The Slow Road from Serfdom: Labor Coercion and Long-Run Development in the Former Russian Empire *

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Abstract

This paper examines the long-run economic consequences of Russian serfdom. Employing data on the intensity of labor coercion at the district level in just prior to emancipation in 1861, we document that a greater legacy of serfdom is associated with lower economic well-being today. Our estimates imply that increasing historical serfdom by 25 percentage points reduces household expenditure today by up to 17%. The analysis of different types of labor coercion reveals substantial heterogeneity in the long-run effects of serfdom. Furthermore, we document persistence of economic development measured by city populations over the period 1800 - 2002 in cross-sectional regressions and panel estimations. Exploring mechanisms, our results suggest that slower industrial development and less urban agglomeration in areas with a greater degree of serfdom perpetuated the negative effects of forced labor in the long-run.

Keywords: Labor Coercion, Serfdom, Development, Russia, Persistence

JEL Classification: N33, N54, O10, O43

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1 Introduction

Twenty-five years after the fall of the Soviet Union, the economies of Eastern Europe still lag behind. A large body of research has attributed the slow rate of their convergence with advanced economies to the legacy of Soviet-era institutions and the difficulties in transitioning to a market economy. The relatively slow pace of development of the former Soviet member countries may, however, also have deeper historical roots. Already at the turn of the 19th century, Imperial Russia was one of the poorest economies in Europe. In 1900, per capita incomes in the countries that would later comprise the USSR were only about a third of those in Western Europe ($1,196 vs. $3,155). While it has been argued that low levels of economic development today could reflect persistent legacies of the Imperial period (e.g. Roland 2012), this hypothesis remains largely untested, and the possible underlying mechanisms unexplored.

In this paper, we examine whether Russian serfdom generated long-term economic consequences extending to the present day. Serfdom was not only one of the most prominent institutions of forced labor in history, but it is frequently regarded as a crucial factor behind Imperial Russian (under-) development (Acemoglu and Robinson 2012; Markevich and Zhuravskaya 2018). Figure 1 provides suggestive evidence of the legacy of similar institutions across several European countries. The figure depicts a striking negative correlation between the timing of peasant emancipation and the level of development today, which suggests that Imperial Russia's retention of serfdom until the 1860s may have contributed to lower income levels in the long-run. Clearly, the societies in Figure 1 differ across many historical and contemporary dimensions, making it difficult to isolate the importance of serfdom or to identify the mechanism(s) of historical persistence. Therefore, to test whether and how this correlation may be indicative of an underlying causal relationship, this study investigates the economic effects of serfdom within the area of the former Russian Empire, making use of disaggregate data measuring labor coercion at the level of the district (uezd) just prior to formal emancipation in 1861. Our main estimates document a significant negative relationship between this institutional heritage

\[1\]Estimates from the Maddison project (Bolt and Zanden 2014).
FIGURE 1: Peasant Emancipation and Long-Run Development in Europe

Notes: This figure plots log GDP per capita in 2014 against the year of peasant emancipation in European countries. See Appendix for data description.

and measures of economic development today. Critically, we complement this finding with a careful exploration of the possible mechanisms that generated this pattern. Rather than direct institutional, cultural, or human capital channels, the evidence suggests that initial economic differences interacted with evolving but high restrictions on labor mobility, delayed industrialization, and Soviet-era geographically differentiated policies to generate long-run structural impediments for development in former serf areas.

Russian serfdom was a system of labor coercion that existed from the 16th century until 1861, when about 45% of peasants (and 38% of the total population) in the European provinces were obliged to work for the landowning nobility and/or pay them a portion of their income in the form of quit-rent.\(^2\) Formal emancipation was followed by a drawn out process of land reform that transferred property rights (generally assigned to the communal village) and associated mortgage-like obligations to the newly freed peasants. The experience of these privately “owned” serfs may be contrasted with what happened to rest of the peasantry, who resided on either state or Imperial family-owned lands prior to 1861. Serfs possessed less land and faced more restrictions on their labor, education, and entrepreneurial decisions prior to the 1860s, and the emancipation reform solidified these differences in the short and medium term.

\(^2\)Slavery had a long history in Kievan and Muscovite Russia. The laws and customs regarding debt servitude and other forms of obligation helped structure those that later formalized serfdom (Hellie, 1982).
In this paper, we leverage this heterogeneity within the pre-1861 peasantry to identify the longer-run consequences of serfdom. Our district (uezd) level measure of the population who were serfs within the Russian Empire comes from a tax census conducted in the late 1850’s. Assessing the potential determinants of serfdom’s geography, we find that, conditional on fixed effects defined for historical provinces, serfdom was more prominent in districts closer to Moscow, consistent with the spread of the Imperial state, but only weakly associated with bio-geographic conditions, such as agricultural suitability. To investigate subsequent economic outcomes across districts with different levels of historical serfdom, we link our measure of labor coercion to rich data on modern outcomes and on outcomes from intermediate dates in the Imperial, Soviet, and post-Soviet periods. Our main results document that households in districts where serfdom was widespread before 1861 are poorer today: a standard deviation increase in the share of the population who were serfs (about 25 percentage points) is associated with 9 - 17% lower average household consumption among modern households. Further, we document the persistence of this pattern of differential economic activity between areas of varied exposure to historical serfdom. Estimating city-level cross-sectional and panel regressions for the period 1800–2002, we find that cities were significantly smaller in locations with more historical serfdom prior to emancipation, that this gap did not fully close after 1861, and that, if anything, this difference widened during the Soviet period.

Given this pattern of persistence, it is critical to investigate the underlying mechanisms. The literature on the long-run consequences of forced labor in other contexts emphasizes how persistent cultural, ethnic, racial, or institutional characteristics of the previously coerced population help generate divergent outcomes. In contrast, our Russian context shuts down these channels, as such differences were largely non-existent between former serfs and the rest of the population, especially after the Bolshevik Revolution completely

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3These findings are robust to controlling for a large set of geographic characteristics, distance to Moscow, household characteristics, proxies for early (pre-1861) development, and several types of fixed effects. Employing the method proposed by Oster (2019), we find that selection on unobservables must be at least as large – and often much greater – than on observables to overturn the effect of past serfdom on subsequent outcomes.

4See for example Engerman and Sokoloff (1997); Dell (2010); Nunn (2008b); Acemoglu et al. (2012); Acharya et al. (2018); Lowes and Montero (2018).
dismantled the broader institutional and administrative structures.\footnote{While studies such as Michalopoulos and Papaioannou (2013) and Nunn and Wantchekon (2011) find evidence for long-run persistence in the face of dramatic institutional change, their context (primarily Africa) is one where ethnicity, religion, and race play central roles as mechanisms. Russian serfs differed little from their masters with respect to race, ethnicity, or religion, and they tended to enjoy considerable autonomy in how they allocated their time unlike, for example, the majority of American slaves. It is worth noting such differences between Russian serfdom and forced labor in other contexts when considering the external validity of our findings.} Instead, we focus on evolving constraints on factor mobility that reinforced initial gaps between low and high serf areas to generate path dependencies in the nature of local structural change.\footnote{This connects our work to studies by Bleakley and Lin (2012), Davis and Weinstein (2002), and others.} We hypothesize that structural change and industrial agglomeration were less prominent in former serf areas throughout the period, beginning with initial differences prior to 1861, and becoming even more prominent as more modern sectors emerged in the Soviet Union. Labor, migration, investment, and resource allocation policies of the Soviet and post-Soviet regimes worked to reinforce the structural gap between formerly serf and non-serf areas.\footnote{Delays in structural change can also rationalize the cross-country relationship between incomes and the timing of peasant emancipation depicted in Figure 1. Appendix Figure 11 illustrates that a later emancipation of peasants is strongly associated with a larger share of labor in agriculture in 1900, and even in 2000.}

To provide empirical support for this hypothesis, we draw on novel district-level data on urbanization, infrastructure, industrial development, property holdings, human capital, and policy preferences across our entire period. We establish that the incidence of serfdom was negatively associated with the level of urbanization, industrialization and tertiary sector employment in Imperial Russia, road densities and the presence of firms in the Soviet period, and population density and night-time luminosity after 1990. We also find that the greater prevalence of quit-rent obligations – for which serfs enjoyed greater autonomy to engage non-agricultural activities away from the estate (Dennison, 2011) – was associated with lower employment in agricultural occupations and greater employment in industry in the late Imperial period. While documenting that serfdom was associated with fewer industrial establishments over the period 1939-1989, we also show that firms in former serf areas were smaller, less productive, and more likely to be in agriculture than manufacturing at the end of the Soviet period. Although schooling outcomes were only slightly different between more and less serf areas during the Imperial period, we estimate substantial gaps in educational attainment in modern data, consistent with the demand-side consequences of a growing complementarity between labor skills and modernizing industry in the Soviet
Union. Considering plausible alternative mechanisms, we find little support for a direct channel of persistence working through economic inequality, political structures, and reduced public good provision. The evidence also suggests that serfdom is not associated with modern cultural differences, such as trust, xenophobia, institutional preferences, and political participation, or with communist party membership during the Soviet period. Overall, our results identify a set of theoretically and historically consistent linkages between the incidence of past serfdom and the current spatial distribution of economic activity across the former Russian Empire.

Robust empirical work linking labor coercion in Imperial Russia to subsequent or contemporaneous economic outcomes is limited. An exception is Markevich and Zhuravskaya (2018), who estimate that provinces with above average levels of serfdom grew relatively faster after emancipation, largely due to the elimination of disincentives arising from seigniorial obligations. At the same time, Nafziger (2013) shows that the emancipation and land reform processes homogenized institutional structures – particularly the peasant commune – but fixed differences in factor endowments and prices between formerly serf and non-serf areas, a pattern that lasted through the Revolution of 1917. Taken together, this small empirical literature suggest that serfdom imposed meaningful constraints on the rural economy, that some of these were relieved by the reforms of the 1860s, but that former serf areas continued to face persistent differences in land and labor market conditions until the Soviet period. Our study is the first to examine whether economic differences between high and low serf regions persisted beyond 1917. In addition, we provide new evidence on how institutional legacies can constraint structural change, thereby generating long-run the persistence of spatial development patterns.

8While there was an association of serfdom with late-Imperial land inequality, there is little effect of serfdom on contemporary measures of inequality, nor on the provision of local public goods today. For such proposed mechanisms in other contexts, see Engerman and Sokoloff (1997); Galor et al. (2009); Galor and Moav (2006).

9While we find that preferences for redistributive policies are elevated in former serf areas, we view these differences as reflective of the persistent spatial inequalities driven by differential structural change. Given the disruptions of the 20th century, our main findings are also unlikely to be driven by a specific culture of serfdom (e.g. Schooler 1976).

10More qualitative, historical scholarship does attribute the slow pace of development in late-Imperial Russia to serfdom and an emancipation process that seemingly perpetuated many institutional restrictions in the countryside. See Dennison (2011); Gerschenkron (1966); Lenin (1911).

11See Nun (2013) for an excellent survey of this literature. Relative to this literature, we document that coercive labor institutions also have economic consequences outside the context of European colonialism,
The paper proceeds as follows. Section 2 describes the historical background. Section 3 examines the effect of serfdom on long-run development. Section 4 documents the nature of persistence in this pattern. Section 5 investigates mechanisms, and Section 6 concludes.

2 Historical Background

2.1 Serfdom and Emancipation in the Russian Empire

In return for military service to the Tsars during Muscovite and Imperial state expansion in the 16th and 17th centuries, the elite received land grants that came with the right to draw upon the labor of the resident population. However, with competition among the servitors and the ease of fleeing to open land, the high land-labor ratio motivated the land-owning nobility to impose increasingly coercive control of their peasants. These attempts were reinforced by the state through a series of decrees, culminating in the 1649 *Ulozhenie* that sharply constrained peasant mobility and formalized the legal rights of the serf-owning nobility. Further 18th century measures solidified the control of the nobility over their peasants, so that by 1800 the legal and institutional structure of Russian serfdom was firmly in place.\(^\text{12}\)

Serfdom varied widely across estates but possessed certain common characteristics. First, serfs constituted a distinct social estate, with the nobility holding ultimate authority over the daily lives of their property that allowed them to intervene in marriage, employment, educational, religious, judicial, and other matters.\(^\text{13}\)

Second, serf-owners demanded seigniorial obligations: labor services, cash or in-kind payments, or a combination. On many estates, owners actively managed the labor decisions of their serfs, either in person or through managerial staff. Such estates often possessed demesnes, with serf labor on the owner’s land compensated by the granting of use-rights to other property. On other estates, serfs were granted substantial freedom to allocate...

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\(^\text{12}\)The 1762 “emancipation” of the nobility freed the serf-owning class from any corresponding obligations for state service.

\(^\text{13}\)Many of these constraints were explicit under Russian law, especially with regards to restrictions on land ownership, the freedom to contract over labor, and schooling. From the beginning, the nobility’s autonomy included the possibility of emancipating their serfs on their own terms. This option was exercised relatively infrequently.
their labor as they saw fit. This variant was more common in less agriculturally productive regions, where owners tended to transfer the use of all estate land to the serfs in return for cash or in-kind payments (Dennison 2011; Moon 1999).

Thus, the labor and property decisions of serfs were relatively constrained, which created disincentives for investment (of all sorts), impeded the adoption of better agricultural techniques, and led to the misallocation of labor and other resources in and across sectors. Many contemporary observers acknowledged serfdom’s negative growth implications, while supporters of the status quo argued for continuing the institution less in economic terms than to maintain the Imperial regime and to support elite tutelage over masses ill-equipped for freedom (Emmons 1968; Field 1976; Khristoforov 2011).

However, there remains relatively little causal evidence on the economic impact of Russian serfdom or emancipation. Domar and Machina (1984) used information on the price of land with and without resident peasants to argue that serfdom was profitable to the nobility up to 1861. Based on evidence from a single large estate, Dennison (2011) argues that serfdom generated adverse distributional and growth effects. An important recent contribution is Markevich and Zhuravskaya (2018), who evaluate the impact of serfdom by looking at differential economic changes between provinces with more or fewer serfs before and after 1861. The results from their study suggest strongly negative effects of serfdom, although they do not explicitly identify a mechanism behind their findings. Overall, most scholarship on Russian serfdom asserts that the institution undermined economic development while it existed.

More attention has been paid to the short and medium-term consequences of emancipation in the half century before the Bolshevik Revolution. Soviet studies (e.g. Litvak 1972) argued that emancipation and the accompanying land reforms actually worsened former serf land holdings and property rights (by reinforcing communal ownership) and imposed considerable new tax and payment burdens on the rural economy. In contrast, some recent research (e.g. Hoch 2004) asserts that the majority of former serfs were made

14Soviet works (e.g. Koval’chenko 1967) marshaled considerable data to argue that the serf economy was in decline prior to 1861. However, the materials that these scholars employed tended to be rather selective, and their Marxian framework placed the argument before the evidence.

15None of these Soviet works relied on causal identification.
better off – at least in terms of land and obligations. In his influential interpretation, Gerschenkron (1966) emphasized the negative implications of communal property rights (and associated joint liability for land and tax payments) for agricultural productivity and labor mobility after 1861. Gerschenkron and others writing in this vein (e.g. Allen, 2003) tend to focus on broader institutional impediments that characterized all peasants. By the 1880s, the different types of peasants were administratively unified and possessed similar institutions of communal self-governance, (generally) collective property rights, and joint liability for taxes and land payments. However, despite apparent nominal institutional similarities across peasants, Nafziger (2013) shows, using more disaggregate data than previous studies, that landholdings were smaller, land inequality was greater, and the associated land and tax obligations were higher in districts with relatively more former serfs, well into the 20th century.

Gerschenkron (1966) argued that the Stolypin land reforms of the early 20th century improved incentives in peasant agriculture by offering mechanisms for consolidating plots and exiting the commune. Although likely important in alleviating some constraints on labor mobility and agricultural productivity (Chernina et al., 2014; Castaneda Dower and Markevich, 2017), these measures were just the first steps in a series of dramatic changes that would deeply impact rural Russian society over the rest of the century: the Bolshevik Revolution, wars, collectivization, famine, industrial policies, and the slow collapse of the agricultural sector from the 1970s onward. None of these changes explicitly or differentially targeted former serfs, but as we develop further below, they may have built upon and reinforced geographic, institutional, and economic differences in ways that perpetuated existing gaps in economic development between former serf and non-serf areas.

2.2 Measuring 19th–Century Serfdom

Serfdom was a defining feature of Russian society in the early 19th century, but by the 1850s, peasants residing on noble–owned land were a minority. The share of such serfs in the Imperial population crested at just over 50% at the turn of the 18th century, before falling

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16Such revisionist studies have relied on empirical evidence that is not necessarily representative, is too aggregate to identify differences, or covers an intermediate stage of a complicated and drawn-out reform process.
to roughly 35% just before Emancipation (Hoch and Augustine (1979); Kabuzan (2002)). In contrast, peasants on state or Romanov family-owned land were governed by specific government ministries, typically possessed more land and greater freedom to engage in contracts, and were generally only liable for direct (and lower) tax-like obligations (Nafziger 2013). As noted above, factor endowment differences persisted in the decades after 1861, while different groups of peasants experienced at least nominal administrative and legal convergence following serf emancipation.

**Figure 2: Spatial Distribution of Serfs as Share of Population c. 1858.**

Notes: This figure displays serf in 1858 as a share of the population c. 1860.

We study serfdom in the European part of the Russian Empire at the administrative level of the district (*uezd*), the largest sub-unit of a province.\(^\text{17}\) Relying on the 10th tax census of 1858, as reported in Troinitskii (1861), we construct our main indicator of serfdom’s intensity, \(\text{Serfs \% (1858)}\), which divides the total number of serfs by the total district population.\(^\text{18}\) The resulting measure covers roughly 490 historical districts in 50 provinces.

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\(^{17}\) To do this, we digitized a late 19th century district-level map of European Russia.

\(^{18}\) Unfortunately, district-level data on the total or overall peasant population from the 10th tax census are unavailable. As a result, we draw on Bushen (1863), which provides the total population in 1863. Given the possibility of emancipation-induced migration, this might seem to introduce some measurement error. However, the 1863 population figures were based on administrative records of the tax-paying population, which were unlikely to have been quickly revised from the 10th tax census totals. An ideal intensity measure would use the number of peasants as the denominator - we control for various urbanization measures in our empirical work below. By necessity, we employ a snapshot of serfdom in 1858, but as the level of “labor
of European Russia, without Poland and Finland. In our data, serfs averaged 38% of a district’s population.\footnote{While over 90% of districts contained some serfs just before emancipation, in only few did the share of serfs in the total population exceed 80%. See the distribution function in Figure \ref{fig:serfdom_distr} in the Appendix.} Figure \ref{fig:serfdom_map} shows the underlying variation in serfdom across European Russia just before emancipation, indicating that the institution was largely concentrated in a band from Kiev to the upper Volga. However, even within high-serfdom provinces, there was considerable variation in the share of the population subjugated to the nobility.

### 2.3 Correlates of Serfdom

To begin our investigation of the long-run economic consequences of coercive labor, we examine the extent to which districts with a greater prevalence of serfdom were systematically different from districts with a lower incidence. We focus on what the historical record and simple economic logic would suggest were important factors underlying the geographic incidence of serfdom just prior to Emancipation.\footnote{All of the variables mentioned here are described and summarized in the Appendix Table \ref{tab:variable_summary}.} If the prevalence of serfdom was associated with many district characteristics, we would be concerned about the influence of unobservables that are themselves correlated with our observable co-variates. We address such concerns in the long-run analysis below.

As Muscovy expanded away from Moscow before 1700, state service was often rewarded with the allocation of land in newly incorporated areas (this practiced eased over the 18th century). Therefore, we consider the direct distance from each district centroid to Moscow and historical provincial fixed effects to get at the broad geo-political nature of this expansionary process.\footnote{The inclusion of provincial fixed effects helps us to address strategic considerations for the location of military populations (and serfs) as raised by Matranga and Natkhov (2019), as well as issues like migration, settlement patterns and ethnic variation that impacted Muscovite expansion and the availability of land.} Apart from these historical processes, variation in land productivity might have led to differences in the demand for coerced labor or in the desirability of land in return for state service. An important proxy for agricultural productivity is the suitability of the soil for growing crops. As grains were dominant in the agriculturally productive areas to the south of Moscow, we use modern geo-spatial data to produce a time-invariant measure of the land’s suitability for growing cereals.\footnote{We also consider soil suitability for growing specific grains, from wheat to oats, barley and rye, but these are all highly correlated.}
and geographic conditions might have affected local agricultural productivity, the mobility of the population, and local non-agricultural opportunities (and, hence, outside options and the incentives for maintaining serfdom, as in Acemoglu and Wolitzky (2011)). Therefore, we also include the latitude and longitude of each district's centroid, the fraction of land covered with forest, the share of podzol soil (relatively poor for agriculture), the slope of the terrain, distance to the coast, the density of rivers in the district, and the mean growing season temperature and precipitation (averaged over the period 1901-2000). Together, these variables constitute the base set of geographic controls for the analyses of this paper.

Table 1 provides results from our investigation of the distribution of serfdom across the European part of Imperial Russia. In an cross-sectional specification focusing on location and grain suitability (Column 1), the coefficients on longitude and distance to Moscow are

23Many of these environmental variables are measured today. Soviet authorities did engage in agricultural and resource practices that may have impacted agricultural conditions over the 20th century. Such changes were relatively small, likely uncorrelated with incidence of serfdom, and largely occurred outside of European Russia.
negative and statistically significant, consistent with the Muscovite expansion from west to east influencing the eventual extent of serfdom. However, as we illustrate empirically below, controlling for the distance to Moscow does not explain away the relationship between historical serfdom and modern outcomes. The suitability for growing cereals is also a strong and positive predictor of serfdom’s intensity in Column 1, which is consistent with the incentive to employ coerced labor in relatively agriculturally productive areas.

Column 2 adds the rest of the geographic variables, as well as the distance of a district to the nearest city in 1600 (reported in the data of Bairoch et al. (1988)) and the distance to the district in which the capital of the province is located. These variables take into account “pre-existing” differences in urbanization as measures of past economic development, since districts in close proximity to cities and provincial capitals were likely characterized by higher population densities. In the absence of suitable early data, these measures help account for the incentive to adopt serfdom in areas with high land-labor ratios Domar (1970). Moreover, the distance to a city is also indicative of the availability of non-coercive outside options for the serf population. However, neither variable is a significant predictor of the geography of serfdom. To further take into account unobserved historical and geographic determinants of serfdom as noted above, Column 3 includes provincial fixed effects (defined for Imperial gubernia). While the size of the coefficients on the main variables in Column 1 remain similar, we find that a district’s province explains a large part of serfdom’s intensity. Moving from the cross-district specification in Column 2 to the provincial fixed-effect model of Column 3 increases the $R^2$ from 0.46 to 0.71, while soaking up much of the impact of other geographic variables. Thus, much of the spatial variation in serfdom was determined at the broader regional level.

Column 4 estimates the same regression as in Column 3 over the districts for which our

24 A priori, it is not clear how proximity to Moscow of high serf areas would directly relate to long-run economic outcomes. On the one hand, there might be positive development spillovers from the economic center to the areas surrounding it. On the other hand, being close to the political center of an extractive state might generate negative development consequences. Empirically we find that, if anything, places close to Moscow are likely more developed, suggesting that any negative impact of serfdom on economic development might be underestimated.

25 For the coefficients of all controls see Appendix Table B1.

26 As argued by Acemoglu and Wolitzky (2011), the depression of outside options can enable stronger coercion. Other available indicators of outside options prior to 1861 – such as the presence of factories – are more likely to have been endogenous to the location of serfdom. Moreover, there are no district-level data on industrial activity prior to 1861.
modern household survey data (see below) are available. We find similar balance in terms of the co-variates considered, with the exception of a positive association between serfdom and cereal suitability. An even larger share of the variation of serfdom in this sub-sample can be explained by our geographic controls and province fixed effects ($R^2$ of 0.78). Columns 5-7 investigate the share of different types of serfs. The estimates indicate that the quit-rent form of obligations (obrok) was relatively less prominent in areas that were more suitable for cereal agriculture, that corvée (barshchina) areas were more riverine, and that non-peasant (household) serfs were located in less fertile regions. With provincial fixed effects included, the coefficients are at best marginally statistically significant, and as a group they explain relatively little of the overall variation in the type of serfdom.

Overall, we do not find any strong association of these co-variates with serfdom, once we control for province dummies that subsume many relevant geographic and historical characteristics. These results help mitigate concerns that the historical emergence of serfdom in Russia was related to unobservable factors that could bias our empirical estimates of the long-run development effects of coercive labor. While our data are indicative of balance in observable characteristics between more and less serf areas, in our empirical work below, we do control for various fixed effects and a baseline set of possible geographic confounders, particularly the distance of a district to Moscow.

3 Documenting the Long-Run Impact of Serfdom

3.1 Data

Constructing outcomes for our long-run investigation is challenging, as income per capita is not available at a unit of analysis comparable to our historical data on serfdom, and as our analysis spans several current countries. To circumvent these limitations, we construct our main outcome variables from the three waves of the Life in Transition Survey (LiTS). Our main indicator for modern economic development is equivalent household

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27 As one final check as to whether the co-variates of serfdom are associated with long-run development, we undertake an omnibus test similar to the one in Satyanath et al. (2017). As we report in Appendix Table B2, this test indicates that the variation in development outcomes today that is predictable from these co-variates is unrelated to the historical incidence of serfdom.

28 The LiTS is collected by the European Bank for Reconstruction and Development to assess household and individual well-being in transition countries. The Appendix contains additional information on the LiTS survey data and the construction of the variables.
expenditure. It is the sum of spending on food, clothing, education, health, and durables, expressed in USD and adjusted for the size of the household to create a measure of economic well-being per capita.\footnote{Although, this variable relies on a recall method, the accuracy is remarkably good when compared to directly measured household consumption data (Zaidi et al., 2009).} In addition to our main outcome, we draw on the LiTS to measure consumer good ownership (mobile phone, car, computer), the importance of farming and land cultivation.\footnote{We also employ LiTS to investigate contemporaneous variation in education, public goods provision, cultural attitudes (redistributional preferences, trust, attitudes towards market economies and democratic institutions, xenophobia), and the incidence of protest and collective action.} The geo-location of each Primary Sampling Unit allows us to precisely match households to historical districts.\footnote{Appendix Figure A2 shows the PSU locations.}

### 3.2 Baseline Empirical Strategy

To assess whether the historical incidence of serfdom was associated with modern socio-economic outcomes, we estimate the following model:

\[
\log(\text{Expenditure})_{i,d,p,c} = \alpha + \beta \text{Serfdom}_{d,p,c} + H_{i,d,p,c} \lambda + X_{d,p,c} \delta + \Gamma_{p,c} + \epsilon_{i,d,p,c}
\]

where \(i\) represents the household, \(d\) refers to the historical district, \(p\) indicates the historical province, and \(c\) contemporary country. \(\text{Serfdom}_{d,p,c}\) denotes our variable of concern, the share of serfs out of the total population in a (historical) district \(d\), located in province \(p\), and contemporary country \(c\).\footnote{To ease readability, per capita shares of serfdom are divided by factor 100 and vary between 0 and 1.} The coefficient of interest is \(\beta\), which gives the effect of serfdom on modern outcomes. \(H_{i,d,p,c}\) is a vector of household and survey controls that includes household size, the share of the household aged 0-18, the share aged 60+, the share of males in the household, the household head’s religion, and indicators for LiTS waves. \(X_{d,p,c}\) is a vector of the aforementioned district-level controls that we link to the PSUs.\footnote{Besides the latitude and longitude of the district, we control for the area covered by forest, ruggedness, land suitability for growing cereals, average temperature and precipitation during the growing-season, river density, the share of land with podzol soils, the distance to the coast, and the distance to Moscow.}

Our preferred specification incorporates a subset of these baseline district characteristics in a more flexible way by including a set of eight dummies for each class of cereal suitability; quartile dummies for river density, temperature, podzol soil, and precipitation; and linear controls for the remaining variables.

Our measure of serfdom is correlated across space. In most specifications, we include fixed effects for administrative units, denoted by \(\Gamma_{p,c}\), which can be modern countries or...
Table 2: Estimating the Long-Run Effects of Serfdom

<table>
<thead>
<tr>
<th>(In) Equivalent Expenditures Per Capita</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serfs % (1858)</td>
<td>-0.373***</td>
<td>-0.431***</td>
<td>-0.379***</td>
<td>-0.677***</td>
<td>-0.694***</td>
<td>-0.644***</td>
</tr>
<tr>
<td></td>
<td>(0.117)</td>
<td>(0.111)</td>
<td>(0.104)</td>
<td>(0.185)</td>
<td>(0.190)</td>
<td>(0.185)</td>
</tr>
<tr>
<td>Distance City in 1600</td>
<td>20.544</td>
<td>-54.487</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(21.718)</td>
<td>(40.700)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance Provincial Capital</td>
<td>-0.062</td>
<td>-0.055</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.045)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household Controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Linear Controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Flexible Controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
</tr>
<tr>
<td>Province</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
<td>17155</td>
</tr>
<tr>
<td>Number of Clusters</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>$\delta$ for $\beta = 0$</td>
<td>16.126</td>
<td>9.856</td>
<td>2.486</td>
<td>2.772</td>
<td>1.518</td>
<td>1.166</td>
</tr>
<tr>
<td>Lower Bound Estimates</td>
<td>-0.424</td>
<td>-0.552</td>
<td>-0.432</td>
<td>-0.591</td>
<td>-0.639</td>
<td>-0.517</td>
</tr>
</tbody>
</table>

Conley S.E. 300km

Serfs % (1858) [0.118]*** [0.126]*** [0.123]*** [0.196]*** [0.195]*** [0.180]***

Note: The unit of observation is the household. Household controls include the household size, the share of household members aged 0-18, the share of household members aged 60+, the share of male household members, the religious denomination of the household respondent, LiTS wave fixed effects. Linear controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow. Flexible controls include eight dummies for cereal suitability, and four dummies for quartiles of growing-season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as the remaining linear controls. The restricted model used to compute $\delta$ and the lower bound estimates controls for country/province fixed effects. Standard errors clustered at the province are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Historically provinces to account for spatial correlation, we use a conservative approach and cluster either at the level of the province (to account for correlation within a province) or compute Conley (1999) standard errors that allow for spatial correlation of errors.

### 3.3 Results

We present our main results in Table 2. The estimates from Equation (1) with the log of household expenditure as the dependent variable are reported under different strategies regarding the use of fixed effects and controls. Overall, we find a large, negative, and statistically significant relationship between serfdom’s intensity and our main measure of economic well-being, conditional on household controls, base geographic controls, and fixed effects. The estimated coefficient on the intensity of serfdom is negative and significant with either country or provincial fixed effects (albeit larger in magnitude with the latter),

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34 In our preferred specifications, and whenever the sample size permits, we utilize historical province fixed effects, which leaves only within-province variation and rules out that the results are driven by provinces without serfdom in 1860, such as the Baltics. This is a demanding specification, since in some provinces the number of households sampled in the LiTS is small and falls in only one district.

35 Appendix Table C1 displays these results with coefficients for all the control variables.
with either fully linear or more flexible versions of the geo-climatic controls. In columns 3 and 6, we add controls that proxy for pre-1861 economic development: the distance to the nearest city of more than 5,000 inhabitants in 1600 and the distance to the provincial capital. The coefficient decreases slightly in absolute terms but stay significant.

Overall, these estimates are economically meaningful. A one standard deviation increase in the prevalence of serfdom (around 25 percentage points or 0.25 here) is associated with a substantially lower level of per capita expenditure in the modern household data of between 9 and 17%, depending on the specification. This finding is robust to the way we control for geography, to the type of administrative unit fixed effects, and to taking into account spatial correlation of errors with a cutoff distance of 300km (standard errors reported at the bottom of Table 2).  

### 3.4 Assessing Selection on Unobservables

The negative effects of serfdom on contemporary development presented in Table 2 are robust to an exhaustive set of controls and fixed effects that together explain about 78% of variation in the main independent variable (see Table 1). Nevertheless, it is possible that unobservables bias our estimates. To assess the scale of any such bias, we employ the methodology of Oster (2019), which evaluates how strong selection on unobservables has to be to explain away the negative effect of serfdom. It examines coefficient stability by comparing movements of estimated coefficients and the $R^2$ in models with full controls relative to a model with a restricted set of controls. We present both the $\delta$ estimate of the proportional bias due to unobservables that would have to exist to drive the coefficient of serfdom to zero, along with a lower bound coefficient estimate of the impact of serfdom under equal selection ($\delta = 1$). For both calculations, we assume a maximal $R^2$ that is 30% larger than the $R^2$ from the controlled regression, as suggested by Oster (2019). A $\delta$ equal to one means selection on unobservables would be equally impactful on the coefficient.

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[36] To compute spatially-adjusted standard errors, we use the routine developed by Colella et al. (2018) that calculates p-values assuming a normal distribution of errors. Appendix Table C2 shows that the 300km cutoff produces the largest standard errors.

[37] See Oster (2019) for the formal details of this test. Our restricted model controls for only province or country effects. In an earlier version of the paper, we took the earlier approach of Altonji et al. (2005), which has been adopted in Nunn and Wantchekon (2011) and other studies of historical persistence. Our results with this method also suggest little bias due to unobservables.
estimate as selection on observables, and so values exceeding one imply that selection on unobservables would have to be significantly stronger than selection on observables to explain away our main result. We report these two test outcomes at the bottom of Table 2. The \( \delta \) values that we compute are consistently larger than one. The implied lower bound estimates are negative, and of large magnitudes that are all economically significant. These findings imply that a bias of our estimates by unobservables is unlikely, and suggest a causal interpretation of the effect of serfdom on contemporary development.

3.5 Robustness and Extensions

We undertook a series of robustness exercises for our main estimates, reported in Table C3 of the Appendix. In these specifications, we control for additional geographic determinants of agricultural productivity and the choice between agriculture or industrial activity, in particular the within-district variation in land quality, differences in the length of the growing period, climatic risk (i.e. the year-to-year variability during the growing-season months), the presence of coal deposits measured during the Soviet period, the distance from St. Petersburg, and pre-Emancipation population density. We find only weak relationships of these additional variables with long-run outcomes and stable coefficients on our serfdom measure, suggesting that the baseline controls and fixed effects already absorb the most important geographic factors. To alleviate concerns about other factors possibly driving persistence, in particular religious differences, we also control for the district-level share of adherents to the major religions in 1870 - in addition to the religious affiliations of respondents today. Including religious shares (which are all individually insignificant) only slightly reduces the estimated coefficient, albeit in a smaller sample. Finally, we show that

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38 A previous version of this paper explored an instrumental variable strategy to identify a causal linkage between historical serfdom and modern economic development. The instrument – the number of monasteries expropriated (with monastic serfs transferred to the state peasantry) by Catherine the Great in the mid-18th century – was strongly associated with our measure of serfdom c. 1860, and the negative consequences for long-run outcomes remained intact. However, and as noted by referees, there are reasons to question the exclusion restriction for this instrument, as the location of monasteries (and monastic serfs) may be related to unobservable local factors that could plausibly drive longer-run economic outcomes. As such, we have excluded this strategy from the current paper, replacing it with extensive other robustness work (results for IV specifications akin to those of Table 2 are available upon request). It is worth noting that our earlier instrumental variable strategy was recently adopted in Markevich and Zhuravskaya (2018).

39 Specifications that include pre-Emancipation population density not only take into account one possible driver of the incidence of serfdom (i.e. labor scarcity, as suggested in Domar (1970)), but this variable also soaks up many other (potentially unobservable) geographic and other channels of long-run persistence.
our main result is unchanged if we employ ownership of various durable consumer goods (mobile phone, car, and computer) in the household as outcome measure from the LiTS (results in Appendix Table C3). We still find a negative and significant relationship between the historical incidence of serfdom and measures of household wealth today

Another way to investigate the long-run impact of serfdom is to differentiate the effects of observable characteristics on economic outcomes in areas where peasants were or were not subjected to the institution. We undertook such an exercise and report the results in Appendix Table C9. If we consider only provinces without serfdom in 1861, land suitability for cereals, wheat, rye, barley and oat shows the expected positive (and statistically significant) correlation with modern per capita expenditures. If one considers the rest of Imperial Russia, where serfdom was present in 1861, the coefficients of grain suitability turn negative. With lower labor coercion, a greater share of suitable land would be conducive to economic development for many reasons, including forward linkages to industrial production, even if the agricultural sector was lagging (as has been the case in the post-Soviet period). However, in areas where Russian serfdom existed prior to 1861, the positive effects of land quality on long-run economic outcomes are limited by persistent effects of labor coercion, since serfdom was more prevalent in more productive lands.

Overall, while the non-serf provinces are admittedly a small group, this evidence on the differential long-run effects of agricultural suitability is highly suggestive that a legacy of serfdom gave rise to persistent constraints on subsequent Russian economic development.

3.6 Heterogeneous Effects by Type of Serfdom

Did local heterogeneity in serfdom matter for long-run outcomes? Employing data from the late 1850s (see the Appendix for details), we can differentiate between the share of serfs required to pay only quit-rent in cash or kind to their landlords (obrok) and the

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40 Additional robustness checks of the long-term economic effects of serfdom are reported in the Appendix. We document that the main effect of serfdom on household consumption today is not sensitive to varying household controls (Table A4), that our findings are robust to controlling for wheat, rye, barley, and oat suitability separately, rather than combined cereal suitability (Table A5); that the main results hold with other measures of consumer good ownership as dependent variables (Table A6) or when using alternative waves of LiTS (Table A7); and that the estimated effect of serfdom is robust to controlling for (potentially endogenous) rural/urban status of the PSU (Table A8). Other extensions are discussed in the Appendix.

41 See Appendix Section C.2 for more details. We thank Katya Zhuravskaya for suggesting this exercise.

42 In addition, we find some weak evidence for a differential pattern in the spatial distance to Moscow in areas where serfdom existed, and similarly for the distance to the coast.
Table 3: Heterogeneity in Long-Run Outcomes by Type of Serfdom

<table>
<thead>
<tr>
<th></th>
<th>(In) Equivalent Expenditures Per Capita</th>
<th>Consumer Goods</th>
<th>Sale Farm Products</th>
<th>Land Cultivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serfs % (1858)</td>
<td>-0.126*** (0.037)</td>
<td>-0.114*** (0.032)</td>
<td>0.053*** (0.014)</td>
<td>0.097** (0.046)</td>
</tr>
<tr>
<td>Corvée % (1858)</td>
<td>-0.073** (0.034)</td>
<td>-0.002 (0.021)</td>
<td>0.018** (0.008)</td>
<td>0.018 (0.011)</td>
</tr>
<tr>
<td>Quit-Rent % (1858)</td>
<td>-0.073** (0.034)</td>
<td>-0.002 (0.021)</td>
<td>0.018** (0.008)</td>
<td>0.018 (0.011)</td>
</tr>
<tr>
<td>Household Serfs % (1858)</td>
<td>0.003 (0.042)</td>
<td>-0.027 (0.027)</td>
<td>-0.001 (0.012)</td>
<td>0.049* (0.025)</td>
</tr>
</tbody>
</table>

H0: Corvée = Quit-Rent (p-value) 0.20 0.00 0.01 0.09

Household Controls ✓ ✓ ✓ ✓ ✓ ✓
Flexible Controls ✓ ✓ ✓ ✓ ✓ ✓
Distances: City & Prov. Capital ✓ ✓ ✓ ✓ ✓ ✓

Fixed Effects Province Province Province Province Province Province
Observations 14736 18609 13011 11196 6171 5291
R-squared 0.38 0.43 0.08 0.09 0.18 0.19
Number of Clusters 44 44 45 44 38 35

Note: The unit of observation is the household. Corvée, Quit-Rent, and Household Serf shares are standardized (mean=0, std=1). See the Appendix for further information.

Household controls include the household size, share of household members aged 0-18, share of household members aged 60+, share of male household members, religious denomination of the household respondent, LiTS Survey Wave fixed effects. Flexible controls include eight dummies for cereal suitability, and four dummies for quartiles of growing season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as the remaining linear controls. Distances are the distance to the nearest city in 1600, and the distance to the Provincial capital. Sample sizes vary due to the number of LiTS waves reporting the dependent variables. Standard errors clustered at the province in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

share with at least some labor obligations (corvée or barshchina). Consistent with their greater prevalence in less fertile regions (see Table [1]), the historical literature emphasizes that serfs on obrok generated more of their income from non-agricultural activities that paid a wage, including craft and factory occupations, or from their own enterprises. The resulting relative autonomy of economic decision-making among obrok serfs could have led to more favorable long-term economic outcomes compared to the conditions faced by serfs obligated for the more directly coercive barshchina.

Table 3 presents results from regressions in which we include the population shares of quit-rent, corvée, and household serfs (the residual category is the remaining population). The standardized coefficients in Columns 1 and 2 suggest that the negative effects of serfdom on contemporary household expenditure and consumer good ownership are more pronounced in areas with a larger share of corvée serfs and attenuated for districts with a larger share of serfs on quit-rent. In Columns 3 to 6 we document that while areas with greater serfdom are today on average more agricultural, this effect is driven by corvée areas that are significantly more likely to depend on farming and cultivation of land as a source of income today than serfs on quit-rent. This is consistent with the possibility that serfs subject to quit-rent maintained greater autonomy before and after 1861, which translated...
over time into a greater degree of transition from agriculture in those areas. Thus, these heterogeneous effects on income and economic activities today shed light on structural change as a mechanism underlying the persistent impact of serfdom, a possibility that we explore further below.

4 Tracing the Persistence of Serfdom's Effects

The previous section documented a long-run association between serfdom and economic outcomes today. To understand the mechanisms behind this relationship, it is crucial to identify when formerly serf areas fell behind, and whether there processes of divergence or convergence over time across historical districts. Unfortunately, generating a consistent indicator of economic development over the entire period is complicated by the changes in regimes and the lack of dis-aggregate data. We therefore focus on a sample of cities for which we can follow their population during the 19th and 20th century. City population as a measure of economic activity has been used extensively in the development, urban, and history literatures (e.g. Glaeser et al., 1995). This measure allows us to estimate the effect of serfdom before and after emancipation in cross-sectional and panel frameworks. Furthermore, the possible interaction between Russian serfdom and local urban growth over time speaks to our hypothesized mechanism the historical persistence that we observe.

4.1 Cross-Sectional Estimates

We begin with a cross-section of 366 cities for which we can follow population change over the 20th century. After locating these cities in our historical districts $d$ and provinces $p$, we regress the log population of city $i$ in each year on the measure of serfdom and our standard controls, including variables that proxy for the pre-1861 level of economic development. We therefore estimate regressions of the form:

$$\log(\text{Population})_{i,d,p} = \alpha + \beta \text{Serfdom}_{d,p} + X_{d,p}\delta + \Gamma_p + \epsilon_{i,d,p} \quad (2)$$

The estimated coefficients on historical serfdom from this repeated cross-sectional

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43 This is especially in agrarian economies, in which urbanization and agricultural productivity are tightly linked (Bairoch et al., 1988).

44 We rely on population data collected by Mikhailova (2012), which, in turn, is derived from the Imperial, Soviet, and post-Soviet censuses of 1897, 1926, 1939, 1959, 1970, 1989, and 2002.
Figure 3: Serfdom and City Population 1897 - 2002

NOTEs: This figure plots the coefficient from regressions of (log) city population on serfdom, conditional on province fixed effects and flexible controls. See Appendix Table D1 for the corresponding regression results.

Exercise are plotted in Figure 3 (see Appendix Table D1 for the regression results). We find a negative association between city population and the incidence of historical serfdom in the surrounding district for every year. Increasing serfdom by one standard deviation was associated with 25% to 38% lower city population on average. When comparing across yearly specifications, the magnitude of the coefficient is slightly smaller in 1939 before becoming larger in the later years. While this pattern could be due to urban-biased Soviet policies interacting with initial conditions (see below), the consistently negative coefficient is in line with longer run processes originating in the Imperial period. Once we control for population in 1897, the coefficient on serfdom becomes insignificant, while the $R^2$ jumps from 0.31 to 0.67 (Column 8, Appendix Table D1). Thus, about 36% of the variation in city population in 2002 is explained by the distribution of population at the end of the Imperial Period. Serfdom impacted the Imperial spatial economic equilibrium, which then persisted and was even reinforced through the Soviet era, into the post-1991 period.

Following Oster (2019) to diagnose whether unobservables might be driving our urban population results, we find that our estimates are, if anything, possibly biased downwards. We get similar results when we control for the geographic environment in a linear fashion, although the effects are slightly smaller and less precisely estimated (see Appendix Table D2). The pattern of persistent differences in urbanization levels according to the experience of serfdom is also consistent with the results obtained using city growth as the dependent variable, controlling for the initial level of population in each sub-period (see Appendix Table D3 and Figure D3). In such specifications, we also find persistence, in that historical serfdom has an insignificant association with later population growth but is associated with the initial city population level.
Table 4: Panel Fixed Effects (1800 - 2002) in 99 Russian Cities

<table>
<thead>
<tr>
<th></th>
<th>Log City Population</th>
<th>Full (1)</th>
<th>1800-1897 (2)</th>
<th>Full (3)</th>
<th>Full (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serfs % (1858) × Post Emancipation</td>
<td>-1.588***</td>
<td>-0.041</td>
<td>0.208</td>
<td>0.259</td>
<td>(0.470)</td>
</tr>
<tr>
<td>Serfs % (1858) × Soviet (1922-1991)</td>
<td>-0.398***</td>
<td></td>
<td></td>
<td></td>
<td>(0.135)</td>
</tr>
</tbody>
</table>

Controls × Post Emancipation ✓ ✓ ✓ ✓
Year FE ✓ ✓ ✓ ✓
City FE ✓ ✓ ✓ ✓
Observations 982 982 294 982
R-squared 0.75 0.79 0.75 0.79
Number of Clusters 99 99 99 99

Note: The unit of observation is a city-year. Controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow. Standard errors clustered at the city in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

4.2 Panel Estimates

Despite the large number of controls and the consistency of the estimates, the cross-sectional results may be subject to residual unobserved factors. Therefore, we turn to a panel of cities observed over the entire period 1800 - 2002 (a subset of the cities studied above) and estimate the following models, where ı denotes cities, d districts, and t time:

\[
\log(\text{Population})_{i,d,t} = \alpha_i + \gamma_t + \beta(\text{Serfdom}_d \times \text{Post 1861}) + (X_d \times \text{Post 1861})\delta + \epsilon_{i,d,t} \tag{3}
\]

If cities in districts with a relatively high incidence of serfdom experienced catch-up growth after emancipation, we would expect the coefficient \( \beta \) to be positive and significant. In the case of the persistence of initial conditions under serfdom, \( \beta \) should be essentially zero, and if serf areas were falling further behind over time after 1861, \( \beta \) would be negative. The advantage of this specification is that it allows us to control for time fixed effects, \( \gamma_t \), and for time-invariant but unobservable characteristics of cities, \( \alpha_i \) (since each district contains only one city, city fixed effects are equivalent to district fixed effects) that were potentially associated with the strength of historical serfdom and influenced economic development in the long run. We allow for time-variant effects of the fixed observable district characteristics, \( X_d \times \text{Post 1861} \), and cluster standard errors at the level of the city.

The results in Table 4 indicate little catch-up in former serf areas in terms of city growth. Considering the full sample (1800-2002) in Columns 1 and 2, we estimate a negative coefficient that is, however, not significantly different from zero once we control for
Figure 4: Serfdom and City Population in 99 Russian Cities (1800-2002)

Notes: This figure plots average city population for cities whose intensity of serfdom is above the median of the distribution (dashed line), and for cities with below median serfdom intensity (solid line). The sample corresponds to Table 4.

Geographic and economic controls interacted with the post emancipation dummy. When we restrict the sample to the years 1800, 1850 and 1897, we find a positive coefficient that is very small and statistically insignificant (Column 3). Furthermore, the widening of the economic gap during the Soviet period that we saw in the cross-sectional results is confirmed by the negative interaction between serfdom and the Soviet dummy in Column 4. Figure 4 illustrates the evolution of this urban gap between areas above and below the median of the distribution of serfdom over the Soviet period. This figure and the other evidence presented in this section show the persistence of initial conditions, which is inconsistent with a process of convergence in economic development across localities with different exposure to serfdom.

5 Mechnisms

This leads us to the essential question: how did historical Russian serfdom generate persistent impediments to economic development? Our findings document a negative

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46 If we study a flexible version of Equation (3), we estimate coefficients on the interaction between serfdom and year dummies that are negative and increase over time, particularly after 1917 (see Appendix Table D4).

47 See the Appendix for i) a visual illustration of the estimated interaction coefficients of serfdom with each time dummy (Figure D4); ii) estimates with standard errors clustered at the level of the province (Table D5); iii) a discussion of possible sample selection bias in the balanced panel (Section D.4); and vi) estimates using data aggregated to the level of the province (Section D.5).

48 This conclusion is consistent with the results reported in Markevich and Zhuravskaya 2018. Their province-level panel analysis finds large positive economic effects of Emancipation in areas with a greater prevalence of serfs, but this does not imply that full convergence was ever achieved (although this is not directly indicated in their paper).
association with development outcomes, but we have also shown that the strength of this relationship varied over time, with some escalation from the 1930s. This section examines the evidence for several possible mechanisms: impediments to structural change and local agglomeration $^{5.1}$, human capital $^{5.3}$ inequality and public goods provision $^{5.4}$, and cultural differences $^{5.5}$. Overall, the evidence suggests that slower structural change and less urban agglomeration generated the persistent pattern of spatial inequality in economic outcomes.

5.1 Structural Change, Urban Development, and Local (Dis-)Agglomeration

Russian serfdom may have negatively impacted modern wellbeing through the generation of persistent constraints on the interconnected processes of urbanization and structural change (i.e. the transfer of factors from relatively low productivity agriculture to higher productivity industry). As argued by Bleakley and Lin (2012), Davis and Weinstein (2002), Michaels and Rauch (2016), and others, geographic factors and/or historical institutions (such as serfdom) can generate initial spatial patterns in economic activity or urbanization that, through the forces of economic diversification, increasing returns and (dis-)agglomeration, give rise to path dependent variation in local urban and industrial development over the long run. In this sense, the pre-1861 distribution of Russian serfdom may have generated subsequent local and persistent effects on urbanization, industrial growth, infrastructure provision, and labor productivity, as well as knock-on consequences for inequality and the demand for human capital.

The relatively more burdensome emancipation settlements and land reforms experienced by the former serfs likely made their experience of the post-1861 rural institutional regime – centered on the communal ownership of property and collective liabilities for taxes and land payments – more constraining than among other peasants (Nafziger 2013, 2012b). Critically, this occurred within the larger post-1861 context of relatively high transportation costs and an Imperial internal passport system that imposed additional frictions on migration out of the countryside and to more distant (greater than 30 km) employment opportunities.$^{49}$ These frictions likely perpetuated initial conditions

$^{49}$The administration of the passport system was in the hands of the Ministry of Internal Affairs, with the help of local police officials. The goals of such a system were myriad, but they all revolved around maintaining absolutist control over the population to prevent social instability and ensure tax payments. See Burds (1998).
and worsened relative consequences of the emancipation reforms among former serfs when it came to moving off the farm into urban settings and/or industrial employment opportunities. Furthermore, such relative immobility may have constrained local technological, human capital, or Marshallian spillovers, with implications for the path dependency of early differences. Thus, while there clearly was labor migration in the period, and some growth in urbanization and industry was evident by the end of the 19th century, former serf areas may have participated less in these processes.

This mechanism might explain differential urbanization rates and structural changes in former serf areas to 1917, but were underlying frictions reinforced or even strengthened by Soviet policies? At first glance, the massive population movements and institutional reforms of the Soviet period would seem to preclude any sort of persistence. However, several features of Soviet society likely contributed towards persistence of the prior spatial pattern of economic development. Political goals, planning objectives, and non-market mechanisms for allocating goods, capital, and land inhibited spatial arbitrage and subsequent convergence. As a result, the locations and sizes of GULAG camps, “special cities”, and many Soviet industrial centers were often driven by non-economic concerns.

The Soviet regime eventually adopted a draconian system of internal passports (propiska) and residency restrictions aimed at controlling the allocation of labor and limiting social unrest in cities. As Buckley and others note, the period of the New Economic Policy in the 1920s saw a general abandonment of Imperial internal passport and residency restrictions. While limited aggregate statistics on passport issuance are available, to the best of our knowledge, there is no corresponding district-level data.

Collectivization explicitly aimed at breaking up traditional institutions and factor relations in the Soviet countryside, and it at least partially succeeded. However, we have found no evidence that collectivization was differentially targeted at former serf villages. That being said, if former serf villages retained relatively more inequality by the 1930s, then “dekulakization” campaigns aimed at wealthier peasants may impacted former serf areas to a different degree. This would be consistent with the recent findings of Naumenko, who shows that areas of the Soviet Union more adversely affected by famine in 1933 saw slower subsequent urban growth. Although she does not explicitly test for such relationships, in our view, the policies (procurement, collectivization, etc.) that drove famine may have compounded initial differences between serf and non-serf areas.

Scholars have argued that the geo-strategic shift of resources eastward (and largely out of our study region) before, during, and after World War II, along with a continual emphasis on cross-regional “equalization” policies, generated significant spatial distortions in the Soviet economy (e.g. Markevich and Mikhailova). These may have perpetuated the initial lag in development in former serf areas.
restrictions before a strengthened system was established in 1932. Even when and where mobility was possible, the shortfall of housing and other dis-amenities of Soviet urban life likely generated additional frictions in the allocation of labor across sectors through out the period. Housing inadequacies, internal passports, and various residency restrictions continued to generate impediments to labor mobility after 1991 in the Russian Federation, Ukraine, and Belarus.

These impediments to factor mobility from serfdom onwards would have translated existing differences into persistent productivity gaps across space, which would have further limited agglomeration economies and constrained urban development in the negatively affected areas. While the historical literature suggests the plausibility of this set of mechanisms, we can go further in documenting its validity using a variety of novel empirical evidence.

5.2 Documenting Serfdom’s Constraints on Structural Change and Urbanization

We begin in the Imperial period. As Table 5 shows, historical serfdom was strongly associated with lower rates of urbanization (as opposed to city size, explored above) before the Revolution (Columns 1 and 2). The reduction in the 1913 urbanization rate of about 3.8 percentage points implied by a standard deviation increase in serfdom is a large effect, given a mean of 10.1 and a standard deviation of 12.2 for the former. Columns 3 and 4 investigate industrial production using newly digitized district-level data from just after Emancipation. We find a negative, albeit not statistically significant association between serfdom and the number of firms per capita, but when we divide the ruble value of factory turnover in a district by the number of firms or factory workers, we find that worker productivity was significantly lower in areas with higher levels of serfdom. A one standard deviation increase in serfdom corresponded to about 16% lower industrial productivity.

Over time, further restrictions were imposed on the migration to “secret” or closed cities. Closed or secret cities, while initially larger, grew more slowly over the Soviet (and post-Soviet) period. However, if we control for their presence using data reported in Gang and Stuart (1999), our main findings and extensions are unchanged (not reported here).

On post–1991 labor mobility constraints in the countries of the former Soviet Union, see Buckley (1995), Koettl et al. (2014), and Markevich and Mikhailova (2013).

Immediately after 1861, Markevich and Zhuravskaya (2018) find a large and positive industrial productivity increase for provinces with relatively more serfdom before Emancipation, but the mechanisms behind this sudden change are not directly observed. Moreover, such improvements did not fully off-set pre-existing differences between serf and non-serf areas.
Table 5: Structural Change and Urbanization

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<th>Post-Soviet</th>
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<td></td>
<td>1863</td>
<td>1913</td>
<td>2000</td>
</tr>
<tr>
<td>Factorys per 1,000 ppl, 1868</td>
<td>(5.524)</td>
<td>(34.049)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Log Production per Worker, 1868</td>
<td>(0.338)</td>
<td>(2.376)</td>
<td>(0.010)</td>
</tr>
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<td>Road Density</td>
<td>0.33</td>
<td>0.40</td>
<td>0.64</td>
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<tr>
<td>Gulag</td>
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<td>4.81</td>
<td>4.40</td>
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<tr>
<td>Log Population Density, 2000</td>
<td>490</td>
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<tr>
<td>Log Light Density, 2008</td>
<td>50</td>
<td>50</td>
<td>50</td>
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<table>
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<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
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</thead>
<tbody>
<tr>
<td>Serfs % (1858)</td>
<td>-15.559***</td>
<td>-15.618***</td>
<td>-50.056</td>
<td>-0.651*</td>
<td>-0.009***</td>
<td>-0.296**</td>
<td>-1.001***</td>
<td>-0.820***</td>
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<td>✓</td>
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<td>Province</td>
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<td>490</td>
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<td>R-squared</td>
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<td>0.35</td>
<td>0.33</td>
<td>0.54</td>
<td>0.40</td>
<td>0.64</td>
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<td>δ for β = 0</td>
<td>5.54</td>
<td>4.81</td>
<td>4.40</td>
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<td>2.376</td>
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<td>-0.010</td>
<td>-0.243</td>
<td>-0.888</td>
<td>-0.888</td>
</tr>
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</table>

Conley S.E. 300km

Serfs % (1858) [4.828]*** [5.049]*** [33.099] [0.264]** [0.003]*** [0.136]** [0.350]*** [0.303]***

Note: The unit of observation is a district. Flexible controls include eight dummies for cereal suitability, and four dummies for quantities of growing season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as linear controls of latitude and longitude of the district, the area covered by forest, ruggedness, the distance to the coast, and the distance to Moscow. Distances are the distance to the nearest city in 1600, and the distance to the Provincial capital. The restricted model used to compute δ and the lower bound estimates controls for province fixed effects. Standard errors clustered at the province in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 5 also reports the estimated relationships between the historical incidence of serfdom and two indicators of Soviet place-based policies: road density and the location of GULAG camps. We find that transportation infrastructure in the form of road density shortly after 1991 was more limited in former serf areas (Column 5). This was likely both an effect of, and a contributing factor towards, the slower pace of structural change in such districts. At the same time, several authors have argued for the positive local economic impact of the GULAG camps through employment or productivity channels (e.g. Gregory and Lazarev, 2003), both in remote regions and in close proximity to already urbanized localities. Column 6 documents a lower incidence of camps in relation to the local historical prevalence of serfdom, suggesting that this possible source of factor redistribution was less operative in former serf areas. Finally, Columns 7 and 8 employ modern measures of urbanization and/or economic development as outcomes: population density in 2000 and satellite light intensity in 2008. The latter variable can be seen as an indicator of structural change, since industry tends to generate much more nighttime illumination than agriculture. Indeed, we find that modern population density and light density are much lower in areas of higher serf incidence.

Overall, the results in Table 5 are suggestive that a legacy of serfdom may have

56 The δ values of the Oster (2019) test, reported at the bottom of Table 5, are either negative, or large and positive, indicating that selection on unobservables is not likely an explanation for these findings. Appendix Table 5G documents that the negative relationship of serfdom and light density can also be found in other years in the period 1994-2012, and even when we condition on historical population density in 1858. We also find very similar results when we use linear rather than flexible controls, see Table 5G. 

27
### Table 6: Structural Change, 1897 Employment, and the Heterogeneous Effects of Serfdom

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4</td>
</tr>
<tr>
<td>Serfs % (1858)</td>
<td>0.077*</td>
<td>-0.008</td>
<td>-0.024</td>
<td>-0.820***</td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td>(0.023)</td>
<td>(0.022)</td>
<td>(0.295)</td>
</tr>
<tr>
<td>Corvée % (1858)</td>
<td>0.035**</td>
<td>-0.016*</td>
<td>-0.016*</td>
<td>-0.240***</td>
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<tr>
<td></td>
<td>(0.014)</td>
<td>(0.009)</td>
<td>(0.008)</td>
<td>(0.081)</td>
</tr>
<tr>
<td>Quit-Rent % (1858)</td>
<td>-0.015</td>
<td>0.026***</td>
<td>0.018**</td>
<td>-0.020</td>
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<tr>
<td></td>
<td>(0.010)</td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.080)</td>
</tr>
<tr>
<td>Household Serfs % (1858)</td>
<td>0.006</td>
<td>-0.008</td>
<td>-0.009*</td>
<td>-0.102</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.006)</td>
<td>(0.005)</td>
<td>(0.091)</td>
</tr>
</tbody>
</table>

H0: Corvée = Quit-Rent (p-value)

<table>
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Fixed Effects: Province Province Province Province Province Province Province Province

Observations 490 468 490 468 490 468 490 468

R-squared 0.51 0.54 0.60 0.64 0.57 0.60 0.57 0.59

Number of Clusters 50 49 50 49 50 49 50 49

**NOTE:** The unit of observation is a district. Corvée, Quit-Rent, and Household Serfs are standardized variables (mean=0, std=1). Flexible controls include eight dummies for cereal suitability, and four dummies for quartiles of growing season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as linear controls of latitude and longitude of the district, the area covered by forest, ruggedness, the distance to the coast, and the distance to Moscow. Distances are the distance to the nearest city in 1600, and the distance to the Provincial capital. Standard errors clustered at the province in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Constrained labor and population mobility into more economically dynamic sectors through the late-Imperial, Soviet, and post-Soviet periods. We can turn to additional data to further shed light on this mechanism. In Table 6, we examine the occupational structure of the late Imperial period as another way of documenting structural change. Relating sectoral employment shares to our measure of historical serfdom, we find a positive and significant difference in primary employment (Column 1), and negative, but not significant, differences in secondary or industrial employment (Columns 3 and 5). These average effects mask heterogeneity by the types of serfdom: areas with more serfs on quit-rent, who paid their obligations in cash or kind, had a lower share of the population working in agriculture, and a larger employment in the secondary and industrial sector at the end of the 19th century (Columns 2, 4, and 6). Column 8 shows that the light intensity result from Table 5 stems from particular structural constrains in formerly corvée areas. Overall, we find that districts with relatively more quit-rent serfs (with more economic autonomy) saw a greater shift towards higher productivity, non-agricultural activities and locations, with

---

57 We do this by drawing on district-level occupational data from the 1897 national census, using occupational totals across the 65 specified in the original source to define employment shares of different sectors. See the Appendix.

58 Districts with higher levels of serfdom also displayed significantly lower 1897 employment in service occupations, such as those related to education and commerce. See Appendix Table G3.
long-run consequences for the level of income today (as in Table 3). Therefore, these results provide additional evidence on the role played by impediments to structural change and urbanization as a key channel underlying serfdom's persistent impact.  

Did industrial production during the Soviet period reflect the same patterns? We first consider the number of factories of the Soviet defense industry in a sample of Russian and Ukrainian cities, as compiled by Acemoglu et al. (2011) using an early version of the data from Dexter and Rodionov (2016). We observe the number of such factories at six points in time: 1939, 1945, 1959, 1970, 1979, and 1989. While defense factories in a command economy were certainly not allocated across space through free market mechanisms, the geographic variation in this type of establishment could be indicative of structural transformation if Soviet authorities made location decisions to take advantage of pre-existing or complementary industrial activities.

The estimated cross-sectional coefficients plotted in Figure 5 show a statistically significant and increasingly negative relationship between historical serfdom and the number of defense plants in observed cities (see Appendix Table E1 for regressions.

Notes: This figure plots the coefficient from regressions of the number of firms per city on serfdom, conditional on province fixed effects and flexible controls. See Appendix Table E1 for the corresponding regression results.

Appendix Table G4 reports similar heterogeneous effects for additional indicators of structural change, such as urbanization, factory employment, and contemporary population density.

Part of this might be due to localized upstream and downstream linkages related to the defense factories, many of which also produced consumer goods. Other than the eastward shift of industry in World War II and the creation of “closed” cities (see above), we have found little evidence for a particular spatial allocation rule when it came to defense plants, particularly with respect to formerly serf areas. If anything, it seems that the sector’s priority status meant that the location of the Soviet defense industry likely built upon and reinforced existing spatial patterns (Markevich 2008).
The fact that coefficients increase over time is consistent with localized agglomeration economies that accelerated the allocation of firms away from areas with greater levels of historical serfdom. A one standard deviation increase in historical serfdom results in 3.75 fewer firms in 1989 (or 0.22 of a standard deviation). When we include the “initial” level of defense production in 1939, we find no residual effect of historical serfdom on firms in 1989 (see Column 7 of Appendix Table E1). Similarly to the results on city populations, this implies that the structural impact of serfdom’s legacy was present early in the Soviet period (i.e. prior to WW II) and then persisted over subsequent decades.

While defense plant data offer a consistent indicator of industrial activity over the Soviet period, we also study the location and number of non-military firms from the 1989 Soviet Census of Manufacturers. As we show in the Appendix, a one standard deviation increase in historical serfdom translates into two fewer firms in 1989 (or 0.11 of a standard deviation). Besides the aggregate number of firms, these data allows us to investigate differences in characteristics across the approximately 14,000 Russian firms observed just before the fall of the Iron Curtain. Table 7 displays these firm-level regression results. Consistent with persistent constraints on structural change (and agglomeration), we find that 1989 firms in areas where serfdom was historically important were i) more likely to be in the agricultural sector and less likely to be in manufacturing; ii) employed fewer people; iii) had smaller turnover; iv) and were less productive.

---

61 The negative coefficient prior to World War II suggests that our findings are not indicative of the wartime movement of production eastward.

62 For 1959, 1970, and 1989, when we have population data for these cities (to define a per capita measure of defense plants), we find similarly negative effects for 1959 but not for the latter two years. This is consistent with our finding of a much greater urban population growth in less serf areas, leading to some convergence in industrial plants per capita. These results are available upon request.

63 The dynamics of this relationship are depicted in Appendix Figure E1. We find similar results when we use linear rather than flexible controls (Table E2) or when estimating negative binomial regressions (Table E3). In Table E4, we extend this analysis to ask whether localities with higher level of historical serfdom grew faster during the Soviet era if they experienced a larger allocation of defense factories early in the period. Interacting the share of serfs with the log number of factories in 1939, we find that the negative effects of serfdom on city population and city growth in the years after is attenuated in cities with a higher number of factories. These results illustrate the inter-linkages between serfdom, industrial development and urban growth. Finally, if we employ the growth rates of the number of defense plants over different periods as our dependent variables, we find a lack of catch-up growth in industrial production (Appendix Table E4 and Figure E3).

64 See Column 8 of Appendix Table E1 where we establish a negative relationship between serfdom and the number of firms in 1989 in more than 2600 towns in our historical districts.
Table 7: A Firm-Level Analysis for 1989

<table>
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<tr>
<th></th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>( \log ) Employment</th>
<th>( \log ) Turnover</th>
<th>( \log ) Turnover per Worker</th>
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<tr>
<td>Serfs % (1858)</td>
<td>0.065***</td>
<td>-0.062***</td>
<td>-0.290**</td>
<td>-0.381**</td>
<td>-0.096***</td>
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<tr>
<td></td>
<td>(0.016)</td>
<td>(0.020)</td>
<td>(0.119)</td>
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<td>(0.034)</td>
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<td>13923</td>
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<tr>
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<td>0.77</td>
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<td>( \delta ) for ( \beta = 0 )</td>
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<td>-0.240</td>
<td>-0.379</td>
<td>-0.139</td>
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</tbody>
</table>

Conley S.E. 300km

|                                | (0.012)**   | (0.018)**     | (0.142)**              | (0.165)**           | (0.037)**                     |

Note: The unit of observation is a firm. Flexible controls include eight dummies for cereal suitability, and four dummies for quartiles of growing season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as linear controls of latitude and longitude of the district, the area covered by forest, ruggedness, the distance to the coast, and the distance to Moscow. Distances are the distance to the nearest city in 1600, and the distance to the Provincial capital. SIC Fixed Effects are dummies for industrial classifications of firms using the 5-Digit Standard Industrial Classification Codes. The restricted model used to compute \( \delta \) and the lower bound estimates controls for province fixed effects. Standard errors clustered at the province in parentheses. * \( p < 0.10 \), ** \( p < 0.05 \), *** \( p < 0.01 \).

5.3 Alternative Mechanism I: Human Capital

The implications of coercive labor institutions for long-run human capital accumulation have been cited as another mechanism behind historical persistence. Lower health or education investments under historical institutions can then persist through intergenerational mechanisms, local preferences, and/or supply-side factors (perhaps mediated by an unequal political structure – see below).\(^{65}\) At the same time, low levels of human capital can cause by impediments to structural change akin to those documented above (e.g. Rocha et al., 2017).\(^{66}\) To identify whether human capital mechanisms were an independent source of historical persistence, we study schooling and literacy before and after the Soviet period (equivalent data at the relevant unit of observation are not available for the Soviet period) using a variety of novel sources.

Table 8 presents estimates of the relationship between historical serfdom and human capital outcomes in the late Imperial Period (Columns 1-2) and today (Columns 3-8). Confirming historical accounts (e.g. Eklof, 1986), Column 1 finds that districts with more

\(^{65}\) Discussions of long-run persistence through human capital channels in other contexts include Bertocchi and Dimico (2014), Chen et al. (2018), Margo (2016), and Sacerdote (2005). These and other studies tend to emphasize the role of intergenerational transmission via households or local culture.

\(^{66}\) Ivanov (2016) argues that Soviet areas with higher human capital levels prior to 1991 – for non-market reasons under the planned economy – saw greater gains in human-capital intensive activities afterwards. This is consistent with our account. Bobonis and Morrow (2014) finds that formerly coerced areas in 19th-century Puerto Rico saw a reduction in literacy in the face of de-industrializing commodity price shocks that reduced the demand for skilled labor. In our Russian/Soviet context, the dynamic sectors can be interpreted as skilled-labor using.
### Table 8: Human Capital

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<tr>
<td></td>
<td>1856</td>
<td>1911</td>
<td>Schools per 1'000 ppl</td>
<td>Respondent Education:</td>
<td>Parents Education:</td>
<td>Government</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td>Serfs % (1858)</td>
<td>-0.042**</td>
<td>0.169</td>
<td>-0.410**</td>
<td>-0.171*</td>
<td>-0.238***</td>
<td>-2.810***</td>
<td>-0.264**</td>
<td>-0.121</td>
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<tr>
<td></td>
<td>(0.016)</td>
<td>(0.218)</td>
<td>(0.193)</td>
<td>(0.091)</td>
<td>(0.071)</td>
<td>(0.814)</td>
<td>(0.118)</td>
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<td>Observations</td>
<td>486</td>
<td>486</td>
<td>19350</td>
<td>19350</td>
<td>19350</td>
<td>4285</td>
<td>13316</td>
<td>21400</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.60</td>
<td>0.59</td>
<td>0.20</td>
<td>0.14</td>
<td>0.09</td>
<td>0.43</td>
<td>0.16</td>
<td>0.07</td>
</tr>
<tr>
<td>Number of Clusters</td>
<td>50</td>
<td>50</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>40</td>
<td>44</td>
<td>45</td>
</tr>
<tr>
<td>δ for β = 0</td>
<td>6.094</td>
<td>-0.660</td>
<td>2.255</td>
<td>3.135</td>
<td>3.135</td>
<td>3.696</td>
<td>1.892</td>
<td>-21.252</td>
</tr>
<tr>
<td>Lower Bound Estimates</td>
<td>-0.046</td>
<td>0.515</td>
<td>-0.336</td>
<td>-0.159</td>
<td>-0.220</td>
<td>-2.937</td>
<td>-0.210</td>
<td>-0.125</td>
</tr>
</tbody>
</table>

Conley S.E. 300km

Serfs % (1858) [0.013]** [0.185] [0.199]** [0.095]* [0.088]** [0.840]** [0.125]** [0.080]

**Note:** The unit of observation is a district in Columns (1) - (2), individual above age 25 in Columns (3) - (5), and an individual of any age in Columns (6) - (8). Household controls include the household size, share of household members aged 0-18, share of household members aged 60+, share of male household members, religious denomination of the household respondent, Lits Survey Wave fixed effects. Flexible controls include eight dummies for cereal suitability, and four dummies for quartiles of growing season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as the remaining linear controls. Distances are the distance to the nearest city in 1600, and the distance to the Provincial capital. The restricted model used to compute δ and the lower bound estimates controls for province fixed effects. Standard errors clustered at the province in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

Serfdom had fewer schools per thousand inhabitants before Emancipation. However, if we consider educational outcomes about 50 years after emancipation (Column 2), we do not find significant differences in educational attainment measured by the density of schools. These results suggest a convergence of basic educational attainment shortly after emancipation.

Differences in educational outcomes by historical serfdom do, however, appear in measures of educational attainment taken from the LiTS (Columns 3-8). Looking at adults above the age of 25, we find that the incidence of historical serfdom is significantly associated with a reduction in the highest education achieved by the respondent (Column 3) and a reduced completion of post-secondary and tertiary education (Columns 4 and 5). In addition, we investigate the implications of serfdom for the level of education of respondents’ parents to shed more light on the persistence of impediments on human capital accumulation in the Soviet period and beyond (more than 3,000 respondents).
in the sample are born before 1945). As shown in Columns 6 and 7, the estimated coefficients suggest similarly a reduction in average education of parents. Finally, Column 8 investigates (and rejects) the idea that some of these differences in contemporary human capital stem from lower demand for government–provided education.

Together, the findings in Table 8 provide little support for a direct human capital channel of persistence, given the pattern of convergence after emancipation. Rather, these results likely reflect a relatively lower demand for skilled labor in former serf areas during the acceleration of industrial development in the Soviet Union. This is yet another piece of evidence suggesting a mechanism of historical persistence closely connected to constraints on urban development and factor mobility – particularly the allocation of labor out of less productive agriculture – that emerged under serfdom but were reinforced and even strengthened over the subsequent periods.

5.4 Alternative Mechanism II: Inequality, Institutions, and Public Goods Provision

A large literature posits a relationship between labor coercion, income or wealth inequality, persistent political institutions, and the subsequent provision of public goods, including basic schooling (e.g. Engerman and Sokoloff 1997; Nunn 2008a; Dell 2010). While there are various possible linkages between inequality and development outcomes (e.g. financial access; differential incentives to save and invest), many of these are relatively transitory. For inequality to be a channel of long-run persistence, there must be some sort of underlying structure that perpetuates the unequal distribution of resources (and its possible impact on public goods) over time, leading to worse development outcomes. Generally, Engerman and Sokoloff (1997) and others highlight the role of institutions and

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70 A one standard deviation increase in past serfdom decreases parents’ schooling by 0.6 of a year (or 0.15 of a standard deviation), and the number of parents with tertiary education by 0.11 of a standard deviation.
71 None of the significant differences in past or contemporary educational outcomes are likely to be driven by unobservables, as documented by the Oster (2019) test results at the bottom of Table 8.
72 This convergence is consistent with late-imperial efforts to improve the provision of basic schooling, especially in underserved rural areas (Eklof 1986; Kaser 2006; Nafziger 2012a).
73 Cheremukhin et al. (2017) argue that market power and entry barriers in the industrial sector constrained pre-Soviet growth. While we cannot directly examine their macroeconomic mechanism in our spatial analyses, our emphasis on labor market frictions is complementary to their interpretation.
74 A similar mechanism is posited in Galor et al. (2009), who asserts that elites in largely agrarian and highly unequal societies may have little interest in funding public goods that have limited direct payoffs to themselves. For evidence of both demand and supply-side mechanisms linking land inequality to schooling in the Prussian case, see Cinnirella and Hornung (2016).
the reinforcing feedback between the unequal distribution of wealth and political power.

Are such mechanisms relevant in the Russian case? The demolition of Imperial institutions, Soviet expropriations and transfers, and the dramatic governance reforms of the Soviet and post-Soviet periods would seem to preclude a straightforward inequality / political economy mechanism differentiating former serf and non-serf areas. Despite this, it might have been the case that some sort of legacy of Imperial inequality did generate longer term outcomes through less visible informal structures. The evidence presented in Appendix Table C10 shows that the incidence of serfdom was strongly related to measures of land concentration prior in 1905, suggesting that the end of serfdom did not fully equalize the distribution of this key asset. However, as we have already seen in Table 6, there is little evidence that schooling can similarly be linked to serfdom by the late Imperial period, and we do not have adequate data to evaluate other types of locally provided public goods in the Imperial or Soviet periods.

Regarding measures of contemporary inequality that we can construct from LiTS household data, arguably imperfect, we do not find a significant effect of serfdom, nor do we find that past inequality predicts contemporary inequality (Appendix Table C10). Persistent inequality seems, therefore, to be an unlikely direct mechanism. Furthermore, we also investigated the connection between the historical incidence of serfdom and access to a variety of public goods in the modern LiTS data. We find little sign of a relationship between serfdom and locally determined public goods such as water and sanitation access (see Appendix Table C11). Given the massive changes imposed by the Bolsheviks on the political and social structures of Russian society, especially at the local level, it would indeed be surprising to see the historical legacy of serfdom continuing to determine the level of locally provided public goods today. That being said, we do find lower levels of more centrally provided (i.e. financed) public goods, such as road infrastructure in areas with a higher historical incidence of serfdom (see Table 5). We interpret these results to suggest,

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75 Acharya et al. (2018) recently argue for the long-run political consequences of slavery in the American South, whereby historical coercion was associated with persistent racist beliefs and subsequent institutional capture by whites, both of which shaped black and white political behavior for generations after emancipation. The role played by economic inequality in driving and reflecting these processes is largely implicit in this account.

76 For a longer discussion of public good provision amidst political and economic inequality in late–Imperial Russia, see Nafziger (2011).
however, that underlying structural constraints related to serfdom played a key role in determining the long run provision of such public goods. This is also consistent with the time pattern of the human capital results shown above and with our preferred framework regarding persistent constraints on local structural change in former serf areas.

5.5 Alternative Mechanism III: A Long-Run Culture of Serfdom?

Did economic exploitation over several centuries shape peoples beliefs and attitudes, perhaps fostering a “culture of serfdom” (e.g., Schooler, 1976), with persistent implications for economic development? Several recent studies have documented that institutions can impact cultural norms in the long-run, which can persist through transmission within households or through formal institutions (for an overview see Nunn (2012)). When we consider measures of trust, preferences for economic and political institutions, xenophobia, or membership in the Communist Party from LiTS, we find little evidence that serfdom was associated with differences in cultural attitudes today (see Appendix Tables C12, C13 and C14). This is consistent with the absence of racial, ethnic, or class markers for the descendants of serfs, and with the sharp break in political and social life created by the Soviet regime. Similarly, we do not find a link between historical serfdom and discontent with the government, as manifested in protests or political participation (Appendix Table C16).

However, we do find that individuals in areas with a greater historical prevalence of serfdom are more likely to see luck as the reason for prosperity or poverty, have stronger preferences for redistribution, and prefer to equalize incomes rather than widen income inequality (Appendix Table C15). Rather than a sign of a direct cultural mechanisms of persistence, we interpret these results as indicative of an underlying unequal (spatial) distribution of incomes between formerly high and low serf area today, which derived from the persistent impediments to urban development and structural change.

6 Concluding Remarks

In this paper, we explore whether variation in the experience of coercive labor institutions, which existed for centuries in the Russian Empire, generated persistent
differences in economic development that lasted until today. The evidence that we marshal confirms the adverse medium and long-run economic consequences of Russian serfdom that has often been assumed but never definitively proven. This is the case across a wide variety of specifications and robustness checks, and we argue that it cannot be driven by unobservable factors associated with both historical serfdom and modern development. In the absence of cultural, racial, or ethnic markers of past labor coercion, we provide evidence that the experience of Russian serfdom and emancipation generated persistent constraints on urbanization and structural change, with repercussions for human capital accumulation. These effects lasted through the late Imperial and Soviet periods to today, resulting in slower city growth, lower industrial development, weaker infrastructure development, and, eventually, lower educational attainment and income levels. Thus, our results imply that early industrial development and subsequent agglomeration effects can be important channels of persistence of the effects of historical serfdom, even after periods of dramatic social and economic change.

The failure to develop adequate institutions to support market and political development has been a theme of research into Eastern Europe’s transition since the fall of the Soviet Union (e.g. Aslund (2013)). Our study points to possible deeper historical roots for the impediments that the Russian Federation and other former members of the Russian Empire currently face in their efforts at economic reform and modernization, a hypothesis that has been proposed but remains relatively untested. Along these lines, a number of interesting questions remain open for further research. How did specific Imperial policies, institutions, or economic shocks translate different experiences of serfdom into economic variation across space and over time prior to 1917? In what ways did specific Soviet and post-Soviet policies differ across relatively small areas? Are local policymakers and residents aware of a prior legacy of serfdom? The development of new archival evidence and empirical sources in Russian economic history can hopefully shed light on these and related questions.

References


