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Natalia Vasilenok

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Natalia Vasilenok *

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Abstract

This paper studies the influence of institutional quality and income inequality on the private provision of security. It is argued that the effects of both factors are far from straightforward and should be thoroughly examined when variation in institutional quality and income inequality is high. To conduct empirical analysis, data on the regions of Russia between 2009 and 2016 are used. It is hypothesized and empirically supported that institutional quality affects the relationship between the private and public provision of security. Weak institutions make the private provision of security a substitute for the public provision of security, whereas strong institutions promote complementarity between the two. It is also shown that income inequality increases the private provision of security when inequality is low and decreases it when inequality is high. This result can be attributed to economies of scale.

JEL Classification: D60, H44, K42.

Keywords: public goods, security, quality of institutions, income inequality.

*National Research University Higher School of Economics. Center for Institutional Studies, Laboratory for Applied Analysis of Institutions and Social Capital, Research Assistant. E-mail: nvasilenok@hse.ru.

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1 Introduction

There is a large and growing literature that studies the provision of security within the broader field of the economics of crime. Multiple issues have arisen in this literature. Some scholars have made numerous and successful attempts to identify a causal effect of deterrence policies on crime rates (Levitt, 1997; Di Tella and Schargrodsky, 2004; Klick and Tabarrok, 2005; Evans and Owens, 2007; Lin, 2009), whereas others have focused on the influence of private security efforts on crime rates (Ayres and Levitt, 1998; Cook and MacDonald, 2011; Gonzalez-Navarro, 2013; Heaton et al., 2016; van Ours and Vollaard, 2016). However, the factors that drive the private provision of security have not been examined often (D'Alessio et al., 2005; Brooks and Strange, 2011), and only a handful of studies considers the relationship between the private and public provision of security (Cheung, 2008; Meltzer, 2011).

Both theoretical and empirical papers provide controversial evidence on the nature of this relationship. In the theoretical literature, models have been developed showing that the private and public provision of security substitute (Helsley and Strange, 2005) or complement each other (Guha and Guha, 2012; Guha, 2013). In the empirical literature, the evidence suggests that the association between measures of the private and public provision of security is negative (Cheung, 2008; Vollaard and Koning, 2009), positive (D'Alessio et al., 2005), or insignificant (Meltzer, 2011). Inconsistency in the previous results may be attributed to a number of reasons. First, research on the provision of security employs data on different levels of aggregation that comprise country-level data, regional-level data, district or neighbourhood data, and more rarely individual survey data. Second, the reported association may depend on whether the supply of publicly provided security or the demand for privately provided security has been used as a dependent variable. Third, the results may be sensitive to whether the causal relationship has been appropriately identified.

Inconsistency in the results may be also caused by omitted variables. A large amount of literature studying the provision of security has been built on a tacit and unrealistic assumption of a benevolent government. In reality, governments may be predatory, and extractive economic institutions that predatory governments design induce insecure property rights, high barriers to entry, and poorly performing public services (Acemoglu and Robinson, 2012). If we relax the "benevolent government" assumption, the relationship between the private and public provision of security may become even less straightforward than the previous evidence predicts. Ineffective police and corrupt courts will diminish the perceived level of security in a society. This, in turn, will increase the demand for the private provision of security. Since privately provided security is expensive, it will be consumed mostly by wealthier citizens who will oppose redistribution policies and invest less in publicly provided security. Moreover, the private provision of security affects the incentives of a government that may choose to free-ride on security provision. This scenario is most likely when political accountability is low. Surprisingly, the literature that explicitly attributes the relationship private and public provision of security to institutional quality is scarce.

In the present paper, I examine the factors that affect the demand for the private provision

of security. The private provision of security refers to all the measures of private protection aiming at the minimization of the probability of crime victimization. Broadly defined, those measures include the services of private guards and private investigators, locksmiths, and workers involved in the production, installation and monitoring of private security devices (Helsley and Strange, 2005). Under weak state institutions, security can be also provided by organized crime, mafia, and vigilante organizations (Marselli and Vannini, 1997; Volkov, 2002; Phillips, 2017). However, organized crime is not the subject of the present study. Thus, I focus on three major issues: the public provision of security, the relationship between the private and public provision of security conditioned on institutional quality, and the effect of income inequality on the private provision of security when variation in income inequality is high.

First, I develop a hypothesis stating that the relationship between the private and public provision of security is conditioned on the quality of institutions. This hypothesis has not been explicitly formulated and tested in literature. The empirical findings of this paper indicate that the effect of the public provision of security on the private provision of security depends on institutional quality. In other words, the quality of institutions determines whether publicly and privately provided security are substitutes or complements. Under weak institutions, privately provided security is a substitute for publicly provided security. If individuals in a society are not satisfied with the quality of law enforcement, they take over security provision. Under strong institutions, privately provided security is expected to complement publicly provided security, since each of the security suppliers can exploit their comparative advantage in security provision.

Second, I discuss the effect of income inequality on the demand for the private provision of security. The results suggest that there is an inverted-U relationship between the private provision of security and income inequality. This implies that the highest level of the private provision of security is reached under moderate values of income inequality, whereas an increase in inequality diminishes the demand for privately provided security. This effect can be explained by economies of scale. In societies with excessively high wealth concentration, less private efforts are required to protect fewer consumers of privately provided security.

In the empirical analysis, I use data on the regions of Russia between 2009 and 2016. The focus on Russia is motivated by three reasons. First, the demand for private protection in Russia is so huge that can be compared to the demand for private protection in South Africa (Mendoza, 2015). Second, in Russia, the extractive nature of institutions nevertheless contains substantial variation in institutional quality between sub-national units that can be treated as exogenous (Baranov et al., 2015). This provides a unique opportunity to explore if institutional quality indeed shapes the interaction between the private and public provision of security. Finally, the predictions of the economic model of crime have not been numerously tested on Russian data[1]. The private provision of security has been examined even more

[1]The examples are Andrienko (2005); Hauner et al. (2012); Ivaschenko et al. (2012); Vasilenok and Yarkin (2018).

rarely. When it was, the research was mainly focused on the private provision of security by organized crime in the period of transition to market economy (Frye and Zhuravskaya, 2000; Varese, 2001; Volkov, 2002) and considered the use of violence in business relations. In the 2000s, there was a substantial decrease in the reliance on the illegal provision of security and an increase in the demand for legal institutions of property rights protection (Gans-Morse, 2017). Nevertheless, the demand for privately provided security is still high. For example, according to the Business Environment and Enterprise Performance Survey (BEEPS) conducted in Russia in 2011 and 2012, 66% of interviewed firms invested in privately provided security in the last fiscal year preceding the survey.

The remainder of the paper proceeds as follows. Section 2 introduces the literature on the private and public provision of security. Section 3 elaborates the hypothesis about the effect of institutional quality on the relationship between the private and public provision of security. Section 4 discusses how income inequality can affect the demand for private security. Section 5 provides the details on empirical strategy and data. Section 6 presents the results of econometric analysis. Section 7 concludes.

2 The Private and Public Provision of Security

Public goods, be it healthcare, education or protection against crime, can be provided either by public authorities, private actors, or both. Economic literature has set up two questions to be answered: under what regime the level of public good provision will be the highest, and what regime of public good provision will be preferred.

The discussion originated from the theoretical examination of public goods provision by a set of voluntary contributors in a stateless society. It has been shown that in the absence of government wealth redistribution among voluntary contributors will keep the supply of a public good unchanged, whereas redistribution across contributors and non-contributors will lead to a decrease in the provision of a public good (Bergstrom et al., 1986). The situation changes when the government steps in. To finance public good provision, the government collects taxes from all the individuals in a society. The governmental coercion broadens the set of contributors to public good provision so that this set coincides with the set of all individuals in a society. This inevitably increases the aggregate supply of a public good. Therefore, the public provision of public goods substitutes the private provision of public goods and is socially desirable.

Another approach to the relationship between public and private provision of public goods suggests that the highest level of public goods provision can be reached only under the mixed regime of public goods provision (Epple and Romano, 1996). In a model where individuals differ in their income level, government expenditure on a public good is financed by a flat tax, and the tax rate is decided by a majority vote, the mixed market regime of public goods provision was proved to be majority preferred over both market-only and government-only regimes. It was also shown that the level of public goods consumption under

the mixed market regime exceeds the levels established under market-only and government-only regimes.

Two perspectives on the relationship between the public and private provision of public goods can be summarized as the substitutability and complementarity hypotheses respectively. According to the substitutability hypothesis, the public provision of public goods crowds out the private provision of public goods. On the contrary, the complementarity hypothesis asserts that the public and private provision of public goods reinforce each other and bring about the highest level of public goods consumption.

However, there are notable features that distinguish security from the public goods that have been usually given as the examples within the theory of public goods provision, such as education or healthcare. These features need to be accounted for when the distinct theory of the relationship between publicly and privately provided security is elaborated.

First, it has been often explicitly assumed that publicly and privately provided public goods are substitutes, and a discrete-choice model describes behaviour of individuals in a society. If a person opts for a private supply of a public good, she will not be able to consume a publicly provided public good at the same time. "It is typically neither desirable nor even possible for a child to attend two schools at once" (Besley and Coate, 1991). As for security, an individual may buy additional security that is privately provided without reducing consumption of publicly provided security.

Second, neither private consumption of healthcare nor education induces the same negative externality as private consumption of security does. It has been shown that private precautions against crime tend to reallocate offences to non-protected or less protected individuals. Since the number of criminals in a society remains unchanged, private protection results in an increase in the severity of offences (Clotfelter, 1978)[2].

In the literature on security provision, both substitutability and complementarity hypotheses can be found.

The substitutability hypothesis is best represented by the study of Helsley and Strange (2005). They show that the mixed regime of security provision leads to an inefficient equilibrium. Private investment in security demotivates public investment in security and reduces the intensity of deterrence policies. However, the effect of privately provided security varies significantly across crime categories. The effectiveness of private security decreases with the growth in the severity of crime, whereas the government is more successful in monitoring and fighting violent crimes. This induces a negative externality embodied in the increase in the aggregate crime rate.

The complementarity hypothesis in the security provision literature employs an explicit distinction between private security measures that are substitutable for the public provision of security, for example, carrying guns, and those complementary to the public provision of

[2]The numerous theoretical predictions have been supported by scarce empirical evidence. This might be attributed to the difficulties in revealing the displacement effect using aggregated crime data. However, Gonzalez-Navarro (2013) presented the evidence on theft displacement from vehicles that were equipped with electronic recovery system to those that were not.

security, for example, electronic alarm systems that are efficient only when the police reaction is fast. It has been shown that investment in private security measures complementary to public provision of security increases with the level of public security provision, and investment in private security measures that are substitutable for policing decreases (Guha and Guha, 2012; Guha, 2013).

3 The Provision of Security and Institutional Quality

The large theoretical and empirical literature on security provision has been built on an implicit assumption of a benevolent government. However, in real world predatory governments exist, and their objective functions differ from the ones of benevolent governments. When security is considered, a benevolent government aims at decreasing the aggregate crime level in society, whereas a predatory government is mostly interested in redistribution of wealth from one subset of society to another. Public security providers can extract rent or cooperate with criminals rather than provide security against them (Konrad and Skaperdas, 2012). It can be expected that the difference between benevolent and predatory governments, inclusive and extractive institutions, can affect how the division of labour between private and public providers of security is implemented. Therefore, to reveal more complex relationships than those reported in the literature, the benevolent government assumption should be relaxed.

In the literature, there are several topics that directly or indirectly refer to the quality of institutions when provision of security is considered. The first topic examines the effect of corruption on the quality of law enforcement. For example, it has been shown that bribery increases crime rates if the punishment for committing a crime exceeds a bribe that might be paid to escape punishment (Becker and Stigler, 1974; Bowles and Garoupa, 1997). Therefore, government faces the problem of the resource allocation between regular crime deterrence and anti-corruption efforts. Nevertheless, this framework assumes that government has incentives to fight corruption and does not necessarily correspond to reality.

The other strand of literature compares the levels of security provision established by benevolent and predatory governments. Garoupa and Klerman (2002) has predicted that when non-violent crimes are considered, a probability of punishment held equal, a predatory government will set higher penalties than a benevolent government to maximize fine revenue. In contrast, for violent crimes, the strictness of penalties held equal, the probability of apprehension under a predatory government is lower, and crime rates will be higher. However, the authors do not examine the mixed regime of security provision. The empirical support for the Garoupa and Klerman predictions are found in the work of Lin (2007). Using panel cross-level data, it has been shown that more democratic countries tend to impose more severe punishment for violent crimes and less severe punishment for non-violent crimes than non-democratic countries. Further analysis suggests that crime rates grow at the early stages of democratization and decrease when democracy becomes consolidated (LaFree and Tseloni,

2006; Dusek, 2012).

The suggestion that the nature of the relationship between public and private providers of public goods might depend on institutional quality first appeared in the work of Ostrom (1996). She developed the notion of the co-production of public goods. This notion implies that the public provision of public goods is impossible without consumers of those goods being directly involved. Moreover, she stressed that treating the government as a single actor of public goods provision is misleading, since the motivation and discipline of local authorities can considerably vary across jurisdictions. According to Ostrom, the success of co-production depends on such factors as legal opportunities of being involved in co-production, contract enforcement, and incentives to cooperate. All the factors of successful co-production distinguished by Ostrom in fact describe the quality of the institutional environment. In other words, high-performing institutions may motivate complementarity between the public and the private provision of public goods, including security.

In contrast, Mendoza (2015) argued that the degree of substitutability between the public and private provision of security may depend on institutional quality. To explain the huge variation in the ratio of public to private investment in security across countries, he elaborated a model of government that makes a decision to free-ride on private security. The model predicts that a government chooses to free-ride when three conditions are met. First, the efficiency of crime against private property is low. Second, the efficiency of crime against public property is high. Finally, the tax system is inefficient. In other words, a government decides to free-ride on private providers of security when it lacks administrative capacity.

Though both Ostrom and Mendoza suggest that the relationship between security providers may be conditioned on the institutional quality, neither explicitly states a hypothesis about such a relationship. In this paper, an attempt to fill this gap has been made. It is hypothesized that weaker institutions tend to foster substitutability between public and the private provision of security, whereas stronger institutions favor complementarity between public and the private provision of security. Under weak institutions, individuals who are dissatisfied with the level of protection provided by the state will be ready to take over their own security. This, in turn, might create incentives for a state to free-ride. In contrast, under strong institutions the division of labour between public and private providers of security will be established, when, for example, a government is focused on monitoring and preventing violent crimes, whereas private security providers focus on non-violent crimes.

4 The Provision of Security and Income Inequality

The theory of public goods provision predicts that preferences for the public provision of public goods depend on individuals' income. It has been shown that wealthier individuals prefer less government expenditure on public goods, since for them a market price of a public good will be lower than the tax burden imposed by the government (Epple and Romano, 1996). Therefore, an increase in income inequality is expected to promote a demand for

the private provision of public goods. Interestingly enough, low-income individuals will also prefer lower level of public good provision to reduce their tax burden. This suggests that the preferences at the edges of income distribution are very similar, and coalition of high-income and low-income individuals could establish a low level of public provision of a public good.

Nevertheless, there continues to be a scholarly disagreement on the effect of income inequality on the private provision of security.

On the one hand, there is literature contending that income inequality leads to the higher demand for privately provided security in line with the predictions of the theory of public goods provision. There is evidence that large owners benefit more from private security provision and therefore support or even become actively engaged in collective actions from the creation of business improvement districts (Brooks and Strange, 2011) to funding vigilante organizations (Phillips, 2017). Income inequality might also produce a higher demand for privately provided security among low-income individuals if there is perceived security inequality that is mostly attributed to corrupt law enforcement. This may lead to the emergence of vigilante organizations as in Mexico (Phillips, 2017).

On the other hand, it has been argued that observable private protection might disclose that there is something valuable that needs to be protected (Lacroix and Narceau, 1995; Baumann and Friehe, 2013). Therefore, wealthier individuals may also have incentives to cut down their investment in private protection.

The intriguing relationship between private security and income inequality has been reported in the paper by D'Alessio et al. (2005). They included the quadratic term of income inequality in the regression equation to account for the probable non-linear effect of inequality on the private provision of security induced by diminishing marginal returns to private investment in security. The results show the significant positive coefficient on income inequality and the significant negative coefficient on the squared term of income inequality. This means that the highest values of the dependent variable, private security, are reached under the average level of income inequality.

In polarized societies with considerable wealth concentration, income inequality can diminish the demand for privately provided security since less efforts are required to protect smaller number of consumers. Therefore, when cross-regional variation in income inequality is high, it can be expected that income inequality will increase the private provision of security on the left side of the income distribution and decrease the private provision of security on the right side of the income distribution.

5 Empirical Strategy and Data

5.1 Empirical Strategy

In this paper, I model the demand for privately provided security that depends on the supply of publicly provided security, institutional quality, and individuals' wealth measured

as income inequality. The hypothesized relationship suggests that the strength and direction of the effect of publicly provided security on privately provided security may differ under different levels of institutional quality. The most straightforward way for testing this hypothesis is the inclusion of the interaction term between the measures of institutional quality and publicly provided security in a regression model. To account for the probable non-linear effect of income inequality on the private provision of security, the squared term of income inequality was also included in the model.

Therefore, the equation takes the following form:

$$\begin{aligned} priv\_sec_{it} = \beta_1 pub\_sec_{it} + \beta_2 inst_{it} + \beta_3 pub\_sec_{it} \times inst_{it} \\ + \beta_4 ineq_{it} + \beta_5 ineq_{it}^2 + BX_{it} + \mu_i + \epsilon_{it}^{priv\_sec}, \end{aligned} \tag{1}$$

where $priv\_sec_{it}$ denotes the outcome variable, the demand for privately provided security, pub_sec_{it} is the measure of publicly provided security, $inst_{it}$ is the measure of institutional quality, $ineq_{it}$ denotes income inequality, X_{it} is the vector of control variables comprising the level of regional economic development, the labour supply of people trained in security provision, and urbanization; μ_i is the regional fixed effect accounting for unobserved time-invariant regional heterogeneity, and $\epsilon_{it}^{priv\_sec}$ is the idiosyncratic error. The coefficients on the public expenditure on security β_1, the interaction term β_3 and the squared term of income inequality β_5 are the coefficients of interest.

The empirical research within the field of the economic of crime is subject to simultaneity bias since potential criminals, government, and the private actors who invest in security make their choices simultaneously. In the existing literature that mostly focuses on the effect of police on crime rates, a primary concern is the simultaneity between criminal activities and deterrence because it can lead to positive or insignificant coefficients on the deterrence variables (Chalfin and McCrary, 2017)[3].

In this paper, an attempt to disentangle the effect of the public provision of security on the private provision of security is made. Hence, the public provision of security should be considered as treatment. Crime rates react to both public and private policing (Helsley and Strange, 2005), which makes it the outcome of the treatment variable. Therefore, the inclusion of crime rates as a control variable would induce the problem of bad controls. This means that the effect of the public provision of security on the private provision of security conditional on crime rates will not have the causal interpretation, because it introduce the selection bias and reflect the causal effect of the public provision of security on the regions with fixed (high or low) levels of crime. Since it is advised to omit bad controls from the regression equation (Angrist and Pischke, 2009), crime rates will not be included as a regressor in the model. In this case, the endogeneity issue remains salient for the public provision of security, since it may be both a cause and a consequence of private protection measures.

[3]The range of empirical strategies employed to overcome the endogeneity of police variables are thoroughly described in the review of Chalfin and McCrary (2017).

Most of the empirical studies of security provision focus on the USA and Europe. This determines the strategies of identifying the causal effect of deterrence variables employed in previous work. Police in the USA is financed by local budgets, and this fact provides scholars with a wide range of potential instrumental variables. For example, Levitt (1997) instrumented the changes in police force with mayoral and gubernatorial electoral cycles assuming that incumbents will increase expenditures on public goods before the elections to maximize their probability of winning. Similarly, Lin (2009) used the changes in a sales tax revenue, which on the average constitutes approximately one-third of a state budget.

The same identification strategy is invalid for Russia because the system of police financing differs sharply. Until 2012, police in Russia was financed partly from the federal budget and partly from regional and local budgets. In 2011, a new police law was adopted. The law prescribed a 20% cut in police personnel and a threefold increase in police officers' salaries. The law also reformed police funding. It established direct financing from a federal budget and prohibited financing from regional and local budgets (Taylor, 2014). Figure 1 illustrates the changes initiated by the police reform: the public expenditure on security dramatically increased in 2012 compared to 2011. Furthermore, the process of money allocation among regional police offices is opaque to the public. The lack of transparency in Russian police budget prompts us to search for the sources of exogenous variation differing from those that were used in the previous research.

The territorial organization of police can be the first source of exogenous variation. Between 2001 and 2014, police had hierarchical territorial structure. In each federal district, there was the chief office of the Ministry of the Internal Affairs (MIA)[4], and all the regional offices were subject to the chief office of a corresponding federal district. The federal districts offices provided coordination of regional police forces and were responsible for the detection of cross-border crime. It can be suggested that money allocation among regional police offices might have been driven by the distance to the chief office of the federal district. Two competing hypotheses on the influence of geography on money allocation can be set up. Neighbouring regions can receive more money due to the tighter connections between the heads of a chief district office and regional offices. Alternatively, the further a region is located from a chief district police office, the more resources can be needed to provide security. In either case, the distance from the center of a federal district to the center of a region is exogenous to the public expenditures on security, institutionally pre-determined and as good as randomly assigned.

Thus, the distance from the administrative center of a federal district to the capital of a region is used as the instrumental variable for the public provision of security. Since the instrumental variable is time-invariant, and the data used for the analysis have panel structure, I interact the instrument with the set of year dummies to produce temporal variation. The same strategy was employed in Angrist and Krueger (1991). The set of resulting instruments also grasps the institutional changes implemented in 2012 and 2014.

[4]In Russian *Ministerstvo Vnutrennikh Del (MVD)*.

Elite networks can also be treated as the source of exogenous variation. It has been shown recently that political connections and loyalty explain monetary transfers from the government to Russian regions (Marques II et al., 2016). The same logic can drive the decisions of the Ministry of Internal Affairs on money allocation among regional police offices. The connections established by the head of a regional police office within the MIA, especially in the central office and the chief offices of federal districts, can increase the amount of money distributed to the regional office.

To construct instrumental variables, I collected the information on the heads of regional police offices from 2009 until present. The data include the years of appointment and dismissal from the position of the head of a regional police office, the last position a person had held before he was appointed to the position of the head of a regional police office, the years of appointment and dismissal from the last position held, the region of the last position held, and whether a person had ever worked in the central office of the Ministry of Internal Affairs. This information allows to see if two heads of police offices have ever worked in the same office. Three instrumental variables were created. The first variable is a dummy variable depicting the experience of working in the central police office. The second dummy indicates the experience of working in the region where the chief office of a federal district is located. Finally, a count variable was created to describe the number of connections between regional heads working in the same region. All the created instruments have low variation over time[5].

High regional disparities in economic development in Russia have produced the number of equalizing grants and subsidies designed to enable poorer regions to provide residents with public goods. Before 2012, regional budgets received grants to reduce a salary gap among regional police agencies. To ensure the instrumental variables are as good as randomly assigned and to avoid the omitted variable problem, the size of federal transfers should be also included in the first stage model.

Therefore, the first stage equation takes the following form:

$$pub\_sec_{it} = \gamma_1\ logtransf_{it} + \sum \gamma_k\ distance_{it} \times year_{it} + \sum \gamma_n\ connections_{it} + \mu_i + \epsilon_{it}^{pub\_sec}, \tag{2}$$

where $logtransf_{it}$ denotes the size of federal transfers per capita, $distance_{it}$ is the distance from the capital of a region to the center of a corresponding federal district, $year_{it}$ is a year dummy variable, $connections_{it}$ comprises the variables describing police network, μ_i is the regional fixed effect, and $\epsilon_{it}^{pub\_sec}$ is the idiosyncratic error. Since the variables describing police network have low time-variation, I also estimate a set of pooled regressions where the distance is interacted with two dummy variables for the time period before 2012 and after 2012 when the police reform was implemented.

[5]Obviously, the collected data are scarce. The data on education of police office heads and the detailed information on the previous positions can substantially enrich the analysis, but the data collection is yet to be done.

The causal interpretation of the IV models requires the exclusion restriction to be held, which means that the specified instruments affect the outcome of interest, the private provision of security, only through the public provision of security and not directly. The exclusion restriction would be violated if licensing for the employment in private security had been subject to the federal districts police offices. In this case, private security companies and their employees in remote regions would bear higher transportations costs to apply for a license. However, until 2016, licensing for private security was provided by municipal and regional police offices[6].

5.2 Data

The empirical analysis in this paper exploits the panel data set for 79 regions of Russia between 2009 and 2016[7]. The data mostly come from the Inter-Agency Joint Information and Statistics System (EMISS) portal, the exceptions are discussed below.

In the literature, the private provision of security has been usually measured with employment in private security occupations (Benson and Mast, 2001; D'Alessio et al., 2005; Zimmerman, 2014). This measure serves as the counterpart for the size of police force, which is a widely-accepted deterrence indicator. The alternative measures of private security comprise the number of private security providers, for example, homeowners associations (Cheung, 2008) or business improvements districts (Meltzer, 2011), or private security expenditures (Cook and MacDonald, 2011).

In the present paper, the revenue of private security industry was chosen as the closest analogue to the consensual measures of the private provision of security. This indicator comprises the services of private security firms, bodyguards, the rental of armoured vehicles, the installation and maintenance of electronic alarm systems, safes, locking devices, and private investigation. This indicator was weighted by the population in a given region. Three highest values of the variable correspond to the revenue of private security industry in Moscow in 2015, in Moscow in 2016, and in Yamalo-Nenets Autonomous Okrug in 2016. Moscow and Khanty-Mansi Autonomous Okrug-Yugra are the outliers with the highest levels of the revenue of the private security industry per capita in each year included in this study.

There are various measures of the quality of institutions in Russian regions. Unfortunately, many of those measures do not satisfy the design of the present research because they are unavailable for most of the years this study covers. For example, the democratization index developed by the Carnegie Moscow Center (Petrov and Titkov, 2013) was last time calculated in 2010. Nevertheless, it has been shown that most of the measures of regional institutions in Russia are highly correlated with each other (Baranov et al., 2015).

In the present paper, the rating of administrative investment risk is used as the measure of institutional quality. The rating of administrative risk describes the quality of public

[6]Since 2016, licensing for the employment in private security has been provided by the National Guard of Russia (in Russian, *Rosgvardia*).

[7]Data are missed for the Chechen Republic, the Republic of Dagestan, Jewish Autonomous Oblast, and Nenets Autonomous Okrug.

administration. The regions are rated on four main indicators. The ability of regional authorities to attract investment is measured with the direct investment share relative to gross regional product. The quality of budget execution is estimated with transparency of budgetary process. Infant mortality represents the ability of regional authorities to provide population with public goods. Finally, the level of corruption is estimated with the number of corruption cases against regional officials mentioned in the mass media. This variable can take values within the range from 1 to 83. The higher values of the variable indicate higher risk and, hence, the poorer quality of institutions.

The rating of administrative investment risk has been estimated by the Expert rating agency as the part of the integral rating of regional investment risk since 1996. Today, the rating of regional investment risk comprises 6 indicators measuring economic risk, social risk, financial risk, administrative risk, ecological risk, and criminal risk in a given region. I use the rating of administrative investment risk instead of the integral rating of investment due to the consistency of methodology. Since 1998, the number of indicators that constitute the integral rating of investment risk have changed several times. This makes the integral rating of investment risk incomparable across time points. In contrast, the methodology of the administrative risk rating remained unchanged.

To conduct a robustness check, the number of incidents of bribe acceptance registered by police was used as the measure of corruption. Though these data are obviously subject to under-reporting, it was argued in a recent paper that the general trend on the country level is similar to the Corruption Perception Index (Schulze et al., 2016). The variable was collected from the Attorney General's office data portal on legal statistics and was weighted by population. Three highest values of the variable correspond to the Tuva Republic in 2011, the Republic of Ingushetia in 2010, and Nenets Autonomous Okrug in 2015.

The deterrence measure used in this paper is close to the consensual ones. The public provision of security is captured with the public expenditure on security. This measure was constructed with the multiplication of the number of employees in the agencies for internal affairs and public security maintenance, including but not limited to police, by the average wage in public security sector. It is important to note that this variable is the biased estimate of the public expenditure on security since it does not include expenditures on physical infrastructure and equipment. However, more adequate measures are not available. The variable was also weighted by population.

The highest values of the public expenditure on security per capita describes Chukotka Autonomous Okrug in 2014. Chukotka and Magadan Oblast are the outliers with the highest levels of the public expenditure on security per capita in each year included in this study.

The income share acquired by the top 20% of population is used as the main measure for income inequality[8]. The maximum value of the variable corresponds to income inequality in Moscow in 2009. Moscow remains an outlier for 5 years in the sample. The minimum value

[8]The example of usage of the top quintile of the population income share as a measure of within-regional inequality can be found in Buccellato and Mickiewicz (2009).

of the variable corresponds to income inequality in the Republic of Karelia in 2016.

The level of economic development is captured with the logarithm of gross regional product per capita. The private provision of security is also expected to be affected by the labour supply of people trained in security provision or the use of violence, for example, retired officers. The corresponding data are difficult to find. Thus, to control for a labour supply, I included the male unemployment calculated as the percentage of males among the unemployed in the set of covariates. Urbanization is measured as the percentage of population residing in cities.

Table 1 provides descriptive statistics for all the variables used in the analysis except for the investment risk because it is measured in an ordinal scale.

6 Results

In this section, I present the empirical evidence on the effect of the public provision of security, institutional quality and income inequality on the private provision of security in the Russian regions.

6.1 Baseline Results

I start with the estimation of a set of fixed-effects regression models with regional fixed effects and clustered standard errors to account for time-invariant unobserved regional heterogeneity and serial correlation. The fixed effects models were preferred to the random effects models because it is unlikely that the observed explanatory variables and the unobserved regional effects are independent. For example, it can be expected that the level of regional economic development is affected by the weather conditions and natural resources endowment. The Hausman tests also suggest that the fixed-effects specification should be preferred over the random-effects specification, the results are available upon request.

Tables 2 and 3 report the coefficients of two sets of models where two alternatives measures of institutional quality were employed. In table 2, institutional quality is measured with the rating of investment risk, whereas in table 3 the number of registered cases of bribe acceptance was used. In column 8 of both tables, Moscow and Yamalo-Nenets Autonomous Okrug were excluded as influential observations. The exclusion of influential observations has not affected the signs and significance of the coefficients of interest. Moreover, in table 2, the coefficient on the public expenditure on security became significant.

In both tables, the first six columns report unstandardized coefficients, whereas in the models reported in columns 7 and 8 the variables have been standardized in order to obtain standardized coefficients. The only variable that was not transformed is investment risk in table 2 since it is measured in an ordinal scale. Standardization changes the interpretation of the coefficients on the variables involved in an interaction term. In this case, standardized coefficients show the effect of a variable when another variable that is included in an interaction is fixed at mean. However, the coefficient on the public provision of security should not

be interpreted in the same way, since investment risk has not been standardized and never takes the value of zero.

The results show that the coefficients on the interaction terms between the public provision of security and institutional quality are robust and significant. In both specifications where investment risk and corruption rates have been used as the measures of institutional quality, the coefficients on the interactions have negative signs. This means that a decrease in institutional quality, or an increase in investment risk and corruption rates, decreases the effect of the public provision of security on the dependent variable. In table 2 all the coefficients on the public provision of security are positive, however, as it has been outlined before, they are uninterpretable because investment risk never takes the value of zero. Since the coefficients on the interactions are negative, it can be suggested that starting from a certain value of investment risk the effect of the public expenditure on security may become negative. Thus, the appropriate interpretation of the interactions requires marginal effects to be calculated. In contrast with investment risk, there are zero values in the variable describing corruption rates. However, in table 3 the coefficient on the public expenditure on security is negative in the preferred specification (models 6 and 7).

The effect of income inequality on the private provision of security is robust and significant across all the models. The coefficient on the squared term of inequality is also significant. This result suggests that income inequality not only matters, but matters quadratically. In other words, the effect of income inequality on the demand for privately provided security depends on the initial level of inequality. The unstandardized coefficient on income inequality is positive, and the unstandardized coefficient on the squared term of income inequality is negative. The standardized coefficient on income inequality is negative, which means that income inequality decreases a demand for privately provided security when income inequality is fixed at mean. The further increase in inequality fosters this negative effect.

However, the results comprise the pieces of evidence that seem counter-intuitive and should be discussed. The coefficients on the interactions are small. This result can be explained by the poor validity of the measures of public security provision. As it has been discussed in the previous section, the measure used in the analysis does not cover all the expenditures on security provision, therefore, the effect of the public provision of security and the interaction on the dependent variable is most likely to be underestimated.

6.2 Marginal Effects

Table 4 reports the marginal effects of publicly provided security on privately provided security calculated using the standardized coefficients of model 7 from table 2:

$$\frac{\delta\ priv\_sec_{it}}{\delta pub\_sec_{it}} = \beta_1 + \beta_3\ inst_{it}, \tag{3}$$

given that investment risk is fixed at the values of 5, 42, and 79, which indicate low investment risk and strong institutions, median investment risk, and high investment risk and weak

institutions. Those values correspond to the 0.05, 0.5, and 0.95 quantiles respectively.

The high values of investment risk produce the significant negative effect of the public provision of security on the private provision of security. This means that weak institutions entail significant substitutability between the private and public provision of security. The low values of investment risk produce the positive yet insignificant effect of the public provision of security on the private provision of security. The insignificance of the marginal effect under high institutional quality can be explained either by the biased measure of the public expenditures on security or the suggestion that the weak institutional environment in Russia does not favour the effective division of labour between security providers even when regional institutions are stronger than the average. Under the median value of investment risk, the effect of the public provision of security on the private provision of security substantially does not differ from zero.

The results favour the hypothesized relationships. In Russia, the effect of the public provision of security is mostly negative and publicly and privately provided security substitute each other. In this case, a decrease in institutional quality strengthens the substitutability between security providers. However, if the effect of the public provision of security happens to be positive and publicly and privately provided security complement each other, a decrease in institutional quality makes the relationship between publicly and privately provided security less complementary.

Figure 2 plots the marginal effect of income inequality on the private provision of security against the level of income inequality. When income inequality is low, the effect of income inequality is positive and significant. An increase in inequality makes the effect insignificant, whereas the further increase in inequality brings about the negative effect. These findings favour the hypothesis on the inverted-U relationship between income inequality and the private provision of security (D'Alessio et al., 2005).

6.3 Two Stages Least Squares

The specifications presented in the previous subsection are subject to the endogeneity of the public provision of security. This can lead to the biased estimates of its effect on the dependent variable. To address the concerns on endogeneity, I now proceed to the instrumental variables strategy. Table 5 provides the two stages least squares estimates of the equation 1, where the public provision of security has been instrumented with the potential connections of the head of a regional police office in the central office of the Ministry of Internal Affairs, the chief office of a federal district, and other regional police offices, the distance from the capital of a region to the center of a corresponding federal district, and the size of federal transfers to a region. First, money allocation among regional police offices can be determined by elite networks and personal connections that the heads of regional police offices established in the course of their carriers. Second, more money can be needed to ensure control over the regions located on the borders of federal districts. It is important that the effect of distance to the center of a federal district can change over time. The police

reform which was implemented in 2011 prohibited police financing from regional budgets. Hence, it can be expected that the effect of distance will be higher in 2012 and the following years. Since all the instruments have low time variation, I estimate both pooled and fixed-effects models. In models 1-4, investment risk was used as the measure of institutional quality, whereas in models 5-8, the number of registered cases of bribes acceptance was used.

The interaction between an endogenous regressor and an exogenous covariate is also an endogenous regressor, which complicates the estimation of corresponding models. In 2SLS specifications (columns 3, 4, 7, 8 in table 5), I exclude the interaction terms and focus on the robustness of the coefficients on the public provision of security. In columns 1-4 and 5-8, four models are reported: a pooled OLS model without the interaction term, a pooled OLS model with the interaction term, a pooled 2SLS model without the interaction term, and a fixed-effects 2SLS model without the interaction term.

In the pooled OLS models without interaction terms (columns 1 and 5), the coefficients on the public expenditure on security are negative and insignificant. In the pooled OLS models with the interaction terms (columns 2 and 6), the coefficients on the public expenditure on security are positive and insignificant and the coefficients on the interaction terms are negative and significant. This means that decrease in institutional quality diminishes the positive effect of the public provision of security on the private provision of security. This result is similar to the results obtained using the fixed-effects estimation in 2 and 3. In the pooled 2SLS models (columns 3 and 7), the coefficient on the public expenditure on security remains negative and becomes significant compared to the pooled OLS model. This suggests that on the average the public provision of security and the private provision of security substitute each other. Finally, in the fixed-effects 2SLS models (columns 4 and 8), the coefficients on the public expenditure on security are positive and significant. This result does not account for the non-linear effect of the public expenditure on security conditioned on institutional quality, however, it is robust. The chosen instruments for the public provision of security appears to be strong and valid, since both the first-stage F-statistics and the p-value for the Hansen-J statistics are high.

Table 6 shows the first stage regressions where the public expenditure on security is a dependent variable. The first two columns provide the results of the estimation of the pooled models, whereas the next 2 models account for the regional fixed-effects. As it has been discussed in the previous section, it can be expected that federal transfers to regional budgets affected the public expenditure on security before the reform when both federal and local budgets had financed police. Hence, this measure should be included in a first stage to avoid the omitted variable problem.

First, we can see that the connections in different territorial police offices increase the public expenditure on security. Surprisingly, the career experience in the central office of the Ministry of Internal Affairs negatively affects the the public expenditure on security in a region. It can be suggested that dismissal from a position in the central office of the Ministry and appointment to the position of the head of a regional police office can be a honorary

retirement. The distance from the capital of a region to the center of a corresponding federal district also positively affects the public expenditure on security. However, the effect of the distance is either insignificant or negative before the police reform was implemented, and positive and significant afterwards.

7 Conclusions

In this paper, the factors that drive the demand for private security provision have been examined with the special focus on a supply of public security provision, institutional quality and income inequality. The empirical evidence reported in the paper relies on the data from the regions of Russia between 2009 and 2016, since Russia is an example of the high variation in institutional quality and income inequality among sub-national units given the weak national institutional environment.

In literature, the relationship between the private and public provision of security has not been extensively examined, whereas the existing evidence on the nature of this relationship is inconsistent and controversial. Whether privately provided security complements, substitutes or does not affect publicly provided security can depend on the quality of institutions. In this paper, this hypothesis is first time explicitly formulated and tested. The empirical results show that the effect of the public provision of security differs under different levels of institutional quality.

Under weaker institutions, the effect of the public provision of security is negative and publicly and privately provided security substitute each other. Under stronger institutions, the effect is either positive or insignificant and publicly and privately provided security either complement each other or are independent. However, a decrease in institutional quality induces and fosters substitutability between the providers of security. The plausible causal mechanism is as follows. Under strong institutions, the private providers of security take comparative advantage in preventing and monitoring non-violent crimes, whereas the public providers of security can redistribute more resources to violent crimes. Under weak institutions, on the contrary, the public providers of security have the incentive to free-ride on the private provision of security.

It has been also found that income inequality wields a non-linear effect on the private provision of security and there is the inverted-U relationship between two variables. This means that the highest values of the private provision of security are expected at the moderate levels of income inequality, whereas the further increase in income gap reduces the demand for privately provided security. This finding suggests that in the polarized societies with high wealth concentration a demand for private security may be low due to economies of scale.

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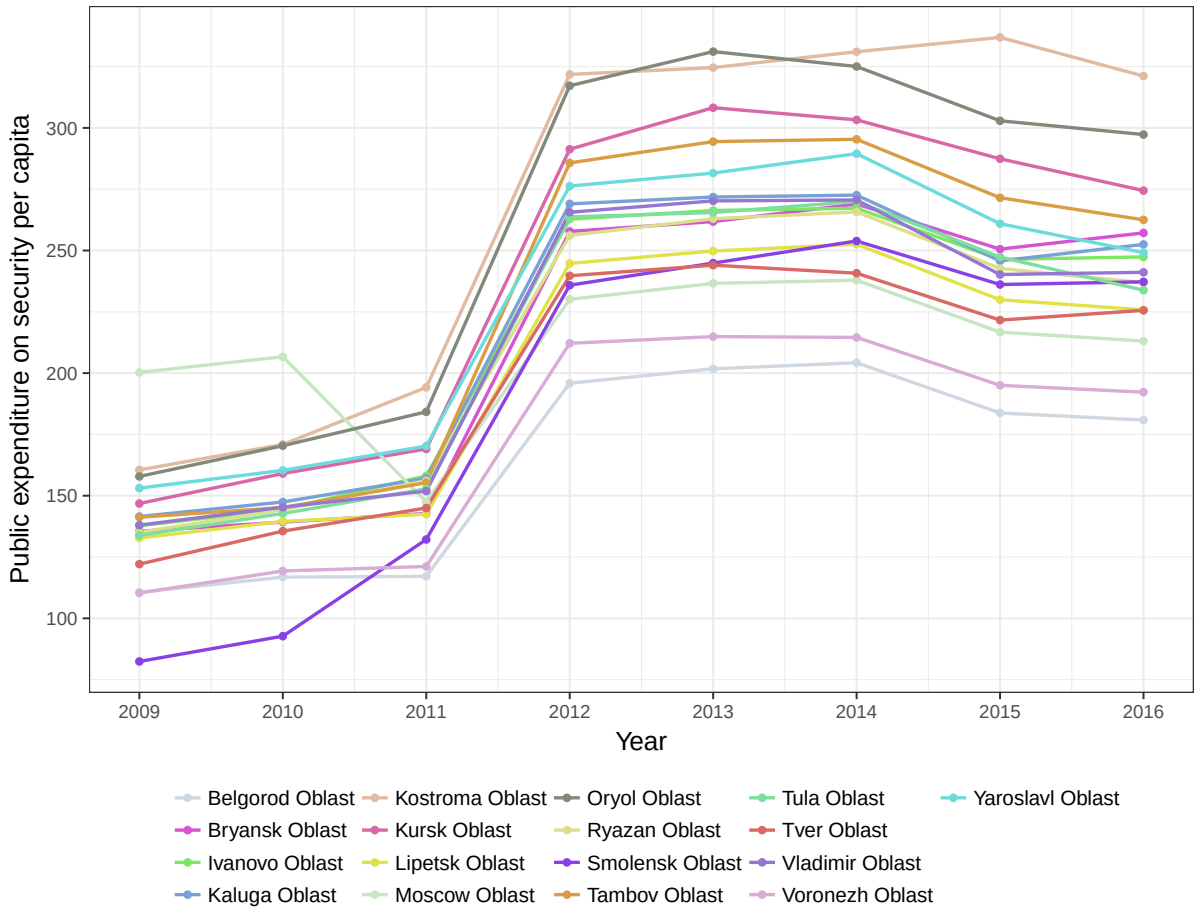
8 Tables and Figures

Figure 1: The dynamics of the public expenditure on security in the Central Federal District



Note: The public expenditure on security is measured in thousand of roubles. Moscow was excluded as an influential observation.

Table 1: Descriptive Statistics

Variable	N	Mean	St. Dev.	Min	Max
Dependent variable					
Revenue of private security industry (1000 roubles per capita)	584	0.445	0.659	0.002	6.893
Covariates					
Public expenditure on security (1000 roubles per capita)	664	329.733	246.498	82.407	2045.334
Registered cases of bribe acceptance (per capita)	664	0.0002	0.001	0.000	0.019
Income share of top 20% of population (%)	661	45.300	2.018	40.900	56.000
Log GRP per capita	658	12.485	0.701	10.740	15.577
Male unemployment (% from total unemployment)	661	56.981	6.729	39.600	82.900
Urbanization (%)	664	69.874	13.200	27.500	100.000
Instrumental variables					
Federal transfers (1000 roubles per capita)	643	0.019	0.027	0.002	0.324
Distance to the center of a federal district (km)	664	6.797	7.662	0.000	45.377
Connections in the central office of the MIA* (dummy)	572	0.110	0.303	0.000	1.000
Connections in the federal district police office (dummy)	632	0.160	0.524	0.000	3.000
Connections with the heads of regional police offices	514	1.282	0.807	0	3

* The Ministry of Internal Affairs

Table 2: Fixed-effects models: Investment Risk

	Dependent variable:							
	Revenue of Private Security Sector Per Capita							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public Expenditure on Security	0.001^{***}	0.001^{***}	0.001^{***}	0.001^{***}	0.001^{***}	0.0003	0.072	0.101^{*}
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.095)	(0.057)
Investment Risk		-0.001^{**}	0.001	0.001	0.002^{*}	0.002	-0.002^{**}	-0.002^{***}
		(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Interaction			−0.00001	−0.00001	-0.00001^{**}	-0.00001^{*}	-0.002^{*}	-0.001^{**}
			(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Income Inequality				-0.159^{***}	2.770^{***}	2.948^{***}	-0.160^{***}	-0.096^{***}
				(0.043)	(0.541)	(0.528)	(0.035)	(0.027)
Income Inequality^2					-0.031^{***}	-0.033^{***}	-0.199^{***}	-0.117^{***}
					(0.006)	(0.006)	(0.035)	(0.017)
Log of GRP PC						0.243^{***}	0.235^{***}	0.132^{***}
						(0.070)	(0.068)	(0.038)
Male Unemployment						−0.002	−0.022	0.003
						(0.002)	(0.022)	(0.009)
Urbanization						−0.007	−0.139	0.120
						(0.014)	(0.261)	(0.126)
Standardized Coefficients							✓	✓
Observations	583	583	583	583	583	583	583	569
R^2	0.044	0.047	0.054	0.238	0.501	0.520	0.520	0.353
Adjusted R^2	−0.113	−0.111	−0.106	0.108	0.414	0.434	0.434	0.236
F Statistic	22.778^{***}	12.399^{***}	9.446^{***}	38.815^{***}	99.540^{***}	66.848^{***}	66.848^{***}	32.845^{***}

Notes: Heteroskedasticity robust standard errors in parentheses. In columns 7 and 8, standardized coefficients are reported except for investment risk. The column 8 excludes Moscow and Yamalo-Nenets Autonomous Okrug as influential observations. The coefficients with * are significant at the 10% confidence level; with ** are significant at the 5% confidence level; with *** are significant at the 1% confidence level.

Table 3: Fixed-effects models: Corruption

	Dependent variable:							
	Revenue of Private Security Sector Per Capita							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public Expenditure on Security	0.001***	0.001***	0.001***	0.001***	0.0003***	−0.0003	−0.070	0.024
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.046)	(0.027)
Corruption		7.143*	25.742**	14.452	10.090	18.004**	0.002	0.007*
		(4.171)	(12.144)	(11.406)	(9.943)	(8.527)	(0.004)	(0.004)
Interaction			−0.060*	−0.042	−0.031	−0.055**	−0.014**	−0.012*
			(0.035)	(0.035)	(0.029)	(0.027)	(0.007)	(0.007)
Income Inequality				−0.158***	2.741***	2.965***	−0.147***	−0.089***
				(0.042)	(0.540)	(0.526)	(0.034)	(0.027)
Income Inequality^2					−0.031***	−0.033***	−0.200***	−0.121***
					(0.006)	(0.006)	(0.035)	(0.018)
Log of GRP PC						0.277***	0.269***	0.148***
						(0.074)	(0.071)	(0.033)
Male Unemployment						−0.002	−0.019	0.004
						(0.002)	(0.071)	(0.033)
Urbanization						−0.005	−0.090	0.167
						(0.014)	(0.268)	(0.135)
Standardized Coefficients							✓	✓
Observations	583	583	583	583	583	583	583	569
R^2	0.044	0.044	0.045	0.227	0.485	0.511	0.511	0.336
Adjusted R^2	−0.113	−0.115	−0.117	0.094	0.396	0.423	0.423	0.216
F Statistic	22.778***	11.505***	7.736***	36.414***	93.601***	64.403***	64.403***	30.442***

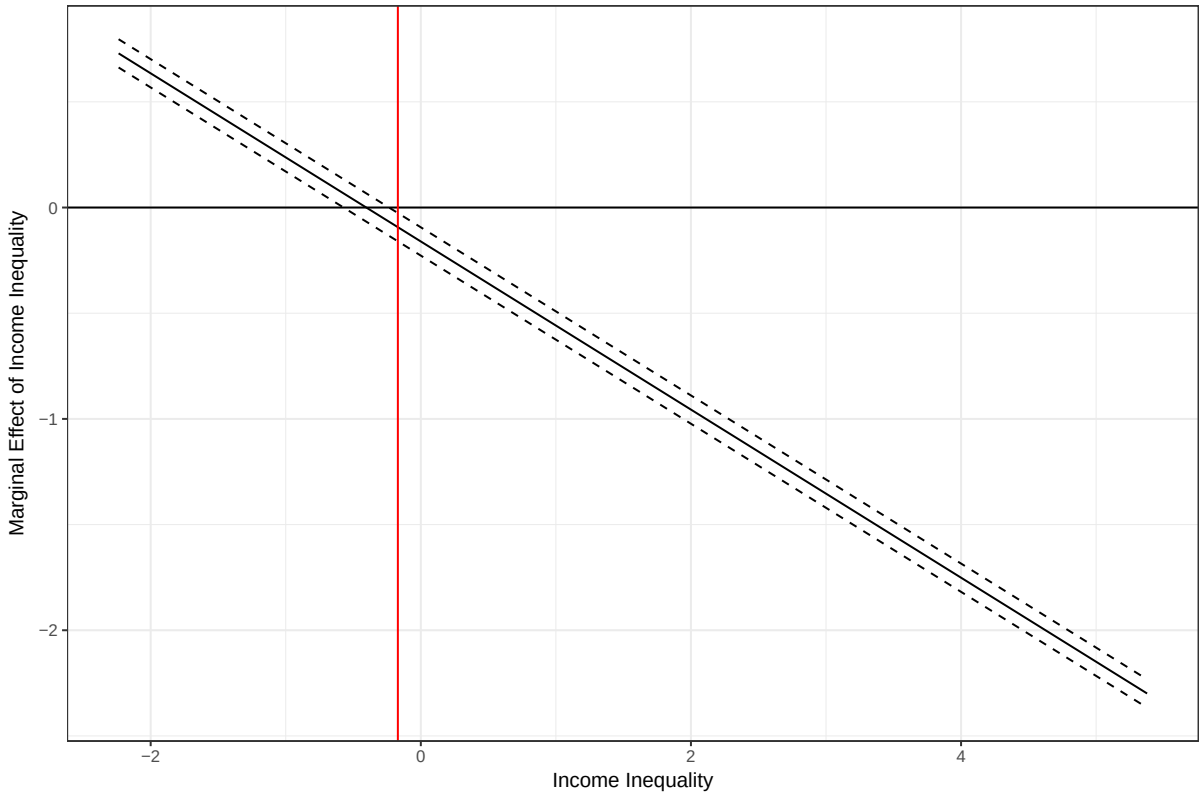
Notes: Heteroskedasticity robust standard errors in parentheses. In columns 7 and 8, standardized coefficients are reported. The column 8 excludes Moscow and Yamalo-Nenets Autonomous Okrug as influential observations. The coefficients with * are significant at the 10% confidence level; with ** are significant at the 5% confidence level; with *** are significant at the 1% confidence level.

Table 4: Marginal effect of the public provision of security
on the private provision of security conditioning on institutional quality

Year	Weak institutions Investment risk = 79	Median institutions Investment risk = 42	Strong institutions Investment risk = 5
2009	Kostroma Oblast	Arkhangelsk Oblast	Vologda Oblast
2010	Tuva Republic	Stavropol Krai	Tula Oblast
2011	Tuva Republic	Ryazan Oblast	Rostov Oblast
2012	Karachay-Cherkess Republic	Republic of Bashkortostan	Kaliningrad Oblast
2013	Volgograd Oblast	Jewish Autonomous Oblast	Komi Republic
2014	Kostroma Oblast	Tula Oblast	Voronezh Oblast
2015	Republic of Dagestan	Kursk Oblast	Leningrad Oblast
2016	Kostroma Oblast	Kaluga Oblast	Yamalo-Nenets Autonomous Okrug
Marginal effect	$\mathbf{-0.121}^{**}$ (0.030)	-0.030 (0.566)	0.060 (0.498)

Notes: P-values in the parentheses. The coefficient with ** is significant at the 5% confidence level. The values of investment risk correspond to the 0.95, 0.5, and 0.05 quantiles respectively. The higher values of investment risk denote weaker institutions.

Figure 2: The marginal effect of income inequality
on the private provision of security



Note: The vertical red line denotes the median value of income inequality.

Table 5: IV estimates

	Dependent variable:							
	Revenue of Private Security Industry Per Capita							
	OLS	OLS	IV	IV	OLS	OLS	IV	IV
	Pooled	Pooled	Pooled	FE	Pooled	Pooled	Pooled	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Public Expenditure on Security	-0.057	0.139	**-0.102****	**0.142*****	-0.041	-0.042	**-0.083****	**0.140*****
	(0.042)	(0.113)	(0.050)	(0.051)	(0.037)	(0.038)	(0.040)	(0.052)
Investment Risk	0.003	0.003	0.004	-0.001				
	(0.002)	(0.002)	(0.002)	(0.001)				
Interaction (Investment Risk)		**-0.004****						
		(0.002)						
Corruption					0.045*	0.055***	0.045*	0.012
					(0.025)	(0.014)	(0.026)	(0.009)
Interaction (Corruption)						**-0.105*****		
						(0.024)		
Income Inequality	0.128***	0.137***	0.135***	-0.171***	0.125***	0.126***	0.131***	-0.167***
	(0.029)	(0.027)	(0.028)	(0.044)	(0.027)	(0.027)	(0.026)	(0.043)
Income Inequality^2	0.052***	0.053***	0.074***	-0.178***	0.058***	0.056***	0.082***	-0.179***
	(0.017)	(0.018)	(0.022)	(0.045)	(0.015)	(0.015)	(0.020)	(0.045)
Observations	557	557	396	392	557	557	396	392
Endogenous variable	Public Security	Public Security	Public Security	Public Security	Public Security	Public Security	Public Security	Public Security
Controls	✓	✓	✓	✓	✓	✓	✓	✓
First stage F-statistics			39.87	20.18			36.77	19.15
Hansen-J			5.617	10.478			5.669	11.252
			(0.345)	(0.399)			(0.339)	(0.338)

Notes: Standardized coefficients are reported. The coefficients with * are significant at the 10% confidence level; with ** are significant at the 5% confidence level; with *** are significant at the 1% confidence level.

Table 6: First stage regressions

	Dependent variable:			
	Public Expenditure on Security Per Capita			
	Pooled	Pooled	FE	FE
	(1)	(2)	(3)	(4)
Regional connections	0.164***	0.089*	0.237***	0.076*
	(0.057)	(0.051)	(0.045)	(0.041)
Federal district connections	0.693***	0.273**	0.483***	0.149
	(0.140)	(0.106)	(0.156)	(0.125)
Central office connections	-0.226**	-0.180*	-0.111	-0.037
	(0.088)	(0.097)	(0.167)	(0.132)
Distance until 2012	0.029	0.018*		
	(0.018)	(0.010)		
Distance since 2012	0.077***	0.042***		
	(0.014)	(0.011)		
Distance X 2010			0.005	-0.006
			(0.006)	(0.005)
Distance X 2011			0.005	-0.015**
			(0.008)	(0.006)
Distance X 2012			0.070***	0.045***
			(0.009)	(0.008)
Distance X 2013			0.070***	0.038***
			(0.009)	(0.008)
Distance X 2014			0.075***	0.034***
			(0.010)	(0.009)
Distance X 2015			0.061***	0.023***
			(0.009)	(0.008)
Distance X 2016			0.048***	0.010
			(0.009)	(0.009)
Log of Federal Transfers	0.421***	0.561***	-0.059	-0.026
	(0.049)	(0.054)	(0.077)	(0.068)
Observations	396	396	396	396
Private Security Controls		✓		✓

Notes: The coefficients with * are significant at the 10% confidence level; with ** are significant at the 5% confidence level; with *** are significant at the 1% confidence level.

Natalia Vasilenok
National Research University Higher School of Economics (Moscow, Russia)
Research Assistant, Center for Institutional Studies, Laboratory for Applied Analysis of Institutions and Social Capital
E-mail: nvasilenok@hse.ru