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William Pyle and Koen Schoors

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



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Abstract

Russia's tremendous inter-regional variation in the pace of industrial land rights reform has meant that geography has helped determine the current tenure status of firms' production plots as much as any individual firm characteristics. By exploiting both this difference in the pace with which land reform has been carried out across Russia's federal subjects and a unique micro-level dataset, we present evidence strongly consistent with the proposition that more secure rights to land facilitate access to external financing. This finding is confirmed by other evidence from the survey that points to private land serving as an important source of collateral for Russian lenders and borrowers.

Keywords: industrial land, property rights, Russia, collateral

JEL codes: O16, P25, P31, R14, R52

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Tiivistelmä

Maareformin eteneminen hyvin eritahtisesti Venäjän eri alueilla on johtanut siihen, että yritysten maanomistusoloihin vaikuttavat yhtä lailla niin maantiede kuin yrityskohtaiset muuttujatkin. Tutkimuksessa käytetään hyväksi tätä teollisuusyritysten käyttämän maan omistusolojen alueellista vaihtelua sekä ainutlaatuista yritystason aineistoa ja osoitetaan, että vakaat maanomistusolot helpottavat ulkopuolisen rahoituksen saamista. Lisäksi osoitetaan, että maaomaisuus on merkittävä vakuus lainanantajille.

Asiasanat: teollisuusmaa, omistusoikeudet, Venäjä

JEL: 016, P25, P31, R14, R52

1 Introduction

Over the past two decades, the establishment of more secure rights over land has become one of the most widely discussed policy prescriptions for reducing financial market frictions in low and middle income countries. Its popularity is most frequently associated with the Peruvian economist, Hernando de Soto, whose advocacy efforts and book, *The Mystery of Capital*, prompted Bill Clinton to describe him as the “world’s leading economist.” Now translated into thirty languages, the book engages one of the biggest questions in economics – why some nations are rich while others remain poor. De Soto argues that the critical difference is the extension of widespread private land tenure (and the institutional infrastructure to support it), which promotes development by facilitating the use of land as collateral. Though skeptically received in some quarters, academic interest in his thesis has been appreciable and, indeed, pre-dates De Soto’s campaign.¹ The work of economic historians (North, 1990) and, more recently, the application of clever instruments for identifying modern growth’s distant institutional origins (Acemoglu *et al.*, 2001) has increased appreciation for the potential impact of secure property rights to productive assets, generally, and land, specifically. In addition to economic histories and macro-level analyses, applied microeconomists have devoted increasing attention to the effect of more secure land rights. Some have explored the link between land tenure and credit market access (Place and Migot-Adholla, 1998; Carter, Michael and Pedro Olinto, 2003; Field, 2006); others have looked at the more general relationship between the strength of tenure rights and investment activity (Alston *et al.*, 1996; Besley, 1995; Braselle *et al.*, 2002; Do and Iyer, 2008; Field, 2005; Galiani and Schargrodsky, 2010; Hornbeck, 2010; Jacoby *et al.*, 2002). All such analyses, however, have concentrated on actors -- frontier settlers, small farmers in poor countries and the residents of urban slums – for whom the value of contiguous capital assets is relatively small. There are no investigations in the literature of economic actors whose land lies underneath complex capital assets. In this paper, we take advantage of unique micro-data from a survey of large urban enterprises and a quasi-experiment occasioned by the uneven rollout of Russia’s industrial land reform to explore whether or not the “de Soto effect” finds support in an industrial setting.²

¹ See Woodruff (2001) for a review of *Mystery of Capital*.

² Acknowledging his role in highlighting the capital market consequences of more secure property rights, one soon-to-be-published pithily described the relationship as the “De Soto effect” (Besley *et al.*, forthcoming).

Though Russia launched privatization rapidly in the 1990s, it often goes unrecognized that the land underneath former state owned enterprises was not touched by the program. Russia, that is, followed a different path than the many Central and Eastern European countries. Rather than simultaneously privatizing enterprise capital and land, privatization initially applied only to equipment, buildings and other structures. Land plots remained state-owned. A fundamental principle of market economies that the ownership of surface objects derives from ownership of the land underneath (*superficies solo cedit*) was thus ignored.³ Today, however, a cursory study of Russia's industrial land reveals a patchwork quilt of tenure rights. Particularly over the past decade, some regions have responded to federal initiatives to liberalize land rights and allocation mechanisms; others, in spite of the federal pressure, have proceeded much more slowly, if at all. Geographic accident has thus determined, in part, whether private firms have taken ownership of its production plot(s). Presently, industrial enterprises operate 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 continue to occupy their land under the old Soviet-era legal framework.

Issues surrounding land tenure seem to have been all but forgotten in commentary on Russia's industrial privatization.⁴ 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).⁵ Further, since the non-competitive technologies in use at many Soviet enterprises on the eve of market-oriented reforms, it does not strike us as unreasonable that land accounted for a substantial share of enterprise asset value when privatization was launched. Although this point has been overlooked by most commentators on Russia's privatization, the split of ownership rights over comple-

³ Expediency, not ignorance nor special Russian sensitivities to land tenure issues, seems to have been the main motive. The potential complexities of resolving property boundaries and the perceived need to develop parallel legislation on title registration and a land cadastre struck the architects of Russia's privatization program as potentially too time consuming given the priority they placed, largely for political reasons, on speed.

⁴ 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 light.

⁵ The Soviet economic model emphasized rapid urbanization and built up population centers whose spatial distribution came to look little like those elsewhere in the world. Because of the suppression of markets and the priorities of planners, a disproportionately large share of urban land was given over to industry. Though this pattern persisted into the post-Soviet era, evidence has been accumulating that as the share of industry in the economy declines and as state control over valuable urban land is weakening, the allocation of space across different economic uses is changing (Makharova and Molodikova, 2007; Molodikova and Makhrova, 2007).

mentary land and capital assets was recognized by Boycko et al., (1995) as a possible hindrance to enterprise restructuring given the potential for rent-seeking officials to translate land control rights into opportunities to enrich themselves and/or pursue political objectives.

The vagueness of [land] lease contracts offer[s] individual bureaucrats both power over businesses and a steady source of income from bribes ... [They may use their] control over land to influence privatized industrial firms, insisting that they continue to pay for social services and main employment.

The concern expressed here, and echoed widely in the literature on the importance of property rights to economic development, is that weak land rights may shorten the effective time horizons of enterprise owners and thereby discourage potentially productive investments.⁶

A related concern is that weak land rights limit the growth of capital markets by restricting the assets that can be used as collateral and thus, perhaps, increasing borrower moral hazard. One recently-published study, which argued that the “collateral variable ... has been vastly ignored in prior empirical work” on bank lending demonstrated an increase in loan activity following the passage in twelve transition countries of legislation governing the pledge of land and other fixed assets as security (Hasselmann *et al.*, 2011).⁷ No prior study, however, has to our knowledge used micro-data from industrial firms to investigate the connection highlighted by De Soto.

The paper is organized as follows. Section 2 briefly lays out changes over the past generation in the policies governing Russia’s non-agricultural commercial lands and highlights the persistent inter-regional differences. Section 3 introduces a unique survey of large urban industrial enterprises. In section 4, we explore the relationship between the tenure status of enterprises’ primary production plot, their self-reported ease in accessing credit and the intensity of their investment activity. Section 5 provides robustness checks and uses the survey to make a fuller case as to the validity of assumptions guiding the analysis. Section 6 concludes.

⁶ Other sources noteworthy for highlighting the importance of land include Heller (1998) and McKinsey Global Institute (1999).

⁷ Hasselman *et al.* (2011) show that a one percentage point increase in the default rate increases the cost of collateral by 2.1 percentage points. Further, they show that the tendency of the mix of assets used as collateral shifts to non-firm-specific assets is less in more financially developed economies. That is, financial development both reduces the monetary cost of collateral and expands the class of assets that can be used.

2 Land policy at the federal and regional levels⁸

Bucking centuries of tradition to the contrary, 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).⁹ Nevertheless, between 1994 and 1997, an estimated 34.5 thousand hectares, across roughly 50 Russian federal subjects, were transferred to private enterprises.¹⁰ 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. Over the next several years, the pace of enterprise land privatization decreased dramatically (Kaganova, 1998; Limonov *et al.*, 2001). Since local 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.

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 use holder of its lands, it faced a legal obligation to provide compensation at market value. Many Russian enterprises continue to this day to hold their land under permanent (perpetual) use rights; requiring them to pay a tax, determined by the land’s assigned cadastral value, at the same rate as land owners.

⁸ This section draws on Pyle (2011) and Khakhalin and Pyle (2009).

⁹ 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.

A breakthrough in the enterprise land privatization process occurred in 2001 when the Putin administration successfully pushed through the Duma 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 rights of permanent (perpetual) land 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 use was first pushed back two years to 2006, and then again later to 2008. The deadline now is January 1, 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

¹⁰ This paper uses the terms Russia’s federal subjects and regions interchangeably. The Russian Federation currently is comprised of 83 federal subjects (including Moscow and St. Petersburg), each with equal representation in the Federation Council.

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.¹¹ Even today, the business press is filled with stories of how region-level bodies attempt to undermine the intent of federal legislation (Vasilieva, 2011; Yel'kina; *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 been more circumscribed, some tinkered with the “price” indirectly by rather capriciously raising the cadastral values that serve as the basis for a plot's price (Khakhalin and Pyle, 2009). They also have been able to raise prices implicitly by putting various bureaucratic obstacles in the way of firms. Regardless of the mechanisms used, the 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 within urban settlements, firms now own 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. Indeed, looking at enterprise land alone, the past decade 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). Figure 1 captures the six-fold increase from 2001 to 2010 of land ownership by enterprises in urban settlements and industrial lands outside of settlements.

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

¹¹ 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

come by. The most complete source that we have uncovered was made available on a website maintained by the Federal Agency for the Real Estate Cadastre (*Roskadastr*).¹² 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.¹³ 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.¹⁴

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 and 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-à-vis* land reform. For Russia as a whole, as well as for the Central Federal District alone, this index is 3.7. The range across Federal Districts spans from a high of 4.9 in the Northwest to a low of 1.1 in the Far East. Further illustrating the variation across regions, Table 1 lists the index by territorial subject.¹⁵ In the final column of Table 1, we list the number of enterprises from the region that participated in the survey which we discuss below.

(*Survey of Land*, 2006). Similar results have been found in research focusing on the barriers to small businesses development (Zhuravskaya *et al.*, 2005).

¹² The website with the comprehensive regional data was at http://www.kadastr.ru/available_land_2008/. After *Roskadastr* was subsumed by *Rosreestr*, the website was no longer available.

¹³ Formally, *Roskadastr*'s designation encompasses "lands for residential and commercial structures as well lands for industry, transport and communications" (*земли жилой, общественно-деловой застройки, земли промышленности и общего пользования, а также транспорта, связи и инженерных коммуникаций, земли иного специального назначения*).

¹⁴ 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.

¹⁵ We explore but do not report a similar measure for industrial lands outside of population settlements, calculating the ratio between that owned by enterprises and that by government entities. Across the RSFSR, this measure is 4.4%, or 67.5 thousand of 1526.5 thousand hectares; across regions, the correlation between it and our urban industrial land ownership index is 0.778.

3 Survey of large, urban, industrial firms

To understand the effects of industrial land privatization, we collaborated with Moscow's Levada Centre to design and administer a survey of 359 large, urban industrial enterprises in the fall of 2009.¹⁶ 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; .5 million to 1 million; and .25 to .5 million. In all, the respondents represented 53 subjects (see Table 1).

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 designed for plots of different tenure status – *i.e.*, private, leased, or permanent (perpetual) use.¹⁷ Of survey respondents, 172 own their primary production plot; 131 lease and 56 hold it in perpetual use rights. Table 2 presents characteristics of the enterprises, their primary production plots, and responses to questions regarding financing, investment and barriers to operation.

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. Likewise, these same firms are more likely to consider other problems a set of other potential problems – inadequate (own) working capital, overdue accounts receivable, government corruption and (non-property) taxes – as problematic.

In response to a similarly-scaled question about investment activity at the enterprise in 2009, firms that owned their plot reported greater intensity; and firms operating under permanent (perpetual) use rights indicated less. Across plot-ownership-type groups,

¹⁶ Pilot surveys were administered in the summer of 2009. 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 (*e.g.*, the surveying organization had some difficulty in settling on a mutually convenient time); at 42 firms, the necessary respondent was absent (*e.g.*, due to illness or vacation); finally, 458 did not complete the survey because they did not make it through the filtering questions that related to their sector, ownership status, year of privatization and/or employment size.

¹⁷ Another series of questions asked about up to three additional plots attached to the firm at the time of the survey. One more block focused on plots that had been seized or sold in the recent past. Finally, respondents answered a series of questions regarding the development of the land market in their regions.

however, we observe a rough similarity of responses to a question about the frequency of requirements to pledge land as collateral to secure external financing. Of all firms, in fact, 38.3% believe it is extremely common (5 on a 1-5 scale) for banks to require land as collateral to secure access to external financing

Several other features of the data in Table 2 strike us as noteworthy. At the time of the enterprises' privatization, over 80 percent of the plots – across all three groups – were attached to the enterprise; a small minority of the plots under consideration, that is, was acquired after privatization.¹⁸ Another point of similarity, firms in all three groups experienced, on average, steep drops in employment after privatization. Firms, however, that continue to operate under Soviet era land tenure rules were more likely to have larger plots. And Moscow is a clear outlier with respect to land tenure; relative to firms elsewhere, those in the capital were more likely to lease their land and less likely to hold it privately or under perpetual use rights. Finally, the ownership profile of firms varies across land tenure status. For instance, the ownership rights of foreigners in firms that hold their plots under perpetual use rights appear relatively weak; and the ownership rights of managers in firms that own their plots appear relatively strong.

Among the firms that own their primary production plots, the median years for the privatization of their enterprise and plot were 1993 and 2003, respectively. Two-thirds of these plots had been held in perpetual use prior to privatization, whereas the remainder had been leased. The transition from lease-holding to private ownership became more common after 2001. To purchase the plots, 67 (46.2%) paid a percentage of cadastral value to purchase the plot (an average rate of 5.6%, median response of 2.5%); 41 (28.3%) paid the full cadastral value; and 20 (13.8%) paid a factor of 3 to 30 greater than the land tax (an average factor of 9, median of 5.5); four had “other” arrangements; and the rest did not answer.¹⁹

¹⁸ 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

¹⁹ 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%.

4 Plot tenure status, access to credit and investment intensity

To explore the micro-level effects of plot privatization more carefully, we employ a regression framework, testing the following specification, to investigate the determinants of ease of access to credit and investment intensity.

$$A_{i,j} = \alpha + \varphi T_i + \zeta C_i + \gamma S_i + \beta E_i + \varepsilon_i \quad (1)$$

The dependent variable $A_{i,j}$ is the answer (expressed as the value of an ordered variable from 1 to 5) for the i^{th} firm to the j^{th} 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; $A_{i,j}=5$ denotes a severe problem and $A_{i,j}=1$ denotes no problem at all. For $j=2$, the question addresses the intensity of the firm's investment activity (on fixed capital, equipment, buildings and land) in 2009; $A_{i,j}=5$ denotes intense activity and $A_{i,j}=1$ denotes no activity at all.

T_i represents the tenure status of the i^{th} firm's primary production plot whose endogeneity we address later. In most specifications, $T_i=1$ if the plot is owned privately; however, in some, we include dummies that capture whether the plot is leased or held under permanent (perpetual) use. C_i is a variable that captures the population of the city in which the firm is located. S_i is a set of sectoral fixed effects. And E_i is a vector of other firm characteristics, including in all specifications the (log) number of years since the firm – not the plot – was privatized; the (log) number of full-time employees and the average assessment of the difficulty posed by four potential problems (in a manner similar to the dependent variable relating to difficulties accessing credit): taxes (not related to property), corruption, overdue accounts payable and inadequate (own) working capital. In some specifications, E_i includes characteristics of the primary production plot: including the area of the plot in (log) hectares and dummies for being located on the edge of the city, for being located proximate to at least two other enterprises, 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 the plot's) privatization and for being the designated the highest in terms of environmental hazard. And in yet other specifications, E_i also includes a dummy variable capturing the respondent's status as a member of a commercial group (*e.g.*, a financial-industrial group or a holding company) and ownership variables

measuring on a 0-4 scale the ownership influence of foreigners, the State Property Fund and Russian individuals not employed by the firm.²⁰

Table 3 lays out the results from the “naïve” models which disregard the potential endogeneity of the plot’s tenure status. We observe here a strong correlation between private land ownership and both dependent variables. Across several different specifications, firms that do not own their plot report greater difficulty accessing credit and lesser investment intensity. Moreover, 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. All eight of these relationships are statistically significant, all but one at the 5% level. In other results, we observe that firms, which belong to commercial groups, which are located in larger cities and which have been privatized longer report less problems with accessing credit.

Our results in Table 3, as was noted, do not address the likely endogeneity of the plot’s tenure status. In Table 4, we introduce a strategy for rectifying this potential problem, which has been widely noted in the empirical literature devoted to assessing the effects of property rights (Besley, 1995; Do and Iyer, 2008; Field, 2005; Galiani and Scharfrodsky, 2008; Hornbeck, 2010). Specifically, we use the regional urban, industrial land privatization index (Table 1) to instrument for the firm’s plot status. The regional land policy that this variable captures is exogenous to the firm and plausibly can be excluded from the second stage of the IV-model since it is difficult to conceive of an alternate, unobserved channel through which land policy might affect access to credit and investment intensity.

Employing this approach, we observe that the regional land policy index strongly predicts private plot status across all specifications. Further, the second stage results show a statistically significant and negative relationship between the predicted value of private plot status and the severity of the self-reported problem with credit access. In other words, we find support for a “de Soto effect” in industry. As in Table 3, we observe a positive relationship between private plot status and investment intensity but it is no longer statistically significant.

²⁰ We lose a number of observations because of non-responses to the questions concerning the plot’s area and the number of years ago that it was privatized.

5 Testing assumptions and exploring alternate data

An important assumption above was that our regional land index did indeed represent the actual inter-regional policy variation that we described. Of course, the fact that we observed in our IV models that surveyed firms were less (more) likely to have taken ownership over their primary production plot in regions where the index of urban industrial land privatization was low (high), even after controlling for a number of firm and plot-specific characteristics, gives us confidence that the index captures what we have argued it does. But we can explore this assumption further by looking at survey responses concerning the obstacles confronted by firms that privatized their plots. Two oft-cited barriers – evaluated on a 1-5 scale in terms of their perceived severity – relate to barriers that regional officials may have put in the way of firms looking to take advantage of the opportunity to privatize their plots. In Table 5, we explore the factors that influence how significant a barrier firms considered, first, opaque regulations and, second, outright opposition from the regional government. Controlling for the same firm and plot characteristics that we did in earlier models, as well as for other perceived barriers, we see that firms located in regions where the index of land privatization was high, firms were less likely to characterize opaque regulations and government opposition as a more important barrier to plot privatization.²¹ Since outright resistance and unclear guidelines are two means by which sub-federal officials have thwarted the privatization of plots, we have even more reason to have confidence that our urban industrial land privatization index is measuring policy variation across space in Russia.

The survey allows us to explore in more depth evidence for a “de Soto effect.” Specifically, firms that privatized their plots were asked the importance of a number of possible motives. Table 6 lays them out in order of popularity according to the percentage of respondents describing a motive as extremely important (*i.e.*, a 5 on a 1-5 scale). The most frequently cited motive, irrespective of timing, was the promise of more secure property rights (*обеспечит большую защищенность бизнеса*). Presumably also related to the security of property rights, the two next most popular responses relate to attracting fi-

²¹ We control for the sum 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. For instance in the government-opposition model, we control for the sum of each of the eight other responses; since respondents rank each barrier on a scale of importance

nancial support. Over 40% of all firms that privatized their plots cited access to external lending and increased attractiveness of the property to investors as important reasons for purchasing their plots. These motives were even more popular among the firms that privatized their plots after the passage of the Land Code in 2001 when financial markets were better developed. We interpret these responses as providing further evidence that legal title to land is indeed valued for enabling firms to access bank loans through facilitating the use of collateral.

6 Conclusion

Our interest in the tenure status of urban industrial land ultimately derives from an interest in the potential effects of formal changes in ownership. Do enterprises that own their plots behave differently than those that do not? Are they more likely to invest at greater rates? Do they have more success in accessing external finance? Are they more apt to sell or lease their lands for new purposes and thus promote urban de-industrialization and the adoption of land use patterns more typical of modern global cities?

In this paper, we exploit a quasi-experiment that has been carried out in Russia. The tremendous inter-regional variation in the pace of land rights reform has meant that geography has helped determine the current tenure status of a firm's primary production plot as much as any individual firm characteristics. By exploiting the difference in the pace with which land reform has been carried out across Russia's federal subjects, we present evidence strongly consistent with the proposition that more secure rights to land facilitate access to external financing. This finding is confirmed by other evidence from our survey that points to the "de Soto effect" as an important motive for otherwise private firms to take ownership of their plots.

from 1 to 5, this variable can take on a value from 8 to 40. A control was also included for whether or not the plot was privatized before or after 2002.

Table 1 Urban commercial-residential-industrial land owned by firms relative to that by state & municipalities (%)

		surveyed firms			surveyed firms
Belgorod	24.9	6	Tver	2.2	2
Vologoda	23.8		Tula	2.2	6
Tatarstan	18.9	13	Krasnodar	2.2	5
Lipetsk	14.8	10	Chukotka	2.2	
Novgorod	8.2	4	Sakha	2.1	
Orenburg	8.1		Oryel	2.0	
Kemerovo	7.4	5	Ingushetiya	2.0	
Tyumen	7.3	3	Samara	1.9	9
Khakasiya	6.4		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	
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	
Karachevo-cherk.	4.4	1	Ulyanovsk	1.2	3
Kirov	3.9		Chita	1.0	
Kurgan	3.9	2	Kabardino-Balk.	0.9	
Nizhny Novgorod	3.9	14	North Ossetiya	0.9	
Kareliya R.	3.7	2	Volgograd	0.8	9
Vladimir	3.6	3	Mordovia	0.7	
Kursk	3.5	3	Penza	0.7	5
Yaroslavl	3.3	8	Astrakhan	0.5	1
Komi R.	3.3		Bashkortostan	0.5	11
Stavropol	3.3	6	Sakhalin	0.5	
Primorye	3.3		Omsk	0.4	7
Kaluga	3.1	5	Amur	0.4	
Ryazan	3.1	5	Moscow city	0.2	48
Perm	2.8	13	Khabarovsk	0.1	2
Marii El	2.7		Kalmykia	0.0	
Pskov	2.5	1	Altai r.	0.0	
Kostroma	2.4	5	Tuva	0.0	
Daghestan	2.4		Kamchatka	0.0	
Voronezh	2.3	4	Magadan	0.0	
Moscow o.	2.3	1	Jewish A.O.	0.0	
Saratov	2.3	5	Chukotka	0.0	

Data source: http://www.kadastr.ru/available_land_2008/ and author's survey.

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

	Private	Lease	Perpetual use		
Credit access, collateral and investment intensity					
Degree to which difficulties accessing credit poses problem for firm (1-5 scale)	2.74	2.83	3.46	***	
Degree to which problems with inadequate working capital, overdue accounts receivable, corruption and (non-land) taxes pose problems for firm (1-5 scale)	3.20	3.26	3.50	**	
Intensity of investment activity in 2009 (1-5 scale)	2.84	*	2.66	**	
Given your experience and that of business colleagues within region, how often do banks require land as collateral to secure long-term financing? (1-5 scale)	3.57	3.53	3.49		
Primary production plot					
Number of hectares	35.1	39.9	344.5	**	
Only plot "on balance" of enterprise when enterprise privatized (%)	40.1	35.1	25.0	*	
"On balance" of enterprise when enterprise privatized (%)	82.0	78.6	76.8		
Being used at full capacity when enterprise privatized (%)	80.7	86.2	80.4		
Categorized as first category of environmental harm (%)	4.7	6.1	3.6		
Located on edge of city (%)	44.2	51.1	53.6		
More than two other enterprises in same part of city (%)	62.8	72.5	*	64.3	
Moscow (%)	1.2	***	33.6	***	3.6
St. Petersburg(%)	7.0		7.6		3.6
City size (1-5 scale) (%)	3.0	***	3.8	***	3.0
Other enterprise characteristics					
Employees at time enterprise was privatized	2209.8	2199.9	3156.8	*	
Employees in 2007	1430.0	1554.1	1981.5		
Years since enterprise was privatized	14.3	14.9	14.4		
Member of commercial group (FIG, holding, etc.) (%)	30.4	34.3	25.0		
Member of government corporation (%)	5.2	3.1	12.5	**	
Influence of state property fund (0-4 scale)	0.35	0.35	0.53		
Influence of non-management labor (0-4 scale)	1.35	1.14	***	1.32	
Influence of foreigners (0-4 scale)	0.45	0.64	**	0.11	
Influence of management (0-4 scale)	2.36	***	1.78	**	1.91
Influence of other Russian individuals (0-4 scale)	1.47		1.01	***	1.82
Influence of other Russian enterprises (0-4 scale)	1.17	**	1.56	**	1.41
Number of respondents	172	131	56		

***, **, * difference significant at 1%, 5% or 10% levels, respectively; t-test on equality of means of those inside and outside sub-group.

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)			
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tenure status of primary production plot								
Private	-0.306** (0.126)		-0.277** (0.131)	-0.320** (0.139)	0.290** (0.146)		0.312** (0.133)	0.303* (0.156)
Permanent (perpetual use)		0.402** (0.186)				-0.408** (0.190)		
Lease		0.258* (0.136)				-0.231 (0.173)		
Severity of 4 other problems, not credit access (1-5 scale)	0.626*** (0.082)	0.622*** (0.082)	0.703*** (0.095)	0.619*** (0.095)	-0.068 (0.082)	-0.064 (0.082)	-0.033 (0.095)	-0.017 (0.107)
(Log) years since privatization	-0.801*** (0.222)	-0.800*** (0.221)	-0.752*** (0.232)	-0.667*** (0.236)	-0.318* (0.184)	-0.324* (0.182)	-0.257 (0.197)	-0.395* (0.223)
(Log) full-time employees	-0.015 (0.079)	-0.021 (0.080)	0.015 (0.087)	0.051 (0.086)	0.178** (0.080)	0.185** (0.083)	0.111 (0.082)	0.134 (0.087)
City size (1-5 scale)	-0.176*** (0.058)	-0.166*** (0.058)	-0.159*** (0.060)	-0.159*** (0.065)	0.083 (0.052)	0.071 (0.056)	0.080 (0.052)	0.082 (0.059)
Member of commercial group (FIG, holding company)				-0.297** (0.126)				-0.111 (0.123)
Sector controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plot characteristics controls	No	No	Yes	Yes	No	No	Yes	Yes
Owner controls	No	No	No	Yes	No	No	No	Yes
N	333	333	297	276	319	319	285	265
Pseudo R2	0.1094	0.1100	0.1259	0.1163	0.0359	0.0350	0.0346	0.0424

Ordered probit models (1-5 scale). ***, **, * difference significant at 1%, 5% or 10% levels, respectively. Standard errors, adjusted for clustering at regional level, in parentheses. Seven sector fixed effect controls. Plot characteristics controls: (log) area in hectares of primary production plot; and dummies for location on periphery of city, location near at least two other enterprises, plot being only one on enterprise's balance at the time of enterprise's privatization; plot being on enterprise's balance at the time of enterprise's privatization, plot being designated as highest environmental hazard. Owner controls: ownership influence of state property fund, Russian individuals not employed by firm; foreign firms or individuals (all 0-4 scale). Results on tenure status hold (1) if Moscow dropped, and (2) analysis restricted to plots attached to enterprise at time of enterprise's privatization.

Table 4 Plot tenure status, access to credit and investment intensity: an IV approach

	Accessing credit is severe problem (1-5 scale)			Firm's investment intensity, 2009 (1-5 scale)		
	Private ownership of primary production plot	-0.667*	-0.660*	-0.766**	0.476	0.233
	(0.380)	(0.390)	(0.360)	(0.303)	(0.321)	(0.312)
First stage: plot owned privately						
(Log) urban commercial-residential-industrial land owned by juridical persons relative to that owned by state and localities	0.717***	0.781***	0.850***	0.748***	0.815***	0.888***
	(0.111)	(0.122)	(0.132)	(0.112)	(0.124)	(0.135)
Sector controls	Yes	Yes	Yes	Yes	Yes	Yes
Plot characteristics controls	No	Yes	Yes	No	Yes	Yes
Owner controls	No	No	Yes	No	No	Yes
N	329	295		318	284	264
Prob>chi2	0.0000	0.0000		0.0000	0.0000	0.0000

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 (Miranda and Rabe-Hesketh, 2006). ***, **, * difference significant at 1%, 5% or 10% levels, respectively. Standard errors, adjusted for clustering at regional level, in parentheses. Seven sector fixed effect controls. Plot characteristics controls: (log) area in hectares of primary production plot; and dummies for location on periphery of city, location near at least two other enterprises, plot being only one on enterprise’s balance at the time of enterprise’s privatization; plot being on enterprise’s balance at the time of enterprise’s privatization, plot being designated as highest environmental hazard. Owner controls: ownership influence of state property fund, Russian individuals not employed by firm; foreign firms or individuals (all 0-4 scale).

Table 5 Barriers to privatizing plot

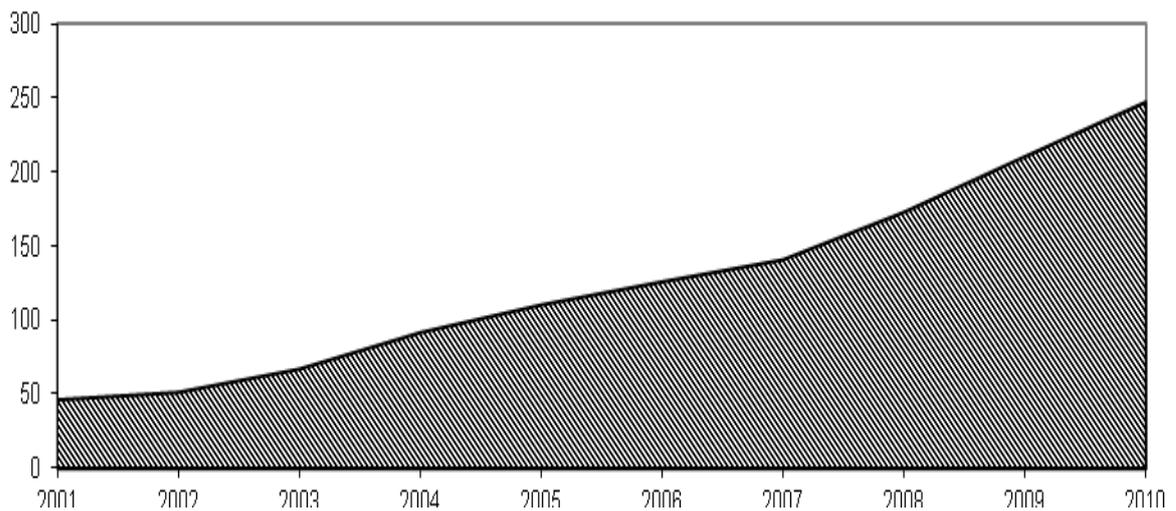
	Opaque regulations	Official opposition
(Log) urban commercial-residential land owned by juridical relative to that owned by municipalities and government	-0.249*	-0.437**
	(0.138)	(0.176)
Sum of other “barrier” responses	0.121***	0.160***
	(0.021)	(0.020)
Sector controls	Yes	Yes
Plot characteristics controls	Yes	Yes
Owner controls	Yes	Yes
N	129	129
Pseudo R2	0.2163	0.2964

Ordered probit models. Robust standard errors, adjusted for clustering at regional level in parentheses. ***, **, * significant at 1%, 5% or 10% levels, respectively. 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.

Table 6 Motives for privatizing primary production plot

	% of firms responding 5 on 1-5 scale with 5=extremely important
Increased security of property rights	62.4
Increased asset value, investment attractiveness	48.2
Increased access to credit	42.4
Danger rental rate grows faster than land tax	30.0
Rental rate greater than land tax	21.1
Danger lease modified unfavorably	18.2
Danger lease not extended	13.5

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



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