

WHEN IS THERE A KUZNETS CURVE?

SOME EVIDENCE FROM THE EX-SOCIALIST COUNTRIES.*

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ABSTRACT

This paper investigates when there is a Kuznets curve, that is, under which conditions income inequality eventually declines with economic growth. The analysis has been done on a sample of 26 ex-socialist countries from the former Eastern Bloc, during the post-socialist years. These countries had very similar characteristics when socialism collapsed, but very different experiences with transition afterwards, which makes them a suitable group for analysing the relationship between GDP and inequality. We focus on four factors that may shape this relationship – labour market institutions, market power of companies, social benefits and taxes. Findings suggest that the Kuznets curve is present only when control of companies' market power is effective and taxes are high.

Keywords: growth, income, inequality, Kuznets, transition

JEL classification: D31, D63, H23, O15

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I. INTRODUCTION

How to ensure that economic growth benefits most of the people, not just the privileged elite? Simon Kuznets argued that nothing special should be done. In initial stages of development, inequality increases with economic growth. After some time, though, it starts to decline. Hence, growth benefits everyone eventually. In other words, economic growth brings an inverted U-shaped relationship between income and inequality. This is the well-known Kuznets hypothesis (Kuznets, 1955).

The Kuznets hypothesis has been tested many times and existing literature gives mixed results. Early cross-country studies in general support the hypothesis, but this is entirely based on the Latin American countries, which happen to be middle-income and have high inequality for historical reasons. Panel studies that control for fixed effects in general dismiss the hypothesis. Time-series studies that focus on specific countries find that it holds only sometimes.

Still, there is a lack of understanding about the conditions under which the Kuznets hypothesis is valid. This paper aims to fill this gap. It investigates the relationship between income and inequality in 26 ex-socialist countries, after the fall of the socialist system¹, aiming to assess which factors shape this relationship. The following countries are analysed: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Ukraine and Uzbekistan. The period covered is 1990-2011.

Several reasons make these countries particularly suitable for this task – they all had similar economic systems and institutions in socialist times, they all had very low and rather similar levels of inequality before socialism collapsed, but they had very different experiences with the transition. Similar initial conditions and different paths during transition imply that most of the differences in the dynamics of inequality after the fall of socialism can be attributed to differences in patterns of economic development, that is, differences in economic growth and the different institutions that the countries adopted.

We focus on four factors that may affect the relationship between income and inequality – labour market regulation, control of market power of companies, social benefits and taxes. Labour regulations affect the bargaining power of workers and owners, and may thus affect how the newly generated income is distributed between them. If companies possess market power, they may extract consumer

1. It is questionable if the term "socialism" is the right name for the system that these countries had until 1990. Still, for ease of exposition, we will use this term.

surplus, which may again affect how income is distributed. Social benefits affect equality of opportunity and through this the distribution of income. Taxes may prevent inequality from reproducing itself.

The paper is organised as follows. The next section presents the Kuznets curve and the empirical literature on it. Section III elaborates on why ex-socialist countries are appropriate for analysing the relationship between income and inequality. Section IV presents the data that are used in the empirical analysis. Descriptive analysis is provided in section V, while econometric analysis is given in section VI. The last section presents the concluding remarks.

II. KUZNETS CURVE

In his presidential address to the American Economic Association in 1954, Simon Kuznets asked the question: Does inequality in the distribution of income increase or decrease in the course of a country's economic growth? (Kuznets, 1955, p. 1). He presented data on inequality in the US, the UK and in Germany from the end of the 19th century until the middle of the 20th century, and tried to explain the trends. He argued that the relationship between income and inequality has an inverted U-shape. In initial stages of development, income growth tends to increase inequality. After some time, though, income growth starts to decrease inequality. He attributed this to industrialisation – in initial stages of development, people work mainly in agriculture, which has low wages and low inequality. With industrialisation, workers start to shift to industry, which has higher wages, but also higher inequality. Thus, during this stage, income growth tends to increase inequality. After some time, when most of the workers move to industry, income growth starts to decrease inequality.

This hypothesis came to be known as the Kuznets curve. Although Kuznets' predictions refer to a process of moving from low-wages low-inequality sector to high-wages high-inequality sector, the Kuznets curve is nowadays interpreted as postulating an inverted-U relationship between economic development and income inequality. For illustration, in one of the most influential and cited papers on this topic, Ahluwalia (1976, p.128) states:

"In recent years, the relationship between income distribution and the process of development has come under increasing scrutiny. Much of the debate has focused on the hypothesis, originally advanced by Simon Kuznets, that the secular behavior of inequality follows an inverted U-shaped pattern with inequality first increasing and then decreasing with development."

Similarly, in the chapter on income distribution and development from the Handbook of Income Distribution, Kanbur (2000, p. 794) states: "Kuznets (1955) put forward his "inverted-U hypothesis", that inequality first increases and then decreases as per capita income rises."

Finally, Piketty (2014, p. 11), in his hugely influential book, states: "[A]ccording to Kuznets's theory, income inequality would automatically decrease in advanced phases of capitalist development, regardless of economic policy choices or other differences between countries, until eventually it stabilized at an acceptable level."

The Kuznets hypothesis has been subjected to empirical evaluation many times. An excellent survey of literature is provided by Fields (2001) and Gallup (2012). Without tending to be comprehensive, we next present a brief overview.

Early cross-sectional studies include Paukert (1973) who analyses the relationship between income and inequality in approximately 60 countries, in a descriptive manner, finding some evidence that there is an inverted-U relationship between them. Ahluwalia (1976) estimates a cross-country regression on a similar sample, also finding support for the Kuznets hypothesis. Many cross-country evaluations appeared subsequently, and most of them found a Kuznets curve. Examples include Campano and Salvatore (1988), Clarke (1995), Ram (1995), Jha (1996), Barro (2000) and Barro (2008). Although several cross-country studies question these findings (Saith, 1983, Anand and Kanbur, 1993, Ravallion, 1997), the prevailing evidence from cross-country studies is that as income grows between countries, inequality first increases, and then decreases.

However, as Fields and Jakubson (1994) and Deininger and Squire (1998) have noted, the inverted-U found in cross-country studies is entirely due to the Latin American countries, which are middle-income and have high levels of inequality. For this reason, studies that rely on panel data and control for country fixed effects usually find that there is no Kuznets curve. Examples are Fields and Jakubson (1994), Bruno et al. (1996), Deininger and Squire (1998), Schultz (1998), Galbraith and Kum (2002).

The Kuznets hypothesis, though, is about the relationship between income and inequality within countries, not between different countries. Therefore, the most appropriate way to test it is through time-series analysis. Studies that have examined time-series evidence for individual countries find mixed results. Williamson and Lindert (1980) discuss the dynamics in the US starting from 1810. Their analysis supports the Kuznets hypothesis – inequality has been on the rise between 1810 and the end of the same century. Then, it stagnated until the 1920s, when it started declining. Lindert (1986) examines Great Britain between 1670 and 1960. He finds similar trends – inequality increased

during the industrial revolution, mostly stagnated between the 1870s and 1913, and then plateaued over the following 60 years. Similar findings, though for a shorter period, are present in Williamson (1985). Morrison (2000) analyses seven European countries over the last two centuries (Denmark, Finland, Norway, Sweden, the Netherlands, Germany and France), finding a Kuznets curve in four of them. Bruno et al. (1996) analyse India, during 1951-1992, finding no Kuznets curve. Deininger and Squire (1998) find a Kuznets curve only in 5 out of the 49 countries they analyse. Therefore, time-series studies dismiss the inverted-U as a general pattern. Rather, it is present in some cases and absent in others.

Despite this, no study has yet analysed the circumstances under which the inverted-U occurs. The present paper aims to fill this gap, by focusing on the ex-socialist countries from the former Eastern Bloc, for the period after the fall of socialism.

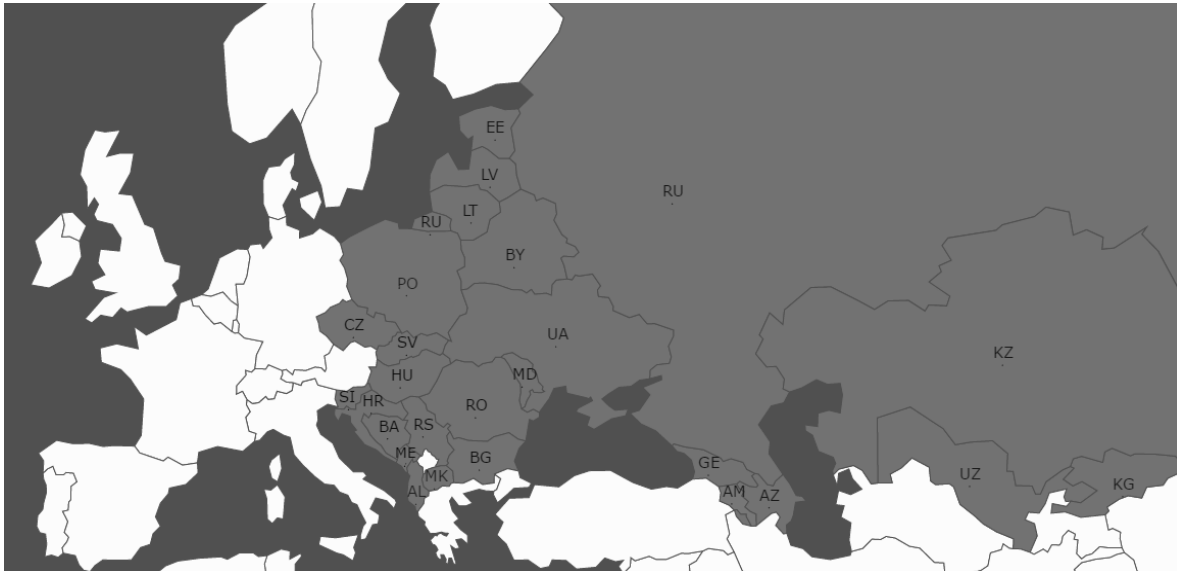
III. WHY THE EX-SOCIALIST COUNTRIES?

We analyse the following 26 countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia², Slovakia, Slovenia, Ukraine and Uzbekistan. German Democratic Republic, Kosovo, Tajikistan and Turkmenistan are not included, due to a lack of data. Figure I shows a map of the analysed countries.

Developments in these countries after the fall of the socialist system are particularly suitable for analysing the relationship between income and inequality, for several reasons. To begin with, these countries were all very similar before the collapse. They had similar levels of inequality and economic systems. The similarity of their inequality is illustrated by their Gini coefficients. In 1989, before the breakdown of socialism, the lowest Gini in these countries was 16 (Slovakia and Slovenia), while the highest was 30 (Macedonia). The similarity of their economic systems is illustrated through the prism of the transition indicators of the European Bank for Reconstruction and Development (EBRD). These indicators measure the similarity of the economic system of a country to the system of the advanced industrialised countries. They vary from 1 to 4.3, higher values implying higher similarity to the advanced industrialised economies. There are six transition indicators – Large Scale Privatisation, Small Scale Privatisation, Governance and Enterprise Restructuring, Price Liberalisation, Trade and

2. Data on Serbia do not include Kosovo.

FIGURE I: MAP OF ANALYSED COUNTRIES



AL=Albania, AM=Armenia, AZ=Azerbaijan, BY=Belarus, BA=Bosnia and Herzegovina, BG=Bulgaria, HR=Croatia, CZ=Czech Republic, EE=Estonia, GE=Georgia, HU=Hungary, KZ=Kazakhstan, KG=Kyrgyzstan, LV=Latvia, LT=Lithuania, MK=Macedonia, MD=Moldova, ME=Montenegro, PL=Poland, RO=Romania, RU=Russian Federation, RS=Serbia, SK=Slovakia, SI=Slovenia, UA=Ukraine, UZ=Uzbekistan

Foreign Exchange System and Competition policy. The dynamics of the indicators for the 26 countries are shown in Figure II. In 1989, there were no differences between the 26 countries in three of the indicators – Large Scale Privatisation, Governance and Enterprise Restructuring and Competition policy. More precisely, they all had a score of 1 in these three indicators, meaning that they all had little private ownership of large companies, soft budget constraints and no competition legislation and institutions. In another indicator, Trade and Foreign Exchange System, only the Yugoslav republics and Hungary had a score of 2 (meaning that there is some liberalisation of import and/or export controls and a foreign exchange regime that is not fully transparent), while all the other countries scored 1 (meaning widespread import and/or export controls or very limited legitimate access to foreign exchange). Only in the remaining two indicators (Small Scale Privatisation and Price Liberalisation) were there some more pronounced differences between the countries.

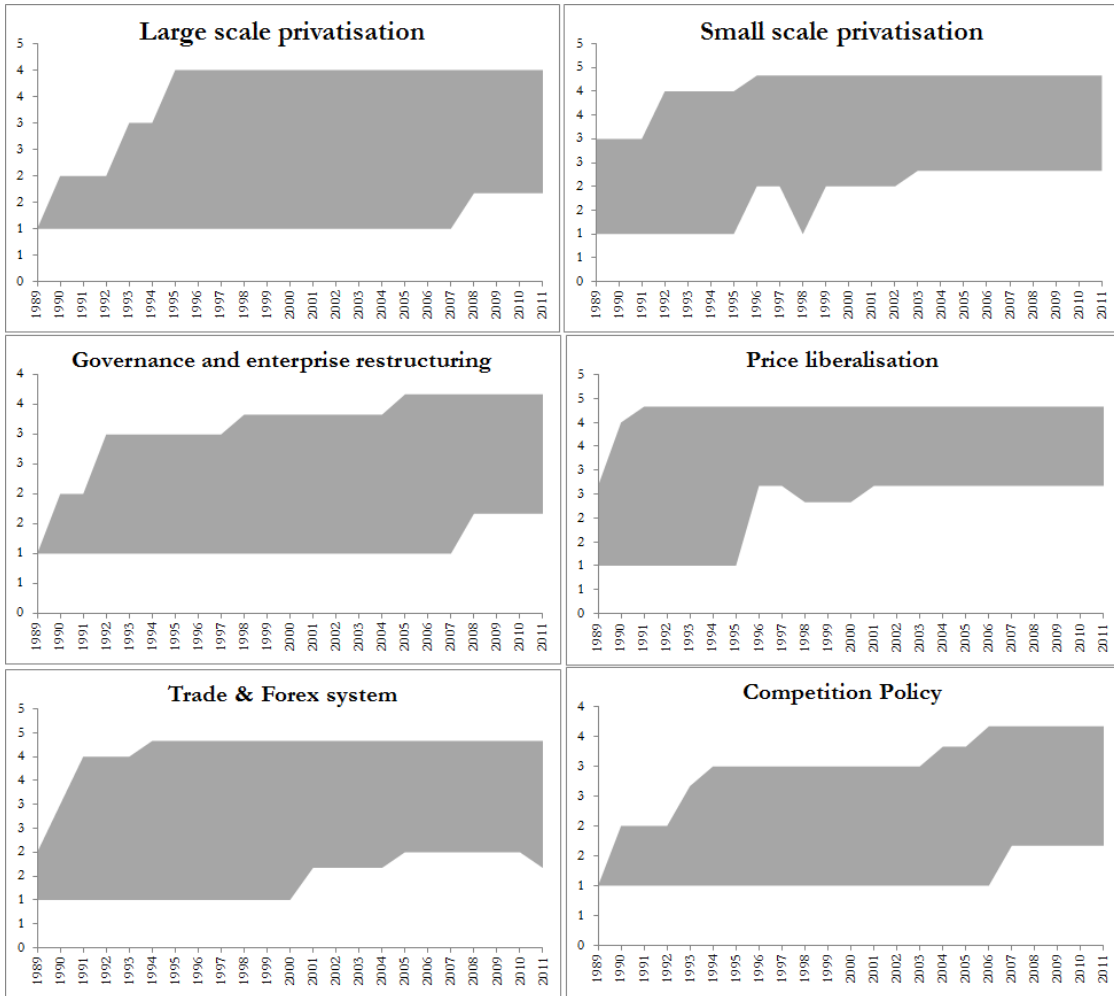
Then, during the transition, different countries took different paths. This is well evident in the EBRD transition indicators. In 2011, there was no indicator in which all the countries had the same values. For example, Large Scale Privatisation index in 2011 was just 1.7 in Belarus, indicating still little private ownership of big companies, while it was 4 in six other countries, indicating almost complete privatisation. Similarly, Uzbekistan had a Governance and Enterprise Restructuring index

of 1.7 in 2011, while four countries had 3.7. This is also clear from Figure II – the grey areas increase as time progresses.

The differences in the transition are observed in the GDP data, too (see Figures XV-XVII in the Appendix). Some of these countries had rather short and small downturn in the early 1990s, followed by a rapid growth afterwards (Albania, Czech Republic, Estonia, Hungary, Poland, Slovenia). Some had a much more severe and prolonged decline in output, followed by a slow growth afterwards (Georgia, Kyrgyzstan, Moldova, Russia, Ukraine).

Similar initial conditions, both in terms of institutions and in terms of inequality, and marked differences in developments during the transition imply that most of the differences in the dynamics of inequality can be attributed to the different patterns of economic development of these countries. This makes them particularly suitable and attractive for analysing the relationship between GDP and inequality.

FIGURE II: TRANSITION PROGRESS INDICATORS



The graphs plot the lowest and the highest value for the 26 countries in each year. Wider area signifies bigger differences between the countries.

IV. DATA

We measure income inequality by the Gini coefficient calculated on gross income, that is, income before transfers and taxes. We choose gross (pre-distribution), not net (post-distribution) income, because we focus on how markets distribute income; we want to abstract from the direct effects of government redistribution as much as possible.

Data on inequality are from the Standardized World Income Inequality Database (SWIID) of Frederick Solt (2013), version 4. This has been and still is the most comprehensive database on income inequality, with continuous data series for approximately 150 countries, since 1960. It uses the data from the World Income Inequality Database (WIID) of UNU-WIDER (2008) (previously known as the Deininger and Squire (1996) dataset), which in turn uses numerous different sources. Because of the differences in the inequality measures in the WIID, SWIID standardises them, using regression techniques, adjusting the different measures to the Luxembourg Income Study definition. Therefore, although the original data that SWIID uses differ in terms of reference units (some data are from household surveys, some are from individuals), or income definitions (some data are calculated on consumption, some on expenditure, some on income), the final product is a standardised database on income inequality, referring to household adult-equivalent net and gross income.

In addition to standardising the different data, SWIID also uses multiple imputation techniques to fill in the missing data points, producing in that way continuous series for all the countries. Because of the imputation, however, proper use of the SWIID requires accounting for imputation variability. Unfortunately, this is not straightforward to combine with the estimation technique that we use. Consequently, we only use the mean values of the imputed inequality measures, as Acemoglu et al. (2010), Ostry, Berg, and Tsangarides (2013) and Solt (2011) (among others) have done. Reassuringly, Jenkins (2015, pp. 666-668) finds that ignoring imputation variability and using the mean values of the imputed inequality measures makes little difference.

Data on GDP are from Penn World Tables (PWT) version 8.1 of Feenstra et al. (2015). This is currently the latest version. We choose PWT, instead of IMF or World Bank databases, because PWT has data on GDP for the countries included in the analysis since 1990.

The period that is covered by the analysis is 1990-2011, that is, a span of 22 years, which should allow identifying clear patterns between GDP and inequality. For comparison, Kuznets (1955) also worked with 22 years of US data (1929-1950). In addition, the GDP variable stretches between USD 1,000 and 27,000 per capita (in 2005 prices) which should also be enough, because it covered

approximately three-quarters of income distribution across the world in 2011³.

Data sources, definitions, plots and descriptive statistics of the variables are presented in the Data Appendix.

V. DESCRIPTIVE ANALYSIS

V.A. A first look at the data

We begin the analysis by looking at cross plots of GDP per capita and market Gini coefficient. In countries shown in Figure III (Croatia, Estonia, Moldova, Montenegro, Russia, Serbia), the relationship between GDP and Gini is negative, that is, inequality decreases all the time as GDP grows. In countries shown in Figure IV (Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Kazakhstan, Lithuania), inequality first decreases with GDP, and afterwards increases. In countries shown in Figure V (Albania, Belarus, Latvia, Macedonia, Romania), inequality increases all the time as GDP grows. In the last group of countries, shown in Figures VI and VII (Czech Republic, Georgia, Hungary, Kyrgyzstan, Poland, Slovakia, Slovenia, Ukraine, Uzbekistan), inequality first increases, then falls. This is the typical Kuznets curve.

Which factors cause these differences in the relationship between GDP and Gini? We focus on four factors that we believe are important for the GDP–Gini relationship – labour rights, market power of companies, social benefits and taxes.

3. For illustration, GDP per capita of 1000 international USD in 2005 prices, is the level of development of Haiti in 2011. GDP per capita of 27000 international USD in 2005 prices is the level of development of Italy in 2011.

FIGURE III: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE THE TWO ARE NEGATIVELY RELATED

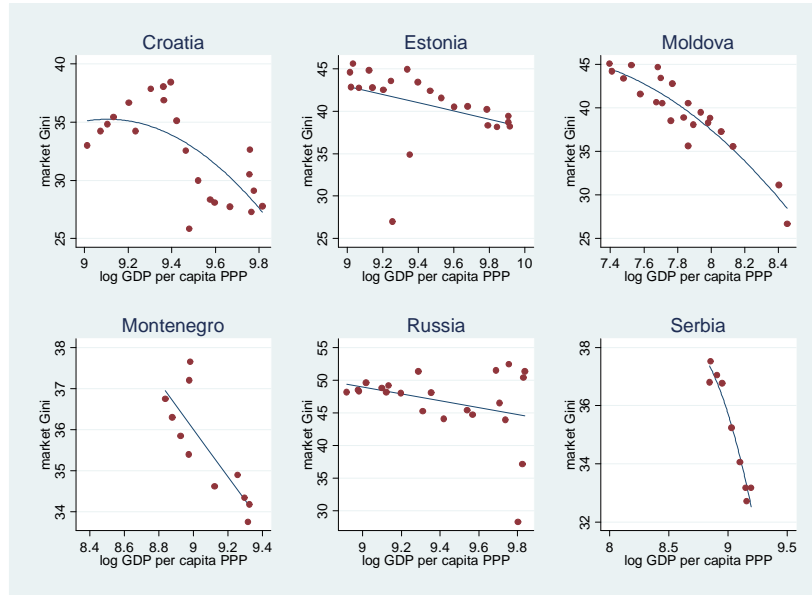


FIGURE IV: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE GINI FIRST FALLS AND THEN RISES WITH GDP

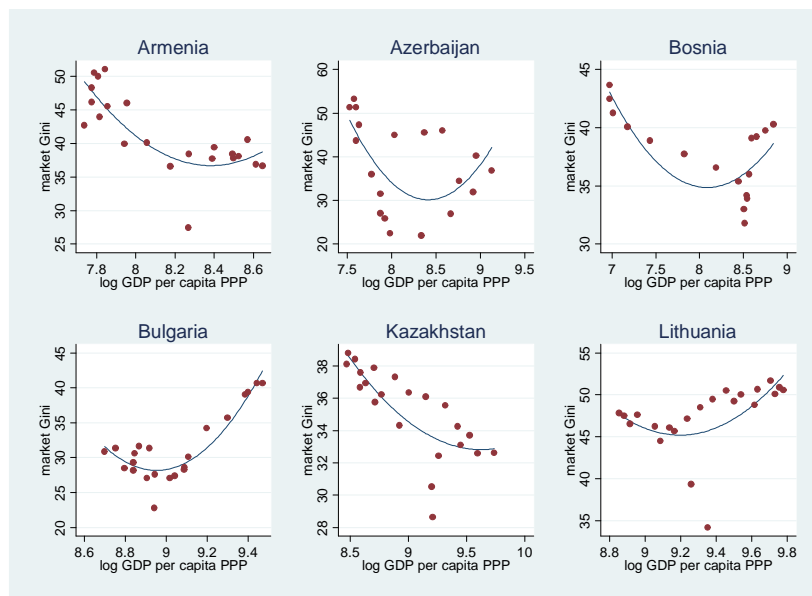


FIGURE V: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE THE TWO ARE POSITIVELY RELATED

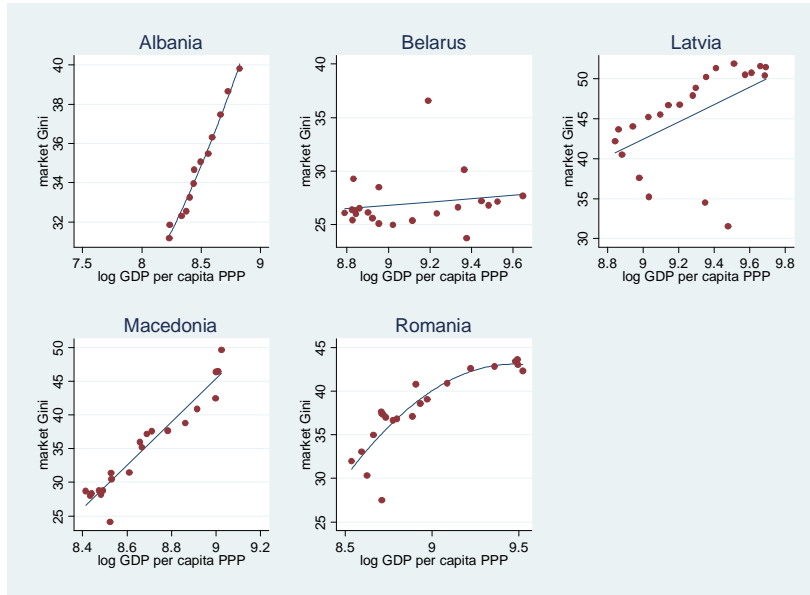


FIGURE VI: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE GINI FIRST RISES AND THEN FALLS WITH GDP (1)

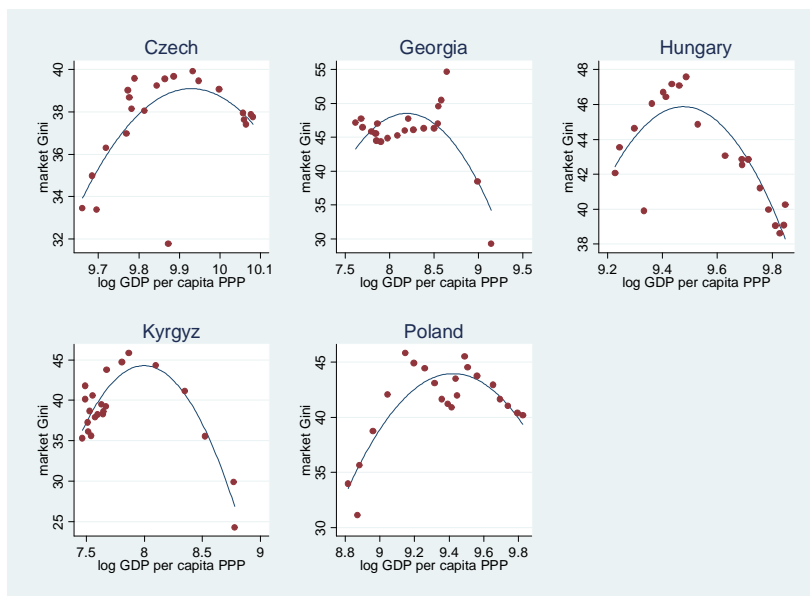
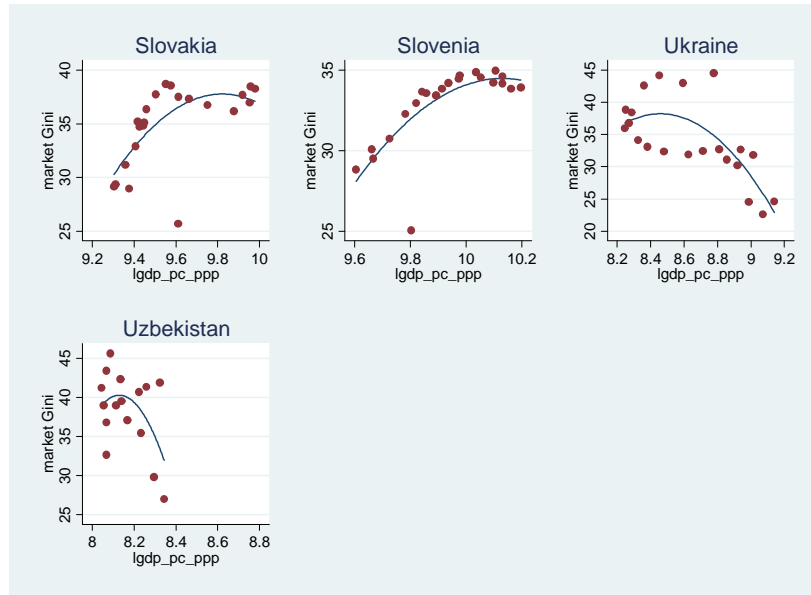


FIGURE VII: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE GINI FIRST RISES AND THEN FALLS WITH GDP (2)



V.B. Variables of interest

The first factor that we focus on are **labour rights**. If workers have few rights, hence small negotiating power, this will allow capital owners to retain most of the value added for themselves. Thus, economic growth may be skewed towards the capital owners, who are usually richer. Stiglitz (2015) stresses the importance of labour rights for income inequality in the US, while Atkinson (2015) proposes raising labour rights in the UK in order to reduce inequality. Our baseline measure of labour rights will be the labour regulation index from the Economic Freedom of the World report of Gwartney et al. (2014). As an alternative, the index of labour market freedom, from the Heritage Foundation's index of economic freedom, will be used.

The second factor is related to **market power of companies**. If companies possess market power and exercise it, this may lead to extraction of consumer surplus and monopoly rents. Hence, economic growth will end up in the hands of the owners of those companies, who are usually few.⁴ Stiglitz (2015) has recently emphasised the importance of market power for income inequality in the US. As our baseline measure of market power, we will use the effectiveness of the anti-monopoly policy index from the Global Competitiveness Report of the World Economic Forum. As our alternative measure,

4. There may be an additional channel through which market power may increase inequality - companies with market power are likely to have higher wages.

we will use the extent of market dominance index from the same report.

The third factor that we examine refers to **social benefits**. Higher social benefits serve as a social safety net and may thus increase equality of opportunities. Through this, they may lead to better usage of people's potentials (better allocation of human "capital") and contribute to more equitable distribution overall. Atkinson (2015) includes higher social benefits in his list of 15 proposals to combat rising UK inequality, and IMF (2014) also identifies social benefits as one of the means for reducing inequality. Data on social benefits are from the Government Finance Statistics of the IMF.

The last factor that we take into account are **taxes**. Taxes can affect market (pre-redistribution) income inequality through several channels. First, they affect economic agents' decisions about work and leisure, so they may affect income distribution through people's decision on how much to work. In addition, if taxes are progressive, this may induce companies to hire additional workers, instead of making their existing employees work more. Finally, taxes may affect current market distribution through redistribution from previous periods, that is, by preventing inequality from reproducing itself. Taxes are considered to be one of the most important drivers of inequality. Their role has been emphasised recently by Piketty (2014), Atkinson (2015), Stiglitz (2015) and Cabral et al. (2016). Data on taxes are from the Government Finance Statistics of the IMF.

V.C. Some stylised facts

To gain some insight into how these factors may shape the GDP–Gini relationship, we next divide the 26 countries into two groups, one in which inequality eventually declines with GDP growth (countries shown on Figures III, VI and VII) and one in which inequality eventually increases (countries shown on Figures IV and V). We then compare the four variables of interest between the two groups (Table 1). It can be seen that countries in which inequality eventually declines with economic growth have higher social benefits and higher taxes than countries where inequality eventually increases. They also have better control of market power and higher labour market regulation.

TABLE 1 - AVERAGE VALUES OF THE VARIABLES FOR THE TWO GROUPS OF COUNTRIES

	Labour regulation	Control of market power	Social Benefits	Taxes
Countries where inequality eventually declines with GDP	6.1	3.6	16 % of GDP	35% of GDP
Countries where inequality eventually increases with GDP	6.6	3.1	11% of GDP	30% of GDP

Control of market power is an index from the Global Competitiveness Report. Labour regulation is an index from the Economic Freedom of the World Report. Social benefits are general government benefits expressed as % of GDP. Taxes are general government revenues from taxes and contributions as % of GDP. Control of corruption is from the Worldwide Governance indicators. See Data Appendix for details.

Countries where inequality eventually declines with GDP are those shown on Figures III, VI and VII.

Countries where inequality eventually increases with GDP are those shown on Figures IV and V.

We next classify the analysed countries into countries with high and low values of the four characteristics, and observe the shape of the GDP–Gini relationship among them. We separate the countries into "high" and "low" on the grounds of their average value for the characteristics, that is, on the grounds of whether it is lower than the median value for all the countries. For example, if the average value of control of market power index for Macedonia is lower than the median value of the index for all the countries, then Macedonia is classified as a country with low control of market power. Table 2 presents how the countries are classified into "high" and "low".

Beginning with labour regulation, of the 12 countries that are classified as having high labour regulation, 8 are countries where inequality eventually declines with GDP (Croatia, Estonia, Hungary, Moldova, Poland, Russia, Slovenia, Ukraine). On the other hand, if we take the 12 countries with low labour rights, only 6 of them are countries where GDP growth is associated with a decline in inequality (Czech Republic, Georgia, Kyrgyzstan, Montenegro, Serbia, Slovakia).

Turning to control of market power, of the 12 countries which can be classified as having effective control of market power, 8 are countries where inequality eventually falls as GDP grows (Croatia, Czech Republic, Estonia, Hungary, Montenegro, Poland, Slovakia, Slovenia). On the other hand, in the group of low control of market power, only 6 of the 12 countries have a negative association between GDP and Gini (Georgia, Kyrgyzstan, Moldova, Russia, Serbia, Ukraine).

Differences are even more drastic when taxes are concerned. 10 of the 12 countries with high taxes are countries where inequality falls with GDP growth (Croatia, Czech Republic, Estonia, Hungary, Moldova, Poland, Russia, Serbia, Slovenia, Ukraine), while just 3 out of 12 countries where taxes are

low have a negative relationship between GDP and Gini (Georgia, Slovakia, Uzbekistan).

TABLE 2 - HIGH AND LOW COUNTRIES

	Labour regulation	Control of market power	Social	Taxes
Albania	HI	LO	LO	LO
Armenia	LO	LO	LO	LO
Azerbaijan	LO	LO	LO	LO
Belarus	.	.	HI	HI
Bosnia	LO	LO	HI	HI
Bulgaria	LO	LO	HI	LO
Croatia	HI	HI	HI	HI
Czech	LO	HI	HI	HI
Estonia	HI	HI	LO	HI
Georgia	LO	LO	LO	LO
Hungary	HI	HI	HI	HI
Kazakhstan	LO	HI	LO	LO
Kyrgyz	LO	LO	.	.
Latvia	HI	HI	LO	LO
Lithuania	HI	HI	LO	LO
Macedonia	LO	LO	HI	LO
Moldova	HI	LO	LO	HI
Montenegro	LO	HI	.	.
Poland	HI	HI	HI	HI
Romania	HI	HI	LO	LO
Russia	HI	LO	LO	HI
Serbia	LO	LO	HI	HI
Slovakia	LO	HI	HI	LO
Slovenia	HI	HI	HI	HI
Ukraine	HI	LO	HI	HI
Uzbekistan	.	.	LO	LO

HI stands for high value of the respective characteristics, and LO for low.

The dot (.) indicates that there are no data

Finally, in terms of social benefits, 7 of the 11 countries that have high benefits are countries where GDP and inequality are negatively associated (Croatia, Czech Republic, Hungary, Poland, Serbia, Slovakia, Ukraine). In contrast, GDP and inequality are negatively related in just 5 of the 12 countries with low benefits (Estonia, Georgia, Moldova, Russia, Uzbekistan).

All in all, these stylised facts suggest that GDP is more likely to be negatively associated with Gini in countries with higher labour regulation, more effective control of market power, higher taxes and higher social benefits.

VI. ECONOMETRIC ANALYSIS

VI.A. *The approach*

The econometric analysis is based on a simple regression in which market Gini coefficient depends on GDP per capita in its linear and quadratic form:

$$Gini_{i,t} = f(GDP_{i,t}, GDP_{i,t}^2)$$

where *Gini* is the Gini coefficient before government redistribution, *GDP* is the GDP per capita at purchasing power parity (in logs), *i* indexes the countries, *t* indexes time.

We allow the coefficients on *GDP* and *GDP*² to vary with the four factors that we focus on, by including cross products of the GDP variables and the dummies for high values of the characteristics. We opt for this approach, with dummies, instead of including cross products between the original variables measuring the characteristics and the GDP variables, because some of the original variables for the characteristics are not available for the whole period of analysis, which greatly reduces our sample. Specifically, when we use cross products with the dummies, we operate with 430 observations, but when we use cross products with the original variables, we end up with just 103 observations. The downside of the use of dummies is that it does not allow one country to change over time in terms of the characteristics of interest. It may happen that a country has had high taxes in the early 1990s but has become a country with low taxes in the 2000s. Still, we believe that the advantage of having many more observations outweighs the disadvantage of assuming constancy in the features.

Therefore, the following regression is estimated:

$$\begin{aligned} Gini_{i,t} = & \alpha1_{i,t} + \alpha2_{i,t} * GDP_{i,t} + \alpha3_{i,t} * GDP_{i,t}^2 \\ & + \alpha4_{i,t} * hi_market_control * GDP_{i,t} + \alpha5_{i,t} * hi_market_control * GDP_{i,t}^2 \\ & + \alpha6_{i,t} * hi_labour_reg * GDP_{i,t} + \alpha7_{i,t} * hi_labour_reg * GDP_{i,t}^2 \\ & + \alpha8_{i,t} * hi_social * GDP_{i,t} + \alpha9_{i,t} * hi_social * GDP_{i,t}^2 \\ & + \alpha10_{i,t} * hi_taxes * GDP_{i,t} + \alpha11_{i,t} * hi_taxes * GDP_{i,t}^2 + \varepsilon_{i,t} \end{aligned}$$

where *hi_market_control* is a dummy for high control of market power, *hi_labour_reg* is a

dummy for high labour regulation, hi_social is a dummy for high social transfers and hi_taxes is a dummy for high taxes.

The "high" dummies take unitary value if the average value of a characteristic for one country is higher than the median value for all the countries. Table 2 above shows which countries are classified as "high" for which characteristic.

VI.B. Method of estimation

All three variables that enter equation (1), $Gini$, GDP and GDP^2 , are non-stationary, as suggested by the results of the cross-sectionally augmented Dickey-Fuller (CADF) test of Pesaran (2007), shown in Table 3. Visual investigation of the plots of the variables shown in Data Appendix suggests the same. Therefore, we need a technique appropriate for non-stationary variables.

TABLE 3 - RESULTS OF THE UNIT ROOT TEST

	p value of the test
Gini	0.98
GDP	0.32
GDP ²	0.33

The null hypothesis is that all cross sections are non-stationary

Dynamic heterogeneous panels techniques, also known as panel cointegration techniques, are appropriate in such cases (see Pesaran and Smith, 1995, Pesaran, Shin, Smith, 1999 and Blackburne and Frank, 2007). As any cointegration technique, they distinguish between the long-run and the short-run relationship between the variables. In addition, they allow the relationship between variables to differ for different countries.

Before we apply these techniques, we need to test whether variables are cointegrated. We do this using the tests developed by Westerlund (2007). He develops four tests for testing cointegration in panel setting, which rely on testing the significance of the error correction term. Table 4 presents the results of these tests. All four tests reject the null hypothesis of no cointegration at the 10 percent level of significance; in three of them, the p-value is below 1 percent. Thus, we proceed as if variables were cointegrated.

TABLE 4 - RESULTS OF THE COINTEGRATION TESTS

Test	p-value
Gt	0.000
Ga	0.068
Pt	0.000
Pa	0.000

The null hypothesis is that there is no cointegration

Two dynamic heterogenous methods exist: mean group (MG) estimator of Pesaran and Smith (1995) and pooled mean group (PMG) estimator of Pesaran, Shin and Smith (1999). MG assumes different coefficients for every cross-section and PMG assumes that the short-run coefficients differ between the units, while the long-run coefficients are the same for all units.

The choice between the two techniques is made by applying the standard Hausman test. Under the null hypothesis of homogeneity of coefficients, PMG estimates are efficient and consistent, while MG are only consistent. On the other hand, if long-run coefficients are different between cross-sections, PMG is inconsistent, while MG is still consistent. Hence, if the difference between PMG and MG estimators is statistically significant, this means that the consistent estimator (MG in this case) is preferred, while if the difference is insignificant, the efficient estimator (PMG) is preferred.

The results of the Hausman test (available upon request) suggest that the null hypothesis of no systematic difference in the MG and PMG coefficients cannot be rejected (the p-value was 0.13). Hence, we proceed with PMG.

VI.C. Results

We next present the results of the econometric analysis. Because there are different short-run results for each of the 26 countries, for clarity, we discuss only the long-run results. The results are shown in Table 5. The first two rows (GDP and GDP^2) show the results for the reference category - countries with low labour rights, low control of market power, low social benefits and low taxes. The coefficient on GDP is positive while the coefficient on GDP^2 is negative, which seems to suggest an inverted U relationship. However, the turning point after which the relationship becomes negative is very high (USD 319,692 per capita), which implies that for the reference category, GDP growth is always associated with increasing inequality. For countries with high labour regulation, in fact, it appears to be U shaped, as the sum of GDP and $GDP * hi_labour_reg$ is negative and the sum of GDP^2 and $GDP^2 * hi_labour_reg$ is positive. However, as the turning point here is very

low (USD 0.812 per capita), the relationship between GDP and Gini for these countries is actually always positive. For countries with effective control of market power, the relationship is again an inverted-U, as the sum of GDP and $GDP * hi_market_control$ is positive and the sum of GDP^2 and $GDP^2 * hi_market_control$ is negative. Furthermore, the turning point here is USD 2,847 per capita, which implies that until GDP reaches that level, its growth is associated with increase in inequality, while afterwards, inequality starts to decline with economic growth. As this level is rather low, it could be said that for countries with effective control of market power, GDP growth is associated with a decline in inequality most of the time. In countries with high social benefits, the relationship is an inverted-U, too, because the sum of GDP and $GDP * hi_social$ is positive and the sum of GDP^2 and $GDP^2 * hi_social$ is negative. The turning point is rather high, though (USD 78,392 per capita), which means that inequality increases with GDP growth all the time. Finally, in countries with high taxes, the relationship is U shaped, as the sum of GDP and $GDP * hi_taxes$ is positive and the sum of GDP^2 and $GDP^2 * hi_taxes$ is negative. Still, the turning point is high (USD 35,309 per capita), which implies that Gini declines with GDP growth all the time.

TABLE 5 - RESULTS FROM THE PMG ESTIMATION

<i>Long-run coefficients</i>	
GDP	40.1 (37.79)
GDP ²	-1.582 (2.15)
GDP*hi_labour_reg	-69.74* (40.76)
GDP ² *hi_labour_reg	4.317* (2.23)
GDP*hi_market_control	2.379 (44.57)
GDP ² *hi_market_control	-1.089 (2.47)
GDP*hi_social	113.9*** (33.11)
GDP ² *hi_social	-5.252*** (1.77)
GDP*hi_taxes	-67.92** (32.77)
GDP ² *hi_taxes	2.91 (1.80)
Observations	430
Turning point reference category (USD)	319,692
Turning point high labour regulation (USD)	0.812
Turning point high market control (USD)	2,847
Turning point high social benefits (USD)	78,392
Turning point high taxes (USD)	35,309

Short-run coefficients omitted for clarity.

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Another way to illustrate the relationship, often found in the literature, is by plotting the Kuznets curve itself. In our case, however, this is not straightforward, because the curve is different for each of the countries (because the intercept term is different). Therefore, instead of the curve itself, we will show the effect of an increase in GDP on the Gini coefficient, at different levels of GDP (that is, the first derivative of the Kuznets curve), which is the same for all countries belonging to one group. This is shown in Figure VIII. These are the semi-elasticities of Gini to changes in GDP from the regression shown in Table 5, at GDP levels from the sample of analysis (between USD 1,000 and 27,000). The title above each graph indicates the sample of countries to which the effects refer.

If one looks at the left panel in Figure VIII, which plots the semi-elasticity for the reference category (countries with low labour rights, low control of market power, low social benefits and low taxes), one can see that at a GDP of USD 5,000 per capita, the semi-elasticity of Gini to changes in GDP is approximately 0.13, which means that if GDP increases by 1 percent (from USD 5,000 to 5,050), this would be associated with an increase in Gini by 0.13 percentage points. When GDP per capita becomes USD 20,000, the semi-elasticity becomes 0.9, meaning that increase in GDP from USD 20,000 to 20,200 would be associated with a fall in Gini by 0.09 percentage points. Despite the declining effect, it stays positive all the time.

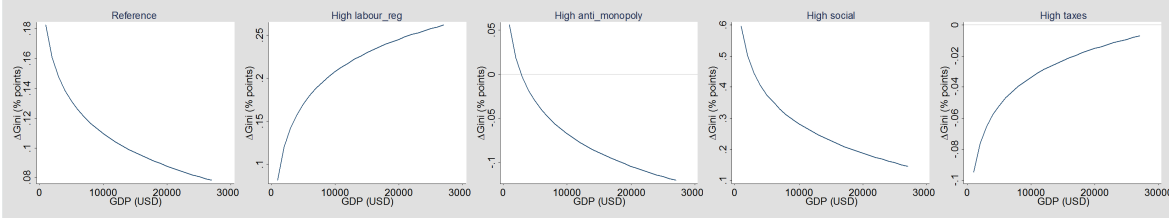
In countries with high labour regulation (second panel from the left in Figure VIII) the relationship is increasing, not decreasing, but again always positive. At a GDP of USD 5,000 per capita, the semi-elasticity is approximately 0.17, meaning that if GDP increases from USD 5,000 to 5,050, this would be associated with an increase in Gini by 0.17 percentage points. At a GDP of USD 25,000 per capita, the semi-elasticity becomes 0.26.

In countries with effective control of market power (middle panel in Figure VIII), the effect is first positive, then negative. At a GDP of USD 1,000 per capita, the semi-elasticity is approximately 0.05, implying that when GDP rises from USD 1,000 to 1,010, Gini increases by 0.05 percentage points. At a GDP of USD 20,000 per capita, the semi-elasticity becomes -0.1, meaning that increase in GDP from USD 20,000 to 20,200 is associated with a decline in Gini by 0.1 percentage points.

Countries with high social benefits (second panel from the right in Figure VIII) have a positive relationship between GDP and Gini all the time. It is declining, however, as at a GDP of USD 5,000, the semi-elasticity of Gini to changes in GDP is 0.35, while at a GDP of USD 20,000, it becomes 0.2.

Lastly, for countries with high taxes (first panel from the right in Figure VIII), the relationship is negative all the time, but increasing. At a GDP of USD 5,000 per capita, the semi-elasticity is around 0.05, while at a GDP of USD 25,000 per capita, the semi-elasticity becomes 0.01.

FIGURE VIII: EFFECTS OF CHANGE IN GDP ON GINI



To summarise, the econometric results seem to suggest that inequality eventually declines with economic growth only in countries with effective control of market power and in countries with high taxes.

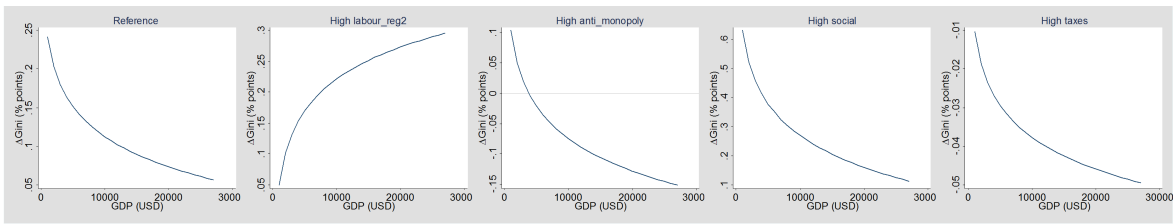
VI.D. Robustness checks

We carry out several robustness checks. First, we use alternative definitions of some of the variables. Then, we reduce the sample on which the regression is estimated. Finally, we use an alternative econometric technique to estimate the regression. The results of these estimations are shown in Table 6. We discuss the plots of the effects in turn.

Figure IX shows the effect of GDP growth on Gini from the specification in which alternative variable for the labour regulation is used. Instead of the index from Gwartney et al. (2014), we use the index of labour market freedom, from Heritage Foundation. The index is defined in the same way as the baseline index – higher values stand for higher labour "freedom", which despite the misleading and ideological name, actually stands for less labour regulation, that is, lower labour rights. There is almost no difference between these effects and those presented in Figure VIII. The effects for the reference country, for countries with high labour regulation and for countries with high social benefits are always positive. The effect for countries with effective control of market power becomes negative after approximately USD 4,000, while the effect for countries with high taxes is negative all the time.

Figure X shows the effects from the specification in which alternative variable for market power is used. Here, we use the intensity of local competition index, from the World Economic Freedom. The index is defined so that a higher value represents higher competition, that is, lower market power. The effects are similar to the previous ones. In the reference country, countries with high labour regulation and countries with high social benefits, the relationship between GDP and inequality is

FIGURE IX: EFFECTS WHEN ALTERNATIVE LABOUR REGULATION VARIABLE IS USED



always positive. In countries with high competition, inequality increases with GDP growth initially, but starts to decline after GDP exceeds approximately USD 3,000 per capita. The effect of taxes is qualitatively similar to previous findings – in countries with high taxes, inequality declines with GDP growth most of the time, more precisely, until GDP reaches approximately USD 20,000. Then, it starts to increase, but only marginally.

FIGURE X: EFFECTS WHEN ALTERNATIVE MARKET POWER VARIABLE IS USED

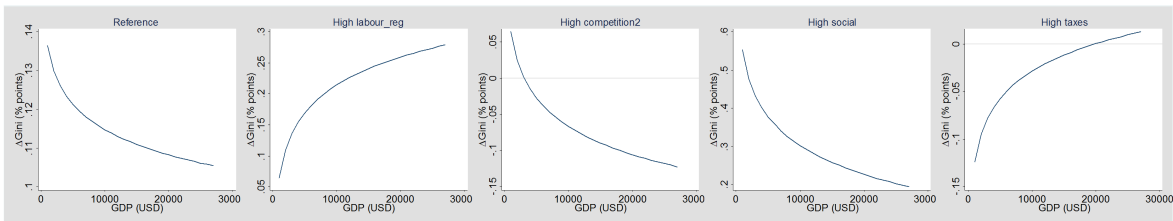
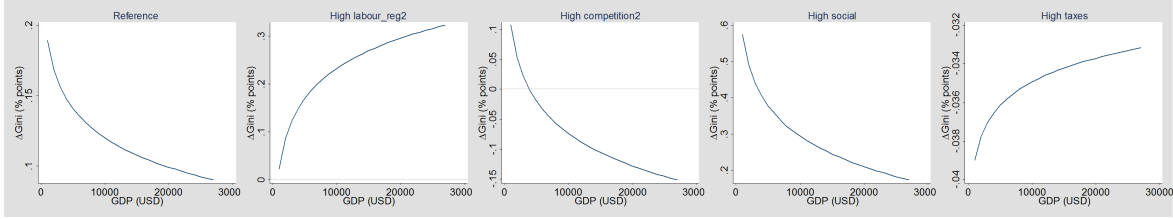


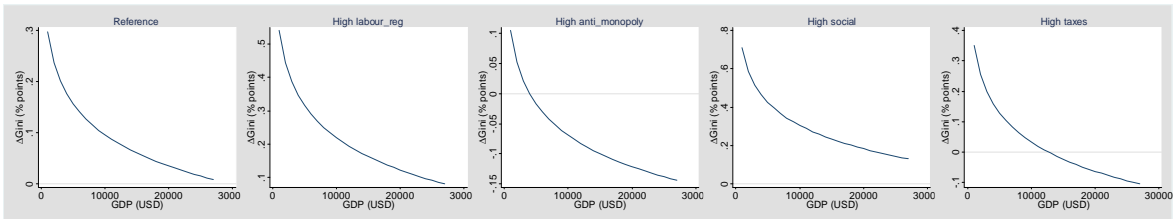
Figure XI presents the results when these two alternative indicators are used together, instead of the original. Results are almost identical to the original ones.

FIGURE XI: EFFECTS WHEN ALTERNATIVE LABOUR REGULATION AND MONOPOLY POWER VARIABLES ARE USED



In Figure XII, the effects obtained from a sample that excludes the initial transition years can be observed. These early transition years were marked by falling GDP and rising inequality in all these countries. Therefore, the findings obtained previously may be driven by this negative relationship between GDP and Gini during the early transition. In addition, in the early years the data on inequality may be contaminated, because it may include transfers through distorted prices. To control this, we exclude the initial years after the breakdown of the socialist system during which GDP was falling. Results remain largely unchanged. The effect of GDP growth on Gini remains positive all the time for the reference country, for countries with high labour regulation and for countries with high social benefits. For countries with effective control of market power, the effect is again positive at low levels of GDP (until USD 4,000) and negative afterwards. For countries with high taxes, the effect is now positive, initially, but becomes negative afterwards, after GDP reaches approximately USD 12,500, which is below the median of the sample.

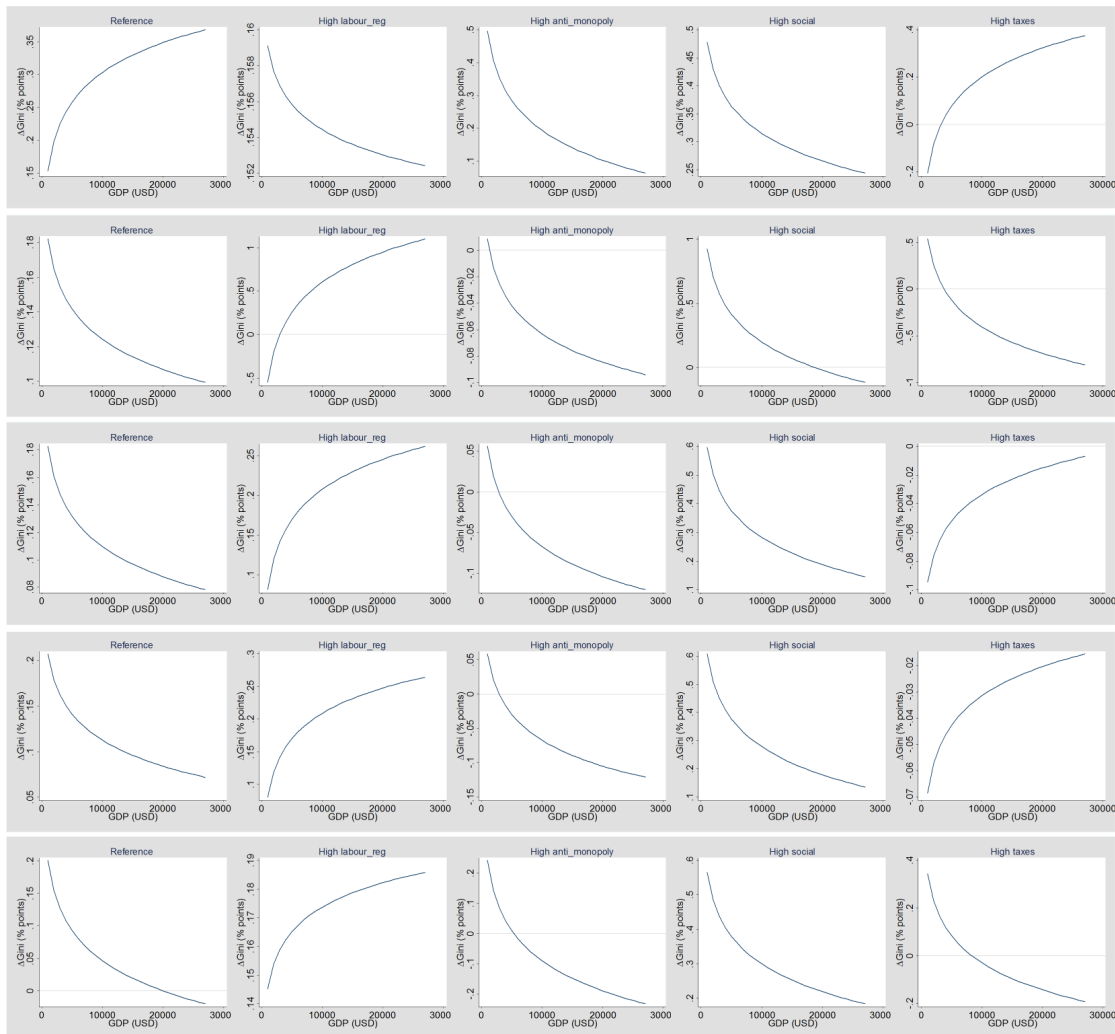
FIGURE XII: EFFECTS WHEN INITIAL TRANSITION YEARS ARE EXCLUDED



Next, we address the possibility that the results may be driven by certain countries. To do this, we run the regression on samples which exclude one country randomly. We first generate random integers between 1 and 26, and then exclude the country that corresponds to that number from the

estimation⁵. Due to the limited space, we repeat this exercise five times. Figure XIII shows the effects of these estimations. Only in the first replication are the effects different from before – the effect of taxes becomes positive after a GDP of approximately USD 3,000, and the effects of the other variables are positive all the time. Still, in the next four replications, the results are largely the same as before – both taxes and market control are negative most of the time. Hence, we read the results of this simulation as evidence that the findings are not driven by some one specific country.

FIGURE XIII: EFFECTS WHEN ONE COUNTRY IS OMITTED RANDOMLY



5. The seed that is used for generating the random integers in Stata is 2601.

VI.E. A note on causality

We have been careful in interpreting our results. We did not interpret them in a causal way, but only as associations. We do this for two main reasons. The first is related to reverse causality, which may be clearly present here, because it is widely acknowledged in the literature that inequality may also affect economic activity (see Berg and Ostry, 2011, for instance). The second one is related to the Kuznets hypothesis itself. As can be seen from the quotes from Section II, the Kuznets hypothesis was not specified and is not interpreted in a causal way, but rather as an association. It never implied that growth increases or decreases inequality, only that the relationship between them is inverted U-shaped.

TABLE 6 - RESULTS OF THE ROBUSTNESS CHECKS

	Baseline		Alternative labour		Alternative market control		Alternative labour and market con.		Excluding initial years		Randomly excluding country		Randomly excluding country		Randomly excluding country	
			labour	market control	labour and market con.	initial years	excluding country	excluding country	excluding country	excluding country	excluding country	excluding country	excluding country	excluding country	excluding country	excluding country
GDP	40.1 (-37.79)	20.15 (36.56)	62.96 (40.26)	39.74 (39.44)	90.37 (133.5)	-29.74 (59.94)	35.54 (43.50)	40.10 (37.79)	49.19 (39.55)	66.21* (39.47)						
GDP2	-1.582 (-2.15)	-0.471 (2.102)	-2.807 (2.290)	-1.506 (2.266)	-4.386 (7.453)	3.259 (3.242)	-1.256 (2.437)	-1.582 (2.147)	-2.058 (2.237)	-3.342 (2.256)						
GDP*hi_labour_reg	-69.74* (40.76)	-58.65 (36.61)	-109.5*** (36.75)	-100.1*** (33.57)	60.38 (39.53)	47.05 (65.52)	-435.9*** (81.98)	-69.74* (40.76)	-79.58* (42.82)	-60.19 (41.25)						
GDP2*hi_labour_reg	4.317* (2.23)	3.723* (2.009)	6.536*** (1.999)	6.042*** (1.831)	-2.609 (2.151)	-3.361 (3.542)	26.26*** (4.742)	4.317* (2.232)	4.843*** (2.343)	3.958* (2.257)						
GDP*hi_market_control	2.379 (44.57)	25.27 (44.50)	0.804 (47.05)	25.12 (46.93)	-27.78 (134.4)	170.4*** (56.63)	-13.20 (51.39)	2.379 (44.57)	-5.832 (45.49)	57.15 (50.73)						
GDP2*hi_market_control	-1.089 (2.47)	-2.354 (2.485)	-1.058 (2.603)	-2.414 (2.620)	0.613 (7.494)	-9.842*** (3.073)	-0.301 (2.815)	-1.089 (2.467)	-0.659 (2.514)	-3.833 (2.795)						
GDP*hi_taxes	-67.92** (32.77)	-61.10* (32.07)	-55.83* (30.35)	-44.85 (29.80)	40.27 (90.74)	-113.1*** (34.00)	299.5*** (78.21)	-67.92** (32.77)	-67.08** (33.26)	80.57 (77.23)						
GDP2*hi_taxes	2.91 (1.80)	2.539 (1.759)	2.215 (1.662)	1.593 (1.632)	-2.526 (4.799)	5.583*** (1.887)	-19.14*** (4.571)	2.910 (1.797)	2.859 (1.824)	-4.783 (4.102)						
GDP*hi_social	113.9*** (33.11)	110.0*** (32.30)	108.8*** (35.23)	101.4*** (34.17)	102.1 (85.71)	126.7* (64.94)	273.5*** (50.65)	113.9*** (33.11)	110.6*** (33.73)	70.43* (39.18)						
GDP2*hi_social	-5.252*** (1.77)	-4.954*** (1.737)	-5.053*** (1.896)	-4.560** (1.845)	-4.406 (4.448)	-6.817*** (3.443)	-14.46*** (2.722)	-5.252*** (1.773)	-5.105*** (1.804)	-2.450 (2.117)						
Observations	430	430	430	430	353	388	409	430	409	409						
T.P. reference	319,692	1.950e+09	74,147	538,097	29,827	95.77	1.403e+06	319,692	154,862	20,050						
T.P. high labour regulation	0.812	0.722	0.813	0.743	0.260	0.842	0.633	0.812	0.830	1.049						
T.P. high market control	2,847	3,098	3,822	3,922	4,005	43,653	1,312	2,847	2,914	5,411						
T.P. high taxes	35,309	19,916	414.2	4,300e+12	12,716	3,224	3,688	35,309	71,138	8,371						
T.P. high social benefits	78,392	161,970	55,581	112,941	56,678	826,788	18,673	78,392	69,835	132,663						

T.P. stands for turning point, in USD. Short-run coefficients omitted for clarity. Standard errors in parentheses. ** p<0.01, *** p<0.001, * p<0.05, ** p<0.01.

VII. CONCLUSION

One of the most prevailing questions in economics is how to ensure that economic growth benefits everyone, not just the privileged elite. Simon Kuznets argued that we should not worry, because the internal workings of the capitalist system ensure that economic growth eventually benefits everyone. This is the well-known Kuznets hypothesis, which postulates that the relationship between inequality and income is like an inverted-U – inequality initially increases with economic growth, but eventually declines (Kuznets, 1955).

This paper has re-assessed this hypothesis, looking at the experiences of ex-socialist countries from the former Eastern Bloc after the collapse of socialism. These countries are suitable for such an analysis, because they had very similar characteristics before the collapse of socialism, but very different experiences during the transition. Unlike the existing literature, we have not assumed that the relationship between economic growth and changes in inequality is homogeneous, but have instead analysed the factors that shape this relationship. Four factors have been assessed – labour rights, control of market power, social benefits and taxes. Findings suggest that inequality declines over the course of economic growth only in countries with effective control of market power and high taxes.

Hence, Kuznets’ prediction does not seem to hold for the ex-socialist countries. Economic growth does not necessarily benefit everyone. For that to happen, effective control of market power and high taxes are required.

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IX. DATA APPENDIX

TABLE A1 - VARIABLE DEFINITIONS AND DATA SOURCES

Variable	Definition	Source
Gini	Market Gini coefficient, i.e. Gini coefficient before government redistribution.	Standardized World Income Inequality database, version 4, of Solt (2013)
GDP	Expenditure-side real GDP at chained PPPs (in mil. 2005 USD), per capita.	Penn World Tables, version 8.1 of Feenstra et al. (2015).
Labour market regulation	Labor market regulations index. Ranges between 0 and 10. Higher values mean lower regulation.	Economic Freedom of the World database, of Gwartney et al. (2014)
Effectiveness of anti-monopoly policy	Effectiveness of anti-monopoly policy index. Ranges between 1 and 7. Higher values indicate more effective monopoly control.	Global competitiveness report of the World Economic Forum
Social benefits	General government expenditure on social benefits (2001 manual), as a percent of GDP.	International Monetary Fund's Government Finance Statistics
Taxes	General government revenues from taxes and social contributions (2001 manual), as a percent of GDP.	International Monetary Fund's Government Finance Statistics
Labour market "freedom"	Index of labour market freedom. Ranges between 30 and 100. Higher values stand for bigger "freedom", i.e. lower regulation.	Index of Economic Freedom of the Heritage Foundation
Extent of market dominance	Extent of market dominance index. Ranges between 1 and 7. Higher values indicate lower market dominance.	Global competitiveness report of the World Economic Forum

TABLE A2 - DESCRIPTIVE STATISTICS OF VARIABLES (WHOLE SAMPLE)

	GDP	Gini	Labour regulation	Market control	Social benefits	Taxes	Labour "freedom"	Extent of dominance
min	1064	22.0	3.60	2.37	4.1	14.4	30	3.34
mean	8972	38.2	6.40	3.56	13.0	31.6	62.7	4.56
max	26813	54.6	9.06	4.92	20.4	48.8	100	5.83
p25	4887	33.4	5.67	3.07	9.7	28.6	54.6	4.04
p50	7607	38.1	6.37	3.43	13.0	31.9	62.4	4.47
p75	12206	43.5	7.14	4.04	16.8	35.2	70.6	5.08
N	616	551	222	238	138	263	181	138

TABLE A3 - DESCRIPTIVE STATISTICS BY COUNTRIES

	GDP (min)	GDP (max)	Gini (min)	Gini (max)	Labour (aver)	Market con. (aver)	Social (aver)	Taxes (aver)	Labour2 (aver)	Market con.2 (aver)
Albania	1920	7401	31.2	39.8	5.98	3.09	8.0	26.8	49.7	3.89
Armenia	2297	5683	27.5	51.0	6.83	2.62	5.6	19.1	68.4	3.52
Azerbaijan	1864	9228	22.0	53.3	6.75	3.05	5.1	16.4	70.8	4.02
Belarus	6576	15471	23.7	36.6	.	.	12.8	43.4	73.6	.
Bosnia	1064	7586	31.8	43.6	7.03	2.78	12.3	34.6	55.9	4.11
Bulgaria	5996	12948	22.8	40.6	6.74	3.30	13.8	30.5	79.9	4.58
Croatia	8199	18317	25.8	38.4	5.69	3.60	16.5	34.7	43.9	4.60
Czech	15696	23910	31.8	39.9	7.06	4.67	16.8	33.1	66.4	5.68
Estonia	8254	20257	27.0	45.5	5.62	4.64	11.4	32.3	49.8	5.50
Georgia	2033	9374	29.2	54.6	7.28	3.05	6.1	22.4	89.4	4.06
Hungary	10172	18907	38.6	47.6	6.63	4.27	17.1	38.5	68.6	5.34
Kazakhstan	4779	16970	28.6	38.8	7.70	3.42	5.4	20.6	84.3	4.40
Kyrgyz	1752	6495	24.3	45.9	6.73	2.87	.	.	74.1	3.83
Latvia	6928	16164	31.5	51.8	6.10	3.97	10.0	28.2	63.3	4.82
Lithuania	7001	17652	34.2	51.7	5.71	3.82	11.4	29.0	56.7	5.08
Macedonia	4509	8641	24.1	49.6	6.69	3.30	11.5	30.0	64.9	4.30
Moldova	1627	4691	26.7	45.0	5.91	3.21	11.3	31.5	54.3	4.34
Montenegro	4320	11218	33.7	37.6	7.09	3.62	.	.	78.6	4.29
Poland	6750	18489	31.1	45.9	6.38	4.15	17.4	33.0	60.9	5.14
Romania	5106	13655	27.5	43.6	6.08	3.76	10.4	28.0	57.9	4.67
Russia	7474	18725	28.3	52.4	5.72	3.26	10.7	31.3	61.3	4.31
Serbia	3129	9863	32.7	37.5	6.70	2.71	19.2	39.6	70.4	3.74
Slovakia	10973	21557	25.7	38.7	6.94	4.37	17.5	31.2	72.9	5.38
Slovenia	14828	26813	25.1	35.0	5.13	4.34	18.0	37.4	41.9	5.13
Ukraine	3815	9321	22.6	44.6	5.85	3.16	17.3	33.8	53.6	4.28
Uzbekistan	3120	6185	27.0	45.6	.	.	9.7	30.9	64.9	.

FIGURE XIV: PLOT OF THE GDP PER CAPITA VARIABLE (1)

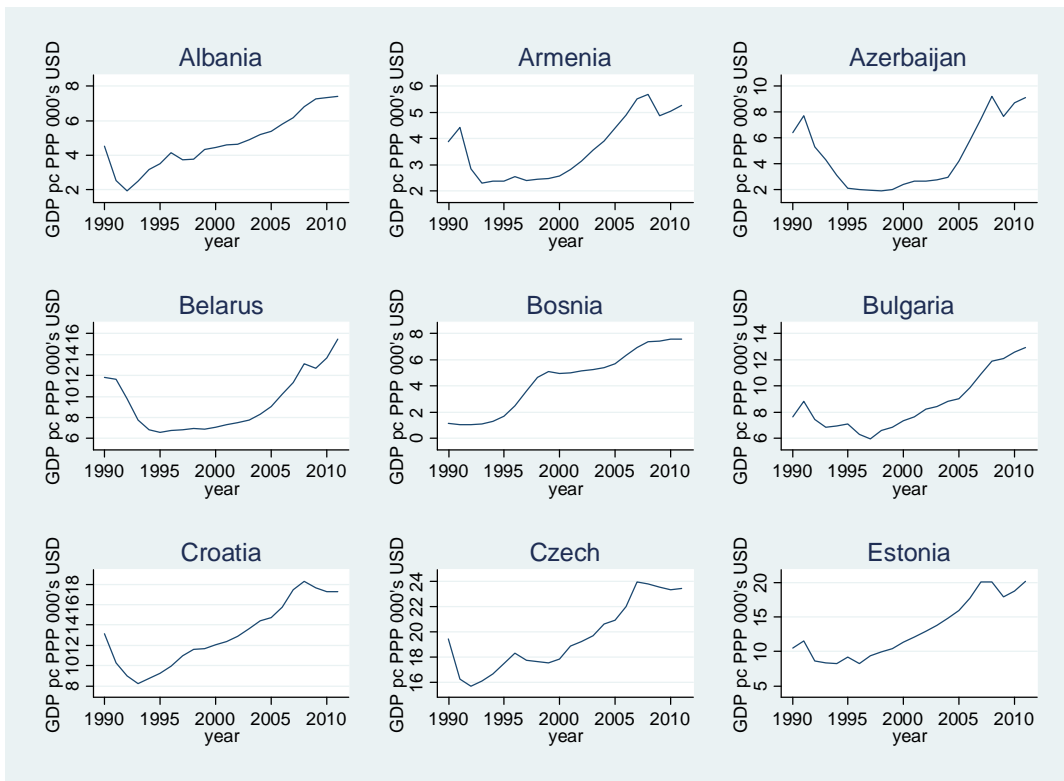


FIGURE XV: PLOT OF THE GDP PER CAPITA VARIABLE (2)

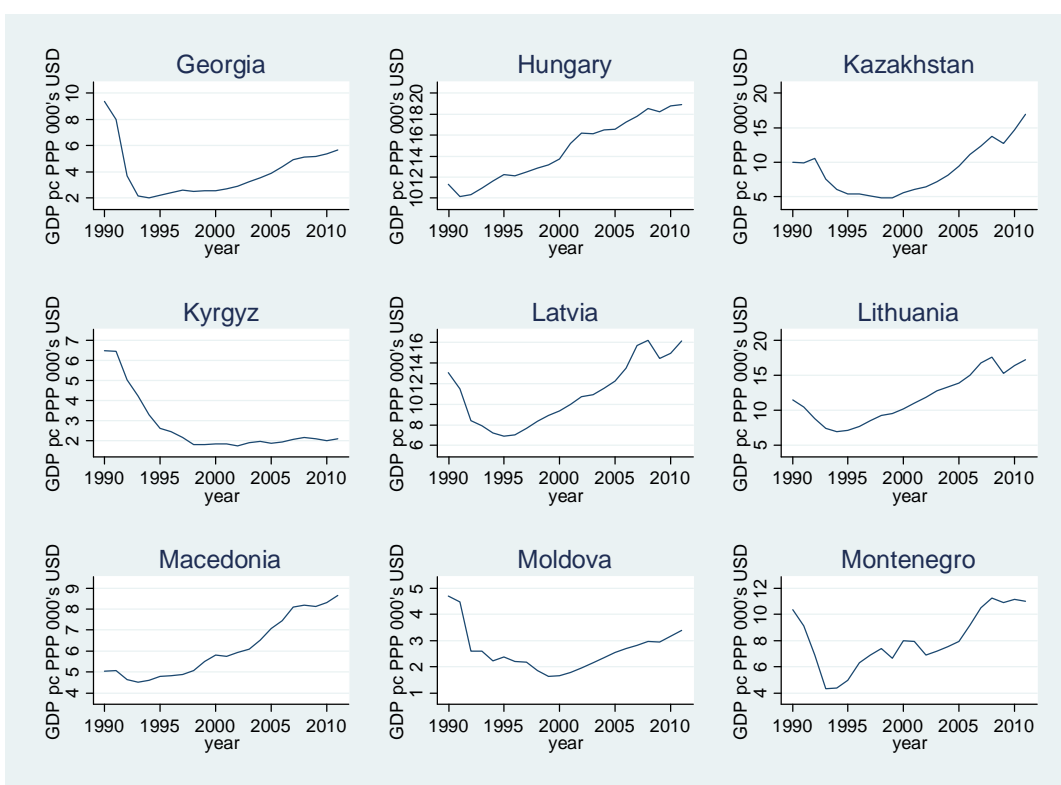


FIGURE XVI: PLOT OF THE GDP PER CAPITA VARIABLE (3)

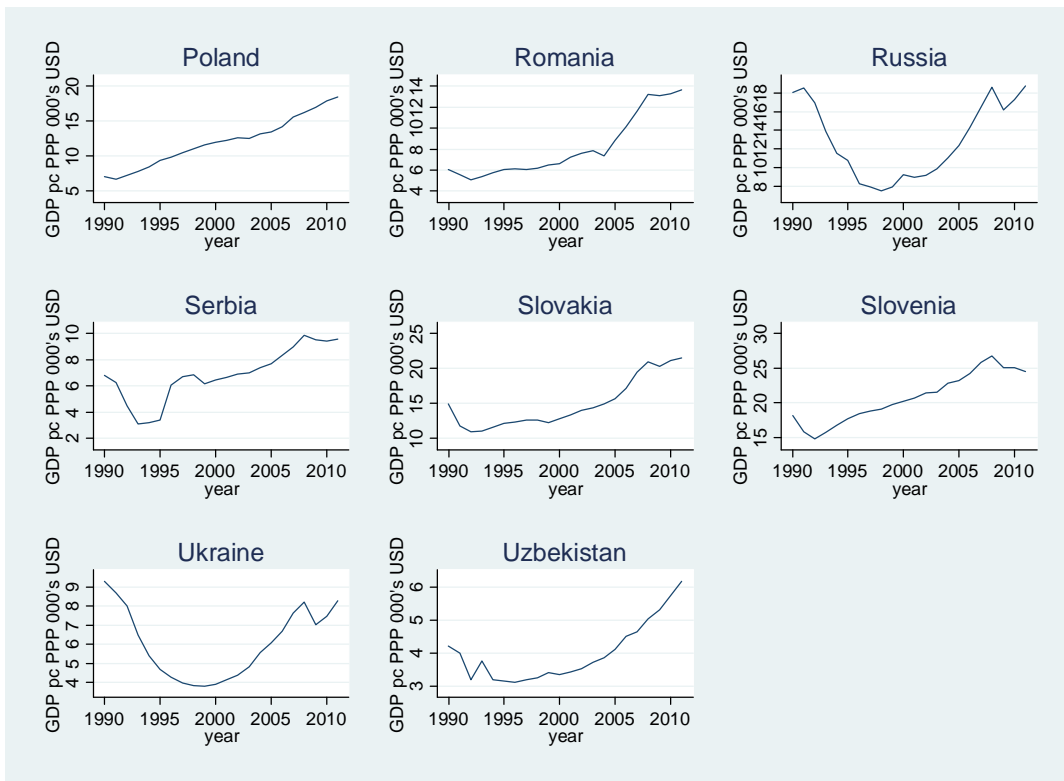


FIGURE XVII: PLOT OF THE MARKET GINI VARIABLE (1)

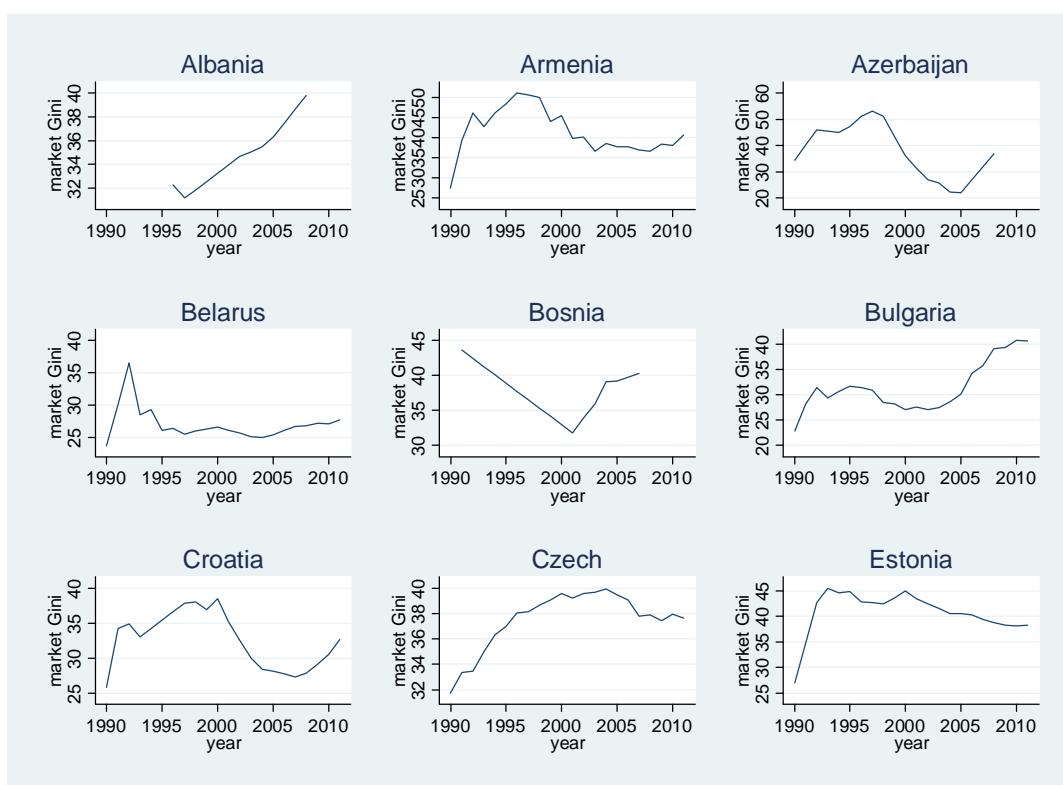


FIGURE XVIII: PLOT OF THE MARKET GINI VARIABLE (2)

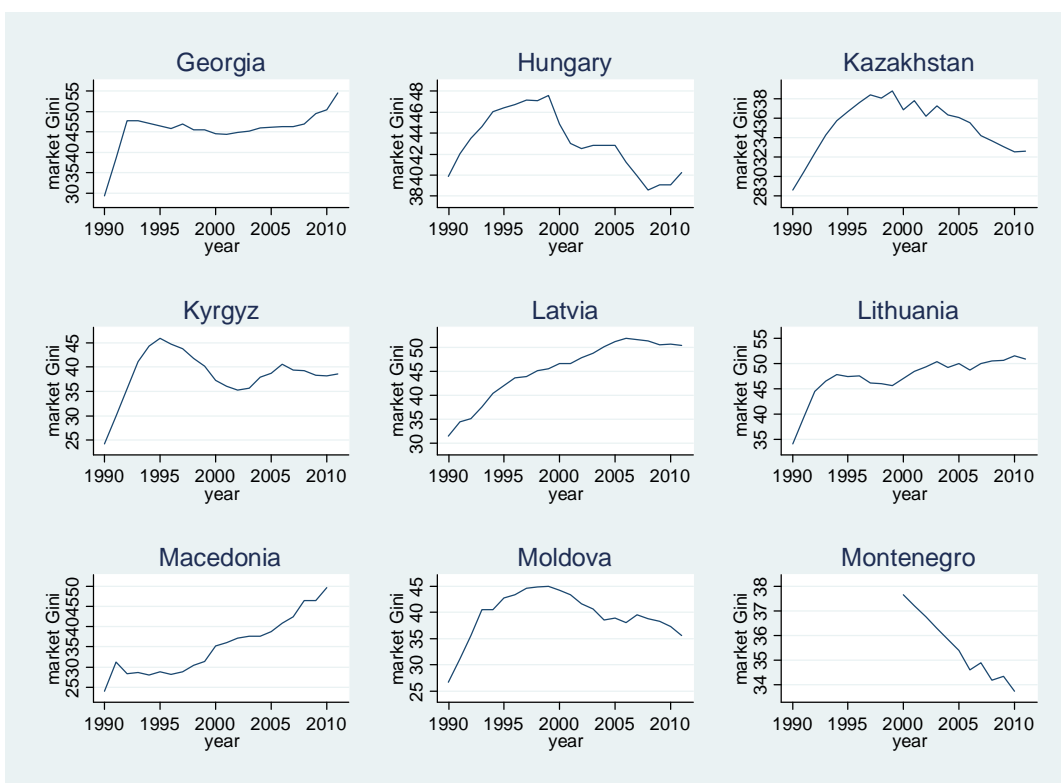


FIGURE XIX: PLOT OF THE MARKET GINI VARIABLE (3)

