Income inequality in post-communist Central and Eastern European countries

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Abstract

Income inequality has become an important issue in Central and Eastern European countries during their transition process. This study constructs a model incorporating different categories of factors that impact inequality and tests whether the wealth of a country makes a difference in these relationships. This article shows that different income categories of Central and Eastern European transition countries do experience different relationships between income inequality and its contributing factors: economic, demographic, political, and cultural and environmental. The resulting Random Effects models of the best fit incorporate economic and political factors and show differences in magnitude, direction, and in their significance. These findings add to the literature by taking a cross-country and cross-income view on the impact of various factors.

Keywords: Central and Eastern European countries, income inequality, transition economies

1. Introduction

Equality was one of the lofty goals of Communism in Central and Eastern Europe. It is a commendable aim but proved unrealistic, even though levels of income inequality in those countries were much lower during the Communist era than they are at present (Milanovic, 1998). Decreasing levels of inequality is an important issue but how should it be addressed in the context of different countries? Do differences in countries' characteristics materially impact inequality? This paper will seek to show that, in terms of transition economies, countries with different levels of wealth experience different relationships between income inequality and its contributing factors. The goal of

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this study is to firstly construct a model incorporating different categories of factors that impact inequality within a country and, secondly, to test whether or not the 'income category' makes a difference in income inequality, where the income category is the level of a country's income, as determined by the World Bank's Atlas Method using Gross National Income (GNI) per capita, divided into low-, middle-, and high-income categories. It will illustrate that there are different relationships between income inequality and its contributing factors dependent on the particular income category.

The paper is organized as follows. Sections 2 and 3 review contributions to income inequality in developing and transition economics literature, followed by a description of the data used in the analysis. Section 5 will present and describe the empirical methodology and results. Section 6 concludes.

2. Income inequality and economic development

The root of much of the study on income inequality is found in Kuznets' (1955) paper, "Economic Growth and Income Inequality". It offers an attempt at explaining income inequality by studying the effects of savings and the shift in focus from the agricultural to the industrial sector. It also compares income inequality in developed versus developing countries, providing a logical, speculative argument that income levels would be more unequal in underdeveloped countries due to the disproportionate income share of the highest income bracket. As this paper seeks to show and as found in various other studies, Kuznets recognizes that there are differences in income inequality across different stages of economic growth (Kuznets, 1955).

Subsequent research has built upon Kuznets' work, looking at changes in income inequality in terms of a country's economic growth and various factors, economic, political or cultural, that have an impact on inequality. Some studies have found that there is not a strong link between inequality and growth, instead finding strong relationships between growth and poverty (Deininger and Squire, 1996). Studies focusing on impacting factors have found mixed results based on the country or group of countries selected. For example, when researching a potential relationship within OECD countries between inequality and imports of manufactured goods, a relationship was found when non-European countries were included, but the relationship did not exist if these countries were excluded from the sample (Gustafsson and Johansson, 1999).

The study of income inequality is of particular importance within the context of developing countries due to its effect on the economy. The economically damaging effects are more severe for weak economies and can result in significantly high poverty rates. Income inequality can cause economic inefficiencies within a country: less people can qualify for credit, due to their lack of collateral; savings would be lower, as the middle class, which is a small group in these countries, has the highest average savings rate; and there would

be an inefficient allocation of assets as, for example, the rich own the majority of land (Todaro and Smith, 2009). Income inequality is also detrimental from social and political perspectives as it can increase socio-political instability (Park, 1996) and facilitate rent-seeking behaviour including cronyism (Samanta and Heyse, 2006), whereas others argue that high enough inequality can reduce growth (Ravallion, 1997). Ravallion, in the same 1997 study, also showed that countries with high levels of income inequality gain less from economic growth in terms of poverty alleviation as the impact on absolute poverty is reduced. The inverse relation, the impact of growth on income inequality, is also unclear. Empirical evidence has shown that changes in income distribution are generally not correlated with growth; inequality increases in roughly half of the cases and in the other half, it decreases (Bruno, Ravallion, and Squire, 1998).

Not only is it challenging to form solid conclusions about a relationship between income inequality and growth, it is also difficult to form general conclusions about income inequality in developing countries. Differences can come from different regions and time periods (Wood, 1997), the openness of the country to globalization (Rudra, 2004), and numerous other factors. This perspective is extended to this study, where differences in income categories across transition economies will be analyzed. Even within a country there can be differences, such as the impact of economic growth among various groups of the poor (Ravallion, 2001). These differences make broad cross-country analysis more difficult when searching for general conclusions; therefore, conclusions must often be more specific to particular situations.

3. Inequality and transition economies

The socialist system saw lower levels of income inequality in comparison to countries at similar levels of development but all transition countries registered an increase in inequality after the fall of Communism (Bandelj and Muhutga, 2010). The average Gini coefficient of disposable income in transition economies increased from 24 to 33 in just nine years and an increase in the dispersion of Gini coefficients could also be observed (Milanovic, 1998). At first, this increase in income inequality was tolerated by the people as it was seen as a sign of increased potential opportunities. Tolerance then decreased over time as the income distribution process was increasingly seen as unfair and people became dissatisfied with the economic situation within their countries (Grosfeld and Senik, 2010), and with good reason; economic reforms in transition economies have stagnated and convergence with the living standards of advanced economies has stalled (EBRD, 2013).

Many studies seem to agree that the different levels of income inequality seen in transition economies, the phenomenon described by Milanovic (1998), are due to different governmental approaches taken towards stabilization, liberalization, privatization, and the resulting policies (Ivanova, 2007; Bandelj and Mahutga, 2010;

Porras, 2010). Certain policies had a negative impact on equality, including those which decreased social services (Ivanova, 2007) and fostered foreign investment over domestic investment (Bandelj and Mahutga, 2010). A lack of certain policies also negatively impacted equality, such as the lack of an educational policy to encourage adaptability to changing technology (Aghion and Commander, 1999). Beyond policy, some governments were more predisposed to combat rising inequality through higher rates of government effectiveness and more financial resources (Grimalda, Barlow, and Meschi, 2010). Further differences can be explained through the different styles of reform, such as their speed and sequence (Aristei and Perugini, 2012; Ivanova, 2007), initial conditions prior to the transition (Porras, 2010), and different models of capitalism implemented in transition economies (Izyumov and Calxon, 2009).

It is the importance of the issue of income inequality, the increasing dissatisfaction with income inequality, and the array of contributing factors that have led to this study. It is the scope of this study to analyze the different impacts of certain factors on income inequality within low-, middle-, and high-income Central and Eastern European transition economies. This study takes into account four main categories of contributing factors of income inequality: economic, demographic, political, and cultural and environmental. These four categories have been directly based on Kaasa's (2005) extensive work on the subject.

The economic indicators have been divided into two sub-groups; wealth and macroeconomic factors. The wealth indicator in this study is Gross Domestic Product (GDP) per capita. Studies that focus specifically on GDP as a measure of economic wealth have provided ambiguous results. Ogwang (1994) provides a compelling empirical argument for a relationship between income inequality and GDP per capita, finding that both the conditional means and conditional variances of inequality measures follow an inverted U-shape, bolstering the work of Kuznets. Alternatively, Chowdhury (2003) suggests statistical independence between the GDP per capita growth rate and income inequality growth rate. The main conclusion drawn from past work is that more empirical study is necessary (Aghion, Caroli, and Garcia-Penalosa, 1999).

Macroeconomic factors allow for the study of a country within an international context. Globalization and increasing financial integration make this an increasingly important category. The first indicator is Foreign Direct Investment (FDI). Much of the research done on the effect of FDI on income inequality has determined that increased FDI often increases income inequality (Kaasa, 2005; Bandelj and Mahutga, 2010; Grimalda *et al.*, 2010), with Alderson and Nielsen (1999) concluding that higher levels of income inequality are related to relative dependence on foreign investment. The other indicator is inflation. It is unclear if inflation actually has an impact on income inequality, as some studies have shown a positive relationship (Parker, 1998; Bulir, 2001),

while others show no statistically significant relationship (Gustafsson and Johansson, 1999).

Demographic factors look at the characteristics of a country's population. This study uses rural population, representing urbanization, and primary school completion rate, representing education. The effect of urbanization on income inequality is not entirely clear. Some studies yield no statistically significant relationship between income inequality and urbanization (Nomiya, 1992; Li, Squire, and Zou, 1998), while others have found a significant, positive relationship between these two variables (Ullman, 1996; Nielsen and Alderson, 1997). Studies on education, the "powerful social equalizer" (Chu, 2000, p. 39), show that the expansion of education is often found to decrease income inequality (Psacharopoulos and Steier, 1988; Chu, 2000). Further, the primary school completion rate itself is specifically shown to decrease income inequality (Dao, 2008). Interestingly, Sylwester (2002a) found that the negative effect of public education expenditures on income inequality is larger in higher income countries.

Political factors consider the government's role in income inequality. The first indicator is privatization, which is specifically a political factor for transition economies as it relates to the share of the government sector within a country. Empirical studies typically yield a significant positive association between inequality and privatization (Bandelj and Mahutga, 2010; Grimalda *et al.*, 2010). The second political indicator in this study is the level of political rights. In terms of the impact of democratization on income inequality, some studies show a negative relationship (Beitz, 1982; Durham, 1999; Sylwester, 2002b) and others (Nielson and Alderson, 1997) show an insignificant relationship between the two. Within the context of former socialist countries, studies have shown that a Marxist-Leninist indicator has a negative effect on inequality (Nielson and Alderson, 1997), while democracy has a positive effect on inequality (Gradstein and Milanovic, 2004).

Finally, cultural and environmental factors cover characteristics inherent to the country itself. The indicator for this category is corruption, which is shown to be connected to cultural traditions (Kaasa, 2005) as, over time it could become entrenched within a culture to the point where it may be culturally accepted. Its prevalence in transition economies reached "endemic levels" (Kaufmann and Siegelbaum, 1997, p. 419) during the 1990s. The results from the relevant research indicate that there is a significant positive correlation between corruption and income inequality (Li *et al.*, 2000; Gupta, Davoodi, and Alonso-Terme, 2002) when using a variety of indicators for corruption.

4. Data

This study considers thirteen Central and Eastern European transition countries: Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, and Ukraine. The countries are divided into three categories to analyze whether differences in income categories cause differences in the relationship between income inequality and the factors that contribute to income inequality. The categories are low-income (LI), middle-income (MI), and high-income (HI). These categories are consistent with the World Bank's categories of lower-middle-income, upper-middle-income, and high income, respectively, and are based on GNI per capita (World Bank, 2011e). The division of the thirteen countries is outlined in Table 1, listed alphabetically.

Table 1. Division of countries into groups, based on GNI per capita, 2010

Low Income (LI) $1,006-$3,975 GNI per capita	Middle Income (MI) $3,976-$12, 275 GNI per capita	High Income (HI) $12,275 GNI per capita or more
Moldova	Belarus	Czech Republic
Ukraine	Bulgaria	Estonia
	Latvia	Hungary
	Lithuania	Poland
	Romania	Slovakia
	Russia	

Source: World Bank (2011a)

Although the countries are not divided equally between the three categories, using the World Bank's categorization system will allow the results of this study to be placed within a global framework of levels of development. All data is yearly and spans from 1990 to 2006, approximating the first fifteen years of transition. Data prior to 1990 are from the socialist era and thus they may not necessarily be representative of the true economic situation.

The Gini coefficient is used to represent income inequality. A greater value of Gini signifies a higher level of inequality. It is advantageous to use the Gini coefficient as it is frequently used and would allow for this study to be compared with other studies and fit into the larger body of work on the subject. One potential limitation of the Gini coefficients from the World Income Inequality Database is that they are compiled from different sources. The GDP per capita data has been retrieved from the World Bank and uses the midyear population. It is measured in terms of US dollars, as of 2011.

The first demographic factor is rural population as a percentage of the total population, where 'rural area' is defined by the national statistical offices of each country. This data has been taken from the World Bank and is calculated as

"the difference between total population and urban population" (World Bank, 2011h). The second demographic factor is the primary completion rate as a percentage of the relevant age group from the World Bank's dataset. It is calculated by dividing the number of students completing the last grade of primary school, minus repeaters, by the total number of children in the country of "official graduation age" (World Bank, 2011g).

The private sector share of GDP data represents privatization, one of the political variables in the model. This data has been obtained through the Transition Reports published by the European Bank for Reconstruction and Development (EBRD, 2011). It is important to note that it includes income generated from both formal and informal activities. The Political Rights index created by Freedom House, which runs on a scale from 1 to 7, with 1 representing 'most free', is the other political factor in the model. The index is based on survey data that evaluates three categories: "electoral process, political pluralism and participation, and functioning of government" (Freedom House, 2011, p. 30).

The Control of Corruption index, representing cultural and environmental factors, was created by the World Bank as part of their Worldwide Governance Indicator's project. It is an indicator on a scale of -2.5 to 2.5 and it represents "perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests" (World Bank, 2011j).

The FDI net inflow, as obtained from World Bank data, is measured in US dollars as of 2011 (World Bank, 2011b). Finally, the inflation is obtained from the World Bank and it is measured as the growth rate of the GDP deflator, showing "the rate of price change in the economy as a whole" (World Bank, 2011f).

The main potential issue posed by this data set is that, for several of the variables, there are missing data points.

5. Empirical Methodology and Results

5.1. Models

All possible combinations involving one variable per category were run individually, using panel data estimation techniques, to determine the optimal model: the general model that best fits the data. The resulting models that exhibited overall statistical significance at the 5 percent level ($\alpha = 0.05$) were then run again, using three different estimation techniques, the pooled OLS model, the Fixed Effects model (FEM), and the Random Effects model (REM), dropping insignificant variables to see how it would affect the model as a whole and if it would change the significance of the other coefficients. This rigorous

process yielded the following general model that best fits the data, based on a Random Effects model:

$$Gini_{it} = \beta_1 + \beta_2 GDPpc_{it} + \beta_3 PrivSec_{it} + \beta_4 Infla_{it} + \beta_5 LI_{it} + \beta_6 MI_{it} + u_{it} \qquad (1)$$

where,

Gini = Gini coefficient
GDPpc = GDP per capita
PrivSec = private sector share of GDP
Infla = inflation, GDP deflator
LI = Low Income dummy variable
MI = Middle Income dummy variable
i = Country
t = Year

As shown, not every category is represented in this model.[1]   The results are presented in Table 2.

Table 2. General (random effects) model results

	Dependent variable: Inequality
Constant	20.69265**
GDPpc	− 0.0003401*
PrivSec	0.1561426**
Infla	0.0030872**
LI	11.21757**
MI	6.33274*

Source: author's estimation
Note: * $p < 0.05$, ** $p < 0.01$

5.2. Results

Due to the significance of the dummy variables in the REM, it can be discerned that the income category to which a country belongs does have an impact on income inequality within a country.

On average, holding all independent variables at zero, the Gini coefficient across time and between countries is 20.69265. It is particularly related to the average level of income inequality within HI countries. On its own,

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[1] This will be discussed further at the end of section 5.2.

this is a fairly low level of inequality, as the Gini coefficient ranges from most equal to least equal on a scale from 0 to 100 percent.

All else equal, an increase in GDP per capita by one unit across time and between countries results in a decrease in the Gini coefficient by 0.03401 percent. This may seem like a small amount but one must note the size of the GDP per capita in this data set, which ranges from $321.0269725 for Moldova in 1999 to $13,887.30239 for the Czech Republic in 2006.

The results from previous studies regarding the relationship between income inequality and GDP per capita are ambiguous in terms of the effect the latter has on the former, so there were no firm expectations before the regressions were run. This study finds that there is a statistically significant relationship, bolstering the results found by Kuznets (1955) and Ogwang (1994). The difference is that Kuznets and Ogwang looked at non-linear functions, resulting in an inverted-U shaped relationship, while this study found significance in a linear relationship. Further investigation into potential non-linear relationships would be beneficial in the future study of GDP and income inequality, sharing the view of Aghion *et al.* (1999).

The next independent variable in the model is the private sector share of GDP, measuring privatization as part of the 'political factors' category. The model indicates that increased privatization increases the level of income inequality. This can cause a significant impact on inequality as the private sector share of GDP reached 70 to 80 percent during the 2000s for the majority of the countries in the dataset. An increase in the private sector share of GDP would thus make quite a difference in the level of inequality in a country, especially compared to the very low levels of privatization seen during Communism and at the start of the transition process.

The positive relationship found in this model reinforces the positive relationship between privatization and income inequality found by Bandelj and Mahutga (2010) as well as Grimalda *et al*. (2010). This positive relationship is found using different variables to represent privatization; Bandelj and Mahutga (2010) considered the size of the private sector while Grimalda *et al.* (2010) used the Private Share of Value Added. This strengthens the evidence of a positive relationship between privatization and income inequality as it is found across differing variables. A significant relationship between the two is of particular importance as privatization was not a feature of the socialist system (Kaasa, 2005). Its inclusion in the analysis shows the effects of the transition process and specifically the introduction of the market economy system in these countries.

The third independent variable is inflation, here measured as the growth rate of the GDP deflator. All else being held equal, an increase in inflation increases the level of income inequality. As with the case of GDP per capita, increased inflation may appear to create a small change in income inequality but

it makes a large difference in the Gini coefficient during years of hyperinflation, such as in Ukraine in 1993 when the growth rate of the GDP deflator reached an annual percentage of 3334.798345 (World Bank, 2011f).

Results from the work of Bulir (2001) and Parker (1996) provide the expectation of a positive relationship between inflation and income inequality, as shown in this study. Bulir's model showed a non-linear relationship between the two, in that a reduction in a high rate of inflation had a larger impact on income inequality than the reduction in a low rate of inflation, while the model in this study yields a linear relationship for this dataset. Herein lies another similarity between the interpretation of the GDP per capita's coefficient and inflation's coefficient as further study is recommended to analyze different functional forms of relationships between inflation and income inequality. While some past studies, for example Gustafsson and Johansson (1999), show an insignificant relationship for both the fixed effects and the random effects estimates, this study yields a statistically significant relationship in both models.

The final independent variables in this model are the dummy variables: LI and MI. For LI countries, the constant term becomes 31.91022. For MI countries, the constant term is 27.02539. Thus, on average, LI and MI countries have higher levels of income inequality than HI countries, with LI countries more unequal than MI countries. Both of the dummy variables for LI and MI are statistically significant at the 5 percent level, indicating that the income level of a country, based on the categories created under the World Bank's Atlas Method (World Bank, 2011i), does have an effect on the country's level of income inequality as represented by the Gini coefficient. This finding agrees with the hypothesized result.

As the results have shown a relationship between the income category and income inequality, the next part of the hypothesis can be tested; different income categories yield different relationships between income inequality and the factors that affect income inequality. This hypothesis was tested by running the same REM model for each income category and analyzing the coefficients in the model. The models show differences in magnitude, the direction of the relationships, and in their significance.

Table 3. Effect on low-income, middle-income, and high-income countries

	LI	MI	HI
Constant	35.70937**	23.50054**	24.8364**
GDPpc	− 0.008557**	0.001323	− 0.000065
PrivSec	0.235328**	0.1868987**	0.0682318**
Infla	0.0028549*	0.0081225**	0.0050133

Source: author's estimation

Note: * $p < 0.05$, ** $p < 0.01$

It is important to take into account the fact that the number of observations is small, especially for the LI regression as only two countries are included in this group. Thus, the results must be interpreted with caution. Further research would be necessary when data for a larger number of countries or a longer period of time can be included.

The LI model is overall statistically significant at a 5 percent significance level and each coefficient is significant at a 5 percent level as well. All of the signs of the coefficients are the same as in the original model. The coefficient for GDP per capita is larger, so it plays a bigger role for LI countries than for all transition countries studied as a group. The coefficient for the private sector share of GDP is roughly 50 percent larger than the one found in the original model, so privatization plays a bigger role than the average as well. The coefficient for inflation is smaller than in the original model, but only slightly. It is interesting to note that while the LI group only consists of two countries, it is the closest to the original REM in sign and significance levels.

The MI model is also statistically significant at the 5 percent level, as is every coefficient except for the GDP per capita. GDP per capita shows a positive relationship, as opposed to a negative one, but it has an insignificant coefficient. The coefficient for the private sector is similar to the original one, while the effect of inflation is shown to be greater.

Lastly, the HI model is also statistically significant at the 5 percent level, however, neither GDP per capita nor inflation are significant. The effect of the private sector is less than half as large as in the original model, so privatization does not have a strong relationship with income inequality in the HI countries. The results from the HI and MI models show that further research must be done to determine which variables are of significance in terms of influencing income inequality for these two income categories. These differences between income groups show interesting policy implications, in that lower income countries must take different factors into account when attempting to increase equality levels relative to higher income countries.

While the results are generally significant, there is the issue of categories that are not represented in the model. There are no variables accounting for 'demographic factors' or 'cultural and environmental factors' in the model of the best fit. It is particularly surprising that corruption was not significant, as it has such an impact on transition economies. The Control of Corruption index could be inherently flawed as corruption is not easily measured. There could also be issues with the missing data points, as the number of data points for this variable was limited.

6. Conclusions

Income inequality in Central and Eastern European transition countries has increased after 1990 when the countries started their economic transition from a centrally planned to a market economy, and political transition from an authoritarian system to a democratic one. The level of income inequality differs across country income categories, as do the relationships between the contributing factors of income inequality and income inequality itself. The importance of this result is that it implies transition economies at different levels of wealth should be analyzed separately when making policy decisions related to income inequality, as the relationships between income inequality and the variables in this study were shown to differ across income categories so policies to decrease the disparity should differ across these categories as well. Policies to decrease inflation would benefit countries in the LI and MI categories, although they would have to take into account relationships between inflation and other variables such as, for example, unemployment. Policies related to privatization would impact inequality for all three income categories and governments would want to search for policies that could support privatization yet mitigate the effect of high levels of privatization on income inequality.

Given the damaging effects of income inequality on a country, including economic inefficiencies and socio-political instability as discussed in Section 2, this study has aimed to provide insights into the factors that impact income inequality so as to better understand the relationships that matter in transition economies. This study has found relationships using a broad range of factors, as opposed to a significant portion of the literature which focuses on only one factor at a time. Future studies would benefit from utilizing different representative variables, different functional forms, and new data as it becomes available. Further research is needed in the field to improve the economic, political, and social situations within transition economies through finding the best policy responses that would result in decreased income inequality.

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