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FACTORS INFLUENCING INCOME INEQUALITY IN TRANSITION ECONOMIES

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Anneli Kaasa*

Abstract

A sharp rise of income inequality in the transition countries has caused a wide-ranging discussion about the factors affecting inequality. The present paper investigates a number of factors that influence income inequality in the transition countries. The main contribution of the study lies in its different approach to analysing these factors. While previous studies have either mainly focussed on single factors of inequality or have used regression analysis involving but a few factors, the author of the present paper uses principal component analysis in order to analyse as many different indicators as possible and at the same time avoid the problem of possible multicollinearity. As a result, four components are formed from the initial indicators. The impact of these components on income inequality and the component scores are then analysed.

Keywords: income inequality, income distribution, transition economies

JEL Classification: D31, I3, P21.

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CONTENTS

Introduction

During the transitional years, the countries of Central and Eastern Europe and the former Soviet Union have experienced a sharp increase in poverty. Therefore the rise in the living standard of the population has become one of the most important aims of their economic policies. To achieve this aim, two aspects have to be taken into account, namely, the country's average income level and the distribution of that income among the population. If the country's average income level is higher than that of other countries, but its income inequality is also higher than the average level, then the poorest quintile of the population may appear to be in even a worse situation than the poorest quintile in some other country whose average income level is lower, but whose income inequality is lower, too. So the distribution of income has to be considered alongside the level of income. As an objective of economic policy, lowering income inequality may be as important as increasing people's incomes and the country's overall economic growth. If for some reason this turns out to be impossible, then the aspect of inequality must still be taken into account when comparing the income levels of different countries.

The uneven distribution of income, or income inequality, has several reasons. Considering these reasons, it is important to distinguish between developed countries (for example, the countries in the European Union) and countries in transition. The member countries of the European Union (EU) have usually established a relatively stable level of income inequality in accordance with their economic, political and cultural characteristics. The countries in transition, on the other hand, have undergone considerable economic and political changes and their economic development is very variable, thus making it impossible to establish some stable level of income inequality.

This paper focuses on the transition economies. Initially it studies the levels of average income and income inequality. Next a brief outline is given of the extensive literature about different factors influencing inequality. Thereafter the data set about the transition countries is used to disclose some general factors that influence inequality in transition. For this purpose, correlation, principal component and regression analyses are used. Then the influence of the derived components and considering these components likely developments in income inequality are discussed.

1. Income level and income inequality in the transition countries

As a measure of a country's income level, per capita GDP is often used. For the sake of comparability, this indicator is measured in US dollars. Because of differences in the price levels of different countries and hence in purchasing power in different countries, it is reasonable to use the GDP adjusted by purchasing power parity and expressed in PPP US dollars. The present analysis uses GDP data drawn from the Global Development Network Growth Database (GDNGD, WorldBank…, 2001).

Measuring income inequality is more complex. As a measure of income inequality, many different indicators can be used. One of the most frequently used indicators of inequality is the Gini coefficient, which is calculated as a ratio — the area between the Lorenz curve and the 45 degrees equality line divided by the entire area below the 45 degrees line. The higher the Gini coefficient, the more unevenly is income divided among the population. The biggest problem for a researcher is unavailability of comparable data about different countries. Namely, the Gini coefficient can be calculated either by using only earnings or using total income, either on the basis of only monetary income or on the basis of all kinds of income. The basis of calculation may be both gross income and income after taxes. There is no unique method by which the Gini coefficient is

calculated for all countries and this makes drawing comparisons between countries more complex and sometimes even unreliable. In this paper we use the Gini coefficients calculated on the basis of net income (income after taxes, including both monetary and non-monetary income), as it is defined in the largest income inequality database, the World Income Inequality Database (WIID, UNU/WIDER-UNDP…, 2000). The main argument for choosing this indicator — the Gini coefficient of net income — is its availability for the transition countries in this database.

Table 1 shows the per capita GDP and Gini coefficients of different transition countries. For better comparison, the author has calculated the ratios of these indicators to the transition countries' average (the value of a particular country's indicator is divided by the average value of all the countries). Most countries whose income level is higher than the average (Slovenia, the Czech Republic, Hungary, the Slovak Republic, Romania and Lithuania) also have a more even income distribution than the transition countries on average. However, the income level of Russia is higher than the average, but its income inequality is above the average. In case of Poland and Estonia, whose income levels are also above the average, the Gini coefficient stays on the average level of the countries involved in this survey. Four countries — Belarus, Latvia, FYR Macedonia and Azerbaijan — have below the average income levels, but their income inequality is lower than the average. Thus, it is possible that the average income of the poorest quintile of the Latvian population may be higher than that of the same quintile in Russia, although the average income of the entire population is higher in Russia. The problem of poverty is probably most severe in the rest of the countries (Bulgaria, the Ukraine, Kazakhstan, Kyrgyzstan, Turkmenistan, Armenia, Moldova and Georgia), whose income inequality is also relatively high in addition to their below-the-average income levels. The relationship between income inequality and average income according to Table 1 can also be illustrated as done by Figure 1. As we can see, richer countries tend to have a more even income distribution.

Table 1

Income levels and income distribution of the transition countries in 1997

Country (year)	GDP per capita		Gini coefficient	
	Indicator (PPP US dollars)	Ratio to average	Indicator (%)	Ratio to average
Slovenia (1996)	13.530	2.28	24.00	0.71
Czech Republic	12.930	2.18	27.64	0.81
Hungary	9.914	1.67	24.58	0.72
Slovak Republic	9.526	1.60	23.36	0.69
Romania	6.210	1.05	30.27	0.89
Lithuania	6.255	1.05	30.90	0.91
Estonia	7.503	1.26	34.10	1.00
Poland	7.439	1.25	34.20	1.00
Russia	7.031	1.18	37.00	1.09
Average of the transition countries*	5.936	1.00	34.04	1.00
Belarus	5.768	0.97	24.85	0.73
Latvia	5.609	0.94	32.60	0.96
FYR Macedonia	4.251	0.72	29.50	0.87
Azerbaijan	2.039	0.34	31.10	0.91
Georgia	4.992	0.84	51.86	1.52
Bulgaria	4.721	0.80	34.59	1.02
Kazakhstan (1996)	4.435	0.75	35.40	1.04
Ukraine	3.295	0.56	35.13	1.03
Turkmenistan (1998)	2.664	0.45	40.80	1.20
Kyrgyzstan	2.310	0.39	43.10	1.27
Moldova	2.175	0.37	46.63	1.37
Armenia	2.053	0.35	43.14	1.27

* Data are not available for Albania, Croatia, Tajikistan and Uzbekistan

Sources: *GDNGD* 2001, *WIID* 2000 and the author's calculations

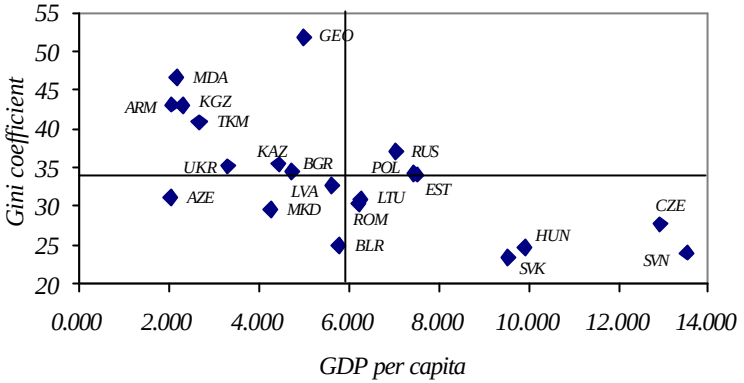


Figure 1. Inequality and average income in transition countries (data from table 1)

2. Factors influencing income inequality

The described evidence of the transition countries has caused a wide-ranging discussion about the factors affecting inequality, both in general and especially in transition. In the extensive literature on this topic several explanations are offered about the causes of inequality. Different studies on both the transition and developed countries propose many factors that influence income inequality to a smaller or larger degree. The direction of these influences, however, is often unclear: whether a higher value of a certain factor causes higher or lower inequality depends on the characteristics of the economic system and the overall level of development of the country in question (see, for example, Cornia and Kiiski, 2001). Likewise there are often problems with causality. For instance, there is no consensus about the direction of the relationship between income inequality and economic growth. Some empirical studies support the hypothesis about growth influencing inequality, while others report that inequality influences growth (Ferreira, 1999). It is possible that this is so because causal links between economic growth and income inequality work through many other factors. All the different factors described in literature as

affecting inequality can be systematised into five groups as follows.

Economic growth and the overall development level of a country — this group includes growth in the GDP, technological progress and the structure of the economy, meaning the shares of the agricultural, industrial and service sectors. There are studies (Higgins and Williamson, 1999) that report the inverted U-shaped relationship between the average income and income inequality first introduced by Kuznets (Ferreira, 1999): growth from the low development level leads first to an increase in inequality, but then, at a higher development level, to a decrease in inequality. However, the evidence from the transition process and many studies has caused scepticism about Kuznets' hypothesis. According to this, it may be reasonable to look for a connection between growth in the GDP and inequality through other indicators, which describe a particular country's level of development. One of these indicators may be the share of the population employed by different sectors. There is evidence that if a large part of the population moves to a higher sector (for example, from agriculture into the industrial sector), inequality will increase, but if the movement stops, income distribution will become more even again (Gustafsson and Johansson, 1997). Technological change can also cause dispersion of wages because of an increased need for skilled workers and rising productivity of skilled workers only (Snower, 1999). However, these changes can be avoided with appropriate adjustments in education policy (Cornia and Kiiski, 2001).

Macroeconomic factors are inflation and unemployment, the size of government's expenditure, external debt and foreign reserves, changes in the exchange rate, and other factors. High inflation mainly causes deepening inequality, because it redistributes resources from persons with fixed nominal income — usually from the socially less insured and poorer part of the population. However, by a progressive tax system, inflation can reduce the income share of the more affluent part of the population (Gustafsson and Johansson, 1997). The influence of

unemployment is somewhat clearer: according to Gustafsson and Johansson, research usually shows that unemployment has inequality increasing effects, because high unemployment worsens the situation of those at the bottom of income distribution. The direction of influence on inequality of the exchange rate and other factors related to foreign economy is not clear. The influence of the government's expenditure depends on its composition, mainly on the share of social transfers in public expenditure. For example, if the external debt increases, then the increase in interest payments will leave less to social transfers and the redistributive effect of public sector expenditures will decrease (Cornia and Kiiski, 2001).

Demographic factors include processes of demographic development, including the age structure of population (share of economically active population), the growth and density of population; urbanisation, level of human capital, including the level of education and health condition of population. For example, inequality tends to be lower in countries with high population density than in those with low population density. In the latter there exists a stronger possibility for land concentration, which leads to a greater inequality through capital income. The level of human capital and especially education is of great importance, too (Eicher and Garcia-Penalosa, 2000, Bouillon, Legovini and Lustig, 1999). Research has indicated that the relationship between educational expansion and inequality is inverted U-shaped. During the initial phases of development, a rise in the population's level of education increases inequality, because more highly educated employees will get a higher income. A further rise and equalisation in the educational level will equalise the income distribution and bring about a decline in inequality (Cornia and Kiiski, 2001).

Political factors include privatisation and the share of the private sector, level of taxes and the share of the public sector, openness of a country, especially trade openness and freedom of labour movement; social policy and other decisions of economic policy. Durham (Durham, 1999) has analysed regime-type as a factor influencing inequality. However, no confident

conclusions can be drawn about the influence of regime-type, because, for example, most developed countries, in which inequality is lower, are democracies, but the reason for their lower inequality can also be their higher level of development. Privatisation in the transition countries causes wealth concentration to a greater or smaller extent, leading to a more uneven income distribution. Earnings inequality in the public sector is typically lower than in the private sector; thus, the bigger the share of the public sector in economy, the lower the overall inequality (Gustafsson and Johansson, 1997). Besides these, for example, the regional policy that favours urbanisation will cause income distribution between urban and rural population to be more uneven. The increasing trade openness in developing countries can cause a greater need for low-priced labour and hence a decrease in inequality, but the overall relationship between openness to trade and income inequality is not clear (Cornia and Kiiski, 2001). Also, a negative relationship has been found to exist between the extent of social transfers or income redistribution and income inequality (Caminada and Goudswaard, 2001), but apart from the direct influence redistribution can likewise affect work and investment decisions, so it is not clear to what extent and in which direction inequality is influenced by the tax system and social transfers.

Historical, cultural and natural factors, which among others include distribution of land ownership, people's attitude to inequality, extent of shadow economy, which are all formed in the course of long history. In addition to these, there is one more factor — availability of natural resources. Countries well endowed with natural resources tend to have greater inequality because of capital-based technology and a lower need for unskilled labour (Cornia and Kiiski, 2001). Inequality is certainly higher in those countries, during whose history land, natural resources and wealth have concentrated into the hands of a small group of the population (Cornia and Kiiski, 2001). Finally, social scientists have found a relationship to exist between the cultural characteristics of a society and its income inequality (Mushinski and Pickering, 2000).

3. Components of factors influencing income inequality in THE transition countries

As we have seen, there is a complex set of factors affecting income inequality in a country. The extensive literature about this topic also includes many empirical studies focussed on correlations between single factors and inequality. To get an idea about how the income inequality level of a country is formed, it is necessary to analyse many possible factors. However, only a few studies have taken into account all or many of these factors in regression analysis (Gustafsson and Johansson, 1997, Higgins and Williamson, 1999). One reason for this may be the problems arising when a large number of factors are analysed. Such an analysis requires a large data set with many indicators, which often leads to the problem of multicollinearity. So it is very complicated to find an estimate for the influence of every single factor on income inequality and even if found it could be insignificant.

Multicollinearity refers to a possibility that there exist some latent or hidden factors influencing the level of inequality or, as in the context of this article, non-measurable factors. Although these factors are not directly measurable, they consist of a set of many visible and measurable indicators. While previous studies have used mainly regression analysis, the application of principal components analysis is very helpful in avoiding the problems of too many variables and multicollinearity. Principal component analysis makes it possible to reduce the data set and draw a large number of variables together to only a few factors. This kind of analysis also helps to find a substantive meaning in a large set of indicators by combining those that are similar. This method means that the set of initial variables is organised so that groups of closely related indicators are established. Such groups of indicators are called components. Thus, the present study uses principal component analysis to find hidden factors affecting income inequality in the transition countries. After this

regression analysis will be used to study the influence of these hidden factors on income inequality in transition.

This study uses a data set compiled by the author, covering 23 countries in transition (Central and Eastern Europe and the former Soviet Union) between 1990–1992 and 1998. The starting year varies for different countries according to the starting point of the transition processes (International…, 2000). The comparable data for later than 1998 are not available yet, especially about the Gini coefficient. The data were drawn from various databases: the GDNGD (WorldBank…, 2001), the WIID (UNU/WIDER-UNDP…, 2000) and the Health for All Data Base (WHO…, 2001). In addition, the data published in the Transition Reports (EBRD, 1995–2000) are used. However, the data set has many gaps, mainly due to lack of data about inequality. The analysis presented herein eventually used 109 observations. Besides the countries shown in Table 1, there are also some earlier observations about Croatia and Uzbekistan.

To give an outline of available observations, Table 2 shows the Gini coefficients for those used in our further analysis. As we can see, in this period inequality increased remarkably in the Czech Republic, Belarus, Georgia and Kyrgyzstan, but also in Latvia, the Slovak Republic and Romania. At the same time in Armenia, Russia and also in Estonia, inequality decreased to some extent. In other countries no clear trend in inequality can be seen. Different countries are represented with a different number of observations, but as economic conditions are changing rapidly during transition, a country probably is in a different stage of transformation next year and every observation can in any case be viewed as a different case. The *SPSS 10.0 for Windows* was applied to carry out a mathematical-statistical analysis.

Table 2

Gini coefficients (based on net income) for the observations used in the analysis (%)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998
Armenia					60.60	62.14	59.72	43.14	
Azerbaijan								31.10	
Belarus				21.60		24.67	24.22	24.85	31.00
Bulgaria		24.92	31.06	31.90	35.62	37.15	34.78	34.59	
Croatia		26.70		26.50					
Czech Republic		18.85	20.34	21.55	22.09	21.52	28.14	27.64	
Estonia			41.23	38.79	39.57	39.04	37.37	34.10	36.97
FYR Macedonia				27.90	27.30	29.50	31.10	29.50	
Georgia			36.45	45.08	57.24	53.50	58.71	51.86	
Hungary	21.41	20.42		22.69	23.15	24.34	24.47	24.58	25.30
Kazakhstan				32.70			35.40		
Kyrgyzstan			30.00	35.30	44.30	39.50	42.80	43.10	
Latvia				27.00	27.00	28.50	32.17	32.60	32.10
Lithuania					35.04	33.34	35.70	30.90	
Moldova				43.70	37.90	39.00		46.63	
Poland							33.12	34.20	32.70
Romania		24.32	25.14	26.19	26.24	31.18	30.60	30.27	
Russia			43.70	38.10	40.50	38.50	37.60	37.00	37.60
Slovak Republic		17.96	18.62	19.68	20.81	20.00	24.83	23.36	
Slovenia				25.05	22.00	23.41	24.00		
Turkmenistan									40.80
Ukraine				36.79	34.75	27.20	35.42	35.13	
Uzbekistan				33.30					

Sources: *WIID* 2000

As a first step, **correlation analysis** was used to study the relationships between the Gini coefficient as a measure of inequality and other indicators included in the data set. It turned out that such indicators as, say, duration of transition, size of a country, share of economically active population, mortality, share of trade in the GDP and also growth in the GDP had no significant correlation with the Gini coefficient. Therefore these indicators were excluded from our further analysis. The absence of a connection between the growth in the GDP and income inequality supports the hypothesis that there is no direct relationship between these two indicators and income inequality is probably related to economic growth through other factors. Finally, the following indicators were included: the GDP per capita (GDPPCA), population growth (in per cent) (POPGR), share of urban population (URBPOP), population density (POPDEN), share of population under 15 years of age (YPOP), inflation (INFL), unemployment (UNEMPL), share of the private sector (PRIV), shares of industry (IND), agriculture (AGR) and the services sector (SERV) in the GDP, government's expenditure (GOVEXP) and expenditure on human capital (EXPHUM) as shares of the GDP, and primary school enrolment (SCHOOL). The correlation structure of indicators included into the analysis for the included 109 full observations is presented in Appendix 1. The correlation coefficients that are significant at the 0.01 level are highlighted with grey shading. Whereas there exist no definite criteria for determining the extent of multicollinearity, we can concede that some of the included indicators are more or less strongly correlated. If we add to this also the intention to find some immeasurable factors influencing inequality, we will find the principal components analysis to be quite useful. As Figure 1 shows no U-shaped relationship between the average income and inequality, we can accept that the principal component analysis focuses only on linear relations.

As a next step, **principal component analysis** is used to find out what components (carrying information of a group of indicators) can possibly affect income inequality in the transition countries. One aim of the component analysis was also to group

the available indicators in the way that would enable interpreting these groups or components as factors influencing inequality. According to this, 14 variables were included into the final analysis (see Table 3). The share of population aged over 65, however, was excluded from the final analysis, because the difference between the component loadings of this indicator and those of the share of population under 15 was mainly in sign.

Table 3 shows the results of the component analysis in the form of a rotated component matrix (the rotation was performed by the *Varimax*-method). The numbers in the table are component loadings of the initial indicators in the final components. The component loadings show the strength and direction of the relationship between a certain initial indicator and a certain component. This information is used for interpreting the components. The table presents those component loadings that were significant at the 0.01 level. For clarity, we excluded less significant component loadings from the component matrix. As a result of the analysis, the initial indicators were grouped into four components (the number of components was chosen with the help of Scree Plot: the contribution of the following components in describing the variance of the initial variables was insignificant), which altogether explain 68.6% of the variance of the initial variables. The first component describes 20.0%, the second 17.4%, the third 17.0% and the fourth 14.2% of the variance. Analysing the direction (sign of component loading) and strength (value of component loading) of the relationships between the components and the initial variables allows us to interpret the components as follows (see also Table 3).

Table3

Components based on initial indicators (rotated component matrix)

Initial indicator	Level of demographic development processes	Level of general development of a country	Extent of transition processes	Creation of human capital
Share of urban population	0.839			
Growth of population (in %)	–0.801			
Share of young population (under 15)	–0.787	–0.313		
Share of agriculture in GDP	–0.539	–0.372	0.420	–0.473
GDP per capita (PPP)	0.360	0.690	0.312	
Population density		0.685		
School enrolment (primary)		0.659		0.331
Share of industry in GDP		0.651	-0.432	
Share of private sector in GDP			0.828	
Share of services sector in GDP	0.445		0.729	0.414
Inflation			–0.526	
Unemployment		–0.312	0.525	0.319
Expenditure on education and health care as a share of GDP				0.856
Government expenditure as a share of GDP		0.460		0.677

The first component describes the level of **demographic development processes** in a country. A strong positive relationship of this component with the share of urban population and also a strong negative relationship with the share of young population confirm it. As known, demographic processes over time are connected with urbanisation and increase the share of urban dwellers in total population. Urbanisation is related to movement from agriculture into the industrial sector and finally into the service sector. So it is logical that the component describing demographic development is connected negatively with the share of agriculture in the GDP and positively with the share of services in the GDP. With these changes, usually, the GDP per capita grows. Thus, a somewhat weaker relationship of this component with per capita GDP makes sense. Demographic development also usually leads to the ageing of the population: its growth decreases and can even become negative. This is shown by the lower share of young population and the higher share of people over 65. Consequently, the negative relationship of this component with population growth confirms that it is reasonable to name this component the level of demographic development processes.

The second component describes different aspects of the **level of general development of a country**. This component is strongly and positively related to per capita GDP, the share of industry in the GDP, population density, and school enrolment. The countries on a higher development level tend to have higher levels of income (higher GDP per capita) and higher education level. Generally more developed countries also tend to have a higher population density and industrialisation has also increased the share of industry in these countries. According to this, a relatively weak negative relationship between this component and the share of agriculture is logical. The demographic processes and overall development are simultaneous, so the weak negative relationship with the share of young population can also be explained. After these, the development of a country often leads to greater public concern about social problems, which in its turn reduces unemployment and is represented by

bigger government expenditure. The component loadings describe these two aspects as well.

The third component concerns the **extent of the transition processes**. This supposition is confirmed by a strong relationship of the third component with the share of the private sector — the private sectors' share increases during the transition process through privatisation. There are usually big changes in the sector structure of economy during transition. Movements from the industrial sector to the services sector are reflected in the component loadings of the shares of industry and services. It is interesting to note that there is a weak positive relationship between the share of agriculture and the third component. One possible explanation is that these countries have not overcome the decline in agriculture experienced at the beginning of transition. The changes in sector structure are often among the most important causes for rising unemployment during transition. So it makes sense that the extent of the transition process is positively connected with unemployment. Almost all the transition countries experienced a sharp increase in inflation at the beginning of their transition, but later the inflation almost continuously decreased, as described by the negative component loading of inflation. A weak positive relationship also appeared to occur between the GDP per capita and this component, which is also quite understandable — after a sharp decline, the GDP mainly has a rising trend during the transition years.

The fourth component is strongly and positively connected with expenditure on education and health care, and government's expenditure as a share of the GDP. As the education level and health condition of its population together determine the level of human capital in a country, these relations refer to **human capital creation**. A somewhat weaker but positive relationship of this component with school enrolment supports this hypothesis. It is worth mentioning that although usually a higher level of human capital creation induces lower unemployment, the analysis in question, on the contrary, shows a positive relationship between unemployment and the fourth component. The

answer should be sought in the features of unemployment in transition. While structural unemployment dominates, it is possible that usual causality does not hold. The higher the unemployment level, the more expenditure should go into re-educating workers. The higher level of human capital creation is also related to the smaller share of agriculture and the greater share of the services sector in economy. This explains the component loadings of these two shares.

4. The Influence of the derived components on income inequality in transition

After the presented component analysis, a **multiple regression analysis** was made to study how the estimated components influence income inequality. It is also possible that some components covering factors presumed to influence inequality in actual fact do not influence income inequality at all. For a regression analysis, the Gini coefficient is selected as a dependent variable. The values of the previously described four components (component scores) are included into the regression model as independent variables. Component scores are composite values calculated (in this analysis, the regression method is used) for each observation according to the results of the component analysis. They show the value of the component for a certain observation. (The component scores for all observations are shown in Appendix 2.)

The estimates of the regression model are as follows:

$$G = 32.685^{**} - 0.771C_1 - 5.435^{**}C_2 - 1.094^{*}C_3 - 5.367^{**}C_4 .$$

The symbol G stands for the Gini coefficient and C_i ($i = 1 \ldots 4$) stands for the i-th component. The model is significant with 99% confidence. The coefficient of the third component is significant with 95% (*) confidence, and the coefficient of the first component with 83% confidence. All the other parameters in this model are significant with 99% (**)

confidence. The somewhat less significant influence of the first component (the level of demographic processes) is consistent with the results of earlier studies. Compared to others, demographic factors have a smaller influence on income inequality. However, it has been argued that the relative insignificance of this relation gives no reason to confirm the absence of the influence (Gustafsson and Johansson, 1997). The regression model describes 65.2% of the variation in the Gini coefficient. This can be evaluated as a rather good result, considering the complexity of the research object and the multiplicity of factors that probably influence inequality.

Both a particular country's level of general development and human capital creation have an equally great effect on the transition countries' income inequality level. A higher level of development and bigger expenditure on human capital creation decrease the value of the Gini coefficient, thus reducing income inequality. The other two components, i.e. the extent of transition processes and the level of demographic development processes also have negative though smaller effects on the Gini coefficient. According to the model, progress in the transition processes of a country will lead to a somewhat more even income distribution.. Demographic development processes in time will lead to a lower Gini coefficient and hence less income inequality.

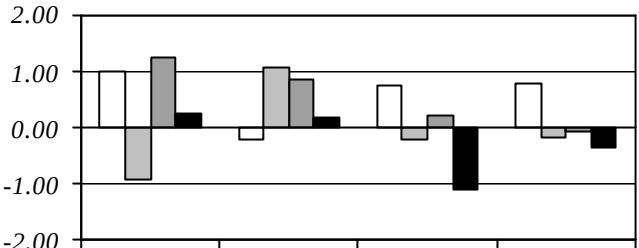
Considering the initial indicators forming these four components it is possible to draw the following conclusion. Income inequality in the transition countries is affected both by factors reflecting economic growth and the level of overall development (GDP per capita, shares of three main sectors representing changes in economies sector structure) and by macroeconomic factors (such as inflation and unemployment). Besides these, income inequality is influenced by both demographic factors (population growth and density, urbanisation, share of young people and school enrolment) and political factors (share of the private sector, government's expenditure and expenditure on human capital). These are the four categories of factors introduced previously. Regrettably, due to lack of data about the last

category — cultural, historical and natural factors, nothing can be said about these factors. However, we can presume that apart from economic and political changes there are also changes in cultural traditions, the influence of which on income inequality needs to be studied more closely.

As we have seen, all four components have a negative influence on the Gini coefficient: the higher the value of component scores (showing the values of components for different observations), the more even the income distribution. The different levels of income inequality in different countries can be explained with differences in values of the components. Each country has a unique set of values of these four components, which together have an additive effect on the income inequality level of this country. For example, in the year 1997, four countries had nearly the same level of income inequality: Estonia's Gini coefficient was 34.10%, Poland's 34.20%, Bulgaria's 34.59% and the Ukraine's 35.13% (the differences are relatively small, considering the deviation of the Gini coefficient in different countries, see Table 2). It turns out that despite almost the same inequality level, the component scores differ significantly for these countries. Figure 3 shows the component scores in 1997 for the four countries under consideration.

As the component scores are measured in standard deviation from the average of the sample, the average component score for the sample is zero. Thus, a positive value of a component indicates that, accordingly, the level of demographic devebpments or the country's level of overall development, the extent of transformations, or the human capital creation is higher than the average of the sample and vice versa. The higher the absolute value of its component score, the more the country stands out from others, in regard to this particular component. The level of demographic development processes is relatively high in all these four countries except Poland. The level of a country's overall development, on the contrary, is mainly lower than the average, except in case of Poland, where it is relatively high. The transformations of all the four countries have progressed in rather different ways. In Estonia and Poland, the situation in

human capital creation is better than the average, while in Bulgaria and the Ukraine it is worse than the average. As the different component structures have lead to the same level of income inequality in these four countries, the additive effect does matter.



	Estonia	*Poland*	*Bulgaria*	*Ukraine*
1. component	*1.01*	*-0.21*	*0.77*	*0.80*
2. component	*-0.90*	*1.07*	*-0.20*	*-0.17*
3. component	*1.24*	*0.87*	*0.23*	*-0.06*
4. component	*0.26*	*0.20*	*-1.09*	*-0.36*

Figure 3. Component scores for four countries with the same inequality level (1997)

The other aspect is that the changes in the level of inequality are affected by the changes of all components and the effect is cumulative again. This can be seen while comparing the dynamics of component scores in different countries. On the one hand: in almost all countries the value of the component of human capital creation has decreased, which according to regression analysis refers to an increase in income inequality. On the other hand, the component scores describing the extent of transformation processes have mainly increased, which has a decreasing effect on income inequality. (The two other components describing the general development level of a country and the demographic processes have had no clear developmental tendencies in most countries.) As we have seen before, income inequality has increased in some countries and decreased in

others. So, the total effect of the components on income inequality depends on the extent of the changes within different components and also on the significance of these components in influencing inequality.

5. Possible developments in income inequality considering the derived components

Analysing the component scores for a certain country can give us an idea about the likely changes of its income inequality in the future. For example, the component scores describing the extent of transformation processes have significantly increased in all countries. It is reasonable to believe that these processes will continue in all the transitional countries. As far as the extent of the transition processes has a negative effect on the Gini coefficient, it is likely that the continuation of transformation can by itself have an inequality-lowering effect. It turns out that after a sharp increase in income inequality at the beginning of transition, the transition processes make income distribution in most countries rather more even. However, the previously introduced regression analysis showed that the effect of this component on inequality is relatively small. It must also be taken into account that the speed of transformation will probably decrease in time.

It has to be noted that the component of demographic development processes has a relatively smaller influence on income inequality. In most countries the value of this component shows no clearly defined trend, but the component scores have been changed in a relatively small interval, except in Georgia, Slovenia and Kyrgyzstan (see Appendix 2). On the basis of this and the relatively low significance of this component, no valid conclusions can be drawn about the possible changes in income inequality caused by demographic processes. The component of general development level (including the GDP per capita as an

important indicator) has in many countries first decreased and then increased. As an increase in the general development level would induce decreasing inequality, a decrease in inequality can be predicted according to the general tendencies of development in Belarus, Estonia, FYR Macedonia, Georgia, Hungary, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania and Slovenia. At the same time, if this trend continues, this component will certainly raise income inequality in Russia, but also in Armenia, the Slovak Republic and the Ukraine. Such a situation can probably be avoided by an appropriate economic policy; however, on the basis of the present analysis it is difficult to make suggestions about appropriate measures.

The component that can be affected most by the economic policy is that of human capital creation. The government's policy can involve increased expenditure on education and health care and measures to raise school enrolment, which both are positively related to this component. In most of the countries under consideration with available observations about the recent years the value of the component of human capital creation has rapidly decreased. No clearly discernible trend can be found for some countries, but there is no country with an increasing value of this component. This evidence indicates that there are significant problems with human capital creation in the transitional countries. Like all the other components, human capital creation has a negative influence on the Gini coefficient. So, if the other three components derived in this analysis have relatively low values in a certain country, then it is highly probable that this country experiences high income-inequality. We have seen from our regression analysis that the component of human capital creation is one of the most important factors of income inequality. Thus, an adequate governmental policy favouring human capital creation would be necessary in order to reduce income inequality in all the transition countries and to avoid the continuous negative effect of ever worsening situation in human capital creation.

Conclusions

When analysing the problems of poverty in different countries, one should consider two aspects of equal importance: besides the average income level income distribution is of the same importance. A high level of income inequality may significantly reduce the welfare of inhabitants of a country whose level of income is relatively high. The factors influencing income distribution are extensively discussed in pertaining literature. The conclusions drawn by previous research give us many different factors that influence income inequality. They can be divided into five main groups: the economic growth and overall development of a country, the macroeconomic, demographic, and political factors, and last but not least — the historical, cultural and natural factors.

This paper presents an analysis, the aim of which is to study the influence of different factors on income inequality in the transition countries. The data used came from different databases. The data set formed by the author involves almost all the transition countries and the years 1990-1998. Unfortunately, there are many gaps in the data set, mainly due to lack of comparable data about the Gini coefficient as a measure of inequality. The initial variables that are likely to affect inequality were chosen on the basis of the results of the correlation analysis. A component analysis enabled us to group the 14 selected initial indicators into four components, which altogether describe 68.6% of the variation of the initial variables. According to the strength and direction of the relationship between these components and the initial indicators, the components are named as follows (in order of size of the variation described): the level of demographic development processes, the overall level of development of a country, the extent of the transition processes, and the creation of human capital.

As a result of regression analysis, it turned out that all the components reduce income inequality. The regression model including all components as independent variables describes 65.2% of the variance in the Gini coefficient. Both the level of

general development of a country and the creation of human capital has a strong impact on income inequality, the influence of the other two components being somewhat smaller. The statistical significance of the relationship between the demographic processes and income inequality is somewhat lower, but it gives no reason to deny the influence altogether. Thus, almost all the factors introduced in previous research appear to play an important role in determining the level of income inequality in transition. The derived four components have a cumulative effect on the level of income inequality in a country. The total effect of changes in the values of the components in time depends on the extent of the changes in different components.

As the transition processes continue, income inequality will probably decrease. The analysis of the component scores revealed that the likely influence of demographic processes could not be evaluated. Depending on the level of overall development, income inequality may increase in some countries and decrease in others. It turned out that the value of the component of human capital creation has a decreasing trend in most countries and the problematic situation in human capital creation can lead to a significant increase in income inequality in all transition countries. The latter can be avoided by implementing an appropriate governmental policy favouring creation of human capital.

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KOKKUVÕTE

Sissetulekute ebavõrdsust siirderiikides mõjutavad tegurid

Tulujaotuse ühtlus on tulutaseme kõrval oluline ühiskonna heaolutaseme näitaja. Sageli võib kõrge tulutasemega riigi elanike tegelikku heaolu vähendada ebaühtlane tulujaotus. Tulutaseme ebaühtlust ehk sissetulekute ebavõrdsust mõjutavaid erinevaid tegureid on käsitletud paljudes uurimustes. Käesoleva artikli põhieesmärk on tuua välja sissetulekute ebavõrdsuse peamised mõjutegurid siirderiikides. Esmalt vaadeldakse lühidalt olukorda siirderiikides keskmise tulutaseme ja tulujaotuse ebavõrdsuse osas. Seejärel antakse ülevaade varasemates töödes välja toodud sissetulekute ebavõrdsust mõjutavatest teguritest, mida võib jaotada järgmiselt: majanduskasv ja riigi üldine areng, makroökonoomilised, demograafilised, poliitilised tegurid ning ajaloolised, kultuurilised ja looduslikud tegurid.

Eelnevates töödes on analüüsitud korraga vaid üksikute tegurite mõju sissetulekute ebavõrdsusele või kasutatud enamate tegurite koosmõju uurimiseks regressioonanalüüsi. Käesolevas töös kasutatakse võimalikult paljude arvatavate mõjutegurite analüüsi hõlmamiseks ja autokorrelatsiooniprobleemi vältimiseks komponentanalüüsi. Analüüs põhineb autori poolt erinevaid allikaid kasutades koostatud andmebaasil (aastad 1990–1998). Korrelatsioonanalüüsi abil välja valitud algnäitajatest moodustub komponentanalüüsi tulemusena neli komponenti, mis kirjeldavad kokku ligi 69% algnäitajate varieeruvusest. Vastavalt komponentide sisule ja seostele algnäitajatega võib neid nimetada järgmiselt (kirjeldavuse järjekorras): riigi demograafiliste protsesside arengutase, riigi üldine arengutase, siirdeprotsesside ulatuslikkus ning inimkapitali loomine. Regressioonanalüüsi

tulemusena selgub, et tulujaotuse ebaühtlust vähendavad oluliselt kõik komponendid, välja arvatud demograafiline arengutase, mis oodatult omas tulujaotusele vähem olulist, kuid siiski tulujaotust ühtlustavat mõju. Regressioonimudel kirjeldab 65% sissetulekute ebavõrdsuse varieeruvusest, mis nii paljude mõjutegurite puhul on küllaltki hea näitaja.

Arvestades komponentkaalude dünaamikat võib arvata, et siirdeprotsesside jätkudes võib sissetulekute ebavõrdsus siirderiikides väheneda. Riigi üldist arengutaset kirjeldava komponendi erinevad arengutendentsid võivad tulujaotuse ebavõrdsust erinevates riikides kas suurendada või vähendada. Et inimkapitali loomist iseloomustava komponendi väärtus on ena muses siirderiikides vähenenud, siis on seetõttu tõenäoline sissetulekute ebavõrdsuse suurenemine. Kuna tegu on enim valitsuse poolt mõjutatava komponendiga, siis on tulujaotuse ebaühtlustumist halveneva olukorra tõttu inimkapitali loomises võimalik vältida sobiva poliitika abil.

Appendix 1

Correlation coefficients of included indicators for analysed observations

		GDPPCA	POPGR	URBPOP	POPDEN	YPOP	INFL	UNEMPL
	1.000	–0.609	0.065	–0.057	–0.271	0.352	0.352	-0.165
GDPPCA	–0.609	1.000	–0.138	0.355	0.321	–0.608	–0.210	–0.025
POPGR	0.065	–0.138	1.000	–0.456	0.118	0.557	0.018	0.078
URBPOP	–0.057	0.355	–0.456	1.000	–0.009	–0.689	–0.024	0.128
POPDEN	–0.271	0.321	0.118	–0.009	1.000	–0.288	–0.035	–0.025
YPOP	0.352	–0.608	0.557	–0.689	–0.288	1.000	0.073	–0.167
INFL	0.352	–0.210	0.018	–0.024	–0.035	0.073	1.000	–0.159
UNEMPL	–0.165	–0.025	0.078	0.128	–0.025	–0.167	–0.159	1.000
PRIV	0.028	0.319	–0.073	0.296	0.100	–0.329	–0.275	0.251
IND	–0.495	0.342	–0.104	0.182	0.291	–0.218	–0.047	–0.176
AGR	0.593	–0.692	0.290	–0.530	–0.108	0.623	0.312	–0.292
SERV	–0.307	0.512	–0.241	0.444	–0.075	–0.520	–0.301	0.425
GOVEXP	–0.585	0.507	–0.080	0.267	0.233	–0.365	–0.121	0.058
EXPHUM	–0.451	0.304	–0.102	–0.004	0.184	–0.235	–0.122	0.141
SCHOOL	–0.698	0.738	–0.192	0.239	0.240	–0.422	–0.263	–0.055

Correlation coefficients of included indicators for analysed observations (previous table continued)

	PRIV	IND	AGR	SERV	GOVEXP	EXPHUM	SCHOOL
GINI	0.028	–0.495	0.593	–0.307	–0.585	–0.451	–0.698
GDPPCA	0.319	0.342	–0.692	0.512	0.507	0.304	0.738
POPGR	–0.073	–0.104	0.290	–0.241	–0.080	–0.102	–0.192
URBPOP	0.296	0.182	–0.530	0.444	0.267	–0.004	0.239
POPDEN	0.100	0.291	–0.108	–0.075	0.233	0.184	0.240
YPOP	–0.329	–0.218	0.623	–0.520	–0.365	–0.235	–0.422
INFL	–0.275	–0.047	0.312	–0.301	–0.121	–0.122	–0.263
UNEMPL	0.251	–0.176	–0.292	0.425	0.058	0.141	–0.055
PRIV	1.000	–0.295	–0.366	0.581	–0.009	–0.020	0.235
IND	–0.295	1.000	–0.401	–0.227	0.372	0.030	0.323
AGR	–0.366	–0.401	1.000	–0.801	–0.506	–0.385	–0.589
SERV	0.581	–0.227	–0.801	1.000	0.295	0.390	0.415
GOVEXP	–0.009	0.372	–0.506	0.295	1.000	0.489	0.565
EXPHUM	–0.020	0.030	–0.385	0.390	0.489	1.000	0.288
SCHOOL	0.235	0.323	–0.589	0.415	0.565	0.288	1.000

Appendix 2

Component scores for analysed observations

Observation (country, year)	Level of demographic development processes	Level of general development of a country	Extent of transition processes	Creation of human capital
Armenia 1994	–0.30	–0.23	–1.41	–1.55
Armenia 1995	–0.67	–0.12	–0.14	–2.11
Armenia 1996	–0.62	–0.08	0.23	–2.39
Armenia 1997	–0.49	–0.13	0.47	–2.47
Azerbaijan 1997	–1.41	–0.15	0.69	–1.36
Belarus 1993	–0.18	0.06	–1.62	1.91
Belarus 1995	0.46	–0.08	–1.33	0.44
Belarus 1996	0.48	0.04	–1.34	0.56
Belarus 1997	0.49	0.14	–1.46	0.97
Belarus 1998	0.58	0.40	–1.30	0.77
Bulgaria 1991	0.72	0.31	–1.30	0.69
Bulgaria 1992	0.79	0.03	–1.10	0.96
Bulgaria 1993	0.73	–0.12	–0.40	0.74
Bulgaria 1994	0.61	0.07	–0.11	0.13
Bulgaria 1995	0.68	0.25	0.06	–0.47
Bulgaria 1996	0.78	0.10	0.25	–0.69
Bulgaria 1997	0.77	–0.20	0.23	–1.09
Croatia 1991	–0.53	–0.99	–0.56	2.06
Croatia 1993	–0.22	–0.53	–0.53	1.15
Czech Republic 1991	0.64	1.90	–1.19	0.56
Czech Republic 1992	0.34	2.09	–0.57	0.14
Czech Republic 1993	0.27	1.70	0.17	0.07
Czech Republic 1994	0.38	1.90	0.59	–0.37
Czech Republic 1995	0.48	2.00	0.74	–0.50
Czech Republic 1996	0.57	1.98	0.92	–0.62
Czech Republic 1997	0.58	2.05	0.88	–0.68
Estonia 1992	1.41	–0.90	–1.02	0.26
Estonia 1993	1.45	–1.29	–0.32	0.92
Estonia 1994	1.14	–1.10	0.30	0.61

Observation (country, year)	Level of demographic development processes	Level of general development of a country	Extent of transition processes	Creation of human capital
Estonia 1995	1.01	–1.06	0.71	0.80
Estonia 1996	1.09	–1.05	1.00	0.54
Estonia 1997	1.01	–0.90	1.24	0.26
Estonia 1998	0.92	–0.87	1.44	0.34
FYR Macedonia 1993	–0.83	–1.15	0.46	2.29
FYR Macedonia 1994	–1.01	–1.27	0.81	2.08
FYR Macedonia 1995	–1.18	–1.59	1.52	1.82
FYR Macedonia 1996	–0.90	–1.50	1.80	1.09
FYR Macedonia 1997	–0.92	–1.34	1.71	0.91
Georgia 1992	–0.65	–0.63	–1.12	–0.97
Georgia 1993	–0.66	–1.73	–1.63	–0.72
Georgia 1994	1.32	–2.08	–3.64	–0.62
Georgia 1995	0.09	–1.18	0.20	–2.59
Georgia 1996	0.04	–1.17	0.91	–2.74
Georgia 1997	–0.24	–0.93	0.82	–2.24
Hungary 1990	0.04	1.09	–0.56	1.00
Hungary 1991	–0.05	0.80	–0.06	1.25
Hungary 1993	0.04	0.51	0.72	1.43
Hungary 1994	0.08	0.62	0.75	1.42
Hungary 1995	0.18	0.77	0.92	0.77
Hungary 1996	0.28	0.87	1.17	0.25
Hungary 1997	0.29	1.01	1.13	0.39
Hungary 1998	0.34	1.13	1.30	0.20
Kazakhstan 1993	0.00	–0.69	–1.15	–0.40
Kazakhstan 1996	0.27	–1.35	0.42	–0.53
Kyrgyzstan 1992	–2.04	0.29	–1.23	–1.66
Kyrgyzstan 1993	–1.66	–0.61	–1.31	–0.30
Kyrgyzstan 1994	–1.81	–1.11	–0.75	0.00
Kyrgyzstan 1995	–2.63	–1.22	0.24	0.13
Kyrgyzstan 1996	–2.93	–0.99	0.59	–0.49
Kyrgyzstan 1997	–2.76	–0.65	0.61	–0.71

Observation (country, year)	Level of demographic development processes	Level of general development of a country	Extent of transition processes	Creation of human capital
Latvia 1993	1.51	–1.15	–0.73	0.19
Latvia 1994	1.30	–1.52	0.10	0.58
Latvia 1995	1.14	–1.32	0.41	0.46
Latvia 1996	1.05	–1.21	0.82	0.23
Latvia 1997	1.08	–0.94	0.74	0.19
Latvia 1998	1.06	–1.06	1.05	0.43
Lithuania 1994	0.47	–0.16	0.46	–0.47
Lithuania 1995	0.33	–0.54	1.11	–0.16
Lithuania 1996	0.37	–0.45	1.25	–0.48
Lithuania 1997	0.42	–0.26	1.36	–0.76
Moldova 1993	–1.14	0.37	–1.92	–0.58
Moldova 1994	–1.33	–0.17	–1.41	0.55
Moldova 1995	–1.25	–0.26	–0.22	–0.09
Moldova 1997	–1.23	–0.05	–0.18	0.76
Poland 1996	–0.26	0.83	0.92	0.41
Poland 1997	–0.21	1.07	0.87	0.20
Poland 1998	–0.13	1.05	1.01	–0.13
Romania 1991	–0.34	0.88	–1.10	–0.66
Romania 1992	0.65	0.34	–1.50	–0.40
Romania 1993	–0.25	0.54	–0.45	–0.96
Romania 1994	–0.23	0.78	–0.39	–1.03
Romania 1995	–0.13	0.79	–0.15	–1.08
Romania 1996	0.00	1.01	–0.03	–1.34
Romania 1997	0.00	1.11	0.04	–1.45
Russia 1992	0.95	–0.03	–1.02	0.47
Russia 1993	1.02	–0.22	–0.54	–0.19
Russia 1994	0.99	–0.36	–0.09	–0.11
Russia 1995	1.07	–0.53	0.37	–0.67
Russia 1996	1.15	–0.56	0.40	–0.53
Russia 1997	1.19	–0.62	0.71	–0.53
Russia 1998	1.25	–0.64	0.81	–0.77

Observation (country, year)	Level of demographic development processes	Level of general development of a country	Extent of transition processes	Creation of human capital
Slovak Republic 1991	–0.42	2.48	–2.22	0.62
Slovak Republic 1992	–0.69	1.36	–0.41	0.88
Slovak Republic 1993	–0.60	1.03	0.27	0.35
Slovak Republic 1994	–0.65	0.90	0.81	0.04
Slovak Republic 1995	–0.15	0.77	0.80	–0.01
Slovak Republic 1996	–0.48	0.91	1.09	0.26
Slovak Republic 1997	–0.74	0.99	1.57	0.10
Slovenia 1993	0.50	0.62	–0.36	1.22
Slovenia 1994	–1.01	1.41	0.51	0.91
Slovenia 1995	–0.32	1.27	0.63	0.67
Slovenia 1996	–0.32	1.42	0.69	0.67
Turkmenistan 1998	–2.21	–0.94	–0.48	0.04
Ukraine 1993	0.50	0.04	–1.95	0.41
Ukraine 1994	0.51	0.20	–0.91	0.15
Ukraine 1995	0.74	0.22	–0.74	–0.71
Ukraine 1996	0.80	–0.03	–0.25	–0.47
Ukraine 1997	0.80	–0.17	–0.06	–0.36
Uzbekistan 1993	–3.46	–0.36	–0.54	1.53