The Economic Effects of the Abolition of Serfdom: Evidence from the Russian Empire

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Motivation

- The effect of slavery and serfdom on economic efficiency and growth has been a subject of a long-lasting debate

  - Many scholars view both slavery and serfdom as inefficient production systems with distorted incentives and suboptimal resource allocation
    - Cairnes 1862, Williams 1944, North and Thomas 1973, Anderson and Gallman 1977, Acemoglu and Robinson 2012, Ogilvie 2013

  - However, there is no clear theoretical argument why slave and landowners failed to provide efficient incentives to their workers

- Empirical examples of efficient slave systems abound:
  - The abolition of slavery in the US saw a decline in output per person in the South and the stagnation of the southern economy
  - Slave labor in the US in 1850 was more efficient at producing cotton than free labor in India, China, and Egypt
  - Haiti in the 18th century was rich with 90% of labor comprised of slaves, but free Haiti did not retain that prosperity
    - the causal interpretation of some of these examples is contested, however (Fogel 1989 vs. Omstead and Rhode 2008 and 2010)

- Russia has been taken by many observers as an example that property in people was not a crucial determining factor of backwardness
  - Russia remained a backward agrarian society right up to the Russian Revolution despite the abolition of serfdom one half a century before (Gerschenrkon 1965)
  - Little systematic evidence existed on this, however, before our paper

Research question

- What are the economic effects of the abolition of serfdom?
  - Agricultural productivity
  - Living standards of peasants
  - Industrial development

Serfdom in Russia

- One of the key institutions in Russian history: 1649 to 1861, i.e., 212 years

- Full usage and transfer ownership rights of landlords over their serfs
  - Property of their estates which belonged to landlords
  - Obligation to fulfil landlord's orders
    - The amount and types of obligations were at almost full discretion of the landlord

The emancipation of serfs

1861: Personal freedom was granted to serfs

- Free of charge and instantaneously

- Landlords lost the right to sell, buy, lease, punish, or imprison peasants and to change the level of peasant obligations

  - Former serfs became agricultural entrepreneurs

    - full owners of their labor and human capital with civil rights

    - with fixed land lease obligations to landlords before the land reform took place

Macro dynamics

Agricultural productivity and the 1861 emancipation reform
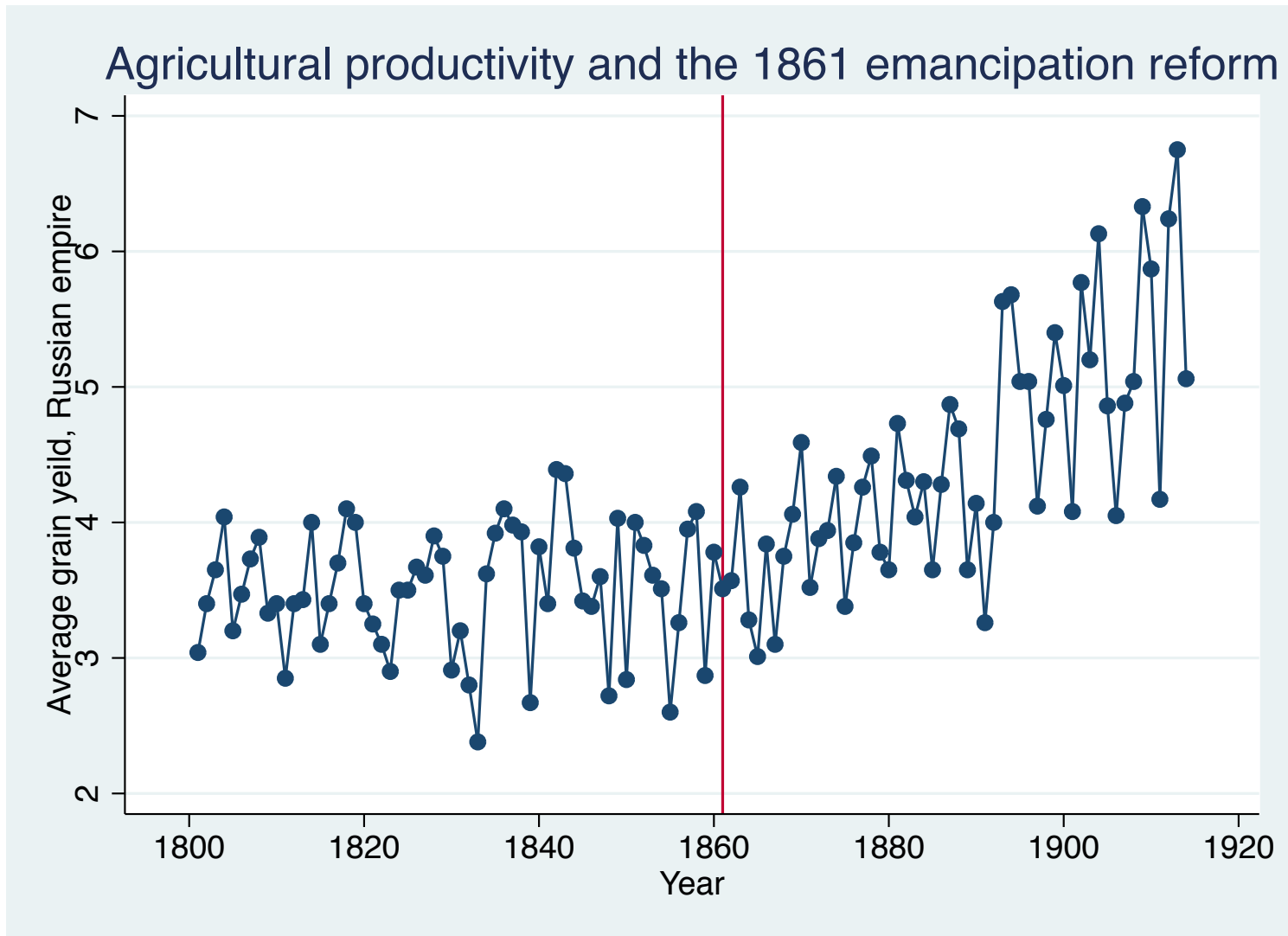
Did contemporaries notice anything?

1. Intellectuals were unhappy about the reform
   - E.g., Lev Tolstoy – however, they might have had wrong expectations

2. Technocrats noticed major improvements
   - From the report of royal commission of agriculture, 1873:

   "The situation of peasants recently has improved considerably because, having received their plots, peasants try to improve the land as much as possible, fertilize it and take care of it, so the land produces more than ever before." (p.28)

In this paper

We exploit geographic variation in the prevalence of serfdom in Imperial Russia and overtime variation in emancipation of serfs in a diff-in-diff panel setting:

- Document very large and immediate increases in agricultural productivity, industrial development, and peasants' living standards as a result of the abolition of serfdom

- We also disentangle the 2 components of the reform: emancipation vs. land reform
  – the positive effects are entirely due to emancipation

- Explore the mechanism
  – Peasants' incentives

Preview of the results

- Our estimates imply that the emancipation led to an increase in total value added of at least 12% across three sectors (our preferred estimate is 29%)
  - 15.5% increase in grain yield in an average province that is comparable to 37 years of aggregate development
  - 48% increase in industrial production
- A counterfactual scenario: Russia would have been 40-60% richer by 1913 had it abolished serfdom 40 years earlier as was considered by Alexander I
- Living standards: the height of draftees was 1.35 centimeters higher for cohorts born after the emancipation compared to cohorts born before
  - comparable to the increase in height of males per decade in the 19th century Western Europe (Hatton and Bray 2010)

Related Literature

1. Institutions and economic development
   – Acemoglu and Johnson 2005, Banerjee and Iyer 2005, Nunn 2009, Acemoglu et al. 2010, Tabellini 2010, Bruhn and Gallego 2012, Michalopoulos and Papaioannou, Ogilvie 2013, 2014

2. Efficiency of forced labor and its effects on economic development
   – Acemoglu et al. 2012, Nunn 2008, Miller 2009, Dell 2010, Nunn and Wantchekon 2011 and Bertocchi and Dimicio 2014

3. Debate on the efficiency of serfdom in the Russian Empire
   1. Gerschenkron (1962, 1965), Koval'chenko (1967)
   2. Moon (1996), Mironov (2010), Dennison (2006, 2011) and Stanziani (2014a and 2014b)

Hypotheses (1)

- The effect of the abolition of serfdom on economic development and living standards is *a priori* ambiguous:

1. Agriculture:
   - The abolition of serfdom could lead to better incentives for former serfs provided that landlords did not credibly commit not to revise peasants' obligations under serfdom
     - Anecdotal evidence: some landlords were able to commit, however, this was not a common practice (Dennison 2011)
     - The emancipation instantaneously solved the ratchet effect problem by fixing the level of quitrent for all former serfs
   - Serfdom could have had efficiency advantages over post-emancipation production due to economies of scale, better access to finance, and better access to new technologies for landlords

Hypotheses (2)

2. Nutrition:
   - Serfs were a valuable input into production for gentry => incentives to feed them well
   - However, the asymmetry of information may have led to malnutrition of serfs in equilibrium, as gentry were concerned that peasants were hiding the proceeds of their production
   - In addition, peasants may have had lower incentives to feed children under serfdom, as peasants' children belonged to the gentry

3. Industrial development:
   - The ratchet effect problem also applied to artisan (industrial) activities of serfs as these activities were also subject to ratchet effect
   - Restrictions on migration were lifted, but only partially due to communes

Data: outcomes

Province-level panel of the 19th century European Russia:

– Agricultural productivity by province x year

  - yield-to-seed ratio of main crops (rye, oat, wheat, barley, buckwheat)
  - 41 snapshots over time

– Industrial output (in 1895 rubles) by province x year

  - 8 snapshots over time

– Living standards: Height of draftees

  - by province x birth cohort (nutrition)

    – 15 snapshots over time

  - by district x birth cohort (nutrition)

    – 10 snapshots over time

– 46 provinces and 467 districts

Data: sources

- The dataset is comprised from various published and archival sources

- Outcome variables:
  - governor reports for the years before 1883
  - official statistics for the later years

- The distribution of rural population by status: 1858 police data (Bushen 1863)
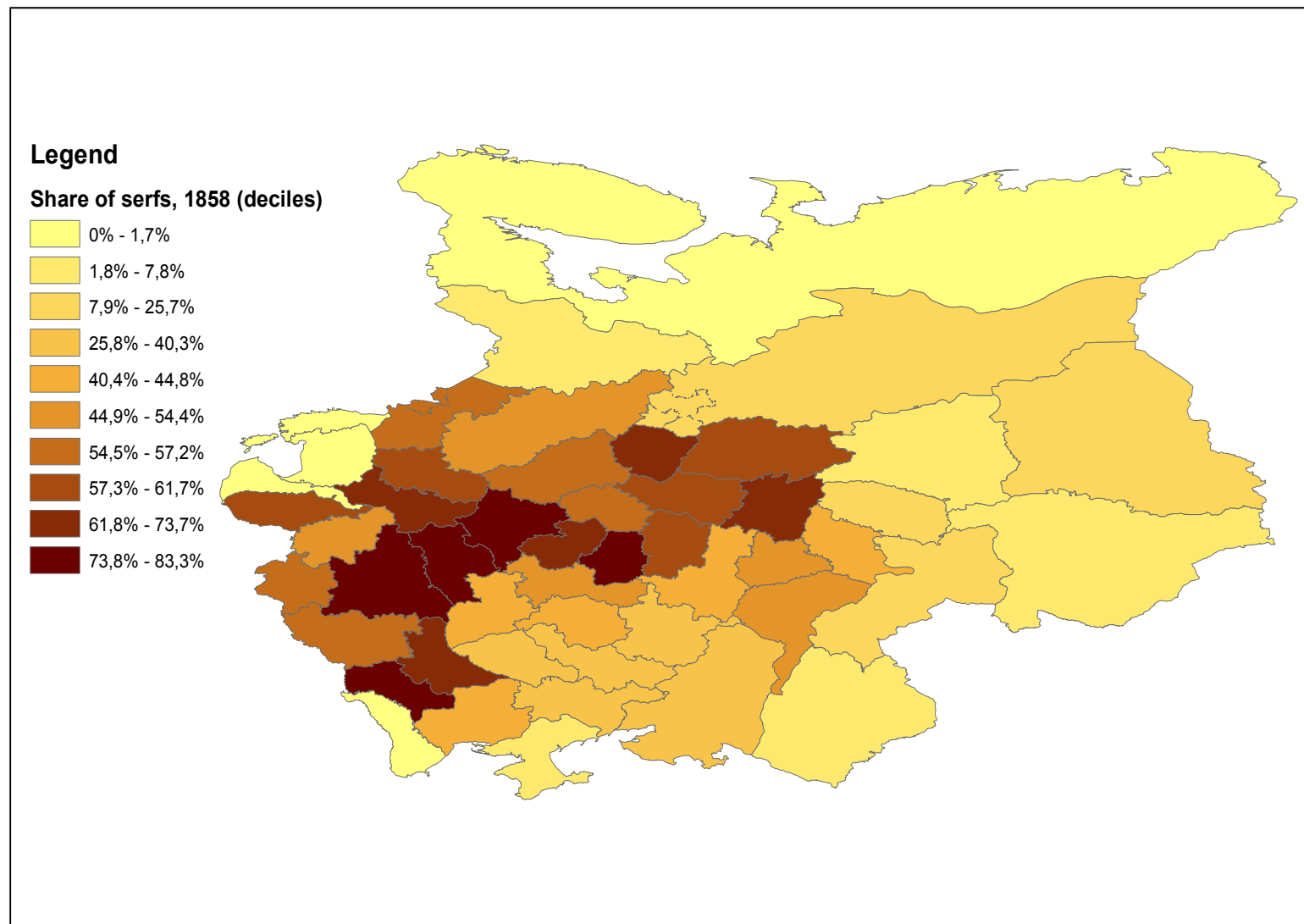
- The land reform progress: Vilson (1878)

European provinces of the Russian Empire

Types of peasants in European Russia

- **Serfs**: 43% of rural population in 1858
  - The landlords had (almost) full discretion over the amount and the form of obligations of their serfs: they could sell, buy, lease serfs
  - 0.1% in Arkhangelsk province to 83% in Mogilev province

- **State peasants**: 40.4% in 1858
  - Formally free landless individuals living and working on the land belonging to the state
  - Fixed by law land-lease payments to the state (in a form of quit rent)

- **Free population**: 12.6% in 1858 (with or without land titles)
  - Cossacks, Colonists, local non-Russians

- **Royal peasants**: 4% in 1858
  - With a fixed quit rent, managed by the special ministry

Geography of Serfdom: Serfs in 1858 as a Share of Rural Population

Legend

Share of serfs, 1858 (deciles)

- 0% - 1,7%
- 1,8% - 7,8%
- 7,9% - 25,7%
- 25,8% - 40,3%
- 40,4% - 44,8%
- 44,9% - 54,4%
- 54,5% - 57,2%
- 57,3% - 61,7%
- 61,8% - 73,7%
- 73,8% - 83,3%

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Need to control for distance to Moscow and land quality
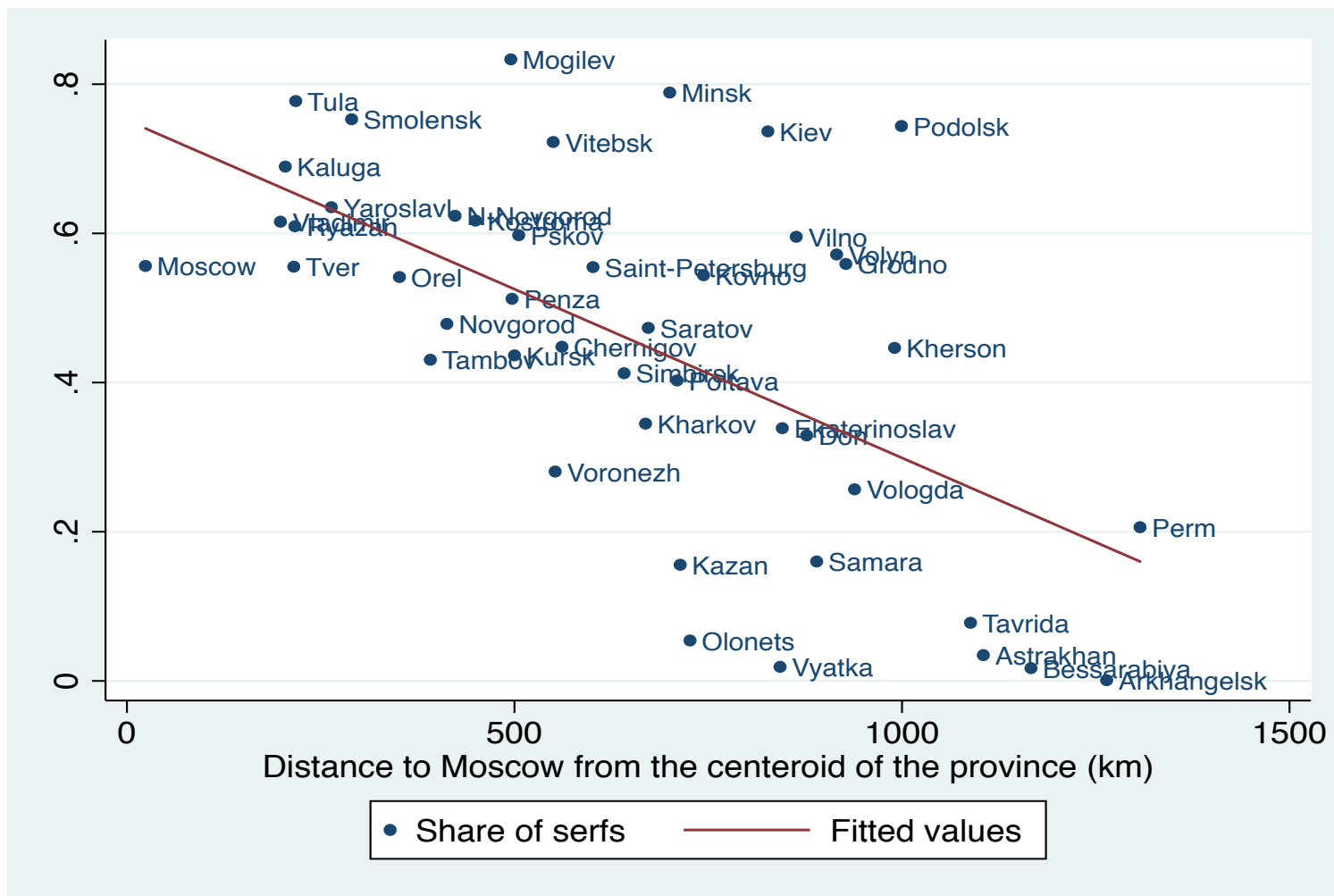
Coef: -0.0005; SE=0.00009; R^2 =0.36.

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Main specification: diff-in-diff

$$Y_{it} = \alpha \, ShareSerfs_i \times PostEmancipation_t + \mathbf{X_{it}}'\gamma + \psi_i + \sigma_t + t\delta_i + \varepsilon_{it}$$

- i – province; t – time period (year or decade); Y – outcome
- *ShareSerfs* – share of serfs in 1858
- *PostEmacipation* – 1 for post 1861 years and 0 otherwise
- ψ_i and σ_t – province and year fixed effects
- $t\delta$ – province-specific linear trends
- X – land quality and distance to Moscow X *PostEmancipation*
- Cluster error terms within each province separately before and after the emancipation of 1861

- Similar analysis with district-level panel data with district and year fixed effects and province-specific liner trends

The effect of the abolition of serfdom on agricultural productivity (OLS)

	Grain productivity		
Share of serfs X Post-emancipation	0.86***	0.80***	1.06***
	[0.233]	[0.289]	[0.302]
Demeaned log distance to Moscow X Post-emancipation		-1.02**	-0.95**
		[0.443]	[0.439]
Demeaned crop suitability X Post-emancipation		0.044	0.035
		[0.046]	[0.044]
Share of state peasants X Post-1866, Share of royal peasants X Post-1859	NO	NO	YES
Province-specific trends	NO	YES	YES
Province and Time fixed effects	YES	YES	YES
Observations	1,777	1,756	1,756
R-squared	0.361	0.398	0.399

Pre-trends? The timing of the effect

Grain productivity
(relative to years 1795-1829)
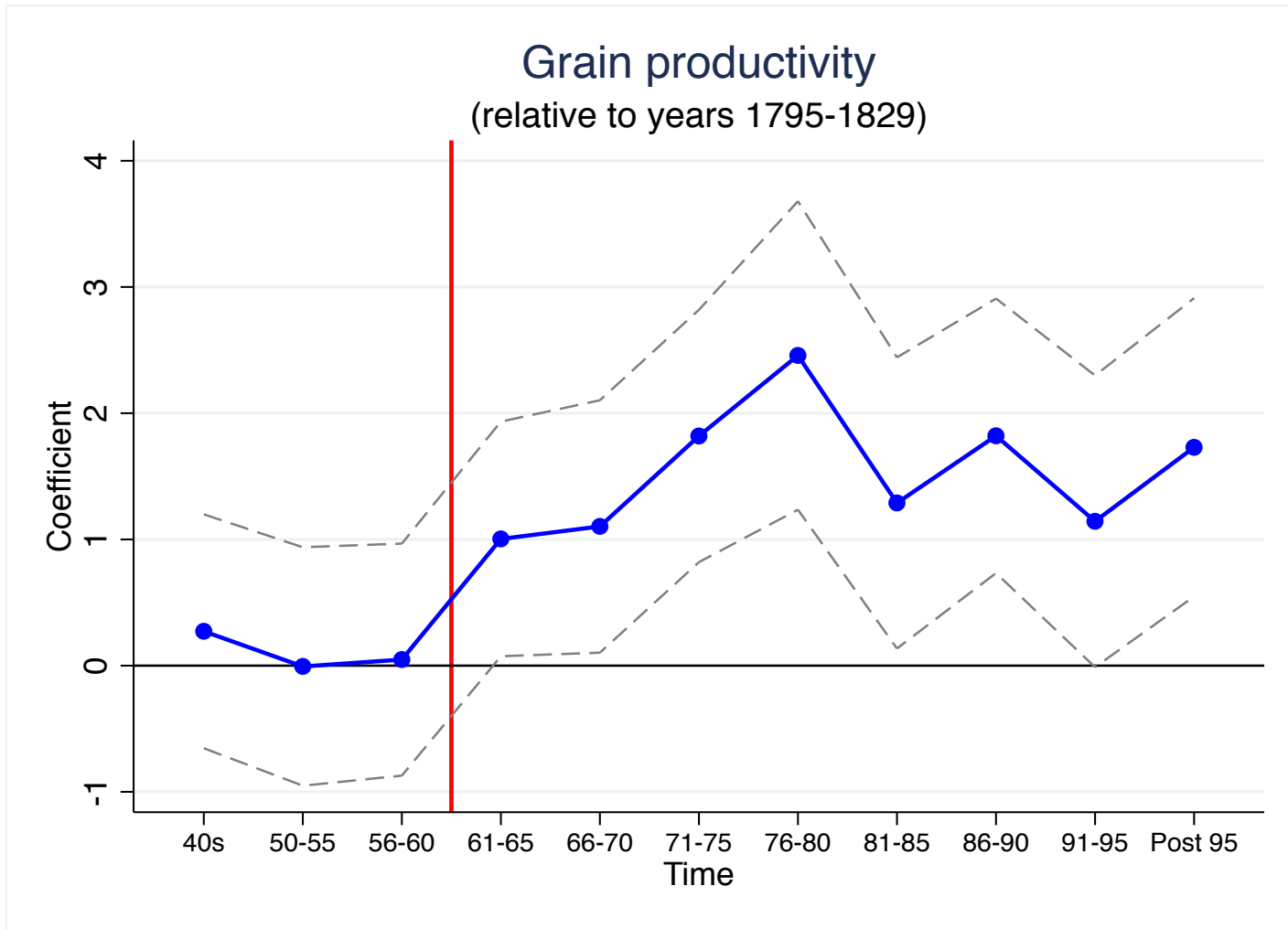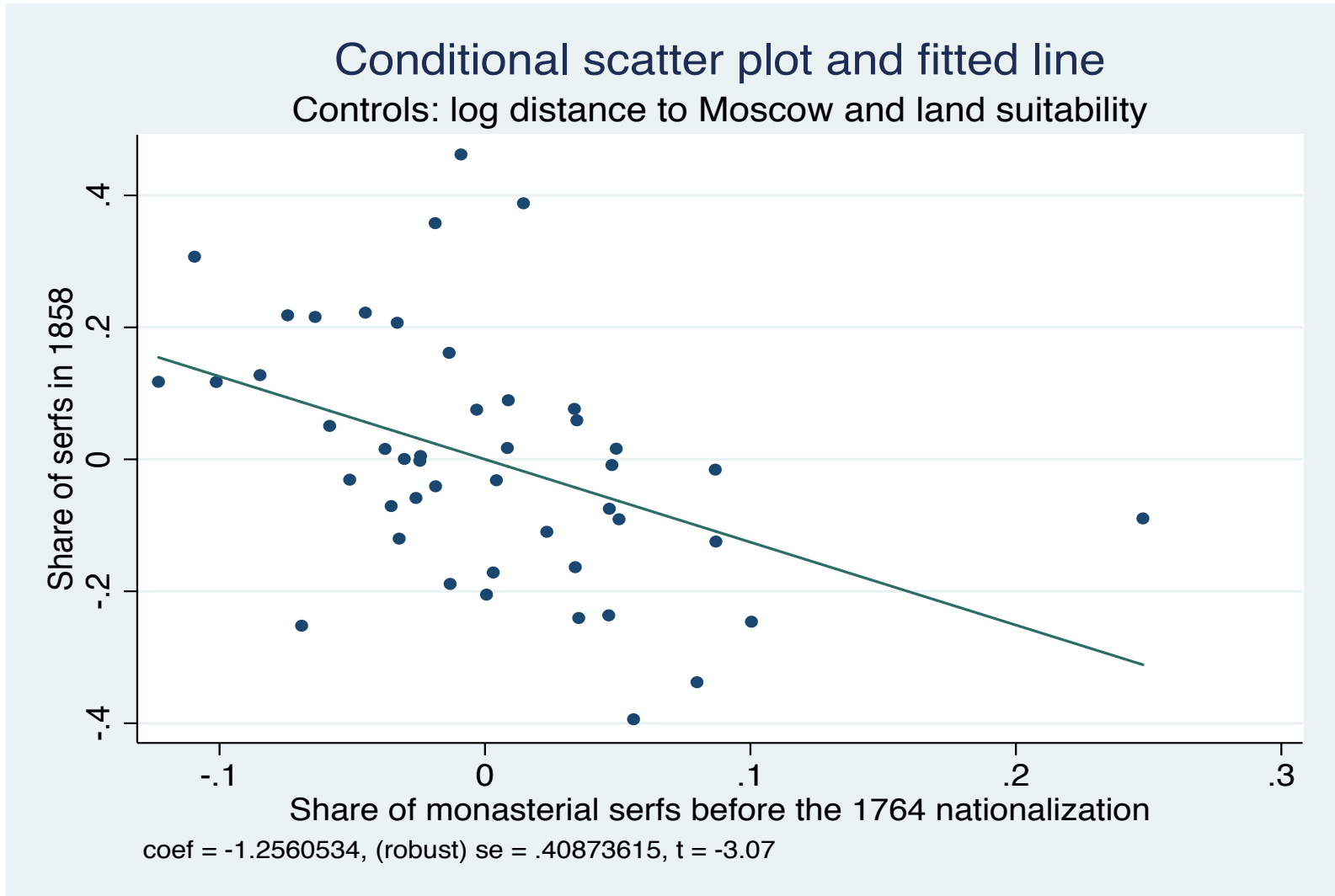
1764 Nationalization of monasterial lands and the prevalence of serfdom

- Remaining challenges to identification are:
  - Measurement error => possible
  - Other unrelated to serfdom factors that change trends in 1861 in provinces with large number of serfs => unlikely, but not impossible, due to defeat in Crimean war
  - Spatial correlation

- There were no private serfs in formerly monasterial lands after Catherine the Great nationalized them in 1764:
  - as these lands were not granted to nobles to avoid conflict with the church

- Use the share of monasterial serfs prior nationalization as a source of exogenous variation in the share of serfs in 1858
  - Similar to Buggle and Nafziger (2015), but under a weaker identification assumption of panel setting

Former monasterial serfs and the prevalence of serfdom in 1858: province-level

Conditional scatter plot and fitted line
Controls: log distance to Moscow and land suitability

coef = -1.2560534, (robust) se = .40873615, t = -3.07

Former monasterial serfs and the prevalence of serfdom in 1858: district-level

Scatter plot conditional on log distance to Moscow
Full sample

coef = -.55964074, (robust) se = .07319432, t = -7.65
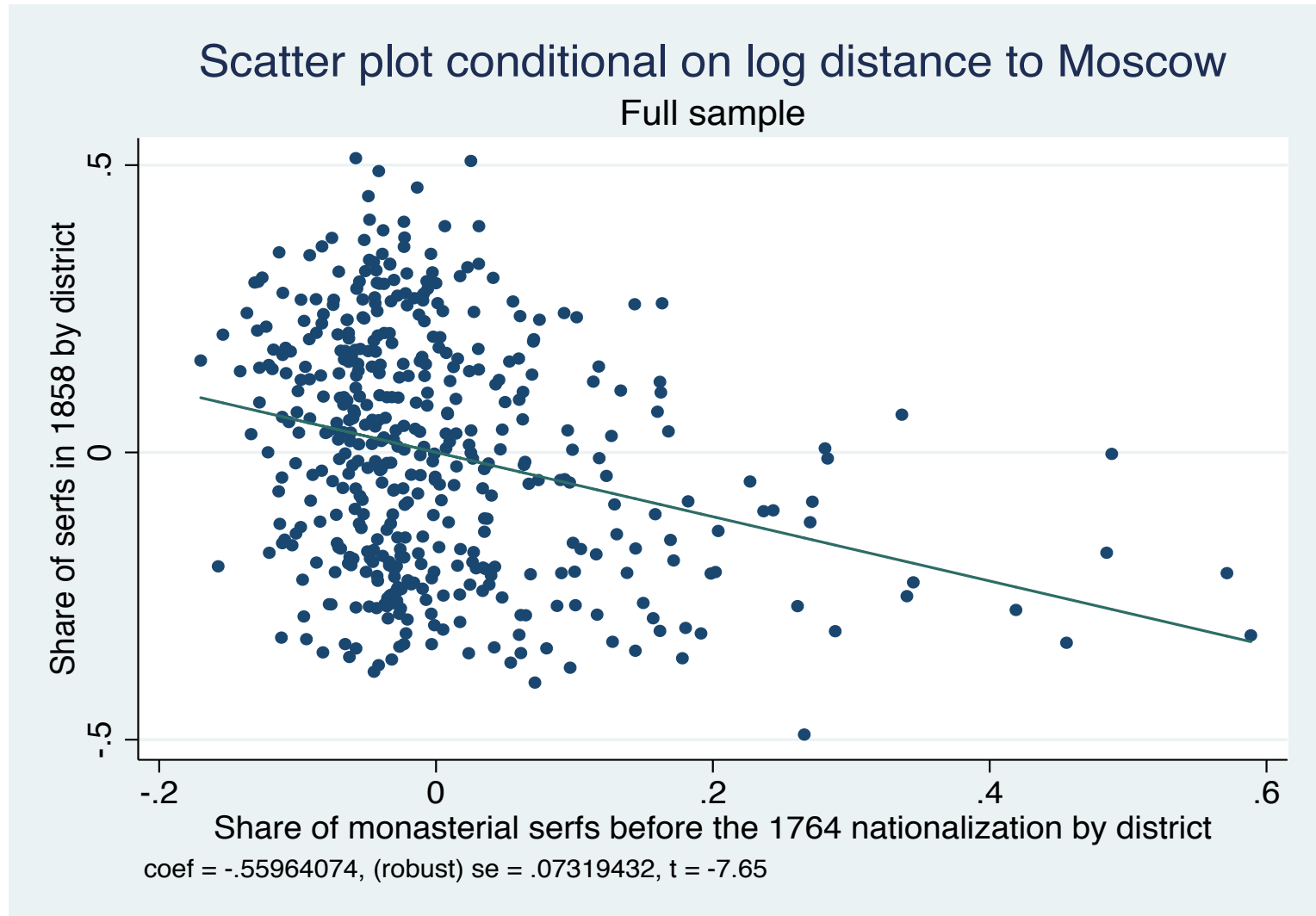
Is the number of monasterial serfs excludable?

No difference between monasterial serfs and privately-owned serfs in:

- production technologies before 1764 (Zakharova 1982)
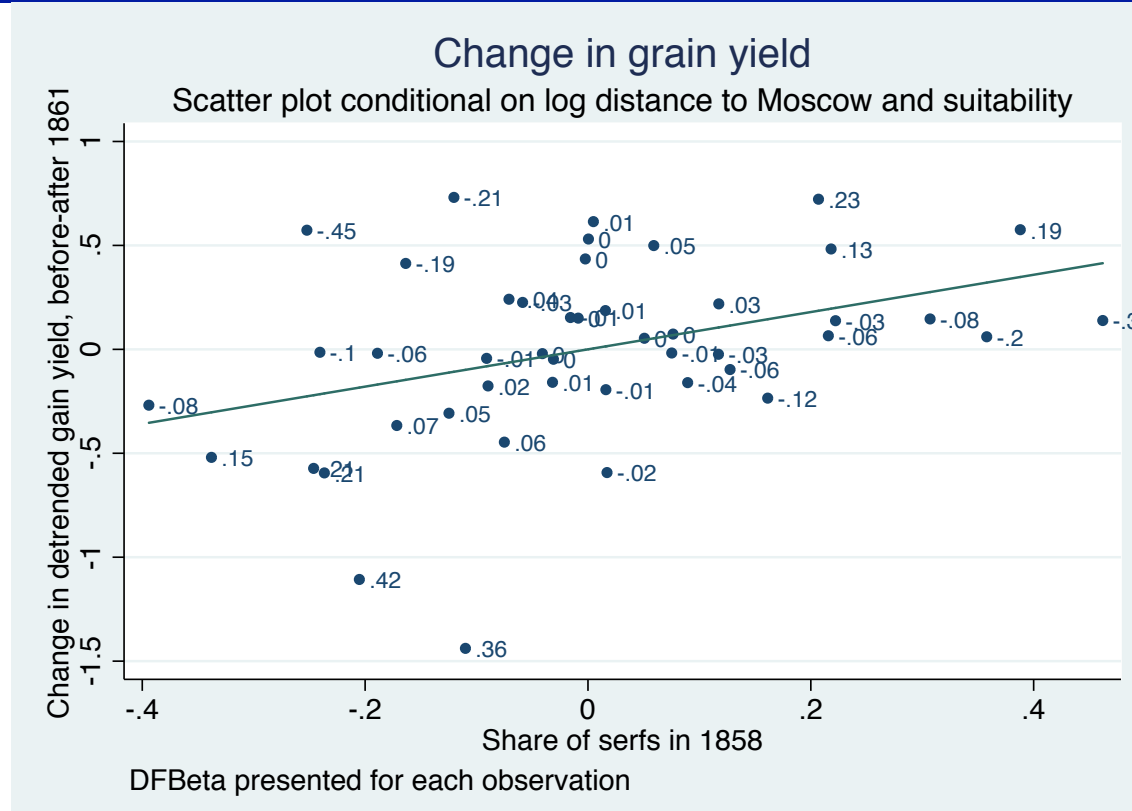- the quality of land (and we control for land quality)
- literacy rates

- Had monasterial serfs affected development directly, why would such an effect be realized only after 1861?

- Identification assumption: the distribution of church lands a century before the emancipation was orthogonal to the changes in economic fundamentals around emancipation

Similar-size estimate with IV

Instrumental variables estimation	Share of serfs X Post-emancipation	Grain productivity
	1st stage	2nd stage
Share of serfs X Post-emancipation		1.21**
		[0.551]
Share of nationalized monasterial serfs X Post-emancipation	-1.25*** [0.299]	
Demeaned Log distance to Moscow X Post-emancipation	YES	YES
Demeaned Land suitability X Post-emancipation	YES	YES
Province-specific linear trends	YES	YES
Province and Time fixed effects	YES	YES
Observations	1,756	1,756
R-squared		0.525
F stat	17.45	

Conley (1999) correction for spatial correlation – agriculture

Change in grain yield
Scatter plot conditional on log distance to Moscow and suitability

DFBeta presented for each observation

	The change in detrended grain yield b/w pre- and post-emancipation	
	full	|DFBeta|<0.3
Share of serfs	0.90***	0.75***
	[0.259]	[0.197]
Log distance to Moscow, crop suitability	Yes	Yes
Observations	46	43
Adj R-squared	0.255	0.344

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The magnitude is large

- A leap forward of 37 years:

    – A 15.5% increase in grain productivity on top of the overall development trend for an average province with 45% of serfs and with the mean distance to Moscow

        - compared to an average increase by 4 percent by decade in the 19th century

The land reform

- Mandatory land buyouts by former serfs leading to communal land tenure
  - Possible better incentives to invest in land, but only in hereditary communes
  - For re-partition commune: low incentives to invest in land

- Gradual realization over 1862-1881 with varying speed
  - Negotiations on precise terms
    - price, size of plots, the exact timing of buyouts in each estate
  - immediate obligatory land buy-out in western provinces in 1863 as a response to the Polish rebellion
- Use the share of serfs who signed land buyout contract in a given year as a measure of land reform progress

OLS: Emancipation vs. land reform

	Grain productivity
Share of serfs X	1.04**
Post-emancipation	[0.407]
Share of serfs	-0.44*
with signed buyout contracts	[0.255]
Demeaned Log distance to Moscow and Demeaned Land suitability X Post-emancipation	YES
Share of state peasants X Post 1863, share of royal peasants X Post 1859	NO
Province-specific linear trends	YES
Time and province fixed effects	YES
Observations	1,701
R-squared	0.396

Gentry indebtedness and land reform

- The progress of land reform was certainly endogenous

- Our source of exogenous variation is as follows: Indebted landlords had a financial incentive to postpone land reform implementation
  - the fixed (temporary) quitrent was higher than the interest they had to pay for their debts to the state

- Construct a synthetic instrument for land reform with linear schedules of reform implementation, with speed varying depending on ex-ante indebtedness

Land reform progress and the synthetic instrument in 1872

Conditional scatter plot and fitted line

Controls: log distance to Moscow and land suitability

Share of peasants with buyout contract signed in 1872

Non-indebtedness instrument in 1872

coef = 3.1986224, (robust) se = 1.3878267, t = 2.3

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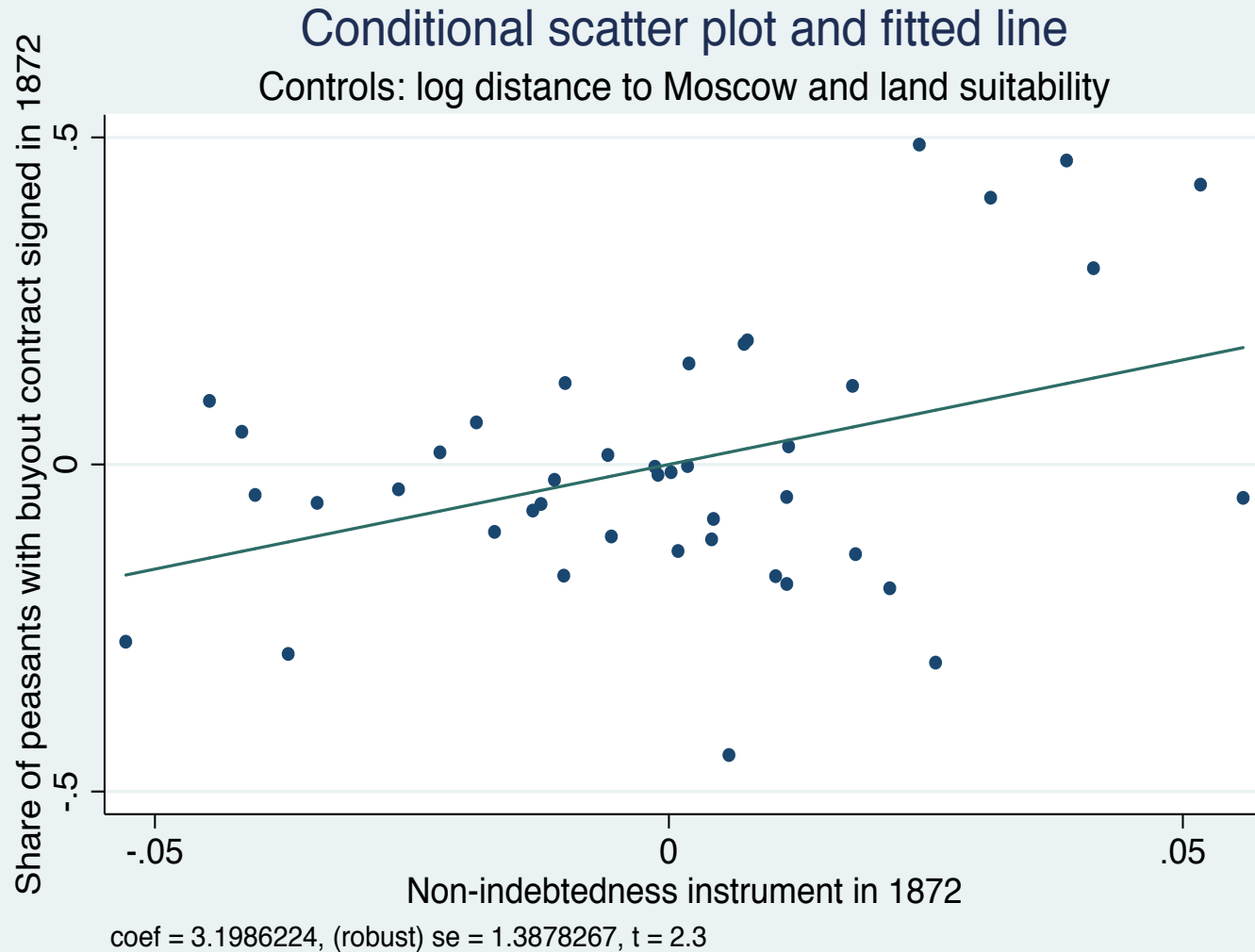
Is gentry indebtedness excludable?

- The primary reason to obtain loans for gentry was the status consumption rather than productive investments

- Loans were issued by non-market state institutions which granted loans for political rather than economic reasons

Emancipation vs. land reform: IV estimates

	Share of serfs	Signed buyout contract	Grain productivity
	1st stage	1st stage	2nd stage
Share of serfs X Post-emancipation			2.78***
			[0.706]
Share of serfs with signed buyout contracts			-1.26***
			[0.334]
Share of nationalized monasterial serfs X Post-emancipation	-1.28***	-1.33***	
	[0.305]	[0.296]	
Interpolation b/w (1-indebtedness) and 1 in the interval 1862-1882	0.09	2.78***	
	[0.150]	[0.231]	
Province-specific linear trends, FEs, Demeaned Log distance to Moscow and Demeaned Land suitability X Post-emancipation	YES	YES	YES
Observations	1,701	1,701	1,701
R-squared			0.531
F, monastierial serfs	17.85	20.28	
F, indebtedness instrument	0.421	136.8	

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The magnitude of the effect of the land reform

- The effect of the abolition of serfdom on agricultural productivity would have been 84% larger without the land reform

    – A full implementation of the land reform (from affecting zero to affecting all former serfs) in an average province led to a decrease in grain productivity by 0.57 or 16.2% from the mean 1858 level

    – Emancipation led to an increase by 1.25 or 35.7%

Land reform had negative effect only in re-partition communes

	Grain productivity
	OLS
Share of serfs X Post-emancipation	0.80*
	[0.416]
Share of serfs with signed buyout contracts	0.18
	[0.298]
Share of serfs with signed buyout contracts X re-partition commune	-0.82**
	[0.351]
Demeaned Log distance to Moscow and Demeaned Land suitability X Post-emancipation	YES
FEs, Province-specific linear trends	YES
Observations	1,701
R-squared	0.397

Mechanism behind positive effect of emancipation

- A large and immediate effect rules out mechanisms, realization of which takes time, such as investment in land and human capital

- The elimination of ratchet effect was immediate
  - If landlords credibly committed to fixed obligations, expect no gains in productivity after emancipation
  - We measure implicit contracts under serfdom by whether peasants and landlords agreed on the terms of temporary land lease before the land reform

A mechanism: incentives
Proxied by implicit contracts under serfdom

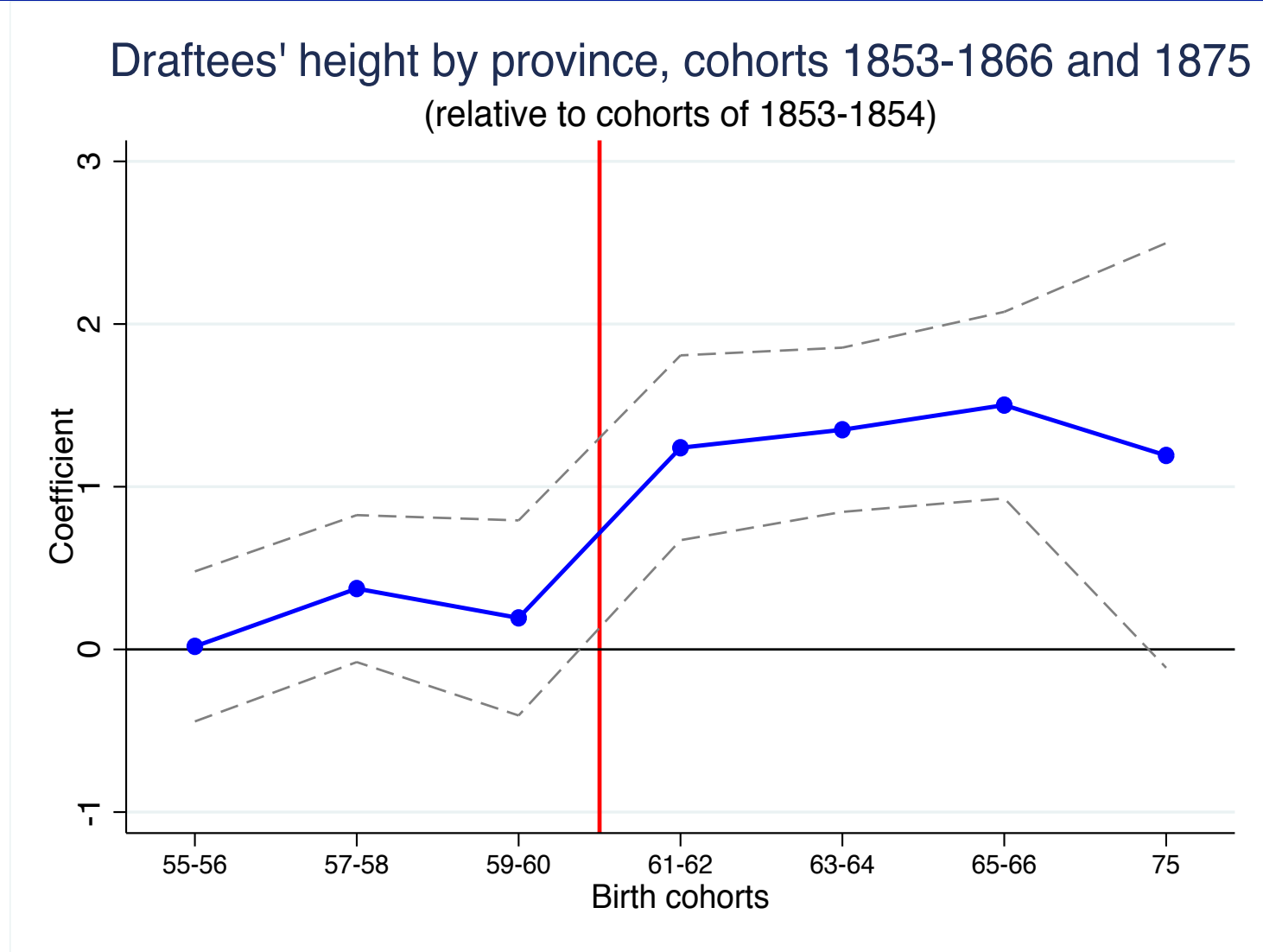|	Grain productivity
	OLS
Share of serfs X Post-emancipation	1.91***
	[0.489]
Share of serfs X Post-emancipation X Implicit contracts	-1.89***
	[0.598]
Share of serfs with signed buyout contracts	-0.60**
	[0.258]
Demeaned Log distance to Moscow, Demeaned Land suitability X Post emancipation	YES
Time and province FEs, Province specific linear trends	YES
Observations	1,648
R-squared	0.415

A mechanism: adjustments to the choice of crops to seed depending on the climatic and market conditions

	Share of winter crops seeded in total winter and summer crops seeded during production cycle		
Share of serfs X Post-emancipation	-0.13***	-0.04**	-0.15***
	[0.037]	[0.019]	[0.048]
Temperature (t-1)	0.007**		0.005
	[0.004]		[0.004]
Share of serfs X Post-emancipation X Temperature (t-1)	0.013***		0.014**
	[0.005]		[0.005]
Share of serfs X Post-emancipation X Rye-to-wheat world price ratio (t-1)		-0.34***	-0.30**
		[0.121]	[0.117]
Demeaned ln distance to Moscow X Post-emancipation	Yes	Yes	Yes
Demeaned crop suitability X Post-emancipation	Yes	Yes	Yes
Year and province fixed effects	Yes	Yes	Yes
Province-specific trends	Yes	Yes	Yes
Observations	629	592	589
R-squared	0.789	0.770	0.780

Draftees' height: province level data (birth cohorts: 1853-1860 vs. 1861-1875)

	Draftees' height		
		IV	
	OLS	2nd stage	OLS
Share of serfs X Post-emancipation	0.99***	1.35**	0.98***
	[0.354]	[0.631]	[0.350]
Demeaned Log distance to Moscow and Demeaned Land suitability X Post-emancipation	YES	YES	YES
Share of state peasants X Post 1863, share of royal peasants X Post 1859	NO	NO	YES
Province-specific linear trends	YES	YES	YES
Province and birth cohorts fixed effects	YES	YES	YES
Observations	690	690	690
R-squared	0,761	0.761	0.761
F stat		15,47	

Pre-trends? Draftees' height (province-level)

Draftees' height by province, cohorts 1853-1866 and 1875
(relative to cohorts of 1853-1854)

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Conley (1999) correction for spatial correlation: height at province-level

Change in draftees' height, by province

Scatter plot conditional on log distance to Moscow and suitability

DFBeta presented for each observation

	The change in detrended height by province b/w pre- and post-emancipation cohorts	
	full	|DFBeta|<0.3
Share of serfs	0.92***	0.66***
	[0.202]	[0.147]
Log distance to Moscow, crop suitability	Yes	Yes
Observations	46	42
Adj R-squared	0,354	0,391

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Draftees' height: district level data (birth cohorts 1853-1860 vs. 1861-1862):

	Draftees' height	
		IV
	OLS	2nd stage
Share of serfs X Post-emancipation	0.35**	0.96***
	[0.175]	[0.348]
Demeaned Log distance to Moscow and Demeaned Land suitability X Post-emancipation	YES	YES
Share of state peasants X Post 1863, share of royal peasants X Post 1859	NO	NO
Province-specific linear trends	YES	YES
District and birth cohort fixed effects	YES	YES
Observations	4,670	4,580
R-squared	0,606	0,589
F stat		95,85

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Pre-trends? Draftees' height (district-level)

Draftees' height by district, cohorts 1853-1862
(relative to cohorts of 1853-1854)

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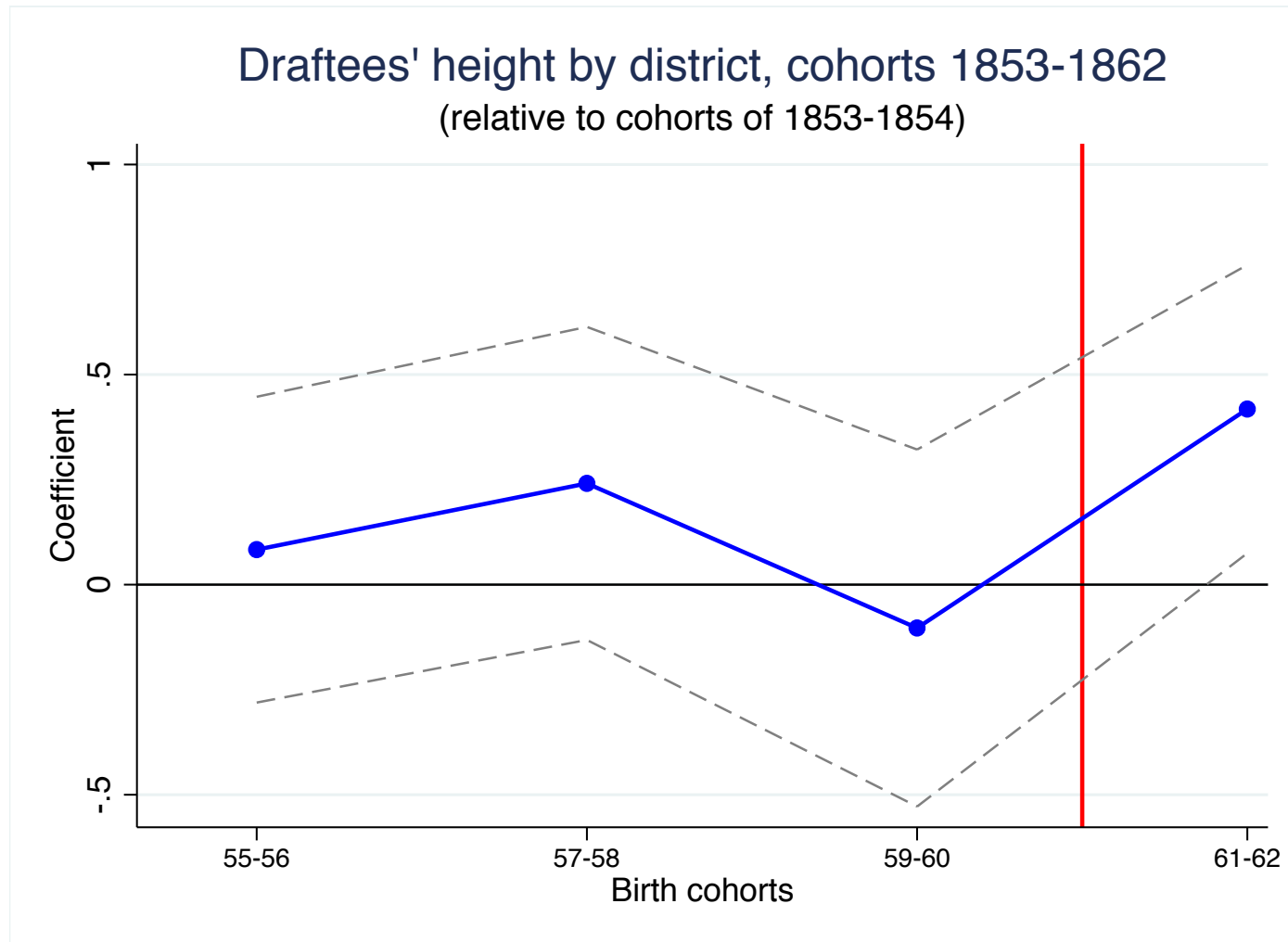
Conley (1999) correction for spatial correlation: height at district level

Change in draftees' height, by district
Scatter plot conditional on log distance to Moscow and suitability

DFBeta presented for each observation
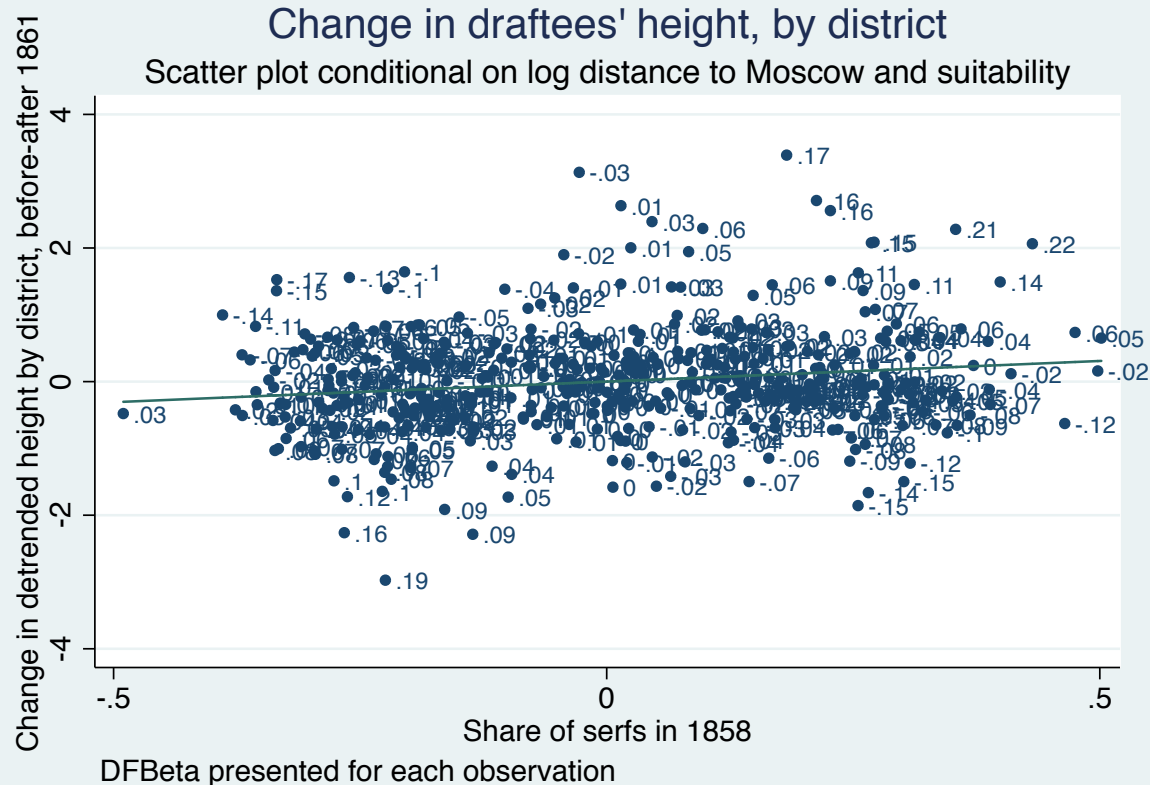
	The change in detrended height by district b/w pre- and post-emancipation cohorts	
	full	|DFBeta|<0.15
Share of serfs	0.62***	0.45***
	[0.204]	[0.136]
Log distance to Moscow, crop suitability	Yes	Yes
Observations	466	457
Adj R-squared	0,043	0,041

Industrial development

	Log industrial output		
	OLS	IV: 2nd stage	OLS
Share of serfs X Post-emancipation	0.88**	2.27*	1.84***
	[0.365]	[1.243]	[0.334]
Demeaned Log distance to Moscow and Demeaned Land suitability X Post-emancipation	YES	YES	YES
Share of state peasants X Post 1863, share of royal peasants X Post 1859	NO	NO	YES
FEs, Region-specific linear trends	YES	YES	YES
Observations	341	341	341
R-squared	0.896	0.936	0.899
F-stat		20.45	

Pre-trends? Industrial output

Log industrial output
(relative to the year 1795)
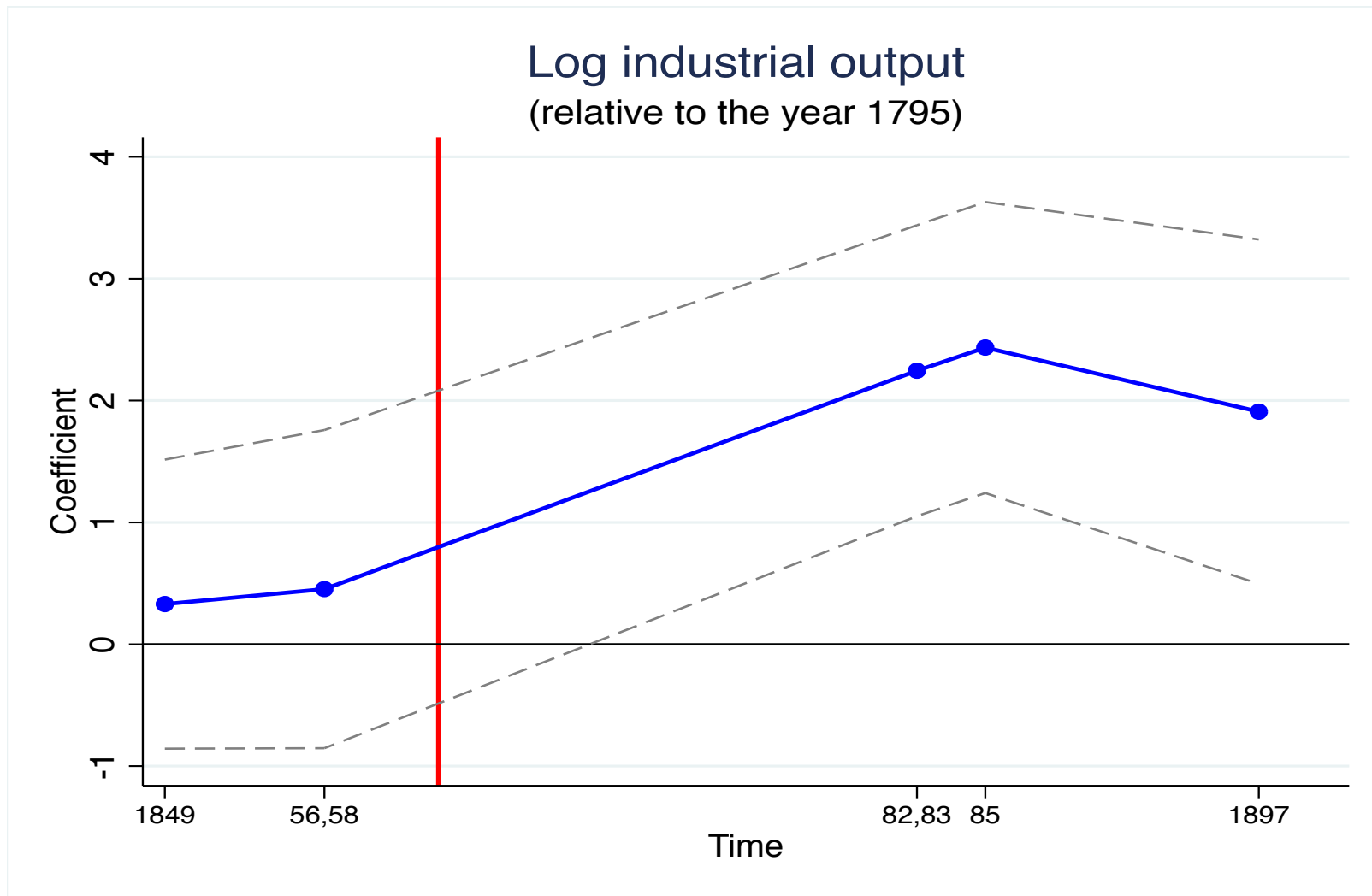
Conley (1999) correction for spatial correlation: industrial output
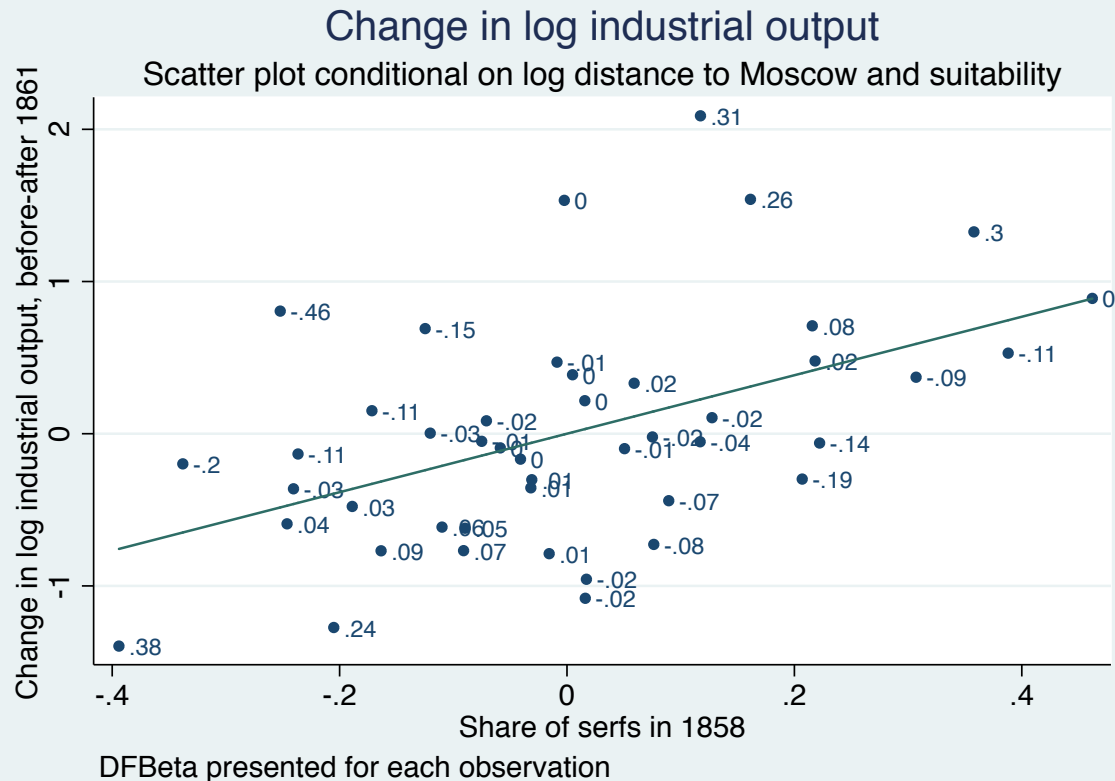
Markevich-Zhuravskaya "The Economic Effects of the Abolition of Serfdom"

The magnitude of the effect on industrial development: LATE

- A substantial difference between OLS and IV point estimates: 48% vs. 170%
  - The most likely reason is the heterogeneous effect of the abolition of serfdom on industrial development
    - IV estimates LATE: the effect in those provinces, where in the absence of monasteries, the lands would have been transferred into private ownership, which is bigger than in provinces where the lands would have stayed in state ownership anyway (in the periphery of empire)

- The big effect is consistent with the evidence on substantial level of labor migration out of villages in the 2nd half of the 19th century (Nafziger 2010)
  - Mobility would have been even larger if there were no communes (Gerschenkron 1965)

Sensitivity tests

- Controls for potentially-confounding factors
  - The length of railway network in a province in a year
  - Historical temperature by year and province
  - The court reform
  - The 1864 zemstvo reform and expenditures

- Controls for land reform implementation
  - The Great Russia provinces only
  - The land redistribution b/w peasants and landlords as a result of the reform: land cuts

- Alternative data on the composition of rural population and alternative samples
  - 1857 tax census rather than 1858 police data
  - Sub-sample with governor reports data only, i.e. pre-1883
  - Sub-sample excluding Moscow and Saint-Petersburg provinces
  - Extended sample with Baltic provinces where (a bit different) emancipation reform happened around 1820
  - WLS by population

- Placebo: changed the date of the abolition of serfdom

An overall effect and counterfactual exercise

	Agriculture	Industry	Service	All sectors	
				scenario: services were not affected by the emacipation	scenario: services grew as demand (weight. average of industry and agriculture
GDP per capita in 1820 from Maddison (2007)				688	
Sectorial shares in value added in 1860 from Goldsmith (1961)	59.3	5.1	35.6		
Value added in 1820	22343	1922	13413	37678	
The multiplier effect due to the abolition of serfdom	1.16	1.48	range: 1-1.19	1.12	1.19
Counter-factual estimates of value added in 1820 (mln USD 1990)	25918	2844	range: 13413-15899	42175	44661
Counter-factual estimates of GDP per capita in 1820				770 (112%)	816 (119%)
Counter-factual estimate of GDP per capita in 1913 (scenario: average growth rate in Russia 1820-1913)				1660 (112%)	1758 (119%)
Counter-factual estimate of GDP per capita in 1913 (scenario: average growth rate in Russia 1870-1913)				2052 (137%)	2173 (146%)
Counter-factual estimate of GDP per capita in 1913 (scenario: East-European average growth rate 1820-1913)				2220 (149%)	2351 (157%)
Actual GDP per capita in 1913 from Maddison (2007)				1488	

Conclusion

- The emancipation of serfs caused a very large increase in the agricultural productivity, industrial output and living standards

- The institution of serfdom substantially slowed down Russia's economic development because of poor incentives for serfs

- Serfdom was an important reason of divergence in economic development between Western and Eastern Europe