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### **Sticks or Carrots? Comparing Effectiveness of Government Shadow Economy Policies in Russia**

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## Abstract

Which incentives have the strongest impact on the size of the shadow economy? Is it about government's pressure against entrepreneurs operating in this sector, or is it about the benefits of legality? The goal of this paper is to explicitly contrast the role of *sticks* (court repressiveness) and *carrots* (financial aid to small and medium-sized firms) as factors determining the size of the shadow economy, using the case of the Russian taxi market. It uses a unique dataset of taxi licensing data from regional transport departments and indicators for taxi market demand to estimate the extent of informal business. When controlling for market demand, it finds a strong and robust positive effect of sanctions on the size of the official market, with higher repressiveness leading to a smaller shadow economy. In contrast, the effect of *carrots* was insignificant. The results suggest that the effectiveness of *carrot* policies is compromised when entrepreneurs operate informally to avoid dealing with corrupt bureaucrats and have low trust in the government.

**JEL-Classification:** D73, D78, O17

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## 1 Introduction

Tackling the shadow economy has become a priority for policy makers in developed and developing countries alike. However, despite a large and growing body of literature on the size and determinants of the shadow economy, there is little empirical research that analyzes the effectiveness of various formalization policies. One explanation for this void is that in cross-country studies, it is difficult to control for the variation of political and institutional frameworks, while on the subnational level, there is usually not sufficient variation in the implemented policies. In addition to the scarcity of empirical studies on policy effectiveness, previous empirical research has predominantly focused on developed economies with well-functioning tax and regulatory administrations. Yet, the recipes that work in Western Europe and North America may not be helpful to fight the large and persistent shadow economies of less developed countries (Williams and Nadin 2014).

This paper argues that the institutional context has to be taken into account to find the right policy mix. Much depends on the bureaucracies and agencies that are implementing the policy (Rist 1998; Eilat and Zinnes 2002), as well as on the motives and policy interpretation of the economic agents. It is now widely recognized that institutions are an important determinant of the shadow economy in less developed countries. Corrupt state officials who extort entrepreneurs, insufficient state services and the resulting low trust in the state create incentives for entrepreneurs to operate informally. As a result, particular governmental policies can become more or less effective in various contexts.

Policies aimed at confronting the shadow economy can be broadly characterized in *sticks*, meaning sanctions that make informality less attractive to entrepreneurs, and *carrots*, i.e. policies that create positive incentives for formalization (Small Business Council 2004; Brockmann *et al.* 2016). This study compares the effectiveness of *sticks* and *carrots* in reducing the size of the shadow economy, using a unique dataset from the previously unexplored case of the Russian taxi market. Our study focuses on the subnational variation in the level of formalization of the market among 76 Russian regions. We utilize two aspects of heterogeneity of governmental policies across regions. On the one hand, although all regions are subject to the same federal laws, courts have considerable discretion in applying sanctions. We use the courts' propensity to make prison sentences unconditional (court repressiveness) to capture variation of *sticks* in the Russian regions. On the other hand, we also consider the *carrot* policies that the Russian government has implemented – in particular, the variation in the funding of state programs to subsidize small and medium-sized enterprises (SMEs) across regions of Russia. To estimate the regional market share of the official economy, this paper uses data on taxi licenses (the official market), while controlling for overall taxi demand.

We find a strong and robust positive effect of *sticks* on the size of the official market, indicating a smaller shadow economy. In contrast, the effect of *carrot* policies is insignificant (albeit positive as well). We explain this result with the institutional environment and the resulting business-state relationship in Russia. Subsidies require that informal entrepreneurs first expose themselves to a state bureaucracy, which often engages in extortion and other forms of corrupt practices. Thus, low trust into the government precludes business from taking advantage of the *carrots*, rendering this policy ineffective. In contrast, sanctions are likely to be implemented more effectively because they give bureaucrats additional leverage over businesses and forces them to comply. Even if the business has a generally low trust in government, it still assumes that the bureaucrats, driven by their own career concerns and possibly willingness to extort bribes, will actively use harsh punishments: Hence, one has an incentive to rethink one's attitude towards business legalization.

Our paper is structured in the following way: In section two, a brief overview over institutional causes of shadow economies is given, followed by a summary of the literature on policy effectiveness. Section three characterizes the Russian taxi market, the role of the shadow economy and the policies which are in place to support formalization. Section four presents our empirical model and the results for the effectiveness of *stick* and *carrot* policies in the Russian taxi market. In section five, the findings are discussed and implications for policy and further research are addressed.

## **2 Theory and literature**

Entrepreneurs in the shadow economy, defined here as “all market-based legal production of goods and services that are deliberately concealed from public authorities” (Schneider *et al.* 2010: 444), operate informally for a variety of reasons. Common explanations are that operating in the shadow economy allows entrepreneurs to save on taxes, social security payments, and costs for complying to regulations (De Soto 1989; Schneider 2005). However, especially in less developed countries, poor institutions have been identified as another major cause of informality (Dreher *et al.* 2009). Corruption, low quality of state services and a lack of accountability of bureaucrats are important factors driving business into the shadow economy.

Several studies explain the reluctance to officially register and comply to regulations as an attempt to minimize exposure to corrupt bureaucrats (Friedman *et al.* 2000; Choi and Thum 2005; Aidis and Adachi 2007: 403; Dreher *et al.* 2009). In many developing countries, bureaucrats follow their own agenda and extort bribes from businesses, which has been characterized as the “grabbing-hand model” of bureaucrat-entrepreneur interaction (Frye and Shleifer 1997). If officials are successful in extorting bribes, firms are forced to make payments off the books which also leads them to the “grey zone” of partial informality (Vasileva 2017). The corrupt transactions of bureaucrats and businessmen are not necessarily confrontational: Kickbacks from businesses acquainted to political actors in public procurement are widespread and tax officials may also collude with businesses to reduce payable tax (Hindriks *et al.* 1999).

Poor institutions also affect the legislative process. In countries where institutions allow for political participation of those affected by new laws, it is more likely that efficient and less costly regulation is introduced in the first place (Loayza *et al.* 2005; Timm 2010: 3). But even if the regulations are “fine on paper”, discretion of bureaucrats increases the burden on firms (Johnson *et al.* 1998).

For entrepreneurs, the price of operating in the shadow economy is losing access to state services such as the enforcement of property rights and official documents required for bank loans (De Soto 1989; Loayza 1996). If the overall quality of state services is poor and the official enforcement of property rights is not reliable, however, there is little reason to comply with the state regulations (Chong and Gradstein 2007). For protection and contract enforcement, shadow entrepreneurs often employ the services of private legal or illegal organizations instead (Johnson *et al.* 1997; Frye and Zhuravskaya 2000; Varese 2005). When law enforcement is ineffective, it is also less likely that the shadow entrepreneurs will be detected (Farrell 2004: 34; Dabla-Norris *et al.* 2008).

Finally, poor institutions also impair the willingness of entrepreneurs to formally register and pay taxes because of a lack of perceived fairness and trust in business-state affairs (Torgler

2007; Torgler and Schneider 2009). A sustainable “psychological contract” between taxpayers and state requires quality state services as well as political participation (Feld and Frey 2002, 2007). When the relationship between the state and businesses resembles that of “cops and robbers” instead of “service and client”, voluntary compliance is unlikely (Kirchler *et al.* 2008).

Despite the mounting evidence of the impact of institutions on the shadow economy, the effectiveness of policies has – with a few exceptions – only been examined for democratic countries with little corruption and effective bureaucracies. In a comprehensive survey of twenty-six laboratory experiments on the effect of punishment on compliance, Italy turned out to be the most corrupt country scrutinized by researchers (Blackwell 2010).<sup>1</sup> Since the effectiveness of policies depends on the motives of entrepreneurs and the functioning of the state organs that implement them, additional research is needed on countries with very high level of corruption and poor public bureaucracy. There is no “one-size-fits-all” policy, what is needed instead is a “variegated approach” (Williams and Nadin 2014). This paper attempts to fill this gap by comparing the effectiveness of *stick* and *carrot* policies in an environment with weak institutions.

## 2.1 Stick and carrot policies

There is a variety of instruments available to governments for dealing with the shadow economy. Possible strategies include doing nothing, de-regulation, formalization and eradication of the shadow economy (Williams and Nadin 2012). From the standpoint of the government, the preferred policy outcome is mostly the formalization of shadow entrepreneurs as opposed to their eradication (i.e., a case when shadow economy activity is ceased without respective formal activity started), because formalization allows to increase regulatory control and tax returns while keeping the shadow entrepreneurs in business (Williams 2016). The policies employed to achieve formalization can be broadly categorized in *sticks* and *carrots* (Bemelmans-Videc *et al.* 1998)<sup>2</sup>.

The rationale behind *stick* policies is to make informality less attractive by imposing harsher punishment such as fines, confiscation of property or prison sentences, and by strengthening enforcement efforts to make detection more likely. The theoretical support for this policy mainly comes from models of non-compliance that are essentially cost-benefit considerations. Stricter penalties lead to more compliance and a smaller shadow economy as expected costs of

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<sup>1</sup> According to the current Corruption Perception Index Ranking published by Transparency International. The experiments were conducted in USA (13), UK (3), Israel (2), Austria, Canada, Costa Rica, Hong Kong, Italy, New Zealand, Spain and Switzerland (each 1).

<sup>2</sup> Sticks and carrots relate to direct measures targeted at formalization. There are many policies that have an indirect effect on the size of the shadow economy, which are not considered here.

informality rise (Becker 1968; Allingham and Sandmo 1972). Although the deterring effect of sanctions has been confirmed in a large number of laboratory experiments on tax evasion (Blackwell 2010), a strong consensus in the literature on this topic is lacking (Feld and Schneider 2010). This may be partially due to the fact that participants tend to view laboratory experiments as “merely a game” in which nobody actually is severely fined or has to go to prison; the response could be different in a real-life situation with higher stakes (Webley and Halstead 1986: 87).

Additionally, sanctions may not be equally effective in every context. Previous work suggests a moderating effect of the institutional environment on the effectiveness of sanctions. Some studies link prevailing social norms to the impact of penalties, attesting a stronger effect where tax evasion is widespread and considered acceptable (Davis *et al.* 2003; Wenzel 2004). Where, in contrast, the “psychological contract” between authorities and entrepreneurs is intact, stricter deterrence policies may even reduce compliance by damaging this relationship (Murphy 2005; Feld and Frey 2007). This indicates that the inconsistent results may be caused by the empirical methods and the institutional context in which the vast majority of studies has been conducted.

*Carrot* policies are aimed at making it more attractive for entrepreneurs to formally register their business and declare income. Common ways to achieve this are lowering taxes, easing regulation, or offering targeted financial support to small firms (Williams 2014: 121). Because a correlation of tax rates and the shadow economy has been identified by a number of studies, lowering tax rates is the most straightforward policy recommendation (Schneider 2005). Yet, tax cuts can be problematic as well if the quality of public services suffers from shrinking budgets (Friedman *et al.* 2000).<sup>3</sup> Deregulation policies aim at easing the regulatory burden and have been linked to a smaller shadow economy in previous research (Thiessen 2003; Enste 2010).

Overall, both tax cuts and a general deregulation are “meta measures” (Schneider and Williams 2013) that have considerable side effects and are difficult to implement. Most governments try to use more pinpointed *carrots* to incentivize formalization. One approach is offering direct financial support to small businesses that are formally registered (Williams 2014: 131). Across Europe, about half of the governments have similar measures in place and consider them to be effective for fighting the shadow economy (Dekker *et al.* 2010). Financial help such as grants or affordable loans is usually structured to offer support for starting or expanding businesses, helping entrepreneurs with the investments that are necessary to fulfil regulations. Empirical research has shown that support programs foster the development of small enterprises in

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<sup>3</sup> In the case of Russia, despite a drastic reduction of rate and complexity of income taxes to a flat 13% in 2001 the shadow economy has not shrunk (Schneider *et al.* 2010), however, the tax reform has been connected to a reduction in informal employment (Slonimczyk 2012) and higher tax compliance (Gorodnichenko *et al.* 2009).

the developing world (Schreiner and Woller 2003). These policies are also increasingly implemented in Western European countries as part of a general trend towards *carrot* policies and “positive reinforcement” (Sepulveda and Syrett 2007; Williams 2014: 121).

However, the effectiveness of *carrot* policies may be limited to well-functioning bureaucracies and an environment of good institutions. As entrepreneurs have to formalize first in order to become eligible for benefits offered by the state, one-sided trust in state officials is necessary for the policy to have an effect (Rose-Ackerman 2001: 565). When entrepreneurs hide in the shadow economy because of uncertainty over bureaucrats’ behavior and weak protection of property rights, *carrot* policies, especially those that are based on a one-off subsidy, are unlikely to tip the scale. The effectiveness of *carrot* policies is further impeded if bureaucracies lack the “service mentality” necessary for their successful implementation or available funds are drained by corruption. The Russian case, as will be shown in what follows, could provide evidence with respect to this type of economies.

### 3 Empirical case

In this paper, we empirically study the effectiveness of *sticks* and *carrots* using a dataset of Russian regions. The advantage of this approach is that subnational studies alleviate some of the concerns of unobserved heterogeneity that are common in cross-country regressions. In contrast to existing studies, we examine policy effectiveness in the context of weak institutions and corrupt bureaucracies. The Russian shadow economy is estimated to equal 41%–47% of GDP (Alexeev and Pyle 2003; Schneider *et al.* 2010). Surveys conducted in Russia find that few SMEs are operating in full compliance with all regulations (Williams and Round 2008; Vasileva 2017). This is despite the fact that the formal barriers for market entry are comparatively low in Russia. In the most recent World Bank’s Ease of Doing Business report, which only considers the rules “on paper”, Russia ranks 26 out of 190 economies in the ease of starting a business (World Bank 2016). Kim and Kang find that, together with the delay of reform, low quality of institutions is the main driver of informality in Russia (Kim and Kang 2009). The business environment is not hostile because of regulation *per se*, but because of the behavior of state officials (Safavian *et al.* 2001; Aidis and Adachi 2007). Many new SMEs in trade and services prefer to keep their distance to the state (Yakovlev 2006); overall, the trust into government in Russia is very low (Sapsford *et al.* 2015). Some informal practices are also inherited from the Soviet era, when informal dealings were a key element in the daily life of most Russians (Ledeneva 2006).

In this paper, we single out the taxi market to analyze policy effects on the shadow economy. There are few industries in Russia in which informality is as common as among Russian cabs.<sup>4</sup> For Moscow, the department of transport estimated the market share of informal taxis to be 70% in 2012 (Mer Moskvyy 2013). The taxi market was deregulated in 2005, when the previous licensing system was abolished because it was deemed to hold back market development (Rossiyskaya gazeta 2005). However, just six years later, a new “Law on taxis” was approved that made a taxi license mandatory again starting 1<sup>st</sup> of January 2012 (Rossiyskaya gazeta 2011a). Taxi licenses are issued by the regional transport departments since mid-2011. To receive a license, taxi entrepreneurs have to incorporate or register as an Individual Entrepreneur (IP, i.e., a person exercising business activity and thus subject to requirements set by the Russian government). With the “Law on taxis”, some new regulatory hurdles were introduced (Goncharova 2011). According to the new law, each taxi has to be equipped with a taximeter, a light on the roof and a chessboard pattern on the doors to qualify for a license. It has to pass a technical

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<sup>4</sup> There is even a Russian word for informal taxis (*bombily*) and working as an informal taxi driver (*bombit'*).

check at the beginning of each workday. The driver has to have at least five years of driving experience and needs to undergo a daily medical checkup (Rossiyskaya gazeta 2011b).

Because there are no business-related or serious technical obstacles to formalization in the case that we investigate in this paper, it is a most-likely case that should show a comparatively strong reaction to policy differences (Gerring 2006: 120). The services offered by the shadow entrepreneurs are mostly identical to the services in the formal market, which is often not the case for other types of shadow activity (La Porta and Shleifer 2008). Formalization is less risky for taxi drivers than for entrepreneurs in other industries, as there are no previously established businesses (such as stores or workshops) that would raise questions about the past when they formalize. The only type of business investment an informal taxi driver undertakes is to buy a car: This, however, can be easily justified as buying it for private use and only later turning it into a taxi. Hence, taxi entrepreneurs are not stuck in an “informality trap”, in contrast to many other shadow businesses, for which formalization is extremely risky (Kenyon and Kapaz 2005; Vasileva 2017: 92). From this point of view, responses to different governmental measures should be relatively easy to observe.

### **3.1 Measuring the shadow economy**

The literature on the shadow economy provides a rich array of approaches which are based on different data sources and methods (a comprehensive survey of methods can be found in Kazemier 2006). The most common direct methods include data on tax evasion cases and surveys. For example, the Russian Federal State Statistics Services (Rosstat) uses monthly surveys to estimate the share of informal employment in Russia (Rosstat 2016a). However, in the majority of studies, indirect approaches are used. One common method is to compare growth rates of formal (observed) GDP with measures that correlate with total GDP (including the shadow economy) such as liquidity demand or electricity consumption (Kaufmann and Kaliberda 1996). More recently, indicators and explanatory variables have been used to estimate the size of the shadow economy as a latent variable in MIMIC (Multiple Indicator Multiple Causes) models (Schneider *et al.* 2010).

There are relatively few studies that use subnational data for the estimation of shadow economies. Some of the exceptions are studies using MIMIC models on Germany (Buehn 2012), India (Chaudhuri *et al.* 2006) and the USA (Wiseman 2013). In the case of Russia, besides the survey-based Rosstat data on informal employment (Rosstat 2016b), there have been several studies that estimate the size of the shadow economy on a regional level. They rely on differences in reported income and expenditures (Nikolayenko *et al.* 1997), regional data on electricity consumption (Komarova 2003; Kim and Kang 2009; Smith and Thomas 2015; Vorobyev 2015) and MIMIC models (Kireenko *et al.* 2017).

In contrast to existing studies on the regional shadow economy in Russia, our analysis focuses on a particular sector – the taxi industry – rather than the Russian economy in general. Hence, a specific approach can be used to measure the extent of the formalization of the market. The federal “Law on taxis” requires regional transport departments to publish a list of all active licenses on their websites. Because there is one license entry for each car that contains the name of the company or entrepreneur operating it, this information can be consolidated into regional data on the formal market size as well as market structure and concentration. It stands to reason that the variation across regions in the number of licenses can be driven by two factors: the actual size of the taxi market (essentially determined by the demand for this service) and the extent of formalization of taxi services. Thus, if we control for the market demand, differences in the number of formal taxis can be explained with differences in the share of shadow entrepreneurs. This is precisely the approach used in our study, where a wide array of proxies of market demand are added to the regressions as control variables

Most firms in the shadow economy are small (Dabla-Norris *et al.* 2008). This is because, on the one hand, fixed costs caused by regulation are a heavier burden for smaller companies (Kitching 2006). On the other hand, smaller firms are less likely to be detected (De Paula and Scheinkman 2007). This allows us to double-check our estimates of the shadow economy using the market structure: Where formalization policies are effective, this should not only result in a larger official market (when controlling for demand), but also lead to a relative increase in smaller official firms and consequently lower official market concentration (a lower regional Herfindahl-Hirshman index), as more small firms from the shadow economy formalize.

Although the declared goal of the “Law on taxis” was not to eradicate, but to formalize the shadow economy (Rossiyskaya gazeta 2011c), the implemented *stick* policies may also lead to market exits of shadow entrepreneurs. Especially part-time drivers who work in addition to regular daytime jobs (“moonlighters”) may get squeezed between the risk of sanctions and the risks of formalization. Their market exits would show in increased demand for remaining firms both in the shadow economy and in the formal market, meaning that larger firms in the formal market would grow as well.

### **3.2 Sticks and carrots**

The Russian state uses both *stick* and *carrot* policies to motivate entrepreneurs to leave the shadow economy. In the case of the taxi industry, an informal taxi driver is fined 5,000 rubles if he gets caught (about \$100 or two thirds of the Russian monthly minimum wage). In some cases, the cars of informal taxis are impounded until a court decides on the driver’s case (Shchedrova 2014; GIBDD 2016). The driver may also be held responsible for more severe offenses

such as illicit entrepreneurship (operating without registering as an IP or legal entity) as well as tax evasion. Traffic police and tax police often cooperate in the pursuit of informal taxi drivers. For a conviction of the driver, the prosecutor has to prove in court that the taxi driver charged the passengers for the trip, which is why decoy passengers are used, who then navigate the driver into a previously set up control point (Ermolyuk 2015).

The fines for operating a taxi without the required license are prescribed by the Code of Administrative Offenses (KoAP) of the Russian Federation. While fines for less significant traffic offenses are determined by the executive organs (traffic police), decisions on the illegal operation of a taxi are made in court (GIBDD 2016). However, the fines defined in KoAP may be the least of the driver's problem: If he did not declare his taxes or did not register as an IP, potential sanctions prescribed by the Criminal Code are much more severe and include prison sentences. This is precisely the basis for our empirical proxy of *sticks*.

In particular, we use the regional indicator of “court repressiveness” developed by Libman, Kozlov and Schultz (Libman *et al.* 2012; Schultz *et al.* 2014) to capture the difference in sanction severity across Russian regions. The basis for computing and applying this indicator is the following: There is a substantial variation across Russian regions in the typical punishments imposed by courts for various felonies. Directly comparing these punishments, however, is problematic because they depend not only on the way the courts implement the law, but also on the nature of individual felonies (which is not observable to us). Furthermore, Russian courts make almost no acquittal decisions, which makes it impossible to compare the variation in this respect across regions as well (Paneyakh 2014). However, there is a particular situation when there are differences in the severity of punishments for identical crimes, which are not influenced by the nature of the crime. In particular, if the Russian Criminal Code requires a felony to be punished by a prison sentence, the court has the right to replace the actual sentence with the conditional release. In this case the accused is still legally treated as sentenced to prison, but is not actually convicted but rather allowed to live and work freely under police supervision. Given the harshness of conditions of the Russian prison, conditional release is a much better outcome of the court trial than actual sentence; however, decisions on conditional releases are (with some very specific exceptions) made not because of the nature of the crime but rather because of the personality of the accused (i.e., the previous good standing, family background etc.). This gives Russian courts enormous discretion in applying this tool. There are substantial cross-regional differences in this respect, which one could reasonably interpret as differences in the repressiveness of the courts for otherwise similar crimes.

Therefore, our main explanatory variable measuring the extent of *sticks* is the share of unconditional prison sentences in total prison sentences passed in the respective region. Given the data availability, we compute it for the period of 2006–2010 for the regional courts. We

acknowledge that in many cases the offenses that led to a conditional release or prison sentence were applied to were very different from those actually facing an informal taxi driver. However, cases decided by the regional court may influence the overall perception of the legal environment and possible harshness of sentences for individuals in a region (who may learn about the outcomes of the trials from the media, through informal networks etc.) and thus affect their behavior. In our analysis, we will also look at repressiveness of courts in individual types of crimes, which could be more relevant for the case we study.

The *carrot* policies analyzed in this paper are subsidies for SMEs which the Ministry of Economic Development is offering to (formal) entrepreneurs since 2005 (Yakovlev 2006: 1052). The support is organized on the regional level but partially paid for with federal transfers. Regions can suggest SME development programs and receive co-financing from the federal budget if they succeed in a national competition of all suggested measures organized by the ministry. Thus, the subsidies paid to regions depend mainly on the policies and efforts of the regional governments (MinEkonomRazvitiya 2016a). In the years 2005–2008, the total federal subsidies amounted to less than four billion rubles (\$70 million) each year. Since 2009, however, the yearly average of the federal co-financing is about 20 billion rubles (\$350 million, MinEkonomRazvitiya 2016b: 2). The program offers different kinds of support to entrepreneurs, ranging from financial help, to consulting and infrastructure. Financial support plays the largest role and consists of grants up to 300,000 rubles (\$5,000), micro-finance for three years up to 1 million rubles (\$17,000), subsidies for interest payments on debt, as well as government guarantees for credits. Grants and micro-finance are primarily targeted at previously unemployed citizens (MinEkonomRazvitiya 2016b). For our estimation, we use the amount of regional budget expenses and federal co-financing for SME development for each region in 2011–2013.

## **4 Empirical Analysis**

The paper applies the following empirical design: The dependent variable of the regressions is the *number of operators* legally present in the regional taxi market. This variable is extracted from official records of the regional governments for the period of 2011–2015. The transport departments of the regions are obliged to publish a list of all active taxi licenses on their websites. Some regions provide sophisticated online databases, others simply offer Microsoft Excel, PDF or Microsoft Word files for download. All lists include the full name of the firm or entrepreneur who owns the license (the operator), the license plate number and the date when the license was issued. The number of operators varies substantially across Russian regions. While in the City of Moscow more than 14,000 were present, in Kalmykia there were only 65 operators. In the majority of the regions, the number of operators does not exceed 5,000; the only exceptions are Moscow City, Moscow Oblast, Sverdlovsk Oblast, St. Petersburg and Rostov Oblast; our analysis will explicitly account for the presence of these outliers. Two main explanatory variables are the already described measure of court repressiveness, as well as the value of subsidies provided by the regional government and by the federal government to the SMEs in the region. The repressiveness of courts in Russian regions, again, is characterized by substantial variation: While in Belgorod Oblast 96% of all cases, where the court sentenced the accused to prison sentence, resulted in actual imprisonment, in Zabaikal Krai two thirds of the accused enjoyed the conditional release. Similarly, the financial support of the federal government to the regional SMEs is unequally distributed across the territory of the Russian Federation.

We regress the number of operators on both key variables, as well as a large set of controls, which are in particular designed to capture the differences in the size of the taxi market across regions (i.e., allow us to identify the actual differences in the formalization of the market). In particular, the following variables are used: First, we control for the regional population's size, as in more populous regions, obviously, the demand for public transportation should be higher. Second, we control for urbanization: Taxi transportation in Russia is more developed in cities and in suburbs than on the countryside. Thus, in regions with small urban population, the demand for taxi services should also be smaller. Third, we control for the income per capita in the region: Obviously, regions with higher income should demonstrate stronger demand for taxi services. Fourth, we control for the size of the regional territory. Fifth, we capture the access of the regional population to alternative means of transportation by controlling for the number of cars per capita and the bus passenger turnover. Finally, we control for the road density, which again should make using a taxi more attractive. All variables are from the official Russian statistics for the year of 2014. Summary statistics are reported in the appendix.

We estimate negative binomial regressions, since the dependent variable is a count one. In the first step, we run regressions adding each of the proxies of *sticks* and *carrots* separately, as well as jointly to the set of controls. The sample includes the majority of Russian regions, with the exception of Chechnya and lower-level regions (the so-called autonomous okrugs), for which data availability is limited and which are typically excluded from the empirical studies of Russian regions, as well as a small number of regions, for which no information on the licensing of taxis is available (Ingushetia, Altai Republic and Evreyskaya Autonomous Oblast). Thus, we cover 76 regions of the Russian Federation, which provides us with a substantially large empirical sample for the analysis.

The choice of the dependent and the independent variables makes the problem of reverse causality unlikely. Taxi market is merely one specific sector of the regional economy, which is not crucial for the generation of rents relevant for the policymaking. It is more likely that the decisions on the level of court repressiveness and funding of SMEs are made out of general concerns regarding the regional economy and political and business interests of the elites in the most lucrative sectors; however, and possibly as an unintended by-product, they also affect the market for taxi services.

The results are reported in Table 1. One can immediately see highly consistent regression outcomes: Court repressiveness is systematically associated with a higher number of legal operators. Subsidies (federal or regional) have no effect on the taxi market. Hence, at the first glance, it appears to be the case that in Russia *sticks have a strong and persistent effect on the formalization of the taxi market*, while *carrots* remain irrelevant.

This result allows us to refute another possible interpretation of the dependent variable: Hypothetically, the higher number of operators could reflect an overall higher number of taxis on the market, and not a smaller informal market share. As mentioned, we try to isolate the variation of the number of operators due to differences in the size of shadow economy by controlling for proxies of the market size and demand. But the negative correlation between court repressiveness and the number of operators makes our interpretation more likely than the alternative interpretation. If the dependent variable varied (*ceteris paribus* observable proxies of the market demand) because of the total size of the market and not because of the informal market share, it would be very difficult to explain why repressive courts should encourage market entry and lead to more entrepreneurs operating in the region. But if the variation of the dependent variable reflects the variation in the size of the shadow economy, the positive correlation is meaningful: *Sticks*, applied more actively, make formalization a necessity for the cab drivers.

**Table 1: Impact of *sticks* and *carrots* on the number of legal operators in the region, negative binomial regressions**

	(1)	(2)	(3)	(4)	(5)	(6)
Court repressiveness	1.690*** (0.477)			1.584*** (0.461)	1.688*** (0.473)	1.597*** (0.464)
Federal subsidies		-0.329 (0.219)		-0.256 (0.219)		-0.356 (0.231)
Regional subsidies			-0.160 (0.564)		-0.020 (0.566)	0.472 (0.660)
Population	0.402*** (0.118)	0.452*** (0.106)	0.404*** (0.143)	0.458*** (0.103)	0.404*** (0.140)	0.421*** (0.115)
Share of urban population	0.015* (0.008)	0.013* (0.008)	0.014* (0.008)	0.015* (0.008)	0.015* (0.008)	0.014* (0.008)
Income per capita	-0.036*** (0.008)	-0.034*** (0.008)	-0.033*** (0.008)	-0.037*** (0.008)	-0.036*** (0.008)	-0.038*** (0.008)
Territory	0.433*** (0.127)	0.364*** (0.107)	0.372*** (0.114)	0.423*** (0.119)	0.434*** (0.128)	0.408*** (0.126)
Cars per capita	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Bus passenger turnover	0.066 (0.102)	0.022 (0.085)	0.051 (0.107)	0.034 (0.089)	0.065 (0.112)	0.047 (0.097)
Road density	-0.201 (0.207)	-0.097 (0.220)	-0.044 (0.214)	-0.244 (0.199)	-0.201 (0.204)	-0.281 (0.206)
Constant	5.038*** (0.635)	5.691*** (0.631)	5.459*** (0.658)	5.246*** (0.615)	5.038*** (0.637)	5.346*** (0.646)
Observations	76	76	76	76	76	76

Note: \*\*\* significant at 1%, \*\* 5%, \* 10%. Robust standard errors in parentheses

The main results reported in Table 1 were subjected to a number of robustness checks. First, we concentrate on the outliers. For this purpose, we replicate regressions excluding all regions with the number of operators above 5,000 (this automatically forces us to drop Moscow City, Moscow Oblast and St. Petersburg – regions with particularly high level of development, which could have reflected itself in more developed taxi market). Similarly, we drop five regions with the highest regional (Moscow City, Tatarstan, Penza, Sverdlovskaya Oblast and Kurgan) and federal (Dagestan, Moscow City, Penza, Tatarstan and Rostov) subsidies. Third, we control for the informal employment share in the region in 2013 as reported by the Russian statistical agency: It could be a proxy of the overall development of the shadow economy. Fourth, similarly, we control for an index of corruption in the region – we extract it from the survey implemented by the FOM (a large Russian polling agency), which in 2010 implemented representative surveys in

the majority of Russian regions asking people about their corruption experience. Fifth, instead of using the control variables for the year 2014, we applied the average values for 2010–2014, assuming that the behavior of taxi entrepreneurs is driven not only by the contemporary situation, but also by the experience of a couple of years, and thus it would be insufficient to assess only the demand for taxis in 2014 to capture the size of the market we need to control for.

The results for the repressiveness of courts are confirmed throughout the specifications without exceptions. Only in some minor cases do the subsidies become significant. We also estimated a specification, where subsidies were replaced by the logs of these values to further deal with the problem of outliers: This is the only one where we find a consistent positive effect of federal (but not of regional) subsidies on formalization. In sum, the effect of *sticks* is much more robust than the effect of *carrots*, present only in some modifications of regressions.

**Table 2: Impact of *sticks* and *carrots* on the number of licenses issued in the region, negative binomial regressions**

	(1)	(2)	(3)	(4)	(5)	(6)
Court repressiveness	1.218*** (0.335)			1.274*** (0.347)	1.200*** (0.340)	1.289*** (0.357)
Federal subsidies		0.063 (0.137)		0.115 (0.135)		0.208 (0.177)
Regional subsidies			-0.385 (0.512)		-0.320 (0.509)	-0.578 (0.562)
Population	0.520*** (0.106)	0.491*** (0.100)	0.549*** (0.077)	0.488*** (0.101)	0.553*** (0.077)	0.524*** (0.084)
Share of urban population	0.011* (0.006)	0.011* (0.006)	0.012* (0.006)	0.012** (0.006)	0.012* (0.006)	0.013** (0.006)
Income per capita	-0.039*** (0.008)	-0.036*** (0.008)	-0.037*** (0.008)	-0.038*** (0.008)	-0.039*** (0.007)	-0.038*** (0.008)
Territory	0.205 (0.135)	0.160 (0.133)	0.169 (0.128)	0.214 (0.139)	0.214 (0.133)	0.234* (0.136)
Cars per capita	0.002* (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002* (0.001)	0.002* (0.001)	0.002* (0.001)
Bus passenger turnover	0.002 (0.075)	0.013 (0.073)	-0.015 (0.057)	0.024 (0.079)	-0.011 (0.062)	0.014 (0.070)
Road density	-0.055 (0.210)	0.050 (0.215)	0.039 (0.205)	-0.025 (0.215)	-0.045 (0.206)	0.013 (0.206)
Constant	6.423*** (0.479)	6.632*** (0.565)	6.692*** (0.468)	6.260*** (0.573)	6.414*** (0.476)	6.135*** (0.551)
Observations	76	76	76	76	76	76

Note: See Table 1

In the next step, we deal with possible interaction of *sticks* and *carrots*. It is possible to hypothesize that both variables mutually reinforce each other. For this purpose, we first rerun regressions (1), (4) and (5) using OLS (interpretation of interaction terms in non-linear models like negative binomial is notoriously difficult). Repressiveness remains significant in specifications (1) and (5), federal or regional subsidies are insignificant. We then add to specifications (4) and (5) the interaction terms between the subsidies and repressiveness. They, however, again turn out to be insignificant.

So far, our analysis focused on the number of operators present in the regional market. An alternative approach would be to look at the number of licenses, i.e. the number of cars admitted by the authorities to operate as taxis. Table 2 reports these results, which are entirely in line with those of Table 1. Again, *sticks* seem to matter for formalization, while *carrots* do not.

As the next step in our analysis, we look at the concentration of regional markets. For this purpose, we computed the Herfindahl-Hirshman index of the monopolization of the legal market for taxis.<sup>5</sup> The results are reported in Table 3 and support the argument we suggested in the previous section. One can see that higher level of repressiveness results in lower market concentration in the legal sector. We explain this with the more frequent entry of previously informal taxis into the legal sector. Interestingly, large federal subsidies result in higher concentration of the legal sector. This could indicate that these subsidies are actually captured only by a handful of interest groups, which use them to promote a small group of companies – thus, essentially, creating the redistribution effect in favor of relatively more powerful actors in the market.

Again, several robustness checks are used to support our results. First, we replicate regressions of Table 3 using the Rosenbluth index of market concentration – the results for the repressiveness of courts are confirmed. Second, we run regressions, using as the dependent variable the number of single-car operators on the market and the number of cars controlled by the operator with the largest number of cars (we apply negative binomial estimates). We observe that the number of single-car operators is higher if the repressiveness is higher, which is consistent with our hypotheses. At the same time, the number of cars owned by the largest operator is not affected by repressiveness (the largest operator, by the sheer size, is likely to operate legally from the very beginning) – but it goes up if the federal subsidies are larger (which is again consistent with our interpretation of interest groups capture of federal subsidies).

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<sup>5</sup> For obvious reasons, data on the illegal market are unavailable; it is prudent to assume that they are mostly dominated by single-cab drivers, who may, however, be involved in various forms of informal networks or enjoy some sort of protection from criminal groups or corrupt local officials.

**Table 3: Impact of *sticks* and *carrots* on the concentration of legal taxi markets, OLS**

	(1)	(2)	(3)	(4)	(5)	(6)
Court repressiveness	-4.041*** (1.399)			-3.247** (1.256)	-3.891*** (1.289)	-3.258** (1.250)
Federal subsidies		1.975*** (0.669)		1.867*** (0.646)		1.712*** (0.512)
Regional subsidies			3.090 (2.285)		2.970 (2.192)	1.074 (1.256)
Population	-0.168 (0.193)	-0.705*** (0.258)	-0.474 (0.373)	-0.713*** (0.258)	-0.509 (0.361)	-0.791** (0.306)
Share of urban population	-0.028 (0.025)	-0.018 (0.027)	-0.034 (0.027)	-0.016 (0.027)	-0.031 (0.026)	-0.018 (0.027)
Income per capita	-0.003 (0.022)	-0.007 (0.022)	-0.012 (0.022)	-0.003 (0.021)	-0.007 (0.022)	-0.005 (0.021)
Territory	-0.804*** (0.238)	-0.622*** (0.157)	-0.817*** (0.220)	-0.742*** (0.163)	-0.953*** (0.247)	-0.802*** (0.183)
Cars per capita	0.001 (0.004)	0.002 (0.004)	-0.001 (0.004)	0.004 (0.004)	0.001 (0.004)	0.003 (0.004)
Bus passenger turnover	-0.164 (0.200)	0.191 (0.218)	-0.032 (0.257)	0.190 (0.214)	-0.015 (0.249)	0.214 (0.223)
Road density	0.668 (0.529)	0.776 (0.478)	0.048 (0.548)	0.966** (0.476)	0.314 (0.495)	0.814* (0.472)
Constant	6.218*** (1.633)	3.163* (1.673)	5.606*** (1.766)	4.029** (1.691)	6.492*** (1.754)	4.310** (1.696)
Observations	76	76	76	76	76	76
R-squared	0.173	0.268	0.171	0.297	0.214	0.302

Note: See Table 1

In the final step of our analysis, we look more carefully at the main explanatory variable of the study – the court repressiveness. As we have acknowledged, it could include numerous types of felonies, which are most likely irrelevant for the issue of legalization of taxi drivers. Thus, instead of looking at the repressiveness in all types of felonies, we single out four articles of the Russian Criminal Code and study the repressiveness in this case. First, we look at fraud. Fraud (one of the most vaguely defined articles in the Criminal Code) is particularly often used by state actors to exercise pressure against entrepreneurs. Second, we look at illicit entrepreneurship (*izhepredprinimatel'stvo*), which is defined as creating a business organization without the actual intent to exercise a legal business activity (e.g., for the purpose of tax evasion schemes or other illegal activity). Third, we consider tax crimes, which may be an important issue for the entrepreneurs exercising their activity without a license (since in this case they inevitably evade taxes, as they cannot report the source of their income). Finally, we look at the punishments for corruption. In Russia, they mostly concern officials, but since illicit taxi networks often require certain behavior from

the side of bureaucrats, willing to turn their eyes away from the illegal activity for a bribe, higher punishments for corruption may become a problem for illegal taxi drivers as well, forcing them to legalize their activity without the informal support of the corrupt bureaucrats.

Results are reported in Table 4 (note that in some cases there were no prison sentences for certain types of felonies in some of the regions and hence they were excluded from the analysis). One can see that repressiveness in the matters of corruption and fraud indeed drives the number of legal operators upwards. Tax crimes do not seem to play a role in this respect. Illicit entrepreneurship is also insignificant; this is not surprising, because for illegal taxi drivers the illicit entrepreneurship (as defined above) is likely to be irrelevant (and also the size of the sample for this variable is very small). In any case, we can confirm that the legalization is related to the economic crimes potentially relevant for the calculus of the illicit taxi driver rather than by some other types of crimes included in the overall repressiveness indicator.

**Table 4: Number of operators and repressiveness in individual types of crimes, negative binomial**

	(1)	(2)	(3)	(4)
Population	0.380*** (0.120)	0.409*** (0.139)	0.406*** (0.123)	0.427*** (0.114)
Share of urban population	0.015* (0.008)	0.021 (0.014)	0.016* (0.009)	0.017* (0.010)
Income per capita	-0.032*** (0.008)	-0.046*** (0.017)	-0.037*** (0.014)	-0.032** (0.015)
Territory	0.404*** (0.126)	0.061 (0.106)	0.354*** (0.132)	0.325** (0.137)
Cars per capita	0.001 (0.002)	-0.000 (0.002)	0.002 (0.002)	0.000 (0.002)
Bus passenger turnover	0.076 (0.104)	0.097 (0.132)	0.056 (0.108)	0.056 (0.099)
Road density	-0.160 (0.203)	-0.410 (0.300)	-0.134 (0.200)	-0.337 (0.248)
Repressiveness (Fraud)	0.891** (0.385)			
Repressiveness (illicit entrepreneurship)		0.182 (0.268)		
Repressiveness (corruption)			0.552** (0.281)	
Repressiveness (tax evasion)				-0.124 (0.229)
Constant	5.301*** (0.652)	6.063*** (1.072)	5.436*** (0.725)	5.865*** (0.779)
Observations	76	43	75	66

Note: See Table 1

## 5 Conclusion

Many developing countries looking to improve economic conditions have attempted to implement “best practice” policies that proved effective in developed countries with well-functioning bureaucracies and accountable officials. However, in the context of weak institutions, the effects of these policies were often different than expected. In this paper, policies for tackling the shadow economy are analyzed in the context of weak institutions. We compare the effects of court repressiveness (*sticks*) and subsidies for SMEs (*carrots*) on the size of the shadow economy across regional taxi markets in Russia. We find that court repressiveness increases the number of cars and the number of firms in the formal taxi market (controlling for taxi demand), while the observed market concentration in the formal taxi market is lower, both indicating a smaller shadow economy. The effect of subsidies on the shadow economy, in contrast, is mostly insignificant.

We explain these results both with a lack of trust in the business-state relationship and the incentives the policies create for corrupt bureaucrats. To be eligible for subsidies, entrepreneurs first have to formalize and expose themselves. This requires the entrepreneurs to have trust into state agencies, which is notoriously lacking in Russia. The effect of subsidies may be further diminished when officials demand their share of the *carrots* they are handing out, a practice well-known from public procurement (Mironov and Zhuravskaya 2011). Because federal transfers have to go through several stages of ministries and may be “skimmed off” while changing hands, a part of the federal funds may not even reach their final recipient. Alternatively, they may be funneled to well-connected firms. This is indicated by the empirical finding that *carrots* do not have a significant effect except for an increase in size of the largest provider of the region.

In contrast, the effectiveness of *stick* policies is not impeded by the lack of trust between businesses and the state. Corrupt bureaucrats also have stronger incentives for actually implementing *sticks*. Discretion over their implementation gives them potentially more leverage in the extortion of businesses. The effective implementation of subsidies, in contrast, requires a service mentality which is not common in this context. Finally, subsidies require successful public communication: Entrepreneurs will only apply for subsidies if this possibility is transparent and advertised, while in the case of the legal sanctions ignorance of the law is no excuse.

Although the results show a clear effectiveness advantage of *sticks* over *carrots* in formalizing the shadow economy, the policy implications are less straightforward. *Sticks* do not only formalize, but also eradicate parts of the informal firms. Eradication can drain the entrepreneurial spirit of an economically active class of citizens and threaten their livelihoods (Asea 1996). It may also lead to higher market concentration and higher prices in the taxi market (if shadow entrepreneurs are included), raising welfare concerns. Finally, *sticks* may be a quick fix when the share of the shadow economy is very high, but at the same time further undermine the

relationship between business and the state in the long term. A functioning “psychological contract” is both the most effective and cost-efficient solution to tax evasion and informality. *Sticks* carry the risk of further alienating entrepreneurs and the government (Vedung 1998: 27).

This paper contributes both to the comparative analysis of policy instruments and to a better understanding of the shadow economy phenomenon. It adds to an emerging stream of research on the variety of shadow economies in different contexts which is set to overcome a “one-size-fits-all” approach in policy (Williams 2014; Williams and Nadin 2014). Furthermore, it also complements the empirical literature on policy effectiveness which has mainly been based on laboratory experiments.

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## Appendix

**Table A.1: Summary statistics of key variables**

Variable	No. obs.	Mean	St. dev.	Min	Max
Bus passenger turnover, bln passenger kilometers	79	1.565	1.489	0.006	6.976
Cars per capita (per 1,000 people)	79	278.700	55.643	79.500	489.200
Federal subsidies, trln RUB (total spending in three years)	79	0.330	0.508	0.000	3.423
HH index, %	76	1.979	2.180	0.175	11.402
Highest number of cars by an operator	76	416.040	523.052	2.000	2904.000
Income per capita (monthly, thousands of RUB)	79	24.626	8.130	12.398	57.310
Number of licenses	76	6790.500	10903.800	102.000	65551.000
Number of operators	76	1817.211	2412.953	65.000	14097.000
Population, mln. people	79	1.805	1.805	0.051	12.197
Regional subsidies, trln RUB (total spending in three years)	79	0.150	0.243	0.002	1.816
Repressiveness, between 0 and 1	79	0.467	0.124	0.259	0.962
Repressiveness (corruption), between 0 and 1	76	0.220	0.227	0.000	1.000
Repressiveness (fraud), between 0 and 1	79	0.418	0.165	0.077	0.965
Repressiveness (illicit entrepreneurship), between 0 and 1	44	0.151	0.281	0.000	1.000
Repressiveness (tax evasion), between 0 and 1	67	0.051	0.162	0.000	1.000
Road density, road km per mln. sq. km of the territory	79	0.275	0.384	0.001	2.438
Number of single car operators	76	1328.934	1749.724	57.000	10747.000
Territory, mln. sq. km	79	0.216	0.471	0.001	3.084
Urbanization, %	79	70.028	12.635	29.200	100.000