

WHEN IS THERE A KUZNETS CURVE?*

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ABSTRACT

This paper investigates when is there a Kuznets curve, that is, under which conditions economic growth is associated with a decline in income inequality. The analysis is done on a sample of 26 ex-socialist countries from Eastern Europe, during the post-socialist years. These countries had very similar characteristics when socialism collapsed, but very different experiences with the 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 inequality (before government redistribution) declines with economic growth when labour markets are more regulated, anti-monopoly policy is more effective and taxes are higher. Taxes seem to be the single most important factor.

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I. INTRODUCTION

There has been a revival in the interest in income inequality after the recent financial crisis. Several authors pointed out at the rising inequality in the US as one of the principal causes of the crisis - Stiglitz (2009), Milanovic (2009), Wade (2009), Fitoussi and Saraceno (2010), Rajan (2010), to name a few. More recently, the attention shifted to changes in inequality after the crisis and the determinants of these changes (Piketty and Saez, 2013, Jenkins et al., 2013, Jovanovic, 2014, Agnello and Sousa, 2012, Woo et al., 2013, Ball et al., 2013). Finally, some recent studies proposed measures in order to prevent rising inequality. Piketty (2014) recommends global and progressive tax on wealth and highly progressive marginal taxes on income. IMF (2014) proposes a set of fiscal measures, including greater use of taxes on property and energy, progressive income taxes, conditional cash transfers, better targeted social assistance programmes and improved access to education and health services. Atkinson (2015) proposes 15 measures, including tax reform, public works, introducing living wage and establishing a public investment authority. Stiglitz (2015) gives 8 proposals to rewrite the rules of the American economy, including increasing competition, reforming the financial system, increasing labour rights and reforming the tax and transfers system.

With income inequality in the focus, it seems to be a good time to re-investigate one old and well-known hypothesis about inequality, the Kuznets hypothesis. In his presidential address to the American Economic Association in 1954, Simon Kuznets argued that economic growth brings an inverted U-shaped relationship between income and inequality (Kuznets, 1955). In the initial stages of development, inequality increases with growth. After some time, inequality starts to decline with growth. The Kuznets hypothesis is important because its validity is directly linked to the need for government intervention. If the hypothesis is valid, i.e. growth eventually results in equitable distribution, then government intervention is not needed. Alternatively, if the hypothesis is not valid, i.e. growth does not lead to an automatic decline in inequality, that would mean that government intervention is needed in order to achieve a more equitable distribution.

Existing literature on the Kuznets curve gives mixed results. Early cross-country studies in general support the hypothesis, but this is entirely due to 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.

Despite the acknowledgement in the literature that the Kuznets curve is present only sometimes, there is a lack of understanding about the factors that make the hypothesis hold. This paper aims to fill this gap. It investigates the relationship between income and inequality in the ex-socialist countries after the fall of the socialist system¹, i.e. during 1990-2011, aiming to assess which factors shape this relationship. 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. The similar initial conditions and the different paths during the transition imply that most of the differences in the dynamics of inequality after the fall of the socialism can be attributed to the differences in the patterns of economic development, i.e. the differences in economic growth and the different institutions that the countries adopted. We will 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.

We proceed as follows. The next section briefly explains the Kuznets curve and the empirical literature on it. Section III elaborates why the ex-socialist countries are appropriate for this analysis. Section IV presents the data on inequality and income that will be used. The descriptive analysis is provided in section V, while the econometric analysis in section VI. Section VII discusses how countries adopted different institutions. Section VIII concludes.

II. KUZNETS CURVE

In his presidential address to the American Economic Association in 1954, Simon Kuznets posed 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 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 is inverted U-shaped. In the initial stages of development income growth tends to increase inequality. After some time, though, income growth starts to decrease inequality. He attributed this relationship to the industrialization - in the initial stages of development, people work mainly in agriculture, which has low wages and low inequality. With industrialization, workers start to shift to industry, which

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.

has higher wages, but also higher inequality. Thus, in 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 its predictions refer to countries that are going through a process of industrialization and depend critically on the assumptions about the agrarian and industrial sectors, most of the time it is loosely interpreted as postulating an inverted-U relationship between economic development and income inequality. For illustration, one of the most influential and cited paper on this topic, Ahluwalia (1976) 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." (Ahluwalia, 1976, p.128).

Similarly, in the chapter on income distribution and development from the Handbook of Income Distribution, Kanbur (2000) claims:

"In fact, many writers in the 1950s discussed the distributional consequences of growth explicitly. Most famously, Kuznets (1955) put forward his "inverted-U hypothesis", that inequality first increases and then decreases as per capita income rises." (Kanbur, 2000, p. 794).

Finally, Piketty (2014), 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" (Piketty, 2014, p. 11).

The Kuznets hypothesis is important because its validity is directly linked to the need for government intervention. If the hypothesis is valid, i.e. growth eventually results in equitable distribution, then government intervention is not needed. Alternatively, if the hypothesis is not valid, i.e. growth does not lead to an automatic decline in inequality, that would mean that government intervention is needed in order to achieve a more equitable distribution.

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

Early studies were cross-sectional. Pauckert (1973) 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), Barro (2008). Although several cross-country studies question these findings (Saith, 1983, Anand and Kanbur, 1993, Ravallion, 1997), the prevailing evidence from the cross-country studies is still 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 the 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).

But, the Kuznets hypothesis 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 19th century. Then, it has stagnated, until 1920's, 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 1870s and 1913, and then equalized over the next 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, the time-series studies dismiss the inverted-U as a general pattern. Rather, it is present in some cases and absent in other.

Despite this notion, 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 Eastern Europe, for the period after the fall of the socialism.

III. WHY THE EX-SOCIALIST COUNTRIES?

Developments in the former socialist countries² 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 similar 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 progress in transition and vary from 1 to 4.3, one implying no progress in the transition, 4.3 implying that the system is very similar to the advanced industrialized economies. There are six transition indicators - Large Scale Privatisation, Small Scale Privatisation, Governance and Enterprise Restructuring, Price Liberalisation, Trade and Foreign Exchange System and Competition policy. The dynamics of the indicators for the 26 countries are shown in Figure I. It can be seen that in 1989 there were no differences between the 26 countries in three of the indicators - Large Scale Privatization, 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 had 1 (meaning widespread import and/or export controls or very limited legitimate access to foreign exchange). Only in the remaining two indicators (Small Scale Privatization and Price Liberalization) there were some more pronounced differences between the countries.

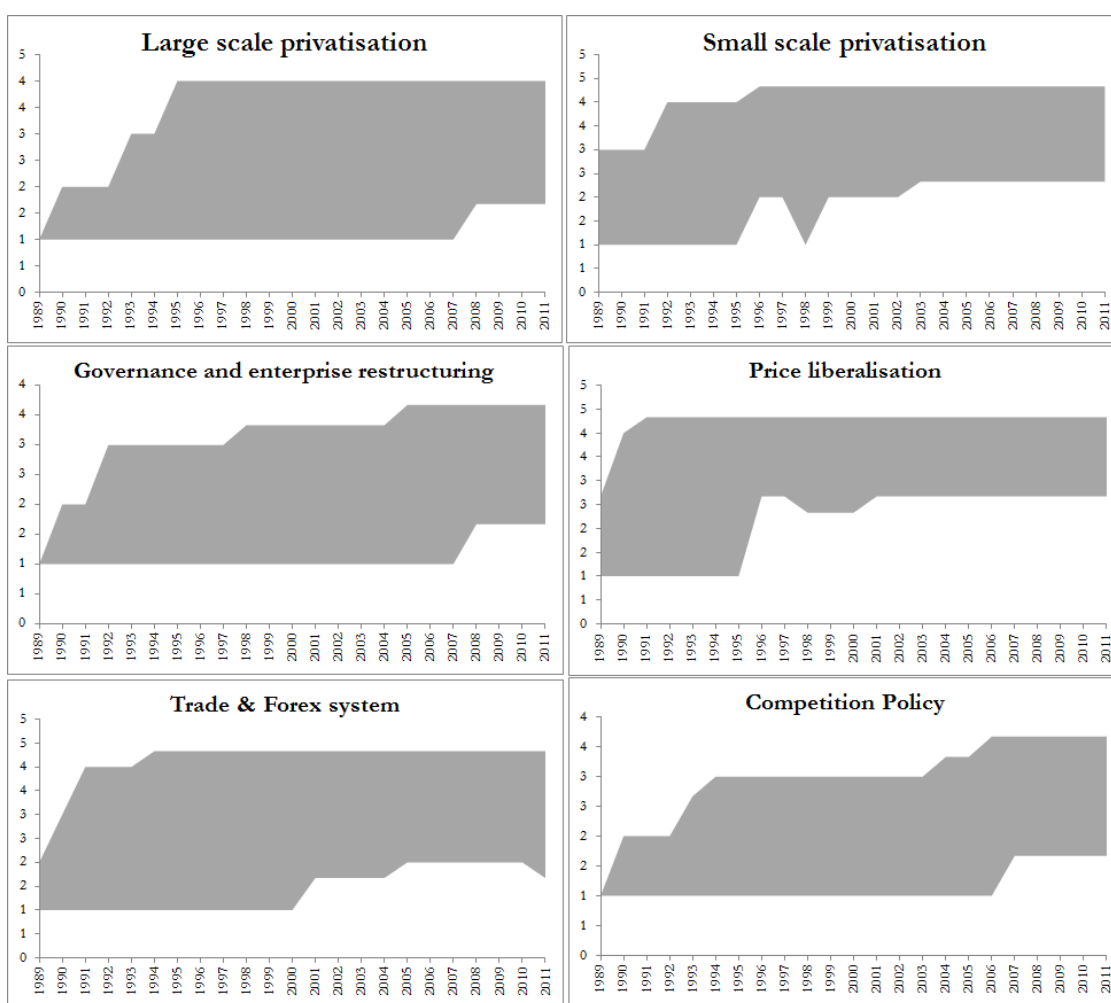
Then, *during the transition, different countries took different paths*. This is well evident in the EBRD transition indicators. In 2011, there is no indicator in which all the countries have same values. For example, Large Scale Privatization index in 2011 is just 1.7 in Belarus, indicating still little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

2. The following 26 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.

2011, while four countries have 3.7. This is also clear from Figure 1 - the grey areas increase as time progresses.

The differences in the transition are observed in the GDP data, too (see Figures XVIII-XX in the Appendix). Some of these countries had rather short and small downturn in early 1990's, 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).

FIGURE I: 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.

The similar initial conditions, both in terms of institutions and in terms of inequality, and the marked differences in the 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*. That makes the ex-socialist countries particularly suitable and attractive for analysing the relationship between GDP and inequality.

IV. DATA

The data on income inequality that will be used in this study are from the Standardized World Income Inequality Database (SWIID) of Frederick Solt (2013), version 4. This is the most comprehensive database on income inequality at the moment, with continuous data series for approximately 150 countries, since 1960. It combines two main sources - the Luxembourg Income Study (LIS) database and the World Income Inequality Database (WIID) from the World Institute for Development Economics Research of the United Nations University. The LIS data serve as the standard, i.e. the WIID data are adjusted in order to make them comparable to the LIS data. Therefore, although the original data that the SWIID uses differ in terms of reference units (some data are from household surveys, some are from individual), or income definitions (some data are calculated on consumption, some on expenditure, some on income), the final product is a standardized database on income inequality, referring to household adult-equivalent net and gross income. We will use the Gini coefficient calculated on the gross income data, i.e. the income before transfers and taxes.

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

The period that will be covered is longer than two decades, which should be enough for identifying clear patterns between GDP and inequality. In addition, the GDP variable spans between 1,000 and 27,000 USD per capita (in 2005 prices) which should also be enough, because it covers approximately three-quarters of the countries in 2011³.

The data sources for all the variables, their definitions, plots and descriptive statistics, are presented in the Data Appendix.

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.

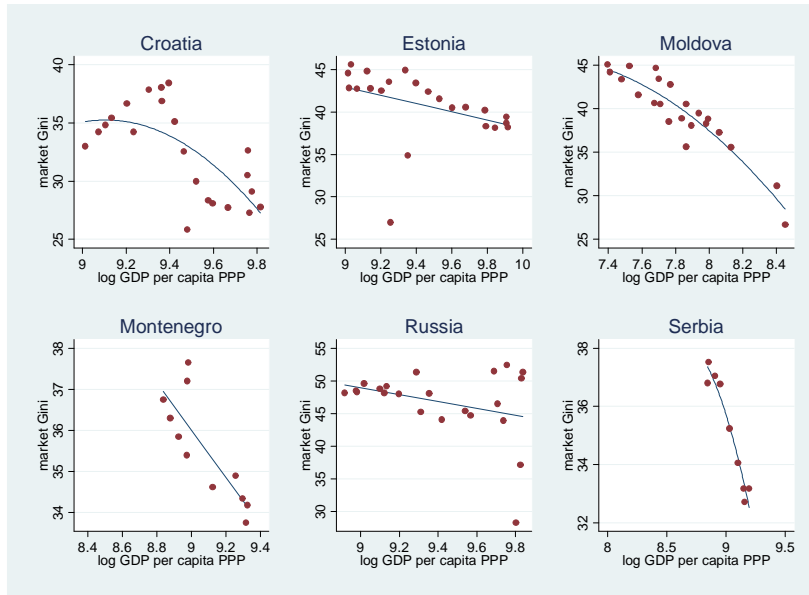
V. DESCRIPTIVE ANALYSIS

V.A. *First look at the data*

We begin the analysis by looking at the cross plots of the GDP per capita and the market Gini coefficient. In the countries shown on Figure II, the relationship between GDP and Gini is constantly decreasing (Croatia, Estonia, Moldova, Montenegro, Russia, Serbia). In the countries shown on Figure III, it is firstly decreasing and afterwards increasing (Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Kazakhstan, Lithuania). In the countries shown on Figure IV it is increasing all the time (Albania, Belarus, Latvia, Macedonia, Romania). In the last group of countries, shown on Figures V and VI, it is first increasing and then falling (Czech Republic, Georgia, Hungary, Kyrgyzstan, Poland, Slovakia, Slovenia, Turkmenistan, Ukraine, Uzbekistan). This is the typical Kuznets curve.

Which factors cause these differences in the relationship between GDP and Gini? We will focus on four factors that we believe are important for the GDP-Gini relationship.⁴

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



4. Due to the specific estimation technique and approach to estimation, we are unable to include more than four factors in the analysis.

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

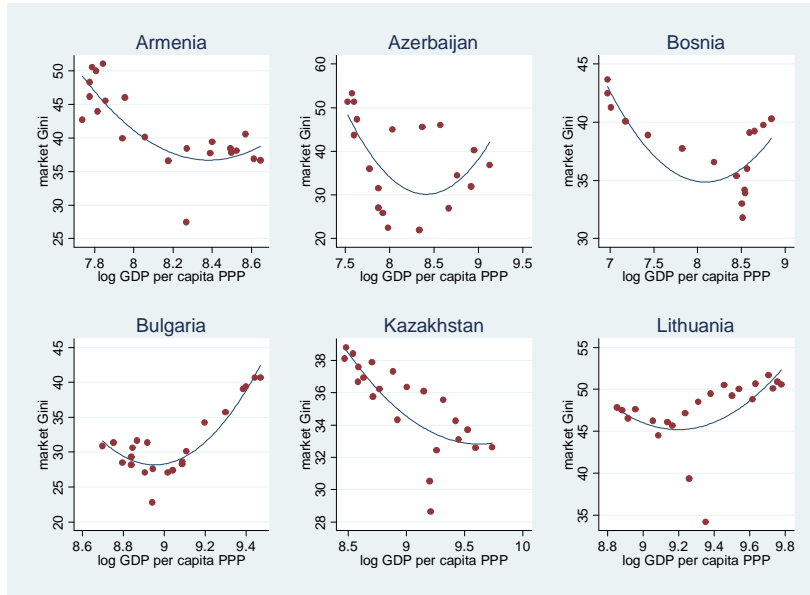


FIGURE IV: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE THE TWO ARE POSITIVELY RELATED

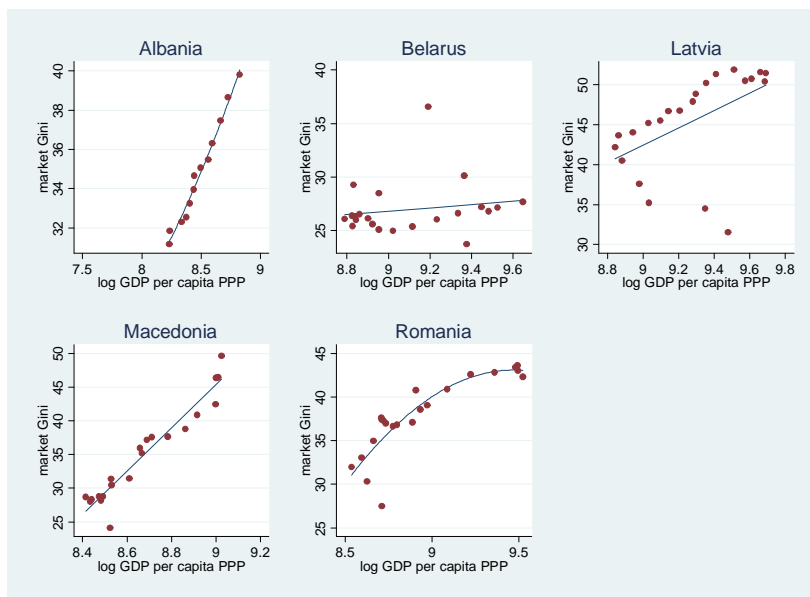


FIGURE V: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE GINI FIRST RISES AND THEN FALLS WITH GDP (1)

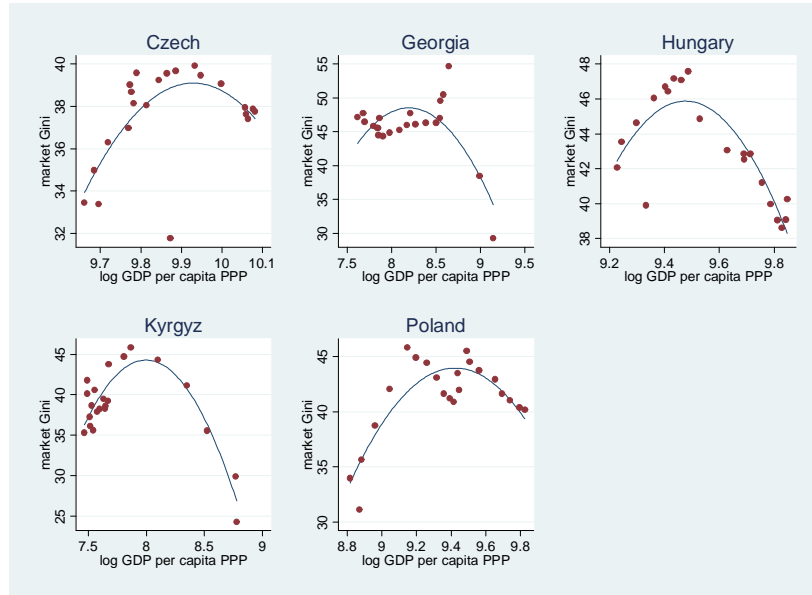
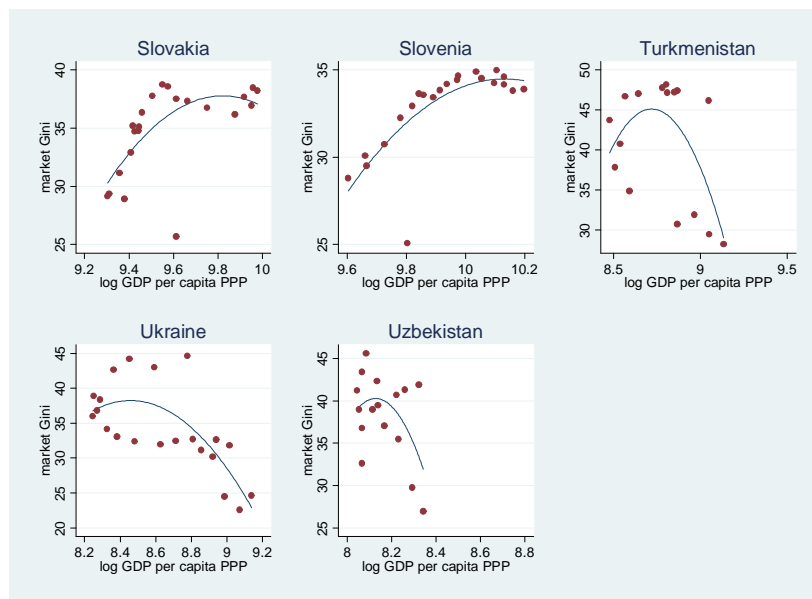


FIGURE VI: CROSS PLOTS OF GDP AND GINI FOR COUNTRIES WHERE GINI FIRST RISES AND THEN FALLS WITH GDP (2)



V.B. Variables of interest

The first factor that we focus on are **labour rights**. If workers have low rights, hence small negotiating power, this will allow capital owners to grasp most of the value added for themselves. Thus, economic growth may be again skewed towards the capital owners, who are usually richer. The report of 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 the 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 the **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.⁵ Stiglitz (2015) has recently emphasized the importance of the market for income inequality in the US. As our baseline measure of the market power, we will use the effectiveness of anti-monopoly policy index from the Global Competitiveness Report of the World Economic Forum. As our alternative measure, we will use the extent of market dominance index from the same report. We opt for the anti-monopoly policy index because it is more directly related to government regulation than the extent of dominance.

The third factor that we examine refers to **social benefits**. Higher social benefits serve as social safety net and may thus increase equality of opportunities. Through this, they may lead to better usage of people's potentials (i.e. 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 the **taxes**. Taxes can affect market (i.e. pre-redistribution) income inequality through several channels. First, they affect economic agents' decisions about work and leisure, so 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 workers work more. Finally, taxes may affect current market

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

distribution through redistribution from previous periods, i.e. by preventing inequality from reproducing itself. Taxes are considered as one of the most important driver of inequality. Their role has been emphasized recently by Piketty (2014), Atkinson (2015) and Stiglitz (2015). Data on taxes are from the Government Finance Statistics of the IMF.

V.C. Some stylized facts

To gain some insights about how these factors may shape the GDP-Gini relationship, we next group the 26 countries into two groups, one in which GDP growth eventually increases inequality (Figures II and III), and one in which GDP growth eventually decreases inequality (Figures I, IV and V). We then compare the for variables of interest between the two groups (Table 1). It can be seen that countries in which growth eventually decreases inequality have higher social benefits and higher taxes than countries where growth eventually increases inequality. 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 of GDP | Taxes of GDP |
|---|----------------------|----------------------------|------------------------------|-----------------|
| Countries where GDP lowers inequality | 6.1 | 3.6 | 16 % of GDP | 35% of GDP |
| Countries where GDP increases inequality | 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.

We next classify the analysed countries into countries with high and low values of the four characteristics, and observe the shapes of the relationships among them. We separate the countries into "high" and "low" on the grounds of their average value for the characteristics, i.e. on the grounds of whether it is lower than the median value for all the countries. For example, if the average value of the control of monopolies index for Macedonia is lower than the median value of the control of monopolies index for all the countries, than Macedonia is classified as a country with low control of monopolies. Table 2 presents how the countries are classified into "high" and "low".

TABLE 2 - HIGH AND LOW COUNTRIES

| | Labour regulation | Anti monopoly | 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

If we take the labour regulation, of the 12 countries that are classified as having high labour regulation, 8 are countries where GDP growth eventually leads to a decline in inequality (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 the 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). Differently, GDP and inequality are negatively related in just 5 of the 12 countries with low benefits (Estonia, Georgia, Moldova, Russia, Uzbekistan).

Differences are even more drastic when countries are grouped in terms of the taxes. 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, Kazakhstan, Latvia, Lithuania, Macedonia, Romania, Slovakia, Uzbekistan).

Speaking of anti-monopoly policy, from the 12 countries which can be classified as having highly effective anti-monopoly policy, 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 anti-monopoly policy, 6 of the 12 countries have a negative association between GDP and Gini (Georgia, Kyrgyzstan, Moldova, Russia, Serbia, Ukraine).

All in all, these stylized facts suggest that GDP is more likely to be negatively associated with Gini in countries with higher taxes, higher labour regulation, more effective anti-monopoly policy and higher social benefits.

VI. ECONOMETRIC ANALYSIS

VI.A. *The approach*

The econometric analysis is based on a simple regression in which the market Gini coefficient depends on the 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 first estimate equation (1) for the whole sample. We then estimate it for sub-groups of countries with high and low characteristics of the variables of interest (the groups shown in Table 2), to see if there are differences between countries with different characteristics. In the end, in order to see which of the characteristics are the most important for the GDP-Gini relationship, we estimate equation (1) on the whole sample again, allowing for differences between countries with different characteristics, i.e. including cross products of the dummies for high values of the characteristics and the GDP variables.⁶

6. We opt for this approach, with dummies, instead of including cross products between the variables measuring the

VI.B. Method of estimation

All the 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 the 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 the 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. As can be seen, all the 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 the variables are cointegrated.

characteristics and the GDP variables, because some of the variables for the characteristics are not available for the whole period of analysis, which would greatly reduce our sample.

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

The choice between the two techniques is done by applying the familiar Hausman test. Under the null hypothesis of homogeneity of the coefficients, the PMG estimates are efficient and consistent, while the MG are only consistent. On the other hand, if the long-run coefficients are different between cross sections, the PMG is inconsistent, while MG is still consistent. Hence, if the difference between the 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 the PMG technique.

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 estimated on the whole sample of countries are shown in Table 5, column 1. It can be seen that the coefficient on the GDP is positive, while the coefficient on the GDP² is negative. Both are significant, at 1%. This implies that the relationship between GDP and inequality is inverse U-shaped; when GDP is low, its growth is associated with raising inequality, but after some threshold, inequality starts to decline with growth. The threshold is 10,888 USD per capita, which is close to the 75th percentile of the GDP per capita in the sample (see Table A2 in the Data Appendix). Hence, it seems that the typical Kuznets curve is in general present in the ex-socialist countries, but kicks in rather late.

The results obtained from the whole sample, however, are averages for all the included countries

and may blur certain differences between the individual countries. For this reason, we next estimate the same regression for countries with high and low values for the characteristics that we focus on - labour regulation, control of market power, social benefits and taxes. The classification of high and low is from Table 2.

Columns 2 and 3 in Table 5 show the results for countries with low and high labour regulation. For countries with low labour regulation, there is a Kuznets curve - inequality increases with GDP growth in the beginning, but starts to decrease after GDP per capita reaches 18,056 USD. Obviously, the threshold is high, and for most of the observations the relationship is positive, i.e. growth raises inequality most of the time. For countries with high labour regulation, on the other hand, there is an inverse Kuznets curve - the coefficient on GDP is negative, while the coefficient on GDP is positive, meaning that GDP growth is associated with a decline in inequality initially, and increase eventually. The turning point, however, is very high, 422,506 USD, meaning that in fact inequality falls with growth all the time. Hence, we do find evidence that labour regulation shapes the relationship between GDP and Gini.

Columns 4 and 5 show the results for countries with low and high effectiveness of anti-monopoly policy. There is a Kuznets curve for both groups of countries - GDP is positive and GDP^2 is negative for both of them. However, the threshold after which inequality starts to decline with GDP growth is very high for countries with ineffective monopoly control - 34,897 USD, higher than the highest observation for the GDP per capita, meaning that for these countries, growth is always associated with increase in inequality. The threshold for countries with effective monopoly control, on the other hand, is rather low, 3,361 USD, which means that for these countries, increase in GDP is associated with a decline in inequality most of the time. Thus, anti monopoly control seems to be important for the GDP-Gini relationship, too.

Columns 6 and 7 show the results for countries with low and high social benefits. There seems to be a Kuznets curve in both of them and the turning point is similar for the two groups - around 11,000 USD. Therefore, the generosity of the social transfers does not seem to be important for the shape of the GDP-Gini relationship.

Columns 8 and 9 show the results for countries with low and high taxes. Again, there seems to exist a Kuznets curve in both of them, but the threshold after which inequality starts to fall with GDP growth is lower for countries with high taxes (10,478 vs. 14,880 USD). Hence, high taxes seem to be important for the Kuznets curve.

TABLE 5 - RESULTS FROM SEPARATE REGRESSIONS

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|-------------------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| Countries | All | Low | High | Ineffective | Effective | Low | High | Low | High |
| | Regulation | Labour | Labour | Monopoly | Monopoly | Social | Social | Taxes | Taxes |
| | Regulation | Regulation | Control | Control | Control | Benefits | Benefits | Benefits | Benefits |
| <i>Long-run coefficients</i> | | | | | | | | | |
| GDP | 254.5*** (33.4) | 320.3*** (28.95) | -24.26* (13.80) | 206.0*** (79.40) | 48.74** (23.59) | 207.6*** (44.50) | 506.2*** (30.05) | 131.8*** (35.71) | 264.4*** (40.47) |
| GDP2 | -13.7*** (1.79) | -16.34*** (1.602) | 0.936 (0.752) | -9.847** (4.526) | -3.001** (1.282) | -11.17*** (2.381) | -27.06*** (1.633) | -6.858*** (1.949) | -14.28*** (2.165) |
| <i>Short-run coefficients</i> | | | | | | | | | |
| ec | -0.203*** (0.0476) | -0.148** (0.0696) | -0.295*** (0.0686) | -0.154** (0.0707) | -0.232*** (0.0418) | -0.223*** (0.0405) | -0.244*** (0.0773) | -0.214*** (0.0334) | -0.290*** (0.111) |
| GDP | 50.86 (65.44) | 59.30 (128.5) | 55.49 (98.42) | 31.55 (113.6) | 141.7 (91.42) | -10.13 (28.32) | 233.0 (155.7) | -76.04 (74.50) | 138.0 (131.5) |
| GDP2 | -2.86 (3.565) | -3.414 (7.049) | -3.037 (5.320) | -2.298 (6.343) | -7.584 (4.874) | 0.459 (1.697) | -12.83 (8.524) | 4.433 (4.218) | -7.673 (7.065) |
| Constant | -231.3*** (54.93) | -223.7** (105.4) | 54.16*** (12.01) | -153.9** (71.56) | -35.32*** (6.517) | -203.6*** (37.33) | -567.7*** (179.7) | -125.1*** (19.78) | -342.9*** (132.2) |
| Obs. | 523 | 219 | 242 | 220 | 241 | 234 | 232 | 233 | 233 |
| Turning point (USD) | 10,888 | 18,056 | 422,506 | 34,897 | 3,361 | 10,817 | 11,551 | 14,880 | 10,478 |

The short-run coefficients are averages for the 26 countries.

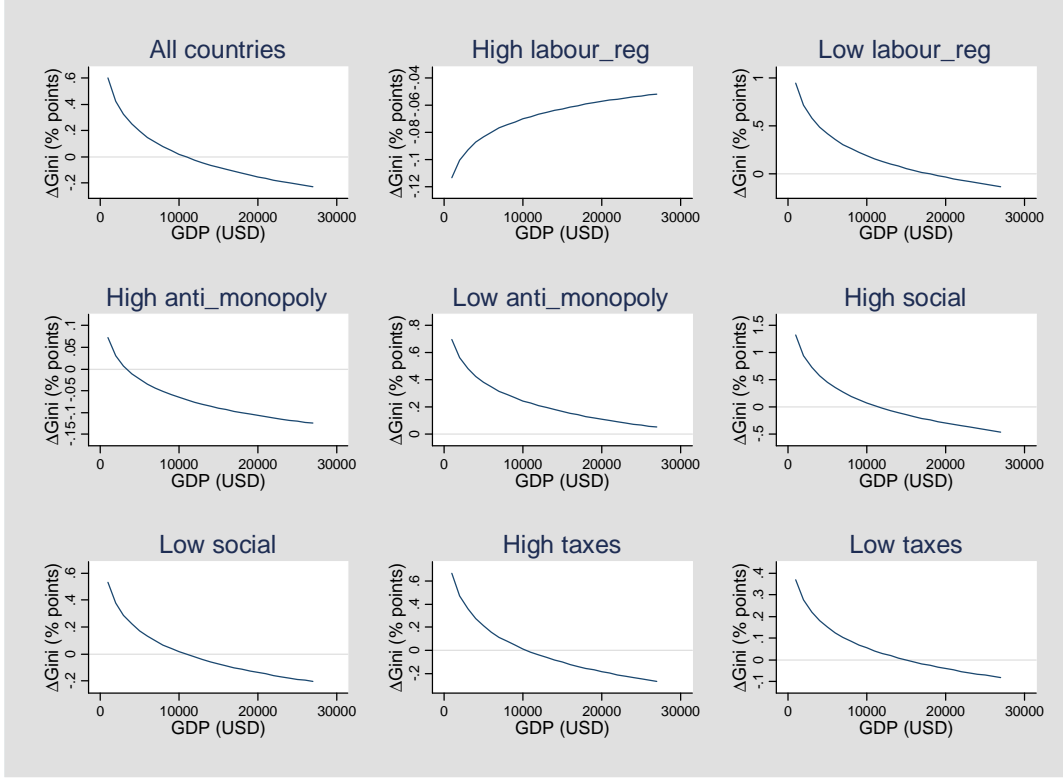
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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 (i.e. the first derivative of the curve). This is shown on Figure VII. These are the semi-elasticities of Gini to changes in GDP from the regressions shown in Table 5, at GDP levels from the sample of analysis, i.e. between 1,000 and 27,000 USD. The title above each graph indicates the sample of countries to which the regression refers.

If one looks at the top left panel, which plots the semi-elasticity obtained from the whole sample of countries, one can see that at GDP around 1,000 USD, the semi-elasticity of Gini to changes in GDP is approximately 0.6, which means that if GDP increases by 1 percent (i.e. from 1,000 to 1,010 USD), this would be associated with an increase in Gini by 0.6 percentage points. When GDP becomes 20,000 USD, the semi-elasticity becomes -0.2, meaning that increase in GDP from 20,000 to 20,200 USD would be associated by a fall in Gini by 0.2 percentage points.

The differences in the relationship between GDP growth and Gini between different countries are evident on the graphs, too. In countries with high labour regulation the relationship is always negative, while in countries with low labour regulation it is positive most of the time. In countries with effective control of monopolies, the effect is negative most of the time, whereas in countries with ineffective control of monopolies the effect is always positive. Despite the similar turning point for countries with high and low social benefits (which is the point when the semi-elasticity line intersects the zero line of the vertical axis), there are notable differences here, too. Countries with higher social benefits have higher sensitivity of Gini to changes in GDP, in absolute terms. At GDP of 1,000 USD, the semi-elasticity for countries with high benefits is around 1.2, while for countries with low benefits it is 0.5. At GDP of 27,000 USD, the semi-elasticity for the former is -0.5, while for the latter, it is -0.2. Finally, for the taxes, it can be seen that, despite the similar shape of the curves, the turning point is much lower for countries with high taxes than for countries with low taxes, meaning that for the former, GDP growth decreases inequality most of the time, whereas for the latter GDP increases inequality most of the time.

FIGURE VII: EFFECTS OF CHANGE IN GDP ON GINI FROM DIFFERENT SPECIFICATIONS



The analysis presented so far does not allow to say whether the effect of taxes is more important than the effect of social benefits, for instance, because countries that have higher taxes would also tend to have higher social benefits. In order to compare the effects of the different factors, we next estimate equation (1) on the whole sample, controlling for all the characteristics of interest at once, i.e. by including the cross-products of the "high" dummies with the GDP variables. Coefficients on GDP and GDP² would then show the relationship between GDP and Gini for countries with low labour rights, ineffective anti-monopoly policy, low taxes and low social transfers. Coefficients on the cross products would give the difference between this reference type of countries and the countries with high values of the respective characteristic. These results are presented in Table 6. The corresponding sensitivities of Gini to changes in GDP are shown on Figure VIII.

FIGURE VIII: EFFECTS OF CHANGE IN GDP ON GINI FROM THE SPECIFICATION WITH ALL THE CONTROLS

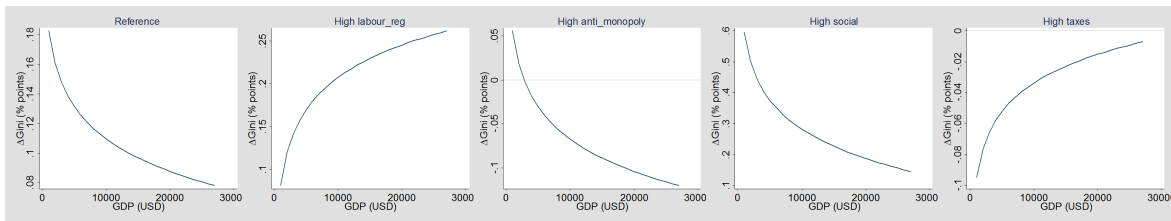


TABLE 6 - RESULTS FROM THE REGRESSION WITH ALL THE CONTROLS

Long-run coefficients

| | |
|--|---------------------|
| GDP | 40.1 (37.79) |
| GDP ² | -1.582 (2.15) |
| GDP*high_labour_reg | -69.74* (40.76) |
| GDP ² *high_labour_reg | 4.317* (2.23) |
| GDP*high_anti_monopoly | 2.379 (44.57) |
| GDP ² *high_anti_monopoly | -1.089 (2.47) |
| GDP*high_social | 113.9*** (33.11) |
| GDP ² *high_social | -5.252*** (1.77) |
| GDP*high_taxes | -67.92** (32.77) |
| GDP ² *high_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 anti monopoly (USD) | 2,847 |
| Turning point high taxes (USD) | 35,309 |
| Turning point high social benefits (USD) | 78,392 |

Short-run coefficients omitted for clarity.

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

These results suggest that for countries with low labour rights, low control of monopolies, low taxes and low social benefits (the reference category), GDP growth is always associated with increasing inequality - the turning point after which GDP growth starts to decline Gini is 319,692 USD, which is very high. This can also be seen on Figure VIII, left panel. The relationship between GDP and Gini is statistically different for countries with high labour regulation, as evidenced by the significant cross products of the GDP and the high labour regulation dummy from Table 6. However, the relationship is always positive even for these countries, as can be seen from the second panel from the left. For countries with effective control of monopolies, GDP growth is associated with a decline in inequality most of the time, as can be seen from the center panel. However, the size of the effect is rather small, and is not statistically different from the reference category, as can be seen from Table 6. In countries with high social benefits, the relationship seems statistically different (Table 6), but it stays positive all the time (second panel from the right on Figure VIII). Finally, in countries with high taxes, Gini declines with GDP growth all the time (right panel on Figure VIII), and this effect seems to be statistically different from the reference category. Therefore, the results obtained when all the factors are included at the same time, seem to suggest that the most important factor for GDP growth to be associated with declining inequality are the 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 alternative econometric technique to estimate the regression. The results of these estimations are shown in Table 7. 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, i.e. lower labour rights. There is almost no difference between these effects and those presented on 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 monopolies turns negative after approximately 4,000 USD, while the effect for countries with high taxes is negative all the time.

FIGURE IX: EFFECTS WHEN ALTERNATIVE LABOUR REGULATION VARIABLE IS USED

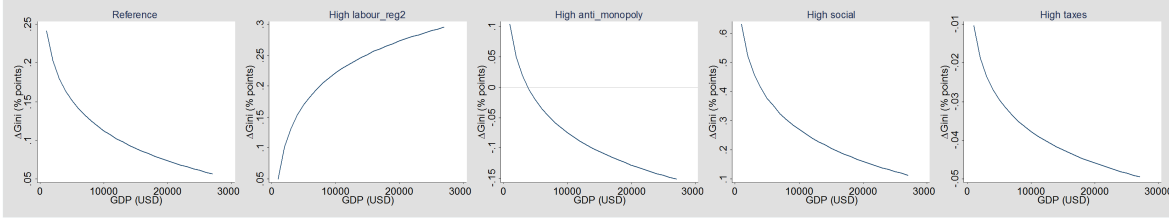


FIGURE X: EFFECTS WHEN ALTERNATIVE MARKET POWER VARIABLE IS USED

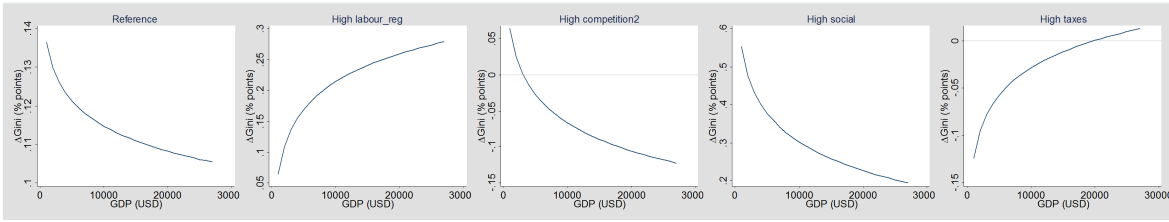


Figure X shows the effects from the specification in which alternative variable for market power is used. Here, we use the intensity of local competition index, from the World Economic Freedom. The index is defined so that a higher value represents higher competition, i.e. lower market power. The effects are similar as previously. In the reference country, countries with high labour regulation and countries with high social benefits, the relationship between GDP and inequality is always positive. In countries with high competition, inequality increases with GDP growth initially, but starts to decline after GDP exceeds approximately 3,000 USD per capita. The effect of taxes is qualitatively similar as before - in countries with high taxes, inequality declines with GDP growth most of the time, more precisely, until GDP reaches approximately 20,000 USD. Then, it starts to increase it, but only marginally.

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.

On figure XII, one can see the effects obtained from a sample that excludes the initial transition years. 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, i.e. may include transfers through distorted prices. To control for

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

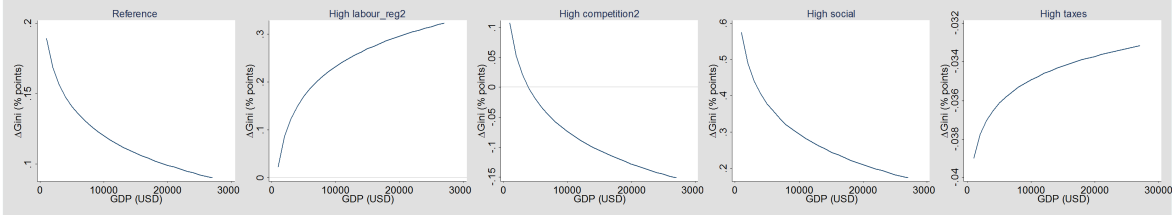
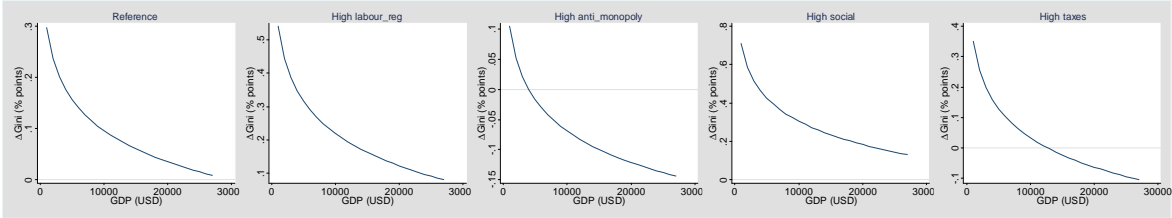


FIGURE XII: EFFECTS WHEN INITIAL TRANSITION YEARS ARE EXCLUDED

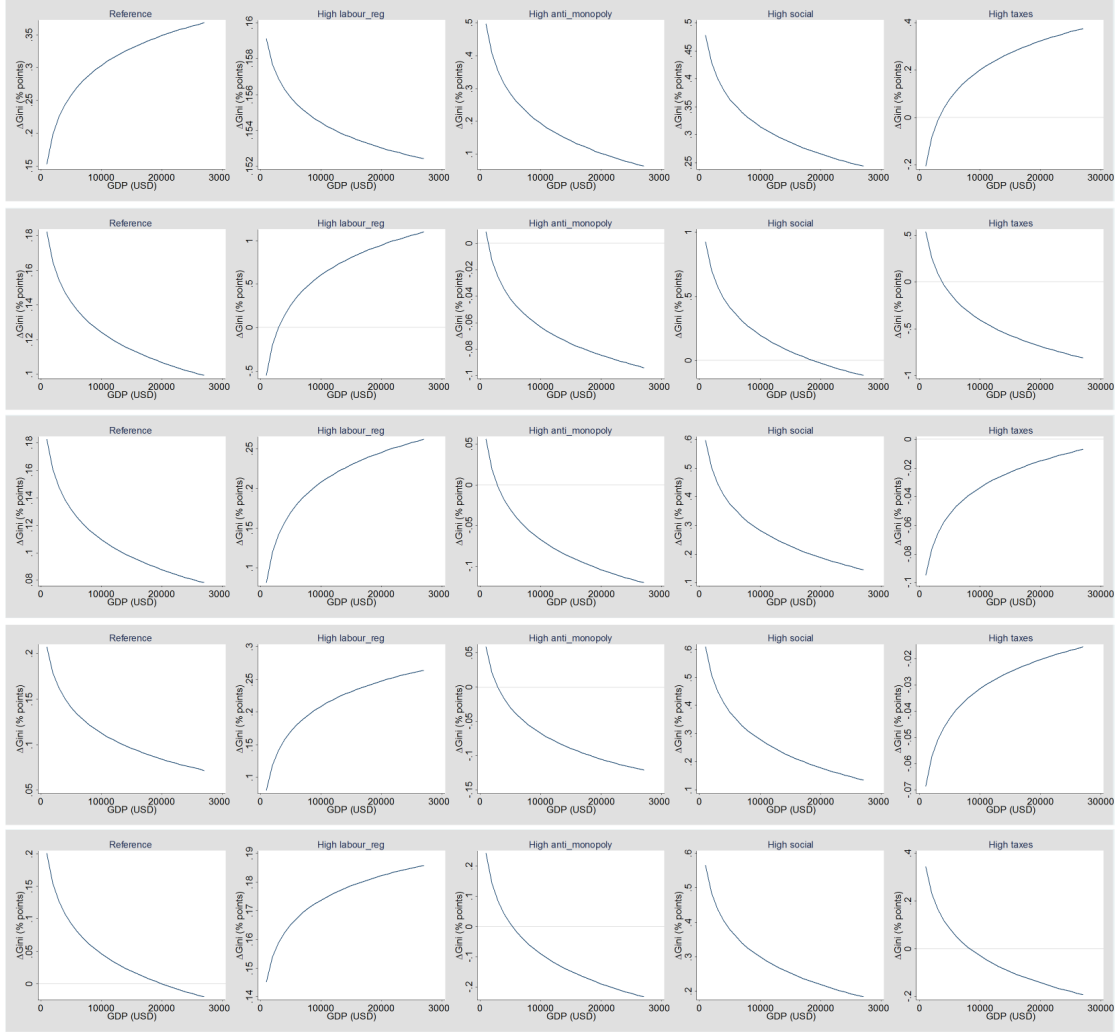


this, we exclude the initial years after the breakdown of the socialist system during which GDP was falling. Results remain largely unchanged. The effect of GDP growth on Gini remains positive all the time for the reference country, for countries with high labour regulation and for countries with high social benefits. For countries with effective control of monopolies, the effect is again positive at low levels of GDP (until 4,000 USD) and negative afterwards. For countries with high taxes, the effect is now positive initially, but becomes negative afterwards, after GDP reaches approximately 12,500 USD, which is below the median of the sample.

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 estimation.⁷ Due to the limited space, we repeat this exercise five times. Figure XIII shows the effects from these estimations. Only in the first replication are the effects different from before - the effect of taxes becomes positive after GDP of approximately 3,000 USD, and the effects of the other variables are positive all the time. Still, in the next four replications, the results are largely same as before - both taxes and anti-monopoly policy are negative most of, if not all the time. Hence, we read the

7. The seed that is used for this in Stata is 2601, the birth date of the author of this paper.

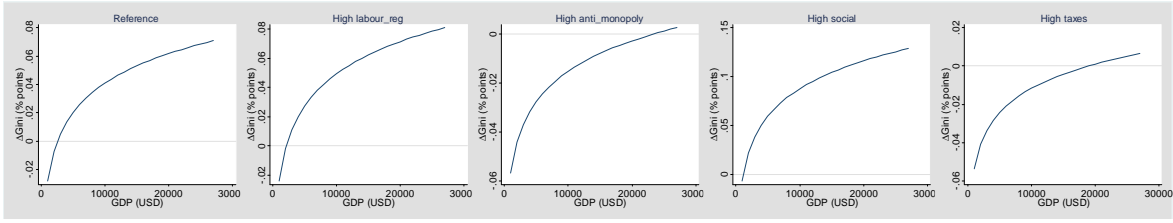
FIGURE XIII: EFFECTS WHEN ONE COUNTRY IS OMITTED RANDOMLY



results of this simulation as an evidence that the findings are not driven by some specific country.

Finally, we evaluate the robustness to the econometric technique. We use the system GMM estimator of Blundell and Bond (1998). It is based on the Generalized Method of Moments, i.e. uses lags of the explanatory variables to instrument the explanatory variables. Although it is not entirely appropriate for our case, because it is designed for small T, big N panels and assumes homogeneity of coefficients across cross sectional units, it is good for robustness check. The effects are shown on Figure XIV. It can be seen that for the reference country and for countries with high labour taxes regulation and high social benefits, GDP growth is associated with a decline in inequality most of the time. On the other hand, in countries with effective control of monopolies and high taxes, inequality declines

FIGURE XIV: RESULTS OBTAINED WITH SYSTEM GMM ESTIMATOR



with GDP growth most of the time. Therefore, we conclude that these results are similar to the previous ones.

TABLE 7 – RESULTS OF THE ROBUSTNESS CHECKS

| | Baseline | Alternative labour | Alternative anti-monopoly | Alternative labour and anti-monop. | Excluding initial years | Randomly excluding country | Randomly excluding country | Randomly excluding country | Randomly excluding country | System | |
|-----------------------------|---------------------|----------------------|---------------------------|------------------------------------|-------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-------------------|----------------------|
| GDP | 40.1 (-37.79) | 62.96 (40.26) | 20.15 (36.56) | 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) | -23.56* (13.67) |
| GDP2 | -1.582 (-2.15) | -2.807 (2.290) | -0.471 (2.102) | -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) | 1.501* (0.823) |
| GDP*high_labour_reg | -69.74* (40.76) | -109.5*** (36.75) | -58.65 (36.61) | -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) | -0.859 (2.235) |
| GDP2*high_labour_reg | 4.317* (2.23) | 6.536*** (1.999) | 3.723* (2.009) | 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) | 0.0925 (0.230) |
| GDP*high_anti_monopoly | 2.379 (44.57) | 0.804 (47.05) | 25.27 (44.50) | 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) | 5.497* (2.953) |
| GDP2*high_anti_monopoly | -1.089 (2.47) | -1.058 (2.603) | -2.354 (2.485) | -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) | -0.604* (0.326) |
| GDP*high_taxes | -67.92** (32.77) | -55.83* (30.35) | -61.10* (32.07) | -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) | 5.647*** (1.914) |
| GDP2*high_taxes | 2.91 (1.80) | 2.215 (1.662) | 2.539 (1.759) | 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) | -0.592*** (0.197) |
| GDP*high_social | 113.9*** (33.11) | 108.8*** (35.23) | 110.0*** (32.30) | 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) | -5.484*** (2.038) |
| GDP2*high_social | -5.252*** (1.77) | -5.053*** (1.896) | -4.954*** (1.737) | -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) | 0.552*** (0.209) |
| I.Gini | | | | | | | | | | | 0.821*** (0.0623) |
| Observations | 430 | 430 | 430 | 430 | 353 | 388 | 409 | 430 | 409 | 409 | 430 |
| T.P. reference | 319,692 | 74,147 | 1.950e+09 | 538,097 | 29,827 | 95.77 | 1.403e+06 | 319,692 | 154,862 | 20,050 | 2,560 |
| T.P. high labour regulation | 0.812 | 0.813 | 0.722 | 0.743 | 0.260 | 0.842 | 0.633 | 0.812 | 0.830 | 1.049 | 0.743 |
| T.P. high anti monopoly | 2,847 | 3,822 | 3,098 | 3,922 | 4,005 | 43,653 | 1,312 | 2,847 | 2,914 | 5,411 | 23,478 |
| T.P. high taxes | 35,309 | 414.2 | 19,916 | 4,300e+12 | 12,716 | 3,224 | 3,688 | 35,309 | 71,138 | 8,371 | 18,932 |
| T.P. high social benefits | 78,392 | 55,581 | 161,970 | 112,941 | 56,678 | 826,788 | 18,673 | 78,392 | 69,835 | 132,663 | 1,180 |

T.P. stands for turning point, in USD. Short-run coefficients omitted for clarity. Standard errors in parentheses. ** p<0.01, * p<0.05, * p<0.1.

VII. DISCUSSION

VII.A. How institutions are shaped?

The results presented so far would suggest that inequality falls with economic growth only in countries which have high taxes, high labour regulation and effective control of market power. These institutions redistribute income from more powerful economic agents to less powerful - from rich to poor, from capitalists to workers, from companies to consumers, so we name them "redistributive". Accordingly, we name low taxes, low transfers, low labour regulation and ineffective control of market power, as "extractive" institutions, because they tend to favour the more powerful agents.

It is worth noting that these institutions go hand-in-hand, i.e. countries that have high taxes are likely to have at the same time high social benefits, high labour rights and effective control of market power. This can be seen from Table 8 below. The first five columns of this table are the same as Table 2, with the difference that what was "HI" in Table 2 is now "red" (acronym for redistributive), while what was "LO" in Table 2 is now "EXT" (acronym for extractive). The final column sums up the previous four columns - if majority of the institutions is extractive or redistributive, the corresponding code is entered here ("EXT" or "red"), followed by the proportion of such institutions. If the share of extractive and redistributive institutions is equal, then the country is considered to have mixed institutions, and dash (-) is entered. It can be seen that just one-third of the countries (9/26) have mixed institutions, while two-thirds have a clear majority of either extractive or redistributive institutions.

What explains these differences between countries? Why do some countries have extractive institutions, and some redistributive? This may be a topic for a research on its own, but we next try to provide some insights. We outline three potential explanations why different ex-socialist countries may have adopted different institutions.

TABLE 8 - TYPES OF INSTITUTIONS BY COUNTRIES

| | Labour regulation | Social | Taxes | Anti monopoly | Summary |
|------------|----------------------|--------|-------|------------------|-----------|
| Albania | red | EXT | EXT | EXT | EXT (3/4) |
| Armenia | EXT | EXT | EXT | EXT | EXT (4/4) |
| Azerbaijan | EXT | EXT | EXT | EXT | EXT (4/4) |
| Belarus | . | red | red | . | red (2/2) |
| Bosnia | EXT | red | red | EXT | - |
| Bulgaria | EXT | red | EXT | EXT | EXT (3/4) |
| Croatia | red | red | red | red | red (4/4) |
| Czech | EXT | red | red | red | red (3/4) |
| Estonia | red | EXT | red | red | red (3/4) |
| Georgia | EXT | EXT | EXT | EXT | EXT (4/4) |
| Hungary | red | red | red | red | red (4/4) |
| Kazakhstan | EXT | EXT | EXT | red | EXT (3/4) |
| Kyrgyz | EXT | . | . | EXT | EXT (2/2) |
| Latvia | red | EXT | EXT | red | - |
| Lithuania | red | EXT | EXT | red | - |
| Macedonia | EXT | red | EXT | EXT | EXT (3/4) |
| Moldova | red | EXT | red | EXT | - |
| Montenegro | EXT | . | . | red | - |
| Poland | red | red | red | red | red (4/4) |
| Romania | red | EXT | EXT | red | - |
| Russia | red | EXT | red | EXT | - |
| Serbia | EXT | red | red | EXT | - |
| Slovakia | EXT | red | EXT | red | - |
| Slovenia | red | red | red | red | red (4/4) |
| Ukraine | red | red | red | EXT | red (3/4) |
| Uzbekistan | . | EXT | EXT | . | EXT (2/2) |

"EXT" stands for extractive institutions, "red" for redistributive, dash (-) for mixed. Dot (.) indicates that there are no data.

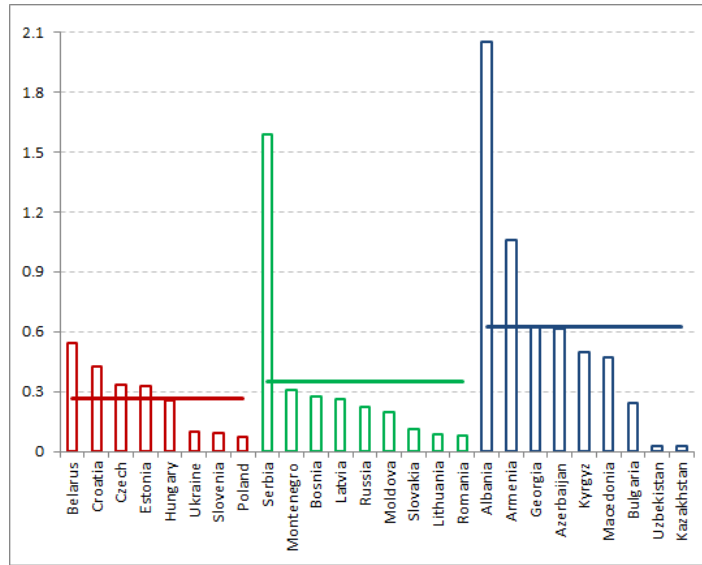
The first possible explanation is related to the discussion of Acemoglu and Robinson (2002), who argued that the Kuznets curve appears when political elites undertake system reforms towards redistribution, under **pressure of political instability and social unrest**. Hence, the factor that explains why some countries adopt redistributive institutions and some do not, according to Acemoglu and Robinson (2002) is the popular pressure. A very rough assessment of this hypothesis, then, would be to compare the number of protests in countries with different types of institutions.

We take data on protests from the Global Data on Events, Location and Tone (GDELT) database. This database collects media stories from nearly every news media in the world, in print, broadcast,

and web formats, in over 100 languages. It then uses language processing algorithms to extract events. As of December 2015, the database has 250 million events, starting from 1979. For more on GDEL, see Leetaru and Schrod (2013).⁸ We take all the protest events in the database between 1990 and 2011 for each of our countries, and divide this by the population of the countries⁹.

Figure XV presents the number of protests per 1000 inhabitants in the 26 analysed countries. The countries are grouped into three groups according to the type of their institutions from Table 8 (extractive, mixed or redistributive). Contrary to the Acemoglu and Robinson (2002) argument, countries with redistributive institutions have on average lower number of protests than countries with mixed institutions, which in turn have fewer protests than countries with extractive institutions. Countries with extractive institutions have actually twice as much protests as countries with redistributive institutions. Hence, instead of driving the institutions, it seems that protest are driven by the institutions, in the sense that people tend to protest more when the institutions are extractive.

FIGURE XV: NUMBER OF PROTESTS DURING 1990-2011 (PER 1000 INHABITANTS)



Countries with redistributive institutions are red (left). Countries with mixed institutions are green (middle). Countries with extractive institutions are blue (right). Bars are data for individual countries, lines are averages for the corresponding group.

8. These data are known to have two main problems. The first is the high number of false positives, i.e. the tendency to overestimate the number of protests, due to its methodology (see Ward et al. 2013). The second one is the exponential growth of events over time, due to the increase in the number of media (see Leetaru and Shrod, 2013). However, none of these problems undermines the suitability of the data for our purpose, because all the countries are likely to be affected by these drawbacks.

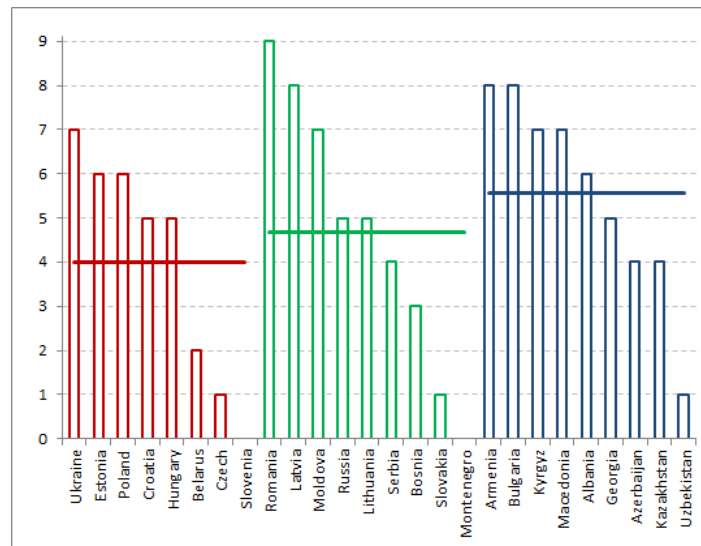
9. The population is from year 2000, the middle of the sample.

The second reason for adopting certain type of institutions may be due to **pressures from international economic organizations**, first and foremost - the International Monetary Fund (IMF). IMF's loans often require that countries adopt certain reforms. The reforms that are usually required ask for flexible labour markets, deregulation, lower taxes, lower public spending etc. (see Rodrik, 2006). These institutions are very similar to what we named extractive institutions. Hence, it may be the case that countries have adopted extractive institutions due to pressures from the IMF. Rough check of this explanation would be to observe the number of IMF arrangements across countries, in order to see if countries with extractive institutions have had higher number of arrangements with the IMF. This is done on Figure XVI. The figure shows the total number of IMF arrangements during the analysed period in the 26 countries. It can be seen that countries with redistributive institutions have indeed had fewer arrangements with the IMF than countries with mixed institutions, which have in turn had fewer arrangements than countries with extractive institutions. Countries with redistributive institutions have had on average 4 arrangements during 1990-2011, while countries with extractive institutions have had on average 5.5 arrangements. Therefore, there is some evidence that countries may adopt extractive institutions due to reforms demanded by the IMF arrangements. One should take these results with a grain of salt, though, because the causality here may also run in the opposite direction - countries with extractive institutions may be more likely to experience crises and call IMF for help.

The third possible explanation for the cross-country differences in the types of institutions is related to the **governance during the socialist years**. Although the 26 countries had similar economic systems during this time, there were notable differences between them in the type of governance - some of the countries had more liberal regimes, some had more oppressive. Consequently, the demand for a replacement of the socialist system was likely different in different countries. Arguably, in countries with more oppressive regimes, the demand for replacement was more pronounced. Consequently, they were better prepared for the transition and managed to do it in a better way, by installing institutions which ensure that the benefits are shared by most of the people. On the other hand, the demand for a change was arguably less pronounced in countries which had more liberal regimes, because of what they were less prepared for the transition. As a result, the transition was not done in a good way, i.e. enabled certain power groups to capture the state, by implementing extractive institutions.

According to this argument, the type of institutions that countries adopted should be correlated with people's opinion about the socialist system. Countries with higher opinion of the socialist times

FIGURE XVI: NUMBER OF IMF ARRANGEMENTS DURING 1990-2011



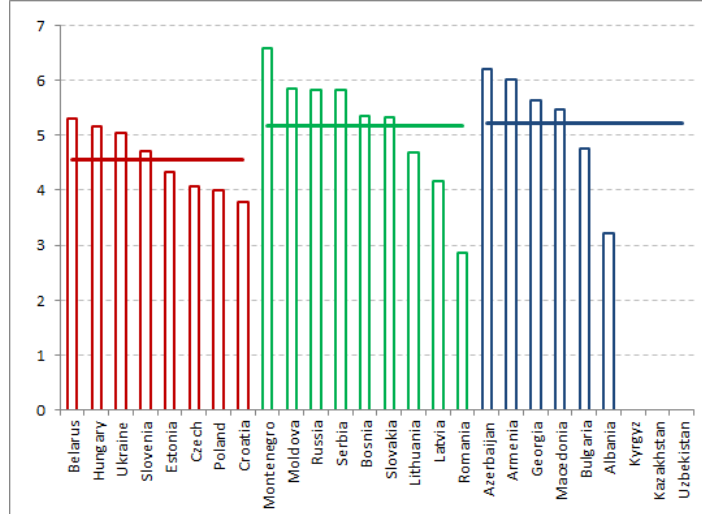
Countries with redistributive institutions are red (left). Countries with mixed institutions are green (middle). Countries with extractive institutions are blue (right). Bars are data for individual countries, lines are averages for the corresponding group.

should be more likely to have extractive institutions, because the demand for a replacement there was likely to be less pronounced. We next check this hypothesis, very roughly, by comparing the opinion about the socialist system between countries with different types of institutions. We measure the opinion about socialism from a question from the World Values Survey. This is a standardized survey, conducted regularly in approximately 90 countries across the globe. In its third wave, conducted between 1995 and 1999, which covered 23 of our 26 countries, there was a question that asked people what is their opinion about the socialist system.¹⁰ The higher the value of the response, the more people thought that socialism was good. Figure XVII shows the average response for 23 countries. It can be seen that countries with redistributive institutions have lower value, meaning that they were less satisfied with socialism - the average for the countries with redistributive institutions is 4.5, while the average for the countries with extractive institutions is 5.2. Hence, there seems to be some support for the hypothesis that the type of institutions is determined by the demand for replacement of the socialist system. Still, one should not take these results for granted, mainly because the opinion about

10. The exact wording of the question is:
 "People have different views about the system for governing this country. Here is a scale for rating how well things are going: 1 means very bad and 10 means very good. Where on this scale would you put the political system as it was in previous regime?"

the socialist times is measured after the collapse of the socialist system.

FIGURE XVII: OPINION ABOUT SOCIALISM



Countries with redistributive institutions are red (left). Countries with mixed institutions are green (middle). Countries with extractive institutions are blue (right). Bars are data for individual countries, lines are averages for the corresponding group.

To summarize this part, we find some evidence that the type of institutions that countries adopted after the collapse of socialism is related to the IMF arrangements and the opinion about the socialist system. However, these findings should be read only as correlations that provide a fertile ground for a more rigorous research in the future.

VII.B. 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, i.e. implying that growth affects inequality, but rather as an association, i.e. saying that the relationship between GDP and inequality is inverted U-shaped.

VIII. CONCLUSION

One of the most prevailing questions in economics is 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 - economic growth eventually benefits everyone, thanks to the internal workings of the capitalist system. Or, in other words, the relationship between income and inequality is inverted U-shaped - inequality initially increases with economic growth, but eventually declines. This is the well-known Kuznets hypothesis.

This paper has re-assessed this hypothesis, looking at the experiences of the ex-socialist countries from Eastern Europe after the collapse of the socialist system. Differently from the existing literature, it has not assumed that the relationship between economic growth and changes in inequality is homogeneous, but has instead analysed the factors that shape this relationship. Four factors have been assessed - control of market power, labour rights, taxes and social benefits. Findings suggest that inequality declines over the course of economic growth only in countries with high taxes, high labour rights and effective control of market power (with taxes being the single most important factor). In other words, growth lifts all boats only in countries which have redistributive institutions, not extractive. Therefore, in order to make sure that economic growth in the capitalist system benefits majority, not just the few, governments should establish these redistributive institutions.

How are these institutions adopted? Why have some ex-socialist countries adopted these institutions, and some not? This paper has outlined three potential explanations for this - that this was due to popular pressure, that this was because of pressure from international financial organizations and that this was due to different experiences with the socialist system. We have found some support for the latter two explanations. Or, perhaps better - we have found some evidence that the latter two explanations deserve more careful examination. With income inequality on the top of economic agendas, economists, both from academia and from the policy world, should be curious to see more research on this issue.

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X. 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 |

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

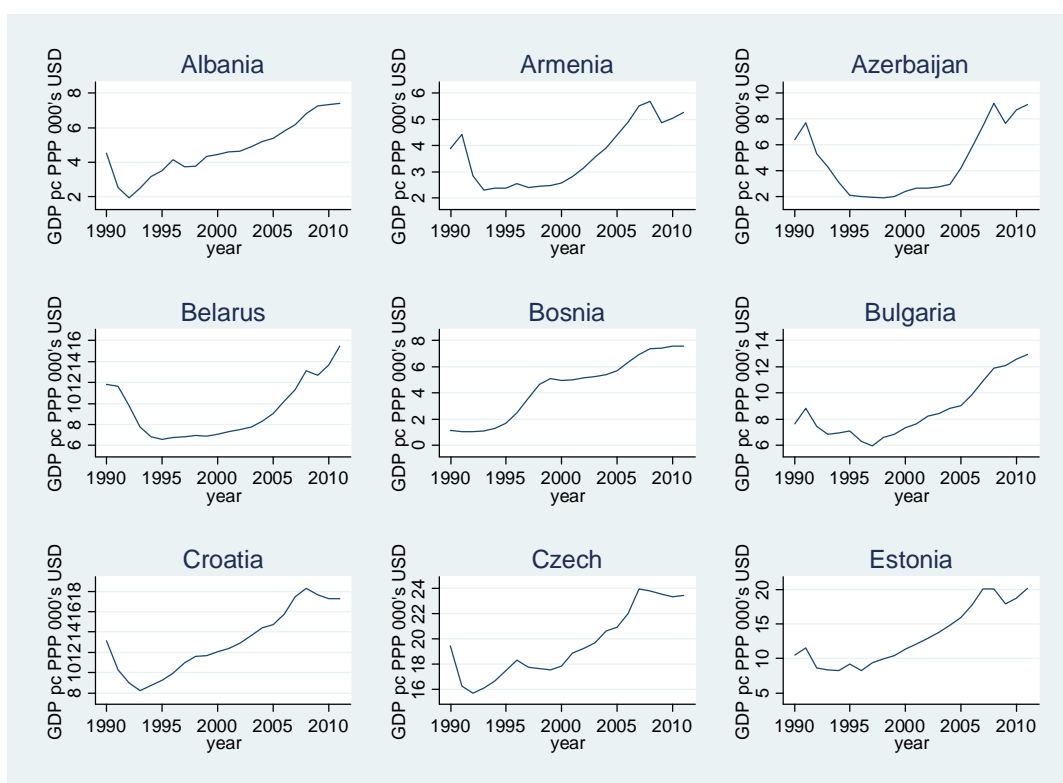


FIGURE XIX: PLOT OF THE GDP PER CAPITA VARIABLE (2)

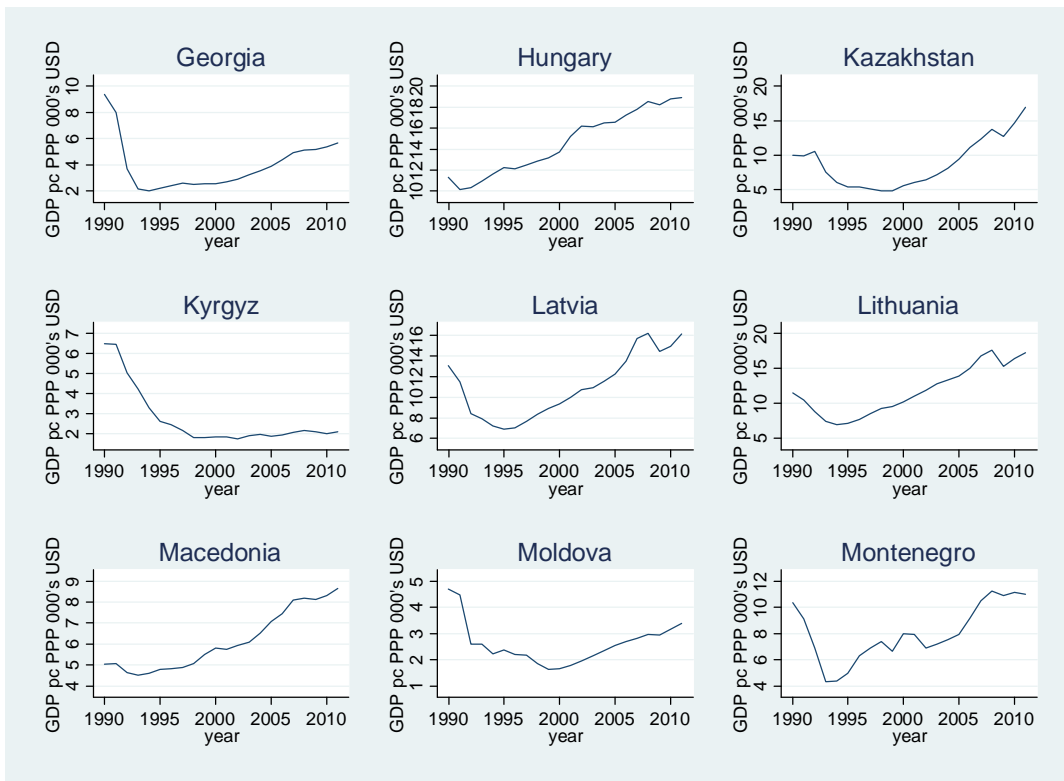


FIGURE XX: PLOT OF THE GDP PER CAPITA VARIABLE (3)

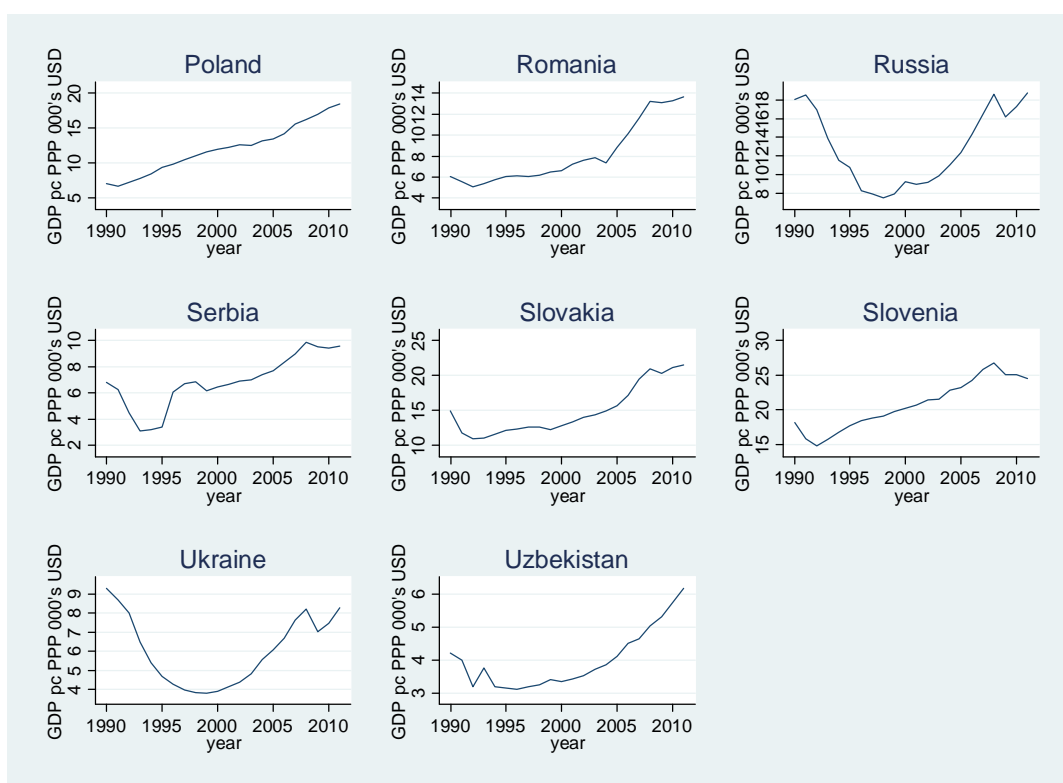


FIGURE XXI: PLOT OF THE MARKET GINI VARIABLE (1)

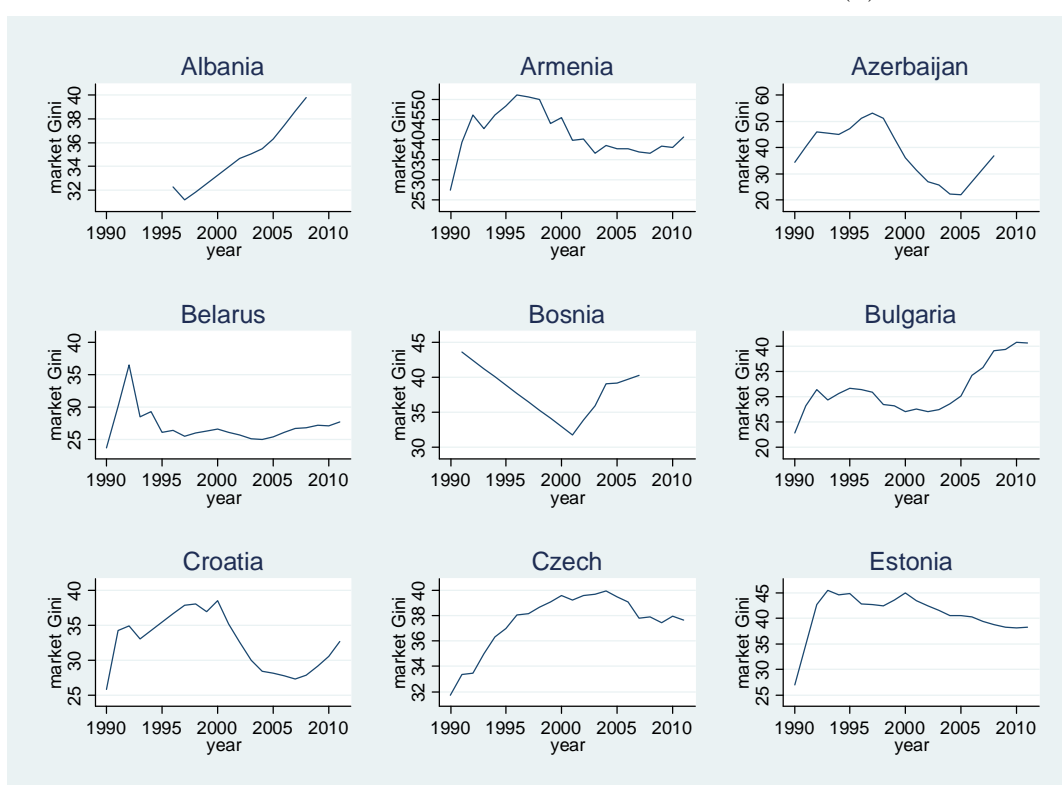


FIGURE XXII: PLOT OF THE MARKET GINI VARIABLE (2)

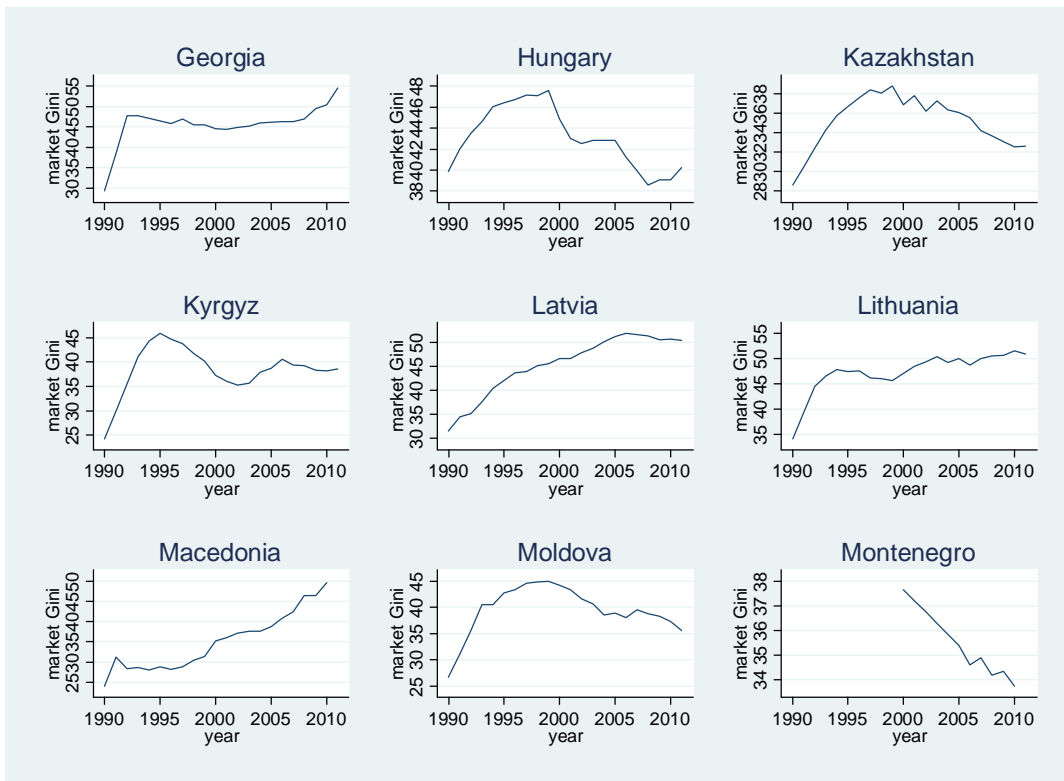


FIGURE XXIII: PLOT OF THE MARKET GINI VARIABLE (3)

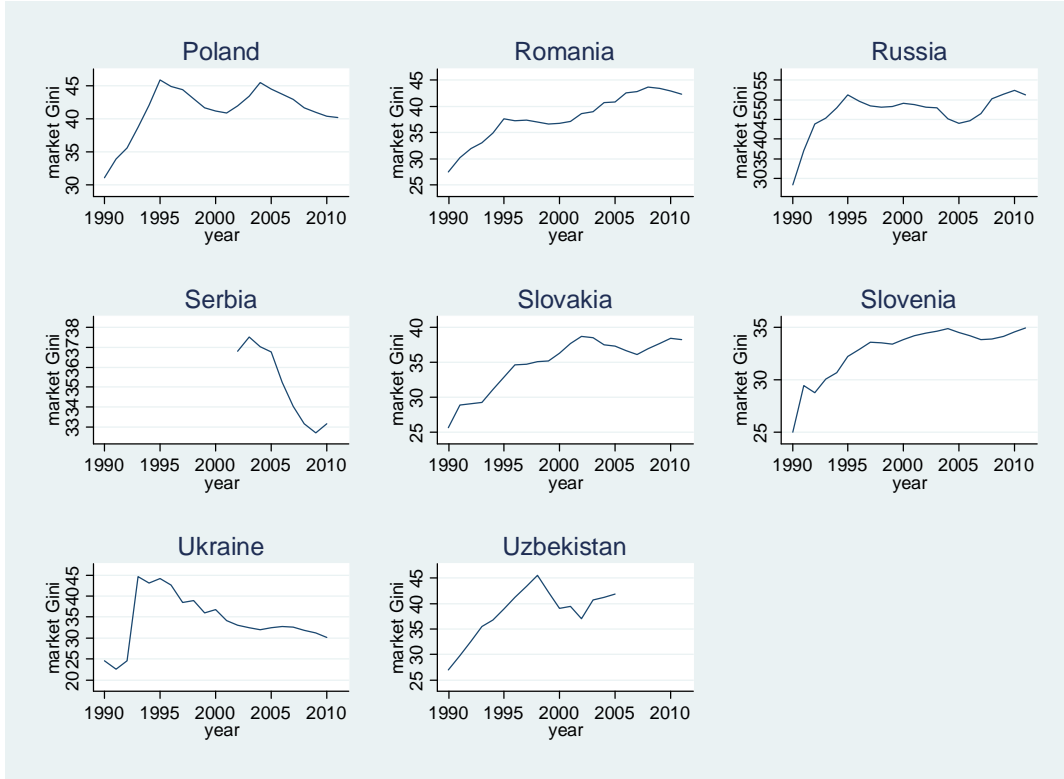


TABLE A2 - DESCRIPTIVE STATISTICS OF VARIABLES (WHOLE SAMPLE)

| | GDP | Gini | Labour regulation | Anti monopoly | 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 |

TABLE A3 - DESCRIPTIVE STATISTICS BY COUNTRIES

| | GDP (min) | GDP (max) | Gini (min) | Gini (max) | Labour (aver) | Monopoly (aver) | Social (aver) | Taxes (aver) | Labour2 (aver) | Monopoly2 (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 | . |