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The Political Kuznets Curve for Russia: Income Inequality, Rent Seeking Regional Elites and Empirical Determinants of Protests during 2011/2012

von

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The Political Kuznets Curve for Russia: Income Inequality, Rent Seeking Regional Elites and Empirical Determinants of Protests during 2011/2012

Harald Hagemann and Vadim Kufenko *

Abstract

The goal of this paper is to apply the theory of the political Kuznets curve to Russia and reveal the key determinants of the probability of recent protests during 2011-2012 in the Russian regions. We apply the political Kuznets curve in the time and spatial dimensions, and find mixed evidence: throughout time, we observe an almost linear and positive relation between income and income distribution, whereas in the spatial dimension there exists an evidence of a concave curve. Empirical investigation of the role of income inequality using the latent variable framework allows us to outmanoeuvre certain measurement issues and state that conventional measures of income inequality, such as the Gini coefficient, may not be able to predict protests. Instead, we use the relation of the governors' family income to the average family income in the region, a proxy for rent-seeking of regional elites, which turns out to be a positive, significant and robust determinant of the protests. Applying additional controls ensures the robustness of the results and highlights the fact that democracy score and the economic factors are also significant. Mapping the distribution of the protests provides information on the clustering effect.

Keywords: political Kuznets curve, regional analysis, protests, logit, income inequality

JEL classification: R11, C25, D63, D72

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1. Introduction

Empirical research of the determinants of economic growth at the regional level is an extremely fruitful topic, especially if we consider papers related to regional growth in Russia. Needless to say, after a gradual improvement in methodology and approaches some of these papers have become interesting examples of empirics at the regional level: Drobyshevsky et al (2005) offer a detailed insight into the dynamics of economic growth and convergence among Russian regions using a cross-sectional approach with dynamic elements; Ledyaeva and Linden (2008), Savin and Winker (2012) and Kufenko (2012) provide an application of a dynamic panel data approach with a different set up to investigate the dynamics of growth and convergence; Berkowitz and DeJong (2003 and 2005) analyze the impact of policies on regional growth and the role of entrepreneurship; Koritzky (2010) examines the role of human capital and education on growth; Kholodilin et al (2009) and Lugovoy et al (2007) put emphasis on the issues of convergence among Russian regions – one of the cornerstones of income inequalities and disparities; Lavrovsky et al (2010) highlight the role of spatial aspects; Libman (2012) investigates the impact of democracy and bureaucracy on regional growth. Considering the related literature, we would like to note that economic growth itself represents a fruitful ground for further research; however, one should not underestimate the role of income inequalities and thus distributional aspects. An interesting item in this case would be Gluschenko (2010), because it incorporates various approaches to empirics of growth and income inequalities, coupled with the examination of inter-regional disparities. A recent contribution by Remington (2011) sheds light on the distributional reforms in Russia and investigates political sources of income inequality.

From the above-mentioned literature it is clear that the observed increase in gross regional product in Russia is dramatic. The question of the determinants of growth can be nowadays partially answered: federal and regional policies, physical and human capital, introduction of new technologies, institutions and historical or geographical background and other factors contribute to economic growth with different elasticity coefficients. The important question of growth empirics is the magnitude of these coefficients. Keeping this in mind, one can ask the following questions: if income grows, how is it distributed? Who benefits, or, do all benefit equally? Does economic growth lead to convergence or divergence among regions? These questions can be answered partly by analysis of economic convergence, but a detailed answer would require more specific data on income inequality and distribution. In addition, one

would require a different theoretical framework and establish a reasonable link between growth and income distribution.

One of the first attempts to postulate an interaction between income growth and inequality can be found in Kuznets (1955). Since then empirical and theoretical aspects of this interaction has been a subject to debates[1]. The idea that income growth has a dynamic concave relation to income inequality – first, income growth triggers an increase in income inequality via production factor shift among sectors during industrialization, then, on the later stages of industrialization, the inequality will diminish and thus income growth will have an opposite effect on the inequality – was picked up by Acemoglu and Robinson (2002), who introduced a new element to it: the Median Voter Theorem (henceforth: MVT). This resulted into a successful merger of political science and growth theory, providing a new politically intuitive reasoning to the Kuznets curve.

The main goal of our paper is to discuss the theoretical and empirical implications of the political Kuznets curve for Russia. Having considered the Kuznets curve on a macroeconomic scale, we will proceed to investigating the determinants of the recent protest which took place in Russia during 2011-2012. We will thus try to find out whether the MVT-explained Kuznets curve holds for the given countries and whether income inequality is a significant and robust determinant of the recent protest. The latter question will be answered with the help of logistic regressions ensuring plausible results by including a broad range of control variables.

The paper is organized as follows: in the first theoretical section 2 we will discuss the implications of the MVT-based Kuznets curves for the given set of countries and reformulate the income – income inequality scenarios, stated in Acemoglu and Robinson (2002). We will discuss the role of the revolution constraint and accumulation. In the subsequent section 3 we will focus on Russia and briefly examine convergence and income inequalities at the regional level. Then a data description will follow in section 4. Section 5 will focus on the empirical analysis of the determinants of the recent protest: we will test the role of income inequality proxies in predicting the probability of protests. In the concluding section 6 we will present the results of our findings.

[1] For a more detailed discussion of the relation between social conflicts, income distribution and growth in frames of modern economic growth theory, see section 7.4 in Erber and Hagemann (2002)

2. Theoretical background: economic growth and income distribution

The Kuznets curve provides a solid ground for the theoretical aspects of our research. In order to understand how the given theory evolved, we have to consider the original formulation of the given theoretical relation. Kuznets (1955) was one of the first prominent economists to postulate the complicated relation of economic growth and income inequality. Noting the importance of distribution of income and savings, he related the changes in income inequality to the shifts of the industrial structure of income, the latter being a consequence of industrialization and economic growth.

One might be shocked by the intuitive and nevertheless detailed explanation of the relation between income and income inequality, which Simon Kuznets offered already in 1955 and based on fragmented historical data from the UK, the US and Germany and an illustrative numerical model. Let us stepwise review the original reasoning for the Kuznets curve.

First of all, Kuznets (1955) refers to national income, the closest proxy to it is in fact gross national product (GNP) or, potentially, gross domestic product (GDP). He also refers to secular levels of income (income distribution), which can be represented by different income inequality measures, including but not limited to the Gini coefficient and similar indices. Kuznets highlights that an impulse of industrialization leads to urbanisation and shifts of production from agricultural sector to other industries. According to Kuznets (1955), the initial increase of income inequality is accounted for an increase of income of urban population relative to the income of rural population. On the later phases of industrialization, the growing urban population will strive to equilibrate the inequalities which would result into a decrease of disparities on a national scale. The narrowing of income inequalities as in Kuznets (1955) depends on the number of political and institutional factors: savings accumulation of the rich is subject to distributional reforms, democratization increases the role of low-income population groups, migration from rural areas to cities enables rural workers to work in industries with higher income. The increase of income inequalities due to structural changes in the economy is quite clear; however, a consequent process of narrowing of inequalities is conditional on at least several institutional factors. The original formulation for the levelling mechanism, which could hypothetically decrease the income inequality over time, lacks details. Nevertheless, it offered room for new suggestions including a deeper consideration of political factors, which could narrow the above-mentioned inequalities.

In order to understand how the Kuznets curve evolved from an economic concept to a more politically-flavoured theory, we have to focus on the MVT and its implications. One of the first economists who started working on the topic of political competition was Harold Hotelling. Exploiting the homogeneity of political parties, Hotelling (1929) applies a game-theoretic approach and finds striking similarities between competition in businesses and politics: in both cases, producers or political parties try to attract the majority of customers or voters, which explains the observed standardisation of products and political programmes. In order to perceive their goal, political parties focus on the interests of a representative voter – a voter, which represents the majority of voters. Black (1948) coins the term "median optimum", related to the decision-making process, which completes Hotelling's (1929) concept and allows us to identify the representative voter as a median voter. Downs (1957) can be considered as the most complete formulation of the MVT in its modern understanding. The key implications of the theoretical postulates of Downs (1957) can be described as follows: political decisions impact income sources and, thus, income distribution; normal distribution of voters is essential for stability of the state, whereas polarization increases the risks of radical changes; multimodal distribution of voters and political pluralism (multiparty system) are preferable. These key assumptions have formed solid grounds to further integration of MVT and its elements into the Kuznets curve. If we recall, the original formulation of the relation between income and income distribution did not account for politics of the decision-making process in regard to income distribution.

Keeping in mind that, in general, MVT is related to political aspects of optimal taxation and distribution between at least two different income groups (usually, the rich and the poor), one has to admit that the scope of this concept is impressive. First of all, the MVT can be applied to study democratic processes and political competition as in Congleton (2002). It is also widely applied as a theoretical ground for examining taxation and provision of private goods as in Cornes and Sandler (1996, p. 489-499) or Luelfesmann (2007). In addition, MVT implications are often used in economic growth research: McGuire and Olson (1996) state that in autocracies an optimal distribution is hard to achieve due to misuse of power; Alesina and Rodrik (1994) have shown that high levels of inequality are associated with lower economic growth. Even though the MVT has its roots in the political competition of the Democratic and Republican parties in the US, it can also be used as a platform for research of non-democratic processes and non-democratic regimes, e.g. autocracies: Acemoglu and

Robinson (2006, Chpt. 5) is focused on applying the MVT apparatus to formulate a revolution constraint based on income ratios of the rich and the poor, whereas Klick (2001) in his thesis discusses the usage of MVT under autocratic conditions. One has to note that modelling non-democratic processes, especially political processes under non-tyrannical autocracies as in Boix and Svolik (2013), requires a more sophisticated game-theoretic approach than the standard MVT equations. Since we have briefly mentioned the revolution constraint, Bolle and Sahli (2007) is another example of research on autocratic regimes: the authors focus on impatience[2] of the people and state that the performance and survival of the regime are subject to this impatience. Some researchers criticize the basic elements of the MVT: e.g. Scervini (2010) argues that the role of the middle class in redistributive decision-making is fading away. It is also important to note, that MVT assumes a certain degree of political pluralism and competition, progressive tax rates and differentiated transfers (as well as different types of public goods) are also crucial for the given concept as in Rowley and Schneider (2003, pp. 176-178). One has to note that the political Kuznets curve, which will be discussed further, treats MVT as a necessary element only for one scenario. Therefore, the rejection of the MVT simply means that the concave scenario cannot be applied, leaving the room for example, for an autocratic disaster scenario.

Let us consider the political Kuznets curve with an integrated MVT element as in Acemoglu and Robinson (2002 and 2006, Chpts. 4 - 5). In Acemoglu and Robinson (2002), the authors present a model of inequality dynamics, where the decisive role is given to physical and human capital accumulation. We will refrain from a detailed presentation of the well-established model; however, we will highlight the set up, key equations and implications – the latter are crucial for the empirical part of our research.

First of all, Acemoglu and Robinson (2002) establish a two-player (the rich elite and the poor) multi-period game with generations and bequests to demonstrate accumulation of capital (human capital is considered to be a major asset). In the first period, the bequest decision regarding human capital are made and bequests are received, in the second period the elite decides whether they share the political franchise with the poor or not, in the third period the poor decide whether to revolt or not, the fourth period denotes a new phase of bequest decisions and human capital accumulation. In fact, one can see this game as a line of cycles based on power-sharing and distribution through time. There are three cases of accumulation

[2] In case of Bolle and Sahli (2007, p. 15) impatience involves inter-temporal reallocation of income between long-run growth and short-run redistribution benefits; however, one can expand this definition.

equations in Acemoglu and Robinson (2002) which we need to consider explicitly in order to understand the developmental scenarios in regard to the Kuznets curve: when only the rich accumulate, autocracy when both the rich and the poor accumulate, and the democracy with taxation and redistribution. The cases are ordered according to a decreasing income inequality, with the lowest inequality achieved under a democratic system with taxation and redistribution. The crucial role of a democratic regime for the existence of the political Kuznets curve is further emphasized: capital accumulation and an increase of the income of the rich would mean an increase in income inequality; however, if this increase is followed by an optimal taxation and redistribution scheme, introduced by the will of the poor median voters, this would result in catching up of the poor and a decrease of inequalities.

From Acemoglu and Robinson (2002 and 2006) it follows that the relation between growth and distribution is non-linear and would depend on the institutional and political background. Therefore, we refrain from an empirical analysis of the impact of income inequality on growth or vice versa. Many econometric techniques would be biased due to reverse causality and endogeneity. Even if we attempt to treat these issues, we still might not be able to capture the true effect. For the sake of our research, we will take the arguments of Barro (2000, pp. 5 - 7): capital market imperfections; inequality in human capital (inequality in human capital may also lead to limited access to credit), corruption and fraudulent elections and social unrest. Nevertheless, Barro (2000, p. 8) refers to special cases of transition economies and notes that inequality may drive growth since the rich might have a higher propensity to save and thus to invest. Barro (2000, p. 29) finds evidence supporting the existence of the Kuznets curve, noting the fact that the relation between growth and inequality is mixed: poor countries with high inequality exhibit lower growth, whereas rich countries have a positive relation between growth and inequality. This would mean that there exists a certain threshold, after which the effect turns into an opposite direction. For the goals of our work a theoretical link between economic growth and income distribution is sufficient; however, it is not the main focus of the given paper.

Keeping in mind the capital accumulation cases and developmental scenarios, Acemoglu and Robinson (2002, p. 195) formulate the theoretical revolution constraint:

$$\frac{h_t^r}{h_t^p} \leq \frac{\lambda(1-\mu)}{\mu(1-\lambda)} = R_1 \qquad (1)$$

Where $\frac{h_t^r}{h_t^p}$ is the relation of human capital[3] of the rich to the level of the poor; λ is the proportion of the poor agents; $(1-\mu)$ is the fraction of wealth which would be destroyed after the revolution (the cost of a revolution), whereas μ is the fraction of wealth which would remain. If the relation holds there will be no revolution.

From equation (1) it follows that the probability of reaching the constraint R_1 depends on capital inequality between the rich and the poor, respected shares of the population and the costs of a revolution.

So far the revolution constraint involved human capital accumulation of the rich and the poor. This should not always be the case and one can formulate a revolution constraint solely based on income inequality. In Acemoglu and Robinson (2006, pp. 104 - 105)[4] the revolution constraint is given a more intuitive form with the help of payoff functions. One may notice that the constraint below is a recalibrated version of formula (1):

$$R_2 = \frac{(1-\psi)\overline{y}}{1-\delta} > y_p \qquad (2)$$

where the left-hand side is the fraction of the average income, $(1-\psi)\overline{y}$, which would remain after the revolution (the authors reversed the notation in that case, by indicating that $(1-\psi)$ is the remaining fraction after the revolution whereas ψ is the cost of the revolution) divided by the share of the poor $(1-\delta)$ population. In this case, if the relation holds, a revolution will occur. We will denote this revolution constraint as R_2. It is obvious, that $\partial R_2 / \partial \psi < 0$ and $\partial R_2 / \partial \delta > 0$: the rise of costs of a revolution would lead to a decrease in the constraint, whereas the increase of the rich share of the population would lead to an increase in the constraint.

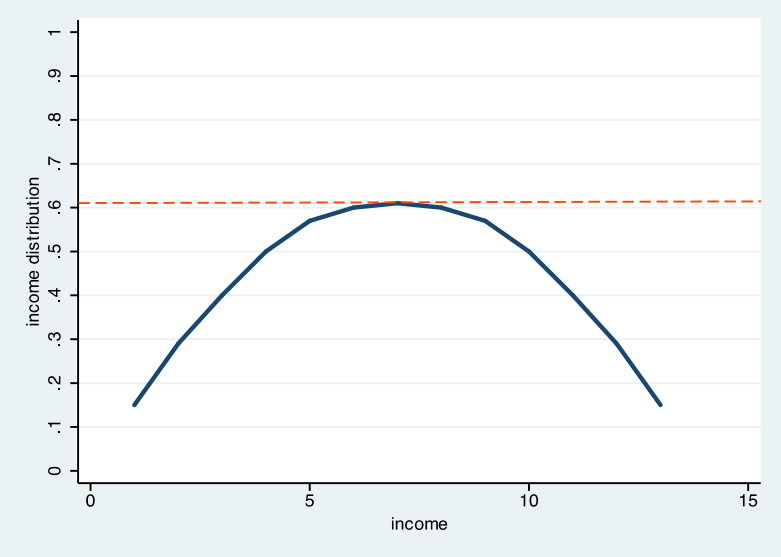
[3] Even though that Acemoglu and Robinson (2002) explicitly mentioned human capital accumulation, the revolution constraints were formed for wealth. In this sense the second constraint is more intuitive, since general payoff functions are used. We assume that the logic of the constraints does no depend on the nature of the capital, which is being accumulated, but rather it depends on the inequality between the rich and the poor. Therefore, the constraint can be applied to human capital inequality as well as to physical capital, income, wealth or other equivalents. In the reality we might face individual multi-dimensional revolution constraints simultaneously guiding the actions of atomistic agents.

[4] In the second constraint, the notations were slightly modified to avoid confusion of certain variables with the first constraint.

Recalling the relation on income growth to income inequality, Acemoglu and Robinson (2002) provide three consequent scenarios, lacking the graphical illustration. We will try to fill this gap with a very trivial numerical simulation using a parabolic function with growth and decay. The values were selected arbitrary and serve only illustrative purposes.

The first case is the Kuznets curve as in Acemoglu and Robinson (2002, p. 196), which has a concave shape, consistent with Kuznets (1955), however, having a completely different background. The revolution constraint at an arbitrary point of 0.61 is marked with a dashed horizontal line.

Graph 1. Kuznets curve scenario



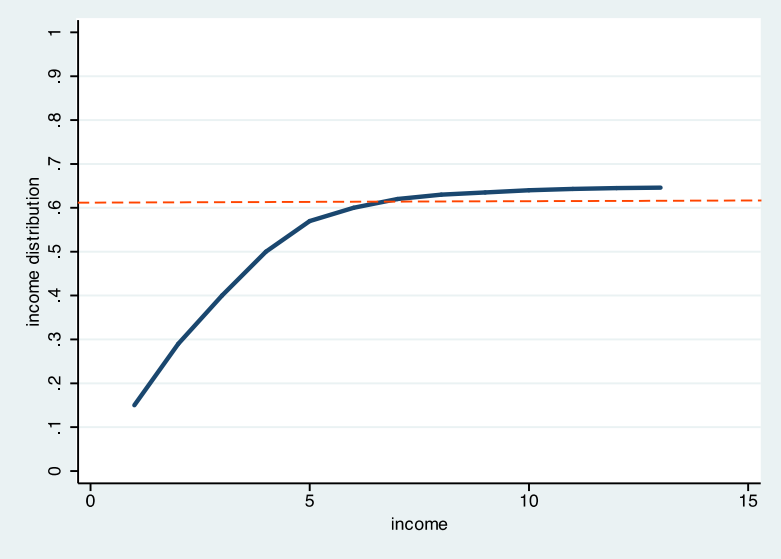
Source: numerical simulation

Let us assume that the rich accumulate and the poor do not: the accumulation of income by the rich will generate increasing income inequality which would inevitably reach the threshold (the revolution constraint)[5]. As in Acemoglu and Robinson (2002, p. 196) after reaching the threshold, the rich would extend the franchise allowing the poor to accumulate capital, which would consequently lead to income convergence and decrease of inequality via taxation and redistribution. One should note that for a such scenario the MVT is essential. However, democratization may not necessarily lead to a decrease in inequality: Remington (2011) notes that most democratic regions in Russia had relatively high levels of inequality. Therefore, addiitonal conditions may apply.

[5] The same holds even if the poor accumulate, however, with a smaller speed than the rich.

In case of an autocratic disaster as in Acemoglu and Robinson (2002, p. 196), only the rich accumulate, or the poor accumulate in extremely small amounts compared to the accumulation of the rich. Even crossing the threshold does not change the income inequality. In our numeric simulation we assume a logistic function, since there would be a natural limit of the growth of income of the rich part of the society, otherwise the poor would face extinction. For this scenario the MVT is not relevant.

Graph 2. Autocratic disaster

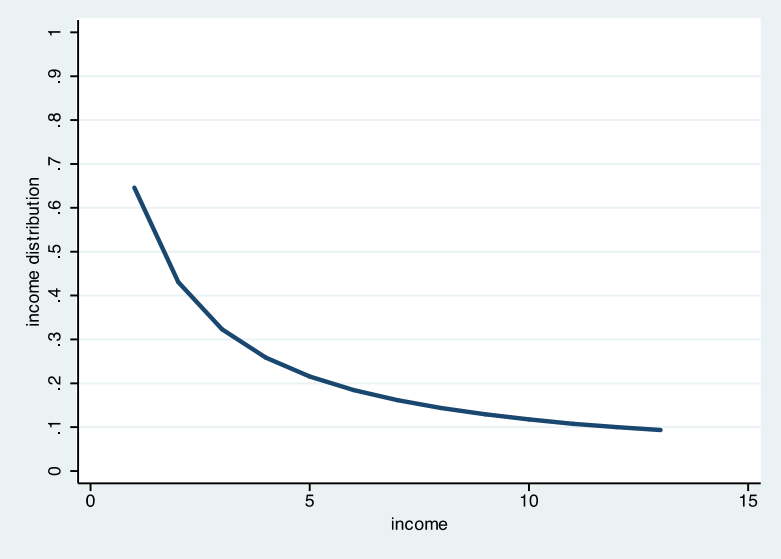


Source: numerical simulation

The above-mentioned scenario raises an important question: in which cases is the revolution constraint binding? In case of an autocratic disaster, as in Acemoglu and Robinson (2002), an extremely low payoff after the revolution as in the constraint R_2, automatically meaning high costs of a revolution, would make the poor ignore the revolution constraint. However, there may be other reasons for this: the informal distribution of income between the rich and the poor. From the first glance we can see that the revolution constraint may be missing important variables, such as different institutional proxies or variables for democracy or repressions. In addition, in Acemoglu and Robinson (2002) the model posesses several drawbacks: the existence of the informal sector is acknowledged; however, the role of informal income is not analyzed; the capital accumulation process is presented in a dynamic way; however, the revolution constraint is clearly an attribute of comparative statics. Once considering the informal sector, we must include informal income and informal distribution in our equations – this would completely change the picture of an autocratic disaster, since the poor may be literally bribed with a share of the informal output to ignore the revolution constraint and the

franchise may be extended in an informal way. Obviously the presence of a large informal sector would provide additional flexibility for the autocratic regime and the related elite. Moreover, creating legitimation and supportive institutions as in Gandhi and Przeworski (2007) may extend the survival of an autocratic system and extend the constraint. One has to note that for this scenario the validity of the MVT is irrelevant, since the constraint is not binding.

Graph 3. East Asian Miracle



Source: numerical simulation

The last case described in Acemoglu and Robinson (2002, p. 197), is the East Asian miracle. This case is denoted by equally shared economic growth at a starting point of relatively high income inequality. Due to certain institutional features, both poor and rich would accumulate with almost equal rates. In this case the revolution constraint is never met, thus revolution, democratization or franchise extension is not a necessary condition for income convergence. Acemoglu and Robinson (2002) relate this case to the examples of Taiwan and South Korea; however, with a lack of details on the institutions, responsible for such convergence. Potentially, one could associate this scenario with informal institutions or traditions, adopted by the given society. Needless to say, this scenario is preferable.

Having considered the theoretical aspects of the political Kuznets curve and the related scenarios, we can now proceed to the stylized facts on Russia in order to apply the given theory. We will be particularly interested to find out which scenarios can be applied to Russia

and whether a revolution constraint and income inequality play a role in the recent political developments in the regions.

3. Stylized facts on income growth and distribution in Russia

The empirical observations on income inequality in the Russian regions deserve specific attention. These facts will guide us to the section of empirical estimation of the role of income inequality in predicting the probability of the recent protests in 2011-2012. We will also explain the recent trends and link them with the findings of other researchers.

One of the first facts to be highlighted is that, according to Remington (2011, pp. 26 - 27), in Russia wages tended to significantly lag behind prices. A large number of state enterprises were strangled in an economic stagnation during the transition period because of rapid changes in the ownership structure in the aftermath of the privatization in 1992 and due to their inability to successfully compete with foreign producers, who gained access to the domestic market via imports. Large Russian state-owned companies often played a role of city-forming enterprises, having a certain burden of social responsibility (see Remington 2011, pp. 40-47). Thus during the first years of transition many workers, who were not fired, have faced a decline in their real wages due to rocketing prices. For example, in 1993 the CPI inflation in Russia was 874.6%, the following 1994 year ended with 307.6% inflation, decreasing in the subsequent periods[6]. Obviously, during such hyperinflation it is extremely complicated to adjust wages and moreover, social security payments, such as pensions or benefits. Remington (2011, p. 26) notes that lagging wages have been a relatively persistent problem, even after the first years of transformation. Another interesting aspect is the informal background of the wage distribution: Clarke (2002, p. 636) notes that the returns to education or experience are low in Russia and that "wage inequalities within industries are greater" than the ones "between industries". In addition, he emphasized a high wage inequality on the firm level. The wage differentiation cannot be solely attributed to labour market aspects, since a large number of informal institutions may distort the relationship of the returns to education, as in Becker (1994), and thus cause substantial disparities in wage distribution. Such differentiation can be also partly explained by the weakness of the Russian labour unions (Remington 2011, p. 70). Naturally, in such an environment inequalities will develop and the gap between the rich and the poor will increase.

[6] Data: Goskomstat

A diminution of labour, which had shortly followed the first reforms, resulted in a large number of workers entering the unemployment pool who had a choice of receiving unemployment benefits during the job search or engage themselves with the shadow economy, which according to Kar and Freitas (2013, p. 12) on average was around 43.8% of the GDP during 1999-2007. It is important to note that even Acemoglu and Robinson (2002) assume that production takes place in the formal sector. In case of Russia, it appears that around 43.8% of the domestic product relates to the informal sector – thus enormous amounts of funds are not taxed and do not enter the redistribution sphere. The presence of a large informal sector distorts the MVT elements of the political Kuznets curve: informal sector impacts the whole chain of redistribution starting with tax collection and ending with state expenditures, for example, on public goods. Once we account for the informal sector by including it into the revolution constraint, the constraint will not only depend on the share of the average formal income and the number of the poor, but also on the share of the average informal income. This would require a new set of conditions to make the constraint binding. Needless to say, the basic idea of the MVT theorem would be violated, unless competing political groups would be defining both formal and informal redistribution. This is extremely important, since this could partly explain the viability of the autocratic disaster: the Gini coefficient on the formal income distribution would be high; however, considering the informal sector and assuming high corruption involvement, the official income distribution may be very different from the distribution of the informal income, making the revolution constraint based on official income inequality, as in equation (1) or (2), irrelevant.

Since we have mentioned the problem of indexation of the redistribution benefits, one should also mention the pension dynamics. It is false to assume that the value of a pension only impacts economic decisions of one layer of the society, the pension recipients. People employed with rational expectations would discount their pensions since they would see this as a part of their future income. In addition, the younger generation may also consider pensions in their decision-making, regarding for example, education. According to Remington (2011, p. 69) the median regional pension in Russia during 2000 – 2006 was more than two times lower than the median wage – a striking fact. Even though the pension was indexed during these years, it had been lower than the median subsistence level. Of course, some regions enjoyed higher pension levels, for example Moscow, where pensions were partly subsidized by the city government. Nevertheless, an abnormally low level of redistribution

benefits has been an issue for Russia for a relatively long period of time, and even the substantial increase in pensions after 2009 did not significantly change the picture.

Another fact which is worth our attention is that in Russia by the beginning of 2013 around 18.9% of families could be attributed to the middle class. This information alone is not valuable; however, around 20% of the Russian middle class are civil servants, policemen (or "*siloviki*" [7]) and other state-employed people[8]. In 2011 the total number of civil servants has reached 1.6million[9] which has almost doubled since the beginning of the transition period. Needless to say, many civil servants are members of the United Russia, the dominant centrist political party. Such composition of the middle class, part of which is obliged to display political loyalty, may significantly distort the MVT, because the voting outcome for a large fraction of the middle class would be already relatively easy to predict. The MVT can also be distorted by the elements of the institutional matrix, e.g. patrimonialism, as in Hedlund (2005). Keeping in mind the particular structure of the middle class in Russia and the large informal sector we may question the validity of the MVT for Russia. Therefore, the political Kuznets curve scenario is unlikely to hold.

One of the most influential determinants of income inequality is the rent-seeking behaviour. As in De Rosa and Iootty (2012, pp. 2-3), Russia is often considered a country experiencing a resource curse phenomenon (also known as the paradox of plenty). The rent-seeking behavour is a integral part of this issue. Russian oligarchs and the regional elite are one of the examples of rent-seeking behaviour. Keeping in mind the crucial role of the oligarchs in the economy, as stated in Guriev and Rachinsky (2005), one should also note that regional elites are also subject to rent-seeking, especially if we keep in mind that during 2005-2011 the regional governors were not elected but rather assigned. Indeed, the share of the Russian bureaucrats is often described to have a negative impact on growth (e.g., Libman 2012) and the rent-seeking behaviour of the regional elites and authorities was only fuelled by the abolishment of the regional elections in 2005. As a result, such behaviour of the regional elites could impact the capital accumulation and income distribution. Moreover, according to Hedlund (2005, p. 15), this rent-seeking behavior is relevant for civil servants and is path-dependent and was historically called "*kormlenie*"[10]. Needless to say, without elections, the MVT element is also

[7] In Russian: state security associates
[8] Data: http://lenta.ru/news/2013/04/04/middle/
[9] Data: Goskomstat
[10] In Russian: feeding or nourishing

absent, and therefore the concave scenario is questionable. This very aspect of income inequality will be further investigated in this paper.

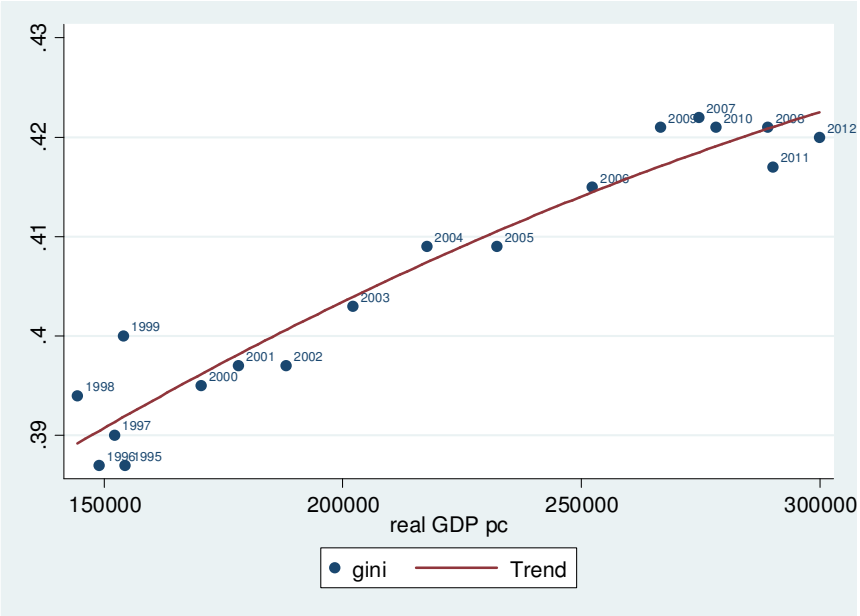
Let us briefly summarize the given stylized facts on Russia: lagging and abnormally differentiated wages; a large informal sector of the economy reaching up to 43.8% of the GDP; distortion of tax collection and redistribution, including provision of public goods and extremely low redistribution benefits; rent-seeking behavior of federal and regional elites. All these factors have contributed to a rise in income inequality in Russia.

Before we try to fit the Kuznets curve to Russia, let us note that in 1988 according to the World Bank, the Gini coefficient for Russia was around 0.238. Since the beginning of the transformation the income inequality had dramatically increased. Let us try to display the Kuznets curve in time for Russia. In order to do so, we had to use aggregated data for Russia from the Goskomstat database combined with the Gini coefficient data also from the Goskomstat. Further we will mainly use the regional Goskomstat data. We will use a quadratic fit, which would reveal the concave curvature, providing it exists.

As we see in Graph 4, the trend is almost linear and there is no curvature and thus, the Kuznets curve scenario cannot be validated during this time period. In fact, the empirical observations point at the autocratic disaster if we recall Graph 2, or at the left half of the Kuznets curve, as in Graph 1; however, what if we consider a spatial version of the Kuznets curve and try to make a snapshot for Russian regions for a given year?

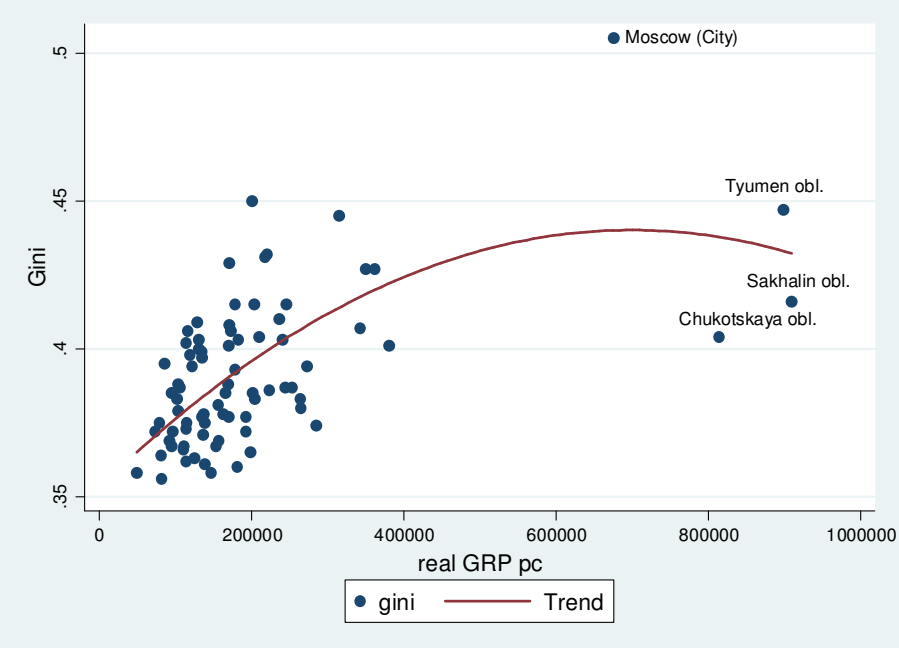
Applying a quadratic fit in this case yields interesting results. With Moscow city having the highest Gini coefficient of 0.505, the curve reaches its peak. Tyumen, Sakhalin and Chukotskaya oblast add the curvature: extremely rich regions with a low population density have higher Gross Regional Product (GRP) values and enjoy a relatively lower income inequality. We should highlight the fact that in the spatial dimension one could speculate on the existence of a concave relation between income and income inequality; however, if we exclude the Tyumen, the Sakhalin and the Chukotskaya oblast, the fit would be linear for the remaining regions.

Graph 4. Income inequality and income: Russia (1995 - 2012)



Data: Goskomstat

Graph 5. Spatial Kuznets curve for the Russian regions (2010)

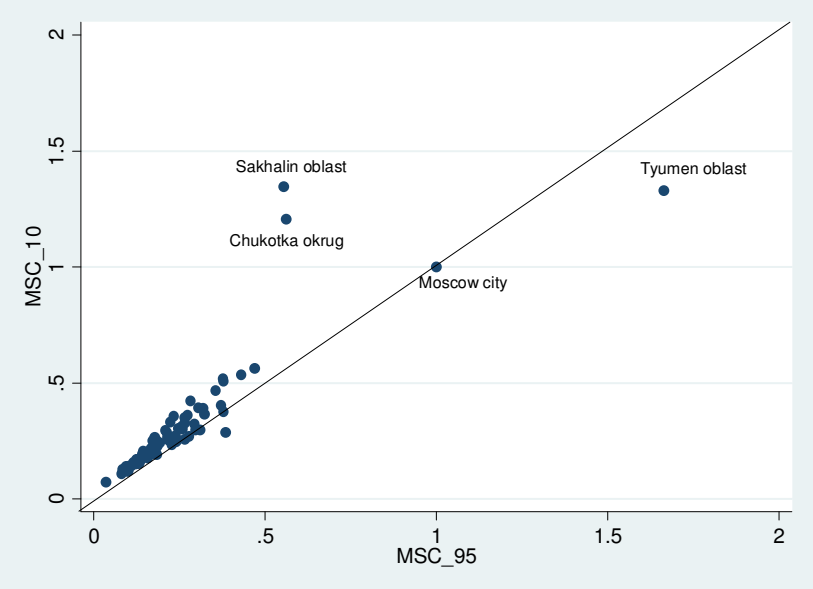


Data: Goskomstat

Another fact on income is a very weak catching up to Moscow. We find it necessary to investigate whether regions are converging to the real GRP per capita level of Moscow, one

of the richest regions. Graph 6 has an additional useful tool displayed: the 45° line which marks constant growth in relation to Moscow's GRP. If the region finds itself exactly on the line, this would mean that the share of the given region's GRP per capita did not significantly change from 1995 to 2010. On the contrary, if the region is below the benchmark line, it became worse off, comparing to Moscow.

Graph 6. Catching up to Moscow



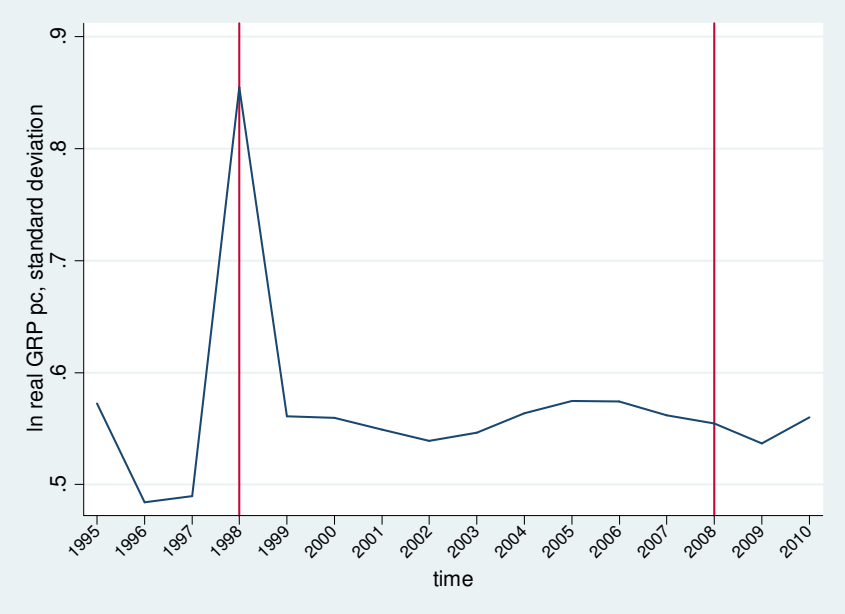
Data: Goskomstat

The most successful regions find themselves above the benchmark line. The evidence of convergence to Moscow is vague: most of the regions are on or marginally above the reference line comparing to Moscow, which hints at the absence of catching up to the level of Moscow. It appears that most of the regions have a real GRP per capita lower than 50% of the Moscow level. However, the majority of the regions follow the richest one, rather than lag behind.

Additionally, the sigma-convergence among regions does not exist: the standard deviation of GRP per capita does not decrease over time. On Graph 7 we see a sharp jump in standard deviation in 1998 which would mean a non-uniform influence of the 1998 crisis on the GRP, or in other words, some regions were affected more than others, causing sharp contrasts; however, in 2008 we observe a decrease in standard deviation, suggesting that the impact of the 2008 financial turmoil was relatively uniform for the regions.

Obviously, inequalities in Russia tend to grow and regional disparities are still dramatic. Therefore it is hard to assign a developmental scenario for Russia. Operating with the terms as in Acemoglu and Robinson (2002, p. 196), we could speculate that Russia is on the left half of the political Kuznets curve and moving towards a constraint, or simply experiences an autocratic disaster.

Graph 7. Dynamic regional income variation



Data: Goskomstat

4. Data

Let us start with describing the dataset and providing a brief description of the variables involved in Table 1. In order to correctly interpret the estimation one should first consider the nature of the data. We have included most of the regions, keeping in mind two autonomous districts within the Tyumen oblast; however, the data on governor's family income for the Karelia republic and the Murmansk Oblast was not available. The Chechnya Republic was also excluded due to the lack of data. Regarding the description of the variables, most of which have an intuitive intrepretation, one should focus on several details in order to understand the coefficients obtained in Table 2. Firstly, the variable "*protest*" takes a binary form of 1 (for multiple protests in the regional capital and at least one other location with strictly more than 300 participants) or 0 (if otherwise). This benchmark definition is introduced to minimize the number of false or exaggerated reports and cut off disorganized spontaneous events. Increasing the benchmark up to 500 participants does not impact the

results; however, in future we will refine the protest data set and provide robustness analysis for further absolute and relative benchmarks. Most of the information of protests were gathered on the official news portals such as: RBC, INTERFAX, RIA, Rosbalt, Kommersant, Lenta.

Table 1. Data for the logistic regressions

Variable	Obs	Mean	Std. Dev.	Min	Max	Description
protest	79	0.3375	0.4758404	0	1	1 if multiple protest in the regions during 2011-2012 with >300 participants; 0 otherwise
gov_income	77	50.8	282	0.9	2270	Income of the regional governor's family, 2010, millions of roubles^, rounded up from the income declarations
ln_gov_income	77	15.52832	1.249073	13.71015	21.54234	Logarithm of the income of the regional governor's family, 2011
gini_100	79	39.18481	2.565605	35.6	50.5	Gini coefficient * 100
avg_income	79	393 251.4	144 227.2	186 576	1 057 224	Average annual family income, 2010, roubles
ln(gov_income/ agv_income)	77	2.702399	1.248641	1.237599	8.725481	Ratio
democ	79	29.01266	6.28489	17	45	Carnegie Center democracy index for the Russian regions, 2000-2004 average
crisis_100	79	4.17484	11.66174	-29.45185	30.74398	Real GRP change after the crisis in 2008 * 100
ln_distmsc	79	7.065677	1.505416	0	9.382275	Spatial distance to Moscow, logarithm of kilometres

Data: Goskomstat, Carnegie Center, Vedomosti.ru, news sources, matrix of distances by Abramov (1965)

^ The income of the regional governor's family is rounded up to millions in the table for presentation purposes. In the estimations full values were used.

The information obtained from the federal and regional news networks suggests that the protests, as identified in terms of our approach, during 2011-2012 took place in: the Ivanovo oblast, the Moskovskaya oblast, the Tulskaya oblast, Moscow city, the Arkhangelskaya oblast, the Vologodskaya oblast, the Kaliningradskaya oblast, the Pskovskaya oblast, Saint-Petersburg, the Krasnodarskaya oblast, the Astrakhanskaya oblast, the Volgogradskaya oblast, the Rostovskaya oblast, the Bashkortastan, the Tatarstan, the Udmurt republics, the Permskiy

krai, the Nizhegorodskaya oblast, the Samarskaya oblast, the Sverdlovskaya oblast, the Tyumen oblast, the Chelyabinskaya oblast, the Altaiskiy krai, the Irkutskaya oblast, the Novosibirskaya oblast, the Tomskaya oblast, the Primorskaya oblast. In fact around 34% of the regions were to a certain extent involved in protests and most of the protests occurred in the time frame between December 2011 and December 2012. Secondly, one should note that the income of the regional governors is derived from the tax declarations (available on the websites of regional administrations) and from the Vedomosti.ru database[11]. This value represents the total nominal family income of the governor, namely the income of the governor and his wife. The reason is trivial: let us take the income of Vladimir Gruzdev, the governor of the Tula oblast, for the year 2010: in this year he earned 444.6 millions of roubles (or 10.029 millions of euros); however, the family income in 2010 was significantly higher: 2 268.4 millions of roubles (56.24 millions of euros). A similar situation is observed in the Primorskiy kray where Sergey Dar'kin earned 3.5 million of roubles (or 87 thousands of euoros) in 2010, whereas his wife earned 1 072 millions of roubles (or 26.5 millions of euros). The official exchange rates were taken from the Central Bank of Russia (CBR)[12]. The fact that the wives of Russian governors are occassionally more successful can be explained by the fact that according to the Russian law civil servants are restricted to engage themselves in private business activities. Needless to say, they may be able to outmaneuvre this restriction and delegate such activities to their closest relatives. Thus, the income of the governor alone would not be representative. The rent-seeking behavour is highly persistent in Russia, being a consequence of the resource curse and historical path dependence. Regional governors are perfect examples of it, keeping in mind that in the period 2005 – 2011 the governors were assigned and not elected. Libman et al. (2012, p. 529) have compared Russian governors with "roving bandits". In our models, we also use the relation of the governor's family income to average family income as a proxy for income inequality and social impatience or tension: a Gini coefficient is a distant macroeconomic measure published *post factum* and with a substantial delay, whereas the governor's income is publically available once the related tax declaration is submitted and thus the poor can be informed about the income of the rich. Moreover, the submission deadline of tax declaration is usually on the 1st of April for the last calendar year, e.g. the 1st April 2011 for the calendar year 2010, which makes it a reasonable variable for predicting the protests of 2011-2012. The variable "democ" represents the impact of civil liberties and political rights on predicting the probability of the protests. Another

[11] Data: Vedomosti.ru; http://www.vedomosti.ru/special/incomes-governors.shtml
[12] http://cbr.ru/currency_base/

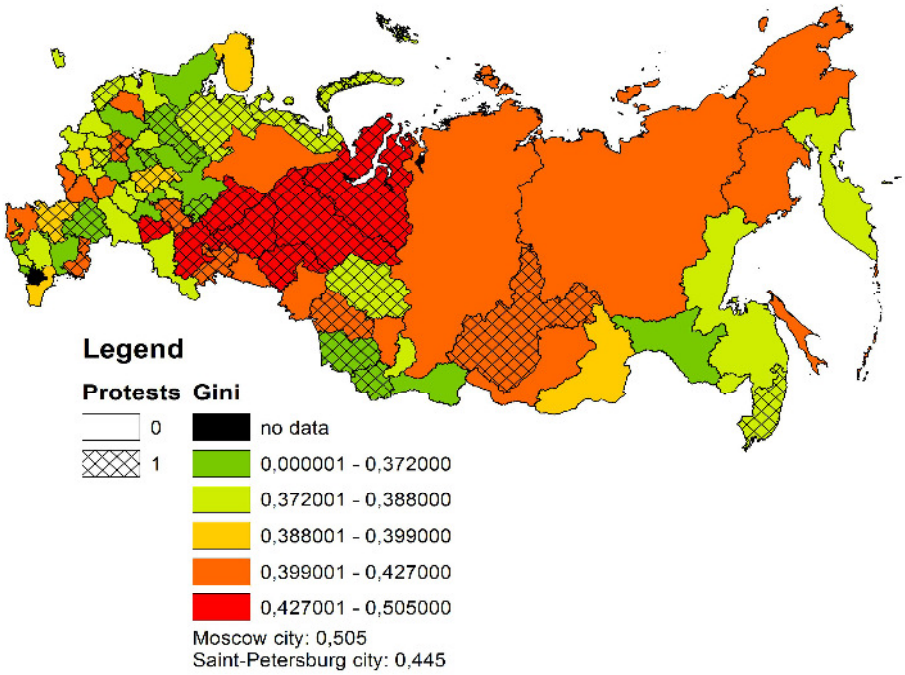
interesting variable is “crisis”, which captures the impact of the recent global financial crisis on the protests: here we take the first growth rate of the real GRP per capita after 2008, when the crisis started. Distance to Moscow is added to investigate the role of the spatial factor. Variables “gini” and “crisis” are multiplied by 100 to simplify the calculation of the marginal effects. The marginal effects as in Wooldridge (2002, p. 465 – 470) are calculated at the means of the explanatory variables. It is crucial to note that marginal effects of variables which were transformed into logarithms would represent elasticities, in other words, for such variables *dy/dx* would represent the percentage change in the probability if the explanatory variable changes by 1%. For other variables *dy/dx* denotes the marginal effect on the probability after a change in the explanatory variable by 1 point.

5. Empirical strategy, analysis of protests and results

Having discussed sharp income and output disparities and main reasons for growing income inequality in Russia, we now have to proceed in our analysis and investigate whether income inequality is responsible for the recent protests during 2011-2012.

At the first glance at the map, which displays the distribution of Gini coefficient and protests in a binary form, one could notice that in most occasions the protests tend to arise in the regions where income inequality is relatively high; however, this conclusion is highly speculative without a robust empirical proof. In order to investigate the impact of the income inequality on the probability of protests, we applied a latent variable approach as in Wooldridge (2002, Chpt. 15, p. 458) and a logit regression based on three models to ensure the robustness of our results. The last model has two specifications: with outliers and without. In addition, we will control for the effects of democracy, economic depression and the spatial factor. The latter would help us to check whether the protests were centralized. From Map 1 it follows that a certain clustering effect of the protests can be observed.

Map 1. Income distribution (2010) and protests (2011-2012)



Data: Goskomstat

The empirical approach which was selected to analyze the role of income inequalities in determining the probability of protests, is derived from the latent variable framework, as in Wooldridge (2002, pp. 458-459):

$$protest = \begin{cases} protest = 1 & if \ \varepsilon > 0 \\ protest = 0 & \varepsilon \le 0 \end{cases} \tag{3}$$

Let us assume that there is a variable ε, signaling that the constraint is reached, which is a result of the following equation $\varepsilon = \frac{(1-\psi)\bar{y}}{1-\delta} - y_p$ if we recall the revolution constraint from Acemoglu and Robinson (2006, pp. 104 - 105). Then if $\varepsilon > 0$, it would mean that the payoff of the poor after the revolution is higher than the income of the poor without the revolution. Therefore, in this case the constraint is binding, whereas if $\varepsilon \le 0$, the payoff after the revolution is lower than the income of the poor without the revolution. The protests are only the "tip of the iceberg", observable consequences of latent processes of capital accumulation

and dynamic income inequalities and they may not necessarily lead to a revolution. A similar approach to protests was mentioned in Manukyan (2011), and Bozzoli and Brück (2011). In the latter case the authors used a multinomial logit to analyse determinants of different grades of participation in the protests in the Ukraine. Empirical works on the recent protests in Russia are scarce. Sobolev (2012, p. 17) uses the opposition reports and the police data to construct an arithmetic average of the amount of protesters. Nevertheless this synthetic variable automatically includes a measurement error: the opposition tends to exaggerate the number of protesters, whereas the police tends to report lower numbers. In addition, in Sobolev (2012), the political Kuznets curve is not considered a theoretical ground of the empirical modeling: income inequality is included in only one of the models and turns to be insignificant in explaining the amount of protesters. We implement a simple binary dependent variable in order to circumvent such empirical issues.

One may criticize the given approach since protests may not be equivalent to a revolution in the terms of Acemoglu and Robinson (2006); however, at the time of protests it is still unclear to which results they will lead. Therefore, considering the latent propensity to revolt, the above-mentioned framework is suitable for analyzing the protests.

We have to make one more note: the protests, which took place in Russia during 2011-2012, were the effect or the manifestation of a certain problem. It is of paramount importance to empirically examine this cause. We disregard spurious protests of unclear nature or mass events like "flash mobs". As in Sobolev (2012, p. 21), one of the causes was the parliament election results. We consider much deeper economic determinants, such as income inequality and the impact of growth or stagnation after the crisis. Thus, we see the protests as an effect mainly driven by an economic cause. Nevertheless, we leave room for institutional and spatial variables in our models.

The first model is designed in order to verify the role of income inequalities in determining the probability of protests:

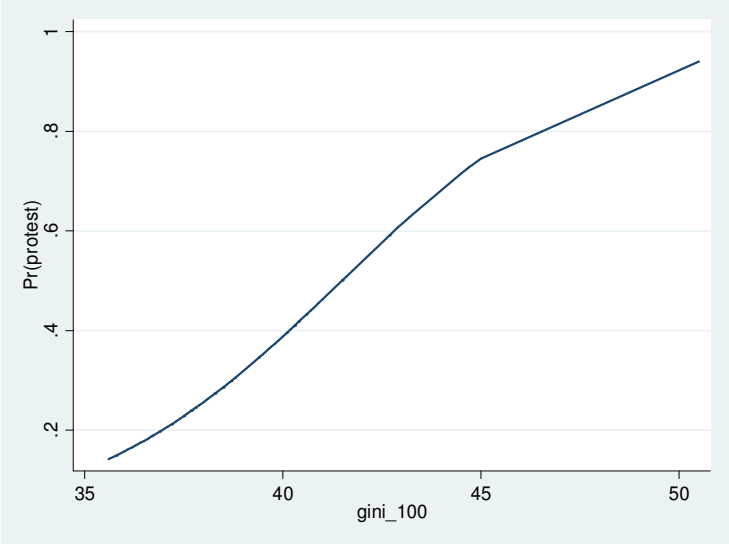
$$protest_i = \beta_0 + \beta_1 gini\_100_i + u_i \qquad (4)$$

where $protest_i$ is a binary variable, $gini\_100_j$ is the Gini coefficient * 100, β -s are coefficients and u_i is the error term.

If we recall equation (3), the latent variable description, we would expect to discover that

higher income inequality corresponds to a higher probability of protests.

Graph 8. Bivariate prediction of protests based on income inequality



Data: Goskomstat

The estimates from model (4) are presented in Table 2. Gini_100 from 2010 turns out to be a significant predictor of protests during 2011-2012. The marginal effect of an one point increase of the Gini-index would result in a 6.76% increase in the probability of protests. The positive relation between the protest risk and income inequality is displayed on Graph 8.

In the bi-variate framework the coefficient on income inequality was significant. Let us now verify the robustness of our results and add another inequality proxy: the governor's family income.

$$protest_i = \beta_0 + \beta_1 gini\_100_i + \beta_2 \ln\_gov\_income_i + u_i \quad (5)$$

where $protest_i$ is a binary variable, $gini\_100_i$ is the Gini coefficient * 100, $\ln\_gov\_income_i$ is the logarithm of the family annual income of the regional governor, β -s are coefficients and u_i is the error term.

The marginal effects presented in Table 2 are of extreme importance. In estimation of equation (5) the significance of the Gini index has lowered and the marginal effect dropped to 6.3%. The marginal effect of the governor's family income is in fact presented as an elasticity coefficient since the variable is used in logarithms: a 1% increase in the governor's family

income would result in a 16.75% rise in the probability of protests. This effect is on the same significance level as the Gini index, but has an almost three times higher magnitude. Let us check the robustness of the latter income inequality proxy.

In order to ensure the robustness of our income inequality proxies, we add more variables to the model:

$$protest_i = \beta_0 + \beta_1 gini\_100_i + \beta_2 \ln\left(\frac{gov\_income_i}{avg\_income_i}\right) + \beta_3 democ_i + \beta_4 crisis\_100_i + \beta_5 \ln\_distmsc_i + \beta_6 urb\_pop_i + u_i \quad (6)$$

where $protest_i$ is a binary variable, $gini\_100_i$ is the Gini coefficient * 100, gov_income_i is the family annual income of the regional governor, avg_income_i is the average family income, $democ_i$ is the Carnegie Center democracy index, $crisis\_100_i$ is the change of the GRP per capita after the crisis of 2008, $\ln\_distmsc_i$ is the logarithm of the distance to Moscow, β -s are coefficients and u_i is the error term.

Specification (6.1) includes outliers and in (6.2) we have excluded Arkhangelsk oblast, Krasnodar krai and Krasnoyarsk krai – these regions had the highest leverage after testing for outliers. Results obtained for model (6) and presented in Table 2 require additional explanations. Firstly, the Gini index loses any statistical significance, which now corresponds to the results in Sobolev (2012).

Even though the results for the Gini index are not robust, one should not conclude that income inequality does not play a role as a determinant of protests: the effect of the governor's family income is significantly higher in the third model. The ratio of income of the elite to the average income allows us to additionally control for the average income in the region. Specification (6.1) suggests that a 1% increase in the ratio of the family annual income of the regional governor to the average family income would result in a rise of the risk of protests by 23.18% - the effect is now significant on all conventional levels, even after including proxies for democracy, economic depression and the spatial factor. After removing the outliers in (6.2) this effect became less significant and increased to 26.82%. Removing the outliers improved the fit of the model as can be seen from the Likelihood ratio test and from the ratios as well.

The effect of democracy in (6.1) is modest; however, sufficient to state a positive relation between democracy score and the risk of protests: a 1 point change in the democracy index

would increase the probability of protests by 3.55%. Without the outliers in (6.2) this effect is less significant, it constitutes 3.501%. One may assume that the Carnegie Center democracy index captures political activity of the population: this would be a logical explanation of the discovered effect.

The impact of the crisis is highly significant in (6.1) and (6.2): a rise in the GRP per capita after the crisis in 2008 by 1% would lower the risk of protests by 3.16%, whereas the drop by 1% would have an opposite effect and would increase the risk by 3.16%. Consequently, in (6.2) the magnitude of this effect is 2.84%. Therefore economic growth or downturn may impact the risk of protests.

This empirical evidence hints at the deep economic nature of the protests. Since the GRP dynamics would highly correlate with unemployment we do not include the latter in our model and use the change of the real GRP per capita as a proxy for economic activity. We can also highlight the clustering effect: the results from Table 2 coincide with the visualization of the protest distribution in Map 1. The distribution of the protests was not centralized, but rather dispersed since the distance to Moscow was not significant. Nevertheless from Map 1 alone we can conclude that the neighboring regions had a greater chance of transmitting protests: spatial distribution of protests hints on a certain clustering effect.

Table 2. Logit estimates of protest determinants (with marginal effects)

VARIABLES	(4) Protest	dy/dx Marginal effects	(5) Protest	dy/dx Marginal effects	(6.1) Protest	dy/dx Marginal effects	(6.2) Protest	dy/dx Marginal effects
gini_100	0.306***	0.0676808***	0.285**	0.0631065**	0.0918	0.0169988	0.0787	0.0061274
	(0.112)	(0.02493)	(0.117)	(0.0259)	(0.163)	(0.03056)	(0.253)	(0.02045)
	2.726	2.72	2.429	2.44	0.564	0.56	0.310	0.3
ln_gov_income			0.755**	0.1675312**				
			(0.305)	(0.06937)				
			2.477	2.41				
ln(gov_income/agv_income)					1.253***	0.2318847***	3.444***	0.2682634*
					(0.443)	(0.08601)	(1.193)	(0.14477)
					2.827	2.7	2.887	1.85
democ					0.192**	0.0355019**	0.451**	0.0350968*
					(0.0859)	(0.01602)	(0.201)	0.01834
					2.232	2.22	2.236	1.91
crisis_100					-0.171***	-0.031648***	-0.365***	-0.0284353**
					(0.0508)	(0.00897)	(0.117)	0.01409
					-3.363	-3.53	-3.108	-2.02
ln_distmsc					0.158	0.0292258	0.669	0.0520854
					(0.285)	(0.0529)	(0.432)	0.038
					0.555	0.55	1.548	1.37
Constant	-12.69***		-23.59***		-14.10**		-36.29**	
	(4.428)		(6.519)		(6.858)		(15.01)	
	-2.865		-3.618		-2.056		-2.418	
Pseudo R2		0.0904		0.1875		0.4816		0.7396
Likelihood ratio		9.18		18.24		48.05		70.01
Observations		79		77		77		74
Outliers						Included		Excluded
Control for urban population						x		x
Likelihood ratio test (6.1) vs (6.2)								0.000

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

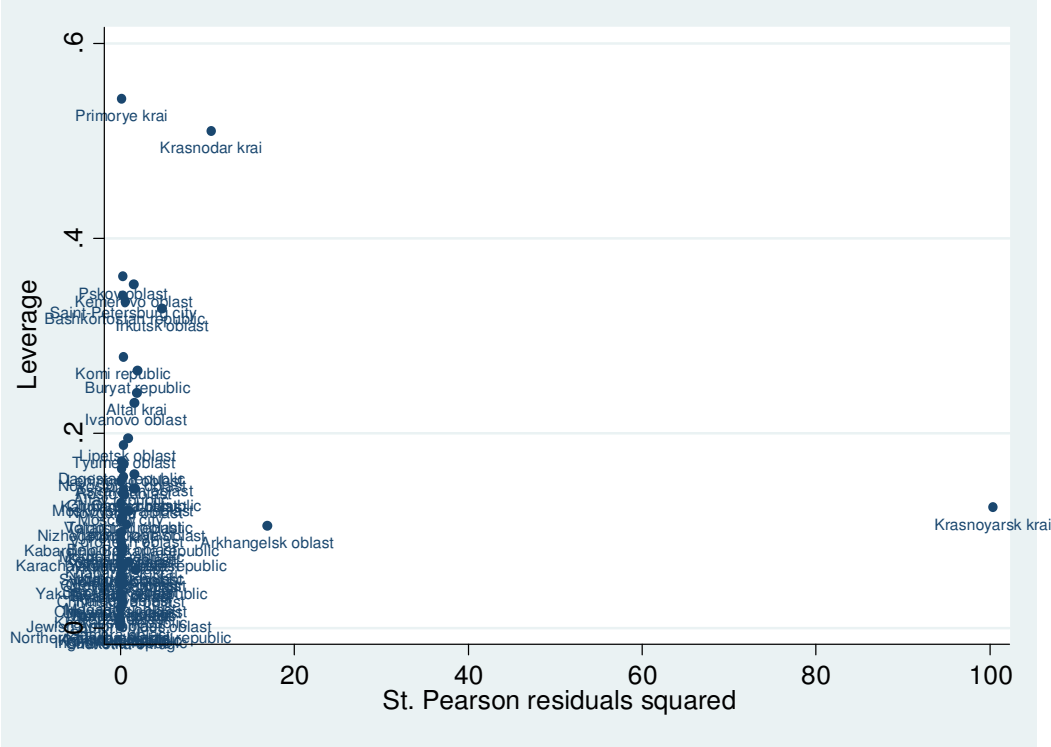
6. Conclusion

Considering the political Kuznets curve, a concave relation between income and income inequality driven by political factors, we pointed out several issues related to the empirics in Russia. The three scenarios, derived from the related literature, the Kuznets curve, the autocratic disaster (for which the MVT is irrelevant) and the Asian miracle, help us to classify the situation in Russia as a left half of the Kuznets curve or autocratic disaster. Regarding Russia, Graph 4 clearly suggests a monotonic positive linear relationship between income and income inequality. Nevertheless, in the spatial dimension we were able to find a mixed evidence of a Kuznets curve. In order to analyze the empirical relation of the recent protests in Russia during 2011-2012 to income inequality proxies, we applied the latent variable framework and a set of logistic models. This approach was selected in order to minimize the measurement error, a potential issue of protest movement measurement as in Sobolev (2012).

We found that income inequality proxies such as the Gini index and the governor's family income and its relation to the average family income in the region, are significantly positive determinants of the risk of the protests; however, only the latter two were robust whereas the Gini coefficient had a fragile effect, which vanished after adding the controls. In model (4) estimations, a 1 point marginal increase in the Gini index would result in a 6.76% increase in the probability of protests. In the extended model (6.1) and (6.2), as in Table 2, the estimates suggest that a 1% increase in the ratio of the governor's family income to average family income in the region would on average increase the risk of protests by 23.18% or by 26.82% without the outliers. The robustness of the latter effect and extremely high income levels of the families of regional governors may signal the presence of the historically established rent-seeking behavior called the "*kormlenie*" phenomenon as in Hedlund (2005, p. 15). We discovered that the effect of democracy on the probability of protests is also significant: a rise of the Carnegie Center democracy index by 1 point would increase the probability of protests by around 3.5% in specifications (6.1) and (6.2). The economic crisis of 2008 also contributed to the development of protests: a drop in GRP per capita after 2008 by 1% would increase the risk of protests by 3.16% or by 2.84% without the outliers in (6.2). This effect confirms the fact that economic growth (or downturn) is of crucial importance in determining the risk of protests. The visualization of spatial distribution of protests in Map 1 allows us to report a certain clustering effect, since mostly neighboring regions had experienced protests and Moscow could not be considered as a main center of protests.

Appendix

Graph A. Outliers for specification 6.1



Data: Goskomstat

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