Supplementary Appendix for

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

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This appendix accompanies the paper *"The Slow Road from Serfdom: Labor Coercion and Long-Run Development in the Former Russian Empire"* by Johannes C. Buggle and Steven Nafziger.

Contents

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A Data Description and Sources

A.1 Country-Level Data

Date of Peasant Emancipation across Countries: The emancipation dates for the 18 countries used in Figure 1 are taken from several sources. The dates refer to the legal emancipation of peasants. Information for Austria, Denmark, France, Switzerland, Estonia, Latvia, Germany (Prussia), Hungary, Russia and Ukraine, Belarus, Romania is taken from Blum (1978). Data for Netherlands from Jarrett (2013), for Bulgaria from Zagorov (1955), dates for Croatia from Magas (2008), and for Italy (Naples) and Spain from Atkin et al. (2011). For Poland we use the average date of the Duchy of Warsaw and the Kingdom of Poland which are taken from Davies (2005).

Agricultural Employment 1900 and 2000: The estimates of the share of labor in agriculture in 1900 and 2000 come from Wingender (2014).

A.2 District-Level Data

Serfdom Data: The main explanatory variable, *Serfs % (1858)*, is constructed using the sum of total male and female serfs in 1858 per district (taken from Troinitskii (1982 (1861)), who relies on the 10th and last tax census, or *revitsii*, conducted during the pre-1861 period), divided by district population in 1858 (taken from Bushen (1863)). Other population sources from around 1861 give slightly different percentage serf values. We rely on total population as that appears to be more accurately recorded than any measure of the total number of peasants or the rural population alone. Using our two preferred sources (numerator and denominator), the weighted mean of the serfdom variable is approximately 36.5%. Markevich and Zhuravskaya (2018) and Castaneda Dower et al. (2018) utilize essentially the same variable in their district-level analyses, with the former relying on a slightly smaller sample. Our note on the share of *peasants* who were serfs in the Introduction – slightly less than 45% – reflects a rough estimate derived from the relevant provincial numbers in Table 1 of Markevich and Zhuravskaya (2018). Troinitskii (1982 (1861)) breaks serfs down by gender and by whether they were "peasant" (i.e. field) serfs or "household" serfs. We utilize the latter as a share of all serfs in our examination of heterogeneous effects by the type of serfdom (Table 3). In those specifications, we also utilize the share of peasants on *obrok* or with at least some labor obligations (corvée or *barshchina*). Each of these is defined with the help of information collected by the Editorial Commission in the late 1850s as they drew up the emancipation reforms. Materials from this Commission, including these and other data, were published in Skrebitskii (1864-1866). Section A.7

Geographic Controls:

- Longitude and latitude information based on own calculations at the district's

centroid using ArcGIS.

- Distance to Moscow gives the distance in kilometers from the centroid of each historical district to Moscow.
- Cereal suitability (and its local standard deviation within historical districts), as well as suitability for growing wheat, rye, barley and oat, measure soil suitability for crop cultivation under low-input, rain-fed conditions and are taken from the FAO-GAEZ database. Cereal suitability is measured in eight suitability classes (Very high; High; Good; Medium; Moderate; Marginal; Very marginal; Not suitable). For the set of flexible controls, we construct dummy variables for each class of (average) cereal suitability. Wheat, rye, barley, and oat suitability are defined as continuous suitability indices that vary between 0 and 10.
- Distance to Coast measures the nearest distance in kilometers of the district's centroid to the coastline.
- Forest Cover measures the average share of land covered by forests and is based on data from the FAO-GAEZ database.
- Ruggedness measures the average terrain slope and is based on data from the FAO-GAEZ database.
- River Density measures the total length of rivers divided by the area of the district. Information on the location of rivers is taken from O'Neill (2016).
- Mean Temperature, and Mean Precipitation during the growing season, are averages over the period 1901-2000, using gridded climate data from the CRU 3.10.1 database of the Climatic Research Unit at the University of East Anglia. We define the growing season as the period from April to September, based on information from the USDA publication *Major World Crop Areas and Climatic Profiles* (1994). Growing Season Variability in Temperature and Precipitation are defined as the average year-to-year variability in temperature and precipitation over the period 1901-2000.
- Podzol Soil measures the share of land in which podzol is the dominant soil and is taken from the FAO-GAEZ database.
- Distance Provincial Capital measures the distance in kilometers from the district's centroid to the centroid of the district where the Provincial capital is located.
- Distance City in 1600 measures the distance in kilometers from the district's centroid to the location of the nearest existing city with at least 5,000 inhabitants in 1600, as reported in the dataset of Bairoch et al. (1988).
- Length Growing Period measures the average number of days during which local environmental conditions allow crop growth. This information is take from the FAO-GAEZ database.

- Distance to St. Petersburg gives the distance in kilometers from the centroid of each historical district to St. Petersburg.
- Coal Territory is an indicator for the presence of coal territories, and is based on data from the *Coal Quality and Resources of the Former Soviet Union* project of the U.S. Geological Survey (Brownfield et al. 2001), accessed via http://pubs.usgs.gov/of/2001/ofr-01-104/fsucoal/html/data1.htm.
- (log) Population Density in 1858 is constructed by dividing the total population of a district in 1858, taken from Bushen (1863), by the area of the district.

Road Density in the Countries of the former Soviet Union: Road densities in 1996 are constructed using digitized maps provided by the *Coal Quality and Resources of the Former Soviet Union* project of the U.S. Geological Survey (Brownfield et al. 2001), accessed via http://pubs.usgs.gov/of/2001/ofr-01-104/fsucoal/html/data1.htm.

Employment Shares 1897: We construct employment shares in different sectors from the occupational census of 1897 by adding up the number of people that work in each sector per district, divided by the district labor force. The primary sector includes occupations in agriculture, fishing and hunting, forestry work, livestock cultivation and mining. The secondary sector contains occupations that process materials such as animals, metals, fiber elements, or wood, as well as occupations that produce textile, instruments, pottery, jewelry, metals, minerals, spirits and alcohol, carriage, chemicals, tobacco, printing and paper, foods and others. In a separate variable we only include the industrial occupations such as in textile production, production of instruments, metals, carriage etc. Service occupations contain those that belong to administration and police, public service, private service and medical service occupations. Commercial occupations are those that involve trading (e.g. grain trade, metal trade, textile trade etc.) as well as credit and insurance. Education and research occupations are teachers and educators and all occupations that involve science, literature and art.

Other Historical Outcomes: We drew on a variety of sources to construct other historical outcome measures to investigate the mechanisms behind the persistent impact of serfdom. Male literacy in 1897 is defined for rural residents in their 20s from data reported in Troinitskii (1905). That source also provides the share of the adult male population with agriculture as the primary occupation. Rural enrollment rates for 1880 and 1894 are defined with both numerators and denominators taken from Tsentraf'nyi statisticheckikh komitet, Ministerstvo vnutrennykh del (1884) and Fal'bork and Charnoluskii (1900-1905), respectively – see Nafziger (2012) for more information. Fal'bork and Charnoluskii (1900-1905) also provide the number of formally recognized primary schools by district in 1856. The urbanization rate in 1913 is derived from Tsentraf'nyi statisticheckikh komitet, Ministerstvo vnutrennykh del (1914). The land Gini (both types), the percentage of land owned by the nobility or in communal tenure, and

the amount of land possessed per peasant household, all defined in 1905, are from Tsentraf'nyi statisticheckikh komitet, Ministerstvo vnutrennykh del (1906), with additional details provided in Nafziger (2013). Finally, information on factory production and employment in 1868 is compiled from Tsentraf'nyi statisticheckikh komitet, Ministerstvo vnutrennykh del (1872).

Ln Population Density in 2000 is based on the Gridded Population of the World (GPW), version 3, data.

Night-Time Luminosity: We use the log of average luminosity at night measured as "Average Visible, Stable Lights, and Cloud Free Coverage" for several years from 1994 to 2012. The data is taken from the National Geophysical Data Center (http://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html).

A.3 Life in Transition Surveys (2006 - 2016)

Log Equivalent Expenditure Per Capita comes from several questions asking about expenditure during a 30 days and 12 month period. Since items and recall periods differ across the three waves, we harmonize and select common items across waves. Total expenditure is the sum of expenditure on food, beverages and tobacco; clothing and footwear; education; health; household durables. We annualized all monthly expenditures (food, beverages and tobacco in all waves; clothing and footwear in wave 2006. Dropping clothing and footwear - that does not have a consistent recall period across waves - from the calculation of expenditure in all waves does not change the results.). Expenditure is expressed in US Dollars (to convert expenditure in the waves 2010 and 2016 from local currencies to USD we use market exchange rates), and adjusted by household size. The equivalence scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

In addition, we use a second measure of household expenditure that is based on wave 2006 only for robustness in Table C7. This measure has the advantage to include two additional relevant household expenditure items (spending on transport and communication expenses, as well as spending on recreation, entertainment and meals outside the home.)

Household controls: Household size, share of male, share of persons aged 0-18, share of persons aged 60+, religious denomination of the respondent, survey round. Source is Life in Transition Survey, waves 2006, 2010, and 2016.

Consumer goods: Question asks "Do you or anyone in your household own any of the following?" We sum up the mentioning of ownership of a car, a mobile phone, or a computer. Source is Life in Transition Survey, waves 2006, 2010, and 2016.

Access to Public Goods: Question asks "Do you have access to [UTILITY] in this

dwelling?" and UTILITY are different type of public goods, such as water, landline, heating, sewage, public sewage system. Source is Life in Transition Survey, wave 2006, 2010, and 2016.

Sale Farm Products and Land Cultivation: Sale Farm Products comes from the question "Which of these sources of livelihood apply to your household?", and takes on the value 1 if the household mentions "Sales or bartering of farm products", and 0 otherwise. Taken from waves 2006 and 2010. Land cultivation comes from the question "Does your household cultivate any land?" and takes on value 1 for households that cultivate land, and 0 for those that do not. Taken from wave 2006.

Education: Highest education measures the highest educational achievement of the respondent in 5 classes (no degree; compulsory education; secondary education; professional training; tertiary education or postgraduate education). Post secondary education equals 1 if the highest educational level of the respondent above secondary education (i.e., professional training or tertiary education or postgraduate education), and 0 otherwise. Tertiary education equals 1 if the highest educational level of the respondent is tertiary education (i.e., tertiary education or postgraduate education), and 0 otherwise (Source is Life in Transition Survey, waves 2006, and 2016.). Parents education is the average of the father's and mother's education measured in years (Source is Life in Transition Survey, wave 2010). Parents with tertiary education is the number of parents that have completed tertiary education (Source is Life in Transition Survey, waves 2006 and 2016). We also use the question "In your opinion, which of these fields should the first priority for extra (government) investment?" to construct an indicator variable equal to 1 if the respondent mentions education, asked in waves 2006, 2010, and 2016.

Inequality: From the household survey, we construct Gini inequality indices of expenditure and consumer good ownership across households that live within a common historical district using the "egen_inequal" command in Stata.

Attitudes:

- *Less or More Inequality?* Question asks "Now I'd like you to tell me your views on various issues. How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between: Incomes should be made more equal (1) vs We need larger income differences as incentives for individual effort (10)". Source is Life in Transition Survey, waves 2010 and 2016.
- *Poor Unlucky?* Question asks "In your opinion, what is the main reason why there are some people in need in our country today? Because they have been unlucky."

We create a dummy that takes on the value 1 if the respondent mentioned luck as the main reason. Source is Life in Transition Survey, waves 2006 and 2010.

- *Demonstrated/Striked/Signed A Petition:* Question asks "How likely are you to... attend a lawful demonstration - participate in a strike - sign a petition" and respondents' answers range from "have done (3) - might do (2) - would never do (1)". Source is Life in Transition Survey, waves 2006, 2010, and 2016.
- *Pref Market Economy:* Question asks "With which one of the following statements do you agree most? A market economy is preferable to any other form of economic system - Under some circumstances, a planned economy may be preferable to a market economy - For people like me, it does not matter whether the economic system is organized as a market economy or as a planned economy" The variable takes on the value 1 if the respondent states that "A market economy is preferable to any other form of economic system " and 0 otherwise. Source is Life in Transition Survey, waves 2006, 2010, and 2016.
- *Pref Democracy:* Question asks "With which one of the following statements do you agree most? Democracy is preferable to any other form of political system - Under some circumstances, an authoritarian government may be preferable to a democratic one - For people like me, it does not matter whether a government is democratic or authoritarian" The variable takes on the value 1 if the respondent states that "Democracy is preferable to any other form of political system " and 0 otherwise. Source is Life in Transition Survey, waves 2006, 2010, and 2016.
- *Trust:* The variable takes on the value 1 if the respondent states that "Most people can be trusted" and 0 otherwise. Source is Life in Transition Survey, waves 2006, 2010, and 2016.
- *Xenophobia:* The variable are derived from questions asking respondents about "People you do not want to have as neighbours ...". Each variable takes on the value 1 if the respondent mentions the category ("different race"/ "immigrant" / "different religion" / "Jewish people" / "different language"), and 0 otherwise. Source is Life in Transition Survey, wave 2016.
- *Communism:* The variable takes on the value 1 if at least one family member of the respondent was in the communist party, and 0 otherwise. Source is Life in Transition Survey, wave 2016.

A.4 City-Level Data

City Population 1897-2002: The population of Russian cities for the years 1897, 1926, 1939, 1959, 1970, 1979, 1989, 2002 has been compiled by Mikhailova (2012) and is based on the population census of the Russian Empire (1897), the Soviet Union (1926-1989) and the Russian Federation (2002). For the cross-sectional sample, we construct a balanced sample of 366 population centers with city status. For the sample from 1800 -

2002 used in the panel analysis, we merge the data of Mikhailova (2012) to the population data constructed by Bairoch et al. (1988) that add the years 1800 and 1850, for a total of 99 cities.

Military Industry 1939 - 1989: Data on the location of defense-related factories during the Soviet period (1939, 1945, 1959, 1970, 1979, 1989) for a sample of 278 Russian and Ukrainian cities is taken from Acemoglu et al. (2011), who matched 17,914 establishments to their current location. The source data is the “Factories, Research and Design establishments of the Soviet Defence Industry" database Version 11 (2010) by Keith Dexter and Ivan Rodionov. We use the total number of factories per city, as well as the growth rates of factories during various time periods as outcome variables.

A.5 Firm-Level Data 1989

We use information on the characteristics of firms that existed in 1989 from the *1989 Soviet Census of Manufacturers*. For each firm we construct the (log) of total employment, the (log) of total turnover, and the (log) of turnover per worker. Additionally, using the Standard Industrial Classification codes we identify agricultural and manufacturing sector firms with an indicator variable. In addition, we count the number of firms per town and district in 1989.

A.6 Descriptive Statistics

TABLE A1: SUMMARY STATISTICS

District-Level	Mean	S.D.	N
Serfs % (1858)	0.39	0.25	490
Quit-Rent % (1858)	0.11	0.17	468
Corvée % (1858)	0.26	0.21	468
Household Serfs % (1858)	0.03	0.02	486
Latitude	54.09	3.80	490
Longitude	36.97	8.44	490
Distance to Moscow	6.29	3.16	490
Distance to Coast	5.97	3.49	490
Forest Cover	36.07	23.57	490
Ruggedness	91.36	4.82	490
River Density	0.02	0.01	490
Cereal Suitability	6.24	1.30	490
Mean Temperature Apr-Sep	1.42	0.19	490
Mean Precipitation Apr-Sep	56.66	8.09	490
Podzol Soil	0.35	0.37	490
Wheat Suitability	6.63	2.17	490
Rye Suitability	6.01	2.25	490
Barley Suitability	6.08	2.33	490
Oat Suitability	6.08	2.29	490
Distance City in 1600	0.23	0.18	490
Distance Provincial Capital	1.24	0.97	490
SD Cereal Suitability	0.87	0.36	490
Length Growing Period	159.51	33.82	490
Growing Season Variability Precipitation	27.18	2.39	490
Growing Season Variability Temperature	0.18	0.02	490
Coal Territory 0/1	0.39	0.49	490
Distance to St. Petersburg	9.25	3.81	490
(ln) Pop Density 1858	3.92	0.91	478
Perc. Christian 1870	0.13	0.39	490
Perc. Muslim 1870	0.06	0.20	490
Perc. Orthodox 1870	0.95	0.44	490
Perc. Armenian 1870	0.04	0.19	490
Perc. Jewish 1870	0.06	0.18	490
Urbanization Rate 1863	8.87	10.11	483
Urbanization Rate 1913	10.10	12.19	490

Table A1 (continued)

Factories Per 1,000 ppl 1868	27.13	60.22	483
Log Production per worker 1868	13.00	0.94	434
Road Density	0.01	0.01	490
Gulag 0/1	0.20	0.40	490
Log Population Density 2000	3.42	1.09	490
Primary Employment 1897	0.62	0.15	490
Secondary Employment 1897	0.13	0.09	490
Industry Employment 1897	0.09	0.08	490
Service Employment 1897	0.01	0.01	490
Education & Research Employment 1897	0.01	0.00	490
Commerce Employment 1897	0.03	0.02	490
Log Light Density in 1994	0.85	0.95	490
Log Light Density in 1999	0.60	1.08	490
Log Light Density in 2005	0.31	1.03	490
Log Light Density in 2008	0.57	1.01	490
Log Light Density in 2012	1.03	0.98	490
Schools before 1856 per thousand	0.05	0.13	486
Enrollment 1880	8.57	7.47	489
Total Schools per thousand 1911	1.50	0.64	486
(Log) Enrollment 1880	1.94	0.62	489
(Log) Rural Enrolmment 1894	-1.99	0.47	490
Schools per 1'000 1894	0.46	0.25	490
Literacy Rate 1897	32.81	18.33	490
Female Literacy 1897	17.70	21.37	490
Male Literacy 1897	47.91	17.47	490
Land Owned by Nobles (perc.), 1905	21.00	14.02	490
Land Gini 1905	0.49	0.16	467
LiTS Household Survey 2006 – 2016	Mean	S.D.	N
(ln) Equivalent Expenditures Per Capita	7.45	0.84	17155
Household Size	2.34	1.24	22061
Share Young	0.12	0.20	22061
Share Old	0.33	0.44	22061
Share Male	0.42	0.30	22061
No Religion	0.14	0.34	21738
Buddhist Religion	0.00	0.04	21738
Christian Religion	0.83	0.38	21738
Jewish Religion	0.00	0.04	21738
Muslim Religion	0.01	0.09	21738

Table A1 (continued)

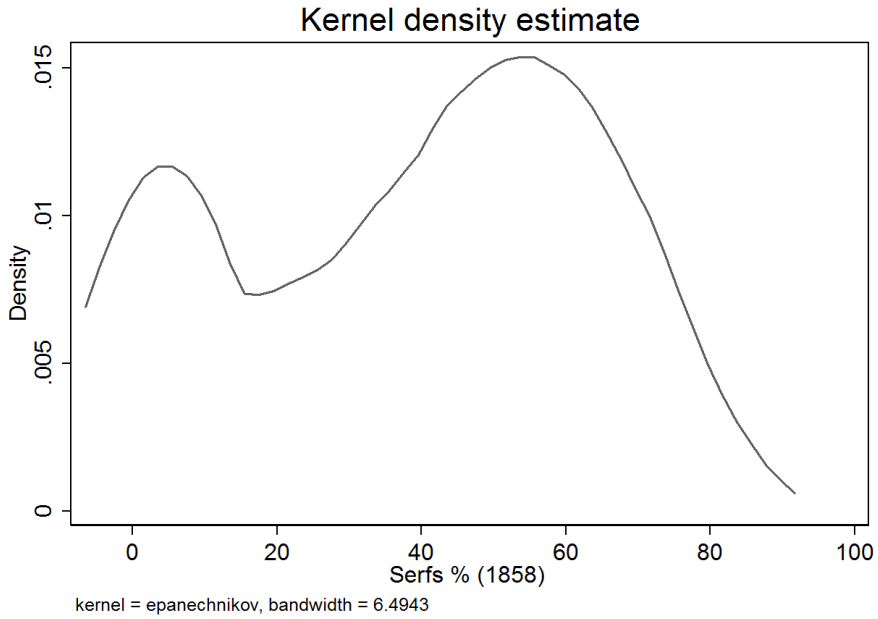
Rural PSU	0.35	0.48	22061
Age of Respondent Individual Questions	49.87	18.40	22052
Age Sq. of Respondent Individual Questions	2825.48	1893.00	22052
Gender of Respondent Individual Questions	0.37	0.48	22058
Consumer Goods	1.75	1.03	22056
Sale Farm Products	0.08	0.27	13240
Land Cultivation	0.53	0.50	6177
Highest Education	3.75	1.02	22060
Post Secondary	0.59	0.49	22060
Tertiary	0.29	0.45	22060
Parents Education Years	9.17	4.26	4410
Parents w/ Tertiary	0.31	0.64	13405
Education Gov. Priority?	0.39	0.49	21722
Poor: unlucky	0.08	0.27	13239
Equal incomes vs inequality	4.82	2.94	15255
Demonstrated 0/1	0.33	0.47	21061
Striked 0/1	0.29	0.45	21061
Signed Petition 0/1	0.42	0.49	21061
Average Protest	0.35	0.41	21061
Trust	0.37	0.48	21520
Prefer Market Economy	0.36	0.48	19864
Prefer Democracy	0.47	0.50	20072
Neighbor: Race	0.18	0.38	8821
Neighbor: Immigrant	0.31	0.46	8821
Neighbor: Religion	0.12	0.32	8821
Neighbor: Jew	0.09	0.29	8821
Neighbor: Language	0.09	0.29	8821
Average Xenophobia	0.03	1.54	8821
At Least One Communist Family Member	0.34	0.47	8821
Access to Water	0.84	0.37	22033
Access to Landline	0.60	0.49	21927
Access to Heating	0.57	0.49	21812
Access to Sewage	0.62	0.48	6125
PC Public Goods	0.03	1.55	6119
City Population Cross-Section	Mean	S.D.	N
Log City Population 1897	9.00	1.00	366
Log City Population 1926	9.33	1.06	366
Log City Population 1939	9.82	1.18	366

Table A1 (continued)

Log City Population 1959	10.10	1.29	366
Log City Population 1970	10.33	1.34	366
Log City Population 1989	10.53	1.39	366
Log City Population 2002	10.47	1.41	366
City Population Panel	Mean	S.D.	N
(Log) City Population	9.95	1.22	5031
Factory Location	Mean	S.D.	N
Number of Establishments in 1939	5.86	13.61	278
Number of Establishments in 1945	7.54	17.70	278
Number of Establishments in 1959	10.57	25.02	278
Number of Establishments in 1970	13.86	31.25	278
Number of Establishments in 1979	14.66	32.40	278
Number of Establishments in 1989	15.55	34.01	278
Firms 1989	Mean	S.D.	N
Number of Firms 1989 (per City)	5.33	19.58	2656
Agriculture	0.07	0.25	14154
Manufacturing	0.82	0.39	14154
(log) Employment	-1.46	1.41	14055
(log) Turnover	1.43	1.79	13933
(log) Turnover per Worker	2.89	0.93	13923

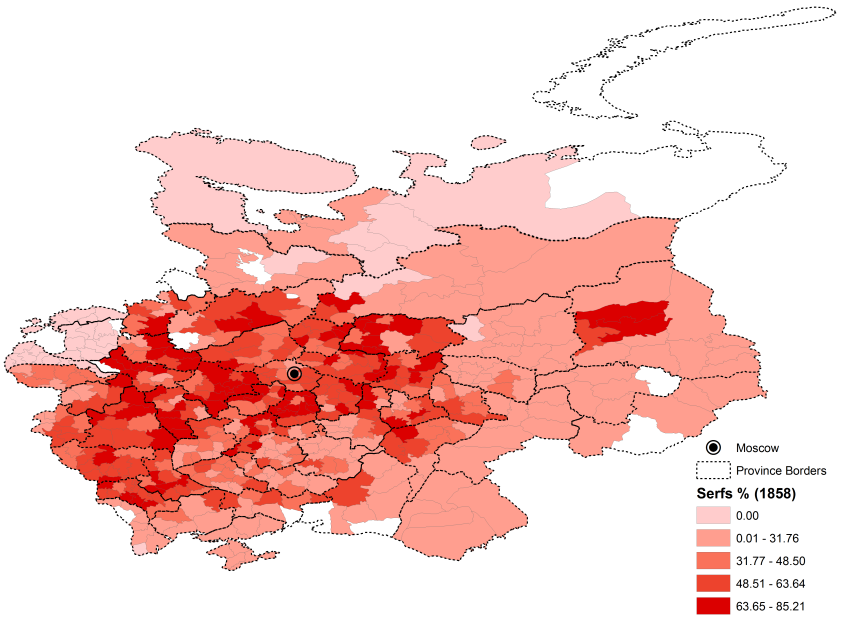
A.7 The Distribution of Serfdom

FIGURE A1: DISTRIBUTION OF SERFS AS SHARE OF POPULATION, C. 1858. N = 495.



NOTES: This figure plots the distribution of average serfdom across districts.

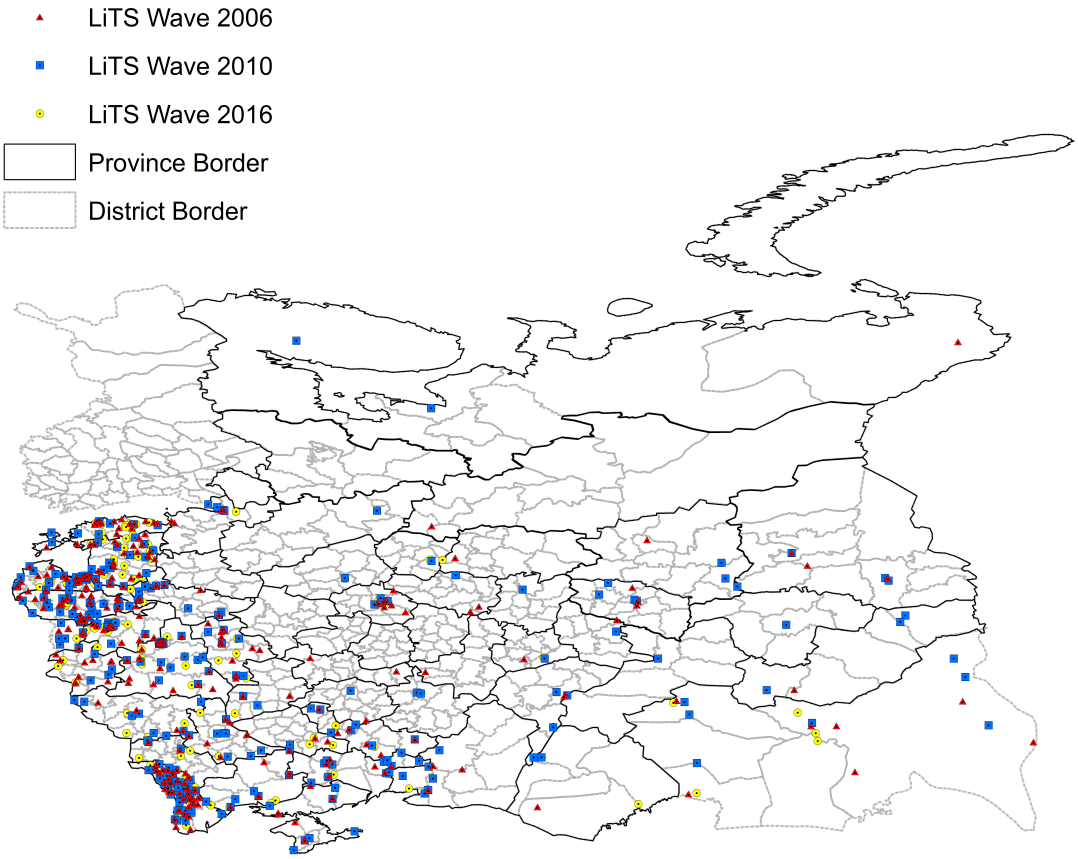
FIGURE A2: SPATIAL DISTRIBUTION OF SERFS AS SHARE OF POPULATION C. 1858.



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

A.8 Spatial Distribution of Primary Sampling Units

FIGURE A3: LOCATION OF LITS PRIMARY SAMPLING UNITS (PSU)



NOTES: This figure plots the location of the LiTS Primary Sampling Units, as well as historical district and province borders.

B Determinants of Serfdom and Omnibus Test

B.1 Determinants of Serfdom: All Controls Reported

TABLE B1: DETERMINANTS OF SERFDOM

	Serfs % (1858)				Types of Serfs: Share		
	All Districts			LiTS Districts	Quit-Rent	Corvée	Household
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Latitude	-0.100	-3.236	-1.333	3.526	1.084	-1.798	-0.783
	(0.648)	(2.026)	(1.967)	(3.448)	(3.627)	(3.057)	(2.978)
Longitude	-0.652**	-1.299*	-1.364**	-0.642	-0.390	-0.225	0.655
	(0.322)	(0.672)	(0.659)	(0.910)	(0.824)	(0.872)	(0.471)
Distance to Moscow	-3.724***	-3.360***	-2.887**	-2.772	-1.485	-0.452	1.848
	(0.849)	(0.844)	(1.147)	(2.558)	(2.156)	(2.241)	(1.152)
Cereal Suitability	4.471**	3.940**	2.267*	4.005*	-4.628*	3.254	1.975
	(1.725)	(1.955)	(1.166)	(2.242)	(2.400)	(2.188)	(1.181)
Distance to Coast		2.203**	1.735	0.749	2.595	-1.880	-0.816
		(0.955)	(1.218)	(1.819)	(1.780)	(2.448)	(2.125)
Forest Cover		0.182	0.149	0.371	0.054	-0.148	0.120
		(0.131)	(0.101)	(0.326)	(0.186)	(0.128)	(0.117)
Ruggedness		0.260	0.110	0.218	-0.045	0.148	0.103
		(0.338)	(0.176)	(0.395)	(0.343)	(0.326)	(0.309)
River Density		-47.805	-2.329	-99.383	-181.570	264.165**	-19.592
		(190.418)	(108.651)	(193.062)	(119.430)	(121.699)	(129.816)
Mean Temperature Apr-Sep		-31.497	-38.712	13.125	33.762	-20.351	-29.652
		(43.243)	(33.883)	(59.448)	(55.052)	(57.643)	(52.738)
Mean Precipitation Apr-Sep		0.066	-0.211	-0.454	-0.271	0.329	-0.284
		(0.396)	(0.283)	(0.504)	(0.527)	(0.384)	(0.419)
Podzol Soil		7.313	-4.905	-17.958*	10.044	-2.031	-7.480**
		(7.609)	(5.591)	(10.414)	(7.942)	(6.784)	(3.657)
Distance City in 1600		12.718	7.397	-8.723	-20.344	-10.379	9.727
		(13.986)	(13.063)	(18.656)	(15.759)	(25.314)	(20.260)
Distance Provincial Capital		1.005	-0.092	0.983	0.008	0.026	-1.050
		(1.460)	(1.217)	(1.599)	(1.609)	(1.159)	(0.973)
Fixed Effects			Province	Province	Province	Province	Province
R-squared	0.37	0.46	0.71	0.78	0.72	0.80	0.38
Observations	490	490	490	185	472	472	490
Number of Clusters	50	50	50	45	49	49	50
F-Stat Joint Significance	21.94	9.72	2.27	2.19	1.58	2.19	1.83
P-Value Joint Significance	0.00	0.00	0.02	0.03	0.13	0.02	0.06

NOTE: The unit of observation is the district. The dependent variable in Columns 1-5 is the share of serfs in a district population, c. 1858. For Columns 6-8, the dependent variable is the share of such serfs in the total number of serfs. Heteroscedastic-robust standard errors in parentheses, clustered at the province. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B.2 Assessing Bias with the Omnibus Test

To test for a bias deriving from the potential association of the determinants of historical serfdom with economic development today, we perform an omnibus test (similar to Satyanath et al. (2017)). To do this, we estimate a first-stage regression that regresses economic development today on all controls and province fixed effects, thereby generating predicted measures of economic development. In the second stage, we estimate the relationship between the predicted measure of economic development and historical serfdom. Thus, the omnibus test examines whether in the second stage, the variation in development that stems from the geographic controls is correlated with historical serfdom. To guarantee the widest geographic coverage, we measure economic development with light density at the district-level in 2008.

The results are reported in Table B2. The dependent variable is predicted light density obtained from regressing light density on the full set of geographic controls (either linear or flexible), the distance to the provincial capital and the nearest cities, as well as province fixed effects. Overall, we do not find any association between historical serfdom and predicted light-density, both without and with additionally controlling for province fixed effects. The magnitudes are positive without province fixed effects, and negative, but very small compared to the original effect (-0.8), conditional on province fixed effects. The 95% confidence intervals imply that maximum value of the coefficients are between -0.42 and - 0.47. Thus, the omnibus test dismisses a bias larger than two-thirds in our original result.

TABLE B2: OMNIBUS TEST

Controls used 1st Stage:	Predicted Log-Light Density (2008)			
	Linear Controls		Flexible Controls	
	(1)	(2)	(3)	(4)
Serfs % (1858)	0.226	-0.006	0.218	-0.031
	(0.327)	(0.207)	(0.334)	(0.217)
	[-0.431,0.883]	[-0.422,0.411]	[-0.453,0.889]	[-0.468,0.405]
Fixed Effects		Province		Province
R-squared	0.01	0.81	0.01	0.76
Observations	490	490	490	490

NOTE: The unit of observation is the district. The dependent variable is predicted log light density in 2008. The omnibus test regresses in a first stage log light density in 2008 on either the full set of geographic controls, the distance to the provincial capital and the nearest cities, and province fixed effects. The predicted light density is then regressed on serfdom, either unconditional or conditional on province fixed effects. The omnibus test examines whether the variation in light density, that is determined by the set of controls used, is associated with serfdom. Heteroscedastic-robust standard errors in parentheses, clustered at the province. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C Additional Results: Households and Individuals

C.1 Additional Robustness Checks

This section performs additional robustness checks of the long-term effect of serfdom on household well-being today.

Figure C1 illustrates the conditional relationship between household expenditure and serfdom.

Table C1 reports the coefficients of all geographic controls.

Table C2 shows that adjusting standard errors for spatial dependence using a cutoff distance of 300km is the most conservative approach, i.e. produces the largest standard errors.

Table C3 documents robustness to additional geographic controls, and to using consumer good as dependent variable.

Table C4 tests whether the main effect of serfdom on household consumption today is sensitive to the inclusion of the set of household controls, some of which could be endogenous to the historical process.

Table C5 tests sensitivity to controlling for wheat, rye, barley, and oat suitability instead of the combined cereal suitability index.

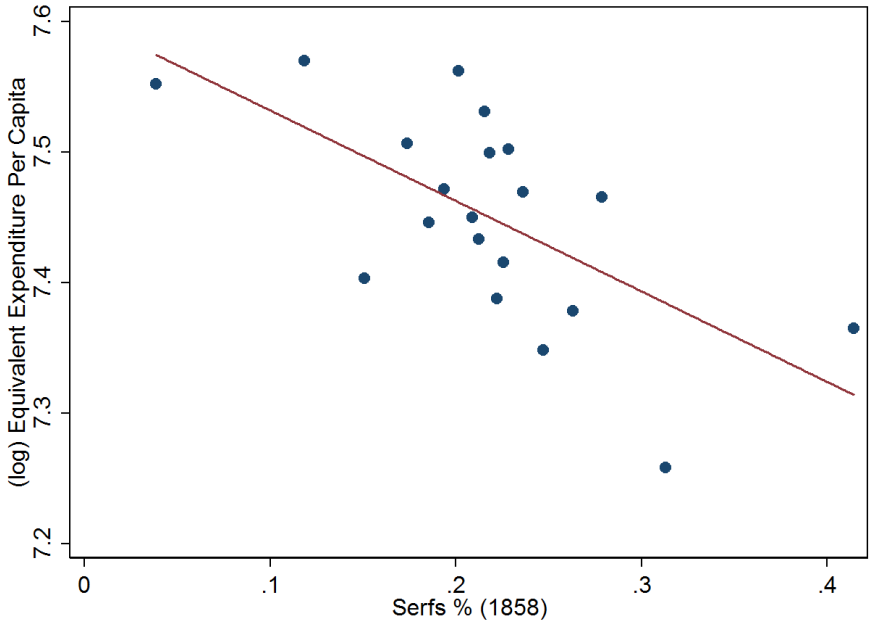
Table C6 replicates the main results with consumer good ownership as dependent variable.

Table C7 replicates the main results with household expenditure calculated from a wider range of items in 2006.

Table C8 tests whether the main results are robust to controlling for whether the PSU is classified as rural or urban settlement. Since this rural/urban status an endogenous control, and likely part of the agglomeration mechanism that we uncover, it is not included in the base set of household controls. Table C8 shows that the main results are robust to its inclusion.

Figure C2 shows strong positive correlations between average district-level night-time lights in 2008 and average expenditure, as well as average consumer good ownership, conditional on either country or province dummies.

FIGURE C1: EFFECT OF SERFDOM ON HOUSEHOLD EXPENDITURE



NOTES: This figure plots the relationship between household expenditure and serfdom, conditional on the full set of household household, flexible geographic controls, and province fixed effects. Households are grouped into 20 bins.

TABLE C1: MAIN RESULTS W/ ALL GEOGRAPHIC CONTROLS REPORTED

	(ln) Equivalent Expenditures Per Capita					
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.373***	-0.431***	-0.379***	-0.677***	-0.694***	-0.644***
	(0.117)	(0.111)	(0.104)	(0.185)	(0.190)	(0.185)
Latitude	0.042	0.002	-0.010	0.185***	0.145***	0.170***
	(0.026)	(0.016)	(0.019)	(0.064)	(0.053)	(0.055)
Longitude	0.002	0.007	0.007	0.016	0.013	0.034
	(0.009)	(0.009)	(0.009)	(0.019)	(0.025)	(0.023)
Distance to Moscow	0.002	-0.008	-0.009	0.048	0.052	0.079**
	(0.015)	(0.009)	(0.011)	(0.055)	(0.035)	(0.037)
Distance to Coast	-0.026*	-0.028	-0.023	-0.074	-0.025	-0.022
	(0.015)	(0.017)	(0.020)	(0.047)	(0.049)	(0.048)
Forest Cover	-0.001	-0.003	-0.004*	0.002	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Ruggedness	-0.020***	-0.026***	-0.022***	-0.013*	-0.023***	-0.016*
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.009)
River Density	0.428			-2.362		
	(3.661)			(3.480)		
Cereal Suitability	-0.016			-0.038		
	(0.027)			(0.040)		
Mean Temperature Apr-Sep	1.155*			1.766*		
	(0.591)			(0.900)		
Mean Precipitation Apr-Sep	0.011			0.011		
	(0.008)			(0.015)		
Podzol Soil	0.332**			-0.066		
	(0.142)			(0.178)		
River Density Quartile 2		0.005	-0.006		-0.025	-0.042
		(0.044)	(0.037)		(0.047)	(0.051)
River Density Quartile 3		0.162***	0.143***		0.056	0.051
		(0.056)	(0.049)		(0.076)	(0.074)
River Density Quartile 4		0.066	0.047		-0.046	-0.023
		(0.073)	(0.081)		(0.097)	(0.106)
Mean Precipitation apr-sep Quartile 2		-0.139	-0.110		-0.183	-0.099
		(0.134)	(0.118)		(0.141)	(0.142)
Mean Precipitation apr-sep Quartile 3		0.257**	0.257**		0.296	0.245
		(0.105)	(0.104)		(0.201)	(0.197)
Mean Precipitation apr-sep Quartile 4		0.235	0.227*		0.329	0.285
		(0.140)	(0.134)		(0.233)	(0.223)
Mean Temperature apr-sep Quartile 2		0.084	0.049		0.132*	0.067
		(0.051)	(0.067)		(0.076)	(0.095)
Mean Temperature apr-sep Quartile 3		0.014	-0.038		0.042	0.034
		(0.114)	(0.140)		(0.220)	(0.225)
Mean Temperature apr-sep Quartile 4		-0.020	-0.100		0.228	0.163
		(0.146)	(0.154)		(0.215)	(0.209)
Very marginal suitabality		0.563***	0.185		1.273***	0.877*
		(0.175)	(0.335)		(0.369)	(0.459)
Marginal suitability		0.658**	0.271		3.506***	3.127***
		(0.267)	(0.456)		(0.923)	(0.997)
Moderate suitability		0.549**	0.242		3.365***	2.971***
		(0.271)	(0.421)		(0.933)	(1.010)
Medium suitability		0.558*	0.235		3.369***	2.917***
		(0.279)	(0.434)		(0.933)	(1.014)
Good suitability		0.521*	0.152		3.268***	2.772**
		(0.263)	(0.444)		(0.937)	(1.032)
High suitability		0.635**	0.263		3.337***	2.840***
		(0.284)	(0.468)		(0.974)	(1.051)
Very high suitability		0.581**	0.195		3.235***	2.789**
		(0.274)	(0.440)		(0.972)	(1.039)
Podzol Soil Quartile 2		-0.055	-0.026		-0.076	-0.028
		(0.078)	(0.073)		(0.068)	(0.067)
Podzol Soil Quartile 3		0.152	0.167		-0.109	-0.067
		(0.105)	(0.102)		(0.096)	(0.108)
Podzol Soil Quartile 4		0.158	0.192		-0.227*	-0.170
		(0.121)	(0.119)		(0.119)	(0.132)
Distance City in 1600			20.544			-54.487
			(21.718)			(40.700)
Distance Provincial Capital			-0.062			-0.055
			(0.038)			(0.045)
Household Controls	✓	✓	✓	✓	✓	✓
Fixed Effects	Country	Country	Country	Province	Province	Province
Observations	17155	17155	17155	17155	17155	17155
R-squared	0.39	0.40	0.41	0.40	0.41	0.41
Number of Clusters	45	45	45	45	45	45
δ for $\beta = 0$	16.126	9.856	2.486	2.772	1.518	1.166
Lower Bound Estimates	-0.462	-0.626	-0.465	-0.530	-0.606	-0.444

NOTE: The unit of observation is the household. 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. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE C2: ADJUSTING S.E. FOR SPATIAL DEPENDENCE: ALTERNATIVE CUTOFF DISTANCES

	(ln) Equivalent Expenditures Per Capita					
Cutoff in km	150	200	250	300	350	400
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.644***	-0.644***	-0.644***	-0.644***	-0.644***	-0.644***
	(0.167)	(0.141)	(0.167)	(0.180)	(0.169)	(0.156)
Household Controls	✓	✓	✓	✓	✓	✓
Flexible Controls	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province
Observations	17155	17155	17155	17155	17155	17155
R-squared	0.41	0.41	0.41	0.41	0.41	0.41

NOTE: The unit of observation is the household. 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. Standard errors adjusted for spatial dependence reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE C3: ROBUSTNESS

	(ln) Equivalent Expenditures Per Capita							Consumer Goods	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Serfs % (1858)	-0.621***	-0.621***	-0.635***	-0.627***	-0.634***	-0.666***	-0.565**	-0.437***	-0.445***
	(0.197)	(0.187)	(0.185)	(0.189)	(0.185)	(0.191)	(0.219)	(0.149)	(0.144)
SD Cereal Suitability	-0.073								
	(0.095)								
Length Growing Period		0.006							
		(0.004)							
Growing Season Variability Precipitation			0.013						
			(0.018)						
Growing Season Variability Temperature			19.631***						
			(6.641)						
Coal Territory 0/1				-0.044					
				(0.080)					
Distance St. Petersburg					-0.126				
					(0.142)				
(ln) Pop Density 1858						-0.057			
						(0.100)			
Religion 1870							✓		
Household Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linear Controls								✓	
Flexible Controls	✓	✓	✓	✓	✓	✓	✓		✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province	Province
Observations	17155	17155	17155	17155	17155	15533	17155	21734	21734
R-squared	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.43
Number of Clusters	45	45	45	45	45	45	45	45	45
δ for $\beta = 0$	1.001	1.067	1.111	1.023	1.111	0.759	0.616	3.212	2.453
Lower Bound Estimates	-0.461	-0.462	-0.500	-0.476	-0.493	-0.604	-0.427	-0.358	-0.368
Conley S.E. 300km									
Serfs % (1858)	[0.189]***	[0.183]***	[0.167]***	[0.184]***	[0.186]***	[0.227]***	[0.212]***	[0.145]***	[0.129]***

NOTE: The unit of observation is the household. 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. 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. 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 C4: SENSITIVITY TO HOUSEHOLD CONTROLS

	(ln) Equivalent Expenditures Per Capita									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Serfs % (1858)	-0.413***	-0.409***	-0.395***	-0.395***	-0.394***	-0.729***	-0.721***	-0.696***	-0.702***	-0.718***
	(0.132)	(0.131)	(0.122)	(0.122)	(0.124)	(0.184)	(0.187)	(0.183)	(0.181)	(0.186)
Household Size		0.047***	-0.023**	-0.029***	-0.028***		0.046***	-0.021**	-0.028***	-0.027***
		(0.008)	(0.010)	(0.009)	(0.009)		(0.008)	(0.010)	(0.009)	(0.009)
Share Old			-0.472***	-0.455***	-0.456***			-0.461***	-0.443***	-0.444***
			(0.030)	(0.032)	(0.032)			(0.031)	(0.033)	(0.033)
Share Young			0.003	0.029	0.027			-0.010	0.018	0.016
			(0.051)	(0.047)	(0.048)			(0.049)	(0.045)	(0.046)
Share Male				0.128***	0.133***				0.134***	0.138***
				(0.023)	(0.023)				(0.023)	(0.023)
No Religion					0.067					0.073
					(0.056)					(0.056)
Buddhist Religion					-0.297**					-0.332***
					(0.120)					(0.115)
Christian Religion					0.064					0.062
					(0.051)					(0.050)
Jewish Religion					0.256					0.238
					(0.165)					(0.154)
Muslim Religion					0.052					0.041
					(0.079)					(0.079)
Linear Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Country	Country	Country	Country	Country	Province	Province	Province	Province	Province
Observations	17333	17333	17333	17333	17155	17333	17333	17333	17333	17155
R-squared	0.33	0.33	0.38	0.38	0.39	0.33	0.34	0.38	0.38	0.39
Number of Clusters	45	45	45	45	45	45	45	45	45	45

NOTE: The unit of observation is the household. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE C5: CROP SUITABILITY

	(ln) Equivalent Expenditures Per Capita							
	Wheat		Rye		Barley		Oat	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-0.566***	-0.558***	-0.561***	-0.573***	-0.583***	-0.560***	-0.563***	-0.510**
	(0.178)	(0.187)	(0.178)	(0.209)	(0.175)	(0.194)	(0.179)	(0.201)
Household Controls	✓	✓	✓	✓	✓	✓	✓	✓
Linear Controls	✓		✓		✓		✓	
Flexible Controls		✓		✓		✓		✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	17155	17155	17155	17155	17155	17155	17155	17155
R-squared	0.40	0.41	0.40	0.41	0.40	0.41	0.40	0.41
Number of Clusters	45	45	45	45	45	45	45	45

NOTE: The unit of observation is the household. 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. 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. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE C6: MAIN RESULTS WITH CONSUMER GOODS

	Consumer Goods					
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.299***	-0.327***	-0.281***	-0.496***	-0.461***	-0.445***
	(0.096)	(0.076)	(0.082)	(0.169)	(0.150)	(0.144)
Household Controls	✓	✓	✓	✓	✓	✓
Linear Controls	✓			✓		
Flexible Controls		✓	✓		✓	✓
Distances: City & Prov. Capital			✓			✓
Fixed Effects	Country	Country	Country	Province	Province	Province
Observations	21734	21734	21734	21734	21734	21734
R-squared	0.42	0.42	0.42	0.42	0.42	0.43
Number of Clusters	45	45	45	45	45	45
δ for $\beta = 0$	-32.802	-113.289	13.079	5.225	2.860	2.453
Lower Bound Estimates	-0.321	-0.359	-0.297	-0.431	-0.384	-0.361
Conley S.E. 300km						
Serfs % (1858)	[0.101]***	[0.088]***	[0.099]***	[0.177]***	[0.146]***	[0.129]***

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. 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 country/province fixed effects. Standard errors clustered at the province are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE C7: HOUSEHOLD EXPENDITURE WAVE 2006

	(ln) Equivalent Expenditures Per Capita					
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.543***	-0.480***	-0.413**	-0.952***	-0.946***	-0.890***
	(0.159)	(0.157)	(0.173)	(0.276)	(0.236)	(0.243)
Household Controls	✓	✓	✓	✓	✓	✓
Linear Controls	✓			✓		
Flexible Controls		✓	✓		✓	✓
Distances: City & Prov. Capital			✓			✓
Fixed Effects	Country	Country	Country	Province	Province	Province
Observations	5721	5721	5721	5721	5721	5721
R-squared	0.40	0.41	0.41	0.42	0.44	0.44
Number of Clusters	38	38	38	38	38	38
δ for $\beta = 0$	-34.045	4.290	2.398	2.585	1.727	1.375
Lower Bound Estimates	-0.617	-0.509	-0.399	-0.772	-0.772	-0.672
Conley S.E. 300km						
Serfs % (1858)	[0.146]***	[0.133]***	[0.140]***	[0.295]***	[0.254]***	[0.217]***

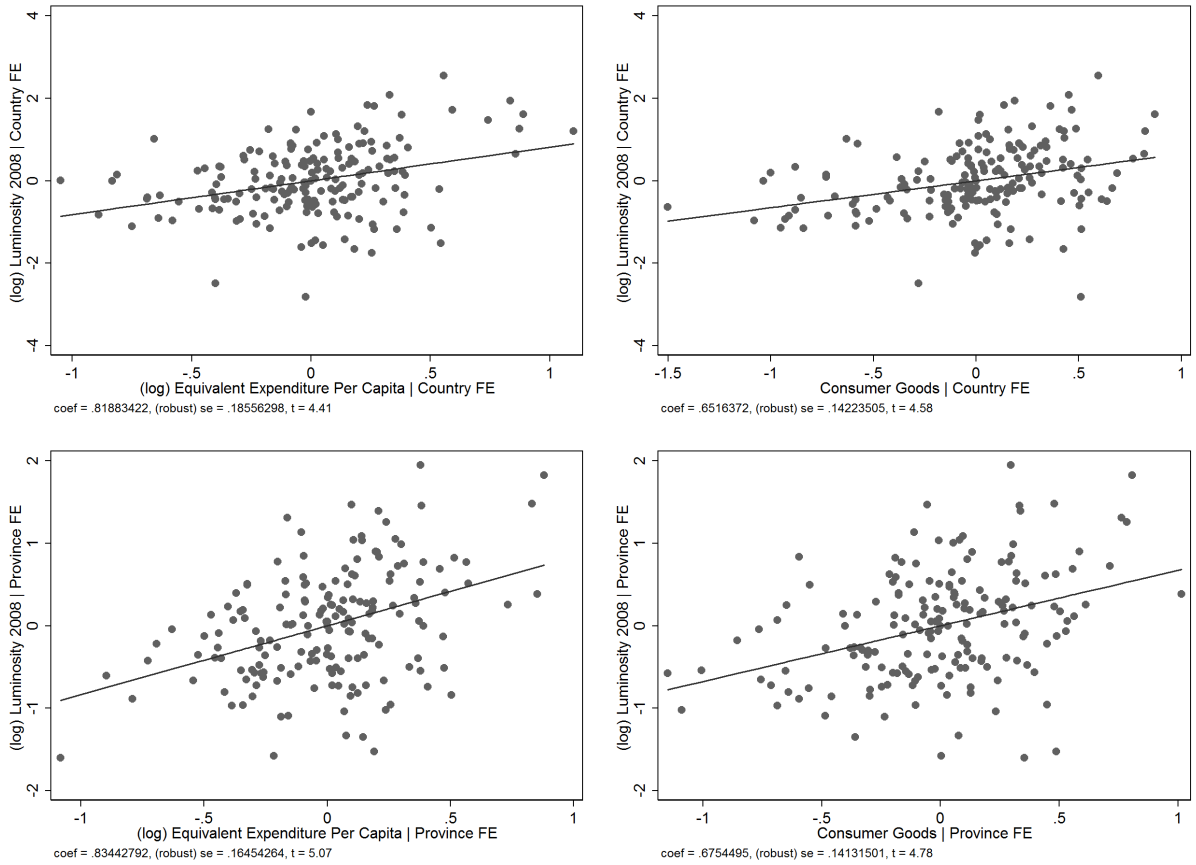
NOTE: The unit of observation is the household. Household controls include the household size, the share of household members aged 0-18, the share of household members aged 60+, the share of male household members, the religious denomination of the household respondent, LiTS wave fixed effects. Linear 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. 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 country/province fixed effects. Standard errors clustered at the province are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE C8: MAIN RESULTS CONTROLLING FOR URBAN/RURAL STATUS

	(ln) Equivalent Expenditures Per Capita					
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.329***	-0.382***	-0.347***	-0.621***	-0.619***	-0.577***
	(0.113)	(0.101)	(0.096)	(0.167)	(0.170)	(0.163)
Household Controls	✓	✓	✓	✓	✓	✓
Linear Controls	✓			✓		
Flexible Controls		✓	✓		✓	✓
Distances: City & Prov. Capital			✓			✓
Fixed Effects	Country	Country	Country	Province	Province	Province
Observations	17155	17155	17155	17155	17155	17155
R-squared	0.41	0.42	0.42	0.41	0.42	0.42
Number of Clusters	45	45	45	45	45	45
δ for $\beta = 0$	4.367	3.960	2.002	2.112	1.221	0.990
Lower Bound Estimates	-0.320	-0.435	-0.359	-0.465	-0.470	-0.375
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. 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 country/province fixed effects. Standard errors clustered at the province are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE C2: NIGHT-TIME LIGHTS, HOUSEHOLD EXPENDITURE, AND CONSUMER GOODS



NOTES: These figures plot average district-level night-time luminosity in 2008 against average household expenditure and average consumer goods ownership, conditional on country fixed effects (upper panel), and province fixed effects (lower panel).

C.2 The Differential Effect of Geographic Fundamentals

A more indirect strategy to investigate the long-run impact of serfdom is to differentiate the effects of observable characteristics on economic outcomes in areas where peasants were more or less subjected to the institution. We present such an exercise in Table C9. This depicts the differential long-run effects of geographic determinants of serfdom in provinces where serfdom either never existed or ended much earlier (in particular, the Baltics, where emancipation occurred in 1819 under very different conditions), compared to provinces where it was present.

We look at all variables that turn out to be significant predictors of serfdom in Table 1, starting with the case of land suitability for agricultural production. In the absence of labor exploitation one would expect a greater share of suitable land to 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, positive effects of land quality on long-run economic outcomes might be limited by persistent effects of labor coercion, since serfdom was more prevalent in more productive lands.

Indeed, this is what Table C9 shows. Looking at only provinces without serfdom in 1861, land suitability for cereals, wheat, rye, barley and oat shows the expected positive (and statistically significant) correlation with per capita expenditures in Column 1.[1] If one considers the rest of Imperial Russia where serfdom was present in 1861, the positive impact of grain suitability turns negative (Column 2). Column 3 and 4 confirm these results conditional on Province instead of Country fixed effects. We still find positive, but insignificant coefficients due to the more limited within-Province variation where serfdom was not prevalent (Column 3), and estimate negative and significant in areas where serfdom existed (Column 4). In the same vein, the share of infertile podzol soils have a differential impact conditional on country fixed effects, but not within-Provinces, where podzol soils cease to be a significant predictor of serfdom.

Besides agricultural suitability, we test for differential effects of proximity to Moscow and to the coast. We find some weak evidence in Columns 3 and 4 suggesting a beneficial effect of spatial distance to Moscow in areas where serfdom existed - which again is consistent with the negative correlation between distance from Moscow and serfdom's intensity. The coefficient for the distance to the coast turns negative in areas where serfdom was widespread, which is what one would expect given that areas with serfdom were located relatively farther away from the coast. Overall, while the non-serf provinces are admittedly a small group, this evidence, and in particular the differential pattern of agricultural suitability, is highly suggestive that a legacy of serfdom gave rise to persistent constraints on subsequent Russian economic development.[2]

[1] We define non-serf provinces to be Kurliand, Lifland, and Estliand, which cover much of what are now the modern Baltic countries. This is the reason why these provinces appear oversampled in the LiTS dataset.

[2] The fact that differential effects are particularly strong and consistent for the suitability measures can also

TABLE C9: THE DIFFERENTIAL EFFECT OF GEOGRAPHIC FUNDAMENTALS

	(ln) Equivalent Expenditures Per Capita			
	Serfdom = 0	Serfdom = 1	Serfdom = 0	Serfdom = 1
	(1)	(2)	(3)	(4)
Cereal Suitability	0.078*	-0.047	0.038	-0.094**
	[0.041]	[0.031]	[0.074]	[0.045]
Wheat Suitability	0.046*	-0.032*	0.016	-0.047*
	[0.024]	[0.019]	[0.046]	[0.027]
Rye Suitability	0.048**	-0.052***	0.019	-0.057*
	[0.025]	[0.020]	[0.045]	[0.033]
Barley Suitability	0.044*	-0.047**	0.023	-0.039
	[0.024]	[0.020]	[0.047]	[0.036]
Oat Suitability	0.042*	-0.050**	0.021	-0.053
	[0.024]	[0.020]	[0.048]	[0.034]
Podzol Soil	-0.619**	0.366***	-0.135	-0.082
	[0.294]	[0.128]	[0.290]	[0.166]
Distance to Moscow	-0.107	-0.007	0.058	0.094*
	[0.601]	[0.019]	[0.485]	[0.050]
Distance to Coast	-0.072	-0.033**	0.060	-0.087**
	[0.052]	[0.016]	[0.058]	[0.039]
Household Controls	✓	✓	✓	✓
Add. Geographic Controls	✓	✓	✓	✓
Fixed Effects	Country	Country	Province	Province
Observations	5297	11858	5297	11858

NOTE: The unit of observation is the household. The areas without Serfdom include the Baltics. Each cell reports the estimated effect of the geographic variable (cereal/wheat/rye/barley/oat suitability, podzol soils, distance to Moscow, distance to coast) on (log) household expenditure conditional on household controls, additional geographic controls, and fixed effects. 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. Additional controls include latitude and longitude of the district, the area covered by forest, ruggedness, growing-season temperature and precipitation, and river density. Standard errors in brackets are adjusted for spatial dependence, using a cutoff distance of 100km, the largest distance which allows to compute standard errors in both samples. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

be explained by the fact that suitability is the only significant predictor of serfdom in the sample of districts with LiTS data that we consider here (see Table 1).

C.3 Inequality and Public Goods Provision

Table C10 investigates differences in historical and contemporary inequality. To measure contemporary inequality, we constructed Gini indices using expenditure and consumer good ownership of households living in a common historical district.

Table C11 investigates the effects of serfdom on the availability of public goods.

TABLE C10: INEQUALITY

	Historical				**Modern (2006-2016)**					
	Land Owned by Nobles 1905		Land Inequality 1905		Gini Expenditure			Gini Consumer Goods		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Serfs % (1858)	28.099***	27.970***	0.323***	0.308***	-0.008	-0.006	-0.006	0.018	0.030	0.041
	(4.929)	(4.704)	(0.052)	(0.049)	(0.008)	(0.007)	(0.008)	(0.035)	(0.036)	(0.032)
Land Gini 1905							-0.002			-0.046
							(0.012)			(0.039)
Linear Controls	✓		✓		✓			✓		
Flexible Controls		✓		✓		✓	✓		✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province	Province	Province
Observations	490	490	467	467	183	183	179	185	185	180
R-squared	0.79	0.80	0.71	0.72	0.55	0.62	0.62	0.35	0.38	0.38
Number of Clusters	50	50	49	49	45	45	43	45	45	43
δ for $\beta = 0$	1.309	1.199	-29.931	3.762	1.562	0.803	0.792	1.419	32.802	-17.028
Lower Bound Estimates	29.385	28.007	0.412	0.343	-0.008	-0.002	-0.002	0.009	0.034	0.055
Conley S.E. 300km										
Serfs % (1858)	[4.736]***	[4.556]***	[0.060]***	[0.054]***	[0.006]	[0.005]	[0.007]	[0.033]	[0.030]	[0.027]

NOTE: The unit of observation is a district. 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. 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 C11: PUBLIC GOODS

Availability of:	Water		Landline		Heating		Sewage		PC Public Goods	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Serfs % (1858)	-0.044	-0.011	-0.174	-0.315**	-0.059	-0.062	-0.203	-0.242	-0.849	-1.094*
	(0.123)	(0.106)	(0.162)	(0.122)	(0.188)	(0.168)	(0.185)	(0.191)	(0.678)	(0.638)
Household Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linear Controls	✓		✓		✓		✓		✓	
Flexible Controls		✓		✓		✓		✓		✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province	Province	Province
Observations	21710	21710	21605	21605	21490	21490	6119	6119	6113	6113
R-squared	0.16	0.17	0.15	0.16	0.22	0.24	0.22	0.24	0.26	0.28
Number of Clusters	45	45	45	45	45	45	38	38	38	38

NOTE: The unit of observation is the household. 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. 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. 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 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.4 Cultural Attitudes and Preferences

Did economic exploitation over several centuries shape peoples beliefs and attitudes, perhaps fostering a "culture of serfdom," with persistent implications for economic development? Several recent studies have documented that institutions can impact cultural norms in the long-run (for an overview see Nunn (2012)), which can persist over generations. Moreover, it is possible that various institutional restrictions, social and economic inequality, or persistent limitations on urban development under and after serfdom generated long-lasting norms and beliefs that undermined income growth in modern post-Soviet economies. We report in the main text that the persisting (spatial) economic inequality caused by historical serfdom is also reflected in stronger preferences for redistribution, and a greater willingness to engage in collective action.

In Table C12 we explore this possibility further and consider inter-personal trust, as well as preferences for a market economy, and democracy, as cultural attitudes that are likely associated with economic growth (e.g. Algan and Cahuc, 2013). Overall, we find no evidence that these economically relevant cultural outcomes are associated to serfdom. Trust in others showed no relationship to historical serfdom. Moreover, preferences for a market economy (versus a planned economy) or for democracy (versus autocracy) are not statistically different between areas with a greater or lesser history of serfdom. While cultural channels have been emphasized in the literature on persistent effects of past labor coercion (i.e. Nunn and Wantchekon (2011)), we find no support that culture is a mechanism from serfdom to growth in the Russian and former Soviet case. The results on redistribution and collective action suggest that cultural attitudes are rather an additional reflection of the underlying economic conditions that serfdom helped to create.

Table C13 documents that serfdom does not have any effect on membership in the communist party.

In Table C14 we investigate whether places where serfdom was more widespread are more hostile towards outsiders. Respondents were asked whether they would accept a neighbor with a different race, someone with an immigration background, someone with a different religion, someone who is Jewish, or someone that speaks a different language. Individuals living in areas where serfdom was higher in the past only show a higher aversion towards Jewish neighbors, but are not different otherwise.

In Table C15 we test whether respondents believe that luck is the main reason for poverty and investigate differences in preferences for income redistribution.

TABLE C12: TRUST, AND ATTITUDES TOWARDS ECONOMIC AND POLITICAL INSTITUTIONS

	Trust			Prefer Market Economy			Prefer Democracy		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Serfs % (1858)	0.028	0.031	0.078	-0.015	-0.006	-0.002	0.052	0.093	0.118
	(0.108)	(0.110)	(0.090)	(0.092)	(0.096)	(0.107)	(0.110)	(0.113)	(0.114)
Household Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linear Controls	✓	✓		✓	✓		✓	✓	
Flexible Controls									
Distances: City & Prov. Capital		✓	✓		✓	✓		✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province	Province
Observations	21218	21218	21218	19609	19609	19609	19811	19811	19811
R-squared	0.03	0.03	0.03	0.06	0.06	0.06	0.05	0.05	0.05
Number of Clusters	45	45	45	45	45	45	45	45	45

NOTE: The unit of observation is the individual. Household controls include the age, age squared, and gender of the respondent, 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. 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. 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 C13: COMMUNISM

	At Least One Communist Family Member	
	(1)	(2)
Serfs % (1858)	0.005	-0.175
	(0.164)	(0.178)
Household Controls	✓	✓
Linear Controls	✓	
Flexible Controls		✓
Distances: City & Prov. Capital	✓	✓
Fixed Effects	Province	Province
Observations	8727	8727
R-squared	0.08	0.09
Number of Clusters	39	39

NOTE: The unit of observation is the individual. Household controls include the age, age squared, and gender of the respondent, 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. 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. 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 C14: XENOPHOBIA

Reject as neighbor someone...	with different race		who is an immigrant		with different religion		who is Jewish		that speaks a different language		Average Xenophobia	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Serfs % (1858)	-0.135	-0.056	0.028	0.005	0.113	0.145	0.338**	0.368**	0.070	0.103	0.656	0.883
	(0.168)	(0.205)	(0.159)	(0.178)	(0.155)	(0.172)	(0.155)	(0.174)	(0.214)	(0.232)	(1.093)	(1.245)
Household Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linear Controls	✓		✓		✓		✓		✓		✓	
Flexible Controls		✓		✓		✓		✓		✓		✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province	Province	Province	Province	Province
Observations	8727	8727	8727	8727	8727	8727	8727	8727	8727	8727	8727	8727
R-squared	0.05	0.05	0.09	0.09	0.03	0.04	0.05	0.05	0.06	0.07	0.05	0.06
Number of Clusters	39	39	39	39	39	39	39	39	39	39	39	39

NOTE: The unit of observation is the individual. Household controls include the age, age squared, and gender of the respondent, 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. 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. 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 C15: PREFERENCES FOR REDISTRIBUTION

	Poor Unlucky?		Less or More Inequality?	
	(1)	(2)	(3)	(4)
Serfs % (1858)	0.051	0.087**	-1.255	-1.869**
	(0.038)	(0.042)	(0.864)	(0.878)
Household Controls	✓	✓	✓	✓
Linear Controls	✓		✓	
Flexible Controls		✓		✓
Distances: City & Prov. Capital	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province
Observations	13000	13000	14946	14946
R-squared	0.03	0.03	0.08	0.09
Number of Clusters	45	45	40	40
δ for $\beta = 0$	1.936	-16.709	7.205	-12.595
Lower Bound Estimates	0.043	0.114	-1.798	-2.642
Conley S.E. 300km				
Serfs % (1858)	[0.034]	[0.046]*	[0.565]**	[0.678]***

NOTE: The unit of observation is an individual. Household controls include the age, age squared, and gender of the respondent, 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. 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. 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 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.5 Protest and Collective Action

Table C16 investigates the effects of serfdom on the willingness to protest and engage in collective action.

TABLE C16: PROTEST AND COLLECTIVE ACTION

	Demonstrated		Striked		Sign Petition		Average Protest	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	0.118	0.089	0.116	0.128	0.080	0.059	0.105	0.092
	(0.093)	(0.084)	(0.087)	(0.085)	(0.091)	(0.105)	(0.083)	(0.085)
Household Controls	✓	✓	✓	✓	✓	✓	✓	✓
Linear Controls	✓		✓		✓		✓	
Flexible Controls		✓		✓		✓		✓
Distances: City & Prov. Capital		✓		✓		✓		✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	20731	20731	20731	20731	20731	20731	20731	20731
R-squared	0.07	0.07	0.09	0.10	0.09	0.10	0.10	0.11
Number of Clusters	45	45	45	45	45	45	45	45

NOTE: The unit of observation is the individual. Household controls include the age, age squared, and gender of the respondent, 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. 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. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D Additional Results: City Population

D.1 Cross-Sectional Estimation in the Period 1897 - 2002

The corresponding regression results to Figure 2 are reported in Table D1. It reports results from repeated cross-sectional regressions of (log) city population on serfdom, conditional on flexible controls and province fixed effects.

In Table D2, we document negative effects of serfdom on city population conditional on linear controls.

Figure D1 plots average city population for cities with above and below median serfdom intensity.

Figure D2 contains coefficients from estimating city population on an above/below median serfdom indicator × year fixed effects, conditional on province dummies × year fixed effects, distance to Moscow × year fixed effects, and cereal suitability × year fixed effects.

In addition, Table D3 looks at city growth and documents the absence of any convergence over time. If there was (beta-) convergence in city sizes, we would expect cities with larger populations to grow slower - not faster. Interestingly, the positive relationship between initial population size and growth in population only appears in the Soviet period (i.e., after 1926). This could be an indication of the well-known urban bias of Soviet planners. Figure D3 plots the corresponding coefficients.

TABLE D1: PERSISTENCE THROUGH THE SOVIET PERIOD: CITY POPULATION 1897 - 2002

Log City Population in	1897	1926	1939	1959	1970	1989	2002	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-1.175***	-1.113***	-1.084**	-1.258***	-1.370***	-1.428***	-1.491***	-0.250
	(0.344)	(0.326)	(0.444)	(0.446)	(0.463)	(0.474)	(0.494)	(0.478)
Log City Population 1897								1.056***
								(0.060)
Flexible Controls	✓	✓	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	366	366	366	366	366	366	366	366
R-squared	0.34	0.32	0.30	0.32	0.31	0.30	0.31	0.67
Number of Clusters	33	33	33	33	33	33	33	33
δ for $\beta = 0$	6.457	95.975	-14.212	-16.698	-27.060	-35.882	-82.170	
Lower Bound Estimates	-1.266	-1.258	-1.261	-1.471	-1.575	-1.629	-1.690	
Conley S.E. 300km								
Serfs % (1858)	[0.313]***	[0.325]***	[0.433]**	[0.433]***	[0.458]***	[0.467]***	[0.474]***	[0.332]

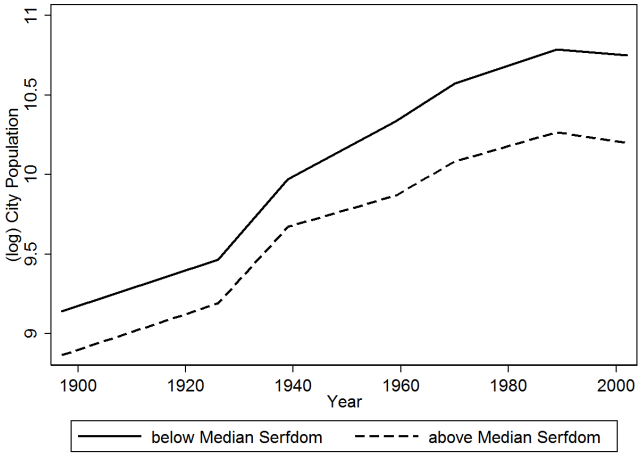
NOTE: The unit of observation is a city. Flexible controls include eight dummies for cereal suitability, and four dummies for quartiles of growing season temperature, growing-season precipitation, the share of podzol soil, and river density, as well as linear controls of latitude and longitude of the 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. 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 D2: PERSISTENCE THROUGH THE SOVIET PERIOD: LINEAR CONTROLS

Log City Population in	1897	1926	1939	1959	1970	1989	2002	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-1.080***	-0.929**	-0.791	-0.953*	-1.061*	-1.127*	-1.196*	-0.036
	(0.349)	(0.348)	(0.494)	(0.534)	(0.565)	(0.601)	(0.613)	(0.558)
Log City Population 1897								1.074***
								(0.065)
Linear Controls	✓	✓	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	366	366	366	366	366	366	366	366
R-squared	0.32	0.29	0.26	0.28	0.26	0.25	0.25	0.64
Number of Clusters	33	33	33	33	33	33	33	33
δ for $\beta = 0$	6.721	13.079	14.850	13.662	11.990	12.925	11.572	
Lower Bound Estimates	-1.100	-0.967	-0.818	-0.996	-1.099	-1.173	-1.240	
Conley S.E. 300km								
Serfs % (1858)	[0.341]***	[0.356]***	[0.509]	[0.535]*	[0.572]*	[0.613]*	[0.616]*	[0.487]

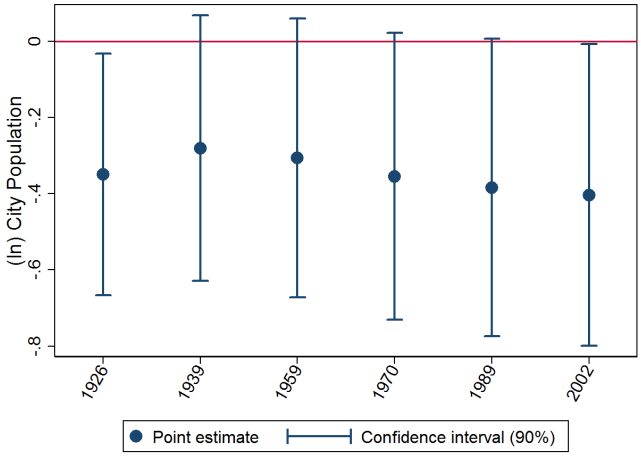
NOTE: The unit of observation is a city. Linear controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE D1: AVERAGE CITY POPULATION OF CITIES WITH ABOVE/BELOW MEDIAN SERFDOM
1897-2002



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 the 366 cities used in Table D1.

FIGURE D2: GAP BETWEEN ABOVE & BELOW MEDIAN SERFDOM AREAS, CONDITIONAL ON PROVINCE × YEAR FE 1897-2002



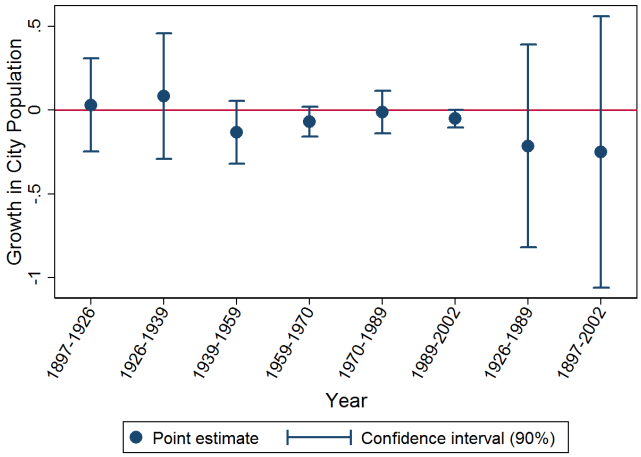
NOTES: This figure plots the coefficients from regressing (log) city population on a dummy for above median serfdom intensity × year fixed effects, conditional on province dummies × year fixed effects, distance to Moscow × year fixed effects, and cereal suitability × year fixed effects. The sample corresponds to the 366 cities used in Table D1.

TABLE D3: POPULATION GROWTH

Growth in City Population	1897-1926	1926-1939	1939-1959	1959-1970	1970-1989	1989-2002	1926-1989	1897-2002
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	0.031	0.085	-0.132	-0.070	-0.011	-0.051	-0.214	-0.250
	(0.164)	(0.221)	(0.111)	(0.052)	(0.075)	(0.031)	(0.357)	(0.478)
Log City Population 1897	-0.027							0.056
	(0.029)							(0.060)
Log City Population 1926		0.050*					0.091	
		(0.028)					(0.060)	
Log City Population 1939			0.039**					
			(0.017)					
Log City Population 1959				0.033**				
				(0.013)				
Log City Population 1970					0.034**			
					(0.014)			
Log City Population 1989						0.008**		
						(0.004)		
Distance Provincial Capital	-0.087***	-0.032	-0.043**	0.009	-0.003	-0.000	-0.110*	-0.213***
	(0.027)	(0.030)	(0.019)	(0.016)	(0.016)	(0.008)	(0.058)	(0.067)
Distance City in 1600	0.161	0.459	0.197	0.094	-0.057	-0.138*	0.780	0.826
	(0.389)	(0.348)	(0.223)	(0.273)	(0.206)	(0.073)	(0.821)	(0.950)
Flexible Controls	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	366	366	366	366	366	366	366	366
R-squared	0.25	0.40	0.40	0.29	0.29	0.32	0.29	0.30
Number of Clusters	33	33	33	33	33	33	33	33

NOTE: The unit of observation is a city. 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. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE D3: ESTIMATED COEFFICIENTS POPULATION GROWTH



NOTES: This figure plots the coefficient from regressions of average city population growth on serfdom, conditional on province fixed effects and flexible controls. The corresponding regression results are reported in Table D3.

D.2 Panel Estimation in the Period 1800 - 2002: Balanced Sample

Table D4 depicts the results from estimating Equation (3) on a balanced panel of 99 cities, as described in the main text.

Figure D4 illustrates average city population for cities above and below the median intensity of serfdom.

Table D5 reports estimates from flexible specifications of Equation (3). Figure D5 illustrates the corresponding coefficients and confidence intervals.

Figure D6 illustrates coefficients from regressions on a dummy for above median serfdom intensity × year fixed effects, conditional on province dummies × year fixed effects, distance to Moscow × year fixed effects, and cereal suitability × year fixed effects.

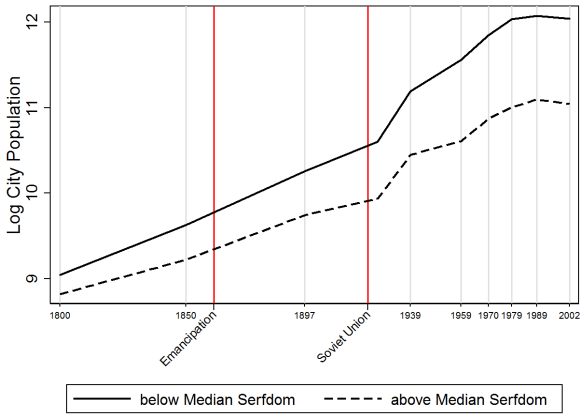
Table D6 reports panel estimation with standard errors clustered at the province.

TABLE D4: PANEL FIXED EFFECTS (1800 - 2002) IN 99 RUSSIAN CITIES

	Log City Population			
	Full		1800-1897	Full
	(1)	(2)	(3)	(4)
Serfs % (1858) × Post Emancipation	-1.588***	-0.041	0.208	0.259
	(0.470)	(0.550)	(0.347)	(0.506)
Serfs % (1858) × Soviet (1922-1991)				-0.398***
				(0.135)
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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE D4: SERFDOM AND CITY POPULATION IN 99 RUSSIAN CITIES (1800-2002)



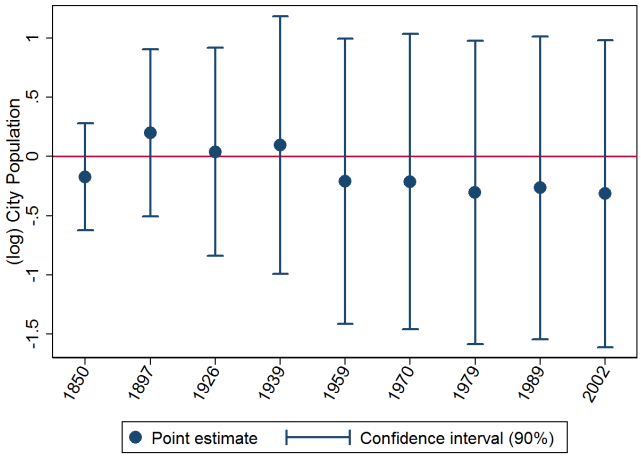
NOTES: This figure plots average city population for cities whose intensity of serfdom is above the median of the distribution (dashed line), and for cities with below median serfdom intensity (solid line). The sample corresponds to Table D4.

TABLE D5: FLEXIBLE ESTIMATION

	Log City Population	
	(1)	(2)
Serfs % (1858) × Year 1850	-0.378*	-0.172
	(0.201)	(0.271)
Serfs % (1858) × Year 1897	-0.720*	0.200
	(0.366)	(0.425)
Serfs % (1858) × Year 1926	-1.378***	0.039
	(0.477)	(0.529)
Serfs % (1858) × Year 1939	-1.517***	0.097
	(0.547)	(0.654)
Serfs % (1858) × Year 1959	-1.995***	-0.208
	(0.610)	(0.726)
Serfs % (1858) × Year 1970	-2.076***	-0.213
	(0.625)	(0.751)
Serfs % (1858) × Year 1979	-2.178***	-0.302
	(0.635)	(0.771)
Serfs % (1858) × Year 1989	-2.155***	-0.265
	(0.637)	(0.770)
Serfs % (1858) × Year 2002	-2.209***	-0.313
	(0.643)	(0.781)
Controls × Year FE		✓
Year FE	✓	✓
City FE	✓	✓
Observations	982	982
R-squared	0.76	0.82
Number of Clusters	99	99

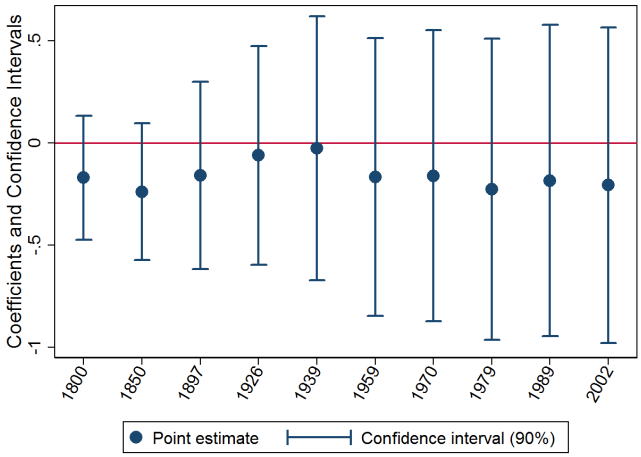
NOTE: The unit of observation is a city-year. Controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow.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

FIGURE D5: ESTIMATED COEFFICIENT FLEXIBLE PANEL ESTIMATION 1800-2002



NOTES: This figure plots the coefficients from regressions of city population on serfdom, conditional on city and year fixed effects, and controls × year fixed effects. The corresponding regression results are reported in Column (7) of Table D4.

FIGURE D6: GAP BETWEEN ABOVE & BELOW MEDIAN SERFDOM AREAS, CONDITIONAL ON PROVINCE × YEAR FE 1800-2002



NOTES: This figure plots the coefficients from regressing (log) city population on a dummy for above median serfdom intensity × year fixed effects, conditional on province dummies × year fixed effects, distance to Moscow × year fixed effects, and cereal suitability × year fixed effects. The sample corresponds to the 99 cities used in Table D4.

TABLE D6: PANEL FIXED EFFECTS WITH STANDARD ERRORS CLUSTERED AT PROVINCE

	Log City Population					
	Full		1800-1897	Full		
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858) × Post Emancipation	-1.588***	-0.041	0.208	0.259		
	(0.469)	(0.684)	(0.385)	(0.637)		
Serfs % (1858) × Soviet (1922-1991)				-0.398***		
				(0.127)		
Serfs % (1858) × Year 1850					-0.378*	-0.172
					(0.210)	(0.262)
Serfs % (1858) × Year 1897					-0.720*	0.200
					(0.386)	(0.457)
Serfs % (1858) × Year 1926					-1.378**	0.039
					(0.514)	(0.602)
Serfs % (1858) × Year 1939					-1.517***	0.097
					(0.536)	(0.787)
Serfs % (1858) × Year 1959					-1.995***	-0.208
					(0.584)	(0.896)
Serfs % (1858) × Year 1970					-2.076***	-0.213
					(0.591)	(0.911)
Serfs % (1858) × Year 1979					-2.178***	-0.302
					(0.605)	(0.934)
Serfs % (1858) × Year 1989					-2.155***	-0.265
					(0.627)	(0.959)
Serfs % (1858) × Year 2002					-2.209***	-0.313
					(0.643)	(0.980)
Controls × Post Emancipation		✓	✓	✓		
Controls × Year FE						✓
Year FE	✓	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓	✓
Observations	982	982	294	982	982	982
R-squared	0.75	0.79	0.75	0.79	0.76	0.82
Number of Clusters	33	33	33	33	33	33

NOTE: The unit of observation is the 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 province in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.3 Panel Estimation in the Period 1800 - 2002: Unbalanced Sample

The main analysis uses a balanced panel of 99 cities for which population was recorded already back in the 19th century. This balanced sample does not take into account the creation of new cities. If new cities were created in different areas then old cities, and as a result exhibit a different growth performance during the 20th century, and if the creation of new cities was systematically (positively or negatively) associated with serfdom, the omission of these cities could create a sample selection bias. To investigate the likelihood of a sample selection bias, we first check whether cities in the baseline balanced sample are significantly different along the observable characteristics compared to cities out of sample. Table D7 documents that sampled cities are on average larger, located in areas with a higher river density, higher agricultural suitability, higher mean temperature, and in closer proximity to Moscow. These differences are not surprising, given the historical process of city formation in favorable areas around the capital of the Russian Empire.

We then test whether the total number of cities that are not included in the sample per district is significantly related to serfdom. To do this, we count the number of "out of sample" cities per district. Column 1 of Table D8 shows the raw correlation between the number of new cities and serfdom, which suggests that the creation of new cities is negatively associated with the intensity of serfdom. Once we condition on the baseline controls (or province fixed effects), however, there is no longer a significant relationship between serfdom and the number of out of sample cities.

As a next step, we look at the growth performance of sample and non-sample cities in Figures D7 and D8. For this we computed average city population (taking out the mean), and average city growth in both samples. The Figures show that the evolution of population is very similar in both samples during the period 1897-2002. The only period when there is a small growth advantage of non-sampled cities is between 1939 and 1959, but otherwise population co-evolves.

Finally, we test whether the effects of serfdom are different when we use a balanced and an unbalanced sample. For this, we estimate flexible models in the balanced and unbalanced sample in Table D9 (i.e. adding cities in the period 1897 - 2002). The estimated coefficients obtained in both samples have the same sign and are very similar in magnitude. Our overall conclusion does not change: there is no catch-up of cities in areas were serfdom was more widespread in the period 1800 - 2002. These persistent differences in city population are also illustrated in Figure D9. Together, these couple of exercises document that the restriction to a balanced sample did not cause a sample selection bias.

TABLE D7: CHARACTERISTICS OF CITIES IN BALANCED AND UNBALANCED SAMPLE

	Mean Population	River Density	Coal Territory	Cereal Suitability	Mean Temp. Apr-Sep	Mean Prec. Apr-Sep	Podzol Soil	Distance to Moscow
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample City	1.209***	0.003***	0.012	0.609***	0.053*	0.836	-0.033	-1.848**
	(0.114)	(0.001)	(0.073)	(0.158)	(0.030)	(1.299)	(0.059)	(0.841)
Observations	683	683	683	683	683	683	683	683
R-squared	0.18	0.02	0.00	0.03	0.01	0.00	0.00	0.02

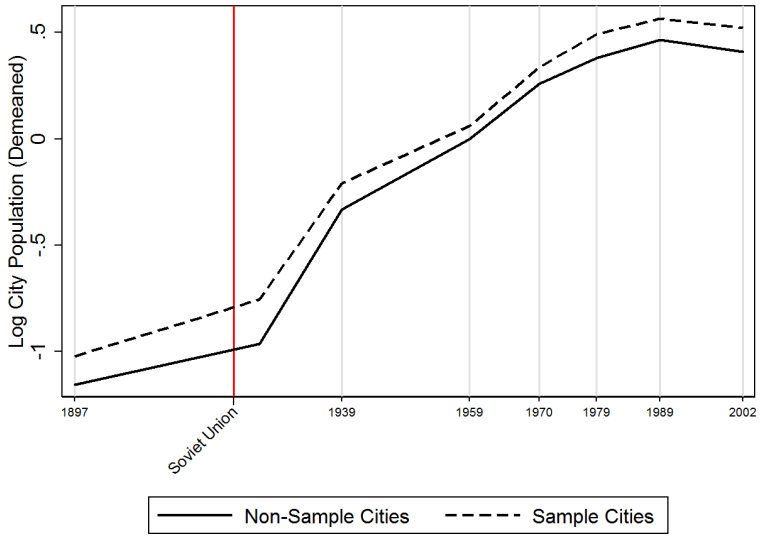
NOTE: The unit of observation is the city. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE D8: RELATIONSHIP BETWEEN "NEW CITIES" AND SERFDOM

	Number of Out of Sample Cities			
	(1)	(2)	(3)	(4)
Serfs % (1858)	-18.074***	5.504	-1.821	2.474
	(6.409)	(10.712)	(7.335)	(7.867)
Linear Controls		✓		✓
Fixed Effects			Province	Province
Observations	282	282	282	282
R-squared	0.04	0.23	0.34	0.42
Number of Clusters	34	34	34	34

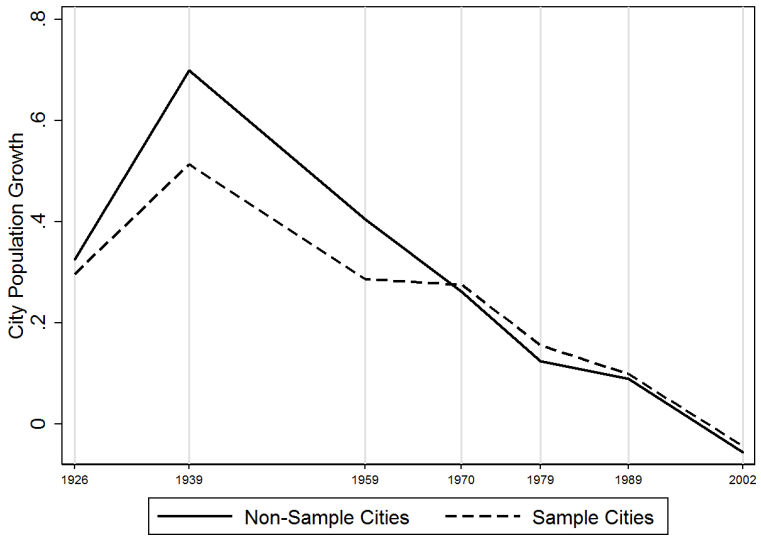
NOTE: The unit of observation is the district. Linear controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow. Heteroskedastic-robust standard errors are in parentheses, clustered at the province. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE D7: AVERAGE CITY POPULATION IN SAMPLE AND NON-SAMPLE CITIES



NOTES: This figure plots average demeaned (log) city population for cities included in the balanced sample (dashed line) and those not included in the balanced sample (solid line).

FIGURE D8: CITY POPULATION GROWTH IN SAMPLE AND NON-SAMPLE CITIES



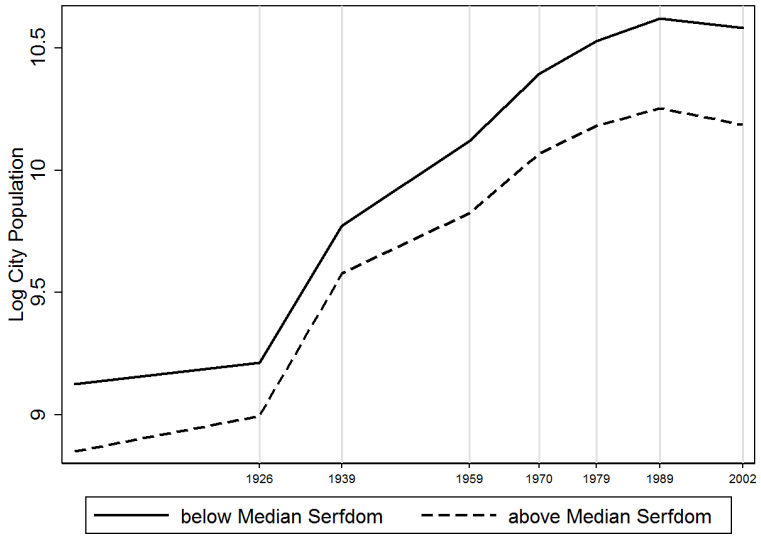
NOTES: This figure plots average city population growth for cities included in the balanced sample (dashed line) and those not included in the balanced sample (solid line).

TABLE D9: PERSISTENCE THROUGH THE SOVIET PERIOD:
PANEL FIXED EFFECTS (1800 - 2002) IN UNBALANCED SAMPLE OF RUSSIAN CITIES

	Log City Population		
	Balanced	Unbalanced	
	(1)	(2)	(3)
Serfs % (1858) × Year 1850	-0.378*	-0.378*	-0.172
	(0.201)	(0.199)	(0.254)
Serfs % (1858) × Year 1897	-0.720*	-1.437***	-0.027
	(0.366)	(0.509)	(0.575)
Serfs % (1858) × Year 1926	-1.378***	-1.359***	0.246
	(0.477)	(0.524)	(0.593)
Serfs % (1858) × Year 1939	-1.517***	-1.605***	0.144
	(0.547)	(0.540)	(0.610)
Serfs % (1858) × Year 1959	-1.995***	-1.842***	0.081
	(0.610)	(0.549)	(0.621)
Serfs % (1858) × Year 1970	-2.076***	-1.921***	-0.155
	(0.625)	(0.548)	(0.624)
Serfs % (1858) × Year 1979	-2.178***	-1.981***	-0.349
	(0.635)	(0.550)	(0.628)
Serfs % (1858) × Year 1989	-2.155***	-2.033***	-0.415
	(0.637)	(0.550)	(0.629)
Serfs % (1858) × Year 2002	-2.209***	-2.081***	-0.514
	(0.643)	(0.551)	(0.631)
Controls × Year FE			✓
Year FE	✓	✓	✓
City FE	✓	✓	✓
Observations	982	5031	5031
R-squared	0.76	0.67	0.71
Number of Clusters	99	683	683

NOTE: The unit of observation is the 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, the distance to the Province capital, and the distance to the closest city in 1600. Standard errors clustered at the city in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE D9: SERFDOM AND CITY POPULATION: UNBALANCED SAMPLE



NOTES: This figure plots average city population growth for cities included in the balanced sample (dashed line) and those not included in the balanced sample (solid line).

D.4 Province-Level Results

Table D10 reports results from panel estimations using data that is aggregated at the province level.

TABLE D10: PERSISTENCE THROUGH THE SOVIET PERIOD: PANEL FIXED EFFECTS (1800 - 2002) ACROSS PROVINCES

	Mean City Size		Total Urban Population	Mean City Size	
	(1)	(2)	(3)	(4)	(5)
Serfs % (1858) × Post Emancipation	-0.148	0.578	-7.922		
	(0.352)	(0.817)	(175.081)		
Serfs % (1858) × Year 1850				-0.701**	-0.822
				(0.326)	(0.815)
Serfs % (1858) × Year 1897				-0.082	0.240
				(0.613)	(1.272)
Serfs % (1858) × Year 1926				0.047	0.773
				(0.477)	(1.273)
Serfs % (1858) × Year 1939				-0.305	0.647
				(0.419)	(1.160)
Serfs % (1858) × Year 1959				-0.574	0.384
				(0.540)	(1.236)
Serfs % (1858) × Year 1970				-0.624	0.176
				(0.519)	(1.114)
Serfs % (1858) × Year 1979				-0.700	-0.111
				(0.498)	(1.034)
Serfs % (1858) × Year 1989				-0.838*	-0.310
				(0.469)	(1.011)
Serfs % (1858) × Year 2002				-0.907*	-0.459
				(0.477)	(1.000)
Controls × Post Emancipation		✓	✓		
Controls × Year FE					✓
Year FE	✓	✓	✓	✓	✓
City FE	✓	✓	✓	✓	✓
Observations	337	337	340	337	337
R-squared	0.68	0.77	0.76	0.69	0.85
Number of Clusters	34	34	34	34	34

NOTE: The unit of observation is the province-year. Controls include latitude and longitude of the province, 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, the (average) distance to the Province capital, and the distance to the closest city in 1600. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E Additional Results: Military Factories

E.1 Firm Location and Firm Growth 1939 - 1989

The corresponding regression results to Figure 3 are reported in Table E1. It reports results from repeated cross-sectional regressions of the total number of military factories on serfdom, conditional on flexible controls and province fixed effects.

Table E2 documents negative effects of serfdom on the number of military firms conditional on linear controls.

Table E3 estimates negative binomial regressions suitable for over-dispersed count variables, such as the number of military firms per district. We similarly find negative effects of serfdom on the number of military firms.

Figure E1 illustrates the evolution of the average number of firms across districts with above and below median serfdom.

Figure E2 contains coefficients from estimating the number of firms on an above/below median serfdom indicator × year fixed effects, conditional on province dummies × year fixed effects, distance to Moscow × year fixed effects, and cereal suitability × year fixed effects.

In Table E4, we investigate the effect of past serfdom on the growth rate of military firms in different sub-periods. The persistent negative difference in the number of firms in places with higher incidence of serfdom - documented in the main text - is also reflected by the insignificant relationship between serfdom and industrial growth. Figure E3 illustrates the associated coefficients and confidence intervals.

TABLE E1: SERFDOM AND THE LOCATION OF SOVIET INDUSTRY

Number of:	Military Firms							Non-Military Firms
	1939	1945	1959	1970	1979	1989		1989
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-9.538**	-10.919*	-11.966*	-14.351**	-14.942**	-14.957**	1.014	-8.380**
	(4.511)	(5.438)	(6.010)	(6.801)	(6.903)	(7.127)	(2.330)	(3.939)
Number of Factories in 1939							1.674***	
							(0.138)	
Flexible Controls	✓	✓	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	278	278	278	278	278	278	278	2656
R-squared	0.22	0.24	0.22	0.22	0.22	0.22	0.92	0.02
Number of Clusters	41	41	41	41	41	41	41	36
δ for $\beta = 0$	1.804	1.276	1.375	1.595	1.639	1.628		14.938
Lower Bound Estimates	-8.642	-8.880	-10.001	-12.434	-12.991	-12.744		-8.904
Conley S.E. 250km								
Serfs % (1858)	[3.986]**	[5.159]**	[5.838]**	[6.577]**	[6.657]**	[6.915]**	[1.951]	[3.574]**

NOTE: The unit of observation is a city. 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. 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 E2: SERFDOM AND INDUSTRY LOCATION IN THE SOVIET PERIOD: LINEAR CONTROLS

Number of:	Military Firms							Non-Military Firms
	1939	1945	1959	1970	1979	1989		1989
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-10.094**	-11.680**	-12.686*	-14.731**	-15.231**	-15.167*	1.646	-7.629*
	(4.747)	(5.711)	(6.393)	(7.158)	(7.274)	(7.551)	(2.188)	(4.084)
Distance Provincial Capital	-2.098	-2.539	-2.994	-3.903	-4.238	-4.350	-0.857	-1.436***
	(1.771)	(1.919)	(2.228)	(2.565)	(2.586)	(2.646)	(0.814)	(0.437)
Distance City in 1600	-6.016	-5.497	-8.854	-13.155	-12.425	-13.975	-3.955	-0.595
	(13.744)	(15.782)	(17.505)	(20.161)	(20.521)	(20.982)	(9.123)	(4.481)
Number of Factories in 1939							1.666***	
							(0.134)	
Linear Controls	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	278	278	278	278	278	278	278	2656
R-squared	0.21	0.23	0.21	0.21	0.21	0.21	0.92	0.02
Number of Clusters	41	41	41	41	41	41	41	36
δ for $\beta = 0$	2.332	1.606	1.738	1.947	1.969	1.892		20.295
Lower Bound Estimates	-9.681	-10.451	-11.432	-13.055	-13.411	-12.934		-7.788
Conley S.E. 250km								
Serfs % (1858)	[4.323]**	[5.541]**	[6.224]**	[6.990]**	[7.116]**	[7.422]**	[1.982]	[3.851]**

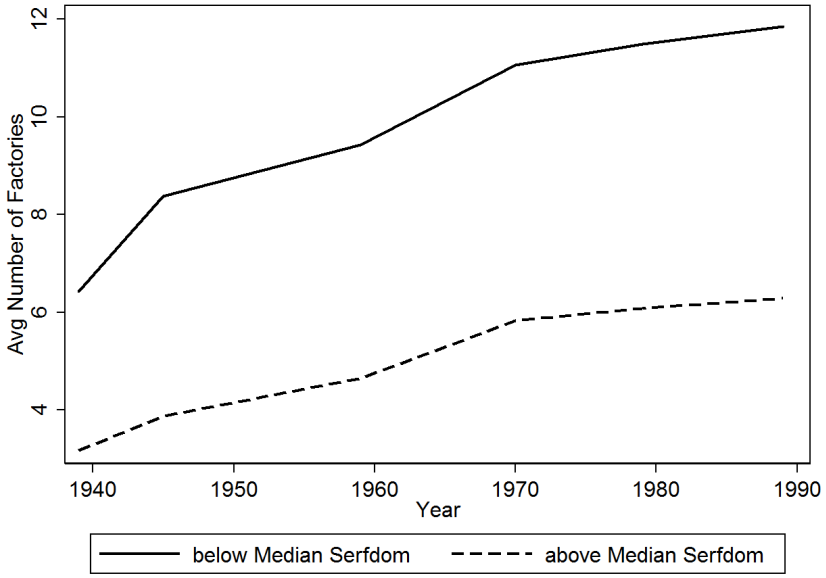
NOTE: The unit of observation is a city. Linear controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow. The restricted model used to compute the Altonji ratios controls for province fixed effects. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE E3: NEGATIVE BINOMIAL REGRESSIONS

Number of Factories in:	1939	1945	1959	1970	1979	1989	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A - Linear Controls							
main							
Serfs % (1858)	-1.600**	-1.632**	-1.477**	-1.395**	-1.366**	-1.245*	-0.180
	(0.669)	(0.725)	(0.730)	(0.668)	(0.655)	(0.655)	(0.330)
Distance Provincial Capital	-0.429**	-0.490***	-0.480***	-0.531***	-0.537***	-0.525***	-0.288***
	(0.179)	(0.176)	(0.158)	(0.160)	(0.154)	(0.149)	(0.097)
Distance City in 1600	-1.301	-0.632	-0.988	-1.116	-1.002	-1.296	-0.445
	(2.245)	(2.294)	(1.946)	(1.968)	(1.911)	(1.875)	(1.420)
Number of Factories in 1939							0.092***
							(0.015)
Linear Controls	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province
Observations	278	278	278	278	278	278	278
Number of Clusters	41	41	41	41	41	41	41
Panel B - Flexible Controls							
main							
Serfs % (1858)	-1.638**	-1.592**	-1.530**	-1.521**	-1.480**	-1.350**	-0.239
	(0.676)	(0.723)	(0.716)	(0.691)	(0.686)	(0.668)	(0.344)
Distance Provincial Capital	-0.400**	-0.487**	-0.474**	-0.511***	-0.516***	-0.516***	-0.261**
	(0.198)	(0.200)	(0.189)	(0.186)	(0.177)	(0.171)	(0.104)
Distance City in 1600	-0.727	0.379	-0.013	-0.568	-0.500	-0.802	-0.634
	(2.272)	(2.355)	(2.160)	(2.160)	(2.073)	(2.001)	(1.491)
Number of Factories in 1939							0.091***
							(0.016)
Flexible Controls	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province
Observations	278	278	278	278	278	278	278
Number of Clusters	41	41	41	41	41	41	41

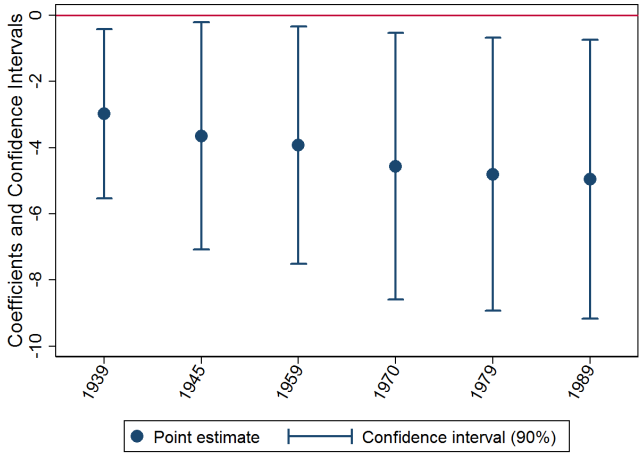
NOTE: The unit of observation is a city. Linear controls include latitude and longitude of the district, the area covered by forest, ruggedness, cereal suitability, growing-season temperature and precipitation, river density, share of podzol soil, the distance to the coast, and the distance to Moscow.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

FIGURE E1: THE PERSISTENCE OF INDUSTRY LOCATION 1939-1989



NOTES: This figure plots the average number of firms 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).

FIGURE E2: GAP BETWEEN ABOVE & BELOW MEDIAN SERFDOM AREAS, CONDITIONAL ON PROVINCE × YEAR FE 1939-1989



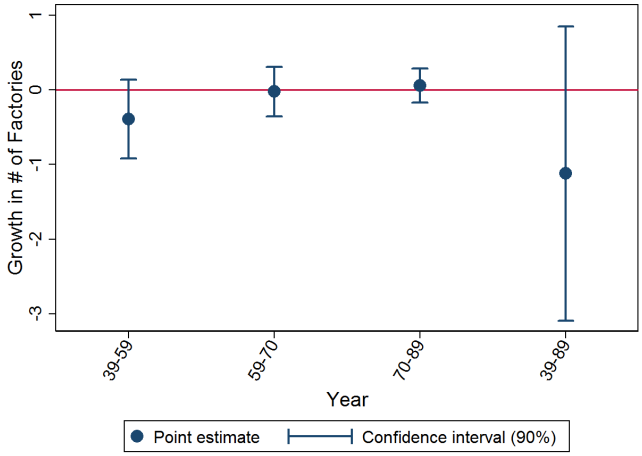
NOTES: This figure plots the coefficients from regressing the number of firms per city-year on a dummy for above median serfdom intensity × year fixed effects, conditional on province dummies × year fixed effects, distance to Moscow × year fixed effects, and average temperature during the growing season × year fixed effects.

TABLE E4: GROWTH OF FACTORIES

Growth of Factories in:	1939-1959	1959-1970	1970-1989	1939-1989
	(1)	(2)	(3)	(4)
Serfs % (1858)	-0.390	-0.022	0.058	-1.121
	(0.313)	(0.196)	(0.135)	(1.171)
Number of Factories in 1939	0.002			-0.010
	(0.004)			(0.014)
Number of Factories in 1959		-0.002		
		(0.002)		
Number of Factories in 1970			-0.001	
			(0.001)	
Distance Provincial Capital	-0.136**	-0.137**	0.005	-0.307
	(0.064)	(0.055)	(0.025)	(0.330)
Distance City in 1600	-0.084	-0.089	-0.242	-7.872
	(1.019)	(0.942)	(0.405)	(7.024)
Flexible Controls	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province
Observations	256	265	267	233
R-squared	0.29	0.31	0.25	0.40
Number of Clusters	41	40	41	40

NOTE: The unit of observation is a city. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE E3: ESTIMATED COEFFICIENTS: GROWTH OF FACTORIES



NOTES: This figure plots the coefficient from regressions of the growth rate of the number of firms per city on serfdom, conditional on province fixed effects and flexible controls.

E.2 Firm Location and Population Growth 1939 - 1989

In Table E6, we study whether localities with higher level of historical serfdom grew faster during the Soviet era if they experienced a larger allocation of military firms early in the period. There is a positive and significant interaction effect between serfdom and the number of factories in 1939, i.e. parts of the negative effect of serfdom on city population growth is mitigated by a larger allocation of firms in 1939.

TABLE E5: SERFDOM, INDUSTRY LOCATION AND URBANIZATION

	Log Population 1989		Population Growth '39-'89		'39-'50	'39-'70
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.573**	-0.678**	-0.054**	-0.064**	-0.025	-0.041**
	(0.232)	(0.273)	(0.024)	(0.027)	(0.015)	(0.018)
Serfs % (1858) × Number of Factories in 1939	0.030***		0.003***		0.002**	0.003***
	(0.010)		(0.001)		(0.001)	(0.001)
Number of Factories in 1939	-0.002		-0.000		-0.000	-0.000
	(0.006)		(0.001)		(0.000)	(0.000)
Serfs % (1858) × Log Number of Factories 1939		0.242*		0.024*		
		(0.126)		(0.012)		
Log Number of Factories 1939		0.132		0.014		
		(0.088)		(0.008)		
(Log) Population 1939	0.971***	0.846***	-0.013*	-0.024***	-0.010***	-0.013**
	(0.062)	(0.077)	(0.006)	(0.008)	(0.004)	(0.005)
Distance Provincial Capital	-0.019	-0.037	-0.002	-0.004	-0.000	-0.001
	(0.057)	(0.060)	(0.006)	(0.006)	(0.004)	(0.005)
Distance City in 1600	0.273	0.545	0.028	0.061	0.014	0.015
	(0.829)	(0.890)	(0.084)	(0.087)	(0.044)	(0.059)
Linear Controls	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province
Observations	278	231	278	231	278	278
R-squared	0.87	0.89	0.33	0.42	0.39	0.36
Number of Clusters	41	40	41	40	41	41

NOTE: The unit of observation is a city. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E.3 Serfdom, WWII, and Industry Location

In Table E6, we investigate whether the intensity of World War II was higher in areas with a higher intensity of serfdom, which could potentially explain the spatial distribution of military firms. We do not find any association between serfdom and (war-related) city population changes between 1939 and 1959, nor with the likelihood that the city was occupied by Germans during WWII. Controlling for these variables, as well as their interaction, we still find a negative and significant effect of serfdom on the number of military firms between 1959 and 1989.

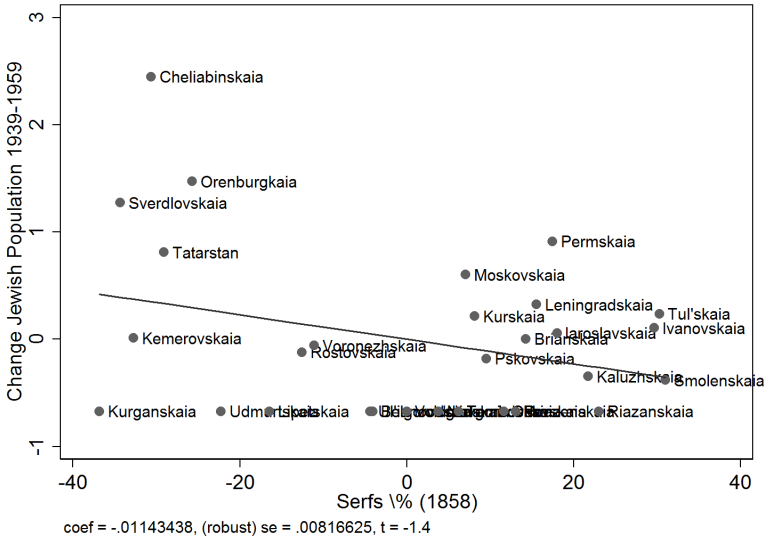
In addition, Figure E4 displays a negative, but weak and insignificant, correlation between the change in the Jewish population in an oblast between 1939 and 1959 and the average intensity of serfdom.

TABLE E6: SERFDOM, INDUSTRY LOCATION AND WWII

	Pop Growth 1939-1959	Nazi Occupation	# Factories 1959	# Factories 1970	# Factories 1979	# Factories 1989
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.202	0.151	-13.198*	-15.224**	-15.708**	-15.640**
	(0.128)	(0.126)	(6.561)	(7.337)	(7.449)	(7.727)
Pop Growth 1939-1959			10.768**	12.099**	12.127**	12.513**
			(4.937)	(5.508)	(5.480)	(5.646)
German Occupation Dummy			8.074*	8.832	8.902	9.154
			(4.471)	(5.559)	(5.712)	(5.899)
Pop Growth 1939-1959 × German Occupation Dummy			-16.100**	-17.465**	-17.044**	-17.366**
			(6.283)	(7.511)	(7.485)	(7.668)
Linear Controls	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province
Observations	322	322	278	278	278	278
R-squared	0.37	0.89	0.23	0.23	0.23	0.23
Number of Clusters	41	41	41	41	41	41

NOTE: The unit of observation is a city. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

FIGURE E4: SERFDOM AND CHANGE IN JEWISH POPULATION 1939-1959 ACROSS OBLASTS



NOTES: This figure plots the relationship between the change in the Jewish population during 1939 and 1959 per oblast and average serfdom.

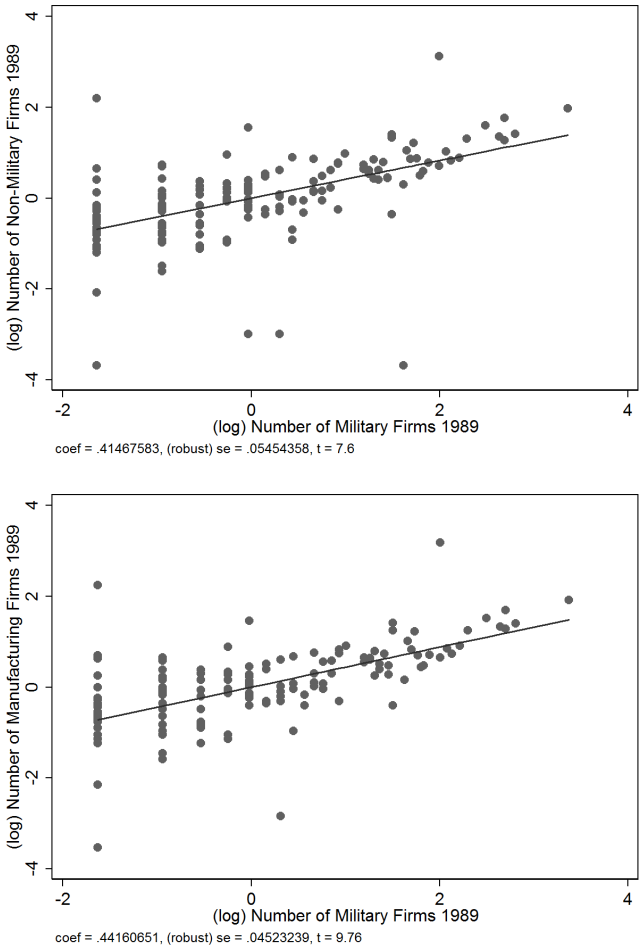
F Additional Results: Firms in 1989

Table 6 relates historical serfdom to characteristics of firms (located in historical districts) in 1989 as derived from the Soviet Census of Manufacturing. This is discussed in the main text and utilizes our standard set of district-level controls. .

Figure F1 shows the correlations between the number of military establishments per district in 1989, and the number of non-military firms in the same year aggregated to the district.

Table F1 replicates the firm-level analysis of Table 6 conditional on linear controls.

FIGURE F1: MILITARY AND NON-MILITARY FIRMS 1989



NOTES: These Figure plots the relationship between a) the (log) number of all non-military firms per district in 1989 against the (log) number of military firms per district in the same year, and b) the (log) number of manufacturing firms per district in 1989 against the (log) number of military firms per district in the same year.

TABLE F1: FIRM-LEVEL ANALYSIS 1989: LINEAR CONTROLS

	Agriculture	Manufacturing	(log) Employment	(log) Turnover	(log) Turnover per Worker
	(1)	(2)	(3)	(4)	(5)
Serfs % (1858)	0.032	-0.044**	-0.245**	-0.325***	-0.080**
	(0.020)	(0.017)	(0.090)	(0.110)	(0.032)
Linear Controls	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓
SIC Fixed Effects			✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province
Observations	14154	14154	14055	13933	13923
R-squared	0.03	0.02	0.57	0.63	0.77
Number of Clusters	36	36	36	36	36
δ for $\beta = 0$	1.617	1.122	2.255	5.588	-1.903
Lower Bound Estimates	0.025	-0.032	-0.180	-0.304	-0.119
Conley S.E. 300km					
Serfs % (1858)	[0.015]**	[0.020]**	[0.093]***	[0.113]***	[0.037]**

NOTE: The unit of observation is a firm. 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. 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 δ and the lower bound estimates controls for province fixed effects. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

G Additional Results: District-Level Outcomes and Mechanisms

G.1 Structural Change and Urbanization

Table G1 documents negative effects of serfdom on indicators of structural change and urbanization conditional on linear controls.

TABLE G1: STRUCTURAL CHANGE AND URBANIZATION: LINEAR CONTROLS

	Pre-Soviet				**Soviet**		**Post-Soviet**	
	Urbanization Rate		Factories	Log Production			Log Population	Log Light
	1863	1913	per 1,000 ppl, 1868	per Worker, 1868	Road Density	Gulag	Density, 2000	Density, 2008
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-15.634***	-15.808***	-47.209	-0.583*	-0.008***	-0.293**	-0.962***	-0.820***
	(5.014)	(5.463)	(32.863)	(0.296)	(0.003)	(0.127)	(0.320)	(0.281)
Flexible Controls	✓	✓	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	483	490	483	434	490	490	490	490
R-squared	0.38	0.37	0.32	0.29	0.51	0.37	0.61	0.54
Number of Clusters	50	50	50	50	50	50	50	50
δ for $\beta = 0$	6.941	5.577	1.925	2.497	124.234	1.804	14.520	77.935
Lower Bound Estimates	-14.955	-14.368	-36.777	-0.465	-0.010	-0.203	-1.014	-0.905
Conley S.E. 300km								
Serfs % (1858)	[4.922]***	[5.049]***	[31.971]	[0.218]***	[0.003]***	[0.144]**	[0.302]***	[0.234]***

NOTE: The unit of observation is a district. 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. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

G.2 Employment by Sectors 1897

Table G2 documents effects of serfdom on employment shares in primary and secondary sectors, and indicators of structural change, as well as hetereogeneity by type of serfdom, conditional on linear controls.

Besides primary and secondary employment, Table G3 tests for effects of serfdom on employment in other sectors. The results suggest that employment in service, education, and commercial opportunities was significantly reduced in areas were serfdom was more widespread.

TABLE G2: EMPLOYMENT AND HETEROGENEITY IN STRUCTURAL CHANGE BY TYPE OF SERFDOM: LINEAR CONTROLS

	Primary Empl. 1897		Secondary Empl. 1897		Industry Empl. 1897		Log Light Density, 2008	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	0.064		0.003		-0.012		-0.820***	
	(0.042)		(0.023)		(0.022)		(0.281)	
Corvée % (1858)		0.033**		-0.014		-0.014*		-0.273***
		(0.014)		(0.009)		(0.007)		(0.082)
Quit-Rent % (1858)		-0.019		0.029***		0.021**		0.031
		(0.011)		(0.009)		(0.009)		(0.080)
Household Serfs % (1858)		0.005		-0.007		-0.008*		-0.113
		(0.010)		(0.005)		(0.004)		(0.087)
H0: Corvée = Quit-Rent (*p-value*)		0.00		0.00		0.01		0.00
Linear Controls	✓	✓	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital		✓		✓		✓		✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	490	468	490	468	490	468	490	468
R-squared	0.48	0.51	0.56	0.61	0.53	0.57	0.54	0.57
Number of Clusters	50	49	50	49	50	49	50	49

NOTE: The unit of observation is a district. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE G3: DIFFERENCES IN OTHER SECTORS

	Service		Education & Research		Commerce	
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	-0.006***	-0.005***	-0.003**	-0.003**	-0.017***	-0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)
Distance City in 1600	-0.006*	-0.006*	-0.002	-0.001	-0.004	0.000
	(0.004)	(0.003)	(0.002)	(0.002)	(0.014)	(0.014)
Distance Provincial Capital	-0.003***	-0.003***	-0.001***	-0.001***	-0.006***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Linear Controls	✓		✓		✓	
Flexible Controls		✓		✓		✓
Fixed Effects	Province	Province	Province	Province	Province	Province
Observations	490	490	490	490	490	490
R-squared	0.40	0.44	0.49	0.51	0.58	0.59
Number of Clusters	50	50	50	50	50	50
δ for $\beta = 0$	7.656	5.555	5.951	4.180	2.398	2.552
Lower Bound Estimates	-0.005	-0.005	-0.002	-0.002	-0.014	-0.016
Conley S.E. 300km						
Serfs % (1858)	[0.001]***	[0.001]***	[0.001]***	[0.001]***	[0.005]***	[0.005]***

NOTE: The unit of observation is a district. 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 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. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

G.3 Heterogeneous Effects on Additional Indicators of Structural Change

Table G4 reports heterogeneous effects by different types of serfdom on additional indicators of structural change. Areas with a higher share of corvée serfs had lower levels of urbanization in 1913, less factories in 1868, and a lower population density in 2000. The differences are only significant in comparison to the combined share of quit-rent and household serfs. While corvée areas also have lower road densities and a reduced likelihood of having a gulag labor camp, these coefficients are not significantly different from each other.

TABLE G4: HETEROGENEOUS EFFECTS ON STRUCTURAL CHANGE

	Urbanization Rate 1913	Factories per 1,000 ppl, 1868	Log Production per Worker, 1868	Road Density	Gulag	Log Pop. Density 2000
	(1)	(2)	(3)	(4)	(5)	(6)
Corvée % (1858)	-3.563***	-10.748	-0.144	-0.002*	-0.064**	-0.246***
	(1.135)	(6.647)	(0.098)	(0.001)	(0.027)	(0.086)
Quit-Rent % (1858)	-2.039	-6.583	-0.061	-0.001	-0.040	-0.098
	(1.339)	(8.075)	(0.089)	(0.001)	(0.031)	(0.076)
Household Serfs % (1858)	-1.459	-7.260	-0.091	-0.001	-0.008	-0.096
	(0.988)	(5.060)	(0.073)	(0.001)	(0.025)	(0.061)
H0: Corvée = Quit-Rent (*p-value*)	0.27	0.52	0.51	0.61	0.39	0.14
H0: Corvée = Quit-Rent + Household (*p-value*)	0.04	0.08	0.20	0.29	0.42	0.03
Flexible Controls	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province
Observations	468	466	421	468	468	468
R-squared	0.42	0.36	0.34	0.50	0.39	0.65
Number of Clusters	49	49	49	49	49	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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

G.4 Light Density in Different Periods

Table G5 documents that the negative effect of past serfdom on log light density in the contemporary era is not limited to the year 2008 that we use in the main text. We find negative effects for all years from 1990 to 2012, and present here a selection of years (1994, 1999, 2005, 2008, 2012). In addition, the odd columns of Table G5 report that the results are robust even to conditioning on past population density measured in 1858.

TABLE G5: SERFDOM AND LIGHT DENSITY IN DIFFERENT PERIODS

Log Light Density in	1994		1999		2005		2008		2012	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Serfs % (1858)	-0.580**	-0.416*	-0.664**	-0.470**	-0.713**	-0.507*	-0.820***	-0.614**	-0.667**	-0.476*
	(0.247)	(0.232)	(0.260)	(0.234)	(0.319)	(0.291)	(0.295)	(0.268)	(0.283)	(0.266)
Distance City in 1600	-0.721	-0.771	-0.866	-0.943	-1.160	-1.202	-1.221*	-1.234*	-1.028	-1.048
	(0.539)	(0.533)	(0.611)	(0.640)	(0.706)	(0.729)	(0.698)	(0.724)	(0.714)	(0.741)
Distance Provincial Capital	-0.308***	-0.234***	-0.349***	-0.278***	-0.328***	-0.250***	-0.313***	-0.233***	-0.310***	-0.233***
	(0.051)	(0.049)	(0.058)	(0.053)	(0.062)	(0.055)	(0.061)	(0.055)	(0.063)	(0.057)
(ln) Pop Density 1858		0.627***		0.662***		0.704***		0.702***		0.650***
		(0.080)		(0.094)		(0.105)		(0.103)		(0.103)
Flexible Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province	Province	Province
Observations	490	478	490	478	490	478	490	478	490	478
R-squared	0.65	0.70	0.64	0.69	0.58	0.64	0.57	0.63	0.60	0.65
Number of Clusters	50	50	50	50	50	50	50	50	50	50
δ for $\beta = 0$	-10.725	2.420	25.256	1.650	24.167	2.035	17.248	2.332	14.861	1.947
Lower Bound Estimates	-0.719	-0.327	-0.754	-0.296	-0.783	-0.356	-0.888	-0.462	-0.713	-0.324
Conley S.E. 300km										
Serfs % (1858)	[0.283]**	[0.247]*	[0.275]**	[0.222]**	[0.325]**	[0.270]*	[0.303]***	[0.248]**	[0.285]**	[0.239]**

NOTE: The unit of observation is a district. 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. 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

H Additional Results: Human Capital

Table H1 documents negative effects of serfdom on educational outcomes prior to emancipation and today, as discussed in the main text.

Table H2 documents the absence of an association between serfdom and educational outcomes in the late Imperial period.

TABLE H1: HUMAN CAPITAL

	Historical		**Modern (2006-2016)**					
	Schools per 1'000 ppl		Respondent Education:			Parents Education:		Government
	1856	1911	Highest	Post Secondary	Tertiary	Years	Tertiary	Priority?
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Serfs % (1858)	-0.042**	0.169	-0.410**	-0.171*	-0.238***	-2.810***	-0.264**	-0.121
	(0.016)	(0.218)	(0.193)	(0.091)	(0.071)	(0.814)	(0.118)	(0.085)
Household Controls			✓	✓	✓	✓	✓	✓
Flexible Controls	✓	✓	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province	Province	Province
Observations	486	486	19350	19350	19350	4285	13316	21400
R-squared	0.60	0.59	0.20	0.14	0.09	0.43	0.16	0.07
Number of Clusters	50	50	45	45	45	40	44	45
δ for $\beta = 0$	6.094	-0.660	2.255	3.135	3.135	3.696	1.892	-21.252
Lower Bound Estimates	-0.046	0.515	-0.336	-0.159	-0.220	-2.937	-0.210	-0.125
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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

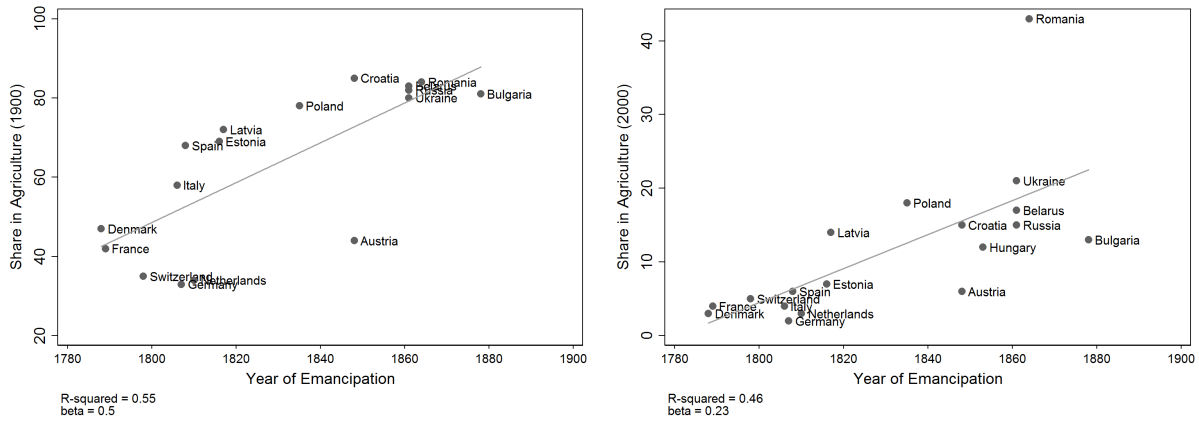
TABLE H2: SERFDOM AND EDUCATION IN THE LATE IMPERIAL PERIOD

	(log) Enrollment 1880	(log) Rural Enrollment 1894	Schools per 1'000 1894	Literacy 1897	Female Literacy 1897	Male Literacy 1897
	(1)	(2)	(3)	(4)	(5)	(6)
Serfs % (1858)	0.047	-0.008	0.017	-0.350	-2.919	2.219
	(0.157)	(0.116)	(0.049)	(2.899)	(3.209)	(3.614)
Flexible Controls	✓	✓	✓	✓	✓	✓
Distances: City & Prov. Capital	✓	✓	✓	✓	✓	✓
Fixed Effects	Province	Province	Province	Province	Province	Province
Observations	489	490	490	490	490	490
R-squared	0.65	0.71	0.77	0.90	0.92	0.84
Number of Clusters	50	50	50	50	50	50

NOTE: The unit of observation is a district. 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. Standard errors clustered at the province in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

I Additional Results: Country-Level

FIGURE I1: PEASANT EMANCIPATION AND SHARE OF LABOR IN AGRICULTURE



NOTES: This figure plots the share of labor in agriculture in 1900 and 2000 against the year of peasant emancipation in European countries. See Supplementary Appendix for data description.

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