the variable $ref_{i,t}$ is strongly exogenous relative to $y_{i,t}$. In this case the value of the market reforms index depends on the level of real GDP per capita neither in the long run nor in the short run. There is an interrelationship between economic growth and market reforms (i.e. endogeneity of the variables), if $\alpha_2 \neq 0$ (long-run interrelationship), $\varphi_2 \neq 0$ (short-run interrelationship), $\alpha_2 \neq 0$ and $\varphi_2 \neq 0$ (interrelationship both in the long-run and short-run).

Given all of the above-mentioned considerations, the following major hypotheses can be formulated for testing:

1. The level (logarithmic) of real GDP per capita and the level of market reforms index are the non-stationary variables with the order of integration $I(1)$. Therefore, the first differences of these variables are stationary with the order of integration $I(0)$.

2. The level (logarithmic) of real GDP per capita and the level of the market reforms index are cointegrated. Therefore, market reforms exert a statistically significant influence on economic growth in the long-run.

3. Market reforms produce a statistically significant influence upon economic growth in the short-run with a one-year lag.

4. The relationship between market reforms and economic growth can be expressed by using an equilibrium correction model that characterizes both the long-run and short-run aspects of such a relationship.

5. Market reforms and economic growth are interrelated, i.e. the investigated variables are endogenous.

It has to be noted that the hypotheses specified above correspond to a large extent to the results presented in Falcetti, Lysenko and Sanfey (2006), specifically: a positive influence of market reforms on economic growth, an influence of market reforms on economic growth with a one year lag, endogeneity of economic growth and market reforms. But in this study, the independent variable (real GDP per capita growth rate) is probably a stationary variable, while the main independent variable (EBRD index of market reform), is evidently a non-stationary variable. As a result, there is a problem of specification (unbalanced regression). Our approach to analyzing the relationship between reforms and growth suggests ways of solving this problem along with investigating relationship between variables not only in the short run, but also in the long run.

3. DATA AND THIRE DYNAMIC PROPERTIES

3.1. The data

Data from 26 post-socialists countries[1] for the period 1989–2005 (balanced panel)[2] were used in this study. The analyzed indicators and their sources are presented in Table 1.

In contrast to numerous papers on economic growth in post-socialist countries, the level of real GDP per capita (as a measure of growth) is used in this chapter, instead of GDP growth rates. This indicator has been calculated on the basis of the growth rates data collected by the European Bank of Reconstruction and Development (EBRD). These data are also used in similar studies. As for the measure of progress in market reforms, the EBRD indexes of transformation are used. The value of the index varies from 1 up to 4+ ('1' is to denote a Soviet-type economy, while '4 +' means the standards and characteristics of a developed market economy, see, for example, EBRD (2006) for a detailed description of the approach). It has to be noted that an assessment with a negative sign means the value of the index 'minus 1/3', while for a positive sign the value of the index 'plus 1/3' is used. Accordingly, the values of the index of transformation range from 1.00 to 4.33.

In order to avoid the problem of multi-collinearity different EBRD indexes of transformation are not included as right hand variables in the regressions simultaneously (Staehr (2005), Falcetti, Lysenko and Sanfey (2006), Chubrik (2003)). These indexes are closely correlated with each other (the minimal and average coefficient of correlation is equal to 0.56 and 0.82 respectively). To solve this problem, some authors propose utilization of factor analysis (method of principal components) which allows obtaining the factors (components) which have been not correlated with each other. The factor analysis is conducted, as a rule, for eight out of nine EBRD indexes of reforms (excluding overall infrastructure reform); then the obtained factors are

[1] Bosnia and Herzegovina is excluded from the list of countries which are analyzed in the EBRD Transition Reports since the data on GDP growth for this country are available only since 1996 and cause certain doubts. Thus, the following countries were analyzed: Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Hungary, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Russia, Romania, Serbia and Montenegro, Slovakia, Slovenia, Tajikistan, Turkmenistan, Uzbekistan, Ukraine, Croatia, the Czech Republic and Estonia.

[2] For all objects there is the same number of observations.

used in the equations of growth. In our study the factor analysis (method of principal components) was conducted for nine indexes of reforms[3] (Table 2).

Table 1

The data used

Abbreviation	Indicator	Source
GDPPC	GDP per capita in constant Euros of 2000	Estimates on the basis of the EBRD data[1] (real GDP growth rates), World Economic Outlook[2] (GDP level in 2000, USD), Eurostat[3] (average exchange rate EUR/USD in 2000), and World Development Indicators[4] (population)
EBRD transition indicators:[5]		
CP	Competition policy	EBRD
BRIRL	Banking reform and interest rate liberalization	EBRD
ER	Enterprise restructuring	EBRD
PL	Price liberalization	EBRD
SMNB	Securities markets and non-bank financial institutions	EBRD
SSP	Small scale privatization	EBRD
TFES	Trade and Forex system	EBRD
OIR	Overall infrastructure reform	EBRD
LSP	Large scale privatization	EBRD
EBRD	EBRD market reforms index	Estimations on the basis of EBRD data (arithmetic average from nine EBRD indexes of transformation)

Notes:
[1] http://www.ebrd.com/country/sector/econo/stats/sei.xls.
[2] http://www.imf.org/external/pubs/ft/weo/2006/02/data/index.aspx, the database of September 2006.
[3] http://epp.eurostat.ec.europa.eu/pls/portal/.
[4] http://devdata.worldbank.org/data-query/. For Serbia and Montenegro the data exclude Kosovo-Metohija; for 1989–1997 the data are estimated on the basis of population growth in the Yugoslav Federation as a whole.
[5] http://www.ebrd.com/country/sector/econo/stats/tic.xls.

Table 2

Principal components of EBRD indexes of transformation

	Components:								
	PC 1	**PC 2**	**PC 3**	**PC 4**	**PC 5**	**PC 6**	**PC 7**	**PC 8**	**PC 9**
Eigenvalues	7.18	0.68	0.29	0.23	0.16	0.15	0.13	0.11	0.07
Variance proportion	0.80	0.08	0.03	0.03	0.02	0.02	0.01	0.01	0.01
Variable	Eigenvectors (loadings):								
CP	0.32	–0.34	0.70	–0.25	–0.11	0.34	–0.19	–0.24	0.01
BRIRL	0.35	–0.11	–0.27	0.07	–0.30	–0.11	–0.07	–0.24	–0.79
ER	0.35	–0.05	–0.26	–0.48	–0.24	–0.27	0.42	–0.34	0.41
PL	0.30	0.58	0.38	0.35	–0.08	0.06	0.54	0.02	–0.08
SMNB	0.32	–0.48	0.19	0.24	0.08	–0.55	0.11	0.49	0.06
SSP	0.34	0.31	0.04	–0.03	0.64	–0.34	–0.39	–0.33	0.03
TFES	0.34	0.32	–0.12	0.09	–0.52	0.03	–0.56	0.29	0.31
OIR	0.33	–0.31	–0.36	0.54	0.21	0.47	0.07	–0.20	0.27
LSP	0.34	0.09	–0.20	–0.48	0.34	0.39	0.12	0.55	–0.18

[3] The calculations have been done using Eviews 6.0 beta.

The calculated components can be interpreted as follows:

1. *Broad-based reforms* (the *EBRD index of transformation*). Since factor loadings are practically identical across all the variables (approximately 1/3), it is possible to consider an arithmetic average of EBRD indexes of transformation as a separate variable. The latter is corresponding to a factor explaining 80% of a variation of the nine analyzed indexes of reforms (Table 2). A similar interpretation of this factor is available in Staehr (2005).

2. *First-wave reforms*. There are high (more than 0.3) positive factor loadings for price liberalization, small-scale privatization, and liberalization of the currency market and foreign trade, along with high negative factor loadings for competition policy, overall infrastructure reforms and securities markets and non-bank financial institutions. It appears that the factor obtained characterizes the initial reforms unaccompanied by structural change (Staehr (2005)). This factor explains 8% of a variation of the EBRD's indexes of reforms. Each of seven other components explains no more than 3% of this variation (Table 2).

3. *Price component of competition policy*. Apart from the cognominal EBRD index, a positive factor loading is recorded for this component. It appears to be an important facilitator of competition policy in the post-socialist economies. A roughly similar negative value is recorded for infrastructure reform, since it also has a component related to price liberalization.

4. *Price component of overall infrastructure reform*. As in the previous case, price liberalization is included since free pricing is an essential element of infrastructure reform.

5. *Privatization*. This component includes two indexes characterizing privatization.

6. *Privatization of enterprises in the infrastructure sector*. This component describes a set of arrangements related to privatization and/or de-monopolization of large enterprise of infrastructure.

7. *Setting of hard budget constrains*. Most likely, this component is to stress price liberalization as a precondition for successful enterprise restructuring.

8. *Securities market*. Development of the national securities market requires large-scale privatization. It follows from a simultaneous insertion of corresponding indexes with high positive factor loadings in that component.

9. *Setting of hard budget constrains in foreign trade sector*. The component probably characterizes transition towards free trade as another prerequisite for successful enterprise restructuring.

Since the aim of this chapter is to investigate the relationship between economic growth and reforms as a whole (instead of their separate components) the variable 'EBRD market reforms index', calculated as an arithmetic average of indexes, will be used in the further analysis. The utilization of such a variable seems reasonable because the first factor explains 80% of the variation of the analyzed indexes and the factor loadings of the indexes entering into this factor are practically identical and equal to approximately 1/3.

The figures A1–A26 in the Appendix show that all transition economies investigated in our research are characterized by the U-shaped dynamics of real GDP per capita. At the beginning of transition, structural distortions inherited from the state socialist past had been corrected in the course of adaptation recession. As

soon as this period was over, economic growth entered the 'recovery phase' (Gaidar (2005)). Over that period, GDP growth had been determined by the economic policies implemented along with a range of other factors, including the initial conditions (De Melo et al. (1997)), dynamics of exports and prices for raw materials, and government expenditures (Falcetti, Lysenko, and Sanfey (2006)). The 'recovery phase' of growth has been fed by the allocation effects unleashed by the 'first wave' of reforms, exogenous factors and also – in some cases – starting conditions (Chubrik (2006)). Accordingly, the scope of adjustment can be explained by the scope of structural distortions a transition economy had been faced with. In its turn, the duration of adjustment is determined by the speed of market reforms. The U-shaped relationships between the speed of reforms and the duration and scope of adaptation recession have already been established in some earlier works on transition. It has been noted that the adaptation recession was short in the countries that implemented first-wave reforms rather quickly, but protracted in those countries that opted for a partial change of the previous system (Havrylyshyn (2001)).

The multitude of the variables used by different authors to explain dynamics of output in post-socialist countries leads to several technical and theoretical problems. First, the right-hand variables of the regression often have a different order of integration, which makes the estimations of coefficients of such a regression inconsistent. Secondly, the theoretical considerations of simultaneous inclusion of traditional variables in the right-hand part of regression equations usually do not go beyond the explanation of growth by stylized facts. Thirdly, a negative influence of the initial conditions on growth decreases in time (Havrylyshyn, van Rooden (2000)), and this should be adequately taken into account while estimating appropriate regressions. In particular, the above-mentioned authors found a relationship between speed of adjustment of structural distortions and speed of market reforms that makes an incorrect simultaneous inclusion of these variables in regression. Lastly, the influence of initial conditions on economic growth can be positive as, for example, in the case of Belarus, Turkmenistan and Uzbekistan (Chubrik (2006)). This creates additional problems while estimating the regression coefficients.

In order to solve these problems, we suggest construction of the following variable:

$$RECOV = \begin{cases} 0, \text{ if } T \le T_B \\ T - T_B, \text{ if } T > T_B \end{cases}, \tag{8}$$

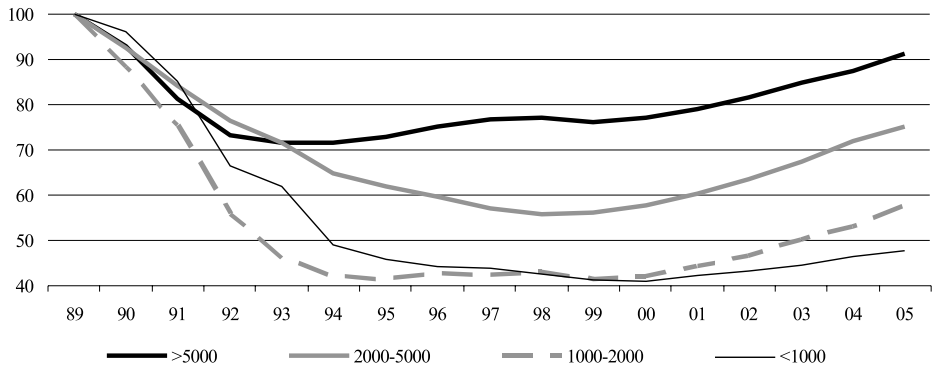
where T_B is the last year of adaptation recession (exogenously determined); T is the current year.

This variable characterizes the influence of factors which are effective in the period of recovery growth. In its turn, adaption recession is estimated by inclusion of the individual trends in the model. Thus, in this research we do not make an attempt to provide a theoretical explanation or an empirical investigation of other factors of economic growth apart from the market reforms.

A way to illustrate a positive impact of market reforms on growth is to analyze the convergence between the average income in the post-socialist countries and the 'old'

members of the European Union. For that purpose, an average GDP per capita across the different groups of the post-socialist counties is calculated against the same indicator for the EU–15. Next, its dynamics is analyzed since 1989 (1989 = 100) (Figure 1). It appears that by 2005 only Estonia and Poland of 26 countries analyzed have exceeded the pre-reform level of GDP per capita, while Slovakia has just reached it. As for the groups of countries[4], high-income countries have converged most closely to the EU–15, while low-income countries have converged least closely. This observation runs in opposition with the convergence theory that predicts that low-income countries would catch-up with high-income ones after market reforms are implemented.

The reason of such output behavior in the analyzed countries is explained in Figure 2. We divided 26 post-socialist countries into two groups depending on their progress in building a market economy. The first group consists of 'fast reformers' (the EBRD index of market reforms is equal to or above three as of 2005). The second group includes 'slow reformers' (the EBRD index of market reforms is below three as of 2005).[5] It is apparent that over 1990–1992, both groups of countries recorded a decrease of GDP per capita as against the EU–15 level. Since 1993 onwards the fast reformers' GDP per capita has begun to converge. As for the slow reformers, the convergence has started in 2000. By that year, the 'laggards' have recorded the value of the EBRD index of market reforms (2.33 on average) very close to the one already achieved by the fast reformers in 1993. Graphically, the existence of the relationship between reforms and growth are shown in Figures 1 and 2.



Note. GDP per capita in constant Euro of 2000.

Figure 1: Convergence of GDP per capita between EU–15 and the groups of post-socialist countries depending on level of income

[4] The first group (> 5,000 EUR per capita) includes Slovenia, the Czech Republic, Estonia, Hungary, Croatia, Poland, Latvia, Lithuania, Slovakia; the second group (2,000–5,000) includes Russia, Romania, Turkmenistan, Bulgaria, Kazakhstan, Macedonia, Belarus; the third group (1,000-2,000) includes Albania, Serbia and Montenegro, Azerbaijan, Armenia, Georgia, Ukraine; and the fourth group (<1,000) includes Uzbekistan, Moldova, Kyrgyzstan, and Tajikistan.

[5] Fast reformers: Armenia, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia; slow reformers: Albania, Azerbaijan, Belarus, Macedonia, Kyrgyzstan, Kazakhstan, Moldova, Russia, Serbia (and Montenegro), Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

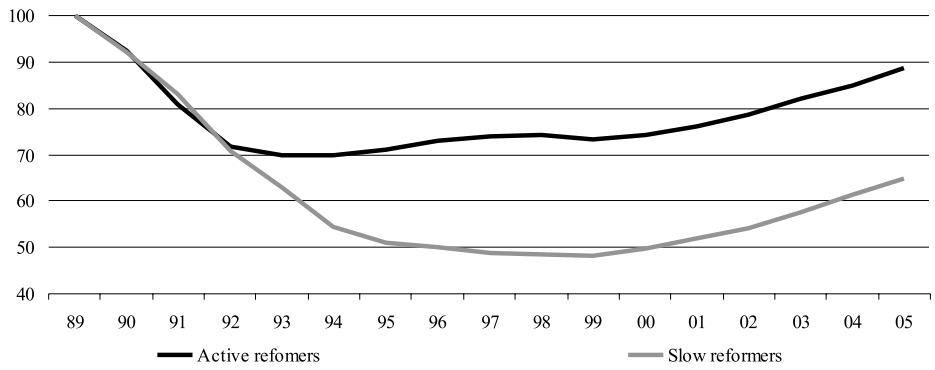


Figure 2: Convergence of GDP per capita between EU–15 and the groups of post-socialist countries depending on progress in reforms

3.2. Dynamic properties of the data

It has to be stressed that the vast majority of the studies on the subject tends to ignore the problem of dynamic characteristics of the data used. The papers by Staehr (2006) and Fish, Choudhry (2007) the indicators characterizing the level of economic reforms are tested for unit root; however these studies are devoted to analysis of the relationship between political and economic reforms. In addition, Staehr (2006) considers the EBRD index of market reforms as a stationary variable.[6] But in our view, the graphical depiction of this indicator both for individual countries and on average for the entire sample suggests that the EBRD index of market reforms is probably a non-stationary variable.

Since the time series for each of 26 countries in question are rather short (17 observations), we, following Staehr (2006), start the empirical analysis by testing the variables for unit root and stationarity. In Table 3 the results of the appropriate panel test for unit root and stationarity (the review of used tests see in QMS (2005)) are presented. We used both the tests with common unit root process and an individual unit root process. The specifications of all tests included individual effects and individual linear trends. The choice of lag length in the corresponding tests was made automatically on the basis of modified Akaike information criteria with maximum lag length equal to 3; Newey-West bandwidth selection using Bartlett kernel is implemented. To visualize the results, the grey color in Table 3 indicates the cases when the unit root hypothesis is rejected (stationarity hypothesis is not rejected) at a 5% significance level. Although there are some contradictions in the results of panel tests for unit root and stationarity, the following conclusions can be formulated:

[6] Despite such a result, the author also uses specifications of various models and tests assuming non-stationarity of the EBRD index of market reforms.

Table 3

Panel unit root tests

Test	*EBRD*		*gdppc*	
	statistic	***p*-value**	**statistic**	***p*-value**
H_0: *unit root (assumes common unit root process)*				
Levin-Lin-Chu (*t**)	–14.34	0.00	–5.04	0.00
Breitung (*t*-statistic)	0.87	0.81	5.38	1.00
H_0: *no unit root (assumes common unit root process)*				
Hadri (*Z*-statistic)	11.38	0.00	12.39	0.00
H_0: *unit root (assumes individual root process)*				
Im-Pesaran-Shin (*W*-statistic)	0.72	0.76	–0.66	0.25
ADF – Fisher (χ^2)	44.79	0.75	83.86	0.00
ADF – Choi (*Z*-statistic)	4.57	1.00	0.91	0.82
PP – Fisher (χ^2)	33.87	0.98	99.79	0.00
PP – Choi (*Z*-statistic)	4.95	1.00	0.15	0.56
Test	**Δ*EBRD***		**Δ*gdppc***	
	statistic	***p*-value**	**statistic**	***p*-value**
H_0: *unit root (assumes common unit root process)*				
Levin-Lin-Chu (*t**)	–6.98	0.00	–4.05	0.00
Breitung (*t*-statistic)	–7.80	0.00	–3.92	0.00
H_0: *no unit root (assumes common unit root process)*				
(*Z*-statistic)	5.31	0.00	5.23	0.00
H_0: *unit root (assumes individual root process)*				
Im-Pesaran-Shin (*W*-statistic)	–3.99	0.00	–2.23	0.01
ADF – Fisher (χ^2)	105.13	0.00	68.56	0.06
ADF – Choi (*Z*-statistic)	–3.59	0.00	–2.52	0.01
PP – Fisher (χ^2)	204.11	0.00	96.90	0.00
PP – Choi (*Z*-statistic)	–8.88	0.00	–3.96	0.00

Note. The calculations have performed by using EViews 5.1. The specifications of all tests included individual effects and individual linear trends. The choice of the lag length was made on the basis of modified Akaike information criteria with a maximum lag length equal to 3; The Newey-West bandwidth selection has been done by using a Bartlett kernel (see QMS (2005)). *p*-statistics for Fisher tests are computed by using an asymptotic χ^2 distribution. All other tests assume asymptotic normality. The grey color indicates that unit root hypothesis is rejected (stationarity hypothesis is not rejected) at a 5% significance level.

1) The level of the EBRD index of market reforms (in our notation – *EBRD*) and a logarithmic level of real GDP per capita (in our notation – *gdppc*) are the variables containing unit root. For the *EBRD* variable, a unit root hypotheses is rejected only in one case out of eight (Levin-Lin-Chu test). For the *gdppc* variable, a unit root hypotheses is rejected in three cases out of eight. Besides the Levin-Lin-Chu test, the *ADF* – Fisher (χ^2) test and the *PP* – Fisher (χ^2) tests also reject the null hypotheses of unit root. However, a modification of these tests (*ADF* – Choi (*Z*-statistic) and *PP* – Choi (*Z*-statistic)) clearly indicates non-stationarity of the *gdppc* variable.

2) The differences of the EBRD index of market reforms (in our notation – Δ*EBRD*) and the logarithmic differences of the level of real GDP per capita (in our notation – Δ*gdppc*) are stationary variables. For Δ*EBRD* only the Hadri test rejects the null hypotheses of stationarity. For Δ*gdppc* this test also rejects the sta-

tionarity hypothesis, the *ADF* – Fisher (χ^2) rejects unit root hypotheses only at a 10% significance level. In general, the tests applied suggest that $\Delta EBRD$ is a stationary variable in seven cases out of eight; $\Delta gdppc$ is stationary variable in six cases out of eight at a 5% significance level and in seven cases out of eight at a 10% significance level.

Hence, panel unit root tests presented in Table 3 show that *EBRD* and *gdppc* are integrated variables with the order of integration $I(1)$; $\Delta EBRD$ and $\Delta gdppc$ are stationary variables with the order of integration $I(0)$. This means that a long-run relationship can exist between the level of real GDP per capita and the EBRD index of market reforms. This leads us to the application of panel techniques of cointegration analysis

4. THE ECONOMETRIC RESULTS

4.1. Panel cointegration: Pedroni tests

In the previous section it has been established that the level of real GDP per capita and the level of EBRD index of market reforms are the variables with an order of integration $I(1)$. Therefore, a long-run relationship can exist between them. In our analysis this suggests the use of panel cointegration analysis.

The main aim of this section is testing of the hypothesis that variables *gdppc* and *EBRD* are cointegrated. For that purpose, a method elaborated by Pedroni (1997; 1999; 2001)) for panel data in the framework single regression equation is applied. Specifically, Pedroni has suggested seven panel cointegration tests: four tests are the so-called within-dimension ones, three tests are between-dimension ones. Within-dimension cointegration tests are statistics based on common autoregression coefficients in corresponding unit root for different countries (panel cointegration test). Between-dimension cointegration tests are simple averages from individual tests for different countries (panel group cointegration test). A null hypothesis of no cointegration is set for all seven tests. The alternative hypothesis assumes the existence of cointegration between examined variables.

Given the dataset, we utilized Pedroni test for panel cointegration based on the equation (7):

$$gdppc_{i,t} = \alpha_i + \delta_i t + \beta EBRD_{i,t} + \varphi RECOV_{i,t} + \varepsilon_{i,t}, \tag{9}$$

where $i = 1, 2 \ldots 26$ (countries); $t = 1989, 1990 \ldots 2005$ (years). This specification assumes the existence of various aspects heterogeneity captured via the fixed individual effects (α_i), and individual time trends (δt).

The cointegration test based on the equation (9) is calculated using the following regression:

$$\varepsilon_{i,t} = \rho_i \varepsilon_{i,t-1} + u_{i,t}, \tag{10}$$

where $\rho_i = 1 \forall i$; H_0: no cointegration; ρ_i is autoregression coefficient.

The difference between panel and panel group test for cointegration follows from the specification of alternative hypothesis concerning the existence of cointegration:

1) For panel cointegration test $H_0 : \rho_i = 1 \forall i; H_1 : \rho_i = \rho < 1 \forall i;$

2) For panel group cointegration test $H_0 : \rho_i = 1 \forall i; H_1 : \rho_i < 1 \forall i.$

Thus, the panel group cointegration test is a more general test because it allows heterogeneity of the coefficients under an alternative hypothesis.

The results of the panel cointegration tests are presented in Table 4. There are several econometric software packages that allow carrying out Pedroni panel cointegration tests. In this study, we employ the latest version of *EViews*. The specifications of all tests assumed the existence of deterministic constants and trends. The choice of a lag length has been done automatically on the basis of the modified Akaike information criteria with a maximum lag length equal to 2; the Newey-West bandwidth selection is applied by using a Bartlett kernel. In order to visualize the results, rejection of the null hypothesis of no cointegration at a 5% a significance level is marked in grey (Table 4).

Table 4

Panel cointegration tests

	Statistic	*p*-value	Weighted statistic	*p*-value
Alternative hypothesis: common AR-coefficients (within-dimension)				
Panel *v*-statistic	23.04	0.00	2.36	0.02
Panel *rho*-statistic	1.08	0.22	2.36	0.02
Panel *PP*-statistic	–4.89	0.00	–3.81	0.00
Panel *ADF*-statistic	–6.77	0.00	–7.91	0.00
Alternative hypothesis: individual AR-coefficients(between-dimension)				
Group *rho*-statistic	3.26	0.00		
Group *PP*-statistic	–5.45	0.00		
Group *ADF*-statistic	–7.18	0.00		

Note. The calculations have been performed by using EViews 6.0 beta. H_0: no cointegration. The specifications of the test assume the existence of deterministic constants and trends. The choice of the lag length was made on the basis of the modified Akaike information criteria with a maximum lag length equal to 2; the Newey-West bandwidth selection is done by using a Bartlett kernel. Grey color indicates the cases when the null hypothesis of no cointegration is rejected at 5% significance level.

As follows from Table 4, five tests out of seven reject the null hypothesis of no cointegration between the level of real DGP per capita and the level of EBRD index of market reforms (null hypothesis is rejected if the statistics has a statistically significant negative value; *v-statistics* is an exception: in this case the null hypothesis is rejected, if the statistics has a statistically significant positive value). It should be noted that for small samples (in our case $t = 26$) group parametric *t-statistics* (group *ADF-statistics*) is a more powerful test than other tests (Pedroni (1997)). This claim along with results obtained, lead to the conclusion of cointegration between the variables *gdppc* and *EBRD*. Therefore, there is a long-run relationship between the level of real DGP per capita and the level of EBRD index

of market reforms. In its turn, the existence of cointegration between the variables *gdppc* and *EBRD* allows to use cointegrating regression (9) in order to estimate the parameters of long-run relationship.

4.2. Estimation of long-run parameters

In order to estimate the parameters of the long-run relationship we used regression equation (12). Our approach has the following peculiarities in the model specification: 1) the estimation of regression was carried out using pooled least squares (PLS); 2) the coefficients at the variables *EBRD* and *RECOV* are common for all countries; 3) the model assumes individual trends for different countries (a testable hypothesis); 4) the model assumes fixed effects (a testable hypothesis). Although utilization of PLS in estimation of the long-run equation can appear to be problematic, and fully modified least squares method in such case gives more reliable estimates (Pedroni (2001)), we aim to estimate the parameters of the long-run relationship using specification that corresponds as much as possible to the model used while testing for panel cointegration. The results are shown in Table 5.

Table 5

Market reforms and economic growth: long-run relationship (dependent variable: *gdppc*)

Variables	Coefficient	*t*-statistic	*p*-value
Constant	7.620	275.9	0.00
EBRD	0.105	4.5	0.00
RECOV	0.208	25.6	0.00
	statistic	**degree of freedom**	***p*-value**
Redundant fixed effects tests:			
F-test	253.0	25, 388	0.00
χ^2-test	1260.1	25	0.00
Redundant individual trends test:			
F-test	42.0	26, 388	0.00
Log likelihood ratio, χ^2	591.7	26	0.00

Note. The calculations have been performed by using EViews 5.1. The model includes fixed effects and individual trends that are not shown in this table. The estimation method is pooled least squares (PLS).

The estimated parameters of the long-run relationship between reforms and growth are provided in Table 5. It appears that the coefficient of the *EBRD* variable is positive and statistically significant. Therefore, it can be concluded that the increase in the value of the EBRD index of market reforms positively affects economic growth in the long-run. A dummy variable characterizing the impact of recovery growth is also statistically significant and has an expected sign. The tests for redundant fixed effects and individual trends testify to the chosen specification of the model.

Therefore, the equation of the long-run relationship between the level of GDP per capita in constant prices and the level of the EBRD index of market reforms in our specification is the following:

$$gdppc_{i,t} = 7.620 + 0.105EBRD_{i,t} + 0.208RECOV_{i,t} + \varepsilon_{i,t}. \quad (11)$$

Cointegration between *gdppc* and *EBRD* assumes that the residuals of this regression ($\varepsilon_{i,t}$) are stationary, and these residuals with a lag 1 represent equilibrium correction mechanism adjusting *gdppc* to its equilibrium trajectory. The residuals of the regression equation are plotted in Figure 3. As it can be seen, the residuals $\varepsilon_{i,t}$ visually are a stationary variable with a zero mean. The results of the formal tests of the residuals of cointegration relationship (11) for unit root are presented in Table 6.[7] These results show that the residuals of the regression equation (11) are a stationary variable.

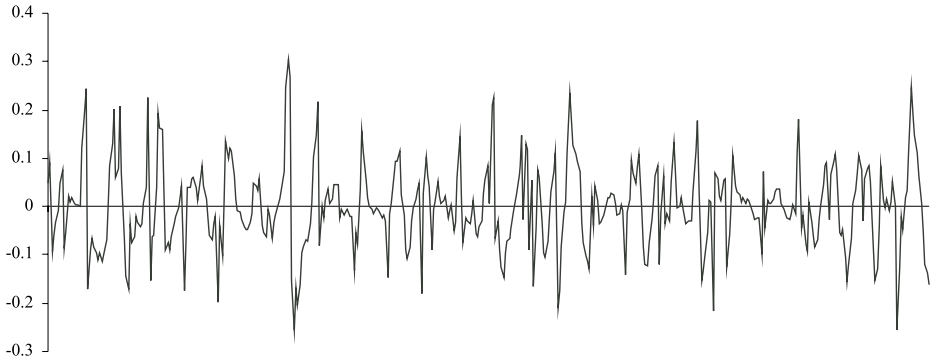


Figure 3: The residuals of the regression equation (11): Equilibrium correction mechanism

Table 6

Equilibrium correction mechanism: Panel unit root test

Test	Exogenous variables	Statistic	*p*-value
H_0: unit root (assumes common unit root process)			
Levin-Lin-Chu (*t**)	no	–11.95	0.00
H_0: unit root (assumes individual root process)			
Im-Pesaran-Shin (*W*-statistic)	individual fixed effects	–4.55	0.00
ADF – Fisher (χ^2)	no	228.92	0.00
ADF – Choi (*Z*-statistic)	no	–10.75	0.00
PP – Fisher (χ^2)	no	233.82	0.00
PP – Choi (*Z*-statistic)	no	–11.03	0.00
H_0: no unit root (assumes common unit root process)			
Hadri (*Z*-statistics)	individual fixed effects	–0.60	0.73

Note. The calculations have been performed by using *EViews* 5.1. The choice of the lag length was made on the basis of the modified Akaike information criteria with a maximum lag length equal to 2, in the tests without the individual effects and with maximum lag length equal to 3, in the tests with the individual effects; the Newey-West bandwidth selection is implemented by using a Bartlett kernel (see QMS (2005)). *p*-statistics for Fisher tests are computed by using an asymptotic χ^2 distribution. All other tests assume asymptotic normality.

[7] Strictly speaking, unit root tests whose results are presented in Table 6 are not tests for cointegration. Nevertheless, they unambiguously show that the residuals of equation (11) are stationary. This is an additional evidence of existence of cointegration between the level of real GDP per capita and the EBRD index of market reforms.

The regression equation (11) depicts the long-run relationship between the level of real GDP per capita and the level of the EBRD index of market reforms. In this equation, the residuals are stationary and characterize an equilibrium correction mechanism that should be used while modeling the relationship 'market reforms – economic growth' both in the long-run and short-run (equilibrium correction model; hereinafter we will denote equilibrium correction mechanism as *ECM*).

4.3. Cointegration and an estimation of the long-run parameters: an alternative approach

In the previous section, a least squares method is applied to estimate panel regression equation in order to estimate the parameters of the relationship between reforms and growth. Strictly speaking, this approach is valid as long as the regression coefficients for different countries are homogenous. Therefore, a somewhat more careful approach is needed to account for the difference in the short-run dynamics across the countries studied. For that purpose, the approach originally suggested by Pesaran, Shin, and Smith (1999) has been applied. This approach allows simultaneously running the tests for cointegration between the variables and estimating the parameters of the long-run relationship.

Essentially, the approach is grounded in two methods of statistical estimation, namely mean group estimations and pooled mean group estimations. The method of mean group estimations of the long-run parameters of the panel data takes an average value of the parameters of long-run relationships calculated for individual countries. The method of pooled mean group estimations is an intermediate technique between the mean group estimation (where the regression coefficients and constants are different for individual countries) and a regression with fixed effects (where the coefficients are fixed and only constants can vary). In the pooled mean group method only the parameters of the long-run relationship are the same for all countries in the panel, while the coefficients of the short-run dynamics can vary across countries included in the panel.

The method of pooled mean group estimations can be applied to our data set in the following way. In particular, the autoregression model with a distributed lag without restrictions has the following form:

$$gdppc_{it} = \sum_{j=1}^{m} \lambda_{ij} gdppc_{i,t-j} + \sum_{j=0}^{n} \delta_{ij} EBRD_{i,t-j} + \sum_{j=0}^{n} \varphi_{ij} RECOV_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (12)$$

This model can then be re-parameterized as the error (equilibrium) correction model:

$$\Delta gdppc_{it} = \theta_i (gdppc_{i,t-1} + \beta_{1i} EBRD_{i,t-1} + \beta_{2i} RECOV_{i,t-1}) + \\ + \sum_{j=1}^{m-1} \phi_{ij} \Delta gdppc_{i,t-j} + \sum_{j=1}^{n-1} \phi_{ij} \Delta EBRD_{i,t-j} + \sum_{j=1}^{m-1} \gamma_{ij} \Delta RECOV_{i,t-j} + \mu_i + u_{it}, \qquad (13a)$$

where β_{1i} and β_{2i} are the parameters denoting the long-run relationship; θ_i is a feedback coefficient, characterizing adjustment to the steady-state; the equilibrium correction mechanism (*ECM*) is in parentheses.

The method of pooled mean group estimates imposes a limitation on (13a): the parameters of the long-run relationship β_{1i} and β_{2i} are the same for all countries in the panel. Then, the model can be described as follows:

$$\Delta gdppc_{it} = \theta_i (gdppc_{i,t-1} + \beta_1 EBRD_{i,t-1} + \beta_2 RECOV_{i,t-1}) + \\ + \sum_{j=1}^{m-1} \phi_{ij} \Delta gdppc_{i,t-j} + \sum_{j=1}^{n-1} \phi_{ij} \Delta EBRD_{i,t-j} + \sum_{j=1}^{m-1} \gamma_{ij} \Delta RECOV_{i,t-j} + \mu_i + u_{it} . \quad (13b)$$

In (13b) all the coefficients of the short-run relationship and the feedback coefficients can vary between individual countries. The estimations of the coefficients in this case are consistent and asymptotically normal both for variables with order of integration *I*(1) and variables with order of integration *I*(0). The model is estimated using the maximum likelihood method. The lag length in the model can be chosen on the basis of various information criteria or using the general-to specific approach which reduced the model so to leave only statistically significant coefficients. The validity of utilization of polled mean group estimations can be determined by the Hausman test (null hypothesis – it is possible to use pooled mean group estimations (poolability)).

The results obtained on the basis of model (13b) are presented in Table 7. First, the individual tests and joint Hausman test do not reject a null hypothesis of data poolability and validity of utilization of pooled mean group estimations. Thus, the results presented in Table 7, adequately describe our panel data. Secondly, the investigated variables are cointegrated, i.e. there is the long-run relationship between them. The negative and statistically significant at 1% level feedback coefficient (–0.318) for equilibrium correction mechanism (ECM) confirms this. The parameters of the long-run relationship at *EBRD* and *RECOV* are statistically significant and have expected signs. Moreover, the value of the coefficient at *EBRD* (0.114) is very close to the results obtained earlier within the static panel regression with fixed effects (0.105). The coefficients of the short-run relationship in this case are not of special interest, although all of them are statistically significant, which follows from the method of lag selection in the model (general-to-specific). Therefore, the two different methods do not contradict each other: they clearly indicate the existence of cointegration between the level of GDP per capita in constant prices and the level of the EBRD index of market reforms and the statistically significant influence of market reforms on economic growth in the long-run. Based on these results, we will use the equilibrium correction mechanism ($\varepsilon_{i,t}$), obtained in Section 4.2, for analysis of causality and endogeneity of investigated variables.

Table 7

Cointegration test and estimation of the coefficients of the long-run relationship: the pooled mean group estimations (dependent variable: *gdppc*)

Variables	Coefficient	*t*-statistic	*h*-test	*p*- value
The long-run coefficients:				
EBRD	0.114	5.87	0.87	0.35
RECOV	0.092	30.33	0.84	0.36
Joint Hausman test			0.88	0.64
Equilibrium correction mechanism:				
ECM	–0.318	–4.40		
The short-run coefficients:				
Constant	0.040	0.67		
$\Delta gdppc_{t-1}$	0.271	3.76		
$\Delta EBRD$	–0.103	–2.31		
$\Delta RECOV$	0.097	4.11		

Note. The calculations have been performed by using Gauss 8.0, program JASA (http://www.econ.cam.ac.uk/faculty/pesaran/jasa.exe). The data for every country have been demeaned. The lag length has been chosen by using a 'general-to-particular' approach. As a result, the following autoregression model with the distributed lag has been selected: (1, 0, 0). The model is estimated by using a Newton-Raphson algorithm. *h*-test: Hausman test.

4.4. Analysis of causality and endogeneity: the short- and long-run aspects

Since we have obtained results confirming the existence of the long-run relationship between investigated variables, the following analysis should be done in the framework of the equilibrium correction model allowing to consider the short-run and long-run aspects of the relationship 'market reforms – economic growth'. Taken into account (10a) and (10b), the hypothesis for testing the following regressions will be used (we denote equilibrium correction mechanism as ECM):

$$\Delta gdppc_{i,t} = \mu_{1i} + \phi_1 \Delta gdppc_{i,t-1} + \gamma_1 \Delta EBRD_{i,t-1} + \delta_1 RECOV_{i,t-1} + \alpha_1 ECM_{i,t-1} + u_{1i,t}, \quad (14a)$$

$$\Delta EBRD_{i,t} = \mu_{2i} + \phi_2 \Delta gdppc_{i,t-1} + \gamma_2 \Delta EBRD_{i,t-1} + \delta_2 RECOV_{i,t-1} + \alpha_2 ECM_{i,t-1} + u_{2i,t}. \quad (14b)$$

On the basis of these regressions it is possible to evaluate the direction of the relationships between variables both in the short-run and long-run (Granger tests), and to consider the problem of endogeneity (exogeneity) of the variables included in the model. The results of the estimations of the regressions (14a) and (14b) using panel least squares (model includes fixed period effects) are presented in Table 8.

As it is shown in Table 8, market reforms influences economic growth both in the short-run and long-run. The change of the EBRD index of market reforms with a one year lag is statistically significant at a 1% level and a positive influence on growth rates of GDP per capita in constant prices. The coefficient of equilibrium correction is also statistically significant at a 1% level and has a correct sign (minus). Its value means that adjustment of the dependent variable towards equilibrium takes approximately 2.5 years (1/0.378 = 2.584).

Table 8

The relationship between market reforms and growth: the short- and long-run dimensions (PLS)

Variables	Dependent variable					
	$\Delta gdppc$			$\Delta EBRD$		
	coefficient	***t*-statistic**	***p*-value**	**coefficient**	***t*-statistic**	***p*-value**
Constant	–0.090	–7.775	0.000	0.145	4.480	0.000
$\Delta gdppc_{t-1}$	0.323	4.790	0.000	0.240	1.610	0.108
$\Delta EBRD_{t-1}$	0.054	3.015	0.003	0.141	2.590	0.010
$\Delta RECOV$	0.123	8.260	0.000	–0.054	–1.310	0.191
ECM_{t-1}	–0.387	7.004	0.000	–0.002	–0.012	0.990
	statistic	**degree of freedom**	***p*-value**	**statistic**	**degree of freedom**	***p*-value**
Redundant fixed period effects tests:						
F-test	2.399	14, 371	0.003	3.608	14, 371	0.000
χ^2-test	33.794	14	0.002	49.784	14	0.000

Note. The calculations have been performed by using *EViews* 5.1. The model includes fixed period effects. The estimation method is the panel least squares (PLS).

The modeling of influence of market reforms on economic growth in the framework of the equilibrium correction model that characterizes the long-run relationship between market reforms and economic growth, logically explains discrepancies between market reforms and economic reforms taking place in several countries (for instance, Belarus). A country can have rather high rates of economic growth and a rather low value of the index of market reforms. This means that the indicator of economic growth in this country is above the equilibrium level, and the equilibrium correction mechanism will work towards slowdown of economic growth and equilibrium recovery. In the opposite situation a country can have rather low rates of economic growth at a rather high value of the index of market reforms. In this case the indicator of economic growth is above the equilibrium level, and the equilibrium correction mechanism will work towards acceleration of economic growth and equilibrium recovery.

The results presented in Table 8 show that economic growth is not a factor of acceleration of market reforms. In regression (14b) coefficients at the equilibrium correction mechanism and $\Delta gdppc_{t-1}$ are statistically insignificant. This rejects the assumption concerning endogeneity of market reforms and economic growth. According to the results obtained, the EBRD index of market reforms is a strictly exogenous variable relative to economic growth.

The estimations of the coefficients of regressions in (14a) and (14b) can be inconsistent while using a panel least squares in the models with fixed effects and lags of dependent variables (Nickell (1981)). In this case there is an estimation bias of the order $1/t$, where t is the length of the time series in the panel. In our case $t = 26$, hence, it is quite probable that any estimation bias will be small. Nevertheless, to obtain more reliable results we additionally used the generalized method of the moments (GMM) for an estimation of the models (14a) and (14b). In our study the so-called system generalized method of moments (GMM-SYS) has been used (see Blundell, Bond (1998)).

The results of these calculations are presented in Table 9. In accordance with corresponding tests, the model is well specified: Sargan test testifies a validity of chosen instruments; additionally, the presence of the first order and absence of the second order autocorrelation also confirms the correctness of model specification.

Table 9

The relationship between market reforms and growth: the short- and long-run dimensions (GMM-SYS)

Variables	Dependent variable					
	Δ*gdppc*			Δ*EBRD*		
	coefficient	***t*-statistic**	***p*-value**	**coefficient**	***t*-statistic**	***p*-value**
Constant	–0.098	–6.470	0.000	0.253	3.750	0.000
$\Delta gdppc_{t-1}$	0.314	3.240	0.001	0.144	0.455	0.649
$\Delta EBRD_{t-1}$	0.074	2.580	0.010	0.180	1.670	0.095
Δ*RECOV*	0.131	7.770	0.000	–0.213	–2.710	0.007
ECM_{t-1}	–0.420	–3.930	0.000	0.037	0.135	0.893
Transformation used: first differences						
GMM-SYS estimations: combined transformed and level equations						
Instruments for transformed equations:						
Transformed instruments: *ECM*; *ECM*(–2).						
Level instruments: Gmm(*gdppc*, 2, 99); Gmm(*EBRD*, 2, 99); Gmm(*RECOV*, 2, 99); Gmm(*ECM*, 2, 99).						
Instruments for level equations: *ECM*; *ECM*(–2); GmmLevel(Δ*gdppc*, 1, 1); GmmLevel(Δ*EBRD*, 1, 1); GmmLevel(Δ*RECOV*, 1, 1); GmmLevel(*ECM*, 1, 1).						
Wald (joint): χ^2 (4) = 802.3[0.000]				Wald (joint): χ^2 (4) = 46.4[0.000]		
Wald (dummy): χ^2 (1) = 41.9[0.000]				Wald (dummy): χ^2 (1) = 14.0[0.000]		
Sargan test: χ^2 (534) = 24.4[1.000]				Sargan test: χ^2 (534) = 21.7[1.000]		
AR(1) test: N(0.1) = –2.1[0.032]				AR(1) test: N(0.1) = –2.9[0.003]		
AR(2) test: N(0.1) = 0.8[0.414]				AR(2) test: N(0.1) = 0.3[0.733]		

Note. The calculations have been performed by using *PDP 1.24* of econometric software *PcGive* 10.3 (Doornik, Hendry (2001)). Wald (joint) is a joint test for significance of the variables in the model (H_0: the variables are statistically insignificant); Wald (dummy) is a joint test for significance of dummies (constants) in the regression (H_0: dummies are statistically insignificant; Sargan test is a test for the validity of the model instruments (H_0: the instruments are valid in the model); AR(1) and AR(2) are the tests for autocorrelation of the first and second order, respectively (H_0: no autocorrelation). In Table 8 the results (coefficients and tests) of the second step of GMM-SYS estimation are shown. The *t*-statistic is calculated using finite sample corrected standard errors.

In general, the obtained results using GMM-SYS correspond to those presented in Table 8. The EBRD index of market reforms has a statistically significant positive influence on economic growth in the short-run (with a one year lag) and long-run. Moreover, the values of coefficients in the equation for Δ*gdppc* are very close to the values that have been obtained on the basis of panel least squares. A similar situation is observed when we see the significance of these coefficients. As to a feedback, estimations of (14b) by GMM-SYS have not changed the results obtained earlier: economic growth does not have a statistically significant 5% level influence on market reforms neither in the long-run, nor in the short-run.

Actually the regression models (14a) and (14b) are Granger tests for the long-run and short-run causality of the investigated variables. In general one can con-

clude that the EBRD index of market reforms is a strictly exogenous variable relative to the indicator of economic growth (GDP per capita in constant prices). Thus, the usage of an equilibrium correction model while analyzing the relationship 'market reforms – economic growth' has allowed considering this issue, taken into account the dynamic characteristics of the data. The regressions (14a) and (14b) are balanced, i.e. in the left-hand and right-hand side of these equations the stationary variables are included. The short-run influence of the EBRD index of market reforms on growth is reflected through variable $\Delta EBRD_{t-1}$; the long-run influence is considered by the equilibrium correction mechanism ECM_{t-1}, representing the residuals from the equation of the long-run relationship between the level of GDP per capita in constant prices and the level of the EBRD index of market reforms. Such an approach, in our opinion, is more reasonable since it allows considering the characteristics of the data used and results in well specified regression models.

5. CONCLUSION

In this study a new approach to the analysis of the relationship market reforms – economic growth is put forward, based on state of the art econometric methods. Taken into account the dynamic characteristics of the data used (the level of GDP per capita in constant prices and the level of the EBRD index of market reforms), cointegration analysis has been chosen for investigation of this relationship. The usage of the equilibrium correction model has allowed getting some new results on the issue.

Within our research we tested five main hypotheses and obtained the following results.

Hypothesis 1. The logarithmic level of GDP per capita in constant prices and the level of the EBRD index of market reforms are non-stationary variables and have the order of integration $I(1)$. Consequently, the first differences of these variables are stationary variables with order of integration $I(0)$.

Result. The set of panel tests for unit root and stationarity used in this research demonstrates that the investigated variables have an order of integration $I(1)$. Their first differences are stationary variables. Thus, it would not be correct to utilize variables with different orders of integration in regressions characterizing the relationship 'market reforms – economic growth'. This could lead to incorrect model specification.

Hypothesis 2. There is a cointegration between the logarithmic level of GDP per capita in constant prices and the revel of the EBRD index of market reforms.

Result. Utilization of different methods of analysis demonstrates that the level of GDP per capita in constant price and the revel of the EBRD index of market reforms are cointegrated variables, i.e. there is the following long-run relationship between them (t-statistics in parentheses):

$$gdppc_{it} = \underset{(275.9)}{7.620} + \underset{(4.5)}{0.105}\, EBRD_{i,t} + \underset{(25.6)}{0.208}\, RECOV_{i,t} + \varepsilon_{it}.$$

Thus, growth of the index of market reforms has a statistically significant positive impact on GDP per capita dynamics in the long-run.

Hypothesis 3. The relationship 'market reform – economic growth' can be described using an equilibrium correction model, characterizing the long-run and short-run aspects of this relationship.

Hypothesis 4. Market reform has a statistically significant positive influence on economic growth in the short-run with a one year lag.

Result. Within our study the following equilibrium correction model, characterizing the relationship 'market reform – economic growth' has been obtained:

$$\Delta gdppc_{i,t} = \underset{(4.790)}{0.323}\,\Delta gdppc_{i,t-1} + \underset{(3.015)}{0.054}\,\Delta EBRD_{i,t-1} +$$
$$+ \underset{(8.260)}{0.123}\,\Delta RECOV_{i,t-1} - \underset{(-7.004)}{0.387}\,ECM_{i,t-1} - \underset{(-7.775)}{0.090} + u_{1i,t}.$$

As one can see, we have obtained a well specified model confirming hypotheses 3 and 4. Market reforms have a statistically significant positive influence on economic growth in the short-run with a one year lag. The statistically significant coefficient at the equilibrium correction reflects the long-run relationship between the variables and characterizes the speed of adjustment of the economic growth indicator towards a steady state. These hypotheses are validated by using different estimation methods of appropriate regressions.

Hypothesis 5. Market reforms and economic growth are interrelated, i.e. the investigated variables are endogenous.

Result. Within our methodology of analysis of the relationship 'market reforms – economic growth' the hypothesis concerning the exogeneity of investigated variables is not supported empirically. In accordance with obtained results, the EBRD index is a strictly exogenous variable relative to the indicator of economic growth. Thus, economic growth does not statistically significant influence market reforms; neither in short-run, nor in the long-run.

It should be noted, that in general our results do not contradict recent studies on this issue (for example, Falcetti, Lysenko and Sanfey (2006)). Our main conclusion is that market reforms have a positive effect on economic growth in post-socialist countries. However, our econometric approach allows analyzing the relationship 'market reforms – economic growth' more correctly, as well as allows considering its various aspects (short-run and long-run dynamics) in more detail. In our opinion, this approach provides more intelligible results and may be used in comparable future research: for example, while analyzing the influence of various indexes of economic freedom on economic growth in all countries as a whole and in their different groups.

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ANNEX A: DYNAMICS OF GDP AND EBRD REFORM INDEX

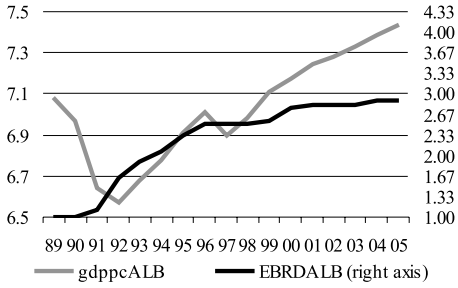


Figure 1. Albania

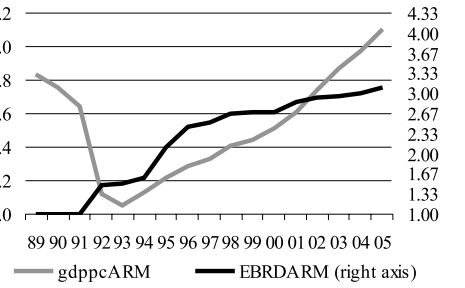


Figure 2. Armenia

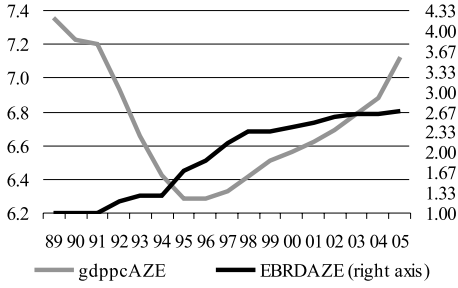


Figure 3. Azerbaijan

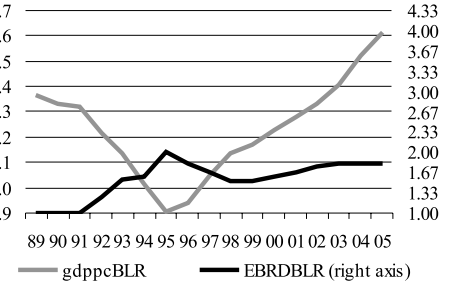


Figure. 4. Belarus

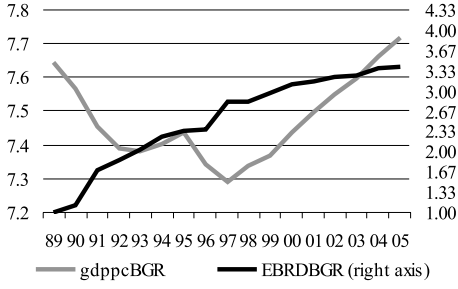
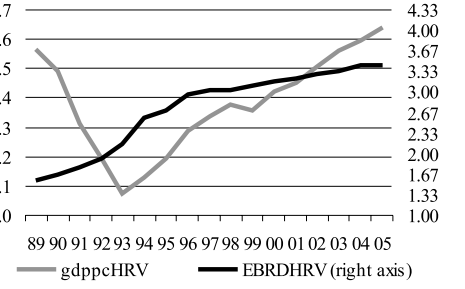


Figure 5. Bulgaria



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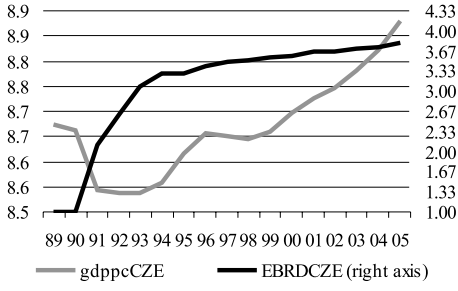


Figure 7. Czech Republic

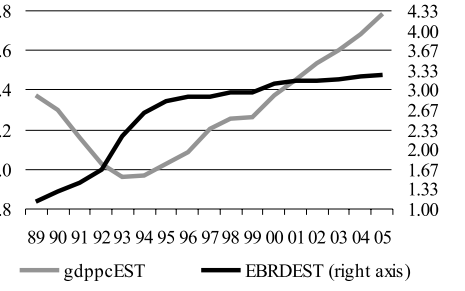
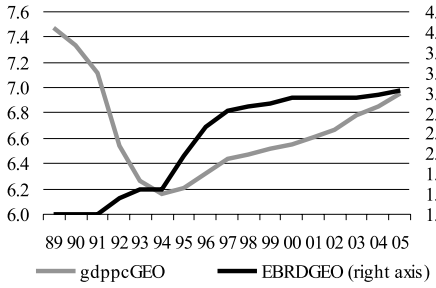


Figure. 8. Estonia



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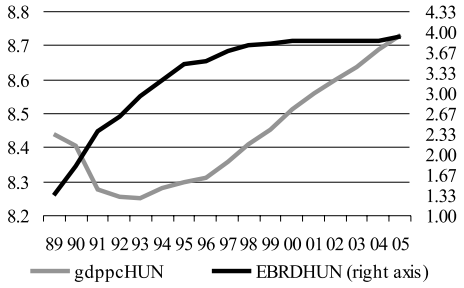

Figure 10. Hungary

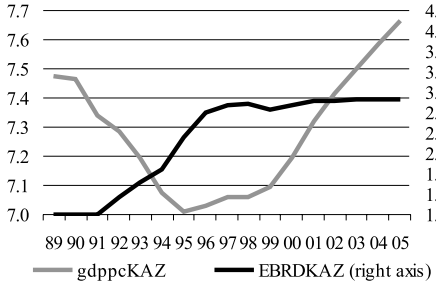

Figure 11. Kazakhstan

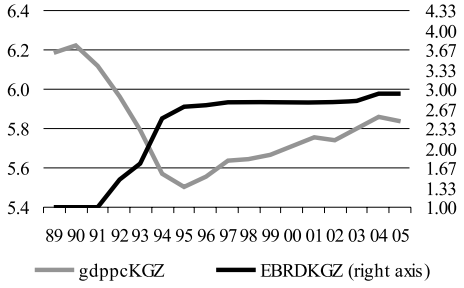

Figure 12. Kirgizstan

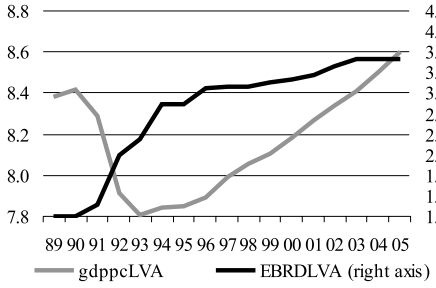

Figure 13. Latvia

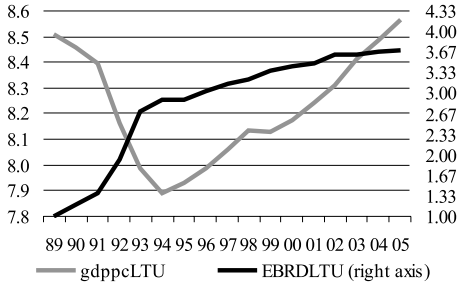

Figure 14. Lithuania

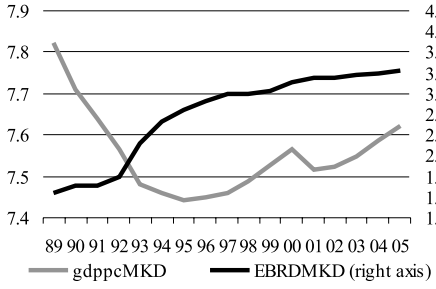

Figure 15. Macedonia

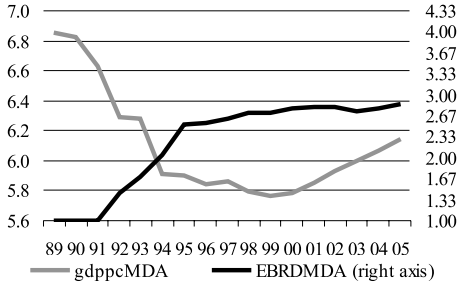

Figure 16. Moldova

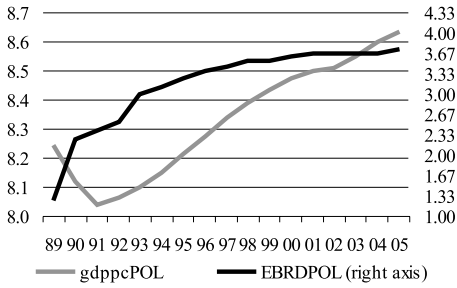

Figure 17. Poland

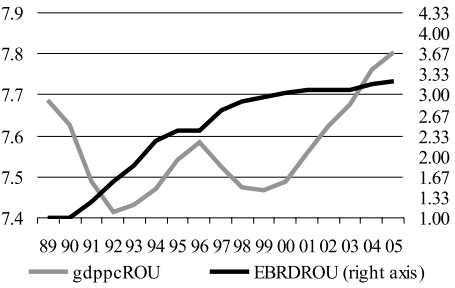

Figure 18. Romania

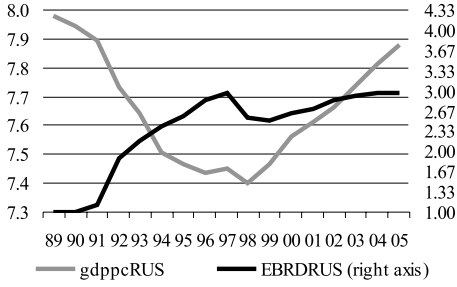

Figure 19. Russia

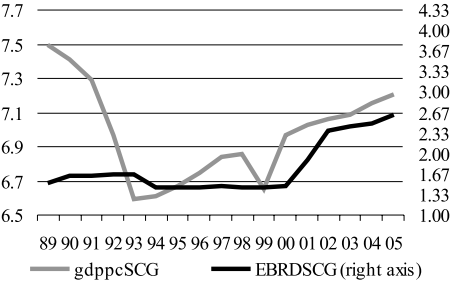

Figure 20. Serbia and Montenegro

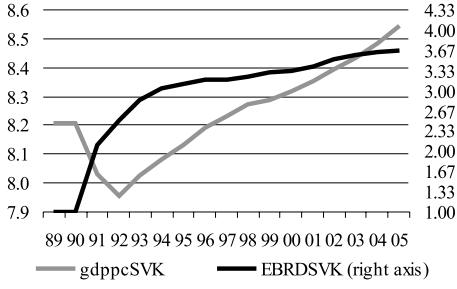

Figure 21. Slovakia

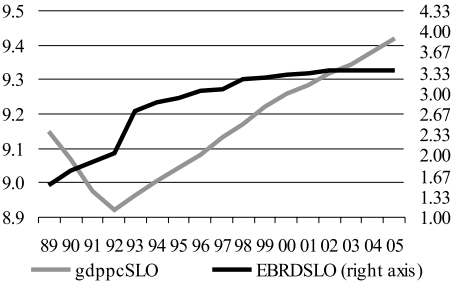

Figure 22. Slovenia

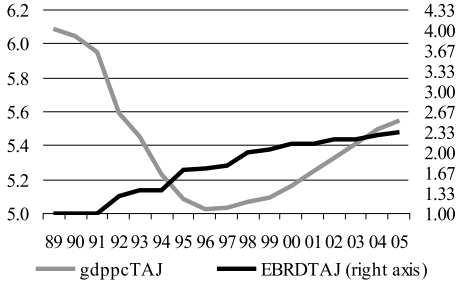

Figure 23. Tajikistan

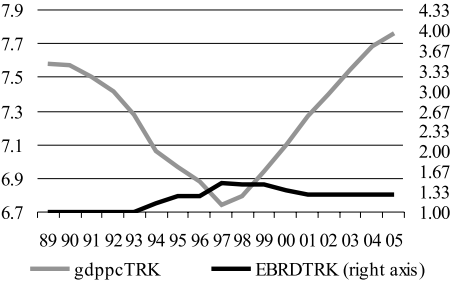

Figure 24. Turkmenistan

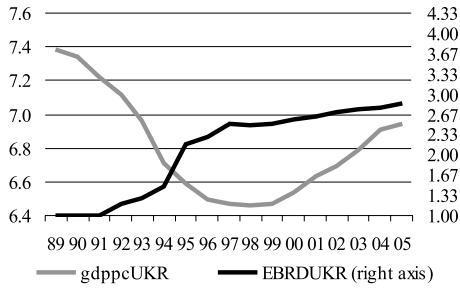

Figure 25. Ukraine

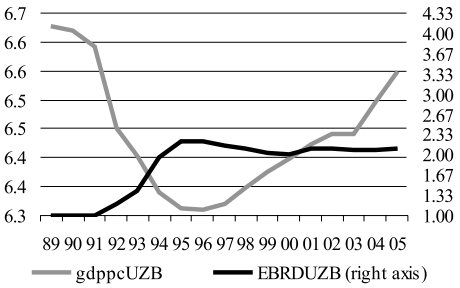

Figure 26. Uzbekistan

ANNEX B: LONG-RUN RELATIONSHIP BETWEEN MARKET REFORMS AND ECONOMIC GROWTH

Dependent Variable: LOG(GDPPC?)
Method: Pooled Least Squares
Sample: 1989 2005
Included observations: 17
Cross-sections included: 26
Total pool (balanced) observations: 442
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	7.620	0.028	275.883	0.000
EBRD?	0.105	0.023	4.470	0.000
RECOV?	0.208	0.008	25.648	0.000
ALB–@TREND	–0.157	0.010	–15.976	0.000
ARM–@TREND	–0.159	0.013	–12.536	0.000
AZE–@TREND	–0.153	0.009	–16.586	0.000
BLR–@TREND	–0.130	0.008	–15.895	0.000
BGR–@TREND	–0.180	0.011	–17.109	0.000
HRV–@TREND	–0.168	0.009	–18.000	0.000
CZE–@TREND	–0.172	0.011	–16.278	0.000
EST–@TREND	–0.150	0.009	–15.807	0.000
GEO–@TREND	–0.187	0.015	–12.388	0.000
HUN–@TREND	–0.161	0.010	–16.311	0.000
KAZ–@TREND	–0.143	0.009	–15.470	0.000
KGZ–@TREND	–0.172	0.009	–18.429	0.000
LVA–@TREND	–0.168	0.011	–15.068	0.000
LTU–@TREND	–0.165	0.010	–16.809	0.000
MKD–@TREND	–0.161	0.011	–14.318	0.000
MDA–@TREND	–0.182	0.008	–21.562	0.000
POL–@TREND	–0.172	0.010	–17.447	0.000
ROU–@TREND	–0.191	0.011	–17.328	0.000
RUS–@TREND	–0.142	0.008	–18.497	0.000
SCG–@TREND	–0.184	0.009	–19.520	0.000
SVK–@TREND	–0.172	0.010	–17.167	0.000
SLO–@TREND	–0.171	0.010	–17.278	0.000
TAJ–@TREND	–0.166	0.008	–20.890	0.000
TRK–@TREND	–0.101	0.006	–17.142	0.000
UKR–@TREND	–0.132	0.007	–20.226	0.000
UZB–@TREND	–0.135	0.010	–13.160	0.000
Effects Specification: Cross-section fixed (dummy variables)				
R-squared	0.992	Mean dependent var		7.401
Adjusted R-squared	0.991	S.D. dependent var		0.954
S.E. of regression	0.092	Akaike info criterion		–1.824
Sum squared resid	3.270	Schwarz criterion		–1.325
Log likelihood	457.198	F-statistic		891.597
Durbin-Watson stat	0.703	Prob(F-statistic)		0.000

Chapter II

GDP Growth and Income Dynamics: Who Reaps the Benefits of Economic Growth in Belarus?

Alexander Chubrik

1. INTRODUCTION

Over the last decade, the concept of pro-poor growth has been widely discussed in papers dealing with economic growth. Essentially, pro-poor growth is supposed to be leading to a 'drastic reduction in poverty' (World Bank (2005a)). It had been recognized that economic growth as such does not lead to poverty reduction, but rather creates opportunities for earning incomes by having productive and paid jobs. When these opportunities are available and seized properly, growth can be considered as pro-poor[1] (United Nations (2000)).

Most commonly, economic growth is pro-poor if it leads to increasing the share of the poor households in total income. In fact, this definition implies that a simple reduction of income inequality under GDP growth makes the latter pro-poor. Another definition stresses the acceleration of income growth of the most impoverished categories of households, while changes in income inequality may be unrelated to poverty dynamics (World Bank (2005a)). Both definitions can still be used to operationalize the concept of pro-poor growth and thus help to study the quality of economic growth in individual countries and also cross-nationally (see, for instance, Dollar, Kray (2002)).

In Belarus, GDP growth is the major indicator very often invoked to illustrate the success of economic policies. Indeed, Belarus is a leader among CIS countries in terms of annual GDP growth rates after the Soviet Union disintegrated. The sources of such a puzzling growth have been analyzed in detail (World Bank (2005b)), IMF (2005), and also Chubrik (2005)), but the quality of economic growth has not been properly investigated. This chapter intends to fill this gap by unveiling the extent of 'social orientation' of Belarusian economic policies. In addition, the analysis performed in this chapter could be informative in the sense of demonstrating possibilities for further poverty reduction in Belarus.

Chapter three (by Kiryl Haiduk) discusses some essential strands found in the literature and applies it to the case of Belarus in order to understand the direction of the social policies there. On that basis the following working hypotheses are formulated for quantitative testing:

1. GDP growth unequally affects the incomes of households with different levels of income (low-income, middle-income, and high-income ones). GDP

[1] An additional criterion for classifying growth as a pro-poor one is an equal involvement of men and women in the growth-generating process and both reaping the benefits of growth (OECD (2001)). This is a 'gender equality' dimension of growth.

growth has been pro-poor in Belarus (i.e. low-income households have benefited most);
2. Devaluation has adversely affected the (real) incomes of the poor and not affected (or not significantly) the financial condition of high-income households;
3. Prices for goods and services consumed by low-income households are growing faster than prices for goods and services consumed by middle-income and high-income households;
4. The political business cycle affects the level of real incomes and the level of poverty Belarus;
5. Redistribution policies play an important role in poverty reduction in Belarus.

The chapter is organized as follows. The second section addresses the peculiarities of the data used and discusses their dynamic characteristics. The hypotheses formulated above are tested in the third (determinants of incomes of the least wealthy households) and the fourth (determinants of poverty) sections. The final section draws conclusions on the major advantages redistribution policies have generated in Belarus and discusses the issue of sustainability of these policies in the future.

2. DATASET

2.1. Data sources and their specificity

The data used (see Table 1) for the study have been taken from the Ministry of Statistics and Analysis of the Republic of Belarus (GDP, wages, and population). Also, the Household Budget Survey data (information about the levels of income of various households, poverty and inequality) has been utilized. Finally, some data have been taken from the National Bank of the Republic of Belarus (exchange rate) and the IPM Research Center (exchange rates during the period of multiple exchange rates, a particular market or unofficial exchange rate that existed parallel with the official market rate).

The data that characterize the standard of living should have certain minimum quality standards (Milanovic (1998)). The study made by Deininger and Squire (1996) suggest the following criteria: the data should be collected from household surveys, should cover all population, and should provide information about the all sources of income (including the in-kind ones). The Household Budget Surveys conducted in Belarus since 1995 offer such quality of the data. The dataset does not only provide information about the levels of income across various groups of households, but also allow calculation of income inequality indicators.

Over 1995–2000, the Ministry of Statistics and Analysis estimated GDP per capital in constant prices of 1995, while over 2000–2006 it was done on the basis of constant prices of 2000. In order to obtain a continuous time series, the 1995–2000 data are recalculated by using the rates of these indicators to GDP in 2001. Quarterly population data are deducted from the annual figures (so the dynamics over a year is assumed to be even).

Table 1

The sources of the data

Abbreviation		Indicator	Data source
1.	*CAVER*	Average income (material resources available), USD	Household Budget Survey
2.	*CD*10	Average income (resources available) of 10% of the most wealthy households, USD	Household Budget Survey
3.	*CGDPPC*	GDP per capita, USD	Calculations made on the basis of the data taken from the Ministry of Statistics and Analysis
4.	*CPI*	Consumer Price Index	Ministry of Statistics and Analysis
5.	*CPOOR*	Average income (resources available) of 30% of the least wealthy households, USD	Household Incomes Survey
6.	*FPI*	Foodstuffs Price Index	Ministry of Statistics and Analysis
7.	*FUNDS*	Coefficient of Funds [1]	Ministry of Statistics and Analysis
8.	*GINI*	Gini index	Household Budget Survey
9.	*NER*	Nominal exchange rate, BYR/USD[2], index: 2000 = 1	Calculations made on the basis of the data provided by the National Bank and the IPM Research Center
10.	*NFPI*	Non-foodstuffs Price Index	Ministry of Statistics and Analysis
11.	*POV*	Poverty level, % of the population	Household Budget Survey
12.	*RGDPPC*	Real GDP per capita, BYR in prices of 2000	Ministry of Statistics and Analysis
13.	*RMW*	Real monthly minimum wage, BYR in prices of 2000	Ministry of Statistics and Analysis
14.	*RP*	Real average monthly pension, BYR in prices of 2000	Ministry of Statistics and Analysis
15.	*RW*	Real monthly average wage, BYR in prices of 2000	Ministry of Statistics and Analysis
16.	*UPI*	Public Utilities Price Index	Ministry of Statistics and Analysis

Notes:
[1] The ratio of the average income of 10% of the wealthiest households to the average income of 10% of the least wealthy households.
[2] 1996–2000 – market exchange rate (IPM Research Center data), 2001–2006 – weighted average exchange rate (the National Bank data).

Households are divided into several groups on the basis of their income. The following procedure has been used for that purpose. First, average poverty level has been calculated over the period concerned. The poverty threshold is taken to be the average income (more precisely, resources available[2]) of 30% of the least wealthy households, i.e. average income of the last (tenth) decile. This is because the income of this group is substantially different from income of the ninth decile (by 1.6 times, while income difference between the 9th and 8th decile is by 1.2 times).

It has to be noted that between 1996 and 2001, there was a multiple exchange rates regime. This creates a problem of constructing a continuous time series for the exchange rate BYR/USD. Accordingly, for the period of 1996–

[2] The Ministry of Statistics and Analysis defines resources available as monetary income of households, foodstuffs consumed and produced at personal subsidiary plots (minus material costs of their production), and the value of social benefits and subsidies in kind provided by the authorities (Ministry of Statistics and Analysis (1999)).

2001 the values of exchange rate was calculated by using monthly market exchange rate data (collected by the IPM Research Center). Over 2002–2006, the National Bank data have been used, namely the weighted average exchange rate. It is on the basis of these values of exchange rates ruble-denominated indicators have been translated into dollar-based ones (GDP and incomes of various household groups).

The Gini coefficient has been calculated on the basis of Household Budget Survey by using the data on average resources available for each of the deciles. A similar methodology is applied by the Ministry of Statistics and Analysis. Since inside each of the deciles incomes are distributed rather evenly, the Ministry's methodology and an alternative one (used in this chapter) give very similar results. The coefficient of funds has also been calculated by using the 'resources available' methodology.

The poverty threshold has been defined as a volume of resources available (both money and non-money income[3]) below the minimum level established for a family of four. This minimum level is set up by the law. Accordingly, the part of the population having resources below this level is considered as poor. Prior to 1999, this subsistence minimum was set at a level of 60% of the so-called minimum consumption budget. In 1999, the Council of Ministers defined a basket of goods and services that should be included in the minimum consumption budget.[4]

There are also alternative poverty thresholds available internationally. The World Bank (2001) suggests using USD 2.15 and 4.3 per day calculated on a PPP basis. However, these indicators are problematic to apply to study countries where the government intervenes in the price-setting mechanism. Such intervention is also observed in Belarus. As a result, the poverty level appears to be lower when prices of goods used in PPP calculations are applied (Sinitsina (2006)). As for Belarus, the poverty threshold set at USD 2.15 per day (calculated on a PPP basis) is less than the subsistence minimum over the whole period analyzed in the chapter (except in 1998). In that case, a poverty threshold at USD 4.3 per day (calculated on a PPP basis) can be utilized. But over a period studied it firstly goes above and then below the official poverty threshold. The dynamics of a subsistence minimum measured in PPP USD follows very closely the dynamics of the real exchange rate of BYR/USD (Figure 1). It means that under conditions of real appreciation of the Belarusian ruble, a poverty threshold fixed in PPP USD does not reflect rising prices of goods consumed by low-income households.[5] It follows that national or Belarus-specific poverty indicators fit better than the USD thresholds suggested by the World Bank for international comparisons.

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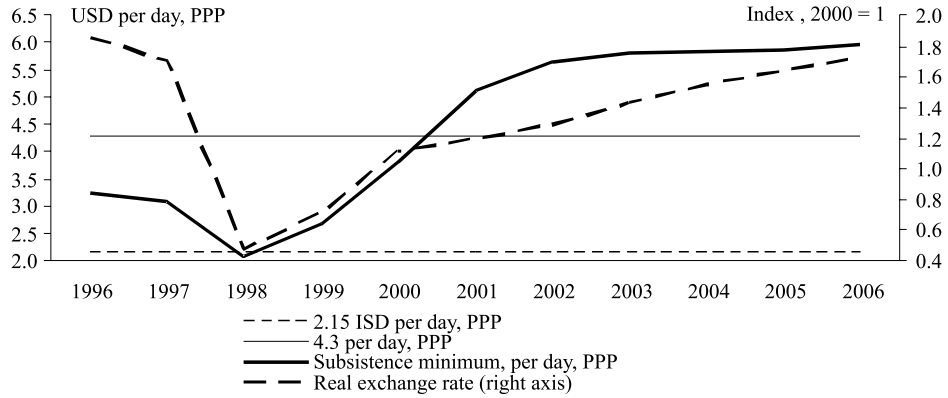
3 In the text, 'resources available' and 'income' are used interchangeably.

4 On average, for a period of 1999–2006, the ratio of subsistence minimum to minimum consumption budget was 63.2%. It confirms the correctness of the estimates made in previous years.

5 Most likely, this is related to some features of PPP baskets and minimum consumption budget. The latter includes not only tradables such as goods and services, but also non-tradable services (like costs of public utilities that increased quite substantially over 2002–2003).



Note. PPP exchange rate is calculated by using the GDP data denominated in the Belarusian rubles (in current prices) and GDP denominated in PPP USD (taken from the World Economic Outlook database as of April 2007). The real exchange rate is calculated in the following way.
Source: author's calculations on the basis of the data taken from the World Bank, National Bank, Ministry of Statistics and Analysis, IPM Research Center, and the World Economic Outlook database.

Figure 1: Subsistence minimum and the World Bank's poverty threshold

In order to trace the impact of GDP growth on the well-being of the population, USD-denominated indicators have been used. There is however a problem of analysing real indicators related to the choice of deflator for high-income households (tenth decile). CPI could be used only as a deflator of average income since the basket of goods and services used for the calculation of this index follow the structure of expenditures of an average individual typically belonging to a middle-income household. As for two low-income and high-income households, their incomes deflated by CPI produce incorrect data. In order to illustrate this claim, the following evidence can be invoked: in 2006, middle-income households spent 40.2% of its income on foodstuffs, while the low-income and high-income ones spent 47 and 33.8%, correspondingly. At the same time, in 2006, food prices increased by 6.1%. When group-specific CPIs are calculated, inputs of foodstuffs appear to be differentiated among income groups (2.87 for low-income and 2.06 for high-income, while for an 'undifferentiated' CPI, this figure is 2.45 percentage points). A similar situation is observed for input of costs for public utilities to CPI. In 2006, low-income households spent 11.2% of their incomes, while middle-income and high-income ones – 8.8 and 7.4%, correspondingly. Therefore, contributions of public utilities costs growth differ across households so the application of a uniform CPI indicator produces incorrect results. Accordingly, input varies: 1.58 and 1.04 percentage points for low-income and high-income households, correspondingly, while for 'economy-wide' CPI this figure amounts to 1.24 percentage points (in 2006, costs of public utilities increased by 14.1%). Correction problems described above point to the existence of a more general problem of variability in inflation rates: put simply, different households experience different inflation rates depending on the con-

sumption baskets consumed by them. It suggests using corrected deflators, but it is hard to make precise calculations. The corrections made above serve to point out that there is a problem, rather than offer a final solution.

2.2. Dynamic characteristics of the data

In our analysis, natural logs of seasonally-adjusted variables have been used along with their first logarithmic differences. The analysis of the order of integration of variables has been made by using the Dickey-Fuller test (Dickey, Fuller (1979)). Where contradictory results were found, an additional Kwiatkowski-Philips-Schmidt-Shin test was used (Kwiatkowski et al. (1992)). This is a direct stationarity test. In addition, the modified Dickey-Fuller *GLS*-test (or Elliot-Rottenberg-Stock test) (Elliot et al. (1996)) has been applied.[6]

The study uses the following testing algorithm of order of integration (by using Dickey-Fuller test). First, the following regression was estimated (1):

$$\Delta y_t = \mu + \delta T + \alpha\, y_{t-1} + \sum_{i=1}^{n} \beta_i \Delta y_{t-i} + \varepsilon_t, \qquad (1)$$

where Δ – difference operator, μ, δ, α, β – regression coefficients, T – trend, ε_t – residuals in three specifications (excluding the component $\sum_{i=1}^{n} \beta_i \Delta y_{t-i}$): accounting for constant and trend, for trend without constant, and without both constant and trend. Second, the residuals of the equation have been tested for the first–third order serial correlation by using the *LM*-test (H_0: there is no serial correlation of the first–third orders). In the cases where this null hypothesis is rejected, the regressions have been added with lags of the dependent variable until the autocorrelation is eliminated.[7] If the trend coefficient appeared to be insignificant, an equation with an intercept has been selected. In case of insignificance of an intercept, *ADF*-statistics has been estimated from regression without both constant and trend.[8] The results of the tests are provided in Table 2.

The *ADF*-test shows that the levels of all of the variables (except exchange rate index and real wage) are non-stationary. In case of nominal exchange rate index (*ner_sa*) the *ADF*-test suggest of the absence of a unit root (at 5% level), while the *KPSS*-test rejects a hypothesis of stationarity of these time series (at 1% level), and the GLS-test does not allow rejection of the hypothesis that the time series contain a unit root. Similar results were obtained in the paper by Chubrik, Kruk, and Pelipas (2006). In addition, a graphic representation (see Appendix A) suggests non-stationarity of these time series. Consequently, the level of nominal exchange rate index was perceived as a non-stationary variable. Increments of all of the variables analyzed appear to be stationary.

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6 All these tests have been performed by using EViews 5.1 software.

7 A similar approach to the choice of lag length is available in the Dickey-Fuller test, when additional lags are included in testing for a unit root in order to eliminate autocorrelation of the residuals (there is a move from particular to general). See, for instance, Pelipas (2006).

8 A similar algorithm has been used in the paper by Chubrik, Kruk, and Pelipas (2006).

Table 2

Unit root tests

Variable[1]	Levels			First differences		
	t-ADF	Specification[2]	*F-LM* (lag length)[3]	*t-ADF*	Specification	*F-LM* (lag length)
cpoor_sa	–2.13	*C. T*	0.14 (1)	–4.18**[4]	–	0.17 (0)
caver_sa	–2.51	*C. T*	0.27 (1)	–4.03**	–	0.33 (0)
cd10_sa	–2.35	*C. T*	0.12 (0)	–4.20**	–	0.88 (0)
ner_sa	–2.43*[5]	–	0.30 (1)	–3.58*	*C. T*	0.42 (0)
cgdppc_sa	–2.31	*C. T*	0.36 (1)	–4.02*	–	0.47 (0)
gini_sa	–2.17	*C*	0.62 (0)	–7.52**	–	0.39 (0)
funds_sa	–2.30	*C*	0.53 (0)	–7.82**	–	0.29 (0)
pov_sa	–2.17*[6]	–	0.54 (0)	–4.74**	–	0.77 (0)
rw_sa	–3.58*[7]	*C. T*	0.92 (1)	–	–	–
rp_sa	–3.57*[8]	*C. T*	1.00 (1)	–	–	–
rmw_sa	–1.98	*C. T*	0.39 (0)	–6.35**	*C*	0.27 (0)
rgdppc_sa	8.29	–	0.63 (0)	–6.85**	*C*	0.12 (0)

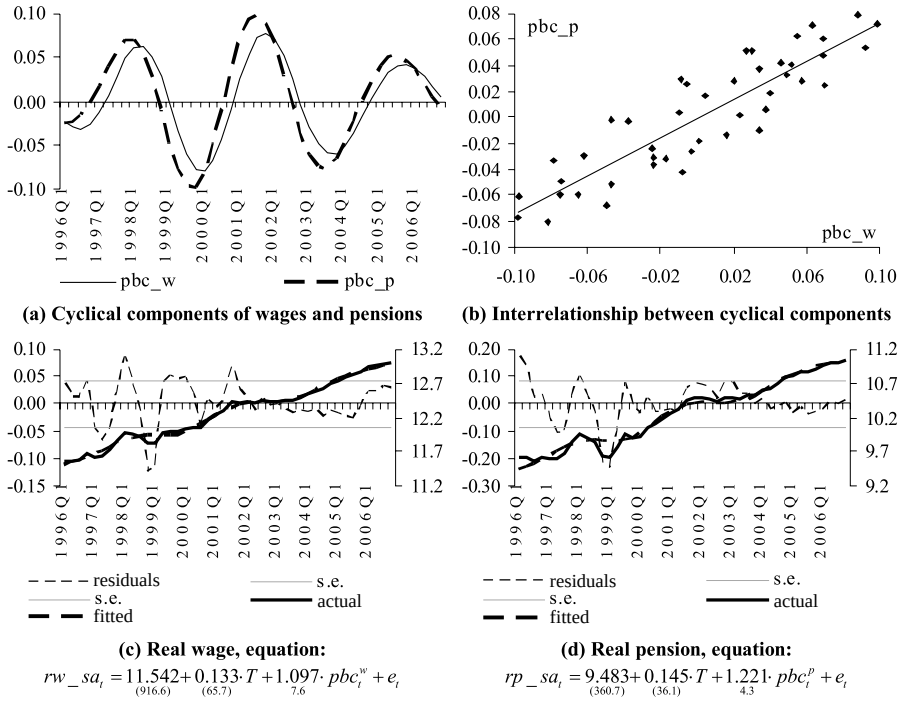
Notes:
[1] Natural logs of the variables have been tested. *_sa* index means that the variable is adjusted for seasonality.
[2] *C* – constant, *T* – trend.
[3] *F*-statistics (*p*-value) *LM*-test on autocorrelation of the first–third orders (H_0: there is an autocorrelation of the first–third orders).
[4] Hereafter: * denotes a 5% significance level, ** – 1% significance level.
[5] Additional tests: *KPSS*-test statistics (H_0: levels are stationary): *LM* = 0.29** (*C, T*); *DF-GLS*-test statistics (H_0: levels have unit root): *t* = –1.11 (*C, T*).
[6] Additional tests: *KPSS*-test statistics (H_0: levels are stationary): *LM* = 0.26** (*C, T*); *DF-GLS* -test statistics (H_0: levels have unit root): *t* = –0.90 (*C, T*).
[7] Additional tests: *KPSS*-test statistics (H_0: levels are stationary): *LM* = 0.05 (*C, T*); *DF-GLS* -test statistics (H_0: levels have unit root): *t* = –3.68* (*C, T*).
[8] Additional tests: *KPSS*-test statistics (H_0: levels are stationary): *LM* = 0.07 (*C, T*); *DF-GLS* -test statistics (H_0: levels have unit root): *t* = –3.27* (*C, T*).

Stationarity of real wage and pension levels (given the trend) has been confirmed by two additional tests, such as *KPSS* and *GLS*. Previous investigation of the dynamics characteristics of these time series (see Chubrik, Kruk, and Pelipas (2006)) shows that wage time series are not only stationary, but also containing a cyclical component. This component has been obtained from real wage and pension seasonality-adjusted time series (natural logs) by using EViews 5.1 software (specifically, asymmetric frequency filter for complete sample) (Christiano, Fitzgerald (2003)).[9] The cyclical component can be seen as an additional variable (*pbc*) that characterizes the political business cycle[10] determining wage and pension dynamics (Figure 2). This cyclical component can be treated as a separate var-

[9] Specification: minimal/maximal number of periods in a cycle– 10/20 quarters; lag length – 12; trend is eliminated; time series stationarity assumption.

[10] In this text, the content of the political business cycle is a manipulation with wages before important political events. Over 1995–2006, five political campaigns took place in Belarus. The evidence shows that five events (three constitutional referenda of 1995, 1996, and 2004 and two presidential elections of 2001 and 2006) have influenced the dynamics of wages. Chapter three of this book discusses the cycle at greater length.

iable (*pbc*) describing a political business cycle driving wages and pensions in Belarus (Figure 2).



Note. Logarithmic scale. Right axis: actual and fitted values; s.e.: standard regression error. Time trend: $T = 0.25 \cdot t$, where $t = 0, 1, \ldots, 43$. In the equations above the trend coefficient characterizes autonomous annual average growth rate of wages and pensions over a period of 1996–2006; *w* and *p* indices denote that a cyclical component is isolated from wage and pension time series, correspondingly.
Source: author's calculations.

Figure 2: Long-run dynamics of wages and pensions: the role of 'autonomous' growth rate and political business cycle

Apart from important political events, the cycle reflects certain 'environmental' circumstances. Benign ones include growing exports to Russia in 1997, higher prices for oil products and a subsequent increase in the volume of their exports in 2004–2005). An example of a malignant circumstance would be the Russian crisis of 1998. These external market fluctuations affected the dynamics of wages and prices in Belarus (Chubrik, Kruk, and Pelipas (2006)). However, this chapter does not treat the political business cycle as a separate variable. Instead, it is seen as a cyclical component of wages and pensions since their dynamics are a poverty-reducing factor.

3. WHO ARE THE BENEFICIARIES OF ECONOMIC GROWTH IN BELARUS?

3.1. Determinants of income growth: the analysis of long-run relationships

The analysis of the dynamic characteristics of the data shows that for the majority of variables, the levels are non-stationary, while their first differences are stationary. Consequently, there can be an interrelationship among the levels of these variables. If so, there should be an equilibrating mechanism operating when indicators deviate from the long-term trend. In other words, an error-correction mechanism should be accounted for when analyzing short-term relationships among variables.

In order to investigate long-term relationships a two-step Engle-Granger test (Engle, Granger (1987)) has been applied. The following equation has been estimated first:

$$y_t = \mu + \delta T + \sum_{j=1}^{k} \beta_j x_t^j + u_t, \qquad (2)$$

where μ, δ, β – regression coefficients, T – trend, u_t – regression residuals. The second step entailed the test of regression (2) residuals by using the Dickey-Fuller test (specification (2) has been used without both constant and trend). This is a test for studying long-run relationships (H_0: there are no long-run relationships). The test employs special McKinnon critical values (MacKinnon (1991)) in order to establish long-term relationships. If the null hypothesis is rejected, then it is said that y and x_j are related to each other in the long term.

The results of the Engle-Granger test are shown in Table 3. The hypothesis about the absence of long term relationships among incomes of 30% of the least wealthy households, GDP per capita, and nominal exchange rate index is rejected at a 1% significance level. The hypothesis about the absence of long term relationships between average income/income of 10% of the wealthiest households and GDP per capital is rejected at a 5% significance level. Therefore, the equation (2) for these variables is not a false regression and reflects long term relationships among them.

Table 3

Results of the test for long term relationships among GDP per capita, nominal exchange rate index, and level of income

Dependent variable:	*F-LM*, *p*-value (lag length)	*ADF*-statistics	Critical McKinnon value	
			1%	5%
$cpoor_sa_t$	0.515 (1)	–4.798**	–4.682	–3.966
$caver_sa_t$	0.167 (0)	–3.688*	–4.161	–3.481
$cd10_sa_t$	0.715 (0)	–4.067*	–4.161	–3.481

Note. Computing is done by using EViews 5.1 software; Critical MacKinnon values for the specifications selected and the number of observations are calculated by using MCVRS software (MacKinnon (1991)). Lag structure has been selected in a fashion similar to the one shown in Table 2 (lags have been added in order to eliminate autocorrelation of the first–third orders).

The equations describing long run relationships (Table 4 describes the parameters of these equations) reveal that the nominal exchange rate index exerts influence only on the incomes of 30% of the least wealthy households. The negative sign corresponds to the theory-informed expectations that over the long term devaluation (or inflation) leads to a loss of income by the poor.[11] As for the equation testing these relationships for the middle and high-income households, this variable appears to be insignificant. It follows that a relatively wealthy fraction of the population does not suffer from devaluation in the long run.

Table 4

Parameters of long term relationships among GDP per capita, nominal exchange rate index, and level of income

Dependent variable:	Independent variables:		
	$cgdppc_sa_t$	ner_sa_t	*C*
$cpoor_sa_t$	1.016 (84.6)**	–0.012 (–2.8)**	–1.407 (–19.7)**
$caver_sa_t$	0.955 (87.2)**	–	–0.325 (–5.1)**
$cd10_sa_t$	0.894 (58.2)**	–	0.929 (10.3)**

Note. The values of *t*-statistics are in the parentheses.

Growth of GDP per capita drives incomes of all households upward, but the value of the coefficient declines as income increases. The only household group that directly benefits from economic growth is the poor. For them, 1% of GDP per capita growth leads to a 1% increase in income (the value of the coefficient at 1.016 is statistically very close to 1).[12] As for more wealthy households, 1% of GDP growth leads to less then 1% increase in household income. Accordingly, it can be plausibly concluded the poor households benefit more from GDP growth then the rich do (i.e. it is pro-poor).

3.2. Determinants of short term income growth

Since GDP per capita and income have a long term relation, the short term dynamics should be investigated by using the error-correction mechanism (*ECM*). Given that the long term relationships have been analyzed by using the Engle-Granger test, the mechanism is applied to the equation residuals (equation (2)):

$$ECM_t = u_t = y_t - (\mu + \delta T + \sum_{j=1}^{k} \beta_j x_t^j). \quad (3)$$

The general view of the error correction model is as follows:

[11] The dynamics of nominal exchange rate index are negatively correlated with the income of first–fourth deciles. This adverse impact is significant and substantial.

[12] For the first decile, the value of the coefficient is 1.031 (significantly above 1). Statistically, it is close to one, but its value becomes less for the decile from the second to five. As for the decile from the sixth to tenths, a 1% increase in GDP per capita leads to less than 1% growth of household income.

$$\Delta y_t = \alpha + \sum_{i=1}^{n} \varphi_i \Delta y_{t-i} + \sum_{i=0}^{n} \sum_{j=1}^{k} b_{ij} \Delta x_{t-i}^{j} + \gamma\, ECM_{t-1} + \varepsilon_t, \quad (4)$$

where α, φ, b, γ – regression coefficients; ε_t – regression residuals.

In order to reduce the error correction model to a parsimonious regression, a general-to-specific approach[13] has been utilized, or, more specifically, the equation (4) has been gradually reduced by deleting the variables or lags whose coefficients are insignificant.

The parameters of long-run relationships obtained in section 3.1 suggest the application of the following error correction mechanisms to the equations describing the dynamics of incomes of three groups of households in the short term:

$$ECM_t^{poor} = cpoor_sa_t - 1.016 \cdot cgdppc_sa_t + 0.012 \cdot ner_sa_t + 1.407, \quad (5)$$

$$ECM_t^{aver} = caver_sa_t - 0.955 \cdot cgdppc_sa_t + 0.325, \quad (6)$$

$$ECM_t^{rich} = cd10_sa_t - 0.894 \cdot cgdppc_sa_t - 0.929. \quad (7)$$

When household income exceeds the long term trend determined by GDP per capita and (particularly for the poor) the nominal exchange rate index, then such a mechanism would drive it upwards or downwards towards an equilibrium trajectory.

Analysis of short run relationships between GDP and income has been performed by using a general-to-specific approach and applying the equations (4):

$$\Delta y_t^j = \alpha + \sum_{i=1}^{3} \varphi_i \Delta y_{t-i}^j + \sum_{i=0}^{3} b_i^1 \Delta cgdppc_sa_{t-i} + \sum_{i=0}^{3} b_i^2 \Delta ner_sa_{t-i} + \gamma\, ECM_{t-1}^j + \varepsilon_t^j, \quad (8)$$

where j – index denoting household group, Δ – difference operator. The first differences of the nominal exchange rate index have been included in the initial specifications of all of the equations, and not only in the equation dealing with the incomes of the least wealthy households. This is because in the short run, an unforeseen devaluation could adversely affect incomes of all groups of households. After the model (8) is reduced by using a method of 'particular to the general', the following equations are obtained (t-statistics are provided in the parentheses):

$$\begin{aligned} d(cpoor_sa)_t = {} & \underset{(3.4)}{0.032} + \underset{(2.6)}{0.292} \cdot d(cgdppc_sa)_t - \underset{(-4.0)}{0.199} \cdot d(cgdppc_sa)_{t-1} + \\ & + \underset{(-4.5)}{0.270} \cdot d(cgdppc_sa)_{t-3} - \underset{(-6.5)}{0.785} \cdot d(ner_sa)_t + \underset{(4.1)}{0.212} \cdot d(ner_sa)_{t-2} + \\ & + \underset{(6.4)}{0.419} \cdot d(ner_sa_{t-3}) - \underset{(-2.7)}{0.280} \cdot ECM_{t-1}^{poor} + \varepsilon_t^{poor}, \end{aligned} \quad (9)$$

[13] This method is applied in PcGets 1 of PcGive 10.3 (Hendry, Krolzig (2001)). Initial specification of the equation contained three lags (n = 3).

$$d(caver_sa)_t = \underset{(4.6)}{0.036} + \underset{(2.6)}{0.278}\cdot d(caver_sa)_{t-2} + \underset{(3.4)}{0.258}\cdot d(caver_sa)_{t-3} -$$
$$-\underset{(-7.2)}{0.295}\cdot d(cgdppc_sa)_{t-1} - \underset{(-29.2)}{0.987}\cdot d(ner_sa)_t + \underset{(4.7)}{0.488}\cdot d(ner_sa)_{t-2} + \quad (10)$$
$$+\underset{(3.8)}{0.340}\cdot d(ner_sa_{t-3}) - \underset{(-4.5)}{0.522}\cdot ECM_{t-1}^{aver} + \varepsilon_t^{aver},$$

$$d(cd10_sa)_t = \underset{(14.9)}{0.787}\cdot d(cgdppc_sa)_t - \underset{(-4.5)}{0.581}\cdot ECM_{t-1}^{rich} + \varepsilon_t^{rich}. \quad (11)$$

It appears that the equations (9)–(11) are well-specified: the residuals are normally distributed; no serial correlation and no conditional autoregression heteroskedasticity are observed (see Table 5).

Table 5

Tests for specification of the equations (9)–(11)

Test:	*p*-value		
	(9)	(10)	(11)
Autocorrelation of the first–third orders (*LM*-test, *F*-statistics)	0.574	0.203	0.730
Conditional autoregression heteroskedasticity of the first–third orders (*LM*-test, *F*-statistics)	0.943	0.248	0.632
Normality of the residuals distribution (Jarque–Bera)	0.554	0.532	0.057

Note. In all cases the null hypothesis suggests anomaly of the residuals (i.e. autocorrelation, heteroskedasticity, or the absence of normal distribution). All computations are done in EViews 5.1.

As in the long term, the dynamics of incomes of the poor (equation (9)) have been most significantly affected by GDP growth (the sum of the coefficients is equal to 0.363, i.e. 1% increase in GDP growth results in 0.4% increase in incomes of the poor) and the nominal exchange rate (the sum of coefficients is equal to –0.154, i.e. depreciation of the Belarusian ruble against the US dollar by 1% leads to the reduction of incomes of the poor by 0.154%). A significant value of the constant suggests that *ceteris paribus* USD-denominated incomes of the poor would have been growing over the period analyzed by 3.2% per quarter. *ECM* coefficient is equal to –0.28, i.e. equilibrium is restored over a period of three quarters and a half after short-run dynamics deviate from the long term trend.

Equation (10) demonstrates a statistically significant negative effect on the dynamics of average income which is produced by the behavior of the exchange rate: 1% of nominal devaluation of the Belarusian ruble results in a 0.16% reduction of average income. Apart from that, exchange rate shows a lag effect. Specifically, a 1% increase in the average income leads to its subsequent increase by 0.6% in the next three quarters. The impact of GDP growth on the average income growth rate over the short run is negative. Most likely, this is due to the significance of lagged values of average income. A constant and error correction mechanism in the equation (10) also appears to be significant: average income grows 'autonomously' at a rate of 3.6% per quarter, while in

the case of deviation from a long term trend equilibrium is restored over a period of two quarters.

After the equation is reduced, wealth of high-income households is determined by two variables, namely GDP growth rate and the error correction mechanism. The value of GDP growth rate coefficient is the biggest of three equations and closest to the value of the coefficient obtained in the equation specifying long run relationships (see Table 4). An 'autonomous' income growth of the wealthiest households is absent since the value of the constant is statistically insignificant. When a deviation from a long term trend is observed, equilibrium is restored rather quickly, i.e. over a period of less than two quarters. The dynamics of the exchange rate does not affect the dynamics of income of high-income households just as it is observed in the long run.

Therefore, high-income households benefit most in the short term from GDP growth, while for middle-income households this growth is the least beneficial (given the adverse impact of devaluation). Incomes of the wealthiest fraction of the population are not affected by devaluation. The only significant factor is economic growth. Most likely, it is because of the smaller dependency of wealthy households from 'rigid' sources of income (such as wages and pensions) in contrast to the other fractions of households. Accordingly, high-income households reap the benefits of economic growth immediately (GDP growth affects their incomes without any lags, while the values of short run and long run coefficients are nearly identical to each other). The poor reap the benefits of economic growth with a certain lag (see equation 3.8)) and at a smaller scale (than the rich). Most likely, this stems from redistribution policies carried out by the government. Middle income (comprised mostly of wages and pensions) displays a certain inertia so its dynamics could be determined by other factors (specifically, the political business cycle) and not GDP growth. It follows that in the short term, GDP growth is beneficial mostly for high-income households, while short term dynamics of low-income and middle-income households are driven by factors other than GDP growth. These factors are analyzed in section four.

3.3. The distribution of benefits of economic growth in Belarus

Additional and powerful evidence in favor of classifying economic growth in Belarus as pro-poor is the reduction in inequality. The Lorenz curve built for a period of 1996–2006 is skewed closer to the equal distribution curve (see Figure 3). However, it is not necessary that the share of the poor household in the total income declined. Ravallion and Chen (2001) suggest using a growth incidence curve. The latter is similar to the Lorenz curve, but instead of incomes, income growth rates of different groups of households (deciles) are drawn at the Y axis. This curve is shown at Figure 4 covering a period of 1996–2006. Similar graphs for individual years are provided in the Annex B.

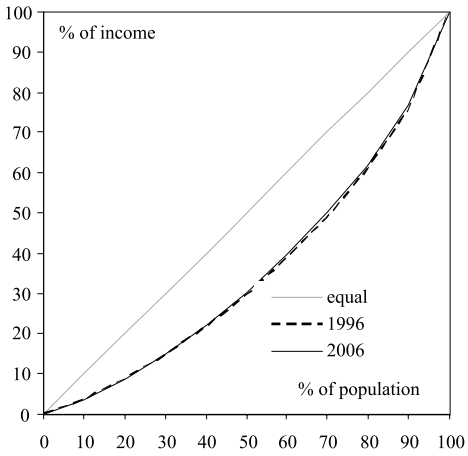
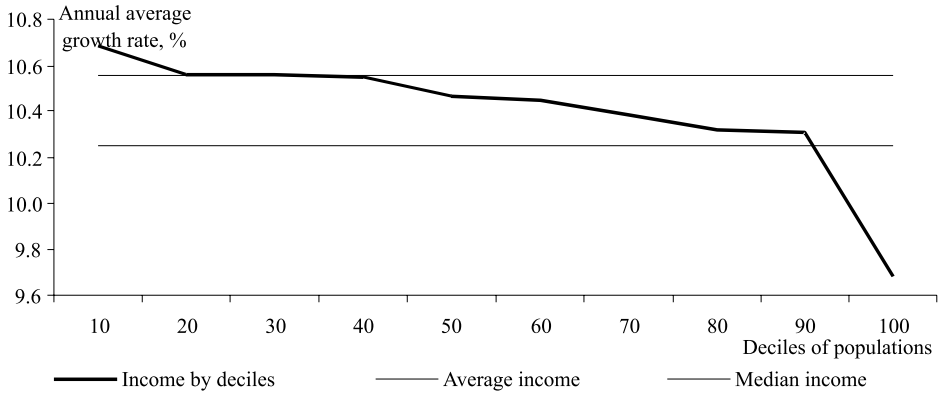


Figure 3: The Lorenz Curve in 1996 and 2006



Source: calculations made on the basis of Household Budget Survey, National Bank and the IPM Research Center.

Figure 4: Growth incidence curve, 1996–2006

It appears that annual average income growth rates decline as the size of income increases so the median income grows faster than the average income. The average income of 30% of the least wealthy households has been growing at 10.6% per year (according to the benchmark used by Ravallion and Chen (2001) and the definition of pro-poor growth adopted in this chapter, economic growth in Belarus is pro-poor). Also, it exceeded the average income growth rate (10.3% per year). At the same time, the difference between income growth rates of the wealthiest and the poorest households is not higher than 1 percentage point. It follows that the redistributive effect of economic growth is not substantial. These effects are more notable when the sample is divided into two time periods: a period of reduction of

incomes (denominated in USD), 1997–1999, and a period of growth of incomes, 2000–2006. In the first period (GDP decline), the poor had suffered most. In particular, the rates of decline of their incomes exceeded the rates of decline of incomes of 10% of the wealthiest households by 0.4 percentage points.[14] During the 'growth period' redistributive effects appear to be more notable than in the first period. Specifically, annual average income growth rates of 10% of the poorest households were 1.6 percentage points higher than annual average income growth rates of 10% of the wealthiest households.

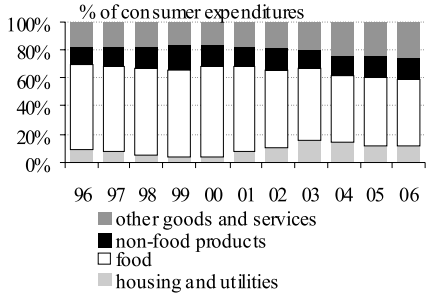
When pointing out such a insignificant difference between the rates of income growth between poor and rich households, it should be recalled that the relationships among the variables have been analyzed by using USD-denominated indicators. It is important to note that the same increase in income measured in US dollars is different for rich and poor in terms of real incomes growth. Since 1999 a real appreciation of the Belarusian ruble was recorded (see Figure 1), real incomes have been growing slower than USD-denominated incomes. Consequently, real income growth rates have to be adjusted for price dynamics that tend to vary across households. In fact, USD-denominated incomes of various households could grow at the same rate, but real incomes would be less for some of them given a faster price increase for goods consumed by these households.

Apparently, different households can face different price dynamics. Such dynamics are largely determined by the structure of household expenditures. Put simply, there is a variability of inflation induced by differences in consumer preferences (or possibilities). Households that consume goods and services whose prices grow faster than prices for other goods and services thereby face a higher inflation rate than other households.

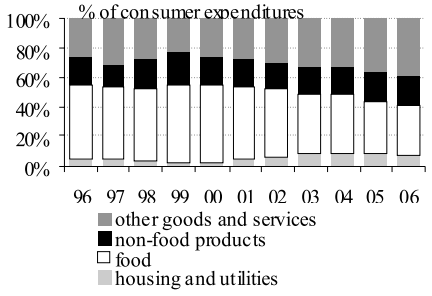
In Belarus, tariffs for pubic utilities have been growing faster than prices for all other goods and services. Prices for foodstuffs have been increasing at a much slower pace, while the rate of non-foodstuffs price growth was the lowest one (see Figure 5 (c)). On average, between 1996 and 2006, 20% of the least wealthy households spent 8.9% of their incomes to cover the costs of public utilities, while expenditures for foodstuffs and non-foodstuffs amounted to 56.6 and 15.3%, respectively. As for 20% of the wealthiest households, these figures were 5.1, 45.7, and 18.9%, respectively (see Figure 5 (a, b)). As a result, inputs of tariffs and prices to consumer price increase tend to differ across households with different levels of income (Figure 5 (d)).

[14] Presumably, this insignificant effect can be left untouched, but some evidence suggests it may be relevant. When income dynamics are observed more closely in some years (1997, 1998, and 1999, see Appendix B), considerable redistribution effects can be distilled. Initially, high-income households exposed most to GDP dynamics suffer most, while other middle-income and low-income households are less sensitive. In particular, in 1997, a fall in incomes of 10% of the wealthiest households exceeded the deterioration of the material situation of 10% of the least wealthy households by 5.2 percentage points. But a year later, in 1998 (a year of the crisis in Russia) incomes of the poor suffered most. They fell by 7.3 percentage points more than incomes of the rich. In 1999, the rates of income growth were almost the same both for poor and rich households, while middle-income households benefited most. The rate of income growth of this group decelerated by 2–2.6 percentage points less than in other income groups. Over the period of 2000–2006, redistribution effects had been different from year to year.

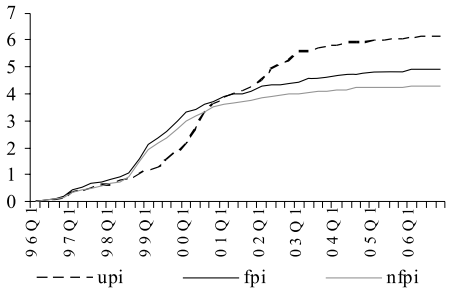
If prices for other goods and services would have been growing at the same rate, then – given the annual CPI growth rate at 61% – the value of this indicator for rich households would have been 60.3%, while for poor ones – 62.4%. However, this consideration does not account for a change in relative prices. It is very realistic to claim that the wealthiest households of Belarus consume imported goods. Prices of these goods follow the dynamics of exchange rate (especially of the Belarusian ruble against the US dollar). Since over the period analyzed in this study, a real appreciation of the Belarusian ruble was observed, imported goods had become cheaper against the ones produced at home. It appears that changes in the relative prices have made the poor less wealthy so the hypothesis about the negative influence of variability of inflation on low-income households cannot be rejected.



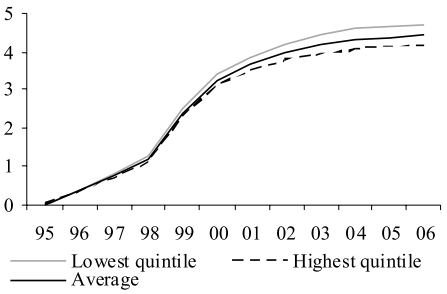
(a) Structure of consumer expenditures: 20% of the least wealthy households



(b) Structure of consumer expenditures: 20% of the wealthiest households



(c) Price indices: public utilities (*upi*), foodstuffs (*fpi*), and non-foodstuffs (*nfpi*)



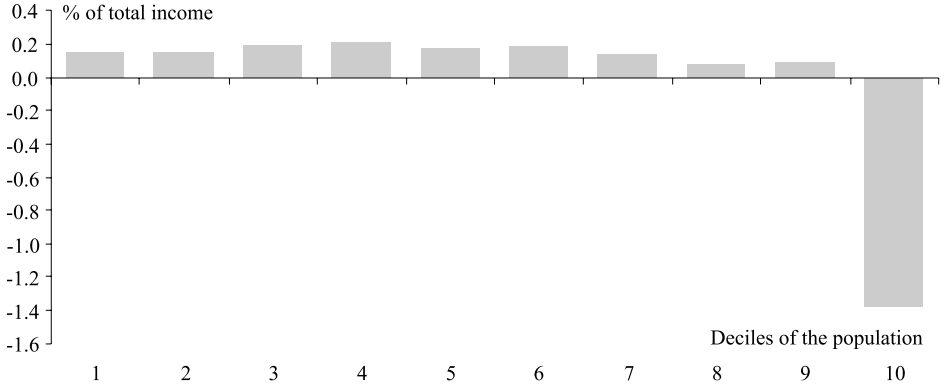
(d) Inputs of tariffs for public utilities and prices for foodstuffs and non-foodstuffs into consumer prices growth rate

Note. Figures (c) and (d) display price indices: 1995 = 1 (log scale). Figure (d) is built to illustrate inputs of tariffs for public utilities for the least wealthy and the wealthiest 20% of households; as for middle-income households, the following formula has been used: $\Delta pi_t^j = s_t^{u,j}\Delta upi_t + s_t^{fi,j}\Delta fpi_t + s_t^{nfi,j}\Delta nfpi_t$, where Δpi_t^j – consumer price increase for groups of households j in a period of time *t*; $s_t^{u,j}$, $s_t^{fi,j}$, $s_t^{nfi,j}$ – denote the share of expenditures of group of households j in a period of time t for covering the costs of public utilities and paying for foodstuffs and non-foodstuffs, respectively; Δupi_t, Δfpi_t, $\Delta nfpi_t$ – denote the rates of price growth of public utilities, foodstuffs, and non-foodstuffs, respectively.
Source: calculations made on the basis of the data taken from Household Budget Surveys (a), (b); Ministry of Statistics and Analysis, (c); (d): author's calculations.

Figure 5: The impact of the structure of consumer expenditures on price dynamics of the least wealthy and the wealthiest households

The analysis conducted above allows formulating some conclusions about the features of social policies conducted in Belarus. Essentially, these policies are, among other aspects, about targeting of economy-wide wage denominated in US dollars. These policies create the illusion of a fast income growth, since over the last nine years a real appreciation of the Belarusian ruble against the US dollar has been recorded. Apart from that, incomes of the poor have been growing faster than incomes of the rich (although purchasing capacity of these two groups remains to be different). At the same time, prices for goods and services consumed by low-income households have been growing faster than for those consumed by high-income households. As a result, the welfare increase the poor seemingly enjoyed (as measured in US dollars) have been offset (at least partially) by a faster increase in prices for goods and services consumed by them. Consequently, some doubts may be cast on 'the socially-benign' effects of economic growth and social policy more generally (when the latter is defined as redistribution of GDP towards the poor).

Sensitivity of pro-poor growth to the dynamics of prices can be illustrated in the following way: over the period of 1996–2006, annual average income growth rates of 10% of the least wealthy households amounted to 82.1%, while for 10% of the wealthiest households this figure amounted to 80.5%. At the same time, CPI was 61.8% (annual average). If the dynamics of consumer prices for the poor would have exceeded the dynamics of prices for the rich by 0.89% per year, then both groups would have enjoyed the same rate of real income growth. However, the difference over this period is higher than 0.89% (about 0.96% per year). Consequently, the relative position of the poor measured in terms of real income dynamics could have been less impressive.



Source: author's calculations on the basis of the data taken from Household Budget Surveys.

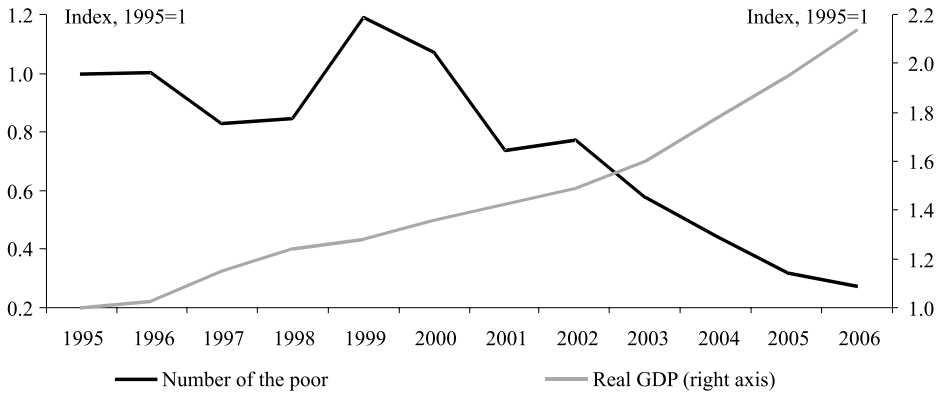
Figure 6: Changes in the share of deciles' income in total income

Finally, the distribution of benefits of economic growth across various income groups can be estimated by calculating changes in the share of each decile in total income. Over the period of 1996–2006, the share of the tenth decile in total in-

come declined by 1.38 percentage points. As for other groups, shares of the deciles from one to six increased by 0.18 percentage points each (on average), and for the deciles from seven to nine this figure amounted to 0.1 percentage points (Figure 6). Therefore, it is not only the poor who benefited from economic growth, but also middle-income households. Most likely, it is this group the Belarusian economic policies have been directed to.

4. DETERMINANTS OF POVERTY REDUCTION IN BELARUS

The analysis made above does not allow reaching an unambiguous conclusion that over a period of 1996–2006 economic growth has been pro-poor. However, poverty has considerably declined particularly due to GDP growth[15] (Figure 7). In this section, the relationship between poverty dynamics and such factors as income, inequality (and redistribution), macroeconomic stabilization, and the political business cycle are investigated by the using error correction mechanism model.



Source: author's calculations on the basis of the data taken from Household Budget Surveys and the Ministry of Statistics and Analysis.

Figure 7: Poverty and GDP in Belarus, 1996–2006

4.1. Long-term determinants of poverty reduction

There is a set of variables that affect poverty dynamics in Belarus: economic growth (measured by real GDP dynamics), income and the political business cycle (measured by the dynamics of real wages and pensions), inequality and redistribution (measured by Gini coefficient/ coefficient of funds), and macroeconomic stabilization (measured by nominal exchange rate index/CPI). Consequently, the following regression equation can be constructed (poverty is a function of all other variables listed above):

[15] When pro-poor growth is defined as increasng the share of the poor in total income, then, strictly speaking, economic growth in Belarus has not been pro-poor. But at the same time, GDP growth in Belarus has resulted in a reduction of the poverty rate. If this definition is accepted, then economic growth can be recognized as pro-poor.

$$POV = f(RGDPPC, RW, RP, GINI, FUNDS, NER, CPI). \quad (12)$$

However, estimation of equation (12) is impossible since the levels of wages and pensions are stationary (see Table 2). Accordingly, these variables could not be included in the equation testing long run relationships. The dynamics of Gini coefficient and coefficient of funds are nearly identical (see Appendix A) since inequality of income distribution is largely determined by the difference between the rich and poor households. Accordingly, the equation contains one of these variables.

The Engle-Granger test shows that in the long term, the dynamics of poverty has been determined by two variables only, namely real GDP per capita and nominal exchange rate index (Table 6, specification (c)). In the long run, a GDP growth of 1% leads to a reduction of poverty by 2.7%, while a 1%-depreciation of the Belarusian ruble against the US dollar increases poverty by 0.2%.[16] Therefore, irrespective of the definition of pro-poor growth, GDP dynamics in Belarus have played a key role in considerably reducing the poverty level from a nearly half of the population to only one-tenth of it. At the same time, devaluation of the Belarusian ruble observed between the end of 1998 and the beginning of 2001 had initially increased the poverty level, but later has prevented its reduction. However, macroeconomic stabilization (its results had become apparent in the second half of 2001)[17] has been one of the major factors of poverty reduction (in 2000, poverty reduced by 4.8 percentage points, while in 2001 – by another 13 percentage points). The importance of macroeconomic stabilization is also confirmed by a sharp reduction of poverty in 2003 (by 7.6 percentage points), when devaluation has been kept in check.

Table 6

Long term determinants of poverty reduction: Engle-Granger test

Specification	*rgdppc_sa*	*gini_sa*	*funds_sa*	*Ner_sa*	*cpi_sa*	*C*	*T*	*ADF*-statistics
(a)	–4.197	2.141	–	–	–	27.986	0.053	–2.90
(b)	–4.268	–	1.027	–	–	23.763	0.054	–2.97
(c)	–2.734	–	–	0.188	–	18.584	–	–3.94*
(d)	–2.984	–	–	–	0.210	19.910	–	–2.88

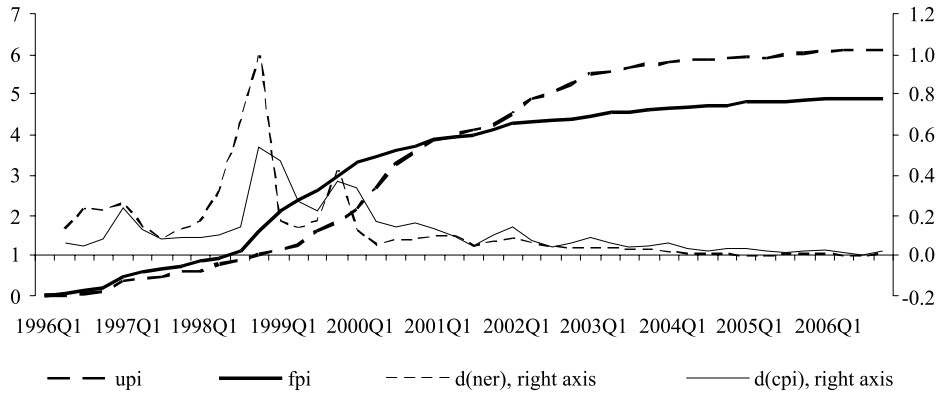
Note. Real GDP has been included in all of the specifications. Only statistically significant specifications are provided.

The adverse impact of devaluation can be illustrated by the following example. According to Casero and Seshan (2006), devaluation accelerates growth of prices for tradables in contrast to non-tradables. In Belarus, the former can be represented by foodstuffs, while the latter – tariffs for public utilities. Figure 8 shows that in those periods when the pace of devaluation exceeded the pace of inflation (on

[16] Per cent, but not percentage points

[17] The National Bank has begun to stabilize exchange rate at the end of 2000 by abolishing multiple exchange rates and switching to a current account convertibility of the national currency. The pace of emission has been decelerated, while real interest rates on ruble-denominated financial instruments have been established (see Chubrik (2005)).

average), prices for foodstuffs had been growing much faster than tariffs for public utilities. Given that 20% of the least wealthy households spend 63% of their incomes for purchasing foodstuffs while 20% of the wealthiest households – 53%, the impact of devaluation vary across households. Specifically, consequences of devaluation are more deleterious for the poor than for the rich.



Note. Log scale; *upi* – tariffs for public utilities, index: 1996 = 1, *fpi* – prices for foodstuffs, index: 1996 = 1. The right axis shows the first logarithmic differences of the rate of growth of nominal exchange rate index and CPI.
Source: Ministry of Statistics and Analysts, author's calculation on the basis of the data taken from the National Bank of Belarus and the IPM Research Center.

Figure 8: The dynamics of prices for foodstuffs and tariffs for public utilities depending on the differences in inflation and devaluation rates

A quantitative analysis of the impact of inflation on poverty in the long run does not reveal the existence of any relationships. It could be explained by the fact that wages, pensions and benefits used to be indexed at the rate of inflation (with some exceptions). Also, until 2001 wage targets have not been set in US dollars[18] (all other payments are unrelated to a dollar-denominated equivalent). Consequently, devaluation appears to occur sudden, particularly for the poor. This category of households is unable to hedge their assets against devaluation-induced macroeconomic shocks.

None of the variables describing redistribution of income has affected the dynamics of poverty in the long term. One of the implications of this observation is the inefficiency of redistribution policies in the long run. Perhaps, such policies could have adversely affected the incentives of the wealthiest households to make savings and investments.[19] However, over the period of time the study is dealing with,

[18] It is hardly possible to interpret such anchoring as a 'functional equivalent' of indexation. This is because devaluation does not automatically lead to higher nominal wages (at least in the public sector – in fact, about 80% of the Belarusian economy can be seen in one way or another as belonging to it).

[19] For instance, Alesina and Rodrik (1994) claim the majority of voters of inegalitarian countries (where median income is well below average one) would vote for higher rates on capital. As a result, incentives to invest could be adversely affected, thereby resulting in lower investment rates and, thus, slower economic growth. Given that economic growth is a key factor of poverty reduction, redistribution policy (based on high taxes on capital) could only be efficient in the short run.

there have been redistribution policies from rich to poor. In particular, in 1998 and between 2000 and 2002, and in 2006, the average income had been growing faster than the median one (i.e. poor households were getting rich with a slower pace than rich households, see Appendix B). In general, over a period of 1996–2006, annual average USD-denominated incomes of 10% of the least wealthy households exceeded the annual average USD-denominated incomes of 10% of the wealthiest households by just 1 percentage points, while median income exceeded average income by only 0.3 percentage points (see Figure 3). Accordingly, the coefficient of funds and Gini index decreased over a period concerned from 7.1 to 6.4 and from 0.298 to 0.283, respectively (on average per quarter between 1996 and 2006). Given that the poor and the rich households have been confronted with different dynamics of inflation, the scale of redistribution appears to be even less than suggested previously.

4.2. Determinants of poverty reduction in the short run

The analysis of the determinants of poverty reduction in the short run is enriched by additional variables that characterize income, inequality, and the political business cycle. However, the latter could be treated as a variable determining the dynamics of poverty in the long run. Nevertheless, our hypotheses suggest that short term dynamics could be affected as well. The error correction mechanism is taken from the equation (13):

$$ECM_t^{pov} = pov_sa_t - 18.584 + 2.734 \cdot rgdppc_sa_t - 0.188 \cdot ner_sa_t . \qquad (13)$$

The analysis is then performed by employing the 'general to specific' approach and estimate the following equations (14):

$$\Delta pov_sa_t = \alpha + \sum_{i=1}^{3} \varphi_i \Delta pov_sa_{t-i} + \sum_{i=0}^{3} b_i^1 \Delta cgdppc_sa_{t-i} + \sum_{i=0}^{3} b_i^2 \Delta macro_{t-i} + \\ + \sum_{i=0}^{3} b_i^3 \Delta ineqality_{t-i} + \sum_{i=0}^{3} b_i^4 \Delta income_{t-i} + \gamma\, ECM_{t-1}^{pov} + \varepsilon_t , \qquad (14)$$

where *macro* denotes inflation (dynamics of consumer prices) or devaluation (dynamics of exchange rate against the US dollar), *inequality* – Gini index/coefficient of funds, and *income* – wages and pensions. Wages and pensions should not be included in the equation at the same time since both variables contain the same cyclical component reflecting the existence of the political business cycle (see Figure 2 (a, b)).

Error correction models (14) have been reduced by using the general-to-specific approach (see section 3.2). After reduction, the following equations have been estimated:

$$d(pov_sa)_t = \underset{(3.3)}{0.243} \cdot d(ner_sa)_t - \underset{(-4.5)}{0.368} \cdot d(ner_sa)_{t-1} + \underset{(5.4)}{0.358} \cdot d(ner_sa)_{t-3} - \\ - \underset{(-5.1)}{0.753} \cdot d(rp_sa)_t - \underset{(-4.6)}{0.645} \cdot d(rp_sa)_{t-1} - \underset{(-4.7)}{0.465} \cdot ECM_{t-1}^{pov} + \varepsilon_t , \qquad (15a)$$

$$d(pov_sa)_t = \underset{-4.2}{-0.057} + \underset{(4.7)}{0.240} \cdot d(ner_sa)_t + \underset{(2.7)}{0.147} \cdot d(ner_sa)_{t-3} - \\ - \underset{(-2.9)}{0.553} \cdot d(rw_sa)_{t-1} - \underset{(-4.8)}{0.522} \cdot ECM_{t-1}^{pov} + \varepsilon_t. \quad (15b)$$

There is no anomaly of residuals in both equations (see Table 7) thereby confirming correct specification.

Table 7

Specification tests, equations (15a) and (15b)

Test:	*p*-value	
	(15a)	(15b)
Autocorrelation of the first–third orders (LM-test, F-statistics)	0.408	0.757
Conditional autoregressive heteroskedasticity of the first–third orders (LM-test, F-statistics)	0.980	0.441
Normality of residuals distribution (Jarque-Bera)	0.610	0.968

Note. In all cases the null hypothesis suggests anomaly of the residuals (i.e. autocorrelation, heteroskedasticity, or the absence of normal distribution). All computations are done in EViews 5.1.

As in the long run, no relationships are detected between poverty, on the one hand, and inflation and variables describing inequality, on the other. In both equations, the exchange rate variable appears to be statistically significant (i.e. devaluation breeds poverty) along with the indicators describing incomes and the political business cycle, i.e. wages and pensions. Their impact (in fact, a joint influence of income variables and the political business cycle[20]) on the dynamics of poverty increase is both significant and negative. In particular, in the equation (15a), the sum of coefficients related to the dynamics of real pensions is equal to 1.398, while for wage dynamics this indicator is (–0.553) (equation (15b)). In case there is a deviation from a long term trend, equilibrium is restored rather quickly (approximately after two quarters).

The absence of a relationship between redistribution and poverty both in the short and long terms needs explanation. This observation contradicts the initial expectations. But it can be plausibly explained by the significance of the nominal exchange rate index established in the long term equation and of devaluation in the error correction mechanism equation. The upshot of the empirical study is that the adverse redistributive effects of devaluation are amplified by dollarization. This claim is confirmed by the results of the regression analysis of determinants of inequality. Long term dynamics of the Gini coefficient (*gini_sa*) are determined by nominal the exchange rate index (*ner_sa*) and real minimum wage (*rmw_sa*).[21] However, the hypothesis that redistribution is relevant for poverty reduction can not be rejected. An important variable directly related to redistribution is the nominal exchange rate index. It implies that a more important channel of redistribution is not fiscal policy, but monetary policy.

[20] It is not only the political business cycle that drives wages up in Belarus. Over the period of time analyzed, labor productivity (i.e. its increase) has been a notable factor of poverty reduction (Chubrik, Kruk, and Pelipas (2006)).

[21] The results of the Engle-Granger test are such that a hypothesis of the absence of long-term relationships among these variables is rejected at the 5% level.

5. CONCLUSION

The following hypotheses have been tested in this chapter:

1) Economic growth in Belarus is pro-poor;
2) Devaluation adversely affects the incomes of the poor and does not affect the incomes of the rich;
3) Prices for goods and services consumed by low-income households are growing faster than prices for goods and services consumed by middle-income and high-income households;
4) The political business cycle influences the dynamics of poverty in Belarus;
5) Income redistribution policy plays an important role in poverty reduction in Belarus.

The first hypothesis has not been rejected, but with some reservations. When a definition of pro-poor growth as leading to a reduction of the share of the poor in total income is accepted, GDP growth in Belarus is pro-poor only to some extent. This is because the benefits of economic growth have been reaped by average households. Most likely, middle-income households have been the key social group social policies in Belarus have been targeted at. However, there is another definition of pro-poor growth, i.e. the one leading to a considerable reduction of poverty level. When this definition is adopted, GDP growth in Belarus is unambiguously pro-poor.

The second hypothesis has neither been rejected: devaluation adversely affects the incomes of the poor in the long run, while in the short run its negative effects touch upon the wealth of middle-income households. The wealthiest households are unaffected by the deleterious consequences of devaluation both in the short and the long terms. Change in the relative prices over the period of time concerned has made the poor poorer. It serves as a ground for not rejecting the third hypothesis. Apart from that, poverty has been amplified by faster growth of prices for those goods and services that occupy a larger share of consumption baskets of the poor than of the rich.

As for the fourth hypothesis, the effect of the political business cycle on the dynamics of poverty in Belarus can not be rejected. Increase of wages and pensions that contain a strong cyclical component is a key factor of poverty reduction in the short term. In the long term, this factor gives way to GDP growth. Devaluation is most deleterious for the least wealthy households incapable of hedging their ruble-denominated incomes against the consequences of macroeconomic shocks. Accordingly, devaluation negatively impacts the poor both in the long and the short terms.

Income inequality indicators appear to be unrelated to the dynamics of poverty. This observation suggests that redistribution policies are inefficient to fight poverty in Belarus. Accordingly, the fifth hypothesis should be rejected. At the same time, devaluation has brought serious redistributive effects, thereby allowing the importance of monetary, and not fiscal, channels of poverty reduction.

The results of the quantitative study made in this chapter lead to a range of conclusions about the specific features of social policies conducted in Belarus. Tar-

geting of wages denominated in US dollars has created an illusion of accelerating real income growth, particularly due to the real appreciation of the Belarusian ruble against the US dollar over the last nine years. Apart from that, incomes of the poor have been allowed to rise faster than incomes of the rich (when the difference of their purchasing capacities is omitted). However, over the period of 1996–2006, prices for goods and services consumed by low-income households have been growing faster than prices for goods and services consumed by high-income households. Therefore, a relative improvement of the material conditions of the poor measured in US dollars has been (at least partially) offset by a higher group-specific rate of inflation. Consequently, some doubts can be raised about the straightforward 'socially-benign' nature of economic growth in Belarus (as benefiting exclusively the poor).

The energy price hike has challenged the Belarusian economy in a number of ways, including threatening its decent rates of GDP growth. But it is of critical importance to preserve these rates in the future. Poverty reduction in Belarus is not connected to the creation of opportunities for the least wealthy citizens to work productively, but mainly related to cyclical income fluctuations. Accordingly, sustainability of poverty reduction in Belarus is fully conditional upon the sustainability of economic growth.

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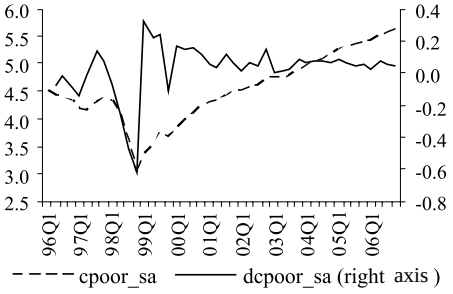
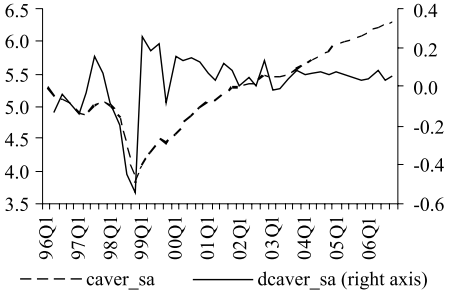
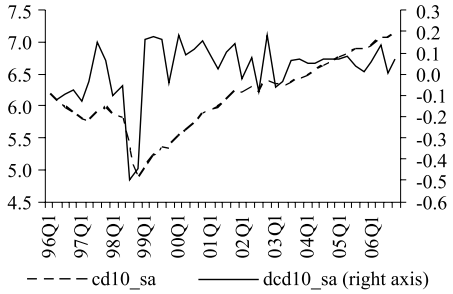
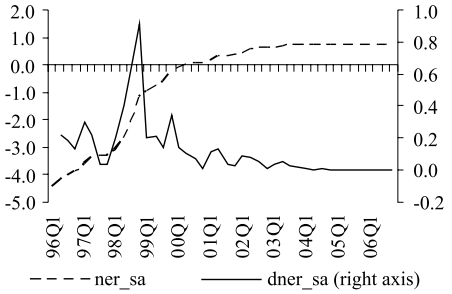
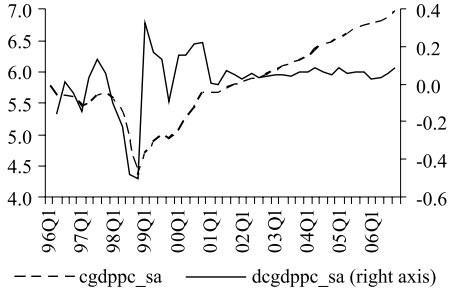
APPENDIX A. VARIABLES

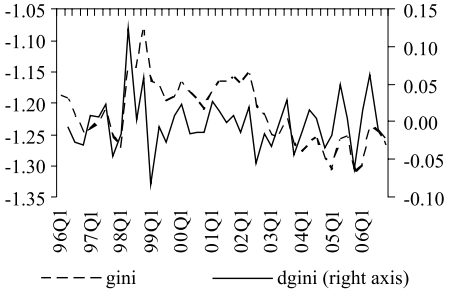


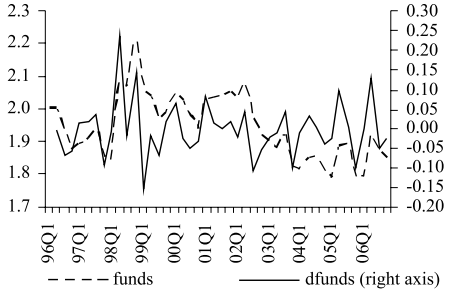


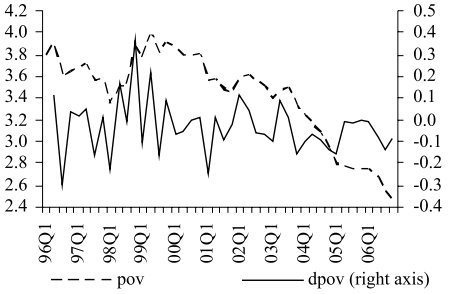


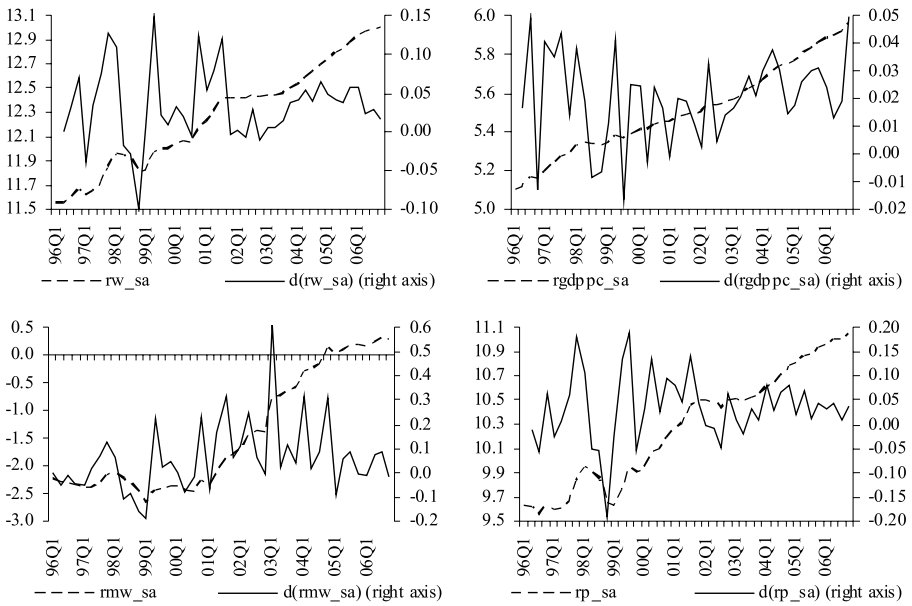






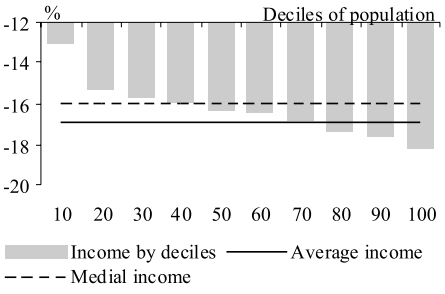






Note. Log scale; right axis – first logarithmic differences.
Source: author's calculation made on the basis of the data taken from Household Budget Surveys, Ministry of Statistics and Analysis, National Bank of Belarus, and the IPM Research Center.

APPENDIX B. INCOME GROWTH RATES AND DECILES



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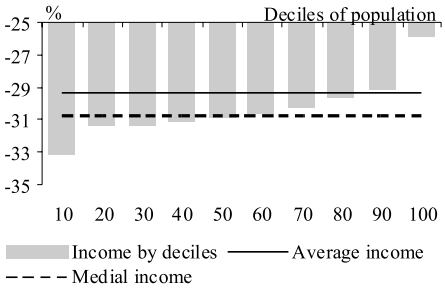

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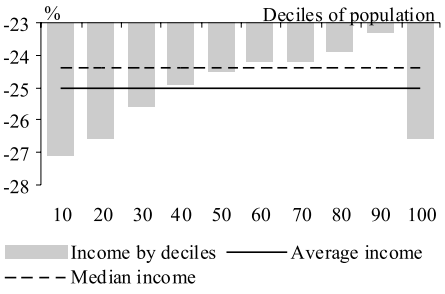

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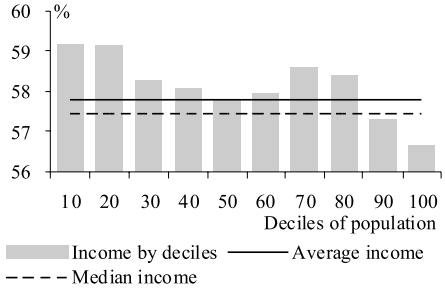

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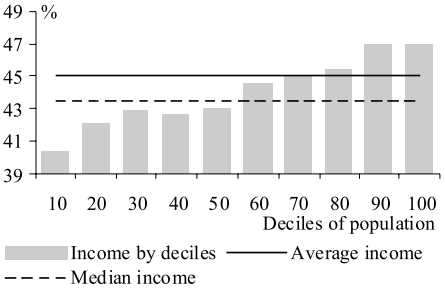

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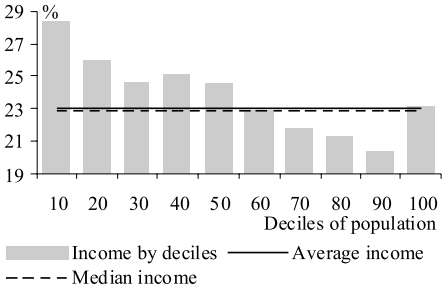

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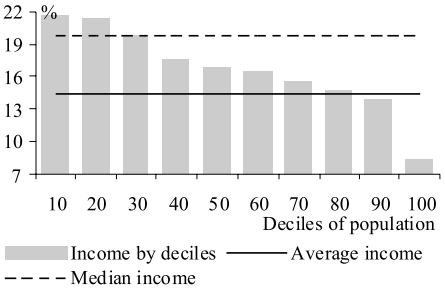

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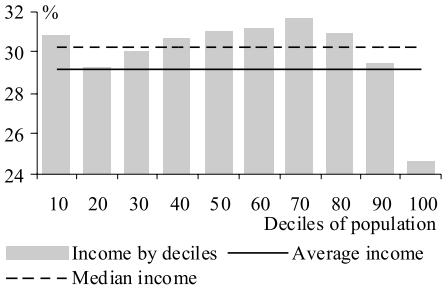

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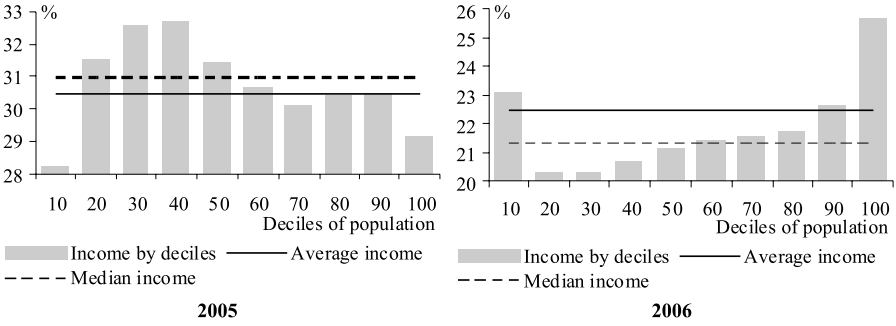


Note. Dynamics of USD-denominated indicators, annual average, %.
Source: author's calculation made on the basis of the data taken from Household Budget Surveys, Ministry of Statistics and Analysis, National Bank of Belarus, and the IPM Research Center.

Chapter III

Redistribution Policies in Belarus: Economic Growth, Labor Markets and the Political Business Cycle

Kiryl Haiduk

1. INTRODUCTION

In market economies, the rate of median income growth exceeds that of the average income. Formally, it implies that the majority benefits from progressive taxation and income redistribution. In democratic political systems, legal equality of citizens (one person has one vote) suggests that income redistribution towards the poor is what majorities of voters tend to favor. For instance, Persson and Tabellini (1999) claim that the volume of income to be distributed largely reflects the preferences of the middle class (or median voters) in turn influenced by their location at the continuum of society's incomes. If this logic were elaborated, then greater income inequality (measured, for instance, as the difference between average and median income) would lead to higher income tax rates. At the same time, preferences for redistribution are balanced against a common interest in growing average level of living. The latter's dynamics are influenced, among other factors, by the scope of redistribution policies. These policies are funded by taxation that might dampen investments as one of the drivers of economic growth and incomes. Therefore, distributive conflict is 'tempered by a common interest in economic growth' (Pontusson (2005)).

Virtually all market economies are characterized by the existence of certain redistribution mechanisms. As for Belarus, its economy has been often seen as 'doomed to failure'. The absence of privatization, support of loss-making state-owned enterprises and a very low level of FDI have fed this expectation. A combination of these factors implies that the economy sooner or later becomes inefficient and uncompetitive. Low progress in market reforms in contrast to other transition economies (see Table 1) has been determined, as the authorities often claim, by the dangers of adverse social consequences, including mass unemployment and impoverishment. Accordingly, a socially-oriented market economy has been built in Belarus instead of a fully-fledged one.

This developmental road is still being followed despite some challenges like energy price hike and worsening of the balance-of-payments situation. Still, in 2006, there was a system of planned indicators and instructions in place to regulated output rates. These indicators have not only been provided to large-scale state-owned enterprises, but also small and medium-sized private ones (as the survey data show, see Chubrik, Pelipas, Rakova, (2007)). In fact, Belarusian economic experiments have been to a notable extent funded by relatively modest gas prices (in contrast to what many other transition economies have).[1] Apart from that, a highly dollarized,

[1] The size of this subsidy can be estimated from 3 to 10% of Belarus' GDP. See Chapter 2 of Chubrik, Pelipas, Rakova (2007).

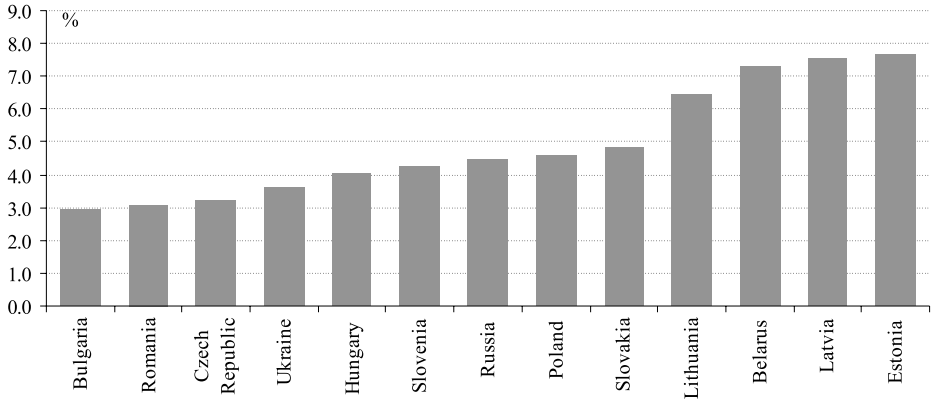
devaluation-sensitive Belarusian economy has been sheltered by growing oil product exports revenues. Russian suppliers of crude oil have benefited from the favorable geographical location of Belarusian refineries, while foreign exchange inflow helped to stabilize the exchange rate. Despite the skeptical attitude of many observers, the Belarusian economy has been capable of generating decent growth rates, exceeding those recorded in other, more advanced, transition economies (Figure 1).

Table 1

Market reforms in Belarus and other selected transition economies by 2007

Country	Large-scale privatization	Enterprise restructuring	Price liberalization	Banking sector reform and interest rate liberalization	Average (of nine indicators)
Belarus	1.00	1.00	2.67	2.00	1.85
Czech Republic	4.00	3.33	4.33	4.00	3.81
Poland	3.33	3.67	4.33	3.67	3.78
Lithuania	4.00	3.00	4.33	3.67	3.70
Russia	3.00	2.33	4.00	2.67	3.04
Ukraine	3.00	2.00	4.00	3.00	3.00

Note. '1' is to denote a planned/command economy; '4' is to denote a developed market economy (Western European countries are used as a benchmark). Details can be found in any of the EBRD Transition Reports.
Source: European Bank for Reconstruction and Development.

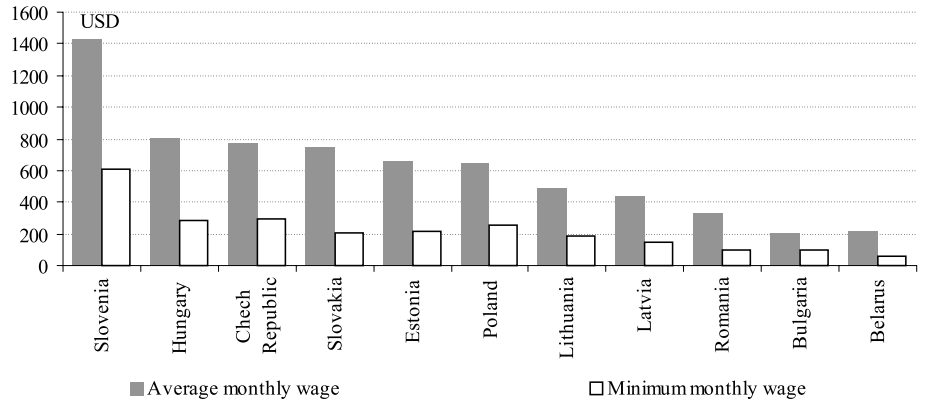


Source: European Bank for Reconstruction and Development.

Figure 1: Annual average real GDP growth rates in Belarus and other transition economies, 1996–2006

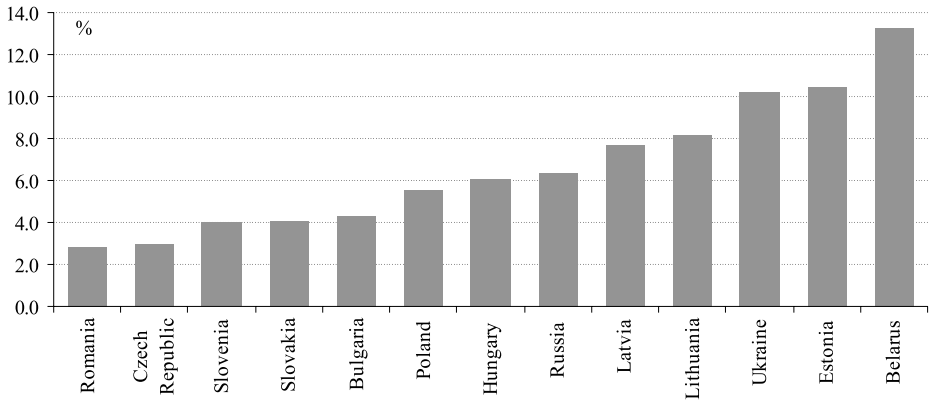
Nevertheless, Belarus is lagging behind other transition countries in terms of absolute value of monthly wages, while productivity dynamics show an opposite trend (Figures 2 and 3). Some could question these figures. For instance, growing productivity can merely follow from impressive GDP growth dynamics occurring against the background of very small reduction in employment (by just 0.1% over 1996–2006). At the same time, a certain share of the Belarusian economy is making

losses (due to the continued existence of loss-making enterprises). This is an anomaly for any market economy. For instance, in August 2006 more than one fifth of all enterprises (21.4%) had generated losses, while in January this figure was 32.3%. In 2006, the total volume of losses amounted to 0.4% of the 2006 GDP. This is two times higher than in 2005, but less than in 2004 (1.4% of 2004 GDP). Some indicators are endemic to the Belarusian economy. The ratio of stocks to monthly output in industry is often close to 50%, while in the light industry and machine-building and metalworking sectors this figure amounts to 120 and 80%, respectively. Figures vary across months and years, but do not substantially deviate from these values.



Source: author's calculations on the basis of the data taken from *Eurostat* and the Ministry of Statistics and Analysis.

Figure 2: Average and minimum wages (absolute values) in Belarus and other transition economies in 2005

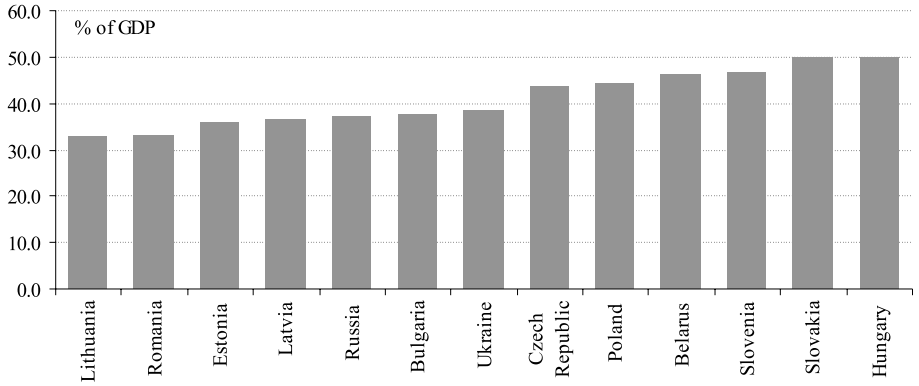


Source: the author's calculations on the basis of the European bank for Reconstruction and Development data.

Figure 3: Annual average productivity growth rates in Belarus and other transition economies, 1996–2006

Yet, economic growth in Belarus can be considered as pro-poor[2] since low-income households benefit most (see Chapter II for details). The issue of 'socially-benign' nature of economic growth in Belarus is an important one, calling for a search of transmission channels of positive effects of GDP growth to households. Chapter II shows that the efficiency of redistribution policies in Belarus can be undermined by a socially painful devaluation. Accordingly, monetary policies are more important than fiscal ones to improve the material conditions of the poor.

Indeed, the data show that the Belarusian economy is not characterized by an exceedingly high level of public expenditures, although Belarus is ahead of many other transition economies in this respect (see Figure 4). As for the social expenditures, these are quite modest (Figure 5). In fact, Belarus is closer to so-called 'neoliberal' transition economies (Bohle and Greskovits (2007)) than to the 'embedded neo-liberal' Visegrad group (like Poland and the Czech Republic).[3] However, there are plans for 2008 to spend about BYR 30 trillion[4], or up to 25% of 2008's GDP for so-called 'social purposes and objects'.



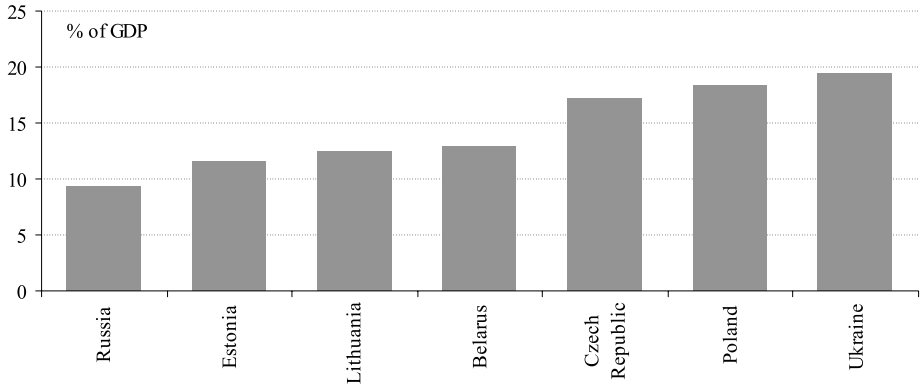
Source: European Bank for Reconstruction and Development.

Figure 4: Public expenditures to GDP, 1996–2006, annual average

[2] The question of whether GDP growth in Belarus is pro-poor is answered differently depending on the definition chosen. By all accounts, over 1996–2006 poverty has declined considerably. See Chapter II for details.

[3] Bohle and Greskovits (2007) develop a concept of post-socialist varieties of capitalism. The original typology of transition economies is based on, among other factors, the degree of social protection offered by the state (measured by the size of social expenditures and transfers). In their turn, the differences in the degree of social protection are determined by the political preferences of the population (voting for certain political parties) and the willingness to accept the pains of a transformation period. These preferences have been shaped by the degree of completion of the nation-state and the rigor applied by early post-socialist politicians towards the dismantlement (or reparation) of socialist legacies.

[4] These data can be found in the newspaper 'Sovetskaya Belorussia', No. 242 (22897), December 22, 2007, available at: http://www.sb.by/article.php?articleID=62965.



Source: the author's calculations on the basis of the IMF data (International Financial Statistics Database).

Figure 5: Social expenditures to GDP in 2005

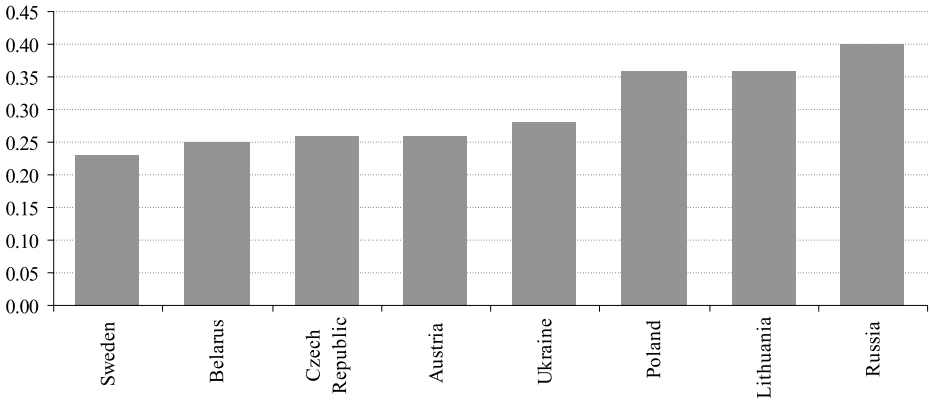
In the Belarusian context, notions like 'social purposes and objects', 'social orientation of the economy' are blurred. Often, these are used as a codeword to denote state funding of education and health care, nursery and primary schools, various cultural facilities and events, and so on. But there is nothing special about this because many countries also have such policies. Moreover, there is a transformation of social policies in Belarus underway. For instance, 66% of students are now paying for their education. State-run health care facilities limit free-of-charge services. Still, unemployment benefits are scanty (almost ten times lower than the average economy-wide monthly wage). Nevertheless, the government subsidizes housing construction for those 'who need to improve their housing conditions'. But the market price of real estate is growing. By the end of 2007 the average price per square meter in Minsk was roughly six times higher than the average economy-wide monthly wage[5], while mortgage interest rates are also higher than in the transition economies. Indeed, for the vast majority of wage earners purchase of real estate is nearly impossible without subsidization by the state.

Also, the notion of 'social orientation' in Belarus is invoked when subsidies and state aid of various kinds are provided to state-owned enterprises and organizations. A considerable share of this assistance is consumed by agriculture. At the same time, the volume of social benefits provided to the socially vulnerable groups of the population was about USD 22 million, or 0.5% of 2007's GDP. It has been calculated officially that in 2008 a partial withdrawal of social benefits would allow saving as much as BYR 168 billion.[6] In comparison with other public expenditures like agricultural support, this amount appears to be negligible.

[5] At the same time, costs per square meter are about USD 700, as it follows from the information provided in the newspaper 'Sovetskaya Belorussia', No. 137 (22792). July 26, 2007.

[6] These data can be found at the newspaper 'Sovetskaya Belorussia', No. 242 (22897), December 22, 2007.

The empirical analysis of redistribution of benefits of economic growth points to a relative weakness of the fiscal policy tools for reducing poverty compared with the crucial role of macroeconomic stabilization[7] (and exchange rate stability in particular) and incomes growing in accord with the political business cycle (see section 4 of this chapter).[8] Nevertheless, Belarus remains to be an egalitarian country (Figure 6) in contrast to the Russian Federation, which is much closer to the least egalitarian EU countries (like Portugal and the United Kingdom).



Source: Eurostat (for the EU countries), statistical offices of Ukraine and Russia, and the Ministry of Statistics and Analysis of Belarus

Figure 6: The Gini coefficients in 2005

How has such a relatively small income inequality been maintained? Has the government stuck to some kind of redistribution strategy and, if so, for how long? Have there been any differences in income equality backed up by corresponding policy changes? What kinds of policy instruments have been applied? This chapter attempts to provide answers to these questions and also to understand the specific features of the Belarusian economic policies, and especially the content of its 'social obligations'. However, specificity can only be understood against the available approaches to redistribution, including the use of macroeconomic policy tools. There are good reasons to suggest that macroeconomic (and institutional) context(s) influence the choice of policy instruments.[9]

The chapter is organized as follows. The second section reviews major approaches to the issue of redistribution. The third section unveils the macroeconomic context that limits a space for discretion when implementing redistribution policies. The fourth section analyzes available empirical data over 1995/1996–2006.

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7 See, for instance, Haiduk et al. (2004).

8 The notion of the political business cycle has firstly been applied in the work of Haiduk et al. (2006).

9 The importance of the economic and institutional context is emphasized in Franzese, Jusco (2006).

2. MAJOR APPROACHES TO THE ISSUE OF REDISTRIBUTION

Poverty and inequality are customary topics of economic theory. In a more general sense, redistribution is the transfer of a share of the income of certain social groups to other groups to provide social benefits, healthcare or education. Traditionally (and especially since the rise of Keynesianism), theory considers the state as the major agent for redistribution (although families or households and private institutions like charities might also play an important role). Social policies are funded by taxes, while spending can be delivered in the form of subsidies and transfers (in monetary form or in kind), etc.

Contemporary economic literature distinguishes between two major approaches to redistribution. The first approach focuses on answers to the question why redistribution exists as such, given that it might hamper economic growth. The second approach takes the existence of redistribution for granted and discusses various modes of redistribution and efficiency of policy instruments. Finally, there is also an approach grounded in libertarian theories emphasizing the advantages of private institutions. However, this body of theorizing is (still) marginal since it describes more hypothetical than existing situations.

The first approach can be labeled 'individualistic'. It includes two groups of theories. The first one takes the individual as a point of departure and then looks through his/her eyes at redistribution. Gary Becker's theory of human capital is an example of such a theory. An individual accepts redistribution (which is in fact the seizure of income) because of the insurance motive. In order to illustrate this claim, Becker describes a family with a joint budget. The family has members experiencing some financial difficulties. These family members are then assisted by those related who do not have such a problem. Spending is not a family-exclusive, charitable affair. In contrast, assistance maximizes utility of the whole family. A temporary loss of income by one or several of its members is financed by cutting aid to those without trouble. Therefore, by being a family member, one contributes to the joint budget and thus insures oneself against possible loss of income in the future. This hypothetical illustration to some extent resembles the current practices of the state. Indeed, states have taken away the functions of Becker's family.

Becker's original idea is employed in many contemporary models. These models assume that individuals are risk-averse and therefore intend to reduce uncertainty about their future incomes. Private economic actors like insurance companies are incapable of fulfilling all of the demands due to the existence of standard microeconomic problems (moral hazard, adverse selection, incomplete information, and other market imperfections). Accordingly, there is a need for the state to intervene in order to avoid market failure in public insurance by conducting redistribution policies. These policies offer a social good that is undersupplied when only market forces operate.

Often, the welfare state is associated with strong trade unions and left-wing parties dominating the political scene. However, historically the introduction of universal unemployment and workplace health insurance has been supported by employers. The creation of a universal, nation-wide system of social protection has

prevented competition in the provision of social benefits. In their turn, unemployment insurance and similar labor-protective measures have encouraged investment in skills so firms have been able to acquire additional competitive advantages at international markets (Iversen (2005); Mares (2003)).

In general, insurance creates avenues for investment in human capital. Acquirement of specific skills (i.e. skills applicable in only a certain branch of industry, sector, or even individual enterprise) is always risky (Oleinik (2000)). This is because job loss usually inflicts income loss since specific skills are not easily redeployed to the industries with a different skill profile, while retraining takes time. In this situation, interests of workers and firms are congruent with each other. Firms often benefit from employing workers with specific skills (in such industries as machine building, metalworking, etc.). These skills are continuously upgraded to increase productivity of labor and thus to make firms competitive both internationally and domestically. The state is a 'third party' along with workers and firms keen on protecting investment in specific skills (Iversen (2005)).

The second approach to redistribution cares about the compatibility of redistribution policies (often aimed at reducing income inequality) and economic efficiency. Pontusson (2005) shows that compatibility is indeed within reach, but certain conditions are required. One of the much-quoted historical examples is corporatism of the West European/Scandinavian type (Eichengreen, Iversen (1999)) over the 1950–1970s. The precondition establishing corporatist policies has been the development of manufacturing capitalism at the end of the 19th–early 20th century along with an expansion of democratic rights and freedoms. The introduction of universal suffrage broadened opportunities for political participation and competition.

In models that account for the existence of political competition, redistribution closely follows voters' preferences. One of the early models by Downs (1957) depicts politicians as vote fighters, while voters are evenly distributed across a continuum of incomes. Redistribution from rich to poor is 'advertised' by politicians as a benefit granted as soon as they are in power. After winning the electoral battle, politicians tax incomes of the minority (49%) and redistribute it to the majority (51%). However, the latter groups could shrink in the future as a result of income growth so the redistribution policy might not be supported by the majority in the future.

These ideas have been translated into a median voter concept. Politicians attempt to make 'binding', or 'credible promises' in order to reach some kind of political equilibrium (so there are no incentives to change the *status quo*). Numerous contemporary models of political processes use the notion of a 'median voter'. In particular, Persson and Tabellini (1999) maintain that in democratic societies the volume of social assistance programs broadly reflects the preferences of the middle class (a sort of proxy for median voters) and its location on the continuum of incomes. The higher the income inequality (measured by the difference in the average and median incomes) is, the higher the income tax rates are. In Belarus, redistribution policies have resulted in the growth of 'average' households (see Chapter II).

In essence, redistribution is not driven by altruistic motives. Rather, it is often based on individualistic motives of incomes insurance and reduction of uncertain-

ty about future incomes. Without the state, the volume of redistribution tends to be 'suboptimal' (Baskan (2002)). In fact, redistribution is a more or less customary feature of market economies. Therefore, politicians have incentives to use certain redistribution policy instruments in order to gain political power. The regularity of such political intervention into the economy is often attributed to the electoral cycles.

In order to describe political management of the economy, the theory of the political business cycle is often invoked. One of the early models offered by Nordhaus (1975), monetary policy is a principal tool of the political business cycle. Interest rates cuts allow new firms to enter the market. This leads to inflation (with a certain lag). The functioning of the cycle can be illustrated by the Philips curve, i.e. increase in employment can be achieved at the expense of higher inflation. Since economic actors project the future on the basis of the past experience (i.e. they have adaptive expectations), the cycle can work for some time. Right after the elections inflation accelerates so the Central Bank is forced to toughen monetary policy thus dampening inflation and employment. Until the next elections, inflation is kept in check so the costs of higher election-caused inflation are minimized.

Nordhaus' model has been criticized on conceptual grounds. First, central banks are not controlled by governments. There is a clear trend towards central bank independence across the world economy.[10] For instance, the European Central Bank is one of the most independent central banks in the world. Second, there is a problem of rationality of voters. Their expectations are not always adaptive, i.e. they are not naive and capable of foreseeing the manipulations by politicians. Third, tax rates and the volume of social transfers can play a role so they have to be accounted for in political business cycle.

Alesina (1987), (1988) claims that expectations are rational only to some extent since voters are incapable of foreseeing the future with precision. Specifically, a political business cycle can be compatible with rational expectations since the results of the elections can be predicted with a certain degree of precision. More importantly, it is hard to calculate the costs of promises (e.g. accelerated inflation) made by power-seeking politicians. Also, there is a factor related to wage contracts. Usually, such contracts are signed up for a certain period of time (a year or two) so expected inflation typically reflects the past experience projected for the future. But unexpected inflation orchestrated by political intervention could affect the real variables like employment and GDP at least in the short term.[11]

However, politicians are not always inclined to manipulate the economy for electoral purposes, but to follow their voters' preferences. Hibbs (1977) employs the Philips curve to show that different political parties can select different combinations of inflation and unemployment. Left-wing parties tend to support higher inflation and lower unemployment, while right-wing parties prefer the opposite combination (higher unemployment, but lower inflation). Later, Hibbs (1994) modified the original idea by stressing that parties can alter their preferences depending on the consequences of their decisions for the economy. While broader politi-

[10] See the papers by Franzese, Hall (2001) and Cukierman (1992).

[11] Iversen and Soskice show that under certain conditions the impact could last for the long run.

cal preferences might be unchanged, the results of economic policies can vary depending on the period of time. Parties can not always correctly predict the results of economic policies implemented so some adjustments are made 'on the spot'. This is because institutions (like labor market institutions, interaction of monetary and fiscal policies, etc.) determine the results of economic policies.

When the modeling of political controls over the economy is performed by using the Philips curve, monetary policy is the major means of manipulating the economy. But central bank independence has left the government only fiscal policies as their core policy tool (Tufte (1978)). Indeed, fiscal policy-based political business cycles are observed across different economies. For instance, in Israel over 1952–1973 changes in the tax rates coincide with important political events (taxes were reduced prior to them and increased after them) (Ben-Porath (1975)). A panel study of 17 Latin American countries between 1947 and 1982 (Ames (1987)) shows that government expenditures had been growing by 6.3% on average in the pre-electoral year and then dropping by 7.6% in the year after the election. Gonzalez (1999) finds cyclicity of government expenditures in Mexico over 1958–1997 that can be attributed to presidential and parliamentary elections.

Schuknecht (1996) in his study of the political business cycles across 35 developing countries over 1970–1992 emphasizes the need to account for the structural context, or the country or region-specific features of the system of checks and balances. In a number of countries, this system is much weaker than in the developed democracies since politicians possess a larger number of instruments of controls over the conduct of monetary and fiscal policies. Apart from that, politicians in developing countries face the need to maintain macroeconomic stability as their chief policy priority.

In Belarus, fiscal policy is most likely to play a role, but it is very hard to trace its influence between 1996 and 2006 on the well being of citizens. This is because of the changes in content of expenditure items. Also, the progressive taxation system of Belarus contributes to the redistribution of incomes. Nevertheless, Household Budget Survey data show that over 1996–2006, 60% of incomes of an average household has been acquired through wages, while 'social transfers' occupy a maximum of 20%. In its turn, real wages are influenced by the rate of inflation. The dynamics of incomes are therefore determined by monetary policies.

3. MACROECONOMIC STABILITY AND REDISTRIBUTION

Developed, developing, and transition economies are monetary economies, operating in international and regional contexts. One of the notable features of these contexts is the 'hierarchy of currencies' (Herr (1997)). The 'quality' of currencies is determined – among other factors – by the price stability a monetary system is able to deliver (Cohen (2004)). In many developing and some transition economies, high inflation has crowded out domestic currencies and raised the attractiveness of foreign currencies (such as the US dollar and German Mark, and later the Euro) as a store of value and a means of savings (and even as a means of circulation) (Feige, Dean (2003)). Dollarization or 'flight' to other currencies (than the

national one) means that economic actors are unwilling to finance the domestic economy. Ultimately, this can result in recession, decline in incomes and increased inequality. Therefore, price stability is one of the major conditions for functioning of the monetary economy, while macroeconomic stability is a precondition for reduction of inequality.

Inflation contains serious redistributive effects. A number of studies show that inflation tends to affect the poor more heavily than other income groups. In particular, the share of low-income households grows as inflation accelerates (Romer, Romer (1998)). Easterly and Fischer (2001) also find that high inflation leads to a decline of incomes of the least wealthy households, an increase in the poverty rate, and a reduction of the minimum wage. According to them, inflation hits the poor more heavily than the rich because of the ability of the latter to hedge themselves against the deleterious effects of inflation. More wealthy households have better access to financial instruments that protect them against loosing purchasing power. At the same time, the incomes of the poor are too small to resort to financial instruments so savings tend to be in cash form. Besides, the poor often rely on social transfers not indexed with inflation (or indexed with a certain lag).

The adverse effect of inflation on the poor is therefore determined by the absence of assets sheltering them from price increase. Usually, the poor can only offer their (often low-skilled) labor. The price for labor is partially determined by the volume of investment made into human capital. The poor are also less educated than the rich, thereby making them inflation-sensitive. It is also hard to break with poverty and the resulting dependency since the incomes are not enough to make investment into human capital. As a result, a 'local poverty trap' is created (Easterly (2002)).

In their study, Easterly and Fischer (2001) take the level of income and its distribution prior to inflation and then trace the impact of inflation upon these indicators. These indicators, they argue, are determined by specific institutions and histories of the economies in question. Besides, the authors emphasize that there is no clear-cut and universal relationship between inflation and the well being of the poor. This is because of the complex mechanism of interaction between these variables so for every single country the relationship has to be established empirically. For instance, in developing countries households are often able to adjust to a deterioration of the material stance. Adjustment strategies include subsistence farming, reduction of consumption of foodstuffs and/or search for new employment, usually in the informal sector of the economy (Fizbein, Giovagnoli, Adúriz (2002)).[12]

Not only inflation threatens the well being of the poor. Devaluation also has negative consequences. For instance, the devaluation in Argentina in times of the financial crisis of the 2000s resulted in a poverty increase (Goldschmit, Vezza (2006)). The analysis of distributive implications of devaluation in Djibouti (Casero, Sehan (2006)) points to a deceleration of nominal income growth and (indirectly) a reduction of real incomes of the poor. As in the case of inflation, less wealthy households have fewer instruments to protect themselves from the deleterious effects of devaluation than more wealthy ones.

[12] These adjustment strategies have been widespread in Russia in the first years of market reforms. See Clarke (2001) for details.

In the dollarized economies, devaluation and inflation are often interconnected. This linkage is also observed in Belarus (see Figure 7). In its turn, monetary sector developments affect the rate of economic growth and the distribution of its benefits across income groups. Therefore, we look at the dynamics of several sectors of the economy and their interaction. Considering monetary or redistribution policies alone cannot clarify the whole pattern of macroeconomic relationships that contribute to poverty dynamics in Belarus.

The interaction of several policy domains, such as monetary and fiscal policies, labor market functioning (wage-setting mechanisms in particular), and the foreign sector situation (influencing exchange rate) can be described by using the notion of the *macroeconomic regime* (Heine, Herr, Kaiser (2007)). However, within the framework of the regime, monetary policy is the most important element.[13] In general, the macroeconomic regime is defined as a constellation of macroeconomic parameters and the interaction among them, including economic institutions, that either stimulates or dampens economic growth (Herr, Priewe (2005)). The notion of the macroeconomic regime can also be employed to study poverty dynamics[14] since fiscal policies are not the only policy instrument. Macroeconomic regimes are not affected by short-term dynamics, but rather determine macroeconomic stability and growth over at least the medium run.[15] Since GDP growth is important for reducing poverty and growth of incomes, macroeconomic conditions for securing this growth are crucial.

Over 1992–2007, macroeconomic developments in Belarus can be characterized by the existence of three macroeconomic regimes (Haiduk et al. (2004); Herr, Priewe (2005)). Between 1992 and 1996, there had been a regime of hyperinflation. This is a combination of a devaluation-led cost-push inflation and high aggregate demand. One of the major characteristics of this regime was a 'devaluation–wages–prices–inflation' spiral. High aggregate demand, devaluation and growing nominal wages stimulated each other resulting in hyperinflation. This situation to a large extent determined the dollarization of the Belarusian economy. Dollarization has also been widespread in other republics of the former USSR (Haiduk (2007a)). Loss of savings and high (and unpredictable) inflation forced households to resort to US dollars as a means of maintaining financial wealth. During this period, increasing dollarization, devaluation and excess demand (financed by accommodating policies of the National bank) stimulated acceleration of inflation.

However, hyperinflation could not last for a long period of time. Sooner or later the monetary system breaks down (as, for example, in Germany in 1923) and a recession occurs. Accordingly, the regime of hyperinflation was soon transformed into a regime of suppressed development (or underdevelopment). One of the features of this regime is the current account deficit creating pressures towards de-

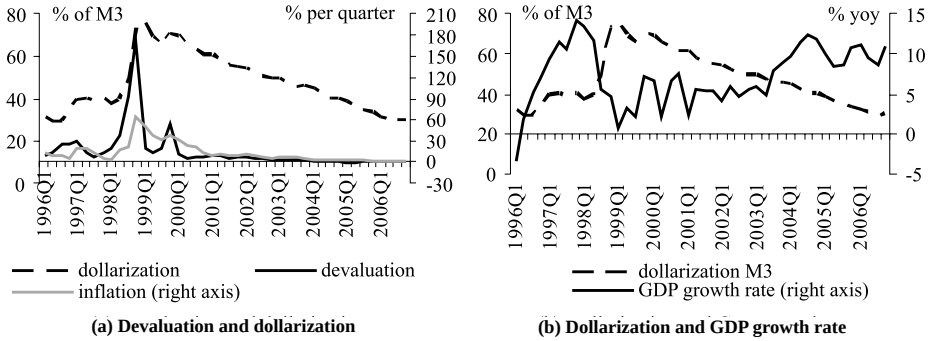
[13] Methodologically, the concept of macroeconomic regimes has been developed within the framework of the monetary-Keynesian approach. In Belarus, monetary policy has decisive consequences for distribution in contrast to other policy channels. See Chapter II of this book.

[14] The concept of macroeconomic regime has recently been applied to study the poverty dynamics in Belarus. See Chubrik, Haiduk (2007).

[15] Say, from five to ten years. This is quite close to the period analyzed in this book.

valuation under the conditions of still high dollarization. Economic growth is constrained by high real interest rates (for investors) since commercial banks have to pay additional risk premiums to convince economic agents to deposit money, instead of resorting to foreign cash. The problem is that the national currency is not fully trusted so the result is a high dollarization and a lack of savings in the domestic currency and therefore a lack of credit supply. The overall effect is low investment and low growth. A way out of such a regime of underdevelopment is to issue a domestic currency that is sufficiently accepted by economic agents inside the country. Dollarization can be reduced via a combination of low inflation and stable exchange rates that lead to positive real interest rates and generally a better quality of the domestic currency. But such a constellation is rather hard to achieve. Usually, economic actors tend to adopt a 'wait-and-see' attitude after experiencing hyperinflation and instability (Dornbusch (1990)). In Belarus, a regime of underdevelopment was observed from 1996 to 2000.

Starting from 2000, devaluation and inflation decelerated, thereby reducing the level of dollarization (see Figure 7). However, it seems to be premature to say that the regime of suppressed development is over. Since the beginning of the 2000s and until now the economy of Belarus is probably in *the stage of transformation of the regime of underdevelopment*. The outcome of this transformation is not clear yet. Despite a considerable reduction of the level of dollarization, it is still substantial (25% is considered as a high level). (see Figure 7(a)). Besides, the expectations of economic agents are not stable.



(a) Devaluation and dollarization **(b) Dollarization and GDP growth rate**

Source: Ministry of Statistics and Analysis (GDP growth rate), and the author's calculations on the basis of the data of the National Bank and the IPM Research Center (the data on devaluation and dollarization.

Figure 7: Devaluation, dollarization, and economic growth in 1996–2006

An indicator of the continuous lack of trust in the national currency is the situation at the end of 2006 – early 2007. At that time, the uncertainty about the result of negotiations with Russia on gas and oil affairs has resulted in a small bank run.[16] It led to a reduction in the volume of national currency deposits and a growth

[16] This situation is described in an article published on the Agency for Financial News web-site, available at: http://www.afn.by/news/docview.asp?id=894.

of demand for foreign cash. In order to satisfy these demands, the National Bank sold part of its reserves. Later, the volume of reserves had been restored and even increased by purchasing foreign currency at commercial banks that increased its foreign debt.[17] Nevertheless, the attractiveness of the national currency has not been fully restored. In 2007, the growth of foreign currency deposits exceeded the growth of national currency ones.

The empirical data show that starting from 2000, macroeconomic stabilization has acquired the status of chief policy priority. One of its central elements is stabilization of the exchange rate as a way out of the regime of suppressed development that constrains economic growth. Indeed, the reduction of dollarization coincides with the acceleration of GDP growth (see Figure 7 (b)). At the same time, policies aimed at preventing devaluation could be considered as a route towards poverty reduction[18], apart from being a way to maintaining a dollar-denominated target value of nominal wages (what has been a policy priority of the government).

In Belarus, prices for essential commodities that are included in the basket of the subsistence minimum, or the 'budget of the living wage' have been growing faster than prices for all other goods and services.[19] For instance, over 1996–2006 prices for the commodities included in the budget of the living wage increased 392-fold, while prices for all other goods went up just 188-fold. This was not an occasion that the government has been keen to maintain price controls. According to different estimates, price controls covered from 44 to 89% of commodities (Gotovskij et al. (2006)). However, the efficiency of these measures can be undermined by high inflation caused by dollarization.

Besides, one of the intrinsic features of the Belarusian economic model is government intervention, which involves directing investment and production. Also, the labor market continues to be regulated, including employment and wage setting. Often, intervention is motivated by the desire to win electoral support prior to important political events, such as presidential elections and constitutional referenda (Chubrik, Guicci (2006)). Consequently, economic policies in Belarus lead to a political business cycle.

4. MACROECONOMIC POLICIES AND REDISTRIBUTION IN BELARUS

4.1. The political business cycle at the labor market

In the developed countries, the opportunity for political manipulation of the economy is limited. One of the constraints is central banks' independence, restricting the possibilities for monetization of the budget deficit. Moreover, high

[17] Indeed, during 2006 – 2007, there has been an increase in the volume of foreign indebtedness of commercial banks in Belarus.

[18] Inflation and devaluation in Belarus seems to be connected (see Figure 7(a)). See also Haiduk et al. (2004).

[19] These commodities occupy a relatively greater share in the consumption baskets of low-income households.

capital mobility makes domestic economic policies sensitive to preferences of investors, who routinely monitor the dynamics of major macroeconomic indicators, including inflation, state and foreign debt (Mosley (2003)). In the developed countries, governments often refrain from hampering macroeconomic stability by discretionary policies. One of the recent papers on political business cycles in the developed democracies (Iversen, Soskice (2006)) points to the limited use of cycles since politicians prefer to maximize the welfare of voters not in the short, but in the medium and long run. The authors claim that governments manipulate their economies less than the theory of political business cycle predicts. However, more precise patterns of intervention are conditioned upon the type of electoral system (proportional versus first-past-the-post representation) and economic institutions (among which wage setting is one of the most important institutions). As for Belarus, its institutional setting give a crucial role to the labor market through which the operation of the political business cycle is captured (Haiduk et al. (2006); Haiduk (2007b); Kruk, Pelipas, Chubrik (2006)).

One of the notable features of the labor market in Belarus is the preservation of employment. Over 1996–2006, employment fell by just 0.1%. At the same time, labor market regulation has not moved towards greater flexibility. An exception is the spread of short-term fixed contracts. Accordingly, there has been 'excessive' employment. According to a rough expert estimate of the Independent Institute of Socio-economic and Political Studies (IISEPS), between 2002 and 2003, the number of 'excessive' workers was around 1 million.[20] Since state-owned enterprises have continued to finance social facilities (kindergartens, hospitals, etc.), employment has secured access to some of these social services. In the past, administrative holidays, wage delays, etc.[21] had not deprived workers of 'bread and butter' (Haiduk et al. (2006)).

Since the early 1990s, an informal economy has begun to evolve in Belarus (initially trade and services). Some workers used to be 'kept on the books' of enterprises (therefore, their work history is not broken), but apply their 'spare time' for more productive use, i.e. making some money on the side. Besides, in the 1990s, workers could still be employed full-time, but reach an informal (verbal) agreement with their employer about self-employment and/or secondary employment. The IMF estimates incomes from unregistered economic activity (including subsistence farming) at one-third of household incomes (IMF (2002)).

The absence of a border with the Russian Federation and the integration between the two countries within the framework of the Union State have broadened employment and income opportunities for Belarusian citizens. These have participated in the semi-legal market for services (primarily housing construction). Unfortunately, there are no reliable estimates available. According to the information provided by the Ministry of Labor and Social Protection, in 2004 only about 5,000

[20] 'Natsionalnaya Ekonomicheskaya Gazeta', No. 21(638), March 21, 2003.

[21] Such phenomena currently exist in the Belarusian economy. They are the products of the early transformation recession.

Belarusian citizens had been officially employed abroad (i.e. their contracts had been registered with the Ministry). At the same time, unofficial assessments of the volume of Belarusian 'guest workers' are much higher. According to the estimates provided by the IISEPS in 2003, there had been between 300,000–400,000 people working in the shadow economy, or 6.7–8.9% of the economically active population in Belarus in 2003.

The first Labor Force Survey conducted by the Ministry of Labor and Social Protection in 2006 revealed that about 117,000 people (about 2.7% of the economically active population) were working abroad, mainly in Russia (98,000).[22] The Department for Citizenship and Migration of the Ministry of Interior provides a figure of 300,000 Belarusian citizens illegally employed in Russia (about 7% of the economically active population). The total number of people employed in the informal sector of the economy may amount to 960,000 (560,000 according to the Household Budget Surveys) (Development Center (2006)).

The reliance on the 'exit' channels described above implies some reduction of demand for redistribution satisfied with formal economic policies. There are no reliable alternative data on employment and unemployment Over 1996–2006 (i.e. obtained on the basis of Labor Force Surveys). The only available data of a proper quality can be deducted from the Household Budget Surveys (Ministry of Statistics and Analysis (2006)). Employment data series have already been used in the paper by Chubrik, Kruk, Pelipas (2006) to construct a production function. In particular, the paper shows that employment is an important factor of GDP growth in the long run. Therefore, job creation can be considered as a policy measure to reduce income inequality via GDP growth.

At the same time, other labor market indicators, such as wage dynamics, can be considered as relevant for redistribution. There are several factors that matter. First, the Household Budget Surveys reveal that wages are the key source of income for the vast majority of families (59.5% of the income of an average household). The second important source of income is pensions (20.9%), but they are to some extent dependent upon wages. This source is followed by social transfers and incomes from subsistence farming (together 19.6%). Since the share of social transfers is not substantial, it can be said that labor market dynamics play a decisive role in redistribution policies in Belarus. Since wages and pensions are the major routes of changes in well being of the population, the government has incentives to target these indicators within the framework of the political business cycle.

It appears that redistribution policies can be analyzed by focusing on the operation of the political business cycle in Belarus. Important political events have put an upward pressure upon wages and incomes in general and changed the patterns of income distribution. What kinds of instruments have been employed? The answer is provided below.

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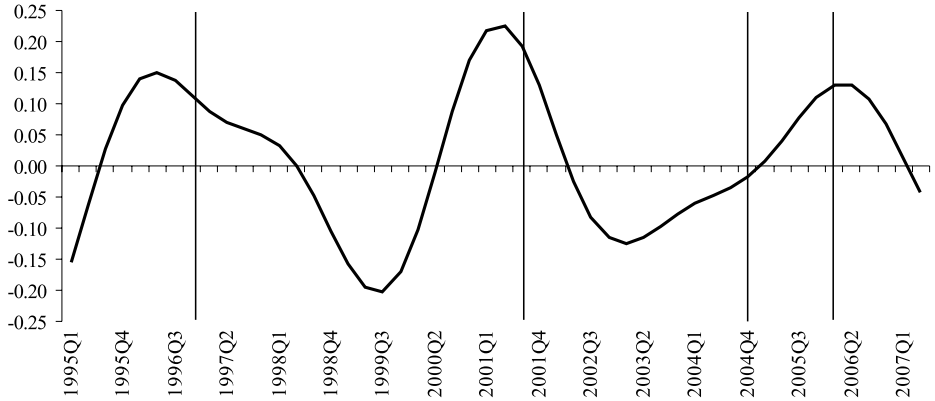
[22] According to the information provided by 'Belarusian News' web-site, available at: http://naviny.by/rubrics/economic/2006/11/17/ic_articles_113_148705/.

4.2. Major instruments of the political business cycle in Belarus

Targeting of average wage and minimum wage

Over 1995–2006, growth of real wages and incomes accelerated prior to important political campaigns (see Figure 8). Besides, wage debts had been liquidated (when necessary). For instance, in 2001 (the year of the presidential elections), USD-denominated wages increased more than twofold. A similar pattern is observed in 2004 (the year of the constitutional referendum on abolishing the number of the maximum presidential terms for one person). But this time the minimum wage was increased to the budget of the living wage.[23]



Notes. Vertical lines correspond to the following events: the 4th quarter of 1996 and the 4th quarter of 2004 denote constitutional referenda, while the 3rd quarter of 2001 and the 1st quarter of 2006 denote the presidential elections.
Source: IPM Research Center.

Figure 8: Cyclical components of wages (USD) and the political business cycle in Belarus, 1995–2006

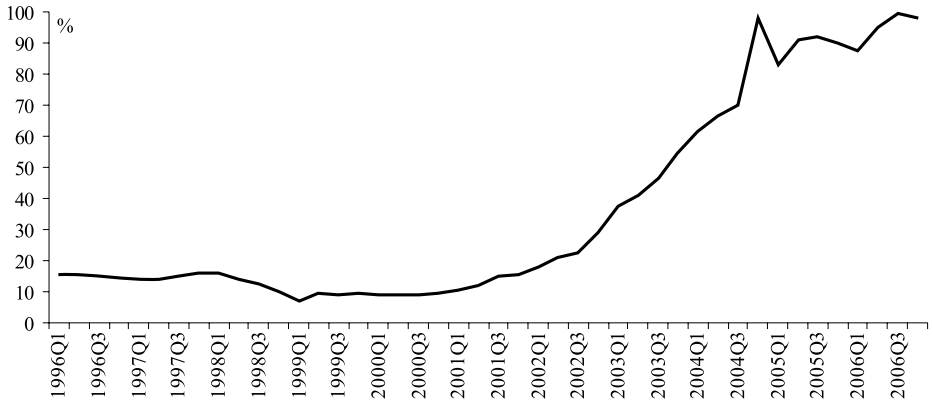
The goal of reaching a certain level of economy-wide average wage denominated in US dollars had become firmly entrenched immediately preceding the presidential elections of 2001 (when the government had assumed the obligation to increase the average monthly wage to USD 100 by the month of the presidential elections). Starting from 2004, targeted wage indicators have been established annually.[24] Besides, intermediate targets are set, like USD 250 by the end of 2005, and about USD 500–540 per month by the end of 2010 (as mentioned in the programs

[23] Minimum wage is an instrument of the political business cycle in Russia, where it was growing prior to the elections (Gimpelson, Lippoldt (2001)). In Russia, the level of minimum wage is revised and discussed publicly, while in Belarus the focus is put on the dynamics and targeted level of 'average monthly wage'. Such a difference in the public use of either indicator is contextual, but not essential.

[24] In particular, USD 200 per month by the end of 2004, and USD 300 by the end of 2006, and USD 340 by the end of 2007.

of social and economic development of the Republic of Belarus for 2001–2005 and 2006–2010, respectively). It should be noted that all wage targets have been met in time (Chubrik, Guicci (2006)).

The adoption of the President's Decree No. 3 on February 15, 2002 entitled 'On Some Issues of Regulation of Minimum Wage' assigns minimum wage as a threshold for reducing the share of working poor in Belarus (since this social group used to be the most impoverished one). In general, on January 1, 2003, minimum wage was increased 2.5 times to reach BYR 40,670 (44% of the budget of the living wage), on January 1, 2004 – by BYR 83,000 (72% of the budget of the living wage), and on January 1, 2005 – by 128,900 (95% of the budget of the living wage), and on January 1, 2006 – by 156,900 (98% of the budget of the living wage). Now minimum wage is equal to the budget of the living wage (see Figure 9).



Note. Seasonally-adjusted quarterly data.
Source: the author's calculation on the basis of the data taken from the Ministry of Statistics and Analysis.

Figure 9: The ratio of minimum wage to the budget of the living wage, 1996–2006

Limits to wage differentiation

Apart from increasing minimum (and well as general) wage, limiting of wage differentiation has played a role in reducing inequality across different categories of wage earners. This is related not only to the changes in the structure of the economy, skill profiles, or strengthening the role of trade union organizations[25], but with extending government interference into the process of wage formation. Indeed, over 1996–2006, the gap between maximum and minimum wages became narrower (see Table 2 for details).

[25] Coordination of wage bargaining under the canopy of trade union organizations usually lead to the reduction of intra-industry and – in some cases – to inter-industry wage differentiation, as the experience of West European countries suggest.

Table 2

Branch differentiation of wages in Belarus

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Ratio of maximum to minimum wage	3.8	3.3	3.3	3.8	3.0	2.9	3.1	3.3	3.0	2.6	2.6
Ratio of minimum to average wage	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ratio of maximum to average wage	1.8	1.9	2.0	2.0	1.9	1.8	1.9	1.9	1.8	1.6	1.6

Note. In this table, maximum and minimum denote the wages in the sectors with the lowest and the highest wage.
Source: the author's calculations on the basis of the data taken from the Ministry of Statistics and Analysis.

However, the reduction of this gap has not been smooth. Between 1997 and 1999, the differentiation increased, and only since 2000 reversing wage differentiation acquired the status of a tendency. Initially, wage differentiation had been induced by enterprise autonomy in wage formation despite the operating wage grid. Within this grid, enterprise-based unions were capable of demanding heightened wage rates. Besides, there was an opportunity to increase wages by paying bonuses and premiums of various kinds. However, the tariff autonomy has been undermined by the President's Decree No. 17 adopted on July 18, 2002 'On Some Issues of Regulation of Wages' and the regulation of the Ministry of Labor and Social Protection No. 123 adopted on September 20, 2002. These two documents have heavily contributed to 'leveling' wages across the economy. In particular, Decree No.17 extended the adoption of the wage grid to all enterprises, including non-state ones.[26] Currently the wage grip consists of 27 categories. Differentiation of wages across occupations and skills are obtained by multiplying the basic wage rate by a tariff coefficient ranging from 1 to 7.84.[27] So wage differentiation is determined by the boundaries set by the wage grip system.

In 2004, a new step has been made to limit wage growth in some high-paid sectors and to raise wages in some low-paid sectors. In particular, the regulation of the Council of Ministers No. 1651 adopted on December 27, 2004 'On Some Issues of Regulation of Wages of Workers of Commercial Enterprises and Organizations' set the wage ceiling. Specifically, the upper level of the first-rate wage of the wage grid has been set at the level of the budget of the living wage. This regulation was applied to commercial enterprises either fully or partially owned by the state. Also, this regulation has limited the share of profits that can be spent for wage payments to 30% of an enterprise's wage fund (this norm is set for enterprises that exceeded the upper limit of the first-rate wage).

Employment and the political business cycle

In Belarus, an inverse relationship between employment and the political business cycle is observed (see Figure 10). The upheaval phase of the political business cy-

[26] More on the legal aspects of labor market regulation can be found in Parchevskaya (2007).

[27] The wage grip existing in Belarus contains the following increase in tariff coefficients: from the 1st to the 4th category – by 16%, from the 4th to the 6th one – by 10%, and from the 6th to the 27th – by 7%.

cle is characterized by greater government intervention into the economy in order to gain electoral support. But in Belarus the phase of upheaval essentially means wage increases so enterprises seem to be reluctant to increase employment. Instead, they prefer not to expand their wage fund too substantially, caring about cost competitiveness. But in the downturn phase of the cycle wages go down. Also, unemployed are becoming more active in searching jobs, while employed search for better income opportunities. In their turn, enterprises are inclined to employ additional workers. At the same time, the informal sector is more dynamic in terms of employment than the official one.[28] This is reflected by the difference in the employment data provided by the Ministry of Statistics and Analysis on the one hand, and the Household Budget Surveys (conducted by the Ministry as well) on the other (see Figure 10).

Note. Political business cycle: logarithmic scale; HBS: the data are taken from the Household Budget Survey; Minstat: the data are taken from the Ministry of Statistics and Analysis.
Source: IPM Research Center and the author's calculations on the basis of the data taken from the Ministry of Statistics and Analysis and the Household Budget Surveys.

Figure 10: Employment and the political business cycle in Belarus, 1996–2006

Price controls

Different Belarusian households face different inflation rates because of differing consumption baskets. In other words, there is variability of inflation[29] in Belarus like in many other economies. Such variability is determined, among other factors, by price controls exercised by the government. Formally, price liberalization took place in 1992–1994 and also in 2002–2003, but price regulation is still practiced in

[28] Most likely, it can be explained by relatively 'fair' hire and fire' procedures in contrast to other conditions of doing business in Belarus. For instance, the World Bank places Belarus at the 31st place with respect to the ease of hiring, while in terms of the ease of 'doing business' Belarus is given a place close to the bottom (129) (see World Bank (2007)).

[29] The concept of 'variability of inflation' is explained in the papers by Deaton (1998) and Crawford, Smith (2002).

Belarus (Chubrik, Pelipas, Rakova (2007)). The European Bank for Reconstruction and Development estimates the progress in price liberalization in Belarus at '3–' (while '4+' is an indicator of a developed market economy). In fact, the estimate for Belarus is one of the lowest among transition economies (EBRD (2006)).

In particular, the government sets ceilings on price increase (no more than 0.5% per month during 2007), while any increase exceeding this threshold has to be 'justified and registered' with government agencies. The survey of private enterprises conducted by the IPM Research Center reveals that the state regulation of price formation is one of the most serious problems for the vast majority of private sector companies. Also, apart from price ceilings, profitability rates and mark-ups are controlled (IFC (2005)). According to the estimates of the IPM Research Center, the costs of price regulation vary from USD 1 to 3bn annually, or about 0.5% of Belarus' GDP (Chubrik, Pelipas, Rakova (2007)). Enterprises also have to bear high transaction costs, leading to higher overall costs translated into higher prices. Enterprises often try to escape price controls by resorting to broadening their product mix. As a result, consumers still have to carry the burden of higher prices. Interestingly enough, prices for 'socially-important' commodities (included in the budget of the living wage) have been growing faster than prices for other goods regardless of price controls.[30]

A more detailed analysis of regulations concerning price setting in Belarus suggests different estimates. In the study made by Gotovsky et al. (2006) three approaches are used. The first one accounts only for goods and services not produced by enterprises treated as being dominant at respective markets. In this case, the share of goods and services whose prices are controlled by the state is about 44% (of the total number of goods and services). The inclusion of dominating enterprises and organizations increases this figure up to 55.7%. The third approach takes into account the application of upper limits of price indexes to goods and services. As a result, the share of controlled prices jumps to 89%.

Therefore, within the framework of the political business cycle the government does not only intervene into the functioning of the labor market, but also establishes controls over price formation. After a phase of 'populism' requiring controls over prices and labor markets, a wave of liberalization is allowed, providing an opportunity to cure the macroeconomic imbalance of the upheaval phase of the cycle.

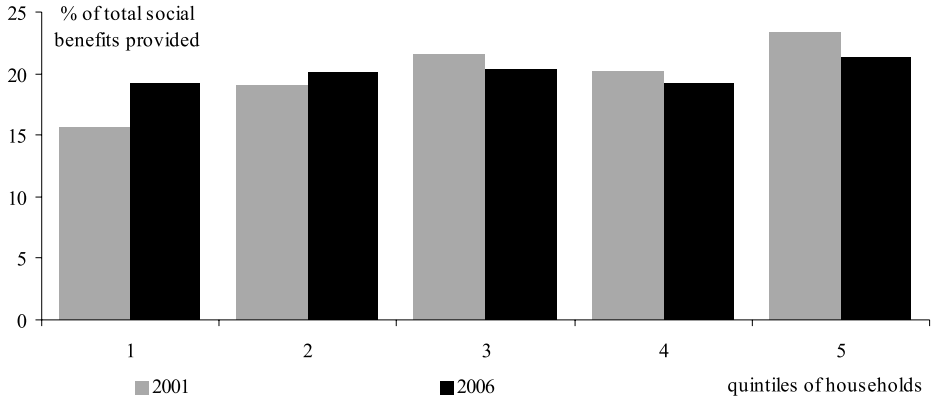
Social benefits

An important element of redistribution policies is the provision of social benefits. In the majority of CIS countries, little changes have been made to the old Soviet-type system. In particular, up to 80% of the population are provided with social benefits of various kinds (Sinitsyna (2006)).

Belarus is not very different from the other CIS countries. In particular, the Household Budget Surveys reveal that in 2001 as many as 61.4% of households were provided with social benefits, and in 2006 – 64.2%. At the same time, the sys-

[30] Over 1996–2006, consumer prices increased 188-fold, while prices for goods included into the budget of living wage increased 392-fold.

tem of benefits provision is not differentiated or targeted. In both 2001 and 2006, 20% of the most prosperous households have been provided with more benefits than 20% of the least wealthy ones (although the gap between these two groups of households narrowed down over the five years, from 7.7 to 2.2 percentage points, see Figure 11).



Source: Household Budget Survey.

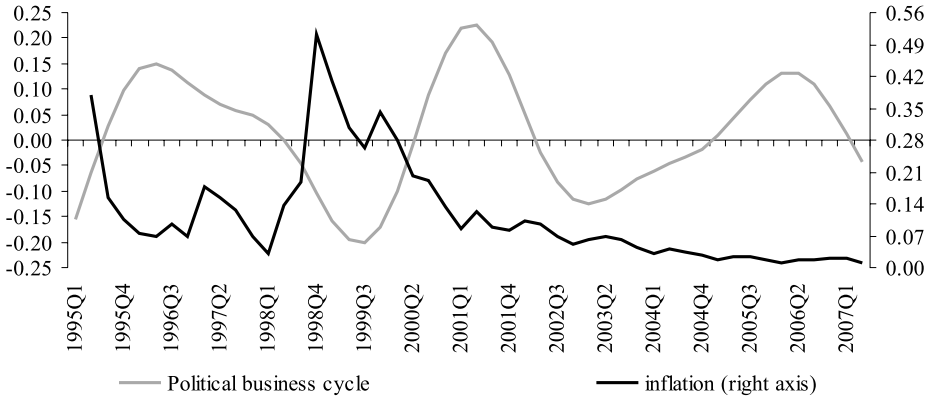
Figure 11: Distribution of social benefits across households in 2001 and 2006

In 2006, the volume of social benefits was trimmed by approximately one-third, from BYR 480 to 312 million.[31] But this policy step can be characterized as symbolic rather than purely economic. The scope of benefits reduced is rather small, but the decision itself draws a broad public response. Perhaps in the future (the year of the parliamentary elections), the authorities will resort to partial returning of the social benefits as a relatively inexpensive way of gaining electoral support in contrast to a real wage increase.

Macroeconomic consequences of the political business cycle

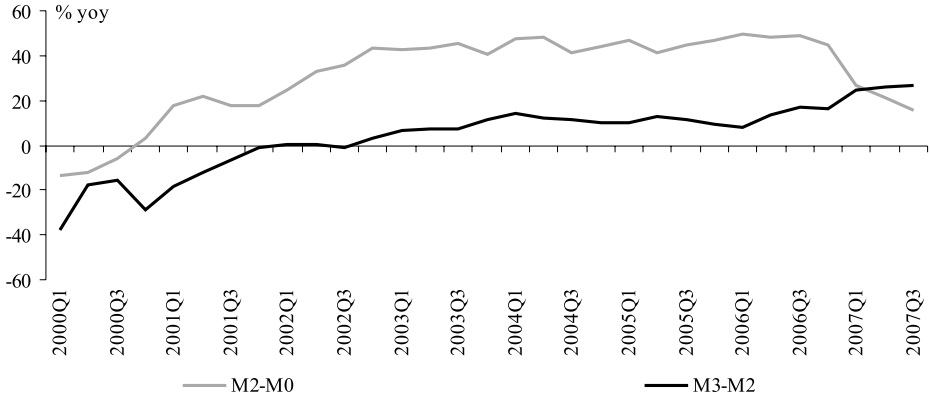
The concept of the political business cycle points to its costs in the phase of downturn, namely inflation. However, in Belarus the repercussions are not so straightforward (see Figure 12). As it can be seen, from 1995 to 1999, inflation had indeed accelerated in the course of the cycle's downturn. But since 2000 onwards the dynamics have been different. Most likely, the authorities, being aware of the inflationary consequences of its policies, have shifted to macroeconomic stabilization (and reduction of inflation in particular) as a chief policy priority. Stabilization of the exchange rate and establishment of positive interest rates on national currency deposits resulting in greater trust in the Belarusian ruble by the population are the major outcomes of stabilization policies (see Figure 13).

[31] The data are taken from the newspaper 'Sovetskaya Belorussiya', No. 242 (22897), December 22, 2007, available at: http://www.sb.by/article.php?articleID=62965.



Note. Logarithmic scales.
Source: IPM Research Center and the author's calculations on the basis of the data taken from the Ministry of Statistics and Analysis.

Figure 12: Inflation and the political business cycle in Belarus, 1995–2007

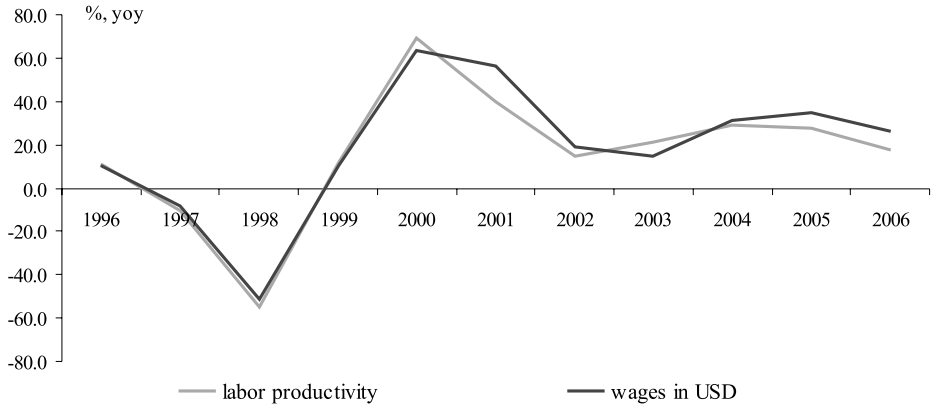


Note. Rates of growth of national currency (M2-M0) and foreign currency (M3-M2) deposits in the real terms, %, yoy.
Source: the author's calculations on the basis of the data of the National Bank and the Ministry of Statistics and Analysis.

Figure 13: The dynamics of the national currency and foreign currency deposits, 2000–2007

The priority of macroeconomic stabilization has been determined, most likely, by the consideration that the costs of inflation are too high. Moreover, every new upswing of the cycle would have required an increase of nominal wages that is stronger than before. Therefore, it would be harder and harder to maintain their real value. For instance, the National Bank would be forced to increase interest rates thereby making loans more expensive and dampening investment and thus the rate of growth.

The political business cycle in Belarus occurs in a particular context. This context is largely defined by the continuous need to deal with the problem of macroeconomic stabilization (threatened by a combination of high dollarization and current account deficit that contains a risk of devaluation). Until 2000, devaluation had not been tackled. But after the crisis in Russia, the authorities turned to more tight monetary policies in order to prevent a 'devaluation–inflation' spiral. Starting from 2001, the policy priority has been to lower inflation by means of exchange rate stabilization.



Source: the author's calculations on the basis of the data taken from the Ministry of Statistics and Analysis.

Figure 14: The gap between wages and productivity in USD, 1996–2006

Fundamentally, redistribution policies entail a choice between wage increases and investment. Belarus is not an exception here. The situation of 2001 can be illustrative of the 'wages/incomes–investment' dilemma. Prior to the presidential elections of 2001, real wages had been growing faster than productivity (see Figure 14). As a result, profitability and the volume of investment decreased. Consequently, the GDP growth rate decelerated, thereby dampening wage growth. In order to restore the growth trajectory, the government induced investment activity, including the means of providing preferential loans (via the banking system) for investment, and not wage purposes. In contrast to the upheaval phase of the cycle, where wage loans are more widespread, the downturn is characterized by the expansion of investment loans that prevent the deceleration of GDP growth and also employment (see Figure 10).

5. CONCLUSION

Many governments in the world use redistribution policies in order to secure popular support. But such policies have tangible effects on the economy. It should be stressed that it is not only developing, but also the developed countries where these

policies are observed. The difference lies not only in the discretion and the use of particular policy instruments, but also in macroeconomic contexts that allow a wider range of policy tools. Nevertheless, developing countries are characterized by a greater degree of political control over their economies than developed countries.

Moreover, in contrast to the developed countries, there is more opportunity for discretion in the developing and, possibly, transition ones. However, the space is somewhat limited by the need to maintain macroeconomic stability: otherwise the costs of intervention become too expensive. One of the adverse repercussions is accelerating inflation at the expense of suffocating GDP growth.

In Belarus, the weakness of the national currency (manifested in a high degree of dollarization of the national economy) has made exchange rate stabilization a policy priority. Moreover, devaluation has adverse redistributive consequences, so its prevention is a precondition to reducing income inequality. In addition, exchange rate stabilization has made it possible to set wage targets as one of the popular indicators of success of economic policies. Still, average economy-wide USD-denominated wage is embedded into the plans for socio-economic development of the country adopted by the government.

The labor market (and the way it is regulated) plays an important role in the redistribution policies in Belarus. Since wages are the major source of income for the majority of households, real wage growth is politically important. Indeed, over 1996–2006 there have been attempts to 'average out' wages in Belarus by reducing the scope for enterprise tariff autonomy and employing some other wage-leveling measures (of a legal nature). As a result, wage differentiation has been reduced.

An important question to address is the sustainability of the political business cycle in Belarus. Why do rational individuals follow such logic? The answer probably lies in the specific mindset of the population, which is shaped by the institutional frameworks present. On the one hand, the political business cycle is run for various political events. On the other hand, there are certain mechanisms of political control at the working place. In the early 1990s, there was a fear of job loss due to the instability of the starting transition. Recently, a new 'fear factor' materialized, namely the introduction of short-run, fixed-term contracts instead of indefinite ones. In this situation, even the slightest increase of incomes is perceived as an improvement of the material condition. For those who seek to escape these institutional boundaries, there is an opportunity to adopt an 'exit' strategy by taking part, for instance, in the expanding informal labor market. Last but not least, a continuous growth of real incomes, although it is subject to cyclical fluctuations, outweighs possible future losses and insecurity. Moreover, wages are sometimes lagging behind productivity. As a result, there is a certain institutional *status quo* defining the context of redistribution policies in Belarus.

Overall, redistribution policies in Belarus should be considered within the framework of the macroeconomic relationships among monetary, fiscal and labor market policies. Such interaction can be understood via the prism of the notion of macroeconomic regime. Ideally, a suitable regime for Belarus is one of sustainable economic growth (i.e. a regime of development) on the medium to the long term. Currently the Belarusian economy is still struggling with moving away from the

regime of suppressed development originating from 1996–2000. A possible shift to a regime of development is largely determined by the ability of the authorities to maintain macroeconomic stability. When the government succeeds in doing that, there would be a more favorable environment for successful fiscal policies addressing important social tasks.

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Chapter IV

The Belarusian Economy after the Energy Shock: Scenarios of Development

Alexander Chubrik, Dzmitry Kruk

1. INTRODUCTION

In 2007, social policies implemented within the Belarusian economic model have been revised. In particular, the economy has been confronted with a gas price hike and new terms of crude oil supply. One of the distinct features of new agreements between the governments of Belarus and Russia has been a gradual increase of the price for imported gas to 100% of the average European price by 2011. These changes could be considered as an external price shock. In order to investigate the impact of this shock (including the consequences for the standard of living), it is necessary to decompose the price shock in its constituent parts and then assess their influence upon the economy and economic agents. Among the tools available, structural macroeconomic models are appropriate tools for conducting a complex analysis of the impact of economic shocks on the economy. These models, based on theoretical assumptions about the functioning of the economy, describe (in an aggregated way) the behavioral motives of economic agents located in various sectors of the national economy. One of the major advantages of macroeconomic models is their comprehensiveness in terms of coverage of segments of an economy and the ability to depict interrelated processes taking place within an economic system. At the same time, there are some shortcomings. First, the theoretical assumptions the model is based on as well as its scale could affect both the overall quality and the forecasting capacities of that model. Second, changes in the behavior of economic agents and in economic policies pursued by the government cannot be described quantitatively and included into the model, thereby decreasing the precision of forecasts this model can deliver (especially against the quality of narrower sectoral models). However, despite the existing shortcomings, macroeconomic models are theoretically consistent when applied to predict the reaction of economic agents and the economy as a whole to various shocks.

In Belarus, a pioneering attempt to build a macroeconometric model has been made in a paper by Chubrik, Kruk, and Pelipas (2006). Conceptually, the model is based on the Keynesian theory and Neoclassical Synthesis, while empirically it feeds on quarterly data over 1995–2006. A major difference between the constructed and the benchmark model is that the former determines the GDP on the supply side, while imports and inventories are the balance factors. The key value of the first model is an econometric description of the functioning of the Belarusian economy over the period of concern and reflection of interrelationships among ma-

jor macroeconomic indicators. In addition, the model accounts for the specific features of the national economy, including the dominant role of large enterprises, a high degree of government intervention, the need to foster exports in order to secure an external balance, and so on. The model is a proper tool to understand the ways and mechanisms of adjustment of the Belarusian economy to various external, fiscal, and monetary shocks. At the same time, some forecasting-related shortcomings of the model have been discovered.

A new version of the model is presented in this chapter. This time the model is employed to forecast the impact of external shocks and the energy shock in particular to which the Belarusian economy is exposed from 2007 onwards. To that purpose, the general theoretical concept has not been considerably revised. First, the model explicitly indicates the dependence of the Belarusian economy on the external environment. This dependency is shown by distilling and analyzing total factor productivity as an endogenous variable. As a result, a mechanism for determining the equilibrium income level is modified. Second, some blocks and individual equations of the models have been specified in new way, i.e. a separate behavioral equation for imports has been constructed (while in the early version of the model it has been a balancing variable calculated on the basis of identity) so the external interactions are described in a more realistic way. Third, components of domestic demand and exports (stationary variables) are determined by using a methodology modified in comparison with the early model. Fourth, the scope of the model has been expanded by including several new variables. Fifth, the sample is extended to the 2nd quarter of 2007 (i.e. up to 50 observations in total). This extension changed coefficients of behavioral equations.

The chapter is organized as follows. The second section analyzes the dynamic characteristics of the data used. The third section describes methodology, structure, and equations of the new version of the small macroeconometric model. The fourth section provides methodological foundations of the analysis of consequences of shocks by utilizing the macroeconometric model. Also, after-shock developmental scenarios for the Belarusian economy are constructed in this section. The final section concludes.

2. THE DATA

2.1. General remarks and the data used

The model uses quarterly data from 1995 up to the 1st–3rd quarter of 2007 (49–51 observations). In contrast to the previous model (Kruk, Chubrik, Pelipas (2006)), real indicators/indexes are recalculated in the prices of 2005 against the annual average of 2005. The indicators and sources of the data are provided in Table 1.

In this section, the following rules and symbols are used: (1) Lowercase characters denote natural logs of variables; (2) the operator Δ denotes first logarithmic differences; (3) C is a constant, T is a trend (0, 1, …, n, where n is a number of observations); (4) index *_sa* shows that a variable is seasonally adjusted; (5) * means a 5%-significance of a coefficient or a test, while ** denotes a 1%-significance.

Table 1

The data

No	Symbol	Indicator (in real terms, billions of BYR in the prices of 2005 otherwise indicated)	Sources of the data
1.	*RGDP*	GDP	Ministry of Statistics and Analysis
2.	*RHC*	Household consumption	Ministry of Statistics and Analysis
3.	*RGC*	Government consumption	Ministry of Statistics and Analysis
4.	*RNGC*	NPISHs consumption	Ministry of Statistics and Analysis
5.	*RI*	Gross fixed investment	Ministry of Statistics and Analysis
6.	*RCI*	Change in inventories (of material circulating assets)	Ministry of Statistics and Analysis
7.	*RX*	Exports of goods and services	Ministry of Statistics and Analysis[1]
8.	*RM*	Imports of goods and services	Ministry of Statistics and Analysis[1]
9.	*RW*	Average monthly wage, in the prices of 2005	Ministry of Statistics and Analysis
10.	*CPI*	Consumer price index, 2005 = 1	Ministry of Statistics and Analysis
11.	*NER*	USD nominal exchange rate, index, 2005 = 1	Authors' calculations[2]
12.	*NERRUB*	RUB to USD nominal exchange rate, index, 2005 = 1	Authors' calculations on the basis of the Bank of Russia data
13.	*RERUSD*	Real USD exchange rate, index, 2005 = 1	Authors' calculations
14.	*RERRUB*	Real RUB exchange rate, index, 2005 = 1	Authors' calculations
15.	*CPIUS*	US Consumer Price Index, 2005 = 1	International Financial Statistics (IFS)
16.	*CPIRU*	Consumer Price Index in Russia, 2005 = 1	IFS
17.	*RGDPRU*	Russian GDP	IFS
18.	*LRU*	Employment, million people, period average	Statistical Office of Russia (Rosstat) and GU VSE[3]
19.	*RLP*	Labor productivity in Belarus, BYR thousand, in the prices of 2005	Authors' calculations
20.	*RLPRU*	Labor productivity in Russia, RUB thousand, in the prices of 2005	Authors' calculations
21.	*RDR*	Fixed capital depreciation	Authors' calculations
22.	*M*1	Monetary aggregated *M*1, BYR billion (given the denomination of 2000)	National Bank
23.	*L*	Labor employment, thousand people, beginning of period	Ministry of Statistics and Analysis[4]
24.	*K*	Capital (fixed assets), beginning of period	Ministry of Statistics and Analysis[5]
25.	*rwpbc*	Political business cycle	Authors' calculations[6]
26.	*RIRRQ*	Real refinancing interest rate, percent per annum	Authors' calculations
27.	*NIRTD*	Fixed-term deposits nominal interest rate, percent per annum	National Bank
28.	*RIRTD*	Fixed-term deposits real interest rate, percent per annum	Authors' calculations
29.	*OPI*	World oil prices index	IFS
30.	*GAP_GAS*	Ratio of Belarusian gas prices to the world gas price	Authors' calculations[7]

Notes:
[1] Sum of exports/difference between imports of goods and services and S of statistical discrepancy.
[2] 1996–2000 – market exchange rate (data of the IPM Research Center), 2001–2006 – average weighted exchange rate (National Bank Data).
[3] State University Higher School of Economics (Moscow, Russia).
[4] Estimates made on the basis of the annual Household Income Survey data.
[5] Estimates made on the basis of annual fixed capital growth rates (in comparable prices).
[6] Political business cycle series are a cyclical component of *rw_sa* series. It is obtained by using a methodology developed in Kruk, Chubrik, and Pelipas (2006).
[7] Ministry of Statistics and Analysis – gas price data over 1995–2000, IMF (2007) – gas price data since 2001 until recently, and IFS – world gas price data (Germany's imports price of Russia's gas).

2.2. The Dynamic Characteristics of the Data

In the analysis conducted below, seasonality and stationarity of the data have been taken into consideration. In case a combined seasonality test (QMS (2005)) reveals the presence of seasonality, the latter was removed by using a seasonal filter X12 ARIMA.[1] As for stationarity (order of integration), it has been analyzed by employing a modified Dickey-Fuller test (Dickey, Fuller (1979)). If the results of this test cast any doubt, additional tests have been run, such as the *KPSS* test (Kwiatkowski et al. (1992)). In addition, a graphical shape of the time series has been considered. The results of the tests are shown in the Table 2.

The results of the Dickey-Fuller test show that the following variables are stationary in their levels: household consumption, real wages, indexes of nominal and real exchange rates, and interest rates. The results of the *KPSS*-test confirm the stationarity of these variables, except the nominal exchange rate index. This finding along with a graphical representation of the time series allowed us to consider it non-stationary in their levels.

There were some doubts about the non-stationarity of *gap_gas* series (ratio of gas price for Belarus to that for Germany) since its graphical representation reminds stationary time series, while the results of the *ADF*-test suggest not to reject the stationarity hypothesis. Accordingly, these time series have been treated as stationary in their levels.

All other variables appear to be stationary in their first differences. There were some doubts about stationarity of employment, since the *KPSS*-test showed that the first differences of these time series are stationary. A similar conclusion could be obtained when a graphical representation of the time series is considered. Accordingly, the model treats employment as a variable with order of integration (1).

[1] The seasonal filter is developed by the Census Bureau of the US Ministry of Trade.

Table 2

Stationarity tests

	Levels		First differences		Order of integration
	***ADF*-statistics**	**specification**	***ADF*-statistics**	**specification**	
rgdp_sa	–2.038	*C, T*	–6.926**	*C*	*I*(1)
rhc_sa[1]	–3.841*	*C, T*	–	–	*I*(0)
rgc_sa	–2.956	*C*	–2.466*	–	*I*(1)
ri_sa	–1.944	*C, T*	–6.657**	*C, T*	*I*(1)
*rx*0_*sa*	–2.902	*C, T*	–8.383**	*C*	*I*(1)
*rm*0_*sa*	–3.486	*C, T*	–7.679**	*C*	*I*(1)
rw_sa[2]	–4.063*	*C, T*	–	–	*I*(0)
cpi_sa	–1.666	–	–2.505*	–	*I*(1)
ner[3]	–2.756**	–	–2.744**	–	*I*(1)
rerrub[4]	–3.396**	–	–	–	*I*(0)
rerUSD[5]	–2.149**	–	–	–	*I*(0)
rgdpru_sa	–2.154	*C, T*	–6.203**	*C, T*	*I*(1)
rlp_sa	–2.796	*C, T*	–7.130**	*C*	*I*(1)
rlpru_sa	–2.229	*C, T*	–6.076**	*C*	*I*(1)
*m*1_*sa*	–1.587	*C*	–4.316**	*C*	*I*(1)
l[6]	–2.090	*C, T*	–1.836	–	*I*(1)
rirrq_sa[7]	–7.114**	–	–	–	*I*(0)
nirtd[8]	–3.266**	–	–	–	*I*(0)
opi	–2.382	*C, T*	–5.099**	–	*I*(1)
gap_gas[9]	–3.269	*C, T*	–	–	*I*(0)

Notes:

[1] *KPSS*-test: 0.139 (*C, T*) –stationarity of levels hypothesis could not be rejected at 1 and 5%-significance levels.
[2] *KPSS*-тест: 0.059 (*C, T*) – stationarity of levels hypothesis could not be rejected.
[3] *KPSS*-тест: 0.317 (*C, T*) – stationarity of levels hypothesis could be rejected at 1%-significance level.
[4] *KPSS*-тест: 0.117 (*C, T*) – stationarity of levels hypothesis could not be rejected.
[5] *KPSS*-тест: 0.173 (*C*) – stationarity of levels hypothesis could not be rejected.
[6] *KPSS*-тест: 0.080 (*C, T*) – first difference stationarity hypothesis could not be rejected.
[7] *KPSS*-тест: 0.140 (*C*) – stationarity of levels hypothesis could not be rejected.
[8] *KPSS*-тест: 0.240 (*C*) – stationarity of levels hypothesis could not be rejected.
[9] *KPSS*-тест: 0.075 (*C, T*) – stationarity of levels hypothesis could not be rejected.

3. THE MODEL

3.1. Real sector: production function and GDP

As a rule, structural macroeconomic models determine short-run output as a sum of aggregate demand components. In their turn, these components are defined via separate behavioral equations. Models of this kind are essentially based on the assumption of the dependence of output on the supply side factor over the long run, or factors of production selected in accordance with a certain specification of production function. Deviation of short-run output from a long-term trend suggests an output gap[2] in the model. This gap determines short-run fluctuations. However, the application of this concept in the context of the Belarusian economy is rather problematic because of government intervention. The latter implies a significant role for the so-called 'output forecasts' in determining of level of output. That is why in Belarus, aggregated output is determined by supply-side factors both

[2] Some models estimate an output gap on the basis of capacity utilization.

in the long and in the short run (Chubrik, Kruk, and Pelipas (2006)). Accordingly, in the model, the output is not determined as a sum of aggregate demand components, but via the production function. Consequently, over the long run, output dynamics are explained by the dynamics of factors of production (i.e. labor and capital) and total factor productivity (*TFP*). In this paper, a production function of the Cobb-Douglas type has been utilized, while the assumption of constant returns to scale is lifted. Early, this approach (see Chubrik (2002); Chubrik, Kruk, Pelipas (2006)) allowed deducing a well-specified production function equation on the basis of the error correction mechanism model.

In this chapter the following equation is estimated:

$$rgdp_sa_t = b_1^{rgdp} \cdot k_sa_t + b_2^{rgdp} \cdot l_t + b_3^{rgdp} \cdot T + b_4^{rgdp} + \varepsilon_t^{rgdp}, \quad (1)$$

Long-term relationships test: *ADF* = –3.157 (–4.376), 5% critical McKinnon value is provided in parentheses. Despite that the value of *ADF*-test statistics run to check for long-term relationships does not allow the rejection of the hypothesis about their existence, it has been shown earlier (in the paper by Chubrik, Kruk, Pelipas (2006)) that there is a long-term relationship between output, labor, and capital within the framework of the production function.[3] In fact, the coefficients obtained are very close to the results obtained in the previous study. Specifically, the production function displays diminishing returns on labor, increasing returns on capital, and increasing returns to scale (the sum of coefficients at *L* and *K* is equal to 2).

On the basis of GDP equation (1) parameters, total factor productivity (*TFP*) could be presented in the following way:

$$tfp_t = rgdp_sa_t - (b_1^{rgdp} \cdot k_sa_t + b_2^{rgdp} \cdot l_t + b_4^{rgdp}). \quad (2)$$

Trend is included in total factor productivity. Apparently, separate *TFP* modeling is required in order to increase the precision of forecasts. This is because a GDP growth rate of 5.4% per annum[4] requires a separate explanation and should not be mechanically extrapolated any further after the energy shock.

Modeling of total factor productivity is an applied problem since conceptual explanations (related to technical progress, institutional changes, etc.) are hard to translate into a quantitative format. In the case of Belarus, GDP growth unrelated to the dynamics of factors of production usually implies success on external markets since the domestic one is relatively small (see Kruk (2006a)). The importance of external competitiveness is confirmed by a simple analysis of demand side factors of GDP growth. According to our estimates, over 1996–2006, exports of goods and services secured 5 percentage points out of 7.2% annual average GDP growth rate. This is above the contribution of household consumption (4.9 percentage points) and fixed capital investment (2.7 percentage points). Therefore, a positive effect of exports on total factor productivity can be expected since exports dynamics partially mirror the dynamics of external competitiveness.

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[3] This test rejects the hypothesis of the existence of long-term relationships at 1%-significance level in case two dummy variables are inserted into the equation that characterize adaptation to recession (1995) and growth of exports to Russia driven by a real depreciation of the Belarusian ruble against the Russian ruble (1997).

[4] It is exactly this value of the coefficient (in annual terms) that is obtained for the trend of the production function. Accordingly, the trend explains about 4/5 of GDP growth over the period of 1996–2006.

Another aspect of competitiveness of Belarusian goods is preferential gas prices set specifically for Belarus (IMF (2005)). This aspect can be quantified as a ratio of gas prices for Belarus and other European countries (for instance, Germany). However, this variable is a stationary one and therefore can not be included into a long-term *TFP* equation. This variable has been substituted by the gas price index for Germany. Since gas prices for Belarus had not been growing for a relatively long period of time, a higher average European price implied an advantage for Belarus.

Last but not least, devaluation against the Russian ruble was an important factor of economic growth of Belarus over 1996–1997. Specifically, devaluation enhanced the price competitiveness of Belarusian goods at the Russian market (Chubrik (2005)). Later, after the Russian crisis of 1998 and the sharp appreciation of the Belarusian ruble, this factor lost its influence. It follows that the effects of devaluation could only be accounted for a limited period of time. Accordingly, the equation looks as follows:

$$tfp_t = b_1^{tfp} \cdot rx_sa_t + b_2^{tfp} \cdot gpi_t + b_3^{tfp} \cdot rerrub_t \cdot d_{[95Q3,98Q2]} + b_4^{tfp} \cdot T + b_5^{tfp} + b_6^{tfp} \cdot d_{98Q3} + \varepsilon_t^{tfp}, \quad (3)$$

where $d_{[95Q3,98Q2]}$ is a dummy variable, which is equal to 1 between the 3rd quarter of 1995 and the 2nd quarter of 1998[5] (otherwise its value is equal to zero); d_{98Q3} is a dummy variable, which is equal to 1 in the 3rd quarter of 1998 (Russian financial crisis). The results of the test for the absence of long-run relationships are that a respective hypothesis is rejected at 5%-signigicance level: $ADF = -5.087$ (-4.74) (5%-criticial McKinnon value is provided in parentheses).

All of the coefficients are statistically significant at 1%-level and have expected signs. In particular, exports growth leads to an increase of total factor productivity (1% of exports growth leads to 0.1% of *TFP* growth), while a 1%-increase in gas prices for Europe leads to 0.02% of TFP growth. Finally, real depreciation by 1% is translated into TFP growth by 0.1% over 1996–1997.

The use of the residuals of the equation (3) as an error correction mechanism ($ECM_t^{tfp} = \varepsilon_t^{tfp}$), an equation describing short-run dynamics of total factor productivity could be constructed. After truncation (a general to specific method was used for that purpose), only two variables are left that determine macroeconomic stability, namely the exchange rate and the real interest rate:

$$\begin{aligned} \Delta tfp_t = {} & b_1^{\Delta tfp} \cdot \Delta tfp_{t-3} + b_2^{\Delta tfp} \cdot rirrq_sa_{t-2} + b_3^{\Delta tfp} \cdot \Delta ner_{t-1} + b_4^{\Delta tfp} \cdot \Delta ner_{t-3} + \\ & + b_5^{\Delta tfp} \cdot ECM_{t-1}^{tfp} + b_6^{\Delta tfp} \cdot T + b_7^{\Delta tfp} + \varepsilon_t^{\Delta tfp}. \end{aligned} \quad (4)$$

This equation does not have an anomaly of the residuals[6], while all of its coefficients are statistically significant at a 1%-level and have expected signs: minus for real

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[5] Herein the choice of the period over which the value of a dummy variable is equal to one is done by maximizing the absolute value of *t*-statistics of respective coefficient.

[6] Autocorrelation of orders 1 to 3 (*LM*-test): $F = 0.482$ (0.696), autoregressive conditional heteroskedasticity (*LM*-test): $F = 0.216$ (0.884), normality of residuals distribution (*JB*): $\chi^2 = 0.782$ (0.676). Herein the null hypothesis is as follows: the residuals have respective anomalies; *p*-values are provided in parentheses.

interest rate and nominal exchange rate index. Therefore, high real interest rates dampening business activity negatively affect total factor productivity also in the short run. In its turn, a negative sign for the nominal exchange rate index means that devaluation adversely affects the activity of economic agents. It was rather visible at the end of 1998 – early 1999, when Belarusian companies being aware of exchange rate-related losses were reluctant to export to Russia.

It follows that by using the equations (2) and (4) GDP can be estimated as a sum of factor contributions and total factor productivity:

$$rgdp_sa_t = tfp_t + (b_1^{rgdp} \cdot k_sa_t + b_2^{rgdp} \cdot l_t + b_4^{rgdp}) , \quad (5)$$

tfp is obtained from the equation (4). In fact, GDP dynamics are determined by the factors shown at Figure 1.

As in the previous model, factors of production (labor and capita) are not modeled.[7] In Belarus, employment is primarily determined by the policy of prevention of mass dismissals in the public sector[8] that employs more than 80% of the workforce (see Halduk et al. (2005); Chubrik, Haiduk (2007)). Accordingly, employment can be considered as an exogenous variable. Capital stock is determined by investment and appreciation (also exogenous).

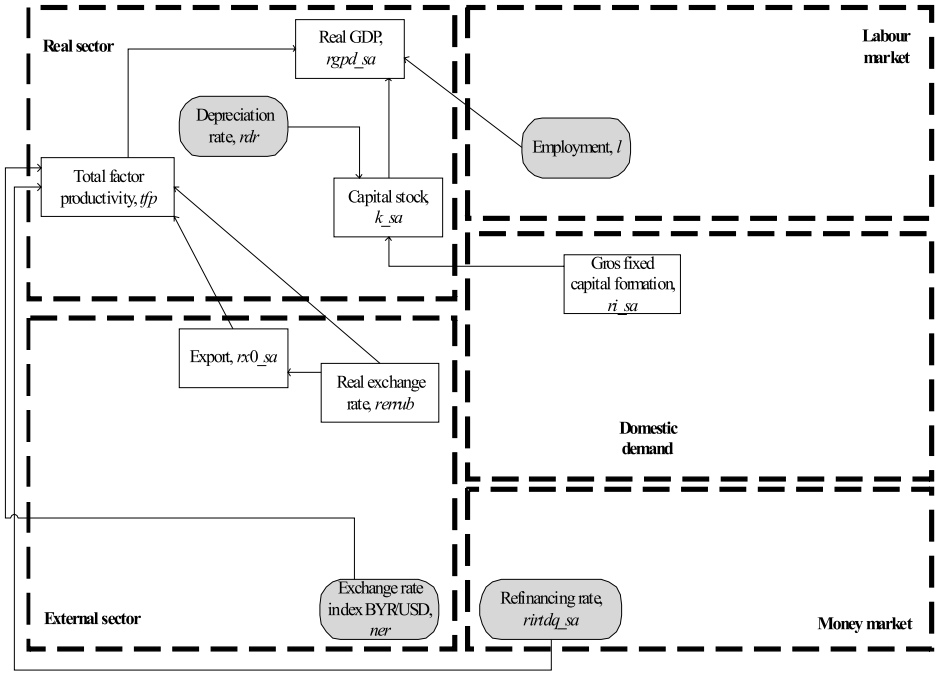

Figure 1: Determinants of GDP and total factor productivity

[7] Employment is exogenous, while capital is determined via the dynamic equation.

[8] In Belarus, the public sector consists of enterprises and organizations owned (fully or partially) by the state and/or funded from the budget.

3.2. External sector: exports and imports

Since output is determined, among other variables, by the volume of exports, it is of the utmost important to estimate the latter with a high degree of precision. In the previous version of the model (Chubrik, Kruk, Pelipas (2006)), exports and imports were considered as variables stationary around the trend since it reflected their dynamics over a period concerned. However, the stationarity has been broken after the energy price hikes. Accordingly, the model now deals with both short-run and long-run dynamics in contrast to the previous one modeling short-run dynamics only.

The long-run imports equation is based on some theoretical assumptions. First, imports are driven by domestic economic needs such as consumption and production of goods (for sale at home or abroad). Also, the volume of imports is determined by real exchange rate dynamics. In particular, real exchange rate appreciation stimulates imports (and otherwise). Taking all these factors into consideration, the following equation can be obtained:

$$rm0_sa_t = b_1^{rm} \cdot rx0_sa_t + b_2^{rm} \cdot rgdp_sa_t + b_3^{rm} \cdot rerrub_t \cdot d_{[01Q3,N]} + b_4^{rm} + \varepsilon_t^{rm}, \quad (6)$$

where $d_{[01Q3,N]}$ is a dummy variable of value 1 starting from the 3rd quarter of 2001; and instead of domestic demand, GDP is used.[9] The test reveals the existence of long-term relationships. The hypothesis of the absence of such relationships is rejected at 1%-level (ADF = –7.581 (–5.066), 1%-critical MacKinnon value is in the parentheses). All coefficients have expected signs. In particular, growth of exports and GDP as well as real appreciation of the national currency[10] all lead to an increase of imports.

Short-term dynamics of imports can be described by using the following equation:

$$\begin{aligned} \Delta rm0_sa_t = {} & b_1^{\Delta rm} \cdot \Delta rx0_sa_t + b_2^{\Delta rm} \cdot \Delta rx0_sa_{t-2} + b_3^{\Delta rm} \cdot \Delta rw_sa_t + \\ & + b_4^{\Delta rm} \cdot \Delta rerrub_{t-2} + b_5^{\Delta rm} \cdot ecm_rm_{t-1} + b_6^{\Delta rm} \cdot d_{[95Q4]} + \varepsilon_t^{\Delta rm}, \end{aligned} \quad (7)$$

where $ecm_rm_t = \varepsilon_t^{rm}$, $d_{[95Q4]}$ is a dummy variable reflecting an outlier corresponding to the 4th quarter of 1995[11]; the residuals of the equation do not have anomalies. It follows that growth of exports in the short run also induces imports growth, while the opposite trend is observed in case of real exchange rate appreciation. Instead of GDP, the equation uses real wages (its growth leads to an increase of the volume of imports in the short run). The use of real wages variable allows accounting for cyclicity of imports dynamics determined by the political business cycle. Finally,

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9 This is done for the sake of convenience in modeling.

10 Over a period specified, the real exchange rate variable is non-stationary.

11 Prior to 1995, dummy variables are hard to interpret properly since the quality of early economic data (particularly foreign trade one) is low. Accordingly, outliers can be explained by poor data quality.

equilibrium is restored (in case imports deviate from a long-term trend) over 1 or 2 quarters (error correction mechanism coefficient is –0.708). This might be indicative of the external disequilibrium in the Belarusian economy.

A long-term exports equation should include income indicators of major trading partners of Belarus along with the variables characterizing terms of trade and external economic conditions. However, the choice of particular variables has to account for the situation in Belarus.

One of the specific features is the structure of the external market. Russia is a major destination for Belarusian goods. As for all other markets, Belarus either supplies raw materials (like oil products, fertilizers, wood, etc.) or 'niche goods' (like some petrochemicals) (see Tochitskaya (2006) for details). Apparently, the dynamics of these markets are marginally affected by the importers' GDP. In contrast, the dynamics of demand for Belarusian goods by Russian consumers is closely related to the dynamics of Russia's GDP.

Oil prices played an important role in the Belarusian exports situation (Rakova, Pelipas, Chubrik (2006)). Since 2002, exports of oil products have gradually become a dominant item. Its share expanded from less than 20% in 2001 and almost doubled (40%) by 2006. Increasing world prices and duty-free imports of crude oil for domestic processing were decisive factors. Accordingly, dynamics of world oil prices would continue to substantially influence Belarus' exports situation.

Last but not least, the real exchange rate remains an important determinant of exports dynamics. Nevertheless, this variable can not be included into long-term equation due to its non-stationarity. Yet, two periods can be distinguished when real exchange rate dynamics affected the dynamics of exports. The first period ranges from 1996 to the middle of 1998 (considerable real devaluation against the Russian ruble) and the second one starts from 2001 until now. Over the latter term, there has been a real appreciation of the Belarusian ruble against the US dollar observed against the background of macroeconomic stabilization. Later, a real devaluation against the Russian ruble occurred. Accordingly, real exchange rate variable is included into the equations with a reference to the periods specified above. Given all these specific features, the following long-term exports equation could be constructed:

$$rx0_sa_t = b_1^{rx} \cdot rgdpru_sa_t + b_2^{rx} \cdot rerrub_t \cdot d_{[95Q1,97Q1]} + \\ + b_3^{rx} \cdot rerusd_t \cdot d_{[04Q2,07Q2]} + b_4^{rx} \cdot opi_t + b_5^{rx} + \varepsilon_t^{rx}, \quad (8)$$

where $d_{[95Q1,97Q1]}$, $d_{[04Q2,07Q2]}$ are the dummy variables of value 1 in the specified periods of time (otherwise 0); the hypothesis of the long-term relationships can not be rejected at 1%-significance level (ADF = –6.293 (–5.426), 1%-critical MacKinnon value is in the parentheses). GDP and real exchange rate variables coefficients have expected signs (positive and negative ones). It follows that the expansion of Russia's market induces growth of Belarus' exports.[12] In its turn, real devaluation of the

[12] Economic growth in Russia positively affects growth in the neighboring countries. This is because of the greater demand for imports. Accordingly, the dynamics of Russia's GDP to some extent reflect the dynamics of GDP of some CIS countries, including Belarus.

Belarusian ruble against the Russian ruble leads to exports growth, while the real appreciation against the US dollar adversely affected competitiveness of Belarusian goods at the non-Russian markets. The world oil prices variable coefficient has a negative sign. Most likely, growth of world oil prices has encouraged Belarusian authorities to seek expansion of oil products exports. As for other goods sold beyond Russia, the volume is too small to focus on increase of their exports. According to this equation, the end of 'the era of cheap oil' could encourage the development of non-raw materials exports of Belarus.

In the short run, exports are driven primarily by Russia's GDP, the real exchange rate (of the Belarusian ruble against the Russian ruble), and the ratio of productivity indicators of Belarus and Russia. Russia's GDP (describing external demand for Belarusian goods) coefficient has the expected positive sign. At the same time, the use of the competitiveness indicator in the specification of the short-run real exchange rate equation appears to be ambiguous (Tochitskaya (2006)). First of all, this variable has a very little use in certain years, like in 1998–1999, when sharp fluctuations of the bilateral real exchange rate were recorded. Second, the importance of this variable as a measure of price competitiveness decreases when real appreciation policy is conduced or companies are subsidized either directly or indirectly. Third, its importance can go down following 'administratively guided' exports growth[13], for the sake of obtaining foreign exchange. These factors have different effects on the index of real exchange rate indicator in the short-run equations (and the long-term ones in some cases). Accordingly, its sign not always corresponds to the theory-informed expectations.

In order to offset contradictions related to interpretation of the real exchange rate level, the short-run equation includes an additional indicator of price competitiveness, namely changes in the ratio of labor productivities of Belarus and Russia. In economic terms, this indicator is close to the real exchange rate one. However, it reflects net price advantages of Belarusian exporters emerging at the microeconomic level and somewhat purified from the impact of economic policies at the macroeconomic level. It is suggested that *ceteris paribus* faster productivity growth in Belarus than in Russia creates additional price advantages for Belarusian companies. In case both variables (bilateral real exchange rate of the Belarusian ruble against the Russian ruble and productivity ratio) are inserted into the specification of the short-run exports equation, a nearly complete set of price competitiveness factors is obtained. The final equation has the following form (residuals have no anomalies, while all coefficients are significant):

$$\Delta rx0_sa_t = b_1^{\Delta rx} \cdot \Delta rgdpru_sa_t + b_2^{\Delta rx} \cdot \Delta rlp_sa_{t-2} / \Delta rlpru_sa_{t-2} + \\ + b_3^{\Delta rx} \cdot \Delta rerrub_{t-3} + b_4^{\Delta rx} \cdot ecm_rx_{t-1} + b_5^{\Delta rx} \cdot d_{[04Q4,05Q1]} + \varepsilon_t^{\Delta rx}. \quad (9)$$

Both variables have positive coefficients, while the absolute value of the coefficient of productivity ratio change (0.70) is more than that of the real exchange

[13] In some cases, such exports growth hampers economic efficiency and profitability.

rate (0.08). This implies that the former variable characterizes price competitiveness better than the latter one. Rather, the real exchange rate dynamics denotes the impact of economic policies upon price competitiveness.

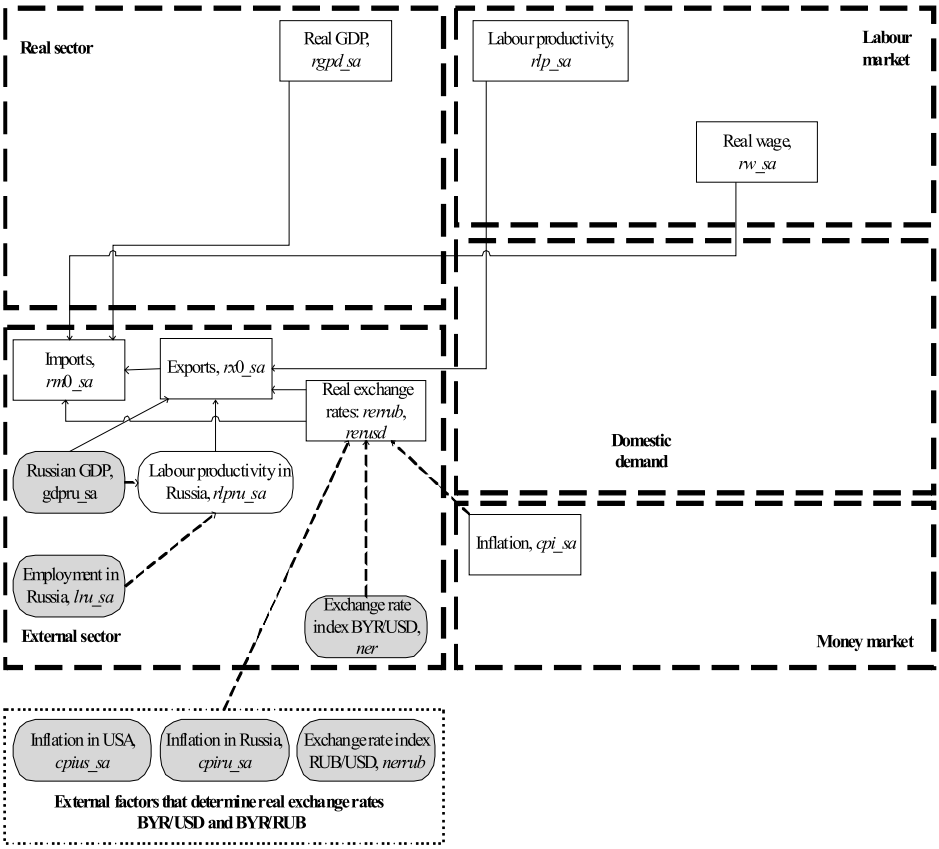

Figure 2: Determinants of exports and imports

The real exchange rates of the Belarusian ruble against the Russian ruble and the US dollar are obtained from the equations of the following type:

$$RER = (1 / NER) \cdot (CPI / CPI^F) , \qquad (10)$$

where *NER* is a nominal exchange rate index (inverse quotation), *CPI* is inflation in Belarus, CPI^F is inflation in a foreign country.

3.3. Labor market: real wages

According to the model, the labor market is only the place to set wages (and, accordingly, labor productivity as a derivative from GDP and exogenously set em-

ployment). Since wages are a stationary variable in the levels, only short-run dynamics can be modeled (no anomalies of the residuals are observed):

$$\Delta rw_sa_t = b_1^{\Delta rw} \cdot \Delta rw_sa_{t-2} + b_2^{\Delta rw} \cdot \Delta rw_sa_{t-3} + b_3^{\Delta rw} \cdot \Delta rlp_sa_t + b_4^{\Delta rw} \cdot \Delta rlp_sa_{t-1} + \\ + b_5^{\Delta rw} \cdot \Delta rlp_sa_{t-3} + b_6^{\Delta rw} \cdot \Delta rerrub_{t-1} + b_7^{\Delta rw} \cdot \Delta rerrub_{t-3} + b_8^{\Delta rw} \cdot rwpbc_t + \varepsilon_t^{\Delta rw}. \quad (11)$$

As in the previous model, there are two important variables, such as labor productivity (the sum of coefficients b_3–b_5 exceeds 3) and the political business cycle.[14] High values of labor productivity coefficients reflect the observation that over a period concerned real wage growth exceeded real productivity growth (Haiduk et al. (2005)). This can be explained by the fact that real GDP and wages are calculated by using different deflators (Chubrik, Gucci (2006)).

Besides the variables specified, the right side of the equation includes previous values of wage growth. Their negative effect can be explained by certain wage rigidity (particularly in the public sector). In addition, there is the real exchange variable (the Belarusian ruble against the Russian ruble). Real appreciation of the Belarusian ruble against foreign currencies (the Russian ruble and the US dollar) automatically implies an increase of the dollar value of wages without hampering competitiveness.

3.4. Domestic demand: household consumption and fixed capital investment

Household consumption is a stationary variable (most likely, this is because real wages are one of the crucial factors behind its change; see Chubrik, Kruk, Pelipas (2006)). Accordingly, only short-term dynamics are modeled.

The previous version of the equation is also considerably modified. An early version of the equation was built in the detrended levels. In other words, in the long run, consumption was growing autonomously at a rate of 10% per annum. Apparently, this explanation can not be accepted under the conditions of growing gas prices so autonomous growth needs to be specified.

The new equation incorporates such factors as employment, investment, and the gap between the average European price for gas and the one set for Belarus by Gazprom. The inclusion of the employment variable designates that consumption is dependent upon wage bill, and not per capita wage. The interrelationship between investment and consumption is intuitively described in the paper by Chubrik and Gucci (2006). The choice between the two is a rather simple one: depending on the phase of the political business cycle, the authorities either stimulate domestic consumption or induce investment. Finally, lower gas price creates opportunities for wage increases for companies and the state budget. Therefore, the short-run dynamics of household consumption can be described as follows:

$$\Delta rhc_sa_t = b_1^{\Delta rhc} \cdot \Delta rhc_sa_{t-1} + b_2^{\Delta rhc} \cdot \Delta rhc_sa_{t-2} + b_3^{\Delta rhc} \cdot \Delta rhc_sa_{t-3} + b_4^{\Delta rhc} \cdot \Delta rw_sa_{t-1} + \\ + b_5^{\Delta rhc} \cdot \Delta rw_sa_{t-2} + b_6^{\Delta rhc} \cdot \Delta rl_{t-3} + b_7^{\Delta rhc} \cdot \Delta ri_sa_{t-2} + b_8^{\Delta rhc} \cdot gap_gas_{t-1} + b_9^{\Delta rhc} + \varepsilon_t^{\Delta rhc}. \quad (12)$$

[14] Chapters II and III deal with political business cycle more thoroughly.

As for anomalies, there is only an absence of normality. However, it is eliminated after one of the outliers (2nd quarter of 1999) is corrected by the use of a corresponding dummy variable.

3.5. Money demand and inflation

Specification of the nominal variables set is nearly identical to the earlier model and based on a hypothesis of the existence of long-run relationships between real money demand and the level of income (Chubrik, Kruk, Pelipas (2006)). The gross income indicator denotes demand for money for transactions and as a means of circulation which is crucial in the long run. Besides, there is also a constant and a trend included in the equation, because of an outlier observed right at the beginning of the sample.[15] It was eliminated by using a corresponding dummy variable (of value 1 in the 1st quarter of 1995 and 0 otherwise). Accordingly, the long-run money demand equation has the following form:

$$m1_sa_t = b_1^{m1} \cdot rgdp_sa + b_2^{m1} \cdot cpi_sa + b_3^{m1} \cdot T + b_4^{m1} + b_5^{m1} \cdot d_{95Q1} + \varepsilon_t^{m1}. \quad (13)$$

All coefficients of the equation (13) are statistically significant, and there are no anomalies.

Short-run money demand and price dynamics are modeled by using error correction mechanisms equations. Since there are long-term relationships between money and prices (13), short-run equations of money demand and price level are specified by using the same error correction mechanism as in the equation (13). It is suggested that money demand in the short run is determined by GDP growth (as a measure of demand for money as a medium of exchange and means of circulation), changes of nominal interest rate (reflecting a speculative motive and a function of money as a store of value, see Kruk (2006b)). Finally, it is maintained that over the short run, money demand is determined by the dynamics of gold and foreign exchange reserves as an indicator partially reflecting the speculative motive of money demand and also the use of money for precautionary purposes. The logic is that a change of the volume of gold and foreign exchange reserves and expectations about dynamics of exchange rates lead to changes of the attitudes of economic agents and, hence, a demand for national and foreign currencies as a way of storing value.

The equation then has the following specification:

$$\Delta m1_sa_t = b_1^{\Delta m1} \cdot \Delta m1_sa_{t-1} + b_2^{\Delta m1} \cdot \Delta cpi_sa_t + b_3^{\Delta m1} \cdot \Delta rgdp_sa +$$

$$+ b_4^{\Delta m1} \cdot \Delta rgdp_sa_{t-3} + b_5^{\Delta m1} \cdot \Delta nirtd_t + b_6^{\Delta m1} \cdot \Delta gfa_{t-3} + b_7^{\Delta m1} \cdot ecm_m1_{t-1} + \varepsilon_t^{\Delta m1}. \quad (14)$$

In this equation, no anomalies of the residuals exist, while all coefficients are statistically significant and have expected signs. Therefore, the short-run equation of money demand describes two major functions of money; lag effects of money demand and preferences of economic agents over the choice of a suitable value.

The short-run inflation equation is as follows:

[15] In early 1995, the economy of Belarus was functioning in conditions of high inflation.

$$\Delta cpi_sa_t = b_1^{\Delta cpi} \cdot \Delta cpi_sa_{t-2} + b_2^{\Delta cpi} \cdot \Delta ner_t + b_3^{\Delta cpi} \cdot \Delta ner_{t-1} + \\ + b_4^{\Delta cpi} \cdot \Delta m1_sa_t + b_5^{\Delta cpi} \cdot ecm_m1_{t-1} + b_6^{\Delta cpi} \cdot d_{[95Q1,98Q2]} + \varepsilon_t^{\Delta cpi}. \quad (15)$$

No anomalies of the residuals are observed.

The key determinants of inflation over the short run are the lag component (inflation in the past) and changes in the nominal exchange rate (in the current period with lag 1). Besides, there is a dummy variable of value 1 until the 3rd quarter of 1998. It is used to reflect changes in the monetary policy regime caused by the 1998 financial crisis in Russia.

In order to estimate the value of inflation in high-inflation periods (so that the lag component and exchange rate dynamics cannot be used for explanation), the equation (15) includes a variable denoting change in demand for nominal money balances. The coefficient has a positive sign here. To some extent, it shows that in conditions of high inflation, monetary policy tends to be accommodating. Recursive estimates of the coefficient indicate its instability over the period of time concerned. In particular, it reaches the maximum value in 2001, while it declines afterwards, approaching zero. Such dynamics reflect changes in the monetary policy regime and a gradual adoption of exchange rate targeting in Belarus. The error correction mechanism used in that equation is identical to that of the short-run money demand equation. The mechanism characterizes adjustment of inflation to equilibrium changes in the money market.

The final element to describe the money market situation is interest rate. In accordance to our estimates, the fixed-term deposit rate exerts the major influence upon the behavior of economic agents at the money market. Since interest rate is a stationary variable, the equation appears to be as follows:

$$rirtdq_sa_t = b_1^{rirtdq} \cdot rirtdq_sa_{t-1} + b_2^{rirtdq} \cdot rirrq_sa_t + b_3^{rirtdq} \cdot rirrq_sa_{t-1} + \\ + b_4^{rirtdq} \cdot \Delta m1_sa_{t-2} + b_5^{rirtdq} \cdot \Delta gfa_t + b_1^{rirtdq} + \varepsilon_t^{rirtdq}. \quad (16)$$

The residuals of the equation are normally distributed and there is no autocorrelation. However, autoregressive conditional heteroskedasticity was observed. At the same time, the dynamics of residuals appear to be somewhat 'problematic' only in the first half of the sample so no changes were made in the model specification.

The fixed-term deposit real interest rate level is determined by the demand of economic agents for nominal money balances and also by the National Bank's policy. The NBB seeks to adjust the money market situation by changing the refinancing rate (including as an exogenous variable of the model). The intended real value of interest rate is then transmitted to the market (Kruk, Daneyko (2005)). This can be confirmed by a significant positive influence of the refinancing rate on the fixed-term deposits interest rate. In addition, there is a sizeable lag in the dynamics of real interest rate. Change in the volume of gold and foreign currency reserves is another variable affecting the fixed-term deposit interest rate. The change in reserves is in fact indicative of exchange rate policies of monetary authorities and reactions of economic agents. It has to be emphasized that *M*1 and *GFA* are small, thereby suggesting a lesser volatility of interest rates

as against these indicators. The interrelationships among the monetary variables are exposed at Figure 3, while the overall model structure is provided at Figure 4.

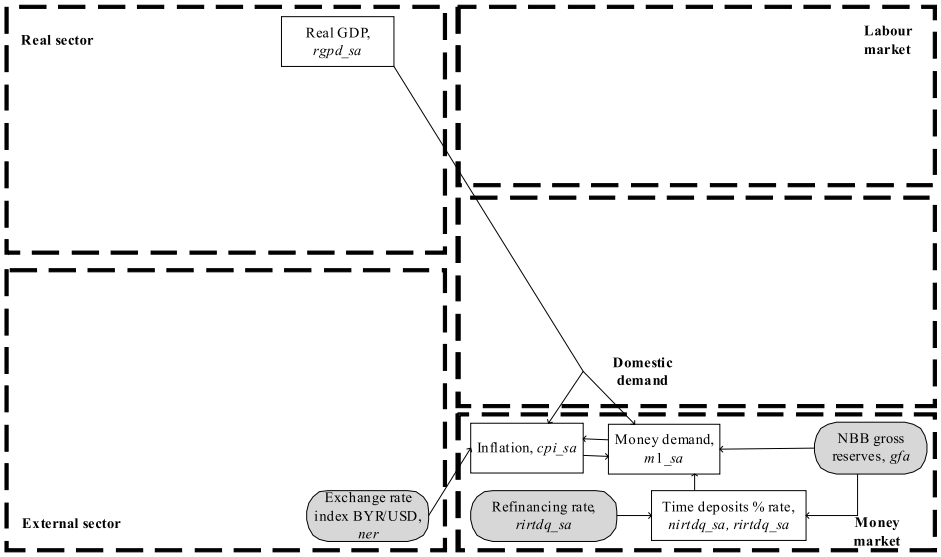

Figure 3: Determinants of money demand, prices, and interest rate

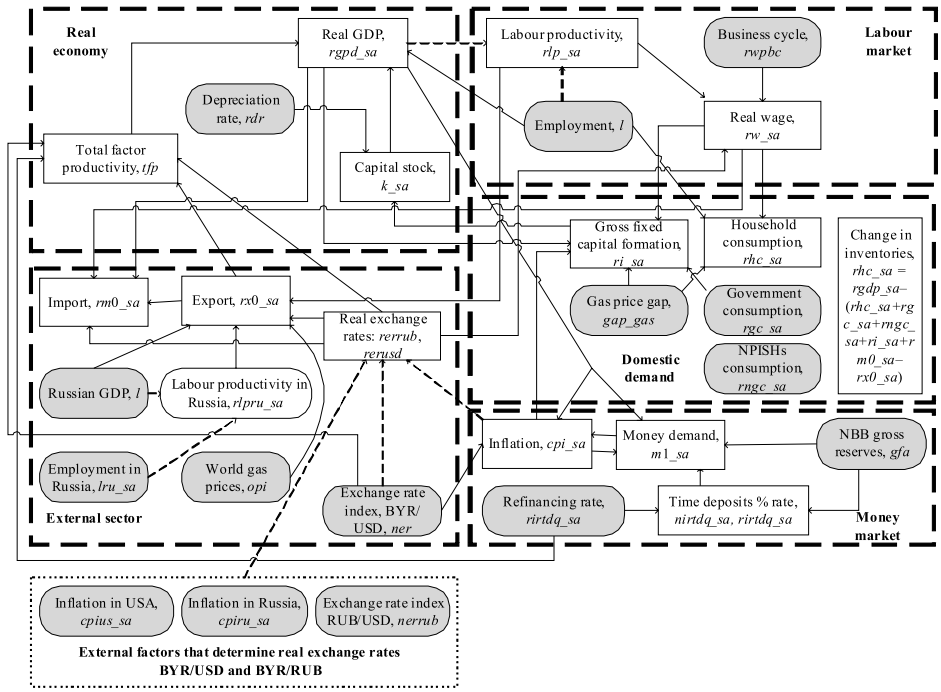

Figure 4: Interrelationships among the variables of the macromodel

4. SCENARIOS

The model constructed reflects the relationships among the major macroeconomic indicators in the economy of Belarus and their degree of dependency upon external factors, such as the dynamics of Russia's GDP, world oil prices, and so on. Accordingly, such modeling allows construction of some developmental scenarios. The latter are drawn upon various versions of economic policies and dynamics of external variables. Below the methodological aspects of modeling the impact of external shocks are considered. In our case, an energy price hike is a core shock. The macromodel is then employed to provide four scenarios until the year 2011.

4.1. External shocks analysis: methodological aspects of the use of the macromodel

Any external shock has three phases: the first is the immediate impact on the economy, followed by the reaction of economic authorities, and, finally, adjustment proceeds. After the immediate impact, economic policies are deployed to meet the effects of the shock and then the economic system adjusts to both shock and economic policy change.

Repercussions of (energy) shocks can be divided into two groups: change of the nominal indicators and change of the real ones. First of all, an energy price shock affects nominal external equilibrium. For instance, the price value of imports would grow despite invariable physical volumes of imports. As a result, the merchandize trade deficit leads to that of a foreign exchange market. Authorities have some policy instruments at their disposal to influence the balance of payments dynamics. For instance, there could be policies stimulating inflow of foreign direct investment (also via privatization) or foreign indebtedness (by increasing government debt or debts of financial and non-financial companies).

As a result, there would be a new situation as a result of shock impact and economic policy measures adopted. This situation would define a new equilibrium situation at foreign exchange markets. In case the challenge of foreign exchange market deficit can not be met with economic policies, there is a pressure on the nominal exchange rate. In order to restore the balance at foreign exchange markets, authorities manipulate three indicators, namely the nominal exchange rate, foreign currency reserves, and the interest rate (refinancing rate). The precise combination of the three would be determined by monetary policy regime, final targets and available tools for reaching intermediate policy goals. It follows that external equilibrium change and the impact upon nominal indicators can be considered as one of the major channels of shock impact upon the economic system of Belarus (Kruk, Daneyko (2005)).

Apart from nominal variables, an external shock could directly impact the economic system and change the behavior of economic agents. Consequently, real variables can also be affected. An illustration of such an impact is an externally-induced cost increase (due to an energy price hike) that undermines competitiveness of Belarusian goods at foreign markets. Accordingly, there might be deceleration of GDP

growth or decline of exports. Cost hikes and lower profitability limits investment opportunities of companies (using their own funds for investment). Profit declines would also mean reduction of tax revenues, so government consumption might be negatively affected as well. In its turn, household consumption might decrease due to the reduction of the volume of government transfers.

The use of a structural macromodel to analyze the impact of price shocks upon the economic system (i.e. the dynamics of real variables) implies that the first two phases of the shock (immediate impact and policy reaction) should be modeled by using corresponding nominal indicators. In essence, these indicators are policy variables. Besides, there could be additional exogenous variables (due to specific features of the economy model is attempting to capture). The dynamics of these additional variables could be unrelated or partially related to external shocks. Shock impact is therefore modeled by specifying exogenous variables in such a way that they trace its influence on the nominal equilibrium. Adjustment of the economic system as a whole becomes available as the model is solved for a certain period of time.

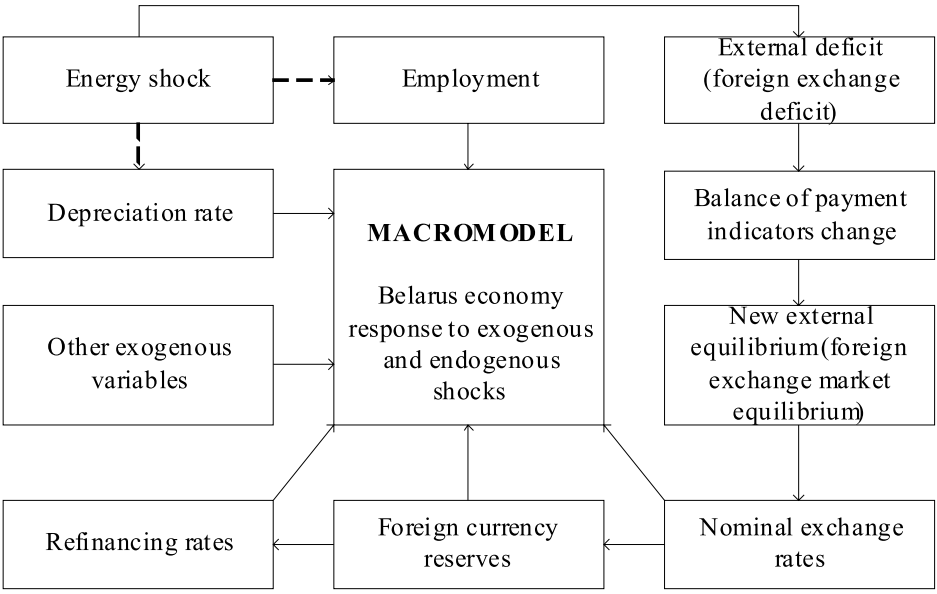

Figure 5: Sequence of analysis and forecast of external shocks upon the Belarusian economy: Structural macromodel for Belarus

The IPM Research Center has developed a macroeconometric model for Belarus that includes the following exogenous variables: nominal exchange rate, volume of foreign exchange reserves, and refinancing rate set by the National Bank. These variables are controlled ones through which the impact of shocks can be traced. However, model specification and some features of the Belarusian economy necessitate considering the employment level and depreciation rates as additional exog-

enous variables. The impact of price shocks should be accounted for when the future dynamics of these additional variables are estimated. A third group of exogenous variables are those that are unrelated to the shock impact. The set includes world prices for oil and gas, employment, real wages, GDP, productivity and inflation in Russia, and the nominal exchange rate of the Russian ruble against the US dollar and, finally, inflation in the United States.

The outcome of the model given the specified values of all of the exogenous variables[16] allows projection of the economy's reaction to external shocks. Also, some medium-run factors of development could be detected. Figure 5 shows the sequence of steps necessary to analyze the impact of external shocks upon the Belarusian economy.

4.2. Quantification of external shock and estimation of exogenous variables

The methodology described above suggests quantification of the shock itself. Next, policy reactions have to be predicted by considering changes in the dynamics of current account and capital account of the balance of payments.

Shock content and economic policy reactions

Long-term supply contracts signed by the government of Belarus and Gazprom specify the volumes of natural gas and methodology of price-setting over 2007–2011. Having this information, it is possible to estimate the volume of the merchandize trade deficit over this period of time. Intergovernmental agreement between Belarus and Russia on terms and conditions of supply of crude oil to Belarus provides necessary information for calculating changes of the value of crude oil imports to Belarus. Also, available forecasts of world prices for oil and gas allow making estimates of oil products exports by Belarus. Consequently, dynamics of trade in energy commodities (gas, oil and oil products) can be foreseen more or less correctly over a period of 2007–2011.

However, changes in foreign trade over a period specified and, consequently, pressure upon nominal equilibrium, are not necessarily limited to trade in energy goods. First, there could be additional price shocks (both positive and negative) emanating from the world markets. Second, there is high likelihood of political shocks to emerge over a period concerned. For instance, signing new treaties with Russia or within the framework of the Eurasian Economic Community (EvrAzES) along with expansion of economic cooperation among the republics of the former USSR all could generate positive external shocks. Also, there is a certain likelihood of emergence of positive exogenous trade shocks emanating from the relationship with the EU or negative shocks originating from possible acceleration of a 'trade war' with Russia. Some elements of this war were observed already over the end of 2006 – early 2007.

The exogenous effects on foreign trade are growing since the government is capable of implementing trade policies. Initial imbalances produced by the energy shock increases the likelihood that the government would be inclined to make ad-

[16] In our case, it ranges from the 2nd quarter of 2007 to the 4th quarter of 2011.

ditional foreign trade shocks because of new political agreements. However, no detailed information is available so far to predict exogenous changes in foreign trade. Nevertheless, these changes are highly probable.[17]

Besides foreign trade policy tools, there are broad opportunities to affect the capital account in order to mitigate the adverse consequences of economic shocks. In the short run, the key task is to secure foreign exchange inflow to finance current liabilities. As for the instruments, these are foreign direct investment (mainly connected to privatization) and foreign indebtedness (accumulated by both financial and non-financial companies), including state loans.

All these instruments have been used to finance the current account deficit over 2007. In contrast to pessimistic expectations, Belarus has become familiar with loans of foreign banks and trade-related loans, such as delay of payments for imports. The latter instrument was broadly used prior to 2007, although at a smaller scale. Despite the prevalence of short-term loans over the long-term ones, the problem of the foreign exchange deficit was successfully resolved. However, the precise security threshold of foreign indebtedness by banks and enterprises is hard to establish. But the generally low level of foreign indebtedness (measured by debt-to-GDP ratio) suggests the further use of this policy tool at least in the course of 2008.

In addition, there is considerable potential for attracting state loans and green field FDI. State loans can be provided via intergovernmental agreements (as in the case of Russia' credit) or placement of Belarusian bonds at foreign markets (in Russia and Japan) and, ultimately, the issue of Eurobonds. Foreign direct investment positively affects the current account situation. It can be expected that over the medium run, FDI inflow would allow the establishment of new and up-to-date production facilities, and not privatization of existing companies. The latter option is more likely in the short run. Liberalization of investment legislation and of the business environment foreign companies operate in could induce the inflow of FDI to set up new companies or to modernize the existing ones.

A large-scale privatization should currently be seen as an emergency tool only. It could only be used when other policies would fail to provide necessary funds to cover the current account deficit. Accordingly, only case-by-case privatization is possible in the short run. The following criteria of case selection could be considered, such as low profitability, high energy intensity, insignificance of company in terms of generating foreign exchange and tax revenues. However, there is certain likelihood of relatively large-scale privatization in the medium run to occur. This likelihood grows as soon as the merchandize trade deficit is not covered by other means than privatization revenues thus engendering exchange rate stability and exaggerating structural problems. Finally, there is a probability of more radical policy change leading to structural economic reforms to solve long-run problems. In that case, privatization would become an instrument of economic reform and secure the inflow of additional FDI.

[17] It is necessary to distinguish between the *nominal* impact of foreign trade upon foreign exchange market dynamics that define the level of exchange rate, reserves, and interest rates (exogenous variables) and *real* foreign trade indicators. Change of real indicators is determined by the behavior of economic agents and an outcome of the model's outcome.

It appears that there is a wide range of policy responses to the growing merchandize trade deficit. But by the end of 2007, the policy choice was not clear enough, including the way of increasing national competitiveness.

General definition and assumption of scenarios

Nominal indicators of external equilibrium (the balance of payments indicators) that define the dynamics of exogenous variables of the model are either controlled (e.g. government debt) or determined by economic policies (i.e. all other capital account indicators and, to some extent, volumes of experts and imports). The information available allows reliable calculation of external nominal equilibrium of trade in energy goods. In addition, it is currently impossible to clearly specify economic policy priorities until 2011. Accordingly, unambiguous forecasts of the balance-of-payments indicators over the years 2008–2011 can not be made. As a result, a scenario approach has been adopted to research and to model the impact of various economic policy strategies on the dynamics of the balance of payments indicators and consequences for economic growth and the dynamics of real macroeconomic indicators.

Depending on economic policies adopted and favorable/unfavorable foreign trade shocks, four developmental scenarios could be suggested, such as baseline (inertial), negative, positive, and crisis. The *baseline scenario* is characterized by an inertial effect of foreign trade (except trade in energy goods) on the foreign exchange market and the use of foreign loans (both government and corporate ones) to cover the merchandize trade deficit, while FDI inflow is insignificant. In the case of a *negative scenario*, nominal merchandize trade deficit (except trade in energy goods) is only partially covered by capital inflow (i.e. foreign debt). The *positive scenario* suggests a decreasing pressure of the foreign trade situation (except trade in energy goods) upon the domestic foreign exchange market along with partial reforms of the economy and reliance on FDI as a primary source of capital inflow.

The fourth scenario is a *crisis* one, accentuating the adverse impact of an external shock on the economy of Belarus. Within the framework of this scenario, some assumptions of the negative scenario are adopted and respective exogenous variables are chosen. In addition, there is an assumption of negative shock affecting the real volume of exports. For that purpose, real exports become an exogenous variable unchanged over the period between the 2nd quarter 2007 and the 4th quarter of 2011.

Each of the above-mentioned scenarios is characterized by certain dynamics of the balance of payments indicators. Also, economic actors behave differently on the foreign exchange market depending on the pressure on the nominal exchange rate. The NBB makes its decisions about monetary policy regime and balances foreign exchange market by changing the level of exchange rate, foreign reserves, and real refinancing rate.

A common feature of all four scenarios is the influence of energy shocks on Belarusian economy and the assumptions about the policy reactions. First, exchange rate stability is unambiguously an economic policy priority. It is due to econom-

ic (like securing of trust to the national currency and banking system) and political (like commitment to maintain a certain dollar value of average economy-wide wages by the end of 2010, see Chubrik (2007)) reasons. It is also expected that devaluation is an emergency measure agreed only when all other policy tools available in the scenarios fail. Another important assumption concerns the existence of some important political events, such as presidential elections (4th quarter of 2010). The latter is very likely to influence the dynamics of incomes and consumption so the dynamics of the political business cycle (one of the model's exogenous variables) can be predicted.

Methodology for identification of exogenous variables

After the assumptions for each of the scenarios are made, the estimates of the nominal goods and services trade deficit (except trade in energy goods) and foreign direct investment are made. Different scenarios set different capabilities for public and private sectors have different capabilities to access international capital markets. Accordingly, there are different needs or intentions to attract additional financial resources by using the instruments falling under the category of other investments. Consequently, the balance on 'other investments' is calculated as a share of the merchandize trade deficit (if foreign borrowing is encouraged) or as a share of the sum of the merchandize trade deficit and FDI inflow (if foreign borrowing is limited). The share varies depending on the opportunities to access international financial markets, terms and conditions of foreign borrowing, and the need for such borrowing.

Next, given the assumptions about the dynamics of the current account indicators, the dynamics of exogenous variables are defined on the basis of the foreign exchange market situation. The Belarusian market for foreign exchange consists of two major segments: legal entities (or companies, both residents and non-residents of Belarus) and individuals.[18]

The share of companies located in Belarus is about 55–60% at the market for foreign exchange. Demand and supply at this market are directly determined by the volumes of exports and imports of Belarusian companies and the quotas for compulsory sale of foreign exchange (for a long time, it was set at 30% so it could be seen as a constant). The volume of exports determines the volume of foreign exchange revenue and thus supply at the market for foreign exchange. A planned volume of imports sets the level of demand for foreign exchange. When imports are funded by using trade loans or other types of foreign loans, economic actors correspondingly

[18] A fourth actor operating at the foreign exchange market is that of commercial banks. However, banks are not considered in this analysis since no data are available for a sufficiently long period of time. Prior to 2007, banks exerted their influence upon the foreign exchange market situation by providing foreign currency loans to companies, while foreign exchange transactions at the expense of banks themselves were not playing any notable role. Increase of foreign borrowing by banks changed that situation. Accordingly, any forecasts of foreign exchange market dynamics have to be made by accounting for the greater role of banks. A more holistic picture of the supply and demand situation can therefore be produced by aggregating banks and legal entities into a single unit.

reduce their demand for foreign exchange. Therefore, the dynamics of purchase and sale of foreign currency of enterprises' segment are closely determined by external market conditions. As for the market segment comprised of non-residents, two factors play a major role: trends in foreign trade (just as in the case of market share for residents) and a share of transactions made by using Belarusian rubles.

Therefore, the segment comprised of legal entities is crucial for the state of the balance of payments. Accordingly, the balance of supply and demand at this segment can be calculated as a balance of the current account and capital account without taking into consideration changes in international reserves and an 'errors and omissions' account.

As for the cash segment of the foreign exchange market, the behavior of individuals is decisive. The following factors are important:

– Relation of demand for national and foreign currencies as a store of value (determined by real returns on financial instruments denominated in Belarusian rubles or any foreign currency and degree of trust in the national currency);
– Demand for the national currency for transactions (determined by the level of income and imports of consumer goods and services).

Therefore, the demand and supply of foreign exchange at the market segment for individuals are mainly driven by real economic indicators. These are forecasted only after the model is solved. Accordingly, change of the net individuals' demand for foreign currency over the first half of 2007 was forecasted exogenously on the basis of the logic of each of the scenarios.

The overall foreign exchange market balance influences the current level of nominal exchange rate, this forcing the monetary authorities either to make adjustments or to change the level of foreign exchange and gold reserves[19] and the refinancing rate.

The NBB's policies towards the foreign exchange market can be predicted by strongly assuming the undesirability of devaluation of the national currency. This assumption is determined by the high degree of dollarization of the Belarusian economy (Chubrik, Haiduk (2007)) and a high degree of its openness (Tochitskaya, Chubrik (2007)). These two factors explain the importance of a workable transmission mechanism from exchange rate dynamics to inflation (i.e. the dominance of exchange rate channel among other channels of monetary transmission). Besides, dollarization leads to a 'balance effect' that implies currency mismatch potentially leading to a banking crisis and a drastic reduction of demand for the national currency in the case of substantial devaluation (Kruk (2007)).

Therefore, it could realistically be expected the NBB would smoothen any sizeable fluctuation at the foreign exchange market by using interventions. Devaluation of the Belarusian ruble could occur as soon as the critical level of foreign currency reserves is reached (about USD 1 billion). With this assumption in mind along with the use of econometric estimates of foreign exchange deficit impact upon nominal exchange rate dynamics and real refinancing rate, respective exogenous variables could be defined.

[19] It is impossible to combine currency interventions and devaluation.

Another exogenous variable, such as employment, is also subject to the impact of external shock. However, its dynamics is predicted by looking at the logic of each of the scenarios. Employment level is considered as a variable controlled by economic authorities. Finally, depreciation rate is treated to be equal for all of the scenarios since it is directly determined by deterioration of fixed capital.[20] Absolute values of depreciation are still connected to the level of investment.

4.3. Scenarios of balance of payments dynamics

A quantitative estimate of the energy shock

A first stage of calculating energy shock effects requires forecasts of world energy prices since long-term agreements between Belarus and Russia, energy prices for Belarus are connected to the world market prices. In order to forecast the dynamics of world market prices, the data of the US Energy Information Administration (2008) and the IMF (2009–2011) have been used. Gas price is then forecasted on the basis of world oil prices forecasts.

Gas price for Belarus is estimated on the basis of the predicted dynamics of world market prices and available agreement between the government of Belarus and Gazprom[21]. This agreement stipulates a gradual increase of gas price for Belarus from USD 100 per 1.000 cubic meters in 2007 to 67% of the world gas price in 2008 and up to 100% in 2011.[22] The price of crude oil is predicted on the basis of world market forecasts and intergovernmental agreement between Belarus and Russia on terms of oil supply. This agreement establishes the introduction of a special duty on oil supply to Belarus over 2007–2009. Belarus' duty is calculated as a share of the duty existing in the Russian Federation. In order to forecast oil price for Belarus over a period of 2010–2011, the duty for Belarus has been calculated on the basis of information available for 2009.[23] Dynamics of world prices for energy goods supplied by the Russian Federation as against prices paid by Belarus is provided in Figure 6.

According to our estimates, the trade balance in energy goods would deteriorate from USD 0.3 billion in 2006 to USD 4.5 billion in 2011. This deficit would exist regardless of economic policies pursued. Accordingly, it is accepted as applicable to all of the scenarios.

There are however differences in the ways how the energy goods trade deficit is financed due to the differences in developmental scenarios. A common feature of

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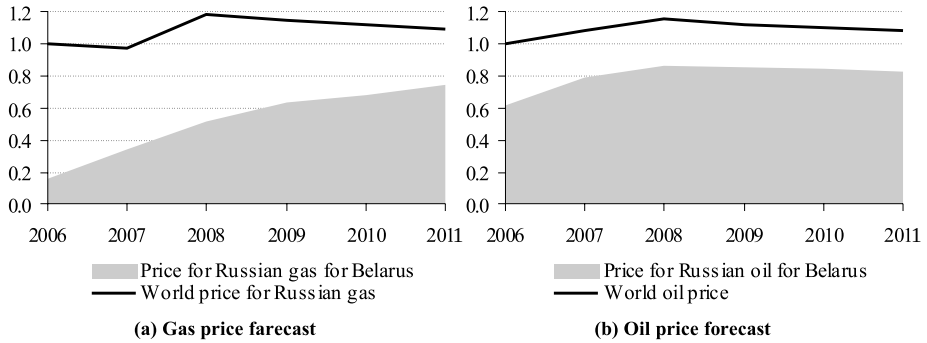
[20] The depreciation rate is to some extent determined by the availability of investment (see Chubrik, Kruk, and Pelipas (2006)). However, the degree is hard to calculate empirically.

[21] According to this agreement, gas transit fees are increased from USD 0.36 and 0.75 to USD 0.43 and 1.45 for transporting 1,000 cubic meters of gas per 100 kilometers by using the 'Yamal-Europe' pipeline and the Beltransgaz network, correspondingly. Besides, the agreement stipulates the sale of 50% stock of Beltransgaz by equal portions (12.5%) over a period of 2007-2010 by paying USD 625 million for each of the portions.

[22] For Belarus, the world market price is corrected by using transport costs and a 30%-rate customs duty established in Russia.

[23] Terms of crude oil supply after 2009 are not provided in the agreement and therefore subject to change.

all scenarios is inflow of FDI due to the sale of a 50% share of Beltransgaz's stock at USD 625 million over a period of 2007–2010.



(a) Gas price farecast **(b) Oil price forecast**

Note. Price indexes; 2006 = 1 (world market prices), 2006 = ratio of Belarus' price to world market price (for Belarus).
Source: authors' estimates on the basis of the IMF data.

Figure 6: World market prices forecast for Belarus: oil and gas supplied by Russia

Baseline scenario

The baseline scenario is an inertial one. It implies economic policies similar to 2007. Within the framework of this scenario, no sharp changes in trade in non-energy goods and services are suggested (i.e. there is no notable structural shift determined by changes of terms of trade or energy shock effects). Import-substitution policies are the major policy tool aimed at decreasing the non-energy goods trade deficit.

A major tool of financing the external deficit is 'other investment' whose volume is growing at the expense of accumulation of foreign loans by commercial banks, government agencies, and non-financial companies (i.e. enterprises). Such financing strategy is clearly about accumulation of foreign debts so it could be claimed that by the end of the period considered there would be fewer opportunities to attract additional foreign loans. Inflow of FDI is expected according to the concept of 'necessary privatization'. This concept maintains that the government is trying to avoid privatization of large-scale enterprises. Nevertheless, it could resort to privatization to finance a sizeable current account deficit.

The employment forecast is produced by assuming an unchanged full employment policy. However, some amendments seem to be inevitable as the government would induce some reduction of excessive employment in order to improve enterprise performance. The net demand of individuals for foreign currency is fixed over the whole forecasting period since no shocks are expected except pressures emanating from foreign trade factors. The scenario suggests nominal devaluation to begin in 2009, accelerating over 2010 and 2011.

Negative and crisis scenario

These scenarios point to a number of additional negative external shocks affecting nominal external equilibrium. In addition, it is maintained that authorities try to offset negative repercussions of an energy shock by using administrative measures only, including import substitution, unlimited accumulation of foreign debts by any means except privatization (some low-profile deals are nevertheless considered). In the negative scenario, external deficit is financed by attraction of other investments (loans accumulated by non-financial companies, banks, and the government). At the same time, foreign borrowing declines as soon as a certain substantial threshold is reached.

The negative scenario provides a more substantial reduction of employment than in the baseline scenario since the government would be forced to change its traditional policies due to the need of offsetting the repercussions of terms of trade deterioration. Net individual demand for foreign currency would also grow following devaluation of the Belarusian ruble. The negative scenario claims that devaluation would occur in 2010, when no revenues from the sale of Beltransgaz are available while the gas price would be equal to the world market price. At the same time, foreign borrowing would be very hard to increase since all opportunities would be exhausted.

The crisis scenario is analyzed in order to show the dependency of the Belarusian economy on foreign trade. The assumptions of this scenario are fully identical to those of the negative scenario. However, there is an additional assumption introduced about the negative effect of an external shock on the real volume of exports as in the case of the 'trade war' with Russia. Belarus would then loose the opportunity to increase the real value of its exports. Quantitatively, it could be modeled by excluding the real volume of exports from the model's outcome by treating it as an exogenous variable fixed until the end of the forecasting period.

Positive scenario

A key difference between the positive scenario and other scenarios is changes of economic policies. It is suggested that Belarusian authorities would implement a partial liberalization and restructuring of the economy, while the energy goods trade deficit would be mainly financed by foreign direct investment. Foreign borrowing (of banks and government) could occur with respect to gas in financing the current account deficit. Therefore, no substantial accumulation of foreign debt is planned within the framework of positive scenario.

Further, it is suggested that liberalization and attraction of foreign direct investment (or some positive external shock) would allow Belarus to increase the value of non-energy goods exports resulting in inflow of additional foreign exchange. Besides, exchange rate stability and economic policies would facilitate an increase of trust in the national currency so net individual demand for foreign currency would decrease. As a result, no nominal devaluation should be expected until 2011.

Table 3

Assumptions of the scenarios compared

	Baseline scenario	Negative and crisis scenarios	Positive scenario
Major source of foreign trade deficit financing	Short-term and medium-terms credits and loans taken mainly by banks and government	Short-term loans to non-financial companies, trade and commercial credits, and payment delays	Foreign direct investment
Trade policies	Administratively driven export growth	Import substitution	Some foreign trade liberalization is possible
Privatization	If necessary	Perseveration of state ownership at a maximum scale	'Case-by-case' privatization with participation of foreign investors
Employment policy	Full employment maintenance	Reduction of excessive employment	Restructuring of large-scale companies and small business development
Behavior of individuals at the foreign currency market	No change of net demand for foreign currency	Growing net demand for foreign currency	Decreasing net demand for foreign currency

The employment forecast is based on the economic policies expected. Restructuring of large Belarusian companies would very likely imply some reduction of employment at the beginning of the period in which forecasts are made, but an improved performance of the enterprise sector would lead to employment growth. Scenarios are compared in the Table 3.

4.4. Differences among scenarios: some forecasting results

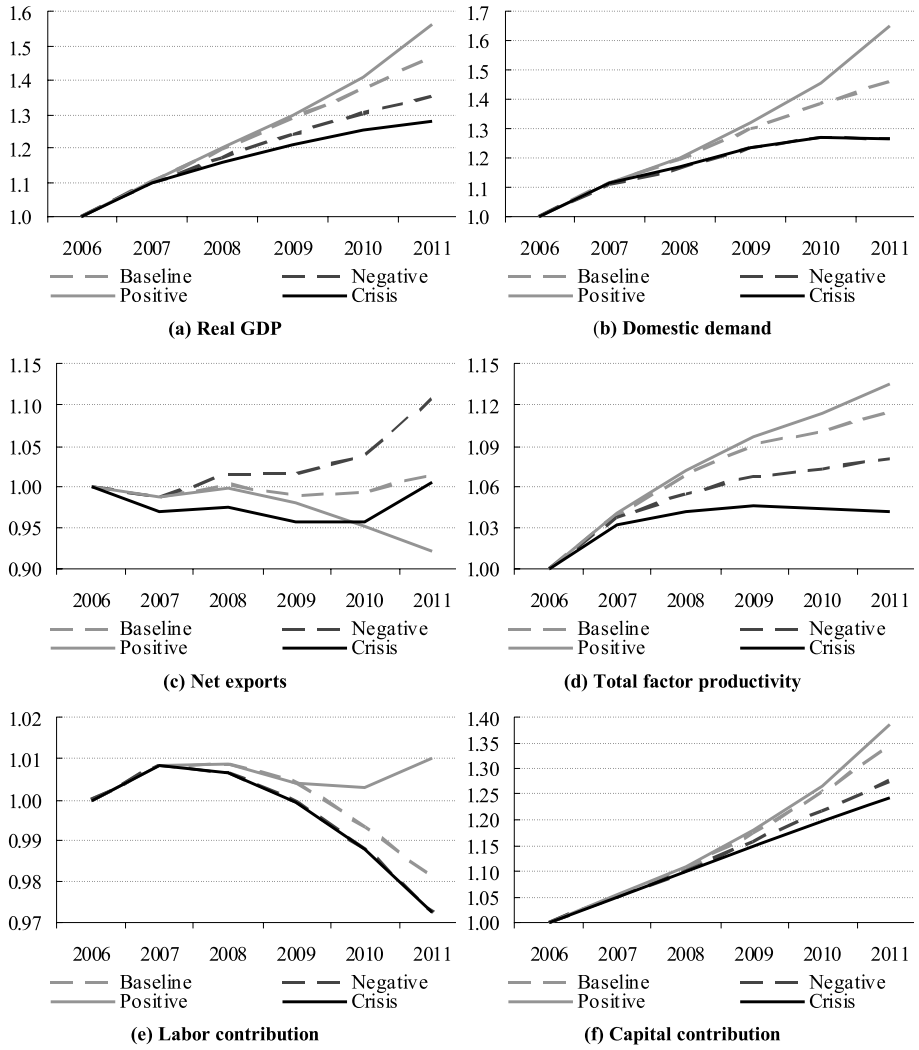
The insertion of exogenous variables into the model and its outcomes over a period of the 2nd quarter of 2007 and the 4th quarter of 2011 allow estimation of the results of economic policies suggested in each of the scenarios. In this section, intra-scenario differences are discussed in terms of the dynamics of GDP and its components.

It seems that the difference between the baseline and positive scenario are the most illuminating since the former and the latter reflect two different models of economic policies in Belarus: preservation of state controls over the economy and a greater role for private sector development. Figure 7(a) shows that there is substantial difference among the scenarios in terms of GDP dynamics, particularly over 2007–2009. However, over five years cumulative GDP growth is 10 percentage points higher than in the baseline scenario.

Differences in the dynamics of aggregate demand are more profound. The implementation of the positive scenario allows domestic demand to increase by 65% in the course of five years, while the baseline one suggests only a 46%-increase (Figure 7(b)). More substantial domestic demand growth also leads to growth of imports and, accordingly, reduction of net exports (Figure 7 (c)). This reduction is greater than in the case of the baseline scenario.

Differential dynamics of GDP growth could be explained by differences in the factor dynamics, such as capital stock, employment, and total factor productivity

(each of the factors explains approximately one-third of differences among the scenarios, see Figure 7(e) – (f)).



Note. Indexes, 2006 = 1.
Source: IPM Research Center.

Figure 7: Supply and demand components of GDP growth: Model-based forecasts

Differences in the dynamics of aggregate demand are more profound. The implementation of the positive scenario allows domestic demand to increase by 65% in the course of five years, while the baseline one suggests only a 46%-increase (Figure 7(b)). More substantial domestic demand growth also leads to growth of im-

ports and, accordingly, reduction of net exports (Figure 7 (c)). This reduction is greater than in the case of the baseline scenario.

Differential dynamics of GDP growth could be explained by differences in the factor dynamics, such as capital stock, employment, and total factor productivity (each of the factors explains approximately one-third of differences among the scenarios, see Figure 7(e) – (f)).

Therefore, liberalization policies are positive for capital accumulation (also facilitated by FDI inflow), labor market development (due to the growing demand for labor by the private sector), and competitiveness of the Belarusian economy (i.e. total factor productivity). Moreover, the positive scenario is also more advantageous for ordinary citizens due to increased consumption (as a component of domestic demand).

The negative scenario makes correction of economic policies more grounded, especially when transformation of the baseline scenario to the negative one is very likely. Differences in cumulative GDP growth between the positive and negative scenario exceeds 20 percentage points, while differences in domestic demand growth are close to 40 percentage points. More than S of the difference in cumulative GDP growth can be explained by the difference in capital stock growth, while more than j is related to difference in total factor productivity dynamics. The rest is explained by varying employment dynamics. Therefore, when the negative scenario is materialized, the long-term potential of economic development is undermined so economic policies have to be corrected.

The crisis scenario is included into the model in order to show the dependency of the Belarusian economy upon exports. Apparently, the decline of exports growth is deleterious for the country's economy. Deceleration of exports growth is observed over the last three years. This adverse trend is explained by structural changes taking place at the Russian market (Chubrik (2007)). When the trend continues over a long period of time, some repercussions of the crisis scenario could resurface. In any case, competition-enhancement policies would allow avoidance of both the crisis and negative scenarios.

5. CONCLUSION

In this chapter, a macroeconometric model of the Belarusian economy is explicated. This model shows that the economy of Belarus is highly sensitive to external shocks (an energy price hike is used as an illustration). Reaction to shocks is to a large extent dependent upon economic policy change implemented after the shock.

The paper constructs four scenarios of economic policy change that determine changes in the model's exogenous variables. One of the scenarios (positive one) reflects a revision of economic policies towards liberalization, while other scenarios (baseline, negative, and crisis one) suggest no change in economic policies (while there are some differences in financing foreign trade deficit).

The model's outcome for each of these scenarios reveals substantial differences in the GDP dynamics (the difference in cumulative GDP growth over 2007–2011 between the positive and negative scenario exceeds 20 percentage points, or over

4% of GDP growth per annum). Moreover, when additional external shocks meet unchanged economic policies, the economy of Belarus would face serious structural problems after 2010–2011, including deterioration of national competitiveness, loss of trust in the national currency, deceleration of capital accumulation, reduction of incomes, acceleration of inflation, and so on.

This situation could only be dealt with by implementing liberalization and restructuring policies (in fact, this complies with the conclusions made in Chapter I of this book) and an orientation towards attraction of FDI as the major source of foreign trade deficit financing. In the model, these economic policies lead to more impressive dynamics of major macroeconomic indicators and social economic development of the country. In sum, the choice of economic policy that is made now would be decisive for Belarus' development over the long run.

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Chapter V

Public Attitudes towards Market Economy Values in Belarus

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1. INTRODUCTION

In the previous chapters of this book, it has been persistently argued that the success of social and redistribution policies as well as the political business cycle run in Belarus has depended on decent rates of GDP growth. The latter, in its turn, has been supported by a rather favorable external economic environment. However, an external shock, which is largely about an energy price hike, could deplete the efficiency of economic and social policies. Foundations for long-term economic development would require revising the current economic policy stance towards greater liberalization. However, any serious economic policy change demands, as a rule, support of at least a certain fraction of society. Such support can be detected by studying values and attitudes of the people. Therefore, this chapter tests the amount and the nature of support for market reforms in Belarus.

Various studies show that in 2006 a majority of the population was satisfied with the existing economic situation and considered the material circumstances as good. In addition, liberal market reforms have been perceived with some caution, while their necessity has not been largely understood (Eurasian Monitor (2007), IISEPS (2007)). In fact, such an attitude to market reforms reflects the actual level of liberalization of the Belarusian economy. The estimates made by the European Bank for Reconstruction and Development (EBRD) suggest that the Belarusian economy is the last but one in terms of progress in market reforms (EBRD (2007)).

The 'mass consciousness' of Belarusians is shaped by a variety of factors. The influences range from biased information provided by domestic television (largely controlled by the state) to traveling to the CIS and the non-CIS (or travel stories). The attitudes displayed are sometimes contradictory. For instance, the population of Belarus seems to be supportive of market reforms, but in favor of existing economic policies. Further, the union with Russia is not very much desired, but cheap energy supplies are welcome. As for foreign investors, their coming is not objected, but the sale of enterprises to foreigners is rejected. Last but not least, EU membership is supported along with the pursuit of 'socially-oriented policies'. These paradoxes are explored below.

This chapter is organized as follows. The second section describes the research methodology. An analysis of socio-economic characteristics of the population and of public attitudes towards economic policy issues and reforms are conducted in the third and fourth sections, respectively. In the fifth section, the sources of information that people resort to are explored. These sources are important as a fac-

tor defining underlying values. The final section concludes.

2. RESEARCH METHODOLOGY

This chapter makes a brave attempt to generalize and systematize information about the public attitudes towards economic policies and market reforms in Belarus. For that purpose, survey data have been collected and analyzed. In particular, a special questionnaire has been developed. This questionnaire includes several sets of questions about the respondents' vision of social and economic well-being, their attitudes towards market values, economic policies, entrepreneurial activity, private property rights, etc. The size of a representative sample is 1,000 respondents.

One of the complexities the study has been confronted with is a mixed understanding of such notions as 'market reforms' and 'market economy'. In order to avoid collision of interpretations, the methodology of the European Bank for Reconstruction and Development (EBRD) has been utilized. The EBRD publishes its annual Transition Report that provides evaluation of progress in economic reforms in 27 countries of Central and Eastern Europe and the former USSR. Specifically, nine fields of reform are analyzed and assessed against the benchmark of a fully-fledged market economy:

- Large-scale privatization (LSP);
- Small-scale privatization (SSP);
- Governance and enterprise restructuring (GER);
- Price liberalization (PL);
- Trade and foreign exchange system (TFES);
- Competition policy (CP);
- Banking reform and interest rate liberalization (BRIRL);
- Securities markets and non-bank financial institutions (SMNB);
- Overall infrastructure reform (OIR).

The evaluation is done on the basis of the four grade scale ('+' and '–' are possible). A score of 1 means no or little progress in transformation and 4+ is associated with the standards and performance norms of advanced industrial economies.[1] In addition to the nine EBRD's indicators, the experts of the IPM Research Center added labour market (LM) and land property (LP) reforms. We used then the principles of the EBRD's scoring in order to formulate claims to be assessed by the public. These claims directly correspond to the EBRD's assessment of progress in market reforms. However, we converted the original scale (from 1 to 4+) into a five-grade one (from 1 to 5). The respondents have been asked to rank their preferences in each of the 11 areas of market reforms. The meaning of the scores has been set as follows: '1' means a full agreement with a claim running in stark contrast to the standards and performance norms of market economy, while '5' means a full agreement with a claim reflecting the standards observed across advanced market economies (Table 1).

[1] Detailed information about the EBRD methodology is available at: http://www.ebrd.com/country/sector/econo/stats/timeth.htm. It is also published in every Transition Report (see, for instance, EBRD (2007). *Transition Report 2007. Life in Transition*).

Table 1

Attitudes towards market reforms

Claim, corresponding to the characteristics of the planned economy	Indicator / score	Claim, corresponding to the standards of advanced market economies
Sale of small-scale enterprises requires permission of the state	SSP 1–2–3–4–5	Small enterprises have to be privately owned and sold and bought without any constraints
The majority of prices should be set and controlled by the state	PL 1–2–3–4–5	The majority of prices should be set on the basis of interaction of demand and supply without state intervention
The vast majority of large enterprises should be state-owned	LSP 1–2–3–4–5	The vast majority of large enterprises should be privately owned
The largest banks have to be owned by the state and should execute state programmes	BRIRL 1–2–3–4–5	Bank regulation has to rest on international norms
Loss-making and uncompetitive enterprises should be subsidized by the state	GER 1–2–3–4–5	Viability of enterprises should be defined by their ability to produce competitive products
Controls over exports, imports, and currency trade should be exercised by the state	TFES 1–2–3–4–5	Minimal regulation of exports, imports and currency trade compatible with international norms is sufficient
The state should create special conditions for individual enterprises and industries and support domestic producers	CP 1–2–3–4–5	All enterprises should face binding and transparent ‘rules of the game’
The state should determine securities of which companies may be traded and which not	SMNB 1–2–3–4–5	Free trade of securities, regulation of which relies on international standards
The energy sector, telecommunications, housing and communal services, and road network all have to be owned by the state	OIR 1–2–3–4–5	Access should be provided for private companies to work in such sectors as energy, telecommunications, housing and communal services, and road network
Employment and wage setting should be regulated by the state even in private companies	LM 1–2–3–4–5	Employment and wage setting should be a part of the labor contract among employee, employer and trade union
Land should be owned by the state except small lots whose sale should be also limited	LP 1–2–3–4–5	With some exceptions, land should be sold and bought freely, including foreign citizens

Note. 1 – fully agree with the first claim, 2 – partially agree with the first claim, 3 – disagree with both statements, 4 – partially agree with the second claim, and 5 – fully agree with the second claim.

The use of the above-described methodology allows concretization of the abstract notion of ‘market reforms’ by delineating their essential elements. It is also possible to juxtapose these data with the EBRD’s assessment of the Belarusian situation.

3. SOCIO-ECONOMIC CHARACTERISTICS OF THE BELARUSIAN POPULATION

3.1. The well-being of Belarusian households

Over the last decade and more, the Ministry of Statistics and Analysis of Belarus has registered a continuous growth of real incomes of the population. However, the official data on incomes and wages do not tell us much about the quality of life of an average Belarusian family. Often, in small- and medium-sized towns and cities, the average wage does not reach USD 300 (the officially declared economy-wide average monthly wage), but BYR 300,000 (which is twice as less). Our research permits analyzing the level of incomes of an average household (family) and, to some extent, to address the issue of the quality of its life (i.e. well-being, or major expenditure items, expenditure limits, etc.).

According to the data collected in the course of conducting the survey, monthly incomes of the vast majority of Belarusian families do not exceed USD 200 per family member (Table 2). Incomes below USD 75 (the budget of the living wage existed at the time the survey was conducted) per family member comprise 9% of Belarusian families, between USD 200 and 300 – 13.7%, between 300 and 500 – 5.8%, and above USD 500 – only 1.7% of them.

Table 2

Answers to the question: 'What is the average monthly income per family member, if possible sources of income are considered?'

	% of respondents
Up to USD 100	25
Between USD 100 and 150	32
Between USD 150 and 200	22
Above USD 200	22

Note. Answers have initially been collected in BYR and then converted into US Dollars and grouped for the purpose of convenience.
Source: IPM Research Center.

The data show that 14% of families spend one-fourth of their income on food and (to pay for) public utilities. Only about one-third of Belarusian households (38%) spend less then 50% on these items. Another one-third has to spend between 51% and 74% of their monthly income on these essentials. Finally, 11% of households spend their income only on food and public utilities. Nevertheless, the majority of families treat their level of income as an 'average' one. A mere 10.3% of families consider themselves as being relatively rich: 9.7% of respondents consider their incomes 'above average' (9.7%) or even 'high' (0.6%). While 11% of families spend their income solely on food and public utilities, the number of those who consider themselves as having 'low' incomes is only 8%. Finally, 22% of respondents think their incomes are 'below average'.

Table 3

Answers to the question: 'How do you regard the income you obtain in relation to other people's income?' and comparison with actual levels of household income, %

	Low	Below Average	Average	Above Average	High
Up to USD 75	11.9	37.3	50.8	–	–
From USD 75 to 100	14.3	37.5	46.4	1.8	–
From USD 100 to 150	8.5	26.8	62.9	1.9	–
From USD 150 to 200	4.7	17.6	67.6	10.1	–
From USD 200 to 300	4.3	16.0	68.1	10.6	1.1
From USD 300 to 500	–	12.8	48.7	35.9	2.6
Above USD 500	–	–	54.5	36.4	9.1

Source: IPM Research Center.

As can be deducted from the Table 3, roughly similar numbers of people rank their family income as 'average' despite a significant income differentiation per family member. Approximately 50% of the respondents whose monthly incomes are below USD 100 and between USD 300 and 500 (per family member) treat these levels as 'average'. Moreover, half of the respondents whose monthly income exceeds USD 500 per family member also believe that this level is somewhat typical for Belarus (the number of those in the sample is 12 people or 1.7% of respondents). These perceptions suggest that the majority of the population does not perceive income inequality.

Table 4

Family income and residence, %

Residence (thousand people)	Monthly income per family member, USD						
	< 75	75–100	100–150	150–200	200–300	300–500	> 500
Less than 10	15.7	19.3	35.7	17.7	8.8	2.0	0.8
10–100	11.3	25.0	27.5	22.5	12.5	1.3	–
100–500	2.9	14.2	31.4	23.4	16.7	8.4	2.9
Minsk	4.2	8.5	27.1	27.1	18.6	11.9	2.5

Source: IPM Research Center.

The rural population and those living in small towns appear to be least wealthy compared to inhabitants of other localities (Table 4). On the contrary, the majority of families with a high income either live in larger cities (50% of families whose monthly income is between USD 300 and 500 per family member and 58% of families whose monthly income is above USD 500) or in Minsk (35% and 25%, respectively).

The observation of level of incomes of the respondents is compounded by the survey data on what is affordable (and what is not) for Belarusians (Table 5). It follows that only about one-third can purchase higher-quality, diverse food and clothes without running into financial trouble, while more than a half of the families can consume only essential food and clothes. In addition, every fourth family can not afford basic household appliances. At the same time, nearly half of the population (40%) can afford buying a second-hand car (so it is no longer a luxury

item). The role of luxury items is now represented by a flat (or real estate). Only 0.2% of the population can afford this.

Table 5

Answers to the question: 'Which of the situations described below are most compatible with expenditure items (at least some of them) affordable to you?'

		% of respondents
A	Sometimes simple food and inexpensive clothes are not affordable	11.8
	Only necessary food and clothes are affordable	53.9
	Higher-quality, diverse food and good clothes are affordable	28.0
	Any food and clothes of choice are affordable	6.2
B	Basic household appliances (refrigerator, TV set, cooker, iron, etc.) are not affordable	26.1
	Only basic household appliances (refrigerator, TV set, cooker, iron, tape-recorder, etc.) are affordable	47.6
	Modern household appliances (stereo, kitchen machine, microwave oven, personal computer, etc.) are affordable	23.2
	More sophisticated household appliances (HI-FI / HI-END video- and audio-equipment, DVD-player, home cinema, laptop, etc.) are affordable	3.1
C	Car and its maintenance are not affordable	59.1
	Inexpensive second-hand car is affordable	28.3
	Second-hand, but relatively good-quality car is affordable	11.9
	New or almost new car is affordable	0.7
D	Real estate (flat) is not affordable	86.9
	Real estate (flat) is affordable at the expense of savings over several years and/or loan for improving living conditions	12.9
	Flat or additional real estate (for leisure, as investment opportunity, etc.) is affordable	0.2

Source: IPM Research Center.

3.2. Economic and social activity

Importantly, a quarter of the country's population relies on additional sources of income apart from the primary source (earned at a major place of employment). But the exact number of people relying on additional income varies from 20% in the rural areas to 27% in Minsk and up to 31% in urban areas in general (larger cities). These indicators are rather high. In particular, additional activity on the labor market also varies significantly due to respondent's social status (Table 6).

For most of the social groups possibilities for gaining additional income are rather limited. This is because of the constraints on private entrepreneurship (Chubrik, Pelipas, Rakova (2007)), and the absence of job vacancies on the vast majority of regional labor markets (i.e. villages and small towns). In addition, lower income of the population impedes the expansion of the services market (that potentially could absorb all those seeking higher-paid jobs). Indeed, 24% share of the population earning extra money is substantial. This indicator reflects a high degree of economic activity of the population. It may be expected that as soon as the administrative regulation of small business and the stringency of labor market regulation

are lifted, then a surge of entrepreneurial activity will occur. Therefore, the social consequences of structural reforms could be smoothened.

Table 6

Answers to the question: 'Do you have additional sources of income apart from the primary source?' and the social status of a respondent, %

	Yes	No
Business owner (co-owner)	–	100.0
Executive/director, top manager	33.3	66.7
Head of a department, deputy (director), middle-rank manager	43.9	56.1
Skilled specialist, manager	42.2	57.8
Worker, shop assistant	27.4	72.6
Office employee, civil servant	28.1	71.9
Soldier, police officer, employee of the Ministry of Interior	50.0	50.0
Private (individual) entrepreneur, farmer	32.1	67.9
Pupil, student	16.7	83.3
Housewife, on maternity leave	16.1	83.9
Pensioner, disabled	7.4	92.6
Temporary unemployed	22.2	77.8
Other	–	100.0

Source: IPM Research Center.

Table 7

Answers to the question: 'How do you personally feel about economic situation?'

	% of respondents
I can not adjust to today's life in either way	4.3
I have gotten accustomed to abolishing the customary way of living and limiting my spending (big and small)	9.5
I am trying to adjust by using any opportunity to earn money in order to secure a decent way of living for me and my family	23.6
I am using new opportunities to achieve more in my life	17.8
I have not changed my way of life; nothing has changed for me over the last years	40.5
Hard to answer	4.3
Total	100.0

Source: IPM Research Center.

The analysis of social adjustment of the population to socio-economic change shows that adjustment is closely connected with the level of well-being and attempts to improve it (Table 7). In particular, the data show that 40% of the population takes some steps to improve the well-being of their family. The rest is merely 'drifting' or simply cutting their expenditures.

3.3. Economic expectations and optimism

The expectations of Belarusians can be divided into two big groups. About 50% of respondents are confident that their economic well-being is not going to change notably in either way. At the same time, 37% is more optimistic believing in growth of well-be-

ing in the future. It has to be mentioned that the survey had been conducted in July 2006, so that the issues concerning possible price increases of gas imported from Russia as well as the revision of the terms and conditions of oil supply were not on the agenda at that time. Consequently, the expectations could be somewhat overblown.

Distribution of expectations of the dynamics of material well-being depending on the place of living is shown in the Table 8. It appears that pessimistic expectations about individual/family well-being increase as the size of the locality grows: from 5.5% in villages and towns to 9.4% in Minsk. This can be explained by a greater awareness of the current situation by those living in larger localities, resulting from access to a variety of sources of information. Smaller places are often populated by people with more adaptive expectations so they perceive their well-being as depending on the past record. The majority of optimists (54%) live in large cities, while in villages and small towns this indicator varies between 32% and 36% (44% in Minsk). This is related to the fact that major profitable enterprises (or sheltered by the state) are usually located in large cities. Accordingly, employees of these enterprises are more optimistic about their chances in life.

Table 8

Answers to the question: 'Do you expect any changes in your well-being in the near future?' and the size of locality, %

	Size of locality, thousand people			
	< 10	**10–100**	**100–500**	**Minsk**
Significant deterioration	0.3	1.9	0.6	1.9
Slight deterioration	5.2	6.5	5.9	7.5
No change	58.5	59.2	39.4	46.2
Slight improvement	34.5	29.6	40.9	38.8
Significant improvement	1.5	2.8	13.2	5.6

Source: IPM Research Center.

Table 9

Answers to the question: 'What is your opinion about possible changes of the country's welfare in the near future?' and the size of locality, %

	Size of locality, thousand people			
	< 10	**10–100**	**100–500**	**Minsk**
Significant deterioration	1.0	2.8	2.1	1.9
Slight deterioration	4.4	6.5	10.2	10.3
No change	46.6	51.4	30.1	32.1
Slight improvement	43.9	37.4	44.6	50.6
Significant improvement	4.1	1.9	13.0	5.1

Source: IPM Research Center.

Some similarities in expectations are registered when the country's welfare is discussed (Table 9). Only 2% of respondents expect a significant deterioration, while for 8 % a slight deterioration is likely. Further, 38% of respondents think that no changes are expected; 45% project a slight improvement and, finally, 7% believe in a signif-

icant improvement. It is informative that expectations about the country's performance are relatively more optimistic than expectations about individual well-being.

In general, expectations of individual well-being are closely related with the expectations of changes of the economic situation in the country and approval (or otherwise) of the current economic policies. Although a fraction of the respondents expects that their well-being is going to deteriorate, 62% of them are positive about current economic policies, while 28% expect that the economic situation in Belarus would improve (Table 10). Both optimists and pessimists are generally in favor of the economic policies currently pursued by the government. And only 25% of those who expect their well-being is going to improve are negative about these policies (Table 11).

Table 10

Expectations of personal well-being and the country's economic performance, %

Expectations of individual well-being	Expectations of the country's economic performance		
	Deterioration	No Change	Improvement
Deterioration	32.8	39.3	27.9
No change	10.7	53.3	36.0
Improvement	4.5	21.2	74.3

Source: IPM Research Center.

In general, the population of Belarus is much more concerned with broader social problems than strictly economic ones. Among the former are alcoholism (44%), access to a higher-quality healthcare (24%), and low fertility and depopulation (43%). As for economic issues, high real estate prices (34%) and low values of pensions and incomes (38%) have been mentioned. A possible gas price increase has been considered as an economic problem by only 16% of respondents.

Table 11

Answers to the question: 'How do you personally evaluate the current economic policies' and expectations of individual well-being?', %

Expectations concerning personal well-being	Attitudes towards economic policies	
	Negative	Negative
Deterioration	38.3	61.7
No change	25.3	74.7
Improvement	24.6	75.4

Source: IPM Research Center.

Satisfaction with the material welfare and an optimistic picture of the future are behind a relatively high share of respondents considering themselves as 'being happy'. In fact, our study reveals that more than 70% of the population of contemporary Belarus claim that they are happy (25% answer 'yes', and 48% answer 'rather yes than no'), which is compatible with the data collected by the Eurasian Monitor (2007).[2]

[2] See the data of the Russian Foundation 'The Legacy of Eurasia' and its monitoring of the social attitudes in Belarus, Russia, Ukraine, and Kazakhstan, available at: http://www.belgazeta.by/20060220.7/020182961/.

To sum up, the analysis of the social and economic characteristics of the population show that people are more or less happy about their economic well-being. They are also optimistic about its future dynamics. It is not only individual wealth that is expected to increase, but also that of the economy as a whole. In addition, the population is supportive of the current economic policies. If so, then market reforms can be perceived somewhat negatively or at least with caution. This issue is explored in the next section.

4. ATTITUDE TOWARDS MARKET REFORMS AND ECONOMIC POLICIES

4.1. Public preferences over the type of 'economic model' in Belarus

The results of our study show that in general a market economy is considered as an efficient construct by the majority of Belarusians. In particular, 68% of respondents agree with the claim that '*as a rule, in countries with a market economy the level of living is higher than in countries with a significant degree of state intervention*'. Nevertheless, this claim is rejected by 33% of the population living in the rural areas and by 31% of those living in urban areas (by 27% of those living in Minsk). All these people are probably adherents of various types of administrative intervention or even a command economy. Also, answers to this question correspond to respondent's age. The advantages of a market economy are not welcomed by 24–26% of respondents whose age is below 34 years old, 32% – by those who are between 55 and 64 years old and by 49% of those who are over 65 years old.

It is interesting to note that the majority of respondents (66%) believe that *'there are market reforms currently underway in Belarus'*. The belief in 'ongoing market reforms' is related to the dynamics of incomes of the respondents. The smaller the income per family member, the greater the likelihood that a family member believes that market reforms are implemented in the country (Table 12). One possible explanation for this attitude is that respondents with higher monthly incomes are much more likely employed in the market or quasi-market sectors of the economy. In these sectors there is an understanding that market reforms in Belarus have not yet been implemented on a large scale (or even at a small scale). Accordingly, if there were such reforms, these people could have received much higher incomes or, at least, had bigger opportunities for increasing their incomes. It is also evident that people with higher incomes tend to trust the government propaganda much less than people with lower incomes. They are able to compare the real situation at their enterprise (or a branch of industry) with what is going on at other enterprises (branches) and to understand the barriers to development erected by the state (such as protectionism, entry barriers, lobbyism, etc.). Also, this group of people has access to a greater variety of sources of information. Another confirmation of this argument is that the above-mentioned claim is shared by 71% of the respondents employed in the private sector and by 56% of the respondents employed in the public sector.

Table 12

Attitude towards the claim: 'Do you Believe that there are market reforms underway in Belarus?' and monthly income per family member, %

	Monthly income per family member, USD						
	< 75	**75–100**	**100–150**	**150–200**	**200–300**	**300–500**	**> 500**
Yes	81.7	71.2	73.4	65.8	65.6	65.8	41.7
No	18.3	28.8	26.6	34.2	34.4	34.2	58.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: IPM Research Center.

At the same time, the claim that *'Belarus does not need economic reforms'* is supported by 39% of respondents, while 59% of them disagrees with this claim. In Minsk this figure is much higher, namely 81%, while in places populated by less than 10,000 people it is 47%. Therefore, the majority supports economic reforms and also considers their implementation in Belarus. Accordingly, it becomes understandable why 66% of the population of Belarus shares the belief that *'over the last ten years Belarus has achieved a greater success in economic development than the majority of its neighboring countries'*.

Apparently, the opinion that market reforms are underway in Belarus is controversial. The controversy arises because of the mixed understanding of the notion of 'market reforms' and of how reforms are connected with the economic policies persuaded in Belarus. This is the reason for applying a modified EBRD methodology as described in section two of this chapter.

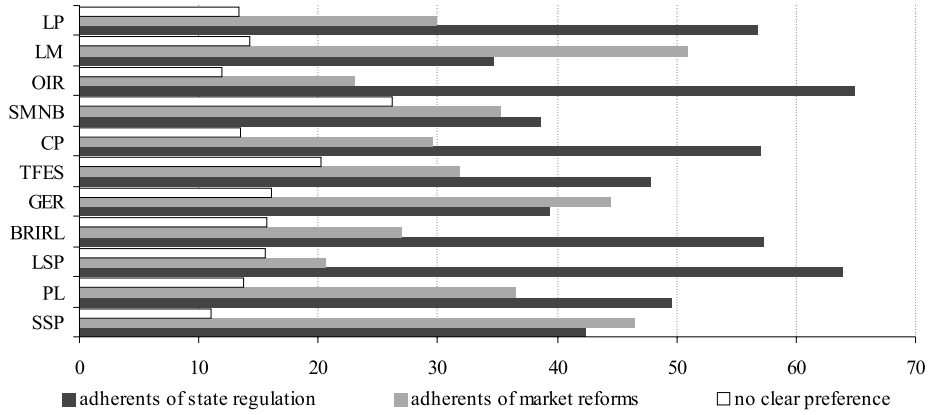
4.2. Adherents and opponents of market reforms

Despite the low progress in market reforms in Belarus and the approval of such a policy attitude by the majority of the population, more than one-third of respondents (34%) support market reforms. But at the same time, half of the population adheres to state regulation. Finally, only 15% of respondents have not expressed their preferences.

Figure 1 shows the attitudes towards each of the 11 fields of reform (see section two for details). The adherents of state regulation are defined as those who choose scales '1' or '2' (of a five-grade scale), while the adherents of market reforms tend to select'4' or '5'. When scale '3' is picked, a respondent is considered as having no clear preference over state or market regulation. As can be seen, the majority of respondents prefer state regulation (by choosing scales '1' or '2' for the most fields of reform). However, market reforms in such areas as small-scale privatization, enterprise restructuring, and labor market regulation was supported at a broader scale.

The survey shows that people are most supportive of labor market reforms. In particular, a claim that '*employment and wages should be a subject of a contract among employee, employer, and trade union'* was supported by 51% of respondents. At the same time, 34% of respondents agreed with the claim that '*employment and wages should be tightly controlled by the state'*. Nevertheless, in their assessment of

labor market reforms, more than one-quarter of respondents opted for scale '5' so they can be considered as convinced adherents of reforms at the labor market.[3]



Source: IPM Research Center.

Figure 1: Adherents of market reforms and state regulation, %

At the same time, opposition to reforms is manifested in disfavor of large-scale privatization and infrastructure reform (closely connected with large-scale privatization). In particular, 64% of respondents consider that *'the vast majority of large-scale enterprises should be owned by the state'*. A roughly similar percentage of the population (65%) supports state ownership of infrastructure objects. In addition, 41% of respondents fully agree with the claim that *'energy, telecommunications, public utilities, and roads have to be owned by the state*'.

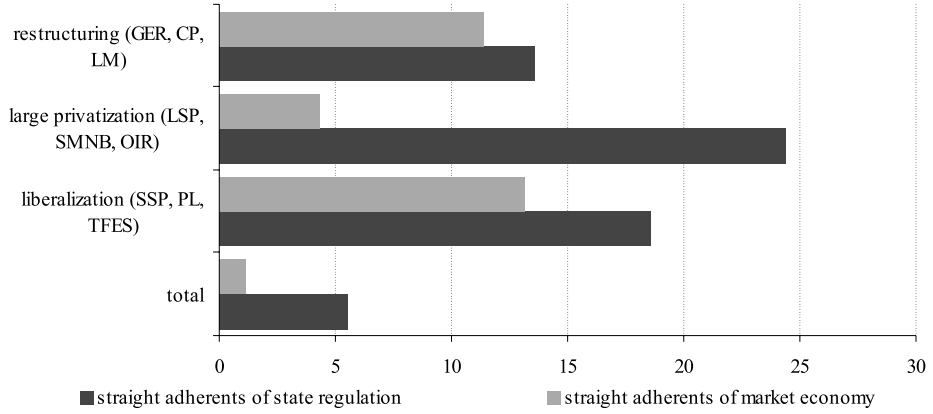
State regulation is also welcome in such areas as land ownership, competition policy, and banking sector reform. Almost one-third of respondents are convinced opponents of banking sector reform by saying that '*the largest banks should be owned by the state and implement state programs*'. Approximately a similar percentage of the population absolutely opposes the statement that *'land, with some minor exception, should be traded freely, including sale to foreign citizens'*. As for reform of the securities market and non-bank financial institutions, people tend to be much less aware of the type of regulation that should be adopted.

In general, it follows that straight adherents of state regulation substantially exceed the number of adherents of market reforms in quantitative terms. At the same time, the number of less straight adherents of state and market are very close to each other on average (but the number of 'state regulationists' is slightly above that of 'market protagonists').

The analysis of the degree of consistency of respondents towards market reforms shows that consistent supporters are a tiny minority (Figure 2). 'Straight' (or 'convinced') supporters of state regulation are classified as those putting scales

[3] 'Convinced' adherents of either state regulation or reforms are defined to be those putting scales '1' or '5', respectively. 'Less convinced' ones are those who used scales '2' and '4'.

'1' or '2' on all 11 areas of market reforms. The number of such people is only 5.5% of all respondents. As for the straight adherents of a market economy (those who put '4' or '5' for all 11 fields of reform), this is just 1.1%.



Source: IPM Research Center.

Figure 2: Straight supporters of state and market

For the sake of conducting a more detailed analysis, fields of reform have been grouped into three encompassing categories:

– Restructuring (enterprises restructuring, competition policy, and labor market regulation);
– 'Massive' privatization (large-scale privatization, securities market and infrastructure reform);
– Liberalization (small-scale privatization, price liberalization and trade liberalization).[4]

The research shows that 'massive' privatization is the least supported area of reform in Belarus. Almost one-fourth of the survey's participants are strictly against reform of ownership of large enterprises. The number of those who support such reforms is more than five times less than the number of opponents. However, liberalization is supported in the most consistent way, but the number of adherents is still considerably less than the number of liberalization opponents. Restructuring is equally favored and disfavored, judging by the number of adherents and opponents.

To summarize, the population is least respectful towards large-scale privatization, infrastructure reform, and liberalization of banking sector functioning. We are inclined to explain such pattern of attitudes by a targeted policy of advancing the positive image of the 'Belarusian economic model' based on the dominance of state ownership. The number of adherents of small-scale privatization in Belarus is below 50% of the population. It suggests that the people are convinced of the efficiency of state ownership and distrustful to the opportunities private sector gen-

[4] Banking reform and interest rate liberalization and land ownership are not included.

erates. The fact that labor market liberalization is most welcomed by the population can be explained as follows. Many of respondents are directly confronted with the problems and deficiencies related to state regulation of labor market. As a result, propaganda of state-run media is undermined by everyday real-life experience. However, motivation and values that lie behind the attitudes recorded in the survey require additional, deeper investigation.

4.3. Public attitudes towards reform progress and the current economic situation

The application of the EBRD methodology allows a compatibility check between recorded public attitudes and the real-life situation. This has been done by juxtaposing the results of the survey to the real economic situation.[5] Table 13 describes the methodology behind such a juxtaposition.

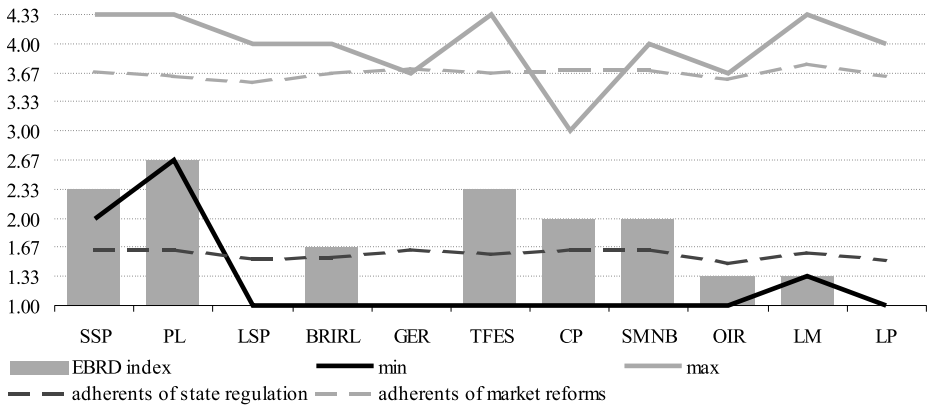
Table 13

Transformation of the scale of the analyses into the EBRD scale

EBRD scale	1	1+	2-	2	2+	3	3+	4-	4	4+
Scale of the analyses	1		2			4			5	

Note. Score 3 – disagree with both claims – was excluded from the analyses.

The results are displayed at the Figure 3. Columns reflect the EBRD's estimates of reform progress made in Belarus, while 'min' and 'max' curves denote the minimum and maximum progress achieved among 27 countries in transition in each of the fields of reform. The lines 'adherents of state regulation' and 'adherents of market reforms' illustrate the average value of preferences of corresponding groups over each of the reform fields.



Source: EBRD (2006) *Transition Report 2006*, the authors' calculations.

Figure 3: Expectations of adherents of state regulation and market reforms as compared with the EBRD's estimation of reform progress

[5] Technically, we compare our scale (from 1 to 5) to the EBRD's original scale (from 1 to 4+).

In many instances, the EBRD considers the reform progress of Belarus in many fields as rather low, including price liberalization, large-scale privatization, and enterprise restructuring. We also assess that similar progress is achieved in labor market reforms and land reform (five fields of 11).

The current situation with reforms in Belarus is on average compatible with the expectations of adherents of state regulation. But there are some differences in a number of fields. Specifically, adherents of state regulation prefer to reduce the scale of price and foreign trade liberalization (in quantitative terms, by two times at least). Such an attitude can be most likely explained by the belief in the ability of authorities to control price increase along with the assurance that domestic companies can be efficiently sheltered from foreign competition by protectionist policy measures. Also, the adherents of state regulation appear to be unsatisfied with an 'excessively intense' small-scale privatization. It follows that this group values state ownership as the most efficient one irrespective of the company's size. In addition, 'state regulationists' support a low degree of securities market liberalization and less stringent competition policy (by preserving some 'special rules' for selected enterprises) in comparison with the actual progress achieved in these fields of reform. At the same time, adherents of state regulation opt for somewhat 'more active' reforms in such fields as large-scale privatization and enterprise restructuring.

The adherents of market reform are deeply unsatisfied with the degree of economic transformation achieved in Belarus. The level of reforms that their protagonists would like to observe in Belarus is similar to the one displayed by the eight former socialist countries on the eve of their EU membership in 2004. As for competition policy and enterprise restructuring, 'reform supporters' would like to see an even greater degree of progress than the one reached across 27 former socialist countries.

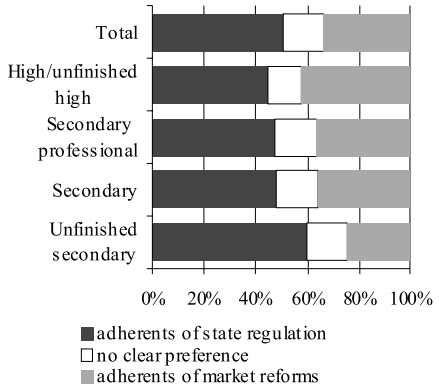
4.4. Social characteristics of the adherents of market reforms

In terms of age, this social group is densely populated with the youth (i.e. people whose age is ranging from 18 to 24 years old, Figure 5). However, this is the only age group where the number of reform supporters exceeds the number of reform opponents, albeit not substantially. It follows that the older the respondent, the more he/she prefers state regulation over markets. But this tendency is not very clearly manifested. For instance, almost one-fourth of the pension-age respondents favor market reforms.

There seems to be a direct relationship between the number of adherents of market reforms and the level of education (Figure 4). Reform supporters tend to have secondary or specialized secondary education. At the same time, while the number of adherents of reforms with higher education is the largest fraction, it does not exceed the number of 'educated' adherents of state regulation (Figure 5).

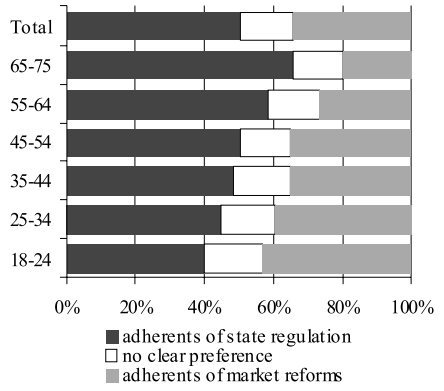
The largest share of reform supporters live in large cities (populated by 100,000–500,000 people), but their number is a bit more than one-third of the inhabitants (Figure 6). The share of reform supporters is largest in small cities and towns (up to 40% and more), exceeding this indicator for Minsk. Most likely, it can be explained

by a somewhat more difficult situation in small-sized localities. There are often city/town companies located; these companies often have economic problems resulting in a relatively high level of unemployment and lower incomes as compared with the ones in the capital of Belarus. In this situation, the people tend to see market reforms, including private sector development as a solution to their problems.



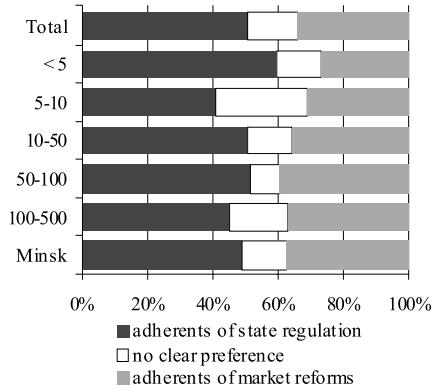
Source: IPM Research Center.

Figure 4: Attitudes towards reforms and level of education of respondents



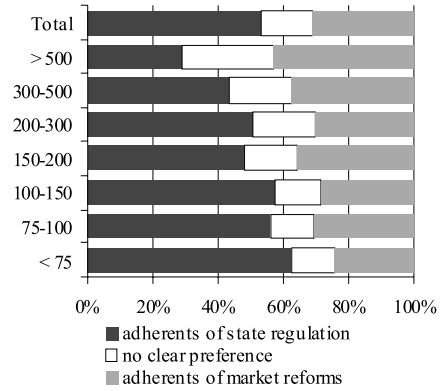
Source: IPM Research Center.

Figure 5: Attitudes towards reforms and age of respondents



Source: IPM Research Center.

Figure 6: Attitudes towards reforms and respondents' residence size



Source: IPM Research Center.

Figure 7: Attitudes towards reforms and respondents' incomes

There is no significant correlation between income of respondents and their attitude (Figure 7). It can be nevertheless said that the higher the income, the more people are inclined to support market reforms. But this claim does not apply to respondents whose monthly income varying between USD 100–150 and USD 200–300 per family member. The number of adherents of market reform declines among these income groups as

against the less wealthy households. Interestingly, most reform supporters (in absolute terms) are among those whose monthly income is between USD 100 and 150.

The reduction of the number of reform supporters among those whose monthly income ranges from USD 200–300 per family member can be explained by the fact that people have been capable of earning incomes above the average (USD 165.5 per person in the sample[6]) by seizing the opportunities offered by the current economic policies. Accordingly, they do not perceive the absence of reforms as an impediment to obtaining income in the future. As soon as a certain level of well-being is guaranteed by the state, no aspiration for change is recorded (in contrast to the attitudes of those whose incomes are below a certain threshold). However, respondents whose income is above the average level specified above express a pro-market attitude. This is because, as a rule, they are employed in the private sector.

An important motivation for public attitudes is the place of work. Private sector employees support reforms (48.3% of the total number of private sector employees). Public sector employees are much less supportive of market reforms in general and changes in individuals fields (Table 14). However, the fraction of reform adherents employed in the public sector exceeds the fraction of those employed in the private sector (63.2% as against 36.8%). This can be explained by the relatively small size of the private sector in Belarus. The total number of public sector employees largely exceeds the total number of private sector employees.

Table 14

Public attitudes towards reforms and employment (public versus private sector)

	% agreed with the claim at	
	state-owned enterprise	**private enterprise**
1. Small enterprises should be privately owned and sold and bought without constraints	47.1	66.7
2. The majority of prices should be set up on the basis of interaction of supply and demand without state intervention	34.0	56.3
3. The vast majority of large enterprises should be privately owned	18.0	30.7
4. Bank regulation should be based on international standards	25.6	37.0
5. The viability of enterprises should be defined by their ability to produce competitive goods	45.0	59.9
6. Minimal regulation of exports, imports, and currency trade compatible with international standards	31.7	44.8
7. All enterprises (including foreign ones) should face simple and transparent 'rules of the game'	27.6	44.8
8. Free sale and purchase of stock; regulation should be based on international standards	34.7	46.9
9. Private companies should be provided access to such sectors as energy, telecommunications, housing and communal services, and the road network	20.7	35.6
10. Employment and wages should be a part of the labor contract among employee, employer and trade union	51.1	63.0
11. With some exceptions, land should be sold and bought freely, including foreign citizens	29.0	45.5

Source: IPM Research Center.

[6] Respondents were not eager to answer to this question: Only 686 respondents of 1000 (i.e. a little more than 2/3) answered to it.

In our study, we have attempted to explore whether certain individual psychological features drive public attitudes. Accordingly, the respondents were questioned about the rules they follow in their life, including the inclination to stay closer to other people, be a part of society, seek personal security, feel dignity, or reach personal goals. In addition, a question about whether a respondent is impulsive or industrious was asked. However, no relationship between psychological characteristics of the respondents and their attitudes towards market reforms has been established. Some indirect relationship has been detected though, i.e. between the desire to fulfil oneself and adherence to market reforms.

There are certain differences found in the sources of information the adherents of reforms and state regulation use to obtain information about everyday events. The number of reform adherents reading independent media slightly exceeds the number of those not reading these media (43% as against 40%). Nevertheless, the majority of reform supporters (59%) do not read independent press. But the 'protagonists of the market' dominate among 17.8% of those respondents who do not watch the Belarusian TV. A considerable share of reform supporters (44%) also watches foreign TV channels. In general, 33.7% of the population watches foreign television, of which 45% support market reforms, while 40% reject them. No relation is found between the attitude towards reforms and whether respondents watch Russian TV or read state-owned Belarusian newspapers.

Internet users tend to be supportive of reforms (43.3% of the total number of web users, while 25% support state regulation). However, the number of users of the World Wide Web in Belarus is very small, so the majority of adherents of market reforms (73.4%) are among those who do not use the Internet.

It follows that the adherents of market reforms tend to watch more foreign TV channels, read more independent newspapers, and more use the Internet than others do. At the same time, only a relatively small share of respondents resort to all these media so their role in advancing certain economic attitudes appears to be limited. In addition, it is not clear what comes first: the use of independent media or the existing preference towards market economy values. In any case, a further development of online and other independent media use is a necessary step to expand alternative sources of information.

4.5. Attitude towards private ownership and private enterprises

A core aspect of market reforms is the development of a private sector. But in Belarus the vast majority of the population is employed at state-owned enterprises. To a large extent, this is a result of transformation (or, better to say, non-transformation) of property rights in Belarus. Partial privatization has been substituted by a creeping nationalization. The state has become the major stockholder in most joint-stock companies. As a result, these are not very different from typical state-owned enterprises. At the same time, serious barriers for private sector development have been put in place (Kozarzewski, Rakova (2006)).

According to the survey, 48% of respondents work for state-owned enterprises, while 19% work for private entities (33% do not work being pupils/students,

pensioners, unemployed, unoccupied, etc.). Therefore, the majority of economically active respondents is employed in the public sector (71%).

There is only some relation between occupation and residence. For instance, state-owned enterprises employ roughly similar numbers of people (about 70%) both in rural and urban areas, and also in Minsk. Regional figures also display some similarities. Only the numbers of those working for private sector companies vary from 22% in the countryside to 36% in large cities. It has to be noted that the number of unoccupied is highest in rural areas (48%), and much less than in cities (27%) and also in Minsk (25%). In addition, there is a clear relation between the age of a respondent and his/her employment in the private sector (Table 15).

Table 15

The relation between occupation (private/state-owned company) and respondents' age, %

	Age, years					
	18–24	**25–34**	**35–44**	**45–54**	**55–64**	**65–75**
State	54.5	68.5	70.1	79.1	91.5	80.0
Private	45.5	31.5	29.9	20.9	8.5	20.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: IPM Research Center.

Despite the positive attitude expressed towards the development of entrepreneurship in the country, half of respondents prefers to work for state-owned enterprises (60%) and only about one-third (33%) is employed by private sector companies. At the same time, 7% of respondents do not express clear preferences because of having difficulties in finding an answer. The majority of Belarusians tends to be happy about the type of ownership of enterprises they work for. For instance, 80% of respondents employed in the private sector prefer to work there. In a similar fashion, the vast majority of those employed in the public sector do not want to be employed in the private sector.

As it has been mentioned above, the population of Belarus generally prefers to work in the public sector. The logic the majority displays is becoming more apparent after the issue of motivation is touched upon. For this purpose, the people have been offered to evaluate their preferences according to a scale that incorporates both material and non-material stimuli (Table 16).

It appears that those respondents who prefer to work for a state-owned enterprise are motivated by regular wage (71%) and social provisions (59%) as well as stable employment prospects (43%). At the same time, the motives of those employed in the private sector are less concentrated and more complicated. There is a combination of high or stable wage or an opportunity of a more flexible work schedule (i.e. material motives) and entrepreneurial environment, a positive attitude towards employees, personal responsibility for success achieved, and possibilities of self-expression and career growth (i.e. psychological, non-material stimuli).

Table 16

Answers to the question: 'What is the motivation for your preference to work for either a private or public sector company?', %

	State-owned enterprise	Private enterprise
Entrepreneurial environment	0.8	17.7
Positive attitude towards employees; valuation of him/her as an individual	8.4	28.4
Continuous re-training at the expense of employer	8.7	4.6
Stable wage	70.8	17.4
Stable employment	43.4	5.2
More flexible work schedule	2.9	31.1
High wage	6.1	70.1
Opportunities for self-expression and career growth	6.6	21.3
Personal responsibility for success of work done	2.4	13.4
There are conditions that stimulates continuous improvement of professional skills in the competitive environment	3.4	14.9
Better future job prospects	8.9	9.5
Social provisions	59.3	5.5
Slackened pace of work, absence of tensions and stress	7.4	9.8
Other	1.5	3.4

Source: IPM Research Center.

4.6. Attitudes towards economic integration

The analysis of the geopolitical view of the population has traditionally focused on the attitudes towards economic integration of Belarus with the EU and the Russian Federation. The view that *'Belarus should become a member of the European Union'* is shared by 55% of the country's population. In Minsk, the number of integration supporters amounts to 68%, while in the rural areas this figure is 56%. There is a clear relation between the age of a respondent and his/her support of the EU membership: the younger a respondent, the more likely that he/she is 'pro-EU'. At the same time, there is no relationship between the level of income and support for Belarus' membership of the EU.

The attitude towards possible membership of Belarus of the EU is regularly explored by the Independent Institute for Socio-economic and Political Studies. For instance, in August 2006, only 36.5% of the population agreed with the claim that 'Belarus should become an EU member'. If there would be a referendum about EU membership, only 21% of the population would support such a step. The same question but in relation to integration with Russia was answered affirmative by 27.3% of the population. At the same time, 25.2% of the population simultaneously supports integration with the EU and Russia. The difference may be explained by the way the questions have been formulated.

The study of the integrationist stance of the population reveals some distrust it has towards the EU. Despite some enthusiasm about EU membership, the majority of Belarusians believe in a hostile attitude of Western countries towards Belarus. In particular, 55% of the respondents believe that *'the governments of Western countries purposively impede the development of the Belarusian economy'*. Given the

relatively favorable opinion about the EU in general, it seems that such a critical attitude is largely about the U.S. The answers depend on the age and residence of the respondents. The belief that Belarus 'is encircled by enemies' is expressed by 70% of the rural population, by 67% of those living in the urban areas populated with less than 100,000 people and by 52% – with above 100,000 but less than 500,000, and by only 29% of those living in Minsk. As for the respondents' age, this belief is shared by 45% of young people (under 35 years old), 58% and 65% of older generations (those whose age is between 45 and 54 years old and between 55 and 64 years old, respectively), by 71% of pensioners (those who are above 65 years old). The difference becomes even more profound if the income is considered: 74% of respondents whose monthly income per family member is equal to USD 75 or less (the budget of the living wage at the time of our research) agrees with the abovementioned belief, 39% of those with incomes ranging between USD 200 and 300, and 33% – with incomes above USD 500.

The survey also reveals a relatively restrained attitude towards integration with the Russian Federation. Only 29% of the population agrees with the claim that *'Belarus should become a part of Russia'*. The majority of respondents (71%) disagree with this claim (only 36% of the rural population and 22% of those living in Minsk agree). Also, there is some relation between the age and the opinion on the necessity of unification: the older a respondent, the more he/she is inclined to support the unification. At the same time, there is no relations between the support for integration and the level of income.

Further, only about one-third of respondents (31%) agree that *'Belarus and Russia should build a Union State with a single currency, the President and the Parliament'* (68% are against this proposition). Integration is not very popular even among the older people (34% of supporters are between 45 to 65 years old, and 37% are older than 65). Moreover, 84% of Belarusians think that *'Belarus should be independent'*. In general, virtually all groups across the population tend to support the idea of independence (the difference across various groups of the respondents is rather small).

The study conducted by the IISEPS shows that in case there would be a referendum on the creation of a single state with Russia, 35.1% of the population would vote in favor (January 2007). In contrast, at the end of 2002 this figure was 53.8%.

At the same time, being unwilling to support integration with Russia, 61% of the population agrees that *'Russia supports the Belarus' economy'*. There is a high degree of solidarity across different social groups on that opinion. Next, the vast majority (72%) reckons that *'Russia, as a member of the Union State, has to sell oil and gas at reduced prices'*. This claim is shared by 72% of the rural population, 73% of those living in the *oblast* cities, and 65% of the Minsk inhabitants. There is no apparent link between the age of a respondent (69% of young people and 73% of old people support this claim) or his/her level of income. As for the latter, 76% of low-income respondents and 75% of middle-income ones (defined as monthly income per family member is ranging from USD 300 to 500), and 67% of high-income ones (monthly income per family member is above USD 500) express their support for the subsidization policy indirectly implemented by Russia. Agreement is also reg-

istered among 71% of those employed in the public sector, and 63% of those employed in the private sector.

5. ATTITUDE TOWARDS MASS-MEDIA AND TRUST IN INFORMATION PROVIDED BY THEM

Major sources of information that Belarusians use are the Russian and Belarusian television and state-owned newspapers and magazines. However, these sources are trusted by a much smaller fraction of respondents (Table 17). The Belarusian television appears to be the most trustworthy information source (46.5% of the population supports this claim). A somewhat comparable level of trust is enjoyed by the Russian television (30.5%) and state-owned newspapers and magazines (26.1%). As for other media sources, they enjoy the trust of no more than 10% of the population.

Table 17

Answers to questions: 'What sources of information do you typically use and which of them appear to be most trustworthy?', %

	Use	Trust
State-owned newspapers and magazines	62.6	26.1
Non-state newspapers and magazines	30.8	8.7
National television	82.1	46.5
Russian television	77.3	30.5
Foreign TV channels	33.7	11.5
Belarusian National Radio	32.4	10.3
FM radio stations	36.1	7.8
World Wide Web	23.3	10.6
Other	0.4	0.3
No trust at all	–	6.7

Note. When answering the question about trust to sources of information, only three answers have been allowed to choose.
Source: IPM Research Center.

The degree of trust varies depending on the age of respondents and their place of residence. State-owned newspapers and magazines and the Belarusian TV are trusted by people living in smaller localities. As soon as the size of locality increases, the number of those who trust the information obtained from the World Wide Web and non-state newspapers and magazines grows (Table 18). Similar linkages have been observed when the age of the respondents is taken into consideration. It appears that the older a respondent, the higher the likelihood that he/she would trust the state-owned media. In addition, the size of locality and the respondent's age determine the degree of trust in foreign TV channels, including the Russian ones. In particular, the relation is as follows: the bigger the locality (and the younger the age), the higher (lower) the degree of trust to foreign TV channels (Russian TV channels).

Table 18

Answers to the question: 'What sources of information you use are most trustworthy?' and respondents' age and residence, %

	State-owned newspapers and magazines	Non-state newspapers and magazines	National television	Russian television	Foreign TV channels	Belarusian National Radio	FM radio stations	World Wide Web
Age, years								
18–24	15.5	12.7	26.0	33.1	18.2	2.2	11.6	26.5
25–34	21.0	13.0	39.5	38.9	13.6	6.2	11.7	15.4
35–44	25.6	7.7	43.6	36.4	16.4	5.6	7.7	10.3
45–54	33.3	9.2	50.3	28.7	10.3	13.3	7.7	4.6
55–64	36.0	4.5	60.4	25.2	4.5	17.1	2.7	3.6
65–75	29.4	3.4	70.7	18.4	1.4	22.4	3.4	–
Size of locality, thousand people								
Less than 10	30.3	4.7	57.1	34.1	5.3	12.9	8.5	3.8
10–100	33.9	5.2	49.6	35.7	5.2	13.0	6.1	8.7
100–500	23.1	11.8	41.3	32.0	16.0	9.1	7.7	11.6
Minsk	20.2	12.7	37.0	18.5	18.5	6.4	8.1	23.7

Source: IPM Research Center.

Consequently, a similar relation is observed when the income level is considered: the higher the level of income, the more frequently the World Wide Web, non-state newspapers and magazines, and foreign TV channels are accessed and, hence, trusted more than the other sources of information.

It has to be stressed that in Minsk, the Internet is the second most trustworthy source of information. However, regular access to the World Wide Web (everyday or at least several days a week) is practiced by only every fifth respondent. At the same time, almost half (48%) of respondents does not use, and 17% does not know what the World Wide Web means at all. There is a significant difference in its use depending on the place of residence. In Minsk, the World Wide Web is accessed every day by 20% of respondents, and another 33% accesses it two or three times per week. As for the smaller localities (inhabited by less than 10,000 people), this figure drops quite notably to just 1.5% (Table 19).

There is a clear relation between the use of the World Wide Web and the age and income of respondents. People under 35 are the most active Internet users in contrast to older generations. The latter are rather infrequent users or non-users. Interestingly, two-thirds of the respondents whose age is above 65 do not know what the Internet as such is. The frequency of the use of the World Wide Web depends upon the incomes of respondents. The share of non-users drops from 88.3% (income of USD 75 per family member) to 32.5% (income of USD 300–500 per family member).

Some specific situation is observed among the families with incomes ranging from USD 200 to 300 per family member. This income is slightly above the country average one. But in this income group a share of those who do not use the Internet is only slightly less than the figure recorded in the income group of USD 75 per family member. Still, these users surf the web two or three times a week, and not every day (as in the case of the respondents from high-income households). In

short, people whose incomes are just above the average level are not frequent web users. This runs in contrast to the initial expectations. The reason for that might be relatively high fees charged by internet providers in Belarus.

Table 19

Answers to the question: 'Do you personally access the World Wide Web and, if so, how often are you doing so?' and respondents' age, residence and income levels, %

	Every day	Two or three times per week	Once per week	Once in two or three weeks	Once per month or less	Not used	Don't know what it is
Size of locality, thousand people							
Less than 10	1.5	1.5	2.3	3.8	8.4	54.0	28.5
10–100	4.3	5.2	2.6	6.1	12.2	61.8	7.8
100–500	10.8	8.0	7.7	5.5	10.5	44.8	12.7
Minsk	20.3	11.6	5.2	5.8	13.4	35.5	8.0
Age, years							
18–24	21.1	12.2	10.6	8.9	23.3	23.9	–
25–34	16.0	9.8	7.4	10.4	14.7	40.5	1.2
35–44	5.6	7.7	5.1	5.6	10.8	61.5	3.6
45–54	4.1	2.6	2.6	3.1	7.7	71.3	8.7
55–64	0.9	1.8	1.8	–	0.9	57.7	36.9
65–75	–	–	–	–	0.7	32.2	67.1
Monthly income per family member, USD							
< 75	1.7	1.7	1.7	1.7	5.0	60.0	28.3
75–100	2.7	0.9	0.9	2.7	9.1	50.9	32.7
100–150	3.7	3.2	4.1	6.0	4.6	49.1	29.4
150–200	7.3	7.3	4.7	7.3	12.0	48.0	13.3
200–300	10.9	16.3	1.1	1.1	10.9	56.5	3.3
300–500	27.5	12.5	12.5	7.5	7.5	27.5	5.0
> 500	33.3	8.3	–	–	16.7	41.7	–

Source: IPM Research Center.

Trust in the media provides a clue to many of the answers made and the values expressed by respondents. For instance, 87% of those who trusts state-owned newspapers, 90% of those who watches Belarusian TV channels, and 88% of those who listens to Belarusian National Radio support current economic policies. At the same time, only half of the Internet users and readers of independent mass-media are positive about economic policies carried out in Belarus nowadays.

This observation is confirmed by the analysis of the respondents' answers to the major economic and geopolitical questions depending on the sources of information trusted by them (Table 20). The respondents who are using the Internet and reading the independent media tend to be not so optimistic about the achievements of the Belarusian economy and the speed of market reforms in Belarus. Also, they are more inclined to support EU membership of Belarus. At the same time, the answers to the questions about integration with Russia have been pretty similar irrespective of the use of particular media sources by respondents.

Table 20

Support of the claims and the source of information trusted to by respondents, %

	State-owned newspapers and magazines	Belarusian TV	Belarusian radio	Non-state newspa-pers	World Wide Web
1. As a rule, in countries with a market economy, the standard of living is higher than in countries with state intervention in the economy	68.9	57.2	58.4	82.8	76.9
2. Belarus should become a member of the European Union	52.3	48.7	44.6	60.5	75.0
3. Success is more dependent upon the external circumstances than upon individual efforts	33.5	34.8	40.8	43.7	37.5
4. There are market reforms in Belarus currently being carried out	77.0	80.3	86.1	53.5	47.1
5. Belarusians should buy domestically produced goods, even if their price is higher (and the quality is lower) than of imported goods	32.3	39.7	54.9	11.6	15.4
6. Over the last ten years Belarus has achieved a greater success in economic development than the majority of neighboring countries	79.2	81.0	78.4	41.4	41.3
7. Belarus should join Russia	29.0	29.2	35.0	26.4	27.9
8. Sales of enterprises to foreigners would lead to their closure and mass dismissals	49.2	56.4	75.2	43.0	34.0
9. Russia as a member of the Union State has to sell oil and gas at reduced prices	74.5	78.6	81.6	64.4	58.3
10. Belarus should be independent	87.6	85.3	90.3	86.2	82.5
11. The government of Western countries purposively impede the development of our economy	61.4	60.4	68.3	40.2	89.8
12. Belarus and Russia should create a Union State with a single currency, the President and the Parliament	30.5	33.1	30.1	32.2	27.2
13. It is possible to become rich at the expense of others	30.5	32.5	25.2	21.2	29.1
14. Taxpayers' money are spent in a transparent and efficient way in Belarus	46.5	49.2	58.3	26.4	30.1
15. Russia supports the Belarusian economy	64.0	63.5	59.2	48.3	45.6
16. Belarusian economy needs foreign investment	71.6	72.0	75.2	77.9	79.6
17. There is a socially-oriented economic policy pursueded in Belarus	80.7	81.6	86.4	49.4	51.5
18. Belarus does not need market reforms	45.6	44.9	43.0	29.9	19.4

Source: IPM Research Center.

6. CONCLUSION

Public opinion on market reforms in Belarus is divided in a ratio of 40 to 60 (not accounting for those having no clear preference). The major factors driving the choice are occupation (private or public sector employment) and the trust in certain media. It appears that the respondents employed in the private sector are much more consistent adherents of market reforms than those who are employed by public sector companies. The respondents trusting Belarusian TV and state-owned me-

dia usually oppose market reforms. They are also more prone to believe the myths and stereotypes propagated by these media.

It should be stressed that the results of the survey analyzed in this chapter have been obtained in a 'pre-shock' period. After an energy price hike the degree of support for market reforms could be expected to change. Prior to this hike, the population has been rather optimistic about its future well-being. The dynamics of personal/family incomes have been connected to improvement in the economy as a whole. Pessimistic expectations have been expressed by less than 10% of the population against 45% of optimists. Economic policies carried out in Belarus have been perceived as closely connected to the growth of personal wealth and improvement of the country's general economic performance. Accordingly, deterioration of the general economic situation or of individual well-being could then be traced back not to changing external conditions, but to 'false' economic policies. Current policies might be seen as inapplicable to or unworkable in the new economic environment. It appears that a deceleration of income growth and a deterioration of the economic situation following an energy shock could make the inefficiency of current economic policies clear. Ultimately, people would begin to understand the beneficial role of market reforms.

Despite the economic optimism recorded over 2006, the majority of the population has been rather sensitive to any negative economic shocks. This sensitivity is related to income. Many Belarusian households obtain a monthly income of not less than USD 200 per family member. This amount of money is enough to cover food essentials, clothes, and public utility fees and charges. As soon as these items become dearer, the well-being of the majority deteriorates, very likely leading to changes in attitudes towards economic policies. Perhaps, these changes in public mood would affect the choice of a developmental trajectory of Belarus in the near future.

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Conclusion

A Post-shock Economy: Can the Old Model Withstand the New Challenges?

The search for its own destiny has brought Belarus back to the place it started its development. The country is again at the cross roads. Growing due to cheap energy and a favorable external environment, the economy has been forced to accommodate the cost hike driven by higher energy prices. For the state, the pressing issue is at what scale assistance to state-owned enterprises should be provided and on what terms. In broader terms the policy choice is about the extent of overall influence upon economic decision-making. In essence, the 'architects' of the Belarusian economic model are confronted with the following dilemma: either to transform the existing model by their own hands or to wait until the model would be changed under the weight of external forces. There is no *a priori* optimal solution to this dilemma. Even worse, the choice of policy is troubled by the need to sacrifice some conveniences.

Complexities of policy choice become more apparent when the economic policies conducted over 2007 are carefully analyzed. The introduction of customs duties on crude oil and the oil products and gas price increase failed to alter the nature of domestic economic policies. The majority of seemingly novel policy measures has been aimed at fixing sudden challenges rather than completing strategic tasks. As a result, in 2007 the opportunities generated by a favorable external environment have not been realized at its full potential. Accordingly, the official data display a decrease of the economic growth rate by two percentage points.

It should be recalled that GDP growth in Belarus has generate benign social consequences. The fruits of economic growth have been nearly equally distributed among low-income, middle-income, and high-income households. Overall, the incomes of Belarusians have been growing steadily since 2000 onwards. Accordingly, the majority has been optimistic about future wealth. By the end of 2006, about 45% of the population expected a rise in the material well-being, while only 7% was pessimistic about that. The gas price hike has made the population more wary: at the end of 2007, about one-third of respondents indicated a deterioration of their material position, while only 15% considered themselves wealthier.

It appears that the economic 'growth for all' is turning into a 'growth for some'. The state that previously seemed to have been very keen on maintaining a modest, albeit steady income growth, has explicitly reduced the degree of its 'care' for citizens' well-being. For instance, social benefits have been partially withdrawn, while tariffs for public utilities and prices for 'socially-important' goods like foodstuffs have been increased following the government's directions. At the same time, creation of appropriate conditions for self-employment or similar opportunities failed. The fact that around 9% of economically active Belarusians have sought their fortune outside their fast growing domestic economy may be a sign that the Belarusian 'model' is in trouble. The new challenges that arise from energy shocks are pushing the authorities towards making a definite choice.

The chapters in this book thoroughly explore the environment in which decisive policy steps are yet to be made. The results of the comprehensive econometric analysis suggest that market reforms are beneficial not only in the short, but also in the long run. Qualitative and quantitative analysis of channels through which the positive effects of economic growth are delivered to the population have confirmed the key role of sustainable GDP growth. The political business cycle that is closely related to major electoral events has been another important factor of poverty reduction. However, the efficiency of pro-poor growth in Belarus continues to depend on the pace of reduction of inflation rates and appreciation of the national currency. In its turn, the political business cycle worked well under conditions of low energy prices. At present the cycle can hardly be run without difficulty, so the need for implementing new forms of demand management is becoming more and more apparent every day. The need to run the cycle can be avoided by creating conditions for productive employment. In contrast to cyclical measures aimed at lifting real incomes of target social groups, job creation policies could make growth more sustainable. It should be noted that political business cycles are also observed in developed economies, but in Belarus it is run in order to solve short-term problems.

A policy option of modifying current economies policies is analyzed by building a small macroeconometric model formalizing major macroeconomic interrelationships. The model is used to forecast major macroeconomic indicators depending on four different scenarios. Three of them do not suggest a fundamental revision of economic policies, while the fourth envisages some liberalization and private sector development via privatization and inflow of foreign investment. The results of econometrical modeling suggest that continuation of economic growth in Belarus requires a policy change towards some liberalization. This change can indeed be successful since behavioral incentives of Belarusian economic agents are similar to those existing in other post-socialist economies. As soon as the 'shelter' of cheap energy is damaged, the miracle turns into an ordinary transition economy growing on the basis of progress in market reforms.

Sociological surveys have revealed that in the second half of 2006 this simple thesis is shared by one-third of the Belarusian population. In addition, half of the population associates improvement of its own well-being with the economic policies pursued in Belarus. As soon as welfare begins to decline, it is very likely that the supporters of current policies would revise their attitude. External forces would unlikely be blamed for being primarily responsible for limiting material wealth regardless of likely attempts of the state-run media to provide such an interpretation. As a result, the conditions for the majority to support market-oriented reform could appear at a certain point.

The 'old' miracle is challenged. It could hardly work as it did before: competitiveness is unlikely to be sustained once energy is made dearer and the degree of state control over people's incomes and wealth has already been reduced. Accordingly, the miraculous growth could only be sustained if the new challenges are met with a proper policy set. The adjective 'proper' is not to mask a greater sophistication or some smart fine-tuning of a once workable model. Rather, some deep, reform-based modernization is required to meet the new challenges.

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GROWTH FOR ALL?
ECONOMY OF BELARUS: CHALLENGES AHEAD

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