A "de Soto Effect" in Industry? Evidence from the Russian Federation

Alexei Karas; William Pyle; Koen Schoors

Abstract: The strengthening of land rights has been proposed as a policy to reduce financial market frictions and promote private investment in low and middle income countries. But assessments of these potential effects have proven inconclusive. One reason may be that research has focused on actors that face difficulties accessing credit for reasons other than the security of land tenure. We explore the effect of greater tenure security in a setting in which non-land-related financial market frictions are apt to be mild – that is, among large, urban, industrial enterprises. Exploiting policy variation across Russian regions and firm-level survey data, we show that private land rights facilitate credit access and promote investment.

JEL codes: D23, O16, P26

Keywords: Private land tenure, access to credit, de Soto effect

Alexei Karas: University College Roosevelt, Middleburg, Netherlands; and Utrecht University School of Economics, Utrecht, Netherlands.

William Pyle: Department of Economics, Middlebury College, Middlebury, Vermont; and International Center for the Study of Institutions and Development, Higher School of Economics, Moscow, Russia; wpyle@middlebury.edu.

Koen Schoors: Department of General Economics and CERISE, Ghent University, Ghent, Belgium; and BOFIT, Bank of Finland.

A "de Soto Effect" in Industry? Evidence from the Russian Federation

1. Introduction

Over the past two decades, the strengthening of land rights has become one of the most widely discussed policy prescriptions for reducing financial market frictions and promoting private investment in low and middle income countries. Land ownership, it is said, provides borrowers with an attractive form of collateral that can ease access to external finance. Moreover, by raising the cost of expropriation, it has the potential to provide those with the land use rights greater assurance that the return on new investments can be realized. Though the logic here is not unreasonable, convincing empirical support has been elusive. But it is worth noting that research to date has concentrated on small-scale producers that inhabit environments that may lie beyond the frontiers of formal finance. The literature, that is, is devoid of studies focusing on actors in environments in which non-land-related financial market frictions are apt to be less severe than those confronted by small-scale farmers and poor urban households. This article looks to fill that gap. We exploit a recent survey of large urban industrial enterprises in Russia and a quasi-experiment occasioned by the country's post-communist land reform to explore whether private land ownership increases access to finance and promotes investment.

Though Russia launched privatization rapidly in the 1990s, it followed a different path than many Central and Eastern European countries. Rather than simultaneously privatizing enterprise capital and land, Russia's privatization program applied only to equipment, buildings and other

structures. Land plots remained state-owned. Largely for reasons of expediency, a fundamental principle of market economies that the ownership of surface objects derives from ownership of the land underneath (superficies solo cedit) was thus initially ignored. Today, however, the situation is different. A cursory study of Russia's contemporary urban landscape reveals a patchwork of tenure rights. As early as the mid-1990s and particularly since 2001, some regions responded to federal initiatives by promoting the privatization of land, including under otherwise privatized industrial enterprises; others have proceeded much more slowly.

The relationship between land, on the one hand, and finance and investment, on the other, has been popularly associated with the Peruvian economist, Hernando de Soto, who portrays the extension of widespread private land tenure (and the institutional infrastructure to support it) as a critical step in the development process. Indeed, he describes the inability of entrepreneurs to pledge fixed assets, notably land, over which they have user rights but not formal title as "the major stumbling block that keeps [the Third World and former Communist nations] from benefiting from capitalism …"(2000, 6-7). Though skeptically received in some quarters, scholarly interest in this relationship – referred to recently as the "de Soto effect" (Besley, Burchardi, and Ghatak 2012) – has been appreciable (Woodruff 2001). But among sophisticated analyses that confront the potential endogeneity of land tenure, findings have been mixed. Besley (1995) presents evidence consistent with land rights being un-related to credit access among Ghanaian farmers. Braselle, Gaspart, and Platteau (2002) find no systematic relationship between land tenure security and investment across household farms in Burkina Faso. And while Field (2005) and Galiani and Schargrodsky (2010) find that urban squatters in Lima and Buenos Aires, respectively, invest more in their properties after

being granted formal tenure, their evidence suggests that increased access to credit is not primarily responsible.[1]

Is the "de Soto effect" a chimera? Do stronger rights over fixed assets, namely land, neither improve access to credit nor increase investment? We find it plausible that scholarship to date may have been too restrictive as to the settings in which these connections were explored. Indeed, as some of the authors of the above-noted studies themselves observe, non-land-related factors may explain the weak connection between land rights and credit access. That is, regardless of whether or not they have title to their land, the farmers and poor urban households that have received scholarly attention may face other barriers – for example, scale and location – that limit their access to lenders who, all else equal, would value titled immovable assets pledged as collateral.   The same concerns cannot be said to apply to the urban industrial firms that are our focus here.

In the following, we first demonstrate the hypothesized correlations between land tenure, on the one hand, and credit access and investment intensity, on the other. Surveyed firms, that is, that own their land express both greater ease in accessing credit and more intense investment activity. These relationships remain robust to a wide variety of firm-specific and regional controls, including regional fixed effects. While consistent with a "de Soto effect," these associations are not interpretable as such given that land tenure may be endogenous. We address that possibility here, in part, by exploiting the aforementioned policy variation across Russia's territorial units. Some firms happen to be in regions in which the "price" for privatizing urban land is low; and some happen to be in regions in which the "price" is high. Using a proxy for these policy differences to instrument for the current tenure status of surveyed firms' primary production plots, thereby identifying a local

---

[1]Field and Torero (2008) find that an urban titling program in Peru did not increase commercial lending. Others that have looked at land rights and credit in the context of the more general question about investment activity include Alston, Libecap, and Schneider (1996) and Do and Iyer (2008).

average treatment effect, we continue to observe that those that own their land have both greater access to capital and more intense investment agendas.

Though our instrumental variable strategy mitigates concerns that the relationship between land rights and access to finance is driven by reverse causation or omitted firm-level variables, regional land policy may be correlated with relevant regional characteristics. Regional land policy, that is, may itself be endogenous. We respond to this concern in three ways. First, we demonstrate that the correlations of interest survive the inclusion of regional fixed effects. Second, our IV models include a rich set of regional controls plausibly related to firms' access to finance and investment activity. Third, we explore deeper, historical drivers of our instrument. Postulating that regional policy reflects both supply and demand forces unleashed by post-socialist economic and political liberalization, we isolate several variables whose values in 1995 explain a substantial share of the variation in the trajectory of regional land policy over the entire reform period. Acknowledging the non-random nature of regional policy enables us to contribute to the political economy of privatization literature by presenting evidence consistent with high land rents – as captured by regional urbanization rates and per capita income – making public officials less prone to privatize assets under their control. And controlling for these policy supply factors, we demonstrate that the demand for urban land privatization – as measured by industrial output per capita and the percentage of loss-making enterprises – further explains policy in a predictable manner.

Finally, in addition to the regression results consistent with a "de Soto effect" in industry, we demonstrate with direct survey responses that firms' managers believe land to be an important source of collateral to secure external loans. For instance, nearly half of the surveyed firms that have taken ownership over their land plots cited improved access to external financing as an extremely important motivation.

We elaborate on all this evidence in the following article. Section 2 lays out changes in the policies governing Russia's non-agricultural commercial lands and highlights the persistence of inter-regional policy variation. Section 3 introduces a unique survey of large urban industrial enterprises. In section 4, we explore conditional correlations between the tenure status of enterprises' primary production plot, on the one hand, and their ease in accessing credit and the intensity of their investment activity on the other. In section 5, we deploy a measure of regional policy variation as an instrument to mitigate concerns about reverse causation and firm-level omitted variables. In recognition that this regional policy variation may itself be endogenous, section 6 explores its historical determinants, allowing us to contribute, in a small way, to the political economy of privatization literature. Section 7 provides further robustness checks and exploits the survey further to demonstrate that the respondents themselves believe in a "de Soto effect." Section 8 concludes.

2.   *Land policy at the federal and regional levels*[2]

Issues surrounding land tenure seem to have been all but forgotten in commentary on the privatization of Russian industry.[3] This is odd. Considering the centrality of industry to Soviet-era urban development, some of the choicest real estate in Russia's largest cities is given over to industry (Bertaud and Renaud 1997). Further, given the non-competitive technologies in use at many Soviet enterprises on the eve of market-oriented reforms, land likely accounted for a substantial share of enterprise asset value when privatization was launched in the early 1990s. Very few commentators on Russia's privatization, however, have paid attention to the split of ownership rights over the

---

[2] This section draws on Khakhalin and Pyle (2009).

[3] For example, see any of the Russia-focused empirical studies referenced in the widely-cited literature review of Estrin et al. (2009). Even though several speculate as to why privatization seems not to have produced the desired results in Russia, none note the potential role of the ambiguous rights over land.

complementary land and capital assets or thought to attribute the slow pace of industrial restructuring to it. [4]

Bucking centuries of tradition, Russia's 1993 Constitution enumerated a right to private land ownership. But subsequent efforts to give specific form to that language – including Presidential Decrees, chapters in the Civil Code enacted in 1994 and 1995, and disparate pieces of legislation – produced a body of law that was seen as "incomplete … and sometimes ambiguous" (Kaganova and O'Leary 1997).[5] Nevertheless, between 1994 and 1997, an estimated 34.5 thousand hectares, across roughly fifty Russian federal subjects, were transferred to private enterprises.[6] In May 1997, a new presidential decree granted regional administrations near full discretion in establishing land sale prices. Thereafter, land prices began to vary significantly across Russia and the overall pace of enterprise land privatization slowed (Kaganova 1998; Limonov, Oding, and Vlasova 2001). Since sub-federal administrations were given greater control to set lease rates on state-owned land than tax rates on enterprise-owned land, they had an incentive to make land privatization procedures complex, expensive and time consuming. In 32 regions, land privatization was banned either by laws that contradicted federal legislation, by popular referenda, or by provisions added to the region's constitution. Moscow's Duma, for instance, passed a resolution that land plots occupied by privatized enterprises could be leased but not sold.

---

[4] Exceptions to this rule include Boycko, Shleifer, and Vishny (1995), Heller (1998) and McKinsey Global Institute (1999).

[5] Presidential Decree 1535, issued in July 1994, spelled out procedures for acquiring the lands underneath privatized, non-agricultural enterprises. In conjunction with a 1995 decree that reduced the purchase price of enterprise-occupied land, it paved the way for a number of privatized enterprises to take ownership of their land plots.

[6] This paper uses the terms Russia's federal subjects and regions interchangeably. The Russian Federation is comprised of more than eighty federal subjects (including Moscow and St. Petersburg), each with equal representation in the Federation Council.

Most privatized enterprises initially held the lands they occupied under the right of "permanent (perpetual) use," a Soviet-era form of land tenure, which granted its holder a right to use and build on a parcel but not to dispose of it through, for instance, sale to another party. This form of land tenure, re-enumerated in the Russian Civil Code of 1995, was characterized as permanent only because a termination date was not specified. If the government did dispossess a permanent (perpetual) use holder of its lands, it faced a legal obligation to provide compensation at market value.

A breakthrough in the enterprise land privatization process occurred in 2001 when the Putin administration successfully pushed through the national legislature the Russian Federation Land Code. Designed to reinvigorate the process begun in the mid-1990s, it laid out mechanisms to force divestiture of state lands under privately owned structures and to unify titles to land and buildings. For instance, it called for the ownership of real estate objects to henceforth follow ownership of the attached land plot; it granted exclusive right to purchase or lease state-owned land to the owner of the attached real estate object; it gave to private owners of buildings on land plots owned by other private parties the pre-emptive right to purchase the land; and it prohibited the future privatization of real estate objects without the concurrent privatization of the attached plot (Remington 2002; *Survey of Land* 2006).

Perhaps most notably, the Land Code sought to bring an end to the right of permanent (perpetual) use by requiring private enterprises to convert from the Soviet-era form of land tenure to rights of ownership or lease by January 1, 2004. Further, the upper bound limiting the price that regional administrations could charge for enterprise land was reduced and their land sale legislation was to be brought into line with federal law. Although this legislative push did lead to an increase in the re-registration of enterprise land rights in many regions, its impact was not as great as anticipated. In an effective capitulation to the resistance the new provisions were encountering, the

original deadline for converting rights of permanent (perpetual) use was first pushed back two years to 2006, then again to 2008, and finally to the summer of 2012.

The response of sub-federal jurisdictions to the 2001 Land Code has varied tremendously. In some municipalities, a substantial share of land – including parcels that were unimproved and those under privatized enterprises – has now been sold off to the private sector; in others, such as Moscow, the municipal government retains an effective ownership monopoly (Kisunko and Coolidge 2007; *Survey of Land* 2006). More recently, the long-awaited Federal Law 212, the so-called "Major Amendments to Land Privatization Legislation" enacted in July 2007, seemed to hold out the promise of resolving, once and for all, ambiguities surrounding the ownership of enterprise land. But many local administrations continue to put up resistance. Although Law 212 laid out a new mechanism for establishing the purchase price of plots, requiring that it not exceed 2.5% of the cadastral value (20% in Moscow and St. Petersburg), evidence suggests that some regions responded by rather capriciously increasing cadastral values so as to discourage land purchases. Regional and municipal governments have also maintained an array of formal and informal barriers to limit competitive access to previously unused urban parcels.[7] The business press continues to be filled with stories of how some region-level bodies attempt to undermine the intent of federal land legislation (Vasilieva 2011; Yel'kina 2011; *Interfaks* 2011).

Regional officials, in other words, have effectively been able to manipulate the "price" for privatizing a hectare of urban land. When given the discretion, as in the 1990s, they have done so explicitly and directly (Kisunko and Coolidge 2007). At other times, when their policy autonomy has

---

[7] One recent analysis suggests that the inability to access land on transparent terms constitutes as big an obstacle to business development in Russia as anywhere in the world (Muir and Shen 2005). And among Russian enterprises that have direct experience with them, difficulties in acquiring land are more problematic than problems with bribery, the courts or access to finance, all matters that tend to receive more attention (*Survey of Land* 2006). Similar results have been found in research focusing on the barriers to small businesses development (Zhuravskaya et al., 2005).

been more circumscribed in a formal sense, some tinkered with the "price" indirectly by arbitrarily raising the cadastral values that serve as the basis for a plot's price. They also have been able to raise prices implicitly by putting various bureaucratic obstacles in the way of firms. Regardless of the mechanisms used, this regional variation in the "price" can be seen as exogenous to the decisions of individual firms.

The reforms set in motion over the past two decades have been such that industrial enterprises have operated under one of three land tenure regimes. Some have formal private title to their land; some lease, making regular rental payments to government agencies; and yet others have continued to occupy their land under the old Soviet-era framework of permanent (perpetual) use. As of January 2010, within urban settlements, private firms owned 247.8 thousand hectares compared to 7108.0 thousand held by the state and municipalities. Since the passage of the 2001 Land Law, this relationship between private and state lands has changed dramatically; the ratio of the former to the latter has grown at roughly 18% per year on average.[8] Figure 1 captures the six-fold increase from 2001 to 2010 of land owned by private enterprises in urban settlements (*Gosudarstvennyi doklad*, multiple years).

As suggested above, the national-level data mask a great deal of variation in the pace of non-agricultural land privatization across regions within Russia. Comprehensive data on land ownership at the level of Russia's eighty-plus territorial subjects is hard to come by. By far the most complete source of data on regional land stocks that we have uncovered was made available by the Federal Agency for the Real Estate Cadastre (*Roskadastr*); specifically, these data address stocks as of January

---

[8] Looking at enterprise land alone, the first decade of the twentieth century could be described as one of rapid privatization, a characterization much at odds with the standard story that in Putin's Russia, privatization "stalled" and the share of Russia's GDP produced by private enterprise fell (Aslund 2007, 251).

1, 2008.[9] Similar data from earlier years were not, to our knowledge, ever made available. In March 2009, the agency was subsumed by the Federal Service for Registration, Cadastre and Cartography (*Rosreestr*). Of the 7875.5 thousand hectares of land in urban settlements, the *Roskadastr* data designated roughly 45% (3512.2 thousand hectares) as residential-commercial-industrial land.[10] Of Moscow's 109.1 thousand hectares, for instance, roughly 77% was so described, as were half of St. Petersburg's 139.9 thousand hectares.[11]

In the absence of any indicators that describe the uses of land more finely, we interpret the ratio of urban residential-commercial-industrial land owned by enterprises to that owned by government entities as a good measure for the pace and extent of urban industrial land privatization in a particular region. And below, we present evidence that this index of urban industrial land ownership is a good proxy for the policy orientation of Russia's federal subjects *vis á vis* land reform. Table 1 lists the index by territorial subject as well as the number of enterprises that participated in the survey discussed below.

3. *Survey of large, urban, industrial firms*

To understand the effects of industrial land privatization, we collaborated with Moscow's Levada Analytical Centre to design and administer a survey of 359 large urban industrial enterprises in the fall of 2009. To focus on firms likely to operate on large plots of land, we addressed only those that had at least 500 employees in 2007. We also restricted analysis to former state-owned enterprises that had been founded prior to 1986 but privatized prior to 2004. By design, roughly half

---

[9] The website http://www.kadastr.ru/available_land_2008/ was the source for the comprehensive regional data. After *Roskadastr* was subsumed by *Rosreestr*, it was no longer available.

[10] Formally, *Roskadastr*'s designation encompasses "lands for residential and commercial structures as well as lands for industry, transport and communications."

[11] Within the Russian capital, after all, a good amount of land is given over to parks and largely undeveloped green spaces; within the city limits of St. Petersburg, roughly 20,000 hectares is designated as arable agricultural land.

of the firms were from regions with more progressive policies *vis à vis* urban land (that is, in the top third of the regions in Table 1). Just under one-fifth of the firms were in either Moscow or St. Petersburg, Russia's two largest cities.   The rest were distributed relatively equally across cities (each a capital of a territorial subject) of three different size ranges: 1 to 3 million; 0.5 million to 1 million; and 0.25 to 0.5 million. In all, the respondents represented 53 territorial subjects (see Table 1).[12]

Respondents answered general questions regarding their firm as well as those specifically addressing land-related issues. A series of questions addressed the firm's primary production plot, with separate blocks for firms that owned the plot privately, those that leased it, and those that held it under the right of permanent (perpetual) use. Of survey respondents, 172 own their primary production plot, 131 lease and 56 operate with permanent (perpetual) use rights. Table 2 presents characteristics of the enterprises, their primary production plots, and responses to questions regarding financing and investment.

All respondents were asked to assess on a scale from 1 to 5, how problematic difficulties in accessing credit were to their operations (with 1 representing "not at all" and 5 representing "extremely problematic"). As shown in Table 2, firms that hold their primary production plot under permanent (perpetual) use rights – the weakest form of tenure – are more apt to view credit access as a barrier than firms that own or lease their land. To shed light on the link between this qualitative difficulty-accessing-credit variable and a potentially more tangible measure of the financial environment, for regions with more than five respondents we plotted its average against regional nominal loan growth between 2008 and 2009 (that is, the period roughly contemporaneous to the survey). The resulting relationship is negative, rather tight ($R^2=0.32$) and highly statistically

---

[12] Of those firms contacted to participate in the survey, 429 refused categorically; 308 did not refuse outright but did not end up participating for one reason or another (for example, the surveying organization had some difficulty in settling on a mutually convenient time); at 42 firms, the necessary respondent was absent (for example, due to illness or vacation). These response rates are in no way correlated with regional land policy.

significant (p<0.01). The relevant coefficient implies that when the regional difficulty-accessing-credit average score rises by 0.7 units (which, as shown in Table 2, is equivalent to the difference between the average score of firms with permanent (perpetual) use rights to their plot and those that hold their land privately) regional loan growth falls by about 6%, a substantial effect relative to the sample average of 32%.[13]

Responding to a similarly-scaled question about investment activity at the enterprise in 2009 (with 1 representing "no investment activity" and 5 representing "intense investment activity"), firms that own their plot reported greater intensity; and firms operating under permanent (perpetual) use rights indicated less.

Firms in the sample had at the time of the survey, on average, over one thousand employees and had been privatized nearly fifteen years prior.[14] Firms with permanent (perpetual) use rights report experiencing the most difficulties with a set of commonly-reported problems – inadequate working capital, overdue accounts receivable, government corruption and (non-property) taxes – and those that own their plots report the least; this latter difference, however, is not statistically significant. About one-quarter of respondents report belonging to a commercial group, some of which may support internal capital markets and ease financial market frictions for their members (Perotti and Gelfer 2001). We observe that the ownership profile of firms varies somewhat across land tenure status; for instance, foreigners appear to have less of an ownership presence in firms that hold land under permanent (perpetual) use rights. Firms that own their plots are, on average, more

---

[13] We cannot perform a similar matching of the qualitative question to a tangible performance indicator at the firm level because the firms' identities are not known to us.

[14] The median year of privatization was 1993. All had been privatized by the end of 2004. 90% of those surveyed had been privatized prior to 2001.

profitable than others but the difference, according to our rather coarse 2-6 profitability scale, is not statistically significant.[15]

About 80% of the plots had been attached to the enterprise at the time of the enterprise's privatization. Roughly half of the primary production plots were located on the city's edge, as opposed to somewhere near the center or "historic district." And a small number had been categorized as the "most hazardous" type of urban land from an environmental perspective.

Among the firms that own their primary production plot, the median year of land privatization was 2003. Two-thirds of these plots had been held in permanent (perpetual) use prior to privatization, whereas the remainder had been leased. The transition from lease-holding to private ownership became more common in more recent years. Sixty-seven firms paid less than the full cadastral value to purchase the plot (an average rate of 5.6% of the cadastral value, and a median of 2.5%); 41 paid the full cadastral value; and 20 report paying a price tied to the annual land tax (an average factor of 9 times greater, and a median of 5.5); four had "other" arrangements; and the rest did not answer that question.[16]

4. *Plot tenure status, access to credit and investment intensity*

Table 2 documents strong unconditional correlations between the ease of access to credit and investment intensity on the one hand, and plot tenure status on the other. Firms that own their plot report fewer problems with accessing credit and higher investment activity. The reverse holds for firms enjoying permanent (perpetual) use rights rather than full property rights. In this section, we demonstrate that these correlations survive in a multiple regression framework.

---

[15] This variable was constructed by summing up scaled responses to questions on profitability in 2007 and 2008 in which a response of 1, in a given year, was equivalent to being loss-making, 2 to being neither profitable nor loss-making and 3 to being profitable.

[16] A substantial majority of firms that own their plots report paying a 1.5% land tax rate; 28 pay less, with the low being 0.4%. The average of all firms that report a specific rate is 1.4%.

We consider a firm trying to finance an investment project with bank credit. A bank is likely to grant a loan (and, therefore, the project is likely to happen) if the firm is healthy and/or can provide collateral of sufficient value. We thus model a firm's access to credit and its investment intensity as a function of two broad sets of variables: (1) those that capture a firm's current and expected future performance; and (2) those that characterize its available collateral, which in our context is its primary production plot. Among the characteristics of its primary production plot, we are most interested in its tenure status; other plot-related characteristics represent additional controls that potentially influence its value as a collateralize-able asset.

Specifically, we estimate the following ordered probit model:

$$A_{i,j} = \alpha + \varphi T_i + \text{Controls} + \varepsilon_i \tag{1}$$

The dependent variable $A_{i,j}$ is the answer (expressed as the value of an ordered variable from 1 to 5) for the ith firm to the jth question (j=1 or 2). For j=1, the question addresses the degree to which difficulties with accessing credit pose a severe problem for the firm; $A_{i,1}$ ranges between $A_{i,1}=1$, denoting no problem at all, and $A_{i,1}=5$, denoting a severe problem. For j=2, the question addresses the intensity of the firm's investment activity (in fixed capital, equipment, buildings and land) in 2009; $A_{i,2}$ ranges between $A_{i,2}=1$, denoting no activity at all, and $A_{i,2}=5$, denoting intense activity.

T_i is a dummy representing the tenure status of the ith firm's primary production plot. In most specifications, $T_i=1$ if the plot is owned privately and $T_i=0$ if it is either leased or held under permanent (perpetual) use rights. We expect our coefficient of interest, φ, to be negative ($\varphi<0$) when firms address the question concerning difficulties with accessing credit and we expect it to be positive ($\varphi>0$) when they address the question about investment intensity. That is, in line with the prediction of the "de Soto effect," private tenure should be associated with fewer difficulties accessing credit and more intense investment activity. In some specifications, we include dummies

that capture whether the plot is either leased or held under permanent (perpetual) use rights so as to compare these two different forms of land tenure to private ownership.

Our baseline specification includes a standard control for the firm's size, its (log) number of full-time employees. To account for the possibility that the temporal sequencing of firms' privatization related to their expected future performance (Gupta, Ham, and Svejnar 2008), the baseline specification also controls for the (log) number of years since the firm (not the plot) was privatized. Further, to capture non-land-related features of its operating environment that plausibly affect current and expected future performance, the baseline specification also contains a control for the firm's assessment of the difficulties posed by four potential problems: taxes (not related to property), corruption, overdue accounts receivable and inadequate (own) working capital. That is, in a manner similar to the question relating to difficulties accessing credit, respondents were asked to assess on a scale from 1 to 5 how problematic difficulties in these areas were to their operations (with 1 representing "not at all" and 5 representing "extremely problematic"); the responses across each of these categories were summed and then divided by four.[17] Finally, our baseline specification includes a measure for the population of the city in which the firm is located, potentially capturing agglomeration and/or market-size effects.[18]

To this baseline specification we add descriptors of the primary production plot's history and geographic location, potentially important determinants of its value. These include dummies for being located on the edge of the city, for being attached to the firm at the time of the firm's (not the plot's) privatization, for being the only plot attached to the enterprise at the time of the firm's (not

---

[17] This variable can also be thought of as capturing otherwise unobserved characteristics of the respondent that might lead to providing either overly positive or negative subjective assessments of the institutional environment. Institutional factors, like corruption, have been shown to be firm-specific (Johnson, McMillan, and Woodruff 2002).

[18] The city size variable is scaled from 1, cities under one-quarter million, to 5, cities over three million.

the plot's) privatization and for being designated as the most dangerous in terms of environmental hazards. An additional plot-specific control captures on a 1-3 scale the number of enterprises in the plot's immediate vicinity: 1 represents none, 2 represents one or two and 3 represents more than two.

We subsequently add variables that describe the firm's ownership structure believing, in line with an extensive literature, that ownership is related to measures of firm performance. The inclusion of a dummy variable for membership in a commercial group (for example, a financial-industrial group or a holding company) is inspired by the finding of Perotti and Gelfer (2001) that such groups ease financial market frictions and facilitate the financing of investment for their members. Additional ownership variables measure on a 0-4 scale the influence of foreigners, the State Property Fund, non-management labor employed by the firm and Russian individuals not employed by the firm; a score of 0 is recorded if there is no representation of the given individual/entity/group among shareholders, 1 means having representation but little influence, whereas 4 denotes having a great deal of influence.[19] Brown, Earle, and Telgedy (2006) find that the effect of privatization on firm productivity is small or even negative in Russia, with the notable exception of privatization to foreign investors which is found to affect firm productivity in a positive way. In addition, there is a rich literature that illustrates that firms owned by their managers and/or workers perform considerably worse than firms with outside owners, be they institutional or individuals. Djankov and Murrell (2002), for example, find for CIS countries that privatization to outsiders yields large productivity gains, whereas privatization to workers is detrimental to firm performance.

We further control for a firm's recent financial health by including an ordered variable, scaled from 2 to 6, constructed by summing answers to questions on profitability in 2007 and 2008

---

[19] Some of our control variables are ordered. In unreported results, we included them as series of dummies. The results, which are available upon request, were not affected in any material way.

17

in which a response of 1, in a given year, was equivalent to being loss-making, 2 to being neither profitable nor loss-making and 3 to being profitable.

Some models include controls for a set of regional characteristics plausibly connected to regional land policies and credit market behavior. Growth of loans to firms over 2005-2009 captures recent financial market development in the region.[20] Five additional controls are drawn from a well-known expert survey characterizing political and economic differences across regions: (1) economic liberalization, with a focus on regional privatization legislation and jurisprudence; (2) corruption among the economic and political elites; (3) the strength of local self-government; (4) the quality and turnover among local elites; and (5) a composite index of six other dimensions related to regional democracy.[21] In the two last specifications, we add a set of sectoral fixed effects. And in the final one, we replace the regional characteristics with a set of regional fixed effects.

Table 3 lays out the results from the ordered probit models. We observe a strong correlation between private land ownership and both dependent variables. Across specifications, firms that own their plot report less difficulty accessing credit (the negative coefficients for private plot status in the left panel of Table 3) and higher investment intensity (the positive coefficients in the right panel of Table 3). Conversely, firms that hold their land under the least secure tenure status – permanent (perpetual) use – report more severe problems accessing credit than private land owners and comparatively little investment activity (see the second specification in both panels of Table 3).[22] These results are in line with the "de Soto effect" hypothesis that property rights facilitate access to

---

[20] Source: Bank of Russia (www.cbr.ru).

[21] More information on the construction of the variables and the data themselves are available on http://atlas.socpol.ru/indexes/index_democr.shtml.

[22] The introduction of regional fixed effects reduces the coefficient on the plot tenure status in the investment intensity equation by about a half and makes it statistically insignificant (Table 3 last column) suggesting that regional variation is important for identifying the effects of interest.

credit and stimulate investment.[23] We also observe some evidence that firms that belong to commercial groups and that reside in larger cities report less problems with accessing credit; and larger and more profitable firms engage in investment more intensely.

5. *Exploiting regional variation in land policy*

Although the results of Table 3 are consistent with the "de Soto effect," they may be subject to omitted variable bias. That is, we may have failed to include all relevant firm-level controls, including one or more correlated with our regressor of interest, the tenure status of the primary production plot. For example, imagine our profitability measure is noisy and does not discriminate well between profitable and non-profitable firms. Further, suppose that profitable firms have both the funds to purchase their land and the healthy balance sheet to convince banks to extend credit. In that case, our Table 3 regressions would still pick up a significant correlation between private land ownership and ease of accessing credit even though there might not be a causal relationship between the two.

In this section, we address this possibility by using the regional urban industrial land privatization measure (Table 1) as an index to instrument for the tenure status of a firm's primary production plot.[24] As we noted in the earlier sections, in spite of federal-level efforts to standardize

---

[23] To better assess magnitudes, we converted our ordered dependent variables into binary form and estimated probit models. The first new binary variable takes a value of 1 for firms reporting severe problems accessing credit (values 4 and 5 on a scale from 1 to 5) and a value of 0 for firms reporting few problems (original ordered values 1 and 2). Probit estimates indicate that private land ownership reduces firm's probability of being in the 'severe problem' group by about 21 percentage points (while all other right-hand side variables are held constant at their means). The second binary variable takes a value of 1 for firms reporting intense investment activity (values 4 and 5) and a value of 0 for firms reporting little activity (values 1 and 2). Probit estimates indicate that private land ownership increases firm's probability of being in the 'intense activity' group by about 17 percentage points. Results are available from the authors on request.

[24] Altonji, Elder, and Taber (2005) have proposed an alternative way to address the potential omitted variable bias. Suppose we have one explanatory variable of interest and a large set of plausible controls. Further, assume our choice of controls to be included in the regression is perfect in the sense that the excluded variables (error term) have zero correlation with our explanatory variable of interest and thus OLS is unbiased. We can then think of

land policy, regional officials have been able to influence the "price," broadly understood, faced by firms wishing to assume ownership of the land on which they sit. We interpret the Table 1 data as capturing this variation in land policy across regions in a manner that is exogenous to individual firms.[25] Where the regional land index is high, that is, we interpret the policy environment as having been conducive to plot privatization; firms, that is, have faced a lower "price" in converting the tenure status of their production plots to private ownership.

Our interpretation of the land index as a suitable proxy for land policy is supported by anecdotal evidence. The city of Moscow, for instance, which has a particularly low value for the index, formally banned the sale of land in the 1990s; and despite the passage of the 2001 Land Code, policy in the capital city has remained hostile to plot privatization (Kisunko and Coolidge 2007).

---

such an OLS estimate as providing an upper-bound on the coefficient of interest; this upper-bound corresponds to an estimate under ideal conditions of exogeneity. Now, suppose instead that our choice of controls to be included in the regression is completely random. In that case, the correlation between the variable of interest and relevant unobserved variables is the same as the correlation between the variable of interest and observed control variables. Altonji, Elder, and Taber (2005) have shown how to use this assumption (in place of the zero correlation assumption) to obtain a lower-bound estimate on the coefficient of interest. We perform the above mentioned sensitivity analysis using Stata's user-written program *rcr.ado* (Krauth 2011). The program has two limitations: it only runs OLS and it can at most handle 25 controls. For this exercise we thus run OLS regressions of access to credit/investment intensity on all explanatory variables with the exception of regional fixed effects and ownership influence variables (the latter were not jointly statistically significant at the 5% level). Excluding the latter two groups of variables allows us to bring the number of included controls under the limit of 25. Our results for the access-to-credit regressions turn out to be robust. Moving from a zero to an equal correlation assumption makes the coefficient on private land ownership *bigger* in magnitude (from -0.36 to -0.57). A conservative confidence interval (that is, lower bound for the lower estimate, higher bound for the higher estimate) does not contain zero. Our results for investment intensity regressions are partially robust. Moving from a zero to an equal correlation assumption leaves the point estimate of the coefficient on private land ownership virtually intact (at 0.37). The new estimate has however a much larger standard error. As a result, a conservative confidence interval contains zero. Results are available from the authors on request.

[25] A claim of exogeneity implies that the regional share of private land is not influenced by any of the surveyed firms that own their primary production plot. Eleven of the 359 firms in the database, however, do own a plot whose size accounts for at least ten percent of the private land in the region (that is, the numerator in the land index). To ensure that our IV results are not driven by these firms, we re-run the models in Table 5 without them. Our results of interest do not change in an appreciable manner.

We would, however, like to provide more systematic support that the index indeed captures land policy variation across regions. We thus look at responses to one of our survey questions that was asked of firms that had actually assumed ownership of their land. Each was asked to assess on a 1-5 scale the severity of eight potential obstacles confronted when trying to privatize its primary production plot. One of these responses referenced the "opposition of local officials." Just over half of the 169 firms that answered this question responded "1," indicating little to no opposition from local officials. Just under 10% of firms, however, responded "5," reflecting that local officials had put up severe roadblocks to the process' completion. The average response was 2.1.

If our land index captures the policy variation that we claim, we would expect it to explain the variation in the response to this question. That is, we would expect a negative correlation between its value and the assessment of individual firms – specifically, those that had experienced the process of plot privatization from beginning to end – as to the degree of opposition presented by government officials. We present tests for this relationship in Table 4.   Controlling for the same firm and plot characteristics we included in Table 3 models, as well as for the seven other perceived barriers to plot privatization, we see that firms owning their primary production plots (column 1) are less likely to characterize government opposition as a significant barrier to plot privatization if they are located in regions for which the index of land privatization is high.[26] This effect is statistically significant at the 5% level.

Our identification strategy relies upon an assumption that firms make decisions about the tenure status of their plots in response to a regional policy environment that affects the "price" of privatizing their plots. Of course, some firms took ownership of their plots early in the post-

---

[26] We control for the average of the firm's responses to the other "barrier" questions so as to diminish the likelihood that results are driven by unobserved variation in firms' willingness to respond with systematically higher or lower responses across all barriers.

communist period, responding to reforms in the 1990s; the majority, however, privatized their land more recently after the passage of the Land Code. By using an instrument that measures the regional stock of urban land that had been privatized by 2008, we assume that the pattern of regional policy variation in the year prior to the survey (that is, 2008) is similar to the pattern that prevailed earlier. That is, in general, regions that were amenable (hostile) to plot privatization later in the reform period were also more amenable (hostile) earlier on. We put this assumption to the test in columns 2 and 3 of Table 4. In column 2, we run the same model that we ran in column 1 but include only those firms that had privatized their plots before 2005; this leaves us with about two-thirds of the firms that report owning their primary production plots at the time of the survey in 2009. In column 3, we run the same model as in column 1 but, this time, include only those firms that had privatized their plots after 2000. Again, we are left with about two-thirds of all firms that reported owning their plots. In both cases, we observe that their perception of government opposition is inversely related to the land index. That is, whether we consider the two-thirds of firms that privatized plots "early" or the two-thirds of firms that privatized plots "late," our land index explains perceptions of government resistance, a finding consistent with the index capturing a consistent pattern of regional policy variation across time.

Having provided evidence that the land index can serve as a reasonable proxy for regional land policy, we now turn to its suitability as an instrument that can be used to identify the causal effect of plot tenure status on access to credit and investment intensity. To qualify as suitable, the index must predict plot tenure status holding other factors constant. That is, a firm in a region in which the index indicates that policy is friendlier to private land tenure should be more likely than a similar firm in a region with a less amenable policy environment to report owning its primary production plot. This condition is easily tested. And, indeed, our first-stage regressions in Table 5 document strong predictive power.

In addition, a suitable instrument must satisfy the exclusion restriction. In other words, it should be uncorrelated with the error term (that is, with all the omitted factors affecting access to credit and investment intensity) in the second stage regressions. Although we cannot test this condition, we believe the land index is likely to satisfy it. On the one hand, it is difficult to conceive of a channel (other than through land ownership) through which land policy might affect a firm's access to credit and investment intensity. On the other hand, while it is possible that regional variation in land policy is correlated with regional variation in other factors that might influence bank behavior and/or the investment climate (for example, other dimensions of the regional institutional environment), we do include the same diverse set of six regional controls (discussed in section 4) in both the first and second stages of all IV specifications: growth of loans to firms over 2005-2009, economic liberalization with a focus on regional privatization legislation and jurisprudence, corruption of the economic and political elites, the strength of local self-government, the quality and turnover of local elites, and a composite index capturing the quality of democracy.

Even if our instrument satisfies the two conditions described above, it might fall short of identifying the population average effect of private land ownership on our two outcome measures because of "essential heterogeneity" (Heckman, Urzua, and Vytlacil 2006). In the process of producing controlled variation in the suspected endogenous regressor (that is, plot tenure status), the instrument necessarily restricts identification to the sub-population of firms for whom plot tenure status would change because of the instrument (Imbens and Wooldridge 2007). That is, we identify a local average treatment effect (Angrist, Imbens, and Rubin 1996) of private land ownership on both access to credit and investment intensity for those firms that would not assume ownership of their plots if located in a region with a lower value for the land index, but would assume ownership if located in a region with a higher value for the index. One should be cautious when extrapolating this local average treatment effect to other subpopulations of firms, especially if firms that expect to

benefit more from plot ownership (in the sense, for example, of having better access to credit) are also more likely to respond to a land-privatization-friendly policy by assuming ownership of their plot. Indeed, if firms "sort on the gain" in this manner then the local average treatment effect may identify the causal effect of private land ownership for a subpopulation of firms that would benefit from it (Heckman, Urzua, and Vytlacil 2006). In this case, the estimated effect would be upwardly biased compared to the average treatment effect for the population as a whole.

We lay out the results of this IV approach in Table 5.[27] The first stage IV regression results show that the regional land policy index strongly predicts private plot status across specifications. Observing that surveyed firms are more likely to have taken ownership of their primary production plot in regions where the index of urban industrial land privatization is high, even after controlling for a number of firm and plot-specific characteristics, gives us confidence that the index is capturing the land policy variation we have argued it does and is therefore an appropriate instrument. The second stage results show a statistically significant negative relationship between the predicted value of private plot status and the firm's reported difficulty in accessing credit, while finding a statistically significant positive relationship with the firm's investment intensity. This is true for all specifications. The instrumental variables estimation results reinforce the ordered probit regression results of Table 3. Our instrumental variable regressions, in other words, provide further support for a "de Soto effect" in industry. We should note, however, that our IV effects are consistently larger than the

---

[27] Given that our dependent variables (access to credit and investment intensity) are ordinal, while the endogenous regressor, plot tenure status, is binary, we cannot rely on the standard Two-Stage Least Squares estimation procedure, which is known to work only approximately in these circumstances (Miranda and Rabe-Hesketh 2006). Instead, we estimate the model in one step by maximum likelihood using a Stata routine, *ssm*, which, in turn, is a "wrapper" for another routine, *gllamm*, designed to estimate endogenous switching models. The set up in these models is comparable to TSLS: the switching equation (probit) is similar to the first stage regression and models plot tenure status as a function of the land index (that is, the instrument) and all other explanatory variables; the outcome equation (ordered probit) is similar to the second stage regression and models credit access/investment intensity as a function of (predicted) plot tenure status and all other explanatory variables (for details see Miranda and Rabe-Hesketh 2006).

probit effects found in Table 3, a difference consistent with the "sorting on the gain" phenomenon discussed above and thus consistent with the possibility that the strength of the found "de Soto effect" does not generalize to all firms.

6.   *Understanding regional variation in land policy*

By introducing a source of regional variation that plausibly explains an individual firm's plot tenure status, our instrumental variable strategy allows us to address identification problems relating to reverse causality and firm-level omitted variables. However, we recognize that land policy was unlikely to have been randomly assigned in the manner of a true natural experiment. And although we control for other, non-land-related regional factors that may explain firms' access to credit and investment activity, we recognize that we may not observe one or more additional regional variables that explain land policy and the financial environment. That is, it is possible that regional land policy is itself endogenous. We thus looked, ultimately without success, for deeper, more historical, drivers of regional land policy that could serve as plausible alternative instruments. This search, of course, was complicated by the requirement that any alternative instrument's effect on our dependent variables occurs exclusively through the land tenure channel.

Despite failing to identify convincing alternatives that satisfy the exclusion restriction, we see value in exploring the historical determinants of regional land policy. For although the post-communist transition has produced an abundance of articles addressing the effect of asset privatization, it has produced few that identify factors governing why public officials relinquish ownership over some assets but not over others.[28] To understand the forces that might be at work

---

[28] Some researchers focus on officials' concern with the unemployment and political opposition that might arise from simultaneous privatization of all state enterprises without focusing on why some might be privatized before others (Glaeser and Sheinkman 1996; Dewatripont and Roland 1995). Gupta, Ham, and Svejnar (2008) use firm-level data from the Czech Republic to show that those privatized first were those that had been more profitable

here, we highlight land's status as a rent-generating asset. Where rents are greater, one might surmise, potentially corrupt officials should be more reluctant to cede ownership control. That is, where land values are higher, the supply of policies conducive to plot privatization should, all else equal, be lower. And controlling for this determinant of policy supply, we would expect that regions with stronger industrial interests would have a policy environment more amenable to private ownership in "equilibrium."

To proxy for these underlying forces, we turn to several variables as measured in 1995, soon after market and political liberalization but before land plots had begun to be systematically privatized in any of Russia's regions. A region's urbanization rate and its per capita income capture its urban land values, the driver of policy supply. Where they are greater, we hypothesize, the land policy index will be lower. Officials in such regions, that is, should be more resistant to federal privatization initiatives so as to preserve the more lucrative, rent-generating opportunities that accompany control over higher-valued land. We capture the demand for urban industrial land privatization with the regional percentage of loss-making enterprises and industrial production per capita. In regions in which the latter is higher, the demand for institutions that facilitate private ownership of urban industrial land should be greater. However, where the liberalization of prices in 1992 uncovered a local economy ill-prepared for markets, as measured by the prevalence of loss-making firms in 1995, the immediate demand for land privatization should be less.

We present a test of these hypotheses in an OLS regression in column 1 of Table 6. As hypothesized, regional income per capita and urbanization, as measured in 1995, are negatively related to the land policy index. Additionally, the two demand-side proxies explain policy variation in the expected manner. Higher industrial production per capita and a smaller percentage of loss-

---

and operated in downstream industries subject to greater demand uncertainty suggesting, they argue, that officials had an "efficiency objective" in choosing whom to have privatized first.

making firms both are associated with more urban land privatization. Each of these relationships is statistically significant at either the 1% or 5% level. Early post-Soviet variation in regional economies, in sum, explains a good deal of the variation in regional land policy over the subsequent decade-plus period.

Consistent with this story that the index reflects forces that have influenced land policy over an extended period of time, we would expect that more recent values of the same variables would have less predictive power. Column 2 confirms that this is the case. Values from 2007 explain much less of the variation in the land policy index than the values of those same variables from 1995. Furthering this line of reasoning, we conduct Davidson-MacKinnon tests. Inserting as an additional control the fitted value based on 2007 variables from column 2, we observe in column 3 that it adds effectively no predictive power to the 1995 variables. Conversely, as can be seen in column 4, the fitted value from the model based on 1995 values overwhelms the predictive power of the 2007 measures.[29]

7.   *Robustness and additional survey-based evidence*

To supplement the instrumental variable specifications, we return to potential sources of reverse causality in the correlations highlighted in Table 3. First, with respect to the credit access regressions, it is worth noting that the dependent variable is not time specific. Firms characterizing credit conditions as favorable at the time of the survey may have been influenced by a favorable financial environment in the preceding years. It is thus not inconceivable that favorable credit conditions in, say, 2007 or 2008 facilitated subsequent land purchases. Causality, that is, might run from access to credit to land acquisition rather than the other way around. We address this potential

---

[29] When we re-run our Table 5 IV models using the 1995 structural measures as alternative instruments, the relationships between land tenure, on the one hand, and credit access and investment intensity, on the other, remain much the same.

problem through the IV strategy presented in Table 5. But we can address it in an additional way by repeating the regressions of Table 3 while excluding from the sample firms that privatized their plots in the most recent years. In Table 7 we do precisely this. The first column includes all sample firms and simply repeats the regional fixed effects specification from Table 3. Subsequent columns represent the same specification but progressively eliminate firms that privatized their plots after 2009, those that privatized their plots after 2008, and so on, until finally eliminating those that privatized their plots after 2005. As can be seen, the number of firms gradually diminishes, but the relationship between private plot status and access to credit remains intact. If anything, the coefficient on plot tenure status becomes even greater, suggesting that the possible reverse causation story outlined above is not a concern.

A slightly different reverse causality concern arises in the investment intensity regressions. Recall that the investment question is time specific; firms, that is, were asked about activity in 2009. We thus cannot rule out the possibility that a portion of 2009 investment includes payment for the primary production plot. To eliminate this as a possible explanation for the relationships we highlighted above, we redefine our independent variable of interest to be one only if the firm owned its plot prior to 2009. We then repeat the earlier ordered probit regressions of Table 3 and the IV regressions of Table 5. The results reported in the two panels of Table 8 confirm our previous findings that private land ownership drives investment activity and not the other way around.

We also wish to draw attention to additional questions from the survey that solicit the respondent's opinion about the relationship between land and credit. Economics research tends to discount evidence gleaned from asking respondents personal thoughts on the relationship between any two variables; it tends to be better form, that is, to demonstrate the relationship between those variables with statistical and econometric tools. But having done this already, we look to specially crafted survey questions for additional confirmation of a "de Soto effect." One question, for

instance, addressed prevailing norms requiring the pledge of land as collateral to secure external financing: "According to your experience, and those of your business colleagues … how frequently do banks demand as collateral to secure a long-term loan, the plot of land on which the firm's production takes place?" Of all respondents, 38.3% characterized the practice as extremely common (that is, "5" on a 1-5 scale). And over half responded with a "4" or "5". Although this evidence indicates that pledging land facilitates credit access, the question's wording does not directly address the importance of land tenure. Fortunately, firms that had taken ownership of their plot were specifically asked about their motivation and 42.4% of them cited access to external lending as an extremely important (a "5" on a 1-5 scale) factor. Perhaps not surprisingly, this motive was even more popular among managers at firms that privatized their plots after the passage of the Land Code when financial markets were better developed.

Finally, although we would not want to read too much into it, we highlight a noteworthy correlation between our survey evidence and regional macroeconomic outcomes. Specifically, extrapolating from the enterprise-level finding that private land tenure reduces financial market frictions and promotes investment, we might expect that regions that privatized land earlier would subsequently demonstrate higher levels of growth. Indeed, this is what we observe. For each region in our survey, we compute the average year that surveyed firms reported having privatized their primary production plots (for the subset that reported having taken ownership of it). Regressing the percentage change in regional gross product across two periods (2002-07 and 2002-09) on this measure, we turn up statistically significant negative relationships (at the 5% level). That is, in those regions in which firms took ownership of their plots on average in an earlier year, the growth rates in the aftermath of the Land Code's passage were higher.

8.   *Conclusion*

We have investigated here the financial impact of private land tenure in a setting in which non-land-related credit market frictions are apt to be relatively mild. In the eyes of commercial lenders, large and well-established urban enterprises are not the equals of either poor farmers or the denizens of sprawling slums. So from the standpoint of identifying a "de Soto effect," they would seem to be more appropriate units of analysis. And we do indeed observe that plot ownership is associated with greater success in accessing external finance and more intense investment activity in our sample of large, well-established industrial firms, lending support for the presence of a "de Soto effect" among this group.

As have prior studies, we grapple with endogeneity concerns. They are twofold. First, instead of capturing a "de Soto effect," it is not inconceivable that the conditional correlations arise from omitted firm-level variables and/or reverse causation. Our instrumental variable strategy, which exploits substantial land-related policy variation across Russia's federal subjects, minimizes these potentialities. However, this strategy raises its own concerns. For one, the local average treatment effect that we estimate, and by consequence the strength of the "de Soto effect" we identify, may not generalize to all firms. For another, regional land policy may itself be endogenous. Though hardly a non-trivial matter, we re-draw attention to two pieces of evidence suggesting that the identified relationships are not a function of unobserved regional variation: the correlation between private land tenure and financial outcomes survives the inclusion of regional fixed effects; and the instrumental variable specifications include a rich set of regional controls. Finally, by way of concluding, we once again highlight the responses of the firms' managers to direct questions. When pressed to identify a motivation for taking ownership of their land, managers at large, industrial firms point to its value as a pledge-able asset. To the actors on the ground, in other words, the "de Soto effect" is a reality.

Table 1. Ratio of urban commercial-residential-industrial land owned by firms relative to that owned by state & municipalities (%)

	surveyed firms				surveyed firms
Belgorod	24.9	6	Tver	2.2	2
Vologoda	23.8	0	Tula	2.2	6
Tatarstan	18.9	13	Krasnodar	2.2	5
Lipetsk	14.8	10	Chukotka	2.2	0
Novgorod	8.2	4	Sakha	2.1	0
Orenburg	8.1	0	Oryel	2.0	0
Kemerovo	7.4	5	Ingushetiya	2.0	0
Tyumen	7.3	3	Samara	1.9	9
Khakasiya	6.4	0	Krasnoyarsk	1.9	3
Irkutsk	6.4	6	Bryansk	1.8	5
Chuvash	6.0	2	Kaliningrad	1.7	3
Sverdlovsk	6.0	17	Ivanovo	1.6	4
Novosibirsk	6.0	3	Tambov	1.6	4
Tomsk	5.5	8	Adygeya	1.6	0
Smolensk	5.1	7	Altai k.	1.6	2
Chelyabinsk	4.8	17	Udmurtia	1.5	4
Leningrad	4.6	6	Buryatia	1.5	3
Rostov	4.5	10	Arkhangelsk	1.4	4
St. Petersburg	4.4	24	Murmansk.	1.4	0
Karachevo-cherk.	4.4	1	Ulyanovsk	1.2	3
Kirov	3.9	0	Chita	1.0	0
Kurgan	3.9	2	Kabardino-Balk.	0.9	0
Nizhny Novgorod	3.9	14	North Ossetiya	0.9	0
Kareliya R.	3.7	2	Volgograd	0.8	9
Vladimir	3.6	3	Mordovia	0.7	0
Kursk	3.5	3	Penza	0.7	5
Yaroslavl	3.3	8	Astrakhan	0.5	1
Komi R.	3.3	0	Bashkortostan	0.5	11
Stavropol	3.3	6	Sakhalin	0.5	0
Primorye	3.3	0	Omsk	0.4	7
Kaluga	3.1	5	Amur	0.4	0
Ryazan	3.1	5	Moscow city	0.2	48
Perm	2.8	13	Khabarovsk	0.1	2
Marii El	2.7	0	Kalmykia	0.0	0
Pskov	2.5	1	Altai r.	0.0	0
Kostroma	2.4	5	Tuva	0.0	0
Daghestan	2.4	0	Kamchatka	0.0	0
Voronezh	2.3	4	Magadan	0.0	0
Moscow o.	2.3	1	Jewish A.O.	0.0	0
Saratov	2.3	5	Chukotka	0.0	0

Sources. Author's survey and http://www.kadastr.ru/available_land_2008/.

Table 2. Characteristics of enterprise and primary production plot by land tenure status

	Private		Lease		Permanent (perpetual) use	
Credit access and investment intensity						
Degree to which difficulties accessing credit poses problem for firm (1-5 scale)	2.75	+	2.83		3.46	**
Intensity of investment activity in 2009 (1-5 scale)	2.76	*	2.51		2.22	*
Enterprise characteristics						
Full-time employees	1249.1		1368.5		1599.3	
Years since enterprise was privatized	14.4		14.9		14.4	
Degree to which problems with inadequate working capital, overdue accounts receivable, corruption and (non-land) taxes pose problems for firm (1-5 scale)	3.21		3.26		3.50	+
City size in which located (1-5 scale)	3.0	**	3.8	**	3.0	*
Member of commercial group (FIG, holding, etc.) (%)	30.6		30.4		23.6	
Influence of state property fund (0-4 scale)	0.35		0.35		0.54	
Influence of non-management labor (0-4 scale)	1.36		1.14		1.31	
Influence of foreigners (0-4 scale)	0.46		0.64	*	0.11	**
Influence of other Russian individuals (0-4 scale)	1.47		1.01	**	1.82	**
Profitability in 2007-08 (2-6 scale)	5.38		5.24		5.16	
Primary production plot						
Only plot "on balance" of enterprise when enterprise privatized (%)	40.4		37.4		25.5	+
"On balance" of enterprise when enterprise privatized (%)	81.9		78.6		78.2	
Categorized as first category of environmental harm (%)	4.7		6.1		3.6	
Located on edge of city (%)	43.9		51.1		54.5	
Number of other enterprises close by (1=none, 2=one or two, 3=more than two)	2.53		2.67	+	2.49	

Note. For t-test on equality of means of those inside and outside sub-group,

+ $P < .10$;

* $P < .05$;

** $P < .01$.

Table 3. Plot tenure status, access to credit and investment intensity

	Accessing credit is a severe problem (1-5 scale)								Firm's investment intensity, 2009 (1-5 scale)							
Plot tenure status																
Private	-0.292*		-0.289*	-0.298*	-0.287*	-0.329*	-0.351**	-0.297*	0.345**		0.357**	0.355**	0.312*	0.382**	0.335*	0.195
	(0.131)		(0.133)	(0.134)	(0.134)	(0.131)	(0.121)	(0.151)	(0.121)		(0.117)	(0.116)	(0.132)	(0.136)	(0.154)	(0.152)
Lease		0.229								-0.279$^+$						
		(0.142)								(0.150)						
Permanent (perpetual) use		0.421*								-0.476**						
		(0.191)								(0.173)						
4 other problems (1-5 scale)	0.628**	0.622**	0.640**	0.631**	0.647**	0.627**	0.639**	0.733**	-0.082	-0.077	-0.087	-0.106	-0.061	-0.086	-0.072	-0.149$^+$
	(0.087)	(0.087)	(0.090)	(0.090)	(0.096)	(0.098)	(0.091)	(0.112)	(0.079)	(0.079)	(0.080)	(0.080)	(0.084)	(0.070)	(0.074)	(0.087)
(Log) years since privatization	-0.757**	-0.758**	-0.794**	-0.813**	-0.810**	-0.802**	-0.882**	-0.959**	-0.320$^+$	-0.326$^+$	-0.310	-0.396$^+$	-0.480*	-0.419*	-0.393*	-0.069
	(0.217)	(0.216)	(0.208)	(0.213)	(0.224)	(0.234)	(0.228)	(0.255)	(0.187)	(0.184)	(0.194)	(0.214)	(0.212)	(0.187)	(0.185)	(0.242)
(Log) full-time employees	-0.021	-0.029	-0.025	-0.025	-0.027	-0.043	-0.043	-0.097	0.164*	0.172*	0.157*	0.169*	0.175**	0.178**	0.186*	0.275*
	(0.072)	(0.073)	(0.074)	(0.075)	(0.076)	(0.072)	(0.075)	(0.093)	(0.067)	(0.069)	(0.073)	(0.071)	(0.068)	(0.068)	(0.076)	(0.117)
City size (1-5 scale)	-0.161**	-0.149**	-0.148*	-0.147*	-0.139*	0.001	-0.005	-0.277	0.080	0.067	0.080	0.087$^+$	0.072	0.111	0.108	-0.014
	(0.056)	(0.058)	(0.058)	(0.061)	(0.060)	(0.087)	(0.090)	(0.186)	(0.049)	(0.054)	(0.050)	(0.049)	(0.056)	(0.077)	(0.075)	(0.170)
Commercial group				-0.203$^+$	-0.225$^+$	-0.247$^+$	-0.270*	-0.214				-0.051	-0.057	-0.053	-0.133	-0.034
				(0.120)	(0.123)	(0.127)	(0.124)	(0.145)				(0.128)	(0.127)	(0.134)	(0.133)	(0.154)
Profitability					0.018	-0.011	-0.004	-0.003					0.259**	0.264**	0.264**	0.352**
					(0.066)	(0.067)	(0.066)	(0.085)					(0.063)	(0.060)	(0.054)	(0.082)
Plot characteristics	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Owner characteristics	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
Reg. characteristics	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes	No
Sector fixed effects	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes
Reg. fixed effects	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes
N	333	333	333	329	326	326	326	326	330	330	330	326	323	323	323	323
Pseudo R²	0.10	0.10	0.10	0.11	0.11	0.12	0.13	0.21	0.02	0.02	0.02	0.03	0.05	0.06	0.08	0.16

Notes: Ordered probit models (1-5 scale). Standard errors, clustered at regional level, in parentheses. Plot characteristics: dummies for located on edge of city, for located proximate to at least two other enterprises, for being attached to firm at time of firm's (not plot's) privatization, for being only plot attached to enterprise at time of firm's (not the plot's) privatization and for being designated highest in terms of environmental hazard. Owner controls: 0-4 scale variables measuring ownership influence of foreigners, State Property Fund and Russian individuals not employed by the firm. Regional characteristics: growth of loans to firms over 2005-2009, economic liberalization with focus on regional privatization legislation and jurisprudence, corruption of the economic and political elites, span of control of local self-government, quality and fluidity of local elites, and a composite index of the quality of democracy.

$^+$ $P < .10$;

* $P < .05$;

** $P < .01$.

Table 4. Opposition of local officials was barrier to privatizing plot, 1-5 scale

	All	Before 2005	After 2000
(Log) urban commercial-residential-industrial land owned by juridical relative to that owned by municipalities and government	-0.322*	-0.544**	-0.382*
	(0.150)	(0.174)	(0.182)
Other "barrier" control	Yes	Yes	Yes
Sector controls	Yes	Yes	Yes
Plot characteristics controls	Yes	Yes	Yes
Owner controls	Yes	Yes	Yes
N	168	105	108
Pseudo R^2	0.19	0.29	0.29

Notes. Ordered probit models. Robust standard errors, adjusted for clustering at regional level in parentheses. Other "barrier" responses refer to the sum of responses to similar questions relating to defining and agreeing on plot boundaries, inadequate resources (difficulty accessing credit), high cost of completing documents to purchase land, incomplete process of assigning land to appropriate government level, and absence of documents conferring rights to land. Other sector, plot characteristic and owner controls are similar to those in Table 3 and 4 specifications.

[+] $P < .10$;

* $P < .05$;

** $P < .01$.

Table 5. Plot tenure status, access to credit and investment intensity: an IV approach

	Accessing credit is a severe problem (1-5 scale)					Firm's investment intensity, 2009 (1-5 scale)				
Plot tenure status, private	-0.762*	-0.713[+]	-0.852*	-0.906*	-0.939*	0.790*	0.812*	0.721*	0.732*	0.670*
	(0.361)	(0.366)	(0.368)	(0.354)	(0.437)	(0.340)	(0.348)	(0.360)	(0.334)	(0.337)
First stage: plot owned privately										
(Log) urban commercial-residential-industrial land owned by firms relative to that by state, %	0.659**	0.679**	0.675**	0.678**	0.686**	0.658**	0.679**	0.670**	0.675**	0.703**
	(0.117)	(0.120)	(0.121)	(0.120)	(0.125)	(0.116)	(0.120)	(0.123)	(0.122)	(0.126)
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plot characteristics	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Owner controls	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Profitability	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Regional characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	No	No	No	No	Yes	No	No	No	No	Yes
N	333	333	329	326	326	330	330	326	323	323

Notes: IV models with ordered dependent variable (1-5 scale) and binary endogenous regressor. Used a "wrapper" program, *ssm*, that calls *gllamm* to fit such models in Stata (Miranda and Rabe-Hesketh, 2006). Standard errors, clustered at regional level, in parentheses. Plot characteristics: dummies for being located on edge of city, for being located proximate to at least two other enterprises, for being attached to firm at time of firm's (not plot's) privatization, for being only plot attached to enterprise at time of firm's (not plot's) privatization and for being designated highest in terms of environmental hazard. Owner controls: 0-4 scale variables measuring ownership influence of foreigners, State Property Fund and Russian individuals not employed by firm. Regional characteristics: growth of loans to firms over 2005-2009, economic liberalization with focus on regional privatization legislation and jurisprudence, corruption of economic and political elites, span of control of local self-government, quality and fluidity of local elites, and a composite index of the quality of democracy.

[+] $P < .10$;

$*$ $P < .05$;

$**$ $P < .01$.

Table 6. Regional determinants of urban land privatization

	1995	2007	1995	2007
(Log) Industrial production per capita	0.76**	0.43**	0.70**	0.00
	(0.143)	(0.125)	(0.180)	(0.150)
Share of loss making enterprises	-0.02**	-1.89	-0.02*	-0.76
	(0.007)	(1.575)	(0.009)	(1.431)
(Log) Income per capita	-0.52*	-0.27	-0.46	-0.20
	(0.257)	(0.283)	(0.292)	(0.253)
Share of population that is urban	-0.02*	-0.01	-0.02*	0.00
	(0.008)	(0.009)	(0.008)	(0.009)
Fitted values for the other year			0.14	0.96**
			(0.288)	(0.220)
N	76	76	76	76
R^2	0.428	0.282	0.430	0.435

Notes: Ordinary least squares. Standard errors in parentheses. Constant not reported. The first and third columns show results of estimations with the 1995 values of the independent variables, the second and fourth column do the same for the 2007 values of independent variables. The dependent variable is always the land index measured on January 1, 2008.

[+] $P < .10$;

* $P < .05$;

** $P < .01$.

Table 7. Plot tenure status and access to credit, excluding firms that recently privatized plots

	Table 3, column 8	Same specification as Table 3, column 8 but excluding firms that privatized plots after				
		2009	2008	2007	2006	2005
Plot tenure status, private	-0.297*	-0.348*	-0.313[+]	-0.333[+]	-0.403*	-0.408[+]
	(0.151)	(0.151)	(0.162)	(0.170)	(0.193)	(0.223)
N	326	314	296	284	275	269
Pseudo R²	0.21	0.10	0.10	0.11	0.11	0.12

Note: Ordered probit models (1-5 scale). Standard errors, clustered at regional level, in parentheses. Plot characteristics: dummies for being located on edge of the city, for being located proximate to at least two other enterprises, for being attached to firm at time of firm's (not plot's) privatization, for being only plot attached to enterprise at time of firm's (not plot's) privatization and for being designated highest in terms of environmental hazard. Owner controls: 0-4 scale variables measuring the ownership influence of foreigners, State Property Fund and Russian individuals not employed by firm. Regional characteristics: growth of loans to firms over 2005-2009, economic liberalization with focus on regional privatization legislation and jurisprudence, corruption of economic and political elites, span of control of local self-government, quality and fluidity of local elites, and a composite index of quality of democracy.

[+] $P < .10$;

* $P < .05$;

** $P < .01$.

Table 8. Investment intensity in 2009 of firms whose plots privatized before 2009

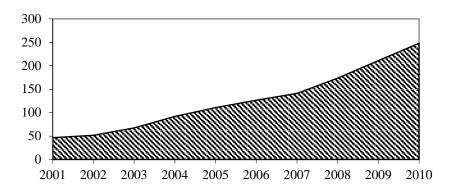|	Ordered probit models similar to Table 4							IV models similar to Table 5				
Plot tenure status, private before 2009	0.299*	0.306*	0.303*	0.258[+]	0.319*	0.274[+]	0.064	0.767*	0.768*	0.700*	0.722*	0.665*
	(0.127)	(0.123)	(0.123)	(0.134)	(0.139)	(0.152)	(0.154)	(0.320)	(0.324)	(0.336)	(0.316)	(0.316)
First stage: plot owned privately												
(Log) urban commercial-residential-industrial land owned by firms relative to that by state, %								0.718**	0.734**	0.730**	0.733**	0.757**
								(0.118)	(0.121)	(0.124)	(0.123)	(0.126)
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plot characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Owner controls	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Profitability	No	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
Regional characteristics	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes
Regional fixed effects	No	No	No	No	No	No	Yes	No	No	No	No	No
N	329	329	325	322	322	322	322	329	329	325	322	322
Pseudo R²	0.02	0.02	0.03	0.05	0.06	0.07	0.16					

Note: Ordered probit models (1-5 scale). IV models with ordered dependent variable (1-5 scale) and binary endogenous regressor. Standard errors, clustered at regional level, in parentheses.

[+] $P < .10$;

* $P < .05$;

** $P < .01$.

Figure 1. Land held privately by firms in urban settlements (1000s of hectares)

References

Alston, Lee, Gary Libecap, and Robert Schneider. 1996. "The Determinants and Impact of Property Rights: Land Titles on the Brazilian Frontier." *Journal of Law, Economics and Organization* 12: 25-61.

Altonji, Joseph, Todd Elder, and Christopher Taber. 2005. "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools." *Journal of Political Economy* 113: 151-184.

Angrist, Joshua, Guido Imbens, and Donald Rubin. 1996. "Identification of Causal Effects Using Instrumental Variables." *Journal of the American Statistical Association* 91: 444-472.

Aslund, Anders. 2007. *Russia's Capitalist Revolution: Why Market Reform Succeeded and Democracy Failed.* Washington, D.C.: Peterson Institute for International Economics.

Bertaud, Alain, and Betrand Renaud. 1997. "Socialist Cities without Land Markets." *Journal of Urban Economics* 41: 137-151.

Besley, Timothy. 1995. "Property Rights and Investment Incentives: Theory and Evidence from Ghana." *Journal of Political Economy* 103: 903-937.

Besley, Timothy, Konrad Burchardi, and Matireesh Ghatak. 2012. "Incentives and the De Soto Effect." *Quarterly Journal of Economics.* 127: 237-282.

Braselle, Anne-Sophie, Frederic Gaspart, and Jean-Philippe Platteau. 2002. "Land Tenure Security and Investment Incentives: Puzzling Evidence from Burkina Faso." *Journal of Development Economics* 67: 373-418.

Boycko, Maxim, Andrei Shleifer, and Robert Vishny. 1995. *Privatizing Russia.* Cambridge, Mass.: MIT Press.

Brown, David, John Earle, and Almos Telegdy. 2006. "The Productivity Effects of Privatization: Longitudinal Estimates from Hungary, Romania, Russia, and Ukraine." *Journal of Political Economy* 114: 61-99.

De Soto, Hernando. 2000. *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else.* New York: Basic Books.

Dewatripont, Mathias, and Gerard Roland. 1995. "The Design of Reform Packages under Uncertainty." *American Economic Review* 85: 1207-1223.

Djankov, Simeon, and Peter Murrell. 2002. "Enterprise Restructuring in Transition: A Quantitative Survey.*" Journal of Economic Literature* 40: 739–792.

Do, Quy Toan, and Lakshmi Iyer. 2008. "Land Titling and Rural Transition in Vietnam." *Economic Development and Cultural Change* 56: 531-79.

Estrin, Saul, Jan Hanousek, Evzen Kocenda, and Jan Svejnar. 2009. "The Effects of Privatization and Ownership in Transition Economies." *Journal of Economic Literature* 47: 699-728.

Field, Erica. 2005. "Property Rights and Investment in Urban Slums." *Journal of the European Economic Association* 3: 279-290.

Field, Erica, and Maxim Torero. 2008. "Do Property Titles Increase Credit Access Among the Urban Poor? Evidence from a Nationwide Titling Program." Unpublished manuscript. Duke University, Department of Economics, May.

Galiani, Sebastian, and Ernesto Schargrodsky. 2010. "Property Rights for the Poor: Effects of Land Titling." *Journal of Public Economics* 94: 700-729.

Glaeser, Edward, and Jose Scheinkman. 1996. "The Transition to Free Markets: Where to Begin Privatization." *Journal of Comparative Economics* 22: 23-42.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2000 godu. 2001. Federal Service for the Land Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2001 godu. 2002. Federal Service for the Land Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2002 godu. 2003. Federal Service for the Land Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2003 godu. 2004. Federal Agency for the Real Estate Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2004 godu. 2005. Federal Agency for the Real Estate Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2005 godu. 2006. Ministry of Economic Development and Trade and the Federal Agency for the Real Estate Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2006 godu. 2007. Ministry of Economic Development and Trade and the Federal Agency for the Real Estate Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2007 godu. 2008. Ministry of Economic Development and the Federal Agency for the Real Estate Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2008 godu. 2009. Ministry of Economic Development and the Federal Agency for the Real Estate Cadastre. Moscow.

Gosudarstvennyi doklad o sostoianiiiispol'zovaniizemel' v rossiiskoifederatsii v 2009 godu. 2010. Ministry of Economic Development and the Federal Service for State Registration, Cadastre and Cartography. Moscow.

Gupta, Nandini, John Ham, and Jan Svejnar, 2008. "Priorities and Sequencing in Privatization: Evidence from Czech Firm Panel Data." *European Economic Review* 52: 183-208.

Heckman, James, Sergio Urzua, and Edward Vytlacil. 2006. "Understanding Instrumental Variables in Models with Essential Heterogeneity." *Review of Economics and Statistics* 88: 389-432.

Heller, Michael. 1998. "The Tragedy of the Anticommons: Property in the Transition from Marx to Markets." *Harvard Law Review* 111: 621-688.

Imbens, Guido, and Jeffrey Wooldridge. 2007. "Instrumental Variables with Treatment Effect Heterogeneity: Local Average Treatment Effects." http://www.nber.org/WNE/lect_5_late_fig.pdf.

Interfaks, 2011. "Glava assotsiatsii prompredpriatii Brianskoi oblasti obviniaet Rosimuschestvo v byurokratizme." http://www.interfax-russia.ru/Center/news.asp?id=210408&sec=1679&p=4 (accessed on November 18, 2011).

Johnson, Simon, John McMillan, and Christopher Woodruff. 2002. "Property Rights and Finance." *American Economic Review* 92: 1335-1356.

Kaganova, Olga, and Sheila O'Leary. 1997. "Real Property and Land Legislation in the Russian Federation." *Real Estate Issues*, August.

Kaganova, Olga. 1998. "Urban Real Estate Markets in Russia: the Current Stage." *Real Estate Issues*, Summer.

Khakhalin, Andrei, and William Pyle. 2009. "The Perpetual Impermanence of Enterprise Land Reforms in Russia." *Russian Analytical Digest* 64: 8-11.

Kisunko, Gregory, and Jacqueline Coolidge. 2007. "Survey of Land and Real Estate Transactions in the Russian Federation: Statistical Analysis of Selected Hypotheses." World Bank Policy Research Working Paper 4115.

Krauth, Brian. 2011. "Bounding a Linear Causal Effect Using Relative Correlation Restrictions." Unpublished manuscript. Simon Fraser University. http://www.sfu.ca/~bkrauth/papers/rcr.pdf .

Limonov, Leonid, Nina Oding, and Tatyana Vlasova. 2001. "Land Market Development in St. Petersburg: Conditions and Peculiarities." Lincoln Institute Land Policy Conference Paper.

McKinsey Global Institute. 1999. "Unlocking Economic Growth in Russia." http://www.mckinsey.com/mgi/publications/russia.asp.

Miranda, Alfonso, and Sophia Rabe-Hesketh. 2006. "Maximum Likelihood Estimation of Endogenous Switching and Sample Selection Models for Binary, Ordinal, and Count Variables." *Stata Journal* 3: 285-308.

Muir, Russell, and Xiaofang Shen. 2005. "Land Markets: Promoting the Private Sector by Improving Access to Land." *Public Policy for the Private Sector*, Note number 300. World Bank.

Perotti, Enrico, and Stanislav Gelfer. 2001. "Red Barons or Robber Barons? Governance and Investment in Russian Financial-Industrial Groups." *European Economic Review* 45: 1601-1617.

Remington, Thomas. 2002. "Russia's Federal Assembly and the Land Code." *East European Constitutional Review.* 3: 99-104.

"Survey of Land and Real Estate Transactions in the Russian Federation." 2006. *Foreign Investment Advisory Services.*

Vasilieva, Yulia. 2011. "Ne otdadim ni piadi: biznesu nuzhno vykpat' predpriatiami." *Rossiiskkaia Biznes-Gazeta*, September 27. http://www.rg.ru/2011/09/27/zemlya.html.

Woodruff, Christopher. 2001. "Review of De Soto's *The Mystery of Capital.*" *Journal of Economic Literature* 39:1215-1223.

Yel'kina, Vera. 2011. "Veste' ned otdali zemliu pod zavodom." *Newsler.ru*, April 11.

Zhuravskaya, Ekaterina, Oleg Zamulin, Akhmed Akhmedov, Evgenii Yakovlev, and Oleg Schetinin. 2005. "Administrative Barriers to Small Business Development in Russia, 5th Round." CEFIR Policy Paper Series, 22.