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WELFARE CHANGES IN EASTERN EUROPEAN AND CENTRAL ASIAN TRANSITION ECONOMIES

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Abstract

This paper investigates the regularities of the transition processes in countries at different levels of transformation from 1994–1998. Twenty-four countries are involved into the analysis and the indicator of welfare is used for analysis. Welfare is measured by the production of gross product per capita, which is adjusted with purchasing power parity (GDP-PPP). The 24 countries will be divided into three groups according to the level of transformation, using the canonical discriminant analysis. The basis of the analysis will be the transition index computed by EBRD. For each group, a component analysis related to various economic indicators will be used. From the results, four transition components will be formed. The effect of the obtained transition components on welfare will be examined with the help of regression analysis, the results of which are the basis for interpreting the causes of welfare changes. The paper concludes that the main factor determining welfare is the development level of a country. Other factors have less influence.

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CONTENTS

Introduction

The transition period, which has lasted for ten years, has involved a number of positive changes in post-socialist countries. The establishing of institutions, which characterise a market economy and contribute to a uniform global economic system undoubtedly form a basis for future economic success. However, changes have not been positive only. It is typical of a start of a transition period that economic growth slows down (often an economic recession takes place), unemployment increases and public welfare drops due to a cut in social guarantees. Some countries have more or less overcome the setbacks of the initial years, but the problems that arose during initial years of the transition period still exist in a number of countries even today. The level of welfare is especially different in the more successful Transition countries of Central and Eastern Europe in comparison with post-socialist countries of Central Asia and Transcaucasia.

The idea of the present paper is to analyse some specific aspects of transformation economies – welfare changes during reform processes. This study concentrates on components most relevant to welfare changes and their appearance in different countries. The purpose of this study is to generalise the factors, which influence welfare. The research of regularities of economic development is in the inductive stage of creating the theory, where the general theoretical standpoints are to be formulated by discovering the empirical relationships between individual indicators. One of the most important aspects of the relationships between economic development and welfare is income distribution. The majority of researchers have concluded that transition processes lead to more uneven income distribution (Milanovic, 1998; Flemming, Micklewright, 1999). Nevertheless, there is increasing evidence that the earlier supposition

about the positive correlation between income distribution and future economic growth does not find any empirical confirmation (Tanninen, 2000). The author has also dealt with these problems earlier (and got the same results) (Kaldaru, 1999b; Kaldaru, 2000), therefore this issue will not be investigated here. Another area, which deserves quite a lot of attention is the analysis about the changes in economic growth and its factors. Here the conclusion has been made that peculiarities result from the macroeconomic performance of the transition economies (Fischer, Sahay, 2000; Campos, 1999). However, economic growth is only a means of obtaining the future economic development of a country, therefore it is essential to investigate its impact on welfare. In the present paper the hypothesis will be proved that economic development in transition countries depends on the extent and depth of the transition process, in addition to the concrete political choices of each country.

This paper aims to point out regularities of transition processes in groups of countries at different levels of transformation. The period analysed includes the years 1994–1998, and the data is obtained from publicly available statistical books of the European Bank for Reconstruction and Development (EBRD) and from the World Bank (WB). The variables that describe external economic relationships of transition countries are excluded from the initial parameters, for the aim is to describe the manifestation of such internal factors as economic growth, changes in the structure of production, inflation and employment in transition processes. By generalisation of parameters, transition components (causes of variance of initial parameters) are revealed, and it is studied how they are formed in groups of transition countries on different levels of transformation. The components that have contributed most to the variance of income level in the period of transition, as well as the regularities of their effects shall be discussed.

According to the WB classification, 27 countries of Eastern Europe and Central Asia belong to the group of transition countries (The World Bank…, 1998). Cyprus, a country with a totally different history compared with the rest, has been left out

of this study, as well as Bosnia and Herzegovina and Turkmenistan, about which comparable statistical data was not available. Thus, 24 post-socialist transition countries are investigated.[1]

1. Income Level in Transition Countries, its Dynamics and Expected Influencing Factors

The wealth of a state constitutes one of the bases for the creation of welfare. A widespread measure for it is **the gross product** (*GDP* or *GNP*) **per capita**. The parameter characterises the "size of the pie" which can be used for securing welfare. In the conversion of gross product[2] to US dollars the World Bank uses the *World Bank Altlas method* (The World Bank…, 1998). The method takes into account different rates of inflation in the countries under observation and in the G-5 group (France, Germany, Japan, Great Britain and the USA). The figure is presented as the moving average of the last three years. In this way internationally comparable figures will be achieved which characterise the productivity of resources. The World Bank has proposed a division of countries into the following groups based on the gross product per capita: 1) low income level — below $ 785, 2) income level below average — $ 786–3,125, 3) income level above average — $ 3,126–9,655 and 4) high income level — over $ 9,656.

From among transition countries under observation, Slovenia ($ 9,779), according to the data of 1998, barely reaches the fourth group; others remain below this level (see Table 1). Tajikistan had the lowest income level in the sample (data of 1997, $ 330), which is comparable to the level of countries such as Angola, Haiti and Kenya. The majority of Caucasian and

[1] Table 1 provides the list of countries

[2] Either *GDP* (gross domestic product) *or GNP* (gross national product) depending on the country, in transition economies the first indicator is usually used.

Central Asian countries, with the exception of Kazakhstan and Georgia, ranked in the lowest income group. The figure for Estonia ($ 3,593) is of the same magnitude as Tunisia, the Republic of South Africa and Panama and the country belongs to the group of countries with above average income levels, like the Czech and Slovak Republics, Hungary, Poland and Croatia (data of 1996). The other two Baltic states, the states of the CIS, countries of Central, Eastern and south-eastern Europe not mentioned before, and Georgia and Kazakhstan mentioned above, belong to the group of countries with a below average income level, which is the most numerous group in the sample (11 countries).

However, the indicator provides a somewhat distorted picture of the welfare of transition countries because domestic price levels are very different and remain lower than the price levels of developed countries. From the point of view of welfare, income in itself is not as important as the volume of goods and services one can consume for the income received. Thus this study uses **the volume of gross product per capita adjusted by purchasing power parity** (*GDP-PPP*) (see Table 1) as a general indicator of income level. If evaluated by the purchasing power parity, Slovenia was again the richest of the countries under observation in 1998, with its income level almost three times higher than the average of the sample, and Tajikistan the poorest, with its figure reaching only one-fifth of the average level. The price level in Armenia being almost two times lower than in Ukraine or Georgia, the welfare level there is more or less comparable to the countries mentioned, regardless of a two-fold difference in productivity. The globalisation of the economy will result in the unavoidable catching up of price levels of the transition countries to the price levels of developed countries. Hence, in those countries where the welfare is relatively higher due to a low price level, the growth of welfare is expected to be reduced in the future (e.g. Byelorussia and Bulgaria, but especially Uzbekistan and the Kyrgyz Republic).

Table 1

Volume of Gross Product per capita (1998)

Country	***GDP-PPP* ($)**	***GDP* ($)**	***GDP-PPP* and *GDP* ratio**	***GDP-PPP* ratio to gp/avera (4243 $)**	***GDP-PPP growth* ratio 98/95 (%)**
Slovenia	11893	9779	1.2	2.80	116.3
Czech Republic	10180	5479	1.9	2.40	112.0
Slovak Republic	7903	3793	2.1	1.86	124.6
Hungary	7323	4730	1.5	1.73	114.3
Poland	6829	3887	1.8	1.61	131.5
Estonia	5335	3593	1.5	1.26	130.6
Byelorussia	4956	1396	3.5	1.17	107.6
Croatia (96)	4778	4422	1.1	1.13	111.3
Lithuania	4392	2890	1.5	1.04	123.5
Bulgaria	4320	1313	3.3	1.02	97.3
Russian Federation	4146	1867	2.2	0.98	91.4
Romania	4019	1695	2.4	0.95	101.1
Latvia	3918	2622	1.5	0.92	116.2
FYR Macedonia	3716	1548	2.4	0.88	103.0
Kazakhstan	3473	1493	2.3	0.82	97.8
Uzbekistan	2931	591	5.0	0.69	100.3
Albania	2287	930	2.5	0.54	118.8
Kyrgyz Republic	2267	355	6.4	0.53	112.0
Georgia	2171	967	2.2	0.51	143.8
Armenia	2136	510	4.2	0.50	108.0
Azerbaijan	1840	540	3.4	0.43	113.9
Ukraine	1790	846	2.1	0.42	66.1
Moldova	1138	432	2.6	0.27	72.3
Tajikistan (97)	930	330	2.8	0.22	69.7

Sources: Data of the World Bank (Databases of *CC* and *GDNGD* 1998, 1999).

In most of the countries under survey the income level has increased during the transition period. An almost one-and-a-half times growth in income in Georgia sets the record, but a low initial level can explain it. Income *per capita* has risen by almost one third in Poland and Estonia during five years and by *ca* a quarter in the Slovak Republic and Lithuania. At the same time, in some countries the income level has practically remained the same (Uzbekistan, Romania, Kazakhstan) and decreased in a few countries and to a rather significant extent (by one-third in Ukraine). Consequently, growth of welfare is not a matter-of-course result of the transition processes (although it is often *a priori* presupposed). Table 1 enables us to draw a cautious conclusion that, as a trend, in more successful transition economies, growth of income is higher. The above states a hypothesis that in countries of different development (and transformation) level different factors influence the formation of income.

The economic indicators included to the analysis of transition countries are based on the data of EBRD (Transition…, 1997, 1998, 1999). Some aspects of a transition economy, which have been treated in many researches, such as changes in foreign trade, condition of the balance of payments and inflow of foreign direct investment, are left out of this analysis. Although the mentioned aspects have an impact on welfare and its changes, here the main aim is to describe the relationships between welfare and domestic factors such as economic growth, production structure, inflation and social guarantees. In doing so, it must be supposed that changes in external conditions are in any case reflected in indicators involved in the analysis.

From among indicators characterising transition processes first of all the structure of production has been observed: the share of industry, agriculture and services in the gross product. In order to characterise economic growth, the growth rates of the gross product, both in industry and agriculture have been analysed. Inflation during a transition period is an unavoidable phenomenon. Even if we leave aside all other factors responsible for inflation, the harmonisation of price levels with developed

countries will bring about a growth in the consumer price index. The share that the private sector had of the gross product has determined different starting positions for countries. Taxation and the ratio of public sector spending (state budget together with local budgets and non-budgetary funds) to gross product show the score of redistribution of income. Growth rate of employment and rate of unemployment are viewed as parameters characterising the use of manpower. Tables 2–4 provide a list of the variables.

Data concerning 24 countries in the years 1994–1998 constitute the factor space (120 objects). The authors are fully aware of the dangers concealed in the source data matrix of repeated objects in view of interpreting the results of a mathematical-statistical analysis. But as economic conditions undergo intensive changes in the period of transition, a country may be in a different stage of transformation in different years. Therefore the parameters characterising a country need not be analogous at all in the case of repeated observations. But if a country significantly dominates in a transformation component with its figures for several years, it may assist us to interpret that component. The *SPSS 8.0 for Windows* was applied to carry out a mathematical-statistical analysis; discriminant, correlation, component and regression analyses were used.

2. Classification of Objects

In order to express the extent and depth of the transition process, EBRD transition indicators will be used. As these indicators measure very different and specific aspects of the transition process, beginning with the success of privatisation and ending with the guarantees of political freedom, the use of average annual transition indicators is not suitable here. Values of individual indicators reflect the opinions of experts. There is no doubt that different indicators have different weights in forming the final result, but due to the lack of a basis for weighting, the estimation of the transformation level is based on the sum total of transformation indicators of the EBRD (Transition…, 1999).

In further analysis, the basis for classification of objects will be the parameters observed by discriminant analysis.

The objects are characterised by country and year in the initial matrix. If the value of transition index over 21, the object (country in this year) was classified under the first group, a group of countries on the highest level, and with the value of index below 18 under the third group, a group of countries on the lowest level of transformation. Other objects belong to the group of countries at the intermediate stage of transition. Because the authors intuitively chose the borderlines and the method of calculating indices is not available, a discriminant analysis was carried out to specify the groups. It was also necessary to check if the difference in transformation levels will be revealed through the parameters included in the analysis.

The analysis revealed two canonical discriminant functions, of which the first described 80% of the variance of parameters and the other 20%. The canonical correlation coefficients were 0.827 and 0.588 respectively and the functions statistically reliable on the significance level of 0.000. This has provided us with a suitable formula for discrimination of groups. The first function is strongly related to the gross product per capita (the value of correlation coefficient 0.653**), somewhat more weakly to taxation (0.448**) and the growth rate of gross product (0.254*).[3] The other function is relatively more strongly related to the share of private sector (0.589**) and services of the gross product (–0.578**), unemployment (0.424**) and the growth rate of agriculture (0.254*).

The value of the first discriminant function in the centre of the first group is 1.924, in the centre of the second group –0.997 and in the centre of the third group –1.294. Thus the objects of the first group differ from the rest by a greater volume of gross product per capita, a higher level of taxation and the growth rate of gross product. The mutual difference of the objects in the

[3] Note: ** denotes here and hereafter statistically significant correlation at the 1% level, * denotes statistically significant correlation at the 5% level.

second and third groups is relatively less significant. The value of the second function was the highest in the centre of the second group (0.632). Consequently, the important role of the private sector and high unemployment figures characterise countries in the intermediate stage of transformation. This is a natural outcome of recent privatisation. As the objects of the second group have an orientation towards agricultural production, a relatively small share of services is a logical result of it. The value of the second function in the centre of the first group is the average of the sample (0.000), but in the centre of the third substantially lower, namely –1.312. Groups are therefore easily distinguishable on the basis of this function as well.

The probabilities of the objects of belonging to each group are given in the Appendix. From among the objects originally classified under the first group on the basis of the EBRD transformation index, according to the results of a discriminant analysis the Czech and Slovak Republics, Slovenia and Estonia still belonged to it in all the years under observation, with probability more than 0.95. The classification of Hungary into this group in 1994 had a probability of 0.55, but of 0.99 already in 1998. Poland, which also should be a relatively successful transition country judging by the transformation index, however, based on the parameters observed, belonged among them in 1994, but in 1995 was more like the countries in the intermediate level of transformation (probability 0.53). In 1995, the transition processes slowed down also in Latvia, which had belonged among the most successful ones in the previous year, was classified in the intermediate group. Judging by the selected parameters, it is Latvia, which is lagging behind the other Baltic countries as far as its level of transformation is concerned, because in none of the years its probability of belonging to the group of the most successful countries reaches 0.9. In case of Lithuania, the relatively successful years of 1994 and 1997, when the probability of belonging to the highest group was 0.95 are followed by a slowing down of transition processes, but the country has still maintained its position in the first group. Based on the selected indicators, Croatia also belongs to this group

although it was not so successful in the first years according to the EBRD estimate.

The evolution of transition processes is most noticeable in the group of countries on the intermediate transformation level. Except some cases, it can be noted that the probability of belonging either to the second group (Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic , Romania) or belonging to the first group is increasing, and the probability of belonging to the third group is decreasing. Thus we may conclude that as the result of transition processes, the object will move into the next group. This can be interpreted as the qualitative change in the development level of a country. On the intermediate level of transformation are for example Bulgaria and Macedonian (among the most successful ones in 1998) and Russia, which on the basis of 1998 figures was on the threshold of the first group. From among the countries in their initial stage of transition processes, development can be noted in the Ukraine and Uzbekistan, which belong to the group of countries in the intermediate level since 1997. Byelorussia, Moldova and Tajikistan belong to the third group for their figures for all the years, as it was specified provisionally.

The results of the discriminant analysis show that the indicators involved in the analysis describe the dynamics of transition processes relatively well. The groups arrived at are in concordance with the estimate given to the level of transformation by the EBRD. The classification of countries in different groups in different years shows the evolution of the transition processes. The following analysis is carried out separately in three groups of objects formed as a result of the discriminant analysis. Thirty-eight objects belonging to the first group can be characterised as the mostly developed transition countries. In the intermediate stage of transition there were 44 objects (the second group). The third group included 19 objects, which had displayed the lowest results in transition process.

3. Transition Components

As a result of correlation analysis over all included objects became evident that the absolute values of correlation coefficients characterising the relationships of single indicators were predominantly below 0.6. This means that the set of objects is uneven. But the number of observations was sufficiently large and so the correlation coefficients of 0.3–0.4 absolute value also proved reliable. Reliable, although weak, relationships between variables refer to the need to explain the original cause for the parameters changing together. This study uses the principal component method to discern initial causes and sets forth independent transition components, which, pursuant to the purpose and the selected initial indicators should characterise the evolvement of transition processes in the sample under observation.

Table 2 presents the rotated component matrix[4] of initial variables measured on the **objects belonging to the first group**, which have advanced the furthest in transition processes. The table presents the component loads that were reliable with a large probability (initial variable and correlation coefficients of the component) for each component is given. For reasons of clarity, the component loads with an absolute value less than 0.3 and significant with a probability of less than 95%, are excluded from the tables of component matrices.

Determination of components is based on the strength and direction of relationships between it and the initial parameters. The first component describes all aspects of **economic growth**, including the growth rate of gross product, industry, agriculture and employment. The negative relationship between this component and the consumer price index conforms to the actual regularity of transition processes that have reached maturity: a rapid economic growth is accompanied by a reduction of inflation. The negative correlation between economic growth and inflation has also become evident in other empirical researches

[4] Rotation method: Varimax with Kaiser normalization.

based on the data of transition countries (Fischer, Sahay, 2000). The second component has a strong positive relationship with the volume of gross product per capita and with the role of industry in the production of gross product, and is negatively strongly related to the role of agriculture.

Table 2

Rotated Component Matrix
(More Successful Transition Countries)

Variable	Economic growth (F1)	Develop-ment level (F2)	Restructu-ring (F3)	Redistri-bution (F4)
Industrial sector growth rate	0.900**			
GDP growth rate	0.857**			
Agriculture growth rate	0.750**			
Growth rate of employment	0.701**	0.331*	0.336*	
Consumer price index	–0.647**			
GDP *per capita*		0.809**		–0.380**
Share of agriculture		–0.777**		
Share of industrial sector		0.621**		0.366**
Public sector spending		0.594**	–0.415**	0.372**
Share of private sector			0.887**	
Unemployment		–0.388**	–0.671**	0.411**
Level of taxes				0.812**
Share of services sector			0.479**	–0.657**

A bit weaker, but statistically still reliable positive relationship with the growth of employment and a negative relationship with

unemployment confirm the supposition that this concerns the **level of development** of the economy. A strong positive relationship of the third component with the significance of the private sector and a somewhat weaker statistically reliable positive relationship with the significance of services and the growth of employment allows us to call it a component of successful **restructuring** of the economy. The supposition is endorsed by negative correlation with public sector spending and unemployment. The last component is strongly connected with taxation and public sector spending and therefore refers to **redistribution**. In every respect, a logical correlation of other variables with this component demonstrates that in more developed transition countries the share of redistribution in the economy is smaller.

The first component (Economic growth) describes 24.7% of the variance of initial variables in the concerned group, the second (Development level) accounts for 18.6%, the third (Restructuring) has 14.9% and the fourth (Redistribution) represents 13.4% of the variance of initial variables. Thus, altogether 71.6% of the variance of initial variables is explained by the mentioned components. The lost original information should be regarded as an opportunity cost of a considerably more comprehensive analysis.

Component scores indicate the value of the respective component of this object in standard deviations in comparison with the average (value is zero) of the sample. The greater the absolute value of the component score, the more the object stands out from among the others and the greater the effect of the respective component. Judging by the component of **economic growth** (F1), transition countries of the first group are in a relatively homogeneous situation (see Appendix).[5] Estonia 1997 ranks first (scale 1.51), which justifies the component's name because thanks to its economic growth in 1997 Estonia positively emerged from among other transition countries. According to the 1997 data, the position of other Baltic countries is

[5] Computed using the regression method.

relatively good (Latvia ranking second and Lithuania having the fourth place). Slovenia stays on the average level of the sample both in 1995 and in 1996 (0.04). Estonia remained on the positive side in 1998, but according to data of 1995 and 1996, below sample average. According to this component, Lithuania 1994 (–4.33) and Latvia 1994 (–2.50) are in the worst situation. Nineteen ninety-six was really a difficult year for the Baltic countries. The real GDP of Lithuania dropped by 10% and growth figures in other Baltic countries did not become positive in any field until next year. According to the component of economic growth, Baltic countries in 1997 were on the same level as the Czech Republic in 1995, Poland and Slovakia in 1995–96. A rapid growth is characteristic only of a certain stage of maturity of the transition period and later on the economic growth will slow down. For example the negative component scores of the Czech Republic since 1996 (the biggest absolute value –0.94 in 1998) testify to that.

Interpreting the **development level** (F2) component, it can be seen that the stability of the countries' positions is remarkable. Slovenia comes first (scores in all the years between 1.60–1.29), followed by the Czech Republic, Hungary, Poland and Slovakia on the positive side. The component score is in most cases bigger the year after. Croatia, Latvia, Estonia and Lithuania, where the component scores have been strongly negative in all these years, remain below the average. Bulgaria in 1998, which was classified under the first group for the first time based on the data from that year, closes the list. The results are logical and therefore the component has been interpreted correctly.

The scores of the component called the **restructuring** (F3) of the economy rank the objects in rather peculiar way at first sight. The indicators of the Czech Republic for all five years beginning with the latest one take the first place (scores between 1.70–1.24), Lithuania, Slovakia and Estonia follow in roughly the same figures and the list is closed by Latvia, Slovenia and Croatia. The 1994 situations of the mentioned countries have the very last positions (negative scores with absolute values between 1.73 and 1.77). The name of the component is jus-

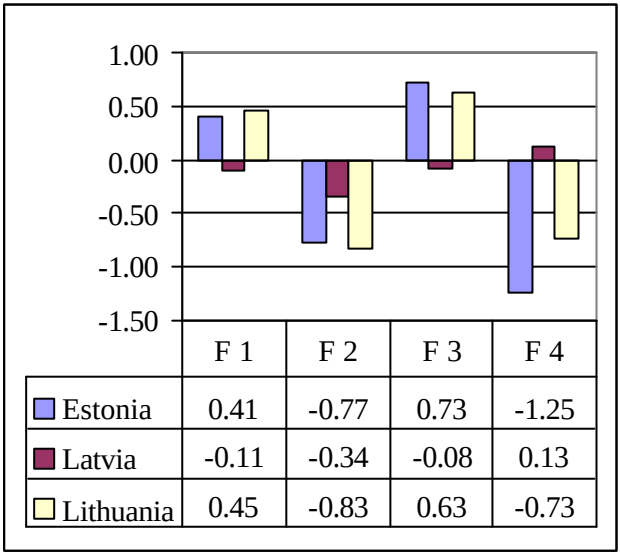
tified in a way because component scores in later years and in more successful countries are higher. However, the structure of production in the pre-transition period is likely to have its impact as well.

In the case of the last component called **redistribution** (F4), bigger scores in earlier years in comparison with the later ones are most conspicuous. Poland 1994 (2.23) has the maximum, followed by Poland 1996 (1.39) and Hungary 1994 (1.31). The figures of Latvia, among the Baltic States, are close to the average in all the years, others remain on the negative side. The figures for Slovenia are also strongly and stable negative, balancing between the absolute values of 1.73 and 1.97. One of the conclusions may be that in the transition period the share of the gross product to be redistributed through the public sector decreases. As the component is negatively correlated with the development of services, a transfer of services to the benefits distributed by the market is also reflected in it. We mean here services such as some educational and health protection services for example, which originally used to be financed through the public sector in the Soviet era.

The level of component scores allows us to provide a comparative omnibus estimate of the objects. For illustration, see Figure 1 below for the conditions of the Baltic countries in 1998. As you can see, Estonia and Lithuania have reached an equivalent level of transformation in the year concerned. In Latvia, the situation is a bit different, but this country, estimated according to all components, is closer to the average of the group than the above-mentioned. The component of economic growth, which was highest of the sample in Estonia in 1997, has fallen practically to the same level with Lithuania. Economic growth has also fallen back in Latvia because in the previous year, the score of this component was far above the average.

As far as the component of development level is concerned, the Baltic countries lag behind the group average level, which is not surprising because of different starting positions. Somewhat unexpectedly, Latvia has an advantage in comparison with oth-

ers. The component of restructuring has a positive value in Estonia and in Lithuania, consequently transition processes have been more successful there, than on average, but Latvia is practically on the average level of the group. The component expressing redistribution is negative in Estonia and Lithuania, which refers to the relatively smaller role of the redistributed product in comparison with the group average. But in Latvia redistribution plays a more significant role in the economy.



	F 1	F 2	F 3	F 4
Estonia	0.41	-0.77	0.73	-1.25
Latvia	-0.11	-0.34	-0.08	0.13
Lithuania	0.45	-0.83	0.63	-0.73

Figure 1. Scores of transition component in the Baltic States in 1998.

The indicators of the objects in the group, which have reached the **intermediate stage of transition**, can be divided into four general transition components that altogether describe 72,6% of the variance of initial variables. The rotated component matrix is presented in Table 3. Unlike the group in the higher stage of transition, the **development level** turned out to be the most significant transition component here, describing 26.4% of the

variance of initial variables. Indicators describing the development level in the second group are significantly more important than in the first group, where this component described only 18.6% of the variance of initial variables.

Table 3

Rotated Component Matrix
(Transition Countries on Intermediate Level)

Variable	Development level (F1)	Economic growth (F2)	X-component (F3)	Production structure (F4)
Level of taxes	0.899**			
Public sector spending	0.822**			
GDP *per capita*	0.815**	0.344*		
Share of industrial sector	0.774**			–0.413**
Share of agriculture	–0.683**		0.485**	
Industrial sector growth rate		0.781**		
GDP growth rate	–0.326*	0.745**	0.345*	
Share of private sector		0.718**		
Share of services sector		–0.707**		0.378**
Consumer price index		–0.658**		
Growth rate of employment			0.833**	
Growth rate of agriculture			0.791**	
Unemployment				0.834**

The gross product *per capita*, which had the strongest relationship with the development level component in the group of more successful transition countries, showed the same results also in the second group. The share of industrial sector in gross product had a strong positive relationship with the component in both groups, at the same time the share of the agricultural sector in gross product had a strong negative relationship. This refers to the usual course of transition processes. It is interesting that the positive relationship between public sector spending and the development level component that could already be observed in the first group was here one of the most significant indicators of the level of development. When examining the public sector spending, the major source for it is tax revenues. This makes perfect sense: A poorly developed financial sector is incapable dealing with government bonds and high country risk impedes the financing of public sector spending with foreign loans.

The positive relationship between both industrial sector and GDP growth rate with the **economic growth** component is very common in transition economies and so is the negative relationship between the component and consume price index. A positive relationship appeared also between the economic growth component and the share of the private sector. This suggests that privatisation has a positive effect on economic growth in the countries which have reached the intermediate stage of transition. The component describes 21.5% of the variance of initial parameters, which is just a little less than in the first group. The growth rate of agriculture, that in the previous group was correlated with overall economic growth, has in this group no correlation with the component. The answer should be sought in the features of the transformation process. It seems that the countries included in this group have not yet overcome the decline in agricultural production. The agricultural sector will revive at the end of the transition period when the changes in production structure in agriculture have changed. The negative correlation between economic growth and the share of services

sector refers to the decline in growth rates due to the development of transition process.

The third component describes 13.7% of the variance of initial variables. The initial indicators (positive relationship of agriculture and GDP growth rates) may at first seem inconsistent with previously drawn conclusions. This is not necessarily the case because the component could have emerged based on the data of the objects where the decline in agricultural production induced decline in GDP growth and employment. However, component loads are not sufficient for the substantial interpretation of the components, maybe the component scores can be of help. We name the component the **x-component.**

The last component describes 10.9% of the variance of initial variables. Because of the nature of the relationships, the component can be interpreted as developments in **production structure** where the production of services increases at the cost of industrial production. The latter induces unemployment because the labour force is not ready to fill the vacancies in the service sector due to insufficient skills.

According to the **component scores,** Russia is the most developed country in the group with the best indicators in every year (see Appendix)[6]. This is not surprising because Russia in fact is more developed than the other countries in the group. It is interesting that Russia's superiority was at its low-point in 1998 (component score 1.41) whereas in 1994, the value of the score was 1.76 and rose in the following years even more. The component score value of Poland (1.82) suggests that Poland belongs actually to the group of more developed countries and was classified this year as an intermediate transition stage country by chance (probability 0.52). Latvia was also classified as an intermediate transitions stage country and had a quite good position in this group (component score 0.82). The indicators of Romania, Bulgaria and Macedonia are above average, the Ukraine's position in 1997 and 1998 can be considered as

[6] The content of each component given in Appendix depends on the group data used for the analysis.

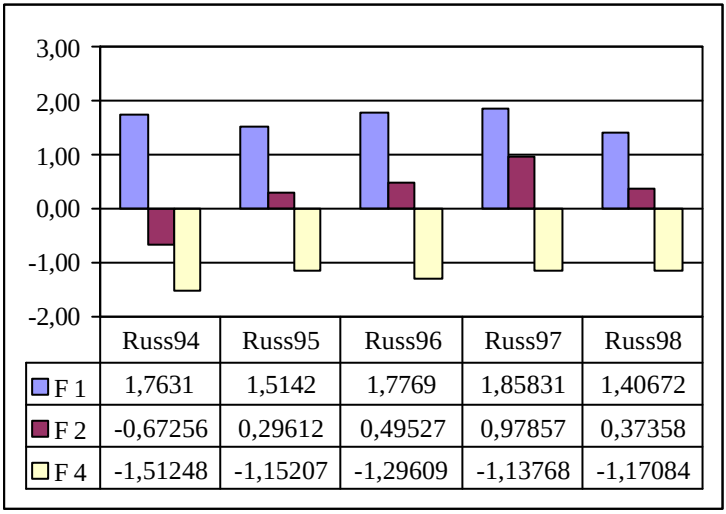
average (component scores respectively 0.48 and –0.14). The component scores of Georgia were in all years less than –1 (the lowest value of –1.76 was in 1998), which makes Georgia the least developed country in the group. When analysing the performance of Kazakhstan, it should be mentioned that it has from year to year improved its position and was in 1998 (–0.47) quite close to the average level of the group.

The component scores of economic growth are with respect to object relatively even. Most of the objects of the sample differed from the average less than +/- 0.5 standard errors. Kyrgyzstan and Georgia experienced depression in 1994, and in later years these countries experienced relatively faster economic growth.

Unfortunately, the component scores do not provide any help in interpreting the third component. The results confirmed the supposition that it expresses the covariance of agricultural production and employment. The component scores had high values in situations (Albania 1994 and 1995, Georgia 1995) where the growth rates of both agricultural production and employment were high. The low values of component scores referred to the situations where a significant decline in agricultural production was accompanied by more than a 10% decline in employment. If we take into account the correlation between the growth of agricultural production and the growth of employment, this component could express the agriculturally based development.

As the unemployment indicator has a strong relationship with the production structure component, it is not surprising that the highest score values of this component belong to Macedonia (2.43…2.69) which experienced the highest rates of unemployment during the period under observation (according to EBRD data 30–40%). In general, the positions of countries in different years are quite similar. Russia differs form the rest of the group by its score values that deviate from the mean by more than one standard error to the negative direction (minimal –1.51) every year.

The development of transition processes can be traced by examining the yearly changes in a country's component score values. Let's examine changes in Russia (Figure 2). As the interpretation of the third component was not very informative, it is not considered here. The graph shows economic development and production structure components (accordingly in positive and negative directions) significantly different from the average which was already mentioned above. The negative deviation of the production structure is due to low unemployment and a high share of the industrial sector and this once again shows the superiority of Russia when comparing it with the rest of the group.



	Russ94	Russ95	Russ96	Russ97	Russ98
F 1	1,7631	1,5142	1,7769	1,85831	1,40672
F 2	-0,67256	0,29612	0,49527	0,97857	0,37358
F 4	-1,51248	-1,15207	-1,29609	-1,13768	-1,17084

Figure 2. Component scores changes in Russia.

The economic growth component was strongly negative in 1994. After that, accelerating economic growth until 1998 was followed by another decline. Such behaviour of an economic growth component is also characteristic to the countries belonging to the more developed group of transition countries

(e.g. Estonia, Lithuania and Croatia). Russia is on its way to the group of more developed transition countries where a country with such production potential also belongs. This trend, however, can be impeded by the decline in development level. The reasons for this are probably to be sought from Russia's domestic situation.

The composition of the third group that include countries in the **initial stage of transition** turned out to be a little unexpected. It includes Byelorussia and Moldova and also the indicators of the Ukraine and Central Asia in the early years of transition. Four components described altogether 77.5% of the variance of the initial variables. The rotated component matrix is listed in Table 4.

The component of **economic growth** emerged similarly to the first and differently from the previous group. The component described 22.6% of the variance of the initial variables. The relationships with initial variables were analogous to the first group, too: the growth of industry, gross product and agriculture had strong positive relations with economic growth and, at the same time CPI had a negative relation. As in the second group, economic growth is not related to the growth of employment, which is due to the release of excess labour. The component that has the strongest relationship with the production of gross product per capita and that is positively related to the share of industry and negatively to the share of agriculture, was previously named the component of **the level of economic development**. This component came up secondly, though it described almost the same amount of the variation of initial variables (22.4%), as did the first component. Unlike in the first group where the level of economic development had a positive impact on the employment, here appeared a reverse relationship between economic development and unemployment. The reason behind it lies in the abrupt change in the production structure because the adjustment of labour to the new conditions takes time. It is also worthwhile mentioning that unlike in the second group where the growth rate of the gross product was related to the component of the level of economic development too, here

(and also in the first group) these two components are totally independent.

Table 4

Rotated Component Matrix Based on Data from Third Group

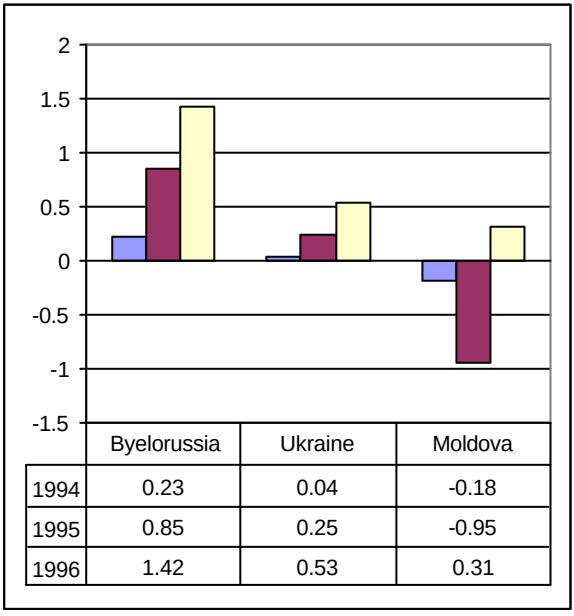
Variable	Economic growth	Development level	Redistribution	Privatisation
GDP growth rate	0.859**			
Industrial sector growth rate	0.842**			
Agriculture growth rate	0.818**			
Consumer Price Index	–0.694**			–0.421*
GDP *per capita*		0.854**		
Share of agriculture		–0.849**		
Share of industrial sector		0.784**	0.443*	
Unemployment		0.701**		
Public sector spending			0.929**	
Level of Taxes			0.895**	
Share of private sector				0.917**
Share of services sector				–0.644**
Growth rate of employment				–0.541*

The **redistribution** component emerged in this group more clearly than in the other groups. It described 16.3% of the variance of the initial variables. A significantly stronger positive relationship of this component with the tax level and public sector expenditures than with the other parameters proves this to be the case. The **privatisation** component had almost as strong explanatory power (16.2% of the variation of the initial parameters) and was most strongly related to the share of the private sector. Remarkable is the negative relationship of this component with unemployment, which is the opposite result compared to the previous group. One possible explanation for that is the large amount of jobs financed by the public sector. This enables unemployment to keep down but is definitely not efficient with respect to resource usage.

Analysing the **component scores,** it appeared that higher values of the economic growth component corresponded, as a rule, to the later years (see Appendix). Accordingly, this group includes mainly the objects in the phase of accelerating economic growth. Maximum score values were in Byelorussia in 1998 and 1997 (respectively 1.13 and 1.29), the lowest component scores were in Moldova and Kazakhstan in 1994 (respectively –1.64 and –1.80). Regarding the development level component, Byelorussia is among the relatively developed countries compared to the group's average since 1995 (the component scores 0.85…1.42). Ukraine lagged behind Byelorussia according to the indicators included in the analysis in the years 1995 and 1996 but already in the following year belonged to the group of countries in the medium level of transition progress. Fast development has taken place also in Uzbekistan, which, during 1994–1996, was the country with the lowest level of economic development in the group, but by 1997 began to approach the average level of group with the intermediate stage of transition.

Component scores of the third component confirm the dependence of the redistribution on the traditions in the societal regulations. On the positive side are the component scores of the European countries (maximum value 1.48 in Byelorussia in 1994), where, in the later years, the share of the public sector

has begun to decrease, which is a characteristic of transformation countries. The Central Asian region is notable for its negative values, the share of public sector being really very low (the minimum value is –1.97 in Kazakhstan in 1995). The scores of the fourth transformation component, called privatisation, enable us to raise a hypothesis about the difference in the success of development in Byelorussia and the Ukraine. Namely, the Ukraine is outstanding with its component scores deviating in the positive direction from the average (maximum 1.71 in the year before entering to the next group). Byelorussia has improved its position from year to year (the last one in the group in 1994 with the scores –1.59) but has not achieved average level of the group regarding this component. Slow reforms have enabled it to maintain employment (unemployment in the period of observation only 2-4% according to the EBRD) but have become an obstacle to development.



	Byelorussia	Ukraine	Moldova
1994	0.23	0.04	-0.18
1995	0.85	0.25	-0.95
1996	1.42	0.53	0.31

Figure 3. Scores of the development level component in some countries 1994–1996.

Three neighbouring countries are chosen as the objects of the comparative analysis of the component scores: Byelorussia, Ukraine and Moldova. The value of the component of development level is analysed in the years 1994-1996, when all three belonged to the observed group (Figure 3). As can be seen from the figure, the economic development in Byelorussia and Ukraine has been continuous in the observed time period. Moldova, on the other hand, suffered a substantial setback in 1995. The development in Ukraine and Moldova has been more or less equal, taking into account the starting position. Byelorussia is remarkable with a faster development and a higher starting position. This is just one component of transition and one cannot judge the success of the transformation process.

In relation to the component analysis it is worth mentioning that the above given transition components are surprisingly steady. Namely, the author has made an analogous analysis based on four years data (1994–1997) (Kaldaru, 1999a). The order and the content of the transition components were very similar to the results given in this paper.

4. Transition Components' Effect on Income Level Formation

Below we attempt to show the dependence of welfare on the level of transformation components. The production of gross product per capita adjusted with purchasing power parity (*GDP-PPP*) (*Y*) is selected as a dependent variable of a multiple regression analysis and the component scores of objects (F_1–F_4) as independent variables. If the problem is set up like this, the problem of collinearity of parameters, which complicates a regression analysis, does not exist, for the components are not interrelated. In the following models only these independent variables are given which, according to the t-statistic, had an essential influence on the dependent variable.

The regression model for income level for more successful transition countries was estimated as follows:

$$(1) \qquad Y = 6608{,}2 + 2481{,}7F_2 - 623{,}1F_4 + 340{,}6F_1$$

The model and all regression coefficients are significant at 99% level, the value of multiple correlation coefficient is 0.945 and the model describes 89% of the variance of the dependent variable. The result is something to be expected because the component of the development level has the greatest positive effect on the formation of welfare. The component of economic growth has also a positive effect. At first sight, the negative effect of the redistribution component may seem unexpected. But as far as it describes public sector spending, the non-effective operation of a too extensive public sector inherited from the socialist period may be relevant here in case of transition economies. But the third component, which describes the restructuring of the economy, was not manifest as a welfare factor at all.

The values of gross product, calculated by means of the model (1), and the real values adjusted by the purchasing power parity in case of some selected objects appear in Table 5. As you can see from the table, the model provides an amazingly exact forecast of the income level in Slovenia. The value of the variable computed according to the model does not differ from the actual one by more than ten per cent in any of the years. Moreover, in the years 1996–1997 the difference is only three per cent. At the same time the indicator of the Czech Republic, another transition country with a relatively high-income level, is largely and systematically underestimated.

According to the component scores of the objects in the group of countries in the intermediate stage of transition, the regression model for the level of welfare as follows:

$$(2) \qquad Y = 3025.1 + 990.0F_1 + 239.3F_2.$$

The model and regression coefficients are significant at 99% level. The value of the multiple correlation coefficient is 0.878

and the model describes 77.1% of the variance of resulting estimates. The development level turned out to be the most significant component affecting the welfare. The economic growth had also a positive impact on welfare. These results are similar with the results obtained form the first group. Although the ordering of the components according to their importance is the same in both groups, there are differences in the contents of the components (compare Tables 2 and 3). Another remarkable fact is that the component of development level, which described a lower share of initial indicators in the first group than the component of economic growth, turned out to be the most essential factor influencing welfare in the group of countries in an intermediate stage of transition. However, the other components in the second group (x-component and production structure) seemed to have no impact at all. The Russian welfare indicator estimated by the model (2) appears in Table 5.

Table 5

Forecasted and Actual Values of Resulting Estimates ($ per capita)

	Forecast	Actual [b]	Difference between forecast and actual figures	Forecast and actual rate
Estonia 95[a]	4349	4422	-73	0.984
Estonia 96[a]	4746	4700	46	1.010
Estonia 97[a]	4560	5241	-681	0.870
Estonia 98[a]	5609	5335	273	1.051
Czech Republic 94[a]	8666	9091	-425	0.953
Czech Republic 95[a]	8790	9954	-1164	0.883
Czech Republic 96[a]	8807	10432	-1625	0.844
Czech Republic 96[a]	8830	10503	-1673	0.841
Czech Republic 96[a]	9226	10180	-954	0.906
Slovenia 94[a]	11040	10230	810	1.079
Slovenia 95[a]	11828	10942	886	1.081
Slovenia 96[a]	11730	11386	344	1.030

	Forecast	Actual [b]	Difference between forecast and actual figures	Forecast and actual rate
Slovenia 97[a]	11530	11796	-266	0.977
Slovenia 98[a]	10877	11893	-1016	0.915
Russia 94[c]	4609	4538	71	1.02
Russia 95[c]	4594	4472	122	1.03
Russia 96[c]	4902	4357	545	1.13
Russia 97[c]	5098	4370	728	1.17
Russia 98[c]	4507	4146	361	1.09

[a] Authors' calculations with regression model (1).
[c] Authors' calculations with regression model (2).
[b] Data by the World Bank (*WDI*, 1998; *CC*, 1998 and 1999).

The model gives for Russia quite exact results, a comparison of actual values in 1994 and 1995, but in the following years the model presupposes that the level of welfare could have been improved. The real value of income level adjusted by the purchasing power parity has decreased year to year. This once again refers to serious problems in Russian economy. The model forecasted the decline in the level of income in 1995 and 1998; the income level during the period between these years is overestimated.

The regression model (3) of transition components and income level based on the data of countries in the initial stage of transition, has a slightly lower coefficient of determination (0.594), but is still correct:

$$Y = 2886.6 + 774.1F_2 + 605.6F_3. \quad (3)$$

The model and its coefficients are significant at 99% level; the multiple correlation coefficient is 0.771. As in the previous cases, the development level component turned out to be the most significant, in the initial stage of transition process also the redistribution had significant position (for the descriptions of transition components see Table 4). The results obtained are

logical in every respect. Changes in the economic growth in this group are very uneven and welfare is only influenced by the component of redistribution, which is an essential characteristic of the planned economy. The comparison of Kazakhstan and Uzbekistan is used as an example of income level forecasts (Table 6).

Table 6

The Impact of Transformation Components on the Formation of Income Level

	Constant	**Develop-ment level**	**Redistri-bution**	**Total**[a]	**Actual**[b]	**Ratio Total/ Actual**
Kazakhstan 94	2886.6	388.4	-544.1	2730.8	3552	0.77
Kazakhstan 95	2886.6	949.7	-1196.0	2640.3	3403	0.78
Uzbekistan 94	2886.6	-1245.9	184.8	1825.4	2922	0.62
Uzbekistan 95	2886.6	-1087.9	390.4	2189.1	2928	0.75

[a] The authors' calculations based on the regression model (3).
[b] The data of the World Bank (*WDI*, 1998).

The value of the development level component of Kazakhstan has been in both years above the group's average and has thus an increasing impact on the income level. The redistribution, in contrast, has a delaying effect. The overall forecasts of the component are in both years below the actual income level. This suggests that the income level has been influenced by factors not included in the model. As in the case of Uzbekistan, but when compared with Kazakhstan the development level and redistribution components had opposite results.

Summary

Countries are grouped based on estimates for their level of transformation given by the EBRD. By means of a discriminant analysis it is established to what extent the level of transformation is reflected in the values of selected initial parameters. As a result, the objects under observation, characterised by a country's name and year in the matrix of initial parameters, are divided into three groups of countries, which have different levels of transformation.

A component analysis carried out on the basis of data from the most successful countries enables us to produce four independent transition components: economic growth, development level, restructuring and redistribution, which together described 71.6 % of the variation of initial parameters. The development component had the greatest effect on the formation of income level (in the positive direction as could be expected). Regarding strength, the negative effect of the redistribution component ranks next, although it is almost four times weaker. Economic growth also slightly influences income level in the positive direction, but the restructuring component was not manifest at all. The model describes 89% of the variance of income level and is significant at 99% level.

In the group of countries at the intermediate level of transformation, the composition of transition components is different, but here too, development level and economic growth can be set forth as transition components, to which the peculiarity of production structure and restructuring are added. The named components describe all together 72.6% of the variance of the initial parameters. Development level and economic growth represent positive factor formation of income level, which describe 77% of its variance. This regression model is also significant at the 99% level.

In the group of countries, which are in the initial stage of the transition period, transition components, quite surprisingly, are rather similar to the components of the group of the most successful countries. Economic growth, development level, redistribution and restructuring describe all together 77.5 % of the variance of initial parameters. Although the development level component and the redistribution component describe only 59% of the variance in income level, the model is still significant at the 99% level. Unlike more successful countries, the effect of both components in this group increases income level.

To generalise the economic indicators of transition countries, the most important appeared to be the component of economic growth and the component of development level. Although the content of the named components varied across the groups, they both had a decisive impact on the formation of welfare in more successful transition countries and in countries in an intermediate stage of transition. The component of redistribution appeared both in the groups of the most and the least advanced transition countries, but indicated its impact on income level only in the last case. In all groups the components reflecting the production structure in one or another way came to the fore, but it was impossible to ascertain their impact on income level on the grounds of this analysis.

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KOKKUVÕTE

Heaolu muutused Ida-Euroopa ja Kesk-Aasia siirderiikides

Käesoleva artikli eesmärgiks on analüüsida siirdeprotsesside kulgu Ida-Euroopa ja Kesk-Aasia siirderiikides (24 riiki, loetelu tabelis 1) aastatel 1994–1998 Euroopa Rekonstruktsiooni- ja Arengupanga ning Maailmapanga andmete põhjal. Näitajate üldistamise kaudu tuuakse välja transformatsioonikomponendid (algnäitajate muutumise põhjused) ja uuritakse nende kujunemist eri transformatsioonitasemel olevate riikide gruppides. Selgitatakse komponendid, mis on kõige enam mõjutanud tulutaseme muutust siirdeperioodil, samuti nende mõju seaduspärasused riigigruppide andmetel. Tegeliku tulutaseme ja mudeli alusel tehtud prognooside võrdluse kaudu püütakse jõuda heaolu kasvu takistavate või soodustavate teguriteni.

Tulutaseme üldnäitajana kasutatakse käesolevas uurimuses ostujõu kordajaga korrigeeritud koguprodukti mahtu ühe elaniku kohta. Enamikes vaatlusalustes riikides on tulutase siirdeperioodi jooksul tõusnud, kuid mõnedes riikides jäänud praktiliselt samaks ning mõnedes alanenud, seda isegi väga olulisel määral. Siit tõstatubki hüpotees, et erineval arengu- (ja transformatsiooni-)tasemel riikides tingivad tulude kujunemist erinevad mõjurid.

Transformatsioonitaseme hindamisel on lähtealuseks võetud *EBRD* transformatsiooniindeksite summa. Kuna gruppide piirid olid autori poolt valitud intuitiivselt ja indeksite arvutamise metoodika ei ole teada, viidi täpsustamiseks läbi diskriminantanalüüs. See oli vajalik ka kontrollimaks, kas transformatsioonitaseme erinevus tuleb analüüsi lülitatud näitajate kaudu esile. Diskriminantanalüüsi tulemuste põhjal võib järeldada, et

analüüsi kaasatud näitajad kirjeldavad siirdeprotsesside dünaamikat suhteliselt hästi. Saadud grupid on põhimõtteliselt (kuid siiski mitte päris) kooskõlas *EBRD* poolt transformatsioonitasemele antud hinnanguga. Riikide klassifitseerumine eri aastatel erinevatesse gruppidesse (aga ka vastavasse gruppi kuulumise tõenäosuse suurenemine või vähenemine) väljendab siirdeprotsesside arengut. Järgnev analüüs ongi läbi viidud eraldi kolmes objektide grupis, mis moodustusid diskriminantanalüüsi tulemusena.

Usaldatavad, kuigi nõrgad, näitajatevahelised seosed, mis tulid käesolevas töös esile, viitavad vajadusele selgitada välja näitajate koosmuutumise algpõhjused, mida võibki käsitleda transformatsioonikomponentidena. Käesolevas töös on algpõhjuste eristamiseks kasutatud peakomponentide meetodit ning toodud välja sõltumatud komponendid, mis vastavalt püstitatud eesmärgile ja valitud algnäitajatele peaksid iseloomustama siirdeprotsesside kulgu vaatlusaluses valimis.

Esimesse, siirdeprotsessidega kõige kaugemale jõudnud gruppi kuuluvatel objektidel mõõdetud algnäitajate pööratud komponentmaatriks on esitatud tabelis 2. Esimene komponent kirjeldab **majanduskasvu** mitmeid aspekte, teine väljendab majanduse **arengutaset**, kolmas näitab **restruktureeritust** ja viimane viitab **ümberjaotuse**le. Kokku on vaatlusaluste komponentidega hõlmatud 71,6% algnäitajate variatsioonist. Majanduskasvu komponendi kaalude järgi otsustades on esimese grupi siirderiigid suhteliselt ühtlases seisundis. Kiire kasv on omane vaid siirdeperioodi kindlale küpsusastmele ning edaspidi majanduskasv aeglustub. Arengutaseme komponendi tõlgendamisel paistab silma riikide positsioonide stabiilsus. Majanduse restruktureerituse komponendi kaalud näitavad, et siin tuleb arvesse ka siirdeperioodi eelne tootmisstruktuur. Ümberjaotuseks nimetatud komponendi puhul paistavad silma varasemate aastate suuremad kaalud hilisematega võrreldes, seega väheneb siirdeperioodil avaliku sektori kaudu ümberjaotatava koguprodukti osa.

Teise, keskmisel transformatsioonitasemel olevate objektide näitajad oli võimalik üldistada neljaks üldistatud siirdekomponendiks, mis kokku kirjeldasid 72,6% algnäitajate variatsioonist (vt. tabel 3). Selles grupis osutus kõige olulisemaks **arengutasemena** määratletav komponent, teisena eristus **majanduskasvu** komponent. Kuigi komponendid on samad nagu esimeses grupis, on nende poolt kirjeldatavate üksiknäitajate koosseis erinev, mis on siirdeperioodil toimuvaid muutusi arvestades täiesti loogiline. Kolmas komponent jäi riigi eripärast tulenevaks **x-komponendiks** ja viimane on tõlgendatav **tootmisstruktuuri** arenguna. Komponentkaalude järgi otsustades on vaatlusaluses grupis kõrgeima arengutasemega Venemaa. Majanduskasvu komponendi kaalud on objektiti suhteliselt ühtlased.

Kolmanda, siirdeperioodi algfaasis olevate riikide grupi andmetel eraldatud neli komponenti (vt. tabel 4) kirjeldasid kokku 77,5% algnäitajate variatsioonist. Vaatlusaluses grupis tuli analoogiliselt esimesega ja erinevalt eelmisest kõigepealt esile **majanduskasv**u komponent. **Arengutaseme** komponent tuli esile teisena, kuid selle olulisus ja seosed üksiknäitajatega ei olnud samasugused nagu teistes gruppides. Kolmandana avaldus siin (selgemini kui teistes gruppides) **ümberjaotuse** komponent ja peaaegu sama esinduslikuks osutus **privatiseerimise** komponent. Komponentkaale analüüsides selgus, et majanduskasvu komponendi suuremad väärtused vastasid reeglina hilisematele aastatele. Seega on selles grupis tegemist peamiselt majanduskasvu kiirenemise faasis olevate objektidega.

Et näidata heaolu sõltuvust transformatsioonikomponentide tasemest siirdeprotsesside eri faasides on läbi viidud mitmene regressioonianalüüs, kus sõltuvaks muutujaks on valitud ostujõu kordajaga korrigeeritud koguprodukti tootmine elaniku kohta (Y) ning sõltumatuteks objektide komponentkaalud (F_1–F_4). Edukamate siirderiikide andmetel kujunenud regressioonimudel (1) ja kõik selle kordajad on usaldatavad tõenäosusega üle *99%*, mitmese korrelatsioonikordaja väärtus on *0,945* ning mudel kirjeldab *89%* resultaatnäitaja variatsioonist. Tulemus on

ootuspärane, kuna kõige tugevamat positiivset mõju avaldab heaolu kujunemisele arengutaseme komponent. Keskmisel transformatsioonitasemel olevate objektide komponentkaalude alusel kujunes heaolu taset määravaks regressioonivõrrandiks (2), mis oli samuti usaldatav enam kui 99%-lise tõenäosusega. Mitmese korrelatsioonikordaja väärtus on 0,878 ja determinatsioonikordaja näitab, et mudel kirjeldab 77,1% resultaatnäitaja variatsioonist. Nagu esimeses grupis, nii ka siin osutus olulisimaks heaolu mõjutavaks komponendiks arengutase. Kolmanda grupi objektide andmetel oli siirdekomponentide ja tulutaseme seose regressioonivõrrand (3) küll eelmistest pisut madalama kirjeldatusega (59,4%), kuid siiski kõigiti korrektne. Mitmene korrelatsioonikordaja on siin 0,771. Traditsiooniliselt osutus tulutaseme kujunemisel kõige olulisemaks arengutaseme komponent, transformatsiooni algstaadiumis on tähtsal kohal ka ümberjaotus.

Siirderiikide majandusnäitajate üldistamisel osutusid kõige olulisemateks majanduskasvu komponent ja arengutaseme komponent. Kuigi nende sisu oli pisut erinev, avaldasid nad otsustavat mõju heaolu kujunemisele kõrgema ja keskmise arengutasemega riikides. Ümberjaotuse komponent eristus nii kõrgeima kui ka keskmise arengutasemega riikide grupis, kuid heaolule avaldas see mõju vaid viimasel juhul. Kõigil transformatsioonitasemetel eristusid tootmisstruktuuri ja selle muutust ühel või teisel viisil kajastavad komponendid, kuid nende mõju heaolule ei olnud käesoleva analüüsi põhjal võimalik tuvastada.

APPENDIX

Characteristics of the Objects According to the Discriminant and the Component Analysis

Object (country, year)	Determined group	Probability of belonging to the group			Component scores			
		First	Second	Third	F 1	F 2	F 3	F 4
Albania 94	2	0.004	0.982	0.013	-0.78	0.61	1.84	0.50
Albania 95	2	0.005	0.990	0.005	-0.73	0.86	1.58	0.33
Albania 96	2	0.011	0.986	0.003	-0.74	1.43	0.41	-0.26
Albania 97	2	0.000	0.999	0.001	-0.49	0.42	0.27	-0.81
Armenia 94	2	0.004	0.899	0.097	-0.25	-0.97	0.82	-0.37
Armenia 95	2	0.003	0.833	0.164	-0.72	0.05	0.41	-0.29
Armenia 96	2	0.006	0.920	0.074	-0.73	0.19	-0.02	-0.25
Armenia 97	2	0.015	0.939	0.046	-0.54	0.22	-0.33	-0.40
Armenia 98	2	0.040	0.953	0.007	-0.35	0.67	1.04	-0.50
Azerbaijan 94	2	0.000	0.513	0.487	-0.31	-2.84	-0.75	0.82
Azerbaijan 95	2	0.000	0.919	0.091	-0.73	-1.44	-0.75	-0.07
Azerbaijan 96	2	0.000	0.855	0.145	-0.83	-0.60	0.11	0.62
Azerbaijan 97	2	0.002	0.946	0.051	-0.84	0.17	-0.51	0.39
Byelorussia 94	3	0.023	0.014	0.962	-1.50	0.23	1.48	1.59
Byelorussia 95	3	0.001	0.037	0.962	-0.27	0.85	0.49	0.69
Byelorussia 96	3	0.002	0.034	0.964	0.99	1.42	0.29	0.75
Byelorussia 97	3	0.056	0.007	0.937	1.29	1.35	0.69	0.68
Byelorussia 98	3	0.021	0.028	0.952	1.13	1.30	0.48	0.59
Bulgaria 94	2	0.065	0.548	0.387	1.13	-0.30	0.89	0.80
Bulgaria 95	2	0.075	0.713	0.211	1.11	-0.19	1.09	0.46
Bulgaria 96	2	0.104	0.719	0.177	0.71	-1.20	-0.38	0.25
Bulgaria 97	2	0.001	0.977	0.021	0.53	-1.06	1.41	0.76
Bulgaria 98	1	0.530	0.453	0.017	0.04	-1.92	-0.09	-0.45
Croatia 94	1	0.728	0.093	0.179	-1.31	-1.08	-1.77	0.73
Croatia 95	1	0.812	0.089	0.099	0.10	-0.28	-1.33	0.93
Croatia 96	1	0.898	0.081	0.021	0.34	-0.40	-1.11	1.11
Croatia 97	1	0.891	0.082	0.027	0.71	-0.49	-0.92	1.07
Czech Republic 94	1	0.999	0.001	0.000	-0.52	1.16	1.24	1.02
Czech Republic 95	1	0.999	0.001	0.000	0.68	0.92	1.45	0.52
Czech Republic 96	1	1.000	0.000	0.000	-0.20	1.04	1.58	0.50
Czech Republic 97	1	1.000	0.000	0.000	-0.67	1.12	1.66	0.52
Czech Republic 98	1	1.000	0.000	0.000	-0.95	1.29	1.70	0.42
Estonia 95	1	0.989	0.007	0.004	-0.21	-1.02	0.17	-0.55

Object (country, year)	Deter-mined group	Probability of belonging to the group			Component scores			
		First	Second	Third	F 1	F 2	F 3	F 4
Estonia 96	1	0.995	0004	0.001	-0.12	-0.83	0.49	-0.39
Estonia 97	1	0.999	0.001	0.000	1.51	-1.25	0.50	-0.88
Estonia 98	1	0.997	0.003	0.000	0.41	-0.77	0.73	-1.25
FYR Macedonian 94	2	0.063	0.823	0.074	0.92	-0.65	0.09	2.46
FYR Macedonian 95	2	0.084	0.900	0.166	0.75	-0.21	-0.54	2.69
FYR Macedonian 96	2	0.003	0.982	0.015	0.61	0.84	-0.35	2.43
FYR Macedonian 97	2	0.261	0.727	0.012	0.49	-0.01	-0.17	2.65
Georgia 94	2	0.000	0.992	0.008	-0.89	-3.81	0.91	-1.36
Georgia 95	2	0.000	0.913	0.087	-1.38	-0.16	1.60	-0.87
Georgia 96	2	0.000	0.990	0.010	-1.44	1.12	0.48	-0.13
Georgia 97	2	0.000	0.993	0.007	-1.25	1.23	0.89	-0.17
Georgia 98	2	0.001	0.993	0.006	-1.76	0.98	-2.93	0.66
Hungary 94	1	0.523	0.425	0.022	0.18	0.74	-0.80	1.31
Hungary 95	1	0.855	0.139	0.006	-0.12	0.30	-0.52	0.44
Hungary 96	1				0.14	0.21	0.07	0.32
Hungary 97	1				0.53	0.23	0.26	0.23
Kazakhstan 94	3				-1.80	0.50	-0.90	0.36
Kazakhstan 95	3				-0.44	1.23	-1.97	-0.84
Kazakhstan 96	2				-0.79	0.05	-1.66	-0.21
Kazakhstan 97	2				-0.65	0.46	-1.60	-0.17
Kazakhstan 98	2				-0.47	0.33	-2.56	-0.66
Kyrgyz Republic 94	3				-0.60	-1.20	-0.71	-0.45
Kyrgyz Republic 95	2				-0.75	-1.27	0.33	-0.52
Kyrgyz Republic 96	2				-1.30	0.23	0.23	0.02
Kyrgyz Republic 97	2				-1.17	1.25	0.62	0.17
Latvia 94	1				-2.50	-1.08	-1.73	-0.15
Latvia 95	2				0.82	-0.03	-0.60	0.54
Latvia 96	1				-0.13	-1.01	-0.59	0.42
Latvia 97	1				1.22	-0.66	-0.14	0.22
Latvia 98	1				-0.11	-0.34	-0.08	0.13
Lithuania 94	1				-4.33	-0.24	1.17	-0.46
Lithuania 95	1				-0.04	-1.26	0.73	-0.75
Lithuania 96	1				0.62	-1.40	1.00	-1.02
Lithuania 97	1				0.76	-1.29	1.08	-0.87
Lithuania 98	1				0.45	-0.83	0.63	-0.73
Moldova 94	3				-1.64	-0.18	0.24	0.23
Moldo va 95	3				0.89	-0.95	0.56	0.04
Moldova 96	3				0.19	0.31	-0.54	-1.57

Object (country, year)	Deter-mined group	Probability of belonging to the group			Component scores			
		First	Second	Third	F 1	F 2	F 3	F 4
Poland 94	1				-0.03	0.40	-0.87	2.23
Poland 95	2				1.82	1.09	1.08	0.18
Poland 96	1				0.71	0.26	-0.49	1.39
Romania 94	2				0.53	0.19	0.37	-0.29
Romania 95	2				0.51	0.51	0.12	-0.07
Romania 96	2				0.69	0.71	0.21	-0.77
Romania 97	2				0.81	-0.06	-0.08	-0.87
Russia 94	2				1.76	-0.67	-0.77	-1.51
Russia 95	2				1.51	0.30	-0.53	-1.15
Russia 96	2				1.78	0.50	-0.21	-1.30
Russia 97	2				1.86	0.98	-0.03	-1.14
Russia 98	2				1.41	0.37	-0.75	-1.17
Slovak Republic 94	1				0.22	-0.05	-0.51	0.55
Slovak Republic 95	1				0.81	0.39	0.16	0.81
Slovak Republic 96	1				0.72	0.57	0.71	0.73
Slovak Republic 98	1				0.30	0.07	0.72	-0.07
Slovenia 94	1				0.22	1.29	-1.75	-1.87
Slovenia 95	1				0.05	1.60	-1.06	-1.97
Slovenia 96	1				0.04	1.57	-1.01	-1.95
Slovenia 97	1				0.20	1.52	-0.80	-1.73
Slovenia 98	1				0.26	1.56	-0.48	-0.49
Tajikistan 96	3				0.18	-0.62	-1.88	1.07
Tajikistan 97	3				1.08	-0.80	-1.61	1.16
Ukraine 94	3				-1.30	0.04	1.11	-1.00
Ukraine 95	3				-0.03	0.25	0.46	-1.31
Ukraine 96	3				0.32	0.53	-0.05	-1.71
Ukraine 97	2				0.48	-0.25	-0.66	-0.44
Ukraine 98	2				-0.14	-0.17	-1.20	-0.51
Uzbekistan 94	3				-0.16	-1.61	0.31	0.96
Uzbekistan 95	3				0.70	-1.40	0.64	-0.25
Uzbekistan 96	3				0.97	-1.25	0.91	-0.99
Uzbekistan 97	2				-0.19	0.13	0.61	-0.47