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## Income Inequality and Oligarchs in Russian Regions: A Note

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# Income Inequality and Oligarchs in Russian Regions: A Note

## Abstract

We trace the rise of the so called oligarchs in post-Soviet Russia and examine their relationship to income distribution in Russia. When Russia moved to a market economy in the 1990s a new business elite evolved. Russia's distinctive path towards market economy, among other factors, gave rise to the oligarchs who now control large parts of the economy and have a strong standing within politics and society. Using a unique regional data set on the locations of oligarchs' businesses across the Russian regions, we test Acemoglu's (2008) proposition that oligarchic societies experience extreme income inequality. Our results show significantly higher levels of income inequality in regions with a higher presence of oligarchs.

JEL-Codes: L220, D430, P250, P310.

Keywords: Russia, oligarchs, entrepreneurship, privatization, inequality.

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## 1. Introduction

When the Soviet Union collapsed in 1990/91, the new political leaders faced a stagnating economy, skyrocketing expenses, petrified political institutions and dismal living standards. When the Yeltsin administration took over power in 1991 they initiated an unprecedented turn to market economy. The immediate and enthusiastic commitment to the performance of such radical change as well as the lack of experience gave rise to a business elite that controls large parts of the Russian economy until today (see e.g. Desai, 2005; Åslund, 1991; Guriev and Rachinsky, 2005). The so called ‘oligarchs’ not only took a dominant position in the Russian economy but soon established ties with political authorities, gaining access to the political sphere as well.<sup>1</sup> The evolving cycle of power and property was of very exclusive nature and enabled the ‘oligarchs’ to effectively impede governmental and market structures that could perform effective re-distribution of the newly generated income and wealth (see e.g. Barnes, 2003; Graham, 1999; Yakovlev, 2006).

One of the most discussed topics is how inequality, economic policy and development are related (Alesina and Perotti, 1993; Kuznets, 1955). Ehrhart (2009) and Galor (2009) present an exhaustive overview of theoretical approaches and empirical evidence on economic growth and inequality, especially in developed economies. Barro (2000) and Perera and Lee (2013) focus more strongly on developing countries. Alderson and Nielsen (2002), Mahler (2004) or Acemoglu (1998) emphasize the effect of economic globalization and technical change on inequality.

Despite a high importance of oligarchs in several developing but also developed countries, there are surprisingly few studies on this issue. Acemoglu (2008 and 2012) present the sole theoretical analysis of oligarchs, growth, and inequality. He derives an inverse U-shaped growth pattern in oligarchic society. Growth accelerates in the first stage of exploitation of available resources, but thereafter the economy stagnates due to low incentives to adapt to new developments. Moreover, Acemoglu shows that inequality will rise to an extreme level in the long run.

Following Acemoglu’s (2008) model, we test the relationship between oligarchs and income inequality in Russia. As of 2003, given a comparably high profitability and efficiency of the

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<sup>1</sup> The relationship of political establishment and business class in Russia in the first decade after the Fall of Communism is well covered in academic literature. On the relation of politics and business in Russia see for example Schröder (1999), Kryshstanovskaya and White (2005), Yakovlev (2006), Orttung (2004) and Sidorov et al. (2000).

oligarchic firms, Russia is likely to be in the early, growing phase that Acemoglu describes in his model. Nevertheless, the oligarchs may have an ambiguous impact on the Russian economy. On the one hand, they are the main counterweight to state bureaucracy. The oligarchs are interested in economic liberalization and development of market institutions, at least to some degree. On the other hand, the oligarchs weaken the economy by tax evasion and capital flights abroad. The phenomenon of oligarchs is closely related to other adverse features including for example corruption and nepotism (Fidrmuc and Gundacker, 2016). Therefore, we test whether Russian oligarchs have a considerable effect on the steeply inclining income inequality figures that could be observed for Russia in the 1990s (World Bank, 2015).

Dominant business elites are often viewed as a factor of inequality in the established literature. Nugent and Robinson (2010) find the relatively higher income inequality in Guatemala to be rooted to massive land grab by the elites in the 1870s. Quantitative research on the effect of business elites on economic inequality, however, is only little represented. Rather, general studies e.g. on the effects of privatization are conducted (Estrin et al., 2009). One of the reasons for such little research on this topic is the lack of data on inequality and ownership structure in different economies. The data on Russian oligarchs employed in this paper is therefore an outstanding starting point for research questions on the Russian case and the study of elites in general. As to our knowledge, no attempt has yet been made to measure the effect of the new Russian business elite on income inequality.

This study therefore contributes to the existing literature in two ways: first, it offers more profound insights via the use of regional data, and second, it examines a possible cause of economic inequality for Russia that has not yet been considered in empirical research: the class of oligarchs.

The paper is organized as follows. In the next section we will review the relationship between oligarchic structures, economic development and especially inequality. In section 3, we examine the Russian transition process to a market economy that facilitated the rise of the ‘oligarchs.’ Section 4 reviews inequality trends in Russian regions. Using a unique regional data set on the location of oligarchs’ businesses in 2003, section 5 estimates the importance of oligarchs and other factors on regional inequality. After a brief discussion of the limitations of the study the last section concludes.

## **2. Oligarchs, Economic Development, and Inequality**

The relationship between oligarchic structures and inequality may be ambiguous. On the one hand, oligarchs use their economic and political power to lower competition, avoid taxation both using legal means as well as by hiding taxes, increase entry barriers, keep wages low and support public policies favoring mainly their interests. All this may result in an inefficient allocation of resources and overall inefficiencies with negative spillovers on the remaining sectors of the economy.

On the other hand, the oligarchs may support entrepreneurial development and growth. They may counterweight autocratic politicians who could otherwise pursue highly damaging domestic or international policies. The combination of political and economic power may be necessary to start a business in a weak institutional environment. Moreover, a high degree of power concentration can guarantee sufficient protection for investment, which could be otherwise extracted by national policies or organized crime. The oligarchs are likely to support business-friendly but unpopular reforms which would otherwise not be introduced by populist politicians.

It is difficult to assess which factors will dominate, and there might be significant differences in the short and long run. So far, only Acemoglu (2008 and 2012) addresses the relationship between oligarchs, growth and inequality. He presents a model where an oligarchic society provides a high degree of protection for the economic elite including property rights of producers. Moreover, the concentration of the political power in the hands of the economic elite prevents high tax rates which reduces distortions and may be advantageous for growth. On the downside, the oligarchs may artificially increase entry barriers for their incumbent industries in order to avoid wage demand from new entrants and instead keep low wages and high profits.

Consequently, Acemoglu predicts that the oligarchic societies experience a pattern of rise and decline. In the early phase of development, the entrepreneurs gain economic and political power, while its concentration generates only low or no distortions. The institutions, however, which were only marginally costly at the beginning will become more costly in the long run. The initial comparative advantage of the incumbent entrepreneurs will erode over time. Structural changes will be avoided by prohibitively high entry barriers. Growth will slow down, resulting in a typical inverse U-shape pattern in an oligarchic society. The economy will converge to the so-called sclerotic equilibrium, where all resources are owned by the initial entrepreneurs despite their declining productivity. Acemoglu (2012) quotes numerous

historical examples of this development including Caribbean plantation economies, but also Roman, Egyptian or Chinese ancient empires, the decline of Venice and Genoa, and the development of the Dutch Republic.

The model of an oligarchic society according to Acemoglu (2008) also shows several implications for the development of inequality levels in a society. During the initial growth phase, the concentration of political power in the hands of the economic elite is likely to result in a low level of taxation and redistribution, which increases economic inequality above the levels in democratic societies. Nevertheless, everybody may profit to some degree from growth in this phase. The distribution of wealth may depend on the individual circumstances and the initial institutional framework, in contrast to, for example, slavery in the Caribbean economies and the communist legacy of the Soviet Union or China with a high preference for low inequality in the population. In the long run, however, the oligarchic societies tend to converge to the extreme level of inequality. Acemoglu (2008, 22) shows in proposition 2 that in the long term, the oligarchic sclerotic equilibrium will be characterized by zero taxes and wages but positive profits of the incumbent oligarchs. Thus, the extractive institutions will be used in order to exploit all economic resources by a few oligarchic entrepreneurs.

Acemoglu's (2008) proposition on the relationship between oligarchs and inequality serves well to explain the developments in Russia. This is particularly interesting because Guriev and Rachinsky (2005) show that oligarchs have rather tended to improve the performance of their enterprises, which were significantly more efficient than firms controlled either by the federal or regional government, and also more efficient than private non-oligarch Russian firms. In the terms of Acemoglu's model, Russia might thus have been, by this time, in the early phase of consolidation of oligarchic power.

### **3. The Emergence of Russian Oligarchs**

The term 'oligarch' is commonly used to describe the new business elite in Russia. It describes a businessman with considerable resources that enable him to influence politics at the national level (Guriev and Rachinsky, 2005). An oligarch, thus, not only exerts market power but also has political weight. Ironically, already Lenin (1916) used the term financial oligarchy to express the importance of the financial sector in imperialism. For contemporary Russia the use of the term often carries a negative connotation (Guriev and Rachinsky, 2005).

Privatization played a key role to support the sudden emergence of oligarchs in Russia. The sellout of shares of state enterprises followed a voucher scheme of stocks with the idea to



provide every citizen with a share in the market economy. In practice, however, factory sales followed an opaque process that excluded the majority of the public. The middlemen bought up vouchers from citizens, and banks holding the auctions arranged with political and economic actors. Former politicians could thus make state property their own in a jumbled environment<sup>2</sup> (e.g. Barnes, 2003; Yakovlev, 2006; Kryshtanovskaya and White, 2005). Many deals followed the ‘loans-for-shares’ scheme in which selected investors received underpriced state assets in return for loans to the debt-ridden government (see e.g. Schröder, 1999; Guriev and Rachinsky, 2005; Desai, 2005).

Due to the lack of a strong state the new regime was unable to unlink power and property, a connection established by the former communist rule. Access to power was necessary to obtain licenses and approvals for lucrative rent-seeking activities like the export of commodities and the import of goods at special exchange rates, the reception of subsidized state credits from the Central Bank, or the bestowal of the title to be an authorized bank (Graham, 1999). And finally, access to power opened doors to the privatization process described above, a process riddled with insider deals that reinforced the intertwined relationship between business and politics (Graham, 1999).

During the first decade of Russia’s conversion to capitalism a new small group of the upper class emerged, individuals who typically control resources combining banking, industry and mass media (Kryshtanovskaya and White, 2005). Additionally, the oligarchs were well connected to the political elite (Schröder, 1999). The new business elite intruded the political sphere exercising considerable influence on political actors and policy decisions. A considerable number of businessmen, that dominated the list of oligarchs in 2003, took part in the loans-for-shares scheme back in 1995 (Guriev and Rachinsky, 2005).

The mix of political and economic power, as well as power continuity, was very typical for Russia’s transition to a market economy. The privatization of state enterprises to the managers of state firms followed the general interests of the provincial governments. These practices kept outsiders from interfering in the regional economy while the new private entrepreneurs did not threaten the political power of the governments (Ortung, 2004). The former Soviet *nomenklatura*, in fact, provided the base for the post-Soviet elites, both for the political

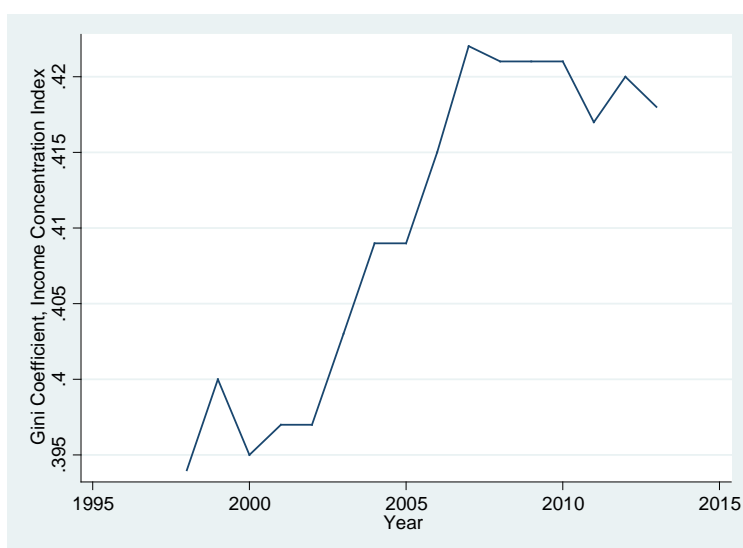
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<sup>2</sup> Common practice was the transformation of state ministries into state-firms, e.g. Norilsk Nickel (formerly Soviet Ministry of Metallurgy), Gazprom (formerly Soviet Ministry of Gas Industry) or Neftegazstroi (formerly Soviet Ministry of Construction of Enterprises of the Oil and Gas Industry), see Kroll (1991) and Whitefield (1993).

establishment and the new business class. Gel'man and Tarusina (2000) find in their review of Russian literature on political elites that Russian scholars estimate the degree of continuity somewhere between 50 and 67 percent for the business elite and between 80 and 85 percent for local political and administrative elites. The close informal networks of the Soviet elites facilitated the transformation of the *nomenklatura* into a post-Soviet oligarchy (Kryshtanovskaya, 1995; as cited in Gel'man and Tarusina, 2000).

The institutional framework in Russia is strongly determined by its post-communist legacy favoring low levels of inequality. Despite of this, the rise of oligarchs has been commonly associated with the strong rise of inequality in Russia (Hoff and Stiglitz, 2004). Russia's unique path to market economy is an important factor that paved the way for the development of a selected economic elite – an elite with resources large enough to create an exclusive political and economic system that led to an increasingly unequal income distribution in the first decade of market economy in Russia. On the one hand, the entrepreneurial elite contributed significantly to the economic development both at the aggregate and regional levels. On the other hand, they are frequently related to corruption, nepotism, and the extreme rise of inequality. Therefore, we test the relationship between oligarchs and inequality following Acemoglu's (2008) framework. The case of Russia is particularly interesting because oligarchic firms in Russia are more efficient than small state firms and small private firms (Guriev and Rachinsky, 2005). From the perspective of Acemoglu's model, Russia at that point thus might have been in the early phase of the introduction of oligarchic structures.

**Figure 1: Gini Coefficients in Russia, 1998-2015**



Source: Rosstat, Bank of Finland, own computation.

#### **4. Income Inequality in Russia**

The example of Russia is especially interesting for the understanding of inequality. It is one of the largest and most heterogeneous countries. Its economy is dependent on the performance of a few key industries (Eller et al., 2016), which makes it highly sensitive to sector and region specific income shocks. While there are several cross-country analyses of inequality, so far only few papers have analyzed determinants of regional income inequality.

The development of the Russian exclusive elites, established in the 1990s, was accompanied by the concentration of wealth in the accounts of very few. A World Bank Study from 1998 calculates that before the collapse the Soviet Union had inequality figures at the same level of low income-inequality OECD countries like the Benelux states or Scandinavia. Since the beginning of the transition, however, disparities increased sharply among all transition economies (except Slovak Republic): the average Gini coefficient<sup>3</sup> rose by 9 points from 24 to 33 within six years. Inequality in the Western countries rose most rapidly in the 1980s by about 0.5 points annually (Milanovic, 1998).

With the ongoing economic reforms, however, differences between transition economies concerning economic inequality also grew considerably, ranging from 20 in Slovakia to 48 in Russia, only passed by Kyrgyzstan with 55 (Milanovic, 1998). Thus, Russia is among the countries with the highest increase in inequality during the early years of economic transition. According to Rosstat, Russia's economic inequality rose from a level of 39 in 1998 to 41.7 in 2001, with a peak of 42 in 2008 (see Figure 1). Still in the 2000s, Russia suffered from income disparities at much higher levels than, for example, Europe or the USA (see Guriev and Rachinsky, 2005). Moreover, inequality varies significantly between the regions (see Figure 2). For 2003, for example, gini coefficients ranged between 0.31 (Tverskaja oblast in Northwest) and 0.58 (city of Moscow).

Similar patterns can be observed for wealth inequality. By 2000, the wealth share of the top 10 percent of the Russian population was at 77.1 percent, increasing to 84.8 percent in 2014 (Credit Suisse Institute, 2014). In 2003, some 12 years after the fall of the Soviet Union, the

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<sup>3</sup> The Gini Coefficient measures the dispersion of income amongst a nation's residents and serves as a common measure of inequality of income. Based on the Lorenz curve the Gini coefficient is the ratio of the total income of the population against the cumulative shares of people from lowest to highest incomes. The coefficient ranges from 0 to 1 denoting perfect equality and maximal inequality, respectively. Due to better readability values are expressed as percentage (from 0 to 100).

top 10 families or investor groups in Russia owned 60.2 percent of the Russian stock market (see Guriev and Rachinsky, 2005), compared to ownership concentration in European countries (35 percent and below) or the United States and Great Britain (below 10 percent). By 2012, around 100 individuals owned 30 percent of all personal assets, which makes Russia the leader of wealth inequality worldwide (Credit Suisse Institute, 2012) with the exception of some small Caribbean nations. Looking at the ownership distribution of the largest firms in the largest sectors in Russia by 2003, the so called oligarchs hold the largest share of 39 to 42 percent (measured by employment and sales, respectively), way ahead of small private domestic entrepreneurs (13 to 22 percent), foreign owners or the state (see Guriev and Rachinsky, 2005). These figures demand a deeper exploration of the question how such high wealth concentration developed in Russia and which impact the leading class of the so called oligarchs has on the Russian society as a whole.

**Figure 2: Gini Coefficients in Russian Regions, 1998-2015**



Source: Rosstat, Bank of Finland, own computation.

## 5. Empirical Analysis

### 5.1 Data Description

In order to adequately measure the effects of oligarchic presence within regions it is necessary to identify the geographical location of oligarchic firms. For this purpose, an extensive and unique data set on Russia's business structure was used. Guriev and Rachinsky (2005) provide a rich data set on ownership structure in Russia in 2003. It covers the largest firms in the largest sectors<sup>4</sup> (about 1700 firms) in order to measure the effect of ownership type on firm performance and on political institutional change. Therefore, Guriev and Rachinsky tracked down the degree of control up to the ultimate owners, arriving at a list of 627 economic actors. This list includes 22 oligarchs and oligarch groups (oligarchs as defined above), further it is comprised of regional governments, federal governments, other domestic owners and foreign owners. Oligarchs hold the largest share, with about 40 percent control of all analyzed firms.

Guriev and Rachinsky (2005) show that oligarchic firms are performing slightly better than other private Russian firms, but slightly worse than foreign-owned firms.<sup>5</sup> The total productivity growth was higher by 8 percent for oligarchic firms than for domestic firms, while it was also 3 percent lower than for foreign owned firms. The better performance is likely to be achieved, at least to some degree, through corruption and political connections. If so, the oligarch dominance can have negative spillovers on Russian firms. The oligarchic firms keep high employment, especially when compared to foreign firms. On the one hand, this increases wage pressure for other firms and lowers restructuring needed for the local government. On the other hand, it helps to stabilize local private consumption. Thus, there may be positive and negative spillovers on other firms in oligarchic regions.

In order to perform a regional analysis, we used firm addresses in the original data of Guriev and Rachinsky. It includes 700 oligarchic businesses. For all firms with yearly sales of one million Rubles in 2003, the actual production regions were identified in a thorough research process, ending up with a list of 233 companies. For most of the firms with oligarchic ownership, several locations had to be taken into account. Many analyzed firms are registered in one city but hold various branches, subsidiaries or production sites at different places, often

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<sup>4</sup> The largest sectors include mining, manufacturing, construction and market services. In 2003, mining and manufacturing accounted for about 65 percent of the Russian GDP (Guriev and Rachinsky, 2004).

<sup>5</sup> Similarly, Gorodnichenko and Grygorenko (2008) analyze productivity of Ukrainian oligarchs in 2000 and provide evidence for higher productivity of oligarchs in transition and developing countries.

transcending regional borders.<sup>6</sup> Therefore, all additional sites were considered if information was available. Indeed, we found 560 different locations for the set of 233 firms. As a result, the oligarchic firms are found to operate in all Russian regions except for six units. Finally, we merged the enterprise data with Russian regional data which were taken from Fidrmuc et al. (2015) and Eller et al. (2016).

Oligarchic dominance in each region is measured by the share of employment oligarchs hold from total employment in the region.<sup>7</sup> The higher the share of employees the bigger the political and economic weight of a business man, it is assumed. The dataset reveals a variance from zero to 14 percent (see Table A.1). The highest concentration of oligarchic business prevails in Murmansk, and overall, the Ural Federal District dominates the list. The cities of Moscow and St. Petersburg remain in the lower middle field. The North Caucasus Republics and the Far East are least dominated by oligarchs.

## 5.2 Estimation Strategy

Using unique data on ownership structure in Russian Regions in 2003 this paper will analyze the impact of oligarchs on income inequality across regions according to the following estimation equation,

$$gini_i = \alpha_i + \beta_i olg_i + \gamma_i lnypc_i + \delta_i ind_i + \mu_i cntr_i + \varepsilon_i \quad (1)$$

for  $i$  regions with income inequality  $gini_i$  as the dependent variable. Income inequality is measured by the Gini Index. The analysis focuses on oligarchic dominance,  $olg$ , which is measured as the percentage share oligarchic employment holds of total regional employment. Gross Regional Product per capita (GRP in Rubles),  $lnypc$ , and industrial production (total industrial production in selling prices as share of GRP),  $ind$ , are additional explaining variables. The control variables include the share of urban population in the regions, overall population in the regions, distance to Moscow (in km), FDI inflows as a ratio in GRP, and dummies for oil regions. Finally,  $\varepsilon$  denotes the error term. Table A.1 reports the descriptive statistics for all variables.

Several control variables check for possible causes of inequality lying beyond oligarchic dominance, overall production and industrial share. We include the industrial share of GRP to

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<sup>6</sup> In fact, none of the listed oligarchs operates only in one region.

<sup>7</sup> Guriev and Rachinsky provide the employment figures of each analyzed firm for 2003. Total regional employment is taken from ICSID (2013).

proxy the impact of large industrial enterprises on income inequality. In addition, higher inequality may prevail in large cities (see Haworth et al., 1978, for USA; and more recently Royela et al., 2014, for OECD). Main urban centers typically hold more diversified employment and a correspondingly wider range of wages than small cities. Large firms have their headquarters in large cities, including their top earning employees in e.g. research, legal or executive areas (Farbman, 1973). Higher income disparities may therefore be reported in regions with main urban centers. For these reasons, we include the urban share of the population in some specifications. Moreover, large regions might imply a broader range of employment types and, thus, higher income disparities. Therefore, selected specifications control for total population size.

Another important factor that may contribute to the variance of inequality is the peripheral location of some regions. In Russia, progress and development have their epicenter in Moscow, just as political decision-making and economic resources are concentrated in the capital (Lehmann and Silvagni, 2013), possibly leaving those regions worse off that are far away from the Russian capital. We include distance to Moscow in order to account for this factor. Similarly, energy resources may contribute to higher inequality. Lucrative extractive industries provide the owners and employees with extra-ordinary high incomes (Karl, 1997). Income concentration among those controlling the extraction of oil may be a result, regardless of the oligarchic or non-oligarchic nature, of the owners.

We will start our discussion with standard OLS estimations. Yet, oligarchs may tend to dominate regions that are characterized by high inequality already before the emergence of oligarchs. Or alternatively, the oligarchs may be a result of the privatization process of previously large state-owned enterprises, which have an ambiguous relationship to inequality. Suitable instruments are difficult to find. Nevertheless, the following variables could be appropriate candidates: Firstly, different time zones imply some degree of regional independence which may be beneficial for the emergence of oligarchic firms. Our analysis indicates that this is especially important for medium time difference, that is, regions with time difference of one to five hours between local and Moscow time. Higher time difference to Moscow, in turn, (which can be up to 9 hours) is not correlated with the presence of oligarchic firms.

Secondly, we include tax arrears and squared tax arrears at the regional level. These variables proxy the political power of influential groups, which is essential for the emergence of oligarchs. It is also directly related to the model of Acemoglu (2008), which predicts that

oligarchs will hide taxes, resulting in low levels of taxation (converging to zero in the long-run equilibrium) in oligarchic societies. Tax arrears could be correlated with inequality because they limit the public redistribution policy. This channel is, however, not likely to be important in Russia because regional fiscal balances are often not balanced.

### 5.3 Empirical Results

Is there a relationship between oligarchs and economic inequality in Russian regions? In other words, do regions with higher oligarchic dominance face higher income disparities that do not originate in the regional economic structure, for example in the dominance of industry or availability of fuels? To get a first idea, we start with a linear regression for 79 regions.<sup>8</sup> The model specification follows the specific-to-general approach. The first specification in column (1) in Table 1 includes oligarchic dominance, GRP per capita and the industrial share. The regression yields the expected positive coefficient of oligarchic dominance. An increase in oligarchic dominance by one percentage point leads to an increase of the Gini coefficient by about 0.30 percentage points. Similarly, an increase in GRP per capita has a positive effect, but the effect is relatively small. As evaluated at the mean of GRP per capita, an income increase by one third (about a half of one standard deviation) increases the region's inequality just by one percentage point. Contrary to the expected effect, a higher industrial share turns out to decrease income disparities. As for income level, the impact remains low: an increase of industrial production by 10 percentage points lowers the regional inequality only by half a percentage point.

The coefficient for oligarchs remains significant also if further control variables are included in specifications (2) to (4). Somewhat surprisingly, there is no significant difference between urban and non-urban regions. Oil resources in a region do not have a significant impact on inequality, supporting the previous findings (Eller et al, 2016) that profits from the energy industry in Russia are assigned to the federal budget. Neither do more peripheral regions, as measured by the distance from Moscow, tend to show higher equality than the central regions. The only control variable that proves to have a significant effect throughout the calculations is regional population size. More populous regions tend to be characterized by higher inequality, but the effect remains moderate.

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<sup>8</sup> The regression is performed using only standard regions (oblast), hence excluding autonomous regions. Moreover, Chechenia is excluded due to unavailability of data.



**Table 1: Determinants of Regional Inequality, All Regions, OLS**

	(1)	(2)	(3)	(4)	(5)	(6)
oligarchs	0.327** (0.150)	0.309** (0.118)	0.310** (0.118)	0.311** (0.122)	0.307** (0.119)	0.305** (0.120)
GRP per capita (in logs)	0.041*** (0.013)	0.032*** (0.005)	0.033*** (0.006)	0.033*** (0.007)	0.032*** (0.008)	0.032*** (0.009)
industry share	-0.050** (0.020)	-0.050*** (0.012)	-0.048*** (0.014)	-0.048*** (0.016)	-0.048*** (0.016)	-0.048*** (0.016)
population (billion persons)		10.387*** (3.237)	10.517*** (3.154)	10.591*** (2.975)	10.578*** (3.015)	10.565*** (3.062)
urban share			-0.007 (0.031)	-0.008 (0.032)	-0.006 (0.032)	-0.005 (0.034)
distance from Moscow (th km)				0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
dummy for oil region					0.002 (0.008)	0.003 (0.009)
FDI share						-0.002 (0.013)
constant	-0.059 (0.128)	0.021 (0.054)	0.016 (0.054)	0.019 (0.068)	0.027 (0.080)	0.027 (0.081)
no of observations	79	79	79	79	79	79
adjusted R <sup>2</sup>	0.452	0.641	0.636	0.631	0.626	0.621

*Note:* Robust standard errors in parentheses. \*\*\*, \*\*, and \* denote significance at 1 per cent, 5 per cent, and 10 per cent, respectively.

**Table 2: Determinants of Regional Inequality, Main Cities Excluded, OLS**

	(1)	(2)	(3)	(4)	(5)	(6)
oligarchs	0.391*** (0.137)	0.360*** (0.125)	0.369*** (0.120)	0.399*** (0.121)	0.387*** (0.113)	0.381*** (0.115)
GRP per capita (in logs)	0.027*** (0.004)	0.027*** (0.003)	0.030*** (0.005)	0.026*** (0.005)	0.021*** (0.005)	0.021*** (0.006)
industry share	-0.029*** (0.010)	-0.035*** (0.009)	-0.029*** (0.010)	-0.020* (0.011)	-0.019 (0.012)	-0.019 (0.012)
population (billion persons)		5.338*** (1.987)	5.469*** (1.875)	6.136*** (1.855)	5.777*** (1.693)	5.727*** (1.700)
urban share			-0.032 (0.034)	-0.043 (0.035)	-0.037 (0.035)	-0.035 (0.037)
distance from Moscow (th km)				0.002* (0.001)	0.002* (0.001)	0.002* (0.001)
dummy for oil region					0.010 (0.008)	0.010 (0.009)
FDI share						-0.007 (0.011)
constant	0.081** (0.038)	0.079** (0.036)	0.063 (0.039)	0.103** (0.044)	0.142*** (0.051)	0.142*** (0.051)
no of observations	77	77	77	77	77	77
adjusted R <sup>2</sup>	0.433	0.481	0.484	0.490	0.498	0.491

*Note:* Robust standard errors in parentheses. \*\*\*, \*\*, and \* denote significance at 1 per cent, 5 per cent, and 10 per cent, respectively.

**Table 3: Determinants of Regional Inequality, Main Cities Excluded, 2SLS**

	(1)	(2)	(3)	(4)	(5)	(6)
<i>A. Second stage estimation:</i>						
oligarchs	1.093*** (0.341)	0.994*** (0.322)	0.899*** (0.270)	0.868*** (0.269)	0.781*** (0.238)	0.790*** (0.242)
GRP per capita (in logs)	0.016** (0.008)	0.017** (0.007)	0.023*** (0.005)	0.017*** (0.006)	0.015** (0.007)	0.015** (0.007)
industry share	-0.050*** (0.013)	-0.052*** (0.013)	-0.040*** (0.011)	-0.023* (0.012)	-0.022* (0.012)	-0.021* (0.013)
population (billion persons)		3.909* (2.169)	4.335** (2.052)	5.677*** (1.976)	5.476*** (1.764)	5.526*** (1.776)
urban share			-0.045 (0.047)	-0.061 (0.050)	-0.054 (0.045)	-0.056 (0.047)
distance from Moscow (th km)				0.003** (0.001)	0.003** (0.001)	0.003** (0.001)
dummy for oil region					0.007 (0.008)	0.007 (0.008)
FDI share						0.008 (0.013)
constant	0.198** (0.082)	0.184** (0.077)	0.144*** (0.053)	0.200*** (0.064)	0.214*** (0.071)	0.214*** (0.069)
no of observations	77	77	77	77	77	77
adjusted R <sup>2</sup>	0.062	0.178	0.270	0.328	0.383	0.369
Hansen test	0.234	0.782	1.284	1.387	1.849	1.895
Hansen test (p-value)	0.890	0.676	0.526	0.500	0.397	0.388
<i>B. First state estimation:</i>						
time difference 1 to 5 hours	0.014** (0.006)	0.013** (0.006)	0.014** (0.006)	0.015** (0.006)	0.015** (0.007)	0.014** (0.007)
tax arrears	-0.359 (0.561)	-0.331 (0.577)	-0.441 (0.638)	-0.361 (0.602)	-0.365 (0.626)	-0.426 (0.637)
squared tax arrears	3.516 (3.347)	3.378 (3.423)	4.132 (3.859)	3.599 (3.606)	3.621 (3.766)	3.985 (3.833)
<i>F</i> -test of excl. instr.	19.55	19.53	16.20	14.87	12.60	12.57

*Note:* Robust standard errors in parentheses. \*\*\*, \*\*, and \* denote significance at 1 per cent, 5 per cent, and 10 per cent, respectively.

In sum, we can see that the presence of oligarchs' businesses significantly increases income inequality by a non-negligible degree. The impact of oligarchs remains also unchanged if we control for resource abundance of the regions and peripheral location.

Next, our results show that large cities do not seem to bias the results. This is confirmed by the regression results when Moscow and St. Petersburg are excluded (see Table 2). When these two large economic, financial and political centers are omitted, the coefficient of oligarchs is even slightly higher and more significant. Moreover, distance to Moscow becomes significant. Furthermore, GRP per capita and population size lose about half of their previous influence.

While the robustness of the main results between oligarchs and inequality is impressive, especially if compared to other control variables, this can also point to possible endogeneity problems related to these variables. As both instruments are not well defined for the main cities (Moscow and St. Petersburg), we exclude those cities from the 2SLS regressions. Both

instrumental variables are positively correlated with the oligarch share, as is confirmed by the  $F$  test of the excluded instruments. It is well above 10, which is generally required for strong instruments (Staiger and Stock, 1997). The critical value of 9.08 (for a maximal IV relative bias of 10 percent) according to Stock and Yogo (2005) is even slightly lower than the generally applied rule of thumb. The Hansen  $J$ -test of over-identifying restrictions fails to reject the null hypothesis of no correlation between the instruments and the error term in the second-stage estimation, which confirms the instrument exogeneity.

Moreover, the coefficient for oligarchs is even higher than in the previous regressions. This suggests a significant downward bias in the OLS estimations. The negative coefficient for industry furthermore implies that regions dominated by large, previously state owned enterprises may tend to be characterized by lower inequality.

**Table 4: Determinants of Regional Inequality, Outlier Regions Excluded, 2SLS**

	(1)	(2)	(3)	(4)	(5)	(6)
<i>A. Second stage estimation:</i>						
oligarchs	1.118*** (0.395)	1.039*** (0.379)	1.015*** (0.357)	0.970*** (0.349)	0.942*** (0.309)	0.971*** (0.317)
GRP per capita (in logs)	0.023*** (0.007)	0.023*** (0.007)	0.025*** (0.007)	0.021*** (0.008)	0.020** (0.010)	0.019* (0.010)
industry share	-0.051*** (0.015)	-0.052*** (0.013)	-0.049*** (0.012)	-0.038*** (0.012)	-0.037*** (0.013)	-0.037*** (0.014)
population (billion persons)		3.185 (2.135)	3.361 (2.050)	4.075** (1.927)	4.088** (1.910)	4.120** (1.918)
urban share			-0.017 (0.037)	-0.025 (0.038)	-0.024 (0.037)	-0.027 (0.040)
distance from Moscow (th km)				0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
dummy for oil region					0.003 (0.009)	0.002 (0.009)
FDI share						0.009 (0.014)
constant	0.129* (0.072)	0.123* (0.070)	0.108* (0.065)	0.149* (0.076)	0.160* (0.096)	0.164* (0.097)
no of observations	69	69	69	69	69	69
adjusted R <sup>2</sup>	0.252	0.306	0.310	0.335	0.338	0.315
Hansen test	0.0108	0.245	0.537	0.553	0.721	0.736
Hansen test (p-value)	0.995	0.885	0.765	0.759	0.697	0.692
<i>B. First stage estimation:</i>						
time difference 1 to 5 hours	0.013** (0.005)	0.012** (0.005)	0.012** (0.006)	0.013** (0.006)	0.012** (0.006)	0.011* (0.006)
tax arrears	0.037 (0.302)	0.075 (0.311)	0.094 (0.330)	0.133 (0.342)	0.147 (0.359)	0.077 (0.357)
squared tax arrears	1.000 (1.719)	0.825 (1.759)	0.706 (1.883)	0.475 (1.932)	0.377 (2.057)	0.794 (2.038)
$F$ -test of excl. instr.	23.40	21.23	18.70	17.08	13.88	14.56

*Note:* We exclude Chukotka, Jewish autonomous region, Republic of Khakassia, Tver, Republic of Tyva, Ulyanovsk, Tumen and Murmansk, Moscow and St. Petersburg. Robust standard errors in parentheses. \*\*\*, \*\*, and \* denote significance at 1 per cent, 5 per cent, and 10 per cent, respectively.

Finally, we test whether the relationship between oligarchs and inequality may be due to outlier regions. In Table 4 we therefore exclude regions with the lowest (Chukotka, Jewish autonomous region, Republic of Khakassia, Tver and the Republic of Tyva) and highest (Ulyanovsk, Tumen and Murmansk) five percentiles of employment in oligarchic firms. The coefficients become even slightly higher for this subsample, while they remain highly significant. It is especially interesting to note that the instruments become stronger in this specification as can be seen at the  $F$ -statistics of excluded instruments (between 13 and 23).

## 6. Conclusions

The 1990s in Russia was a decade of economic and political restructuring. Growing income disparities have been accompanied with the rise of a new upper class group of influential individuals and families, the oligarchs. Our results show that economic inequality among Russian regions, in addition to other factors, is closely related to oligarchic dominance. The analysis has shown that oligarchic presence has a highly significant effect on economic inequality in Russian regions. Russia's trajectory to a market economy shaped an economic and social structure that is manifesting its exclusive character in a way that access to political decision making and economic success is limited to small elite circles.

Guriev and Rachinsky (2005) found for 2003 that conglomerates in the hand of the so called oligarchs show higher output growth rates than firms owned by the governments or other domestic private owners. At the same time, the newly emerged dominant economic players enjoy enormous political power. They are well connected to the offices of political decision makers, which put them into the position to prevent the development of effective institutions and maneuvers them out of the range of effective judicial and political control. Correspondingly, the term oligarch is often associated with nepotism, corruption and crony capitalism. These adverse features may have important negative implications on the development of the new entrepreneurial sector in Russia.

In our paper, we test Acemoglu's (2008) proposition on the relationship between oligarchs and inequality using regional data for Russia in 2003. Guriev and Rachinsky (2005) show that the privatization to oligarchs improved the performance of enterprises. In fact, the oligarch enterprises were nearly as efficient as enterprises managed by foreign owners. Despite the post-communist legacy favoring low levels of income inequality, the rise of the oligarchs has been commonly associated with the extreme rise of inequality in Russia. Our results confirm that oligarchs played a significant role in the process of increasing inequalities.

**Table A.1: Descriptive statistics**

Variable	Obs	Mean	Std.Dev.	Min	Max
oligarchs (in percent)	79	0.022	0.027	0.000	0.139
GINI coefficient	79	0.363	0.037	0.310	0.584
GRP per capita (in RUB)	79	63448	49080	10332	341147
GRP per capita (in logs)	79	10.887	0.547	9.243	12.740
industry (in percent of GRP)	79	0.720	0.275	0.118	1.275
urban share (in percent)	79	69.323	12.955	26.370	100.000
population (million persons)	79	1.817	1.630	0.053	10.461
distance from Moscow (th km)	79	2371	2748	0.000	11876
dummy for oil region	79	0.190	0.395	0.000	1.000
FDI share (in percent of GRP)	79	0.019	0.109	0.000	0.972
time difference to Moscow	79	1.785	2.697	-1.000	9.000
time difference 1 to 5 hours	79	0.291	0.457	0.000	1.000
tax arrears (in percent)	79	8.535	18.504	0.309	162.396
squared tax arrears	79	411	2968	0.10	26373

Source: Rosstat, Bank of Finland, Eller et al. (2016), Guriev and Rachinsky (2004 and 2005), own computations.

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