

*"Local dominance was complete, for, in the course of time, the Junker had become not only an exacting landlord, hereditary serf master, vigorous entrepreneur, assiduous estate manager, and nonprofessional trader, but also the local church patron, police chief, prosecutor, and judge. [...] Many of these experts in local tyranny were experienced in whipping the backs, hitting the faces and breaking the bones of 'disrespectful' and 'disobedient' peasant serfs."*

*German historian Hans Rosenberg  
commenting on Prussian miniature  
autocracies as quoted in Clark (2006, p. 162)*

# Serfs and the Market: Second Serfdom and the East-West Goods Exchange, 1579-1856

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Supervisor: Thomas Piketty  
Referee: Gilles Postel-Vinay

June 13, 2019

## Labor coercion and trade

*"The majority of labor transactions throughout much of history and a significant fraction of such transactions in many developing countries today are 'coercive'"* Acemoglu and Wolitzky (2011, p.555)

- Today, c. 25 million people are in forced labor without the option to quit, many of them producing for international markets (International Labour Organization, 2017)
- Research on distributional consequences of trade, e.g.:
  - Wage-setting in multinational's sweatshop following international scrutiny (Harrison and Scorse, 2010)
  - How fair trade labelling initiatives may lead to better terms for producers (Dragusanu et al., 2014)
- However, existing trade-inequality research assumes that workers **voluntarily** agree to the terms of employment

# Examples of present-day labor coercion related to trade

## NEWS

Home Video World UK Business Tech Science Stories Entertainment & Arts

Magazine

### Doctors and nurses forced to pick cotton

By Ibrat Safo and William Kremer  
BBC World Service

16 October 2012

f t e Share



(a) Enserfement of c. 1 million Uzbek citizens to pick cotton for export

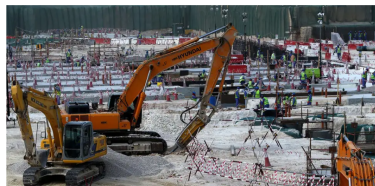
Sport • Football • International

### World Cup 2022: Qatar's workers are not workers, they are slaves, and they are building mausoleums, not stadiums

We have been anaesthetised to the depressing nature of news coming out of the Middle East, but we can't be allowed to forget what is happening in Qatar

Jonathan Liew Chief Sports Writer | @jonathanliew | Tuesday 3 October 2017 13:26 | 97 comments

Click to follow sport



(b) Labor conditions and passport confiscation of guest workers in Qatar

- Usually national services (civil or military) benefiting the public are not considered coercion
- Qatar example involves mobility bans that also frequently occur in history, e.g. as part of serfdom

# This paper

- This paper studies the setting with the firmest qualitative (but no quantitative) evidence that trade drove labor coercion:

## The Second Serfdom and concurrent grain exports (1579-1856)

- The *export hypothesis* was first formulated by Polish historians more than 60 years ago and posits that opportunities to export grain incentivized landowners to coerce labor (Malowist, 1958)
- The hypothesis is mentioned as a driver of the Second Serfdom in most of the literature but remains untested (e.g. Moon, 2001; Stanziani, 2009; Cerman, 2012; Eddie, 2013)
- I use novel trade and de-jure and de-facto unfree labor data
  - De-jure unfree labor: all countries around the Baltic Sea
  - De-facto unfree labor: Denmark, Estonia, Prussia, Southern Sweden & Russia
- My paper also offers a first open-economy model of labor coercion

# Research Questions

## 1. Endogenous Institutions

On the country level, do the East's grain export booms occur before and during *de-jure* reforms that limit peasant freedom?

## 2. Blessing of Bad Geography

On the sub-national level, can a locality's *de-facto* extent of unfree labor be related to its potential to export grain to the West that is determined by its access to ports and ports' export volume?



## Related literature

- **Causes of serfdom:** high land-labor ratios (Domar, 1970), limited outside options (Brenner, 1976; Acemoglu and Wolitzky, 2011), ideology (Finley, 1980; Oudin-Bastide and Steiner, 2015)
- Disagrees with '**Sugar story**'? (Engerman and Sokoloff, 1997)
- **Consequences of serfdom:** for Russia (e.g. Buggle and Nafziger, 2016; Markevich and Zhuravskaya, 2018)
- **World system theory:** Wallerstein's (2011) inspired by Malowist
- **Blessing of bad geography:** difficult-to-traverse geography may limit negative foreign influence (Nunn and Puga, 2012)
- **Endogenous institutions and trade:** e.g. Acemoglu et al. (2005); Greif (2006); Puga and Trefler (2014)
- **Early-modern trade statistics** particularly rare and often ToT for peripheries (e.g. Williamson, 2008)
- **Export hypothesis elsewhere?:** American South during slavery (Wright, 1975), Chile's grain export boom in 1850-70 (Bauer, 1975)



## Chronology of the wider project

- 2015: One slide on Sound Toll's self-declaration tax in undergraduate Public Economics lecture
- 2017: Started cleaning the Sound Toll data  
Poster presentation on the Hansa in San Jose
- 2018: Presentation U. Groningen  
Research stay with Hansischen Geschichtsverein in Lübeck and archives (incl. in Poland)  
Readings on Polish history
- 2019: Funding Fonds Sarah Andrieux  
Presented at U. Helsinki  $\implies$  Estonia data  
Research stay at U. Lund (*planned*)  
Archives Estonia (*planned*)

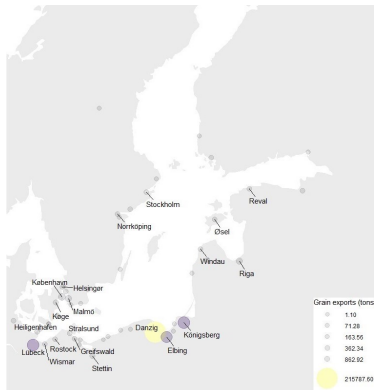
# Contributions - Data

<b>Data sets:</b>	<b>New data</b>	<b>Newly related to trade</b>
Sound Toll records (for all $t$ and for grains)	✓	NA
Grain prices in the West	X	✓
De-jure unfree labor reform dates	✓	✓
<b>De-facto unfree labor:</b>		
Denmark estates	X	✓
Estonian HHs (outside of genealogy)	✓	✓
Prussian counties	X	✓
Scanian villages	X	✓
Russian counties	X	✓

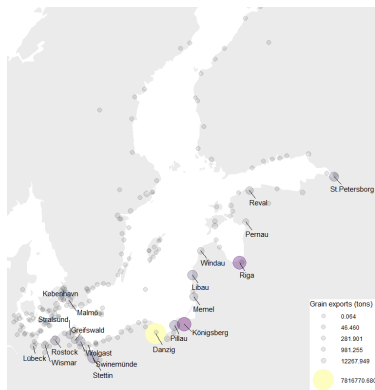
# Outline

- 1 Introduction
- 2 Historical background
- 3 Model
- 4 Data
- 5 Methodology & Findings
- 6 Conclusion
- 7 PhD proposal

# Commercial revolution - changing ports



a) 1579-1617



b) 1618-1856

**Figure 3:** Grain exports (tons) to the West based on Sound Toll.

*Notes:* Top 20 exporting cities named in each panel. Cities not represented by a dot did not export grain. Inland dots represent the few instances when Sound Toll mentions region in stead of origin city.

# Grain shipments by destination - first Dutch then British

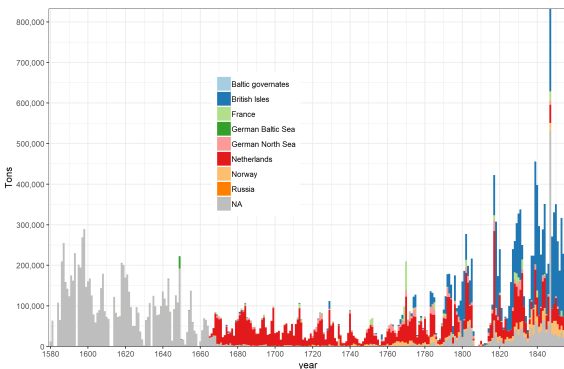


Figure 4: Tons of grain shipments by destination, 1579-1856

Notes: Sound Toll records only systematically show destination post 1660. During peak year (1847), assuming a Nordic consumption basket, exports could have fed >6 million individuals or twice the Netherlands at the time.

- Exports are highly correlated with wars (-), tariffs (-), and prices in the West (+)

[Prices](#)[By Origin](#)[By Domicile](#)[By Grain Type](#)[Comparison to French Trade](#)

# Second Serfdom - spatially and temporally varied

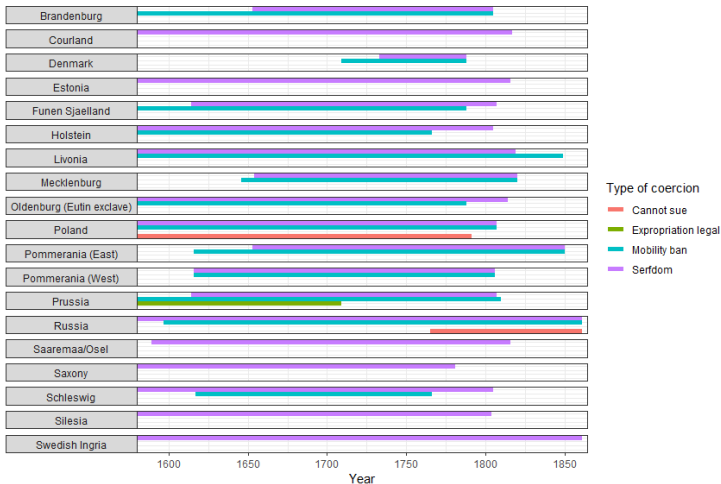


Figure 5: De-jure unfree labor in Baltic Sea region

Notes: Compiled by author from secondary sources. Bars show period of legality of the most common types of labor coercion.

## De-facto unfree labor case studies

- Denmark:** Following Great Northern War, agricultural prices drop during 1720s and rural exodus  
Agricultural board mandates serfdom (*stavnsbåndet*) between 1733-88 bans mobility of farm hands (diff-diff non-farm hands)
- Estonia:** Colonized by German knights since 1200s who owned virtually all land despite changing rulers (Danish, Polish, Russia, and Swedish) and are known for their harsh treatment of natives  
Compare Boers in Southern Africa and Malaysian Chinese
- Prussia:** Junker-led labor coercion and exports East of the Elbe  
Following Napoleonic wars (1807), slow improvements of peasant freedoms, particularly after 1821 Ordinance
- Scania:** No serfdom, but corvée. Ceded to Sweden in 1658; enacted export ban until the 1720s; then land market deregulation: peasants allowed to buy crown (and later manorial) land they tilled, but corvée still unregulated Russia

## Open-economy labor coercion model

- Outside-option models predict *less* coercion in proximity to ports (e.g. Acemoglu and Wolitzky, 2011) contrary to what I observe
- Unlike Acemoglu and Wolitzky (2011), I take prices as exogenous (based on domestic & foreign demand) due to the high levels of market integration (e.g. Jacks, 2004; Olsson, 2006)

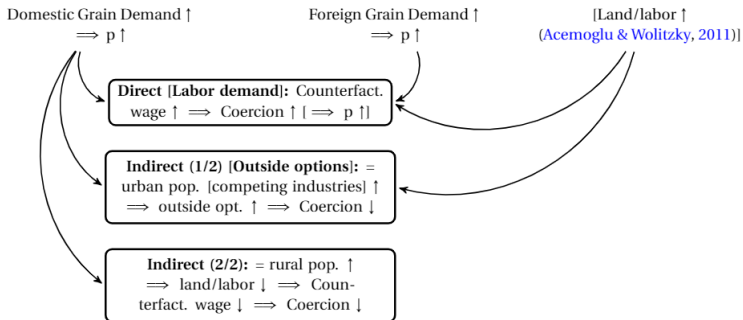


Figure 6: Visualization of my model



# Sound Toll Records (1/2)

7<sup>th</sup> passage on this day

N <sup>o</sup> 7. Gerrit Harmansen Bosch, af Hoorn		Gerrit Harmansen Bosch residing in Hoorn
Ran frae Danzig, dal til Amsterdam		from Danzig to Amsterdam
145 Last rye	72 1/2	145 last rye taxed 72.5 daler
15 Last wheat	15	15 last wheat taxed 15 daler
40 Last barley	20	40 last barley taxed 20 daler
12 pc. wool fabric	15	12 pc. wool fabric taxed 15 skilling
12 Rigsdaler merchant goods	12	12 Rigsdaler merchant goods taxed 12 skilling
Sub total	108 3/4	4 daler 3 skilling discount for skipper
Sub total	104 1/2	Total
Lighthouse fee	4	108 1/2

**Figure 7:** Example of a ship and its shipments recorded in the Sound Toll

*Notes:* Example of the entry of a ship on 18.4.1711 whose captain resides in Hoorn (the Netherlands). All shipments originate in Danzig and are bound for Amsterdam. A last is approximately equal to 1.8 tons. Source: Sonttolregisters-1750238 (film), 632752 (record id).

# Sound Toll Records (2/2)

No.	Ship Name	Cargo	Tax
71.	Dorch Peter Busscamp at Staffen	200 lb Sugar 100 lb Pepper 120 lb Spices 50 lb Raisins 2 lb Tobacco 110 lb Gunpowder	23 23 18 10 23
72.	Willems Blaker at Rotterdam	120 lb Gun Salt 120 lb Gun Salt 120 lb Gun Salt	63 63 63
73.	Caes Maester at Dordrecht	52 lb Gun Salt 52 lb Gun Salt 52 lb Gun Salt	26 26 26
74.	Janus Eubank at Amsterdam	100 lb Gun Salt 100 lb Gun Salt 100 lb Gun Salt	50 50 50
75.	Caes Peter Cullin at Amsterdam	100 lb Gun Salt 100 lb Gun Salt 100 lb Gun Salt	50 50 50

- Tax collected by Danish Crown at Elsinore on shipment level:
  - origin, destination, tax amount & domicile of captain
  - >5 million observations
- Self-reported value with Crown's right-to-buy as truth-telling mechanism
- Fraud limited and mainly in luxury goods (Degn, 2018)
- Digitized in the Netherlands: [www.soundtoll.nl](http://www.soundtoll.nl)
- Further standardizing:
  - value in silver
  - identify type of good
  - units to metric

# Unfree labor

- **Danish estates (1706-1801)**

- *Prices and Wages in Danish Estate Accounts* (Andersen and Pedersen, 2004)
- Wages of different occupations
- Grain sales of estates

- **Estonian estates (1732, potentially more  $t$ )**

- Novel, full-universe dataset from Estonian National Archives
- Corvée days by HH
- Various controls

- **Prussian counties (1816, 1849, 1858):**

- Share of large estates is good proxy for intensity of serfdom (e.g. Cinnirella and Hornung, 2016)
- Census data available in multiple years

- **Scanian villages (1702-1856):**

- Comparable outcome variable can be constructed from 'tenth surveys' compiled by Olsson et al. (2017)

# Estonia data

Specification in 2. Uue halduse juurde võetud Moisaiküla mõisa alla jäänud kinnis- ja liikuvate asjade loetelu

2

Alotted land

Wealth

Specification and Wackenbuch of the Moisaiküla estate [...] regarding corvée, in-kind [Gerechtigkeit] and money payments"

Household	Men	Women	Elderly, children and sick	Oxen	Foals	Horses	Corvée	Corvée with draught animal	Annual in-kind dues (Gerechtigkeit)	Other
Alotted land										
Moisaiküla										
First village										
First HH head										
Second village										
Moisaiküla	1	2	1	1	2	3	3	3	12 1/2	Eggs, Chicken, Sheep, Barley, Rye
Alto Hans	2	2							12 1/2	
Alto Jürgen	2	2							12 1/2	
Thomasi Hink	2	3							12 1/2	
Persti Tommie	1	2	1	1	2	3	1		12 1/2	
Thomasi Mad									12 1/2	
Alto Jorff Tomi									12 1/2	
Thomasi Boma	2	1			2	2	2		12 1/2	
Thomasi Alto	1	1	1	1	2	2	1		12 1/2	
Thomasi Alto	2	1			2	2	1		12 1/2	
Alto Jorff Niika									12 1/2	

Specification and Wackenbuch of the Moisaiküla estate [...] regarding corvée, in-kind [Gerechtigkeit] and money payments"

Eggs

Chicken

Sheep

Barley

Rye

Corvée

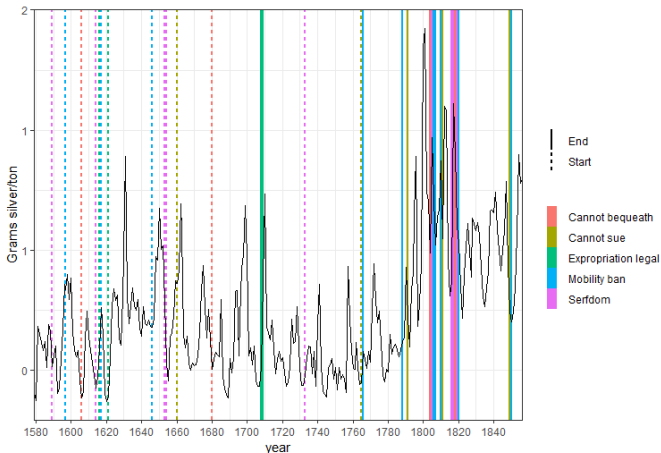
Annual in-kind dues (Gerechtigkeit)

Corvée with draught animal

Figure 8: Example of a Wackenbuch in 1732

Notes: Figure shows a full Wackenbuch of Moisaiküla estate. The book shows for each household the name of the head, a breakdown of its members, the allotted land and other wealth. On the right the dues are detailed, including corvée, in-kind, and monetary payments. Source: EAA.854.7.101

# De-jure findings - prices in the West



**Figure 9:** Prices in the West and de-jure coercion (constant borders), 1579-1856

*Notes:* This figure combines the price index of grains we construct and de-jure unfree labor reform data for all countries and investigates their relationship. The index is constructed from prices of different types of grains in the West based on long-run series. The prices of grain types contribute to the index based on the grain type's share in Baltic grain exports. Thus, multiplying it by the export tonnage leads the total value of Baltic exports (in grams of silver).

# De-jure findings - export

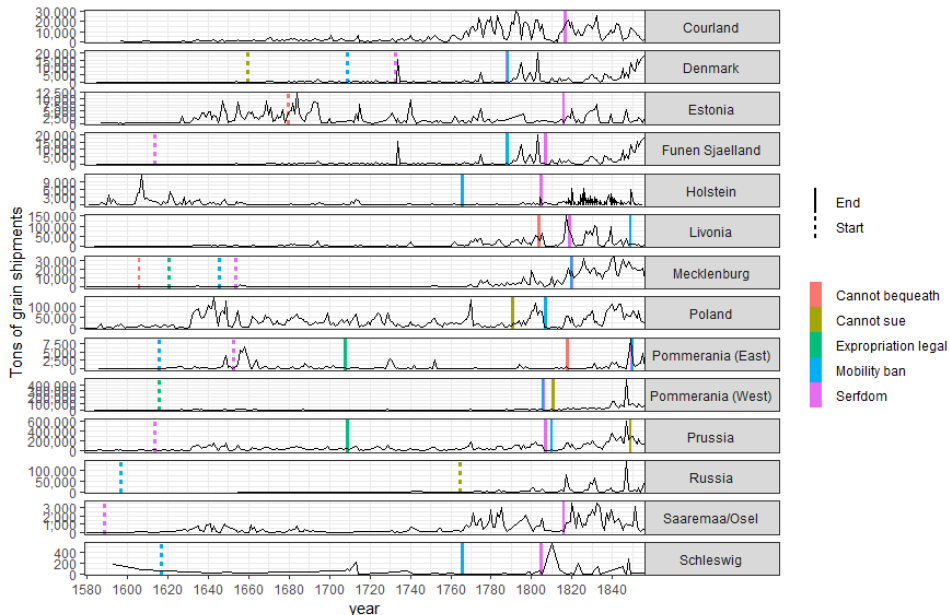
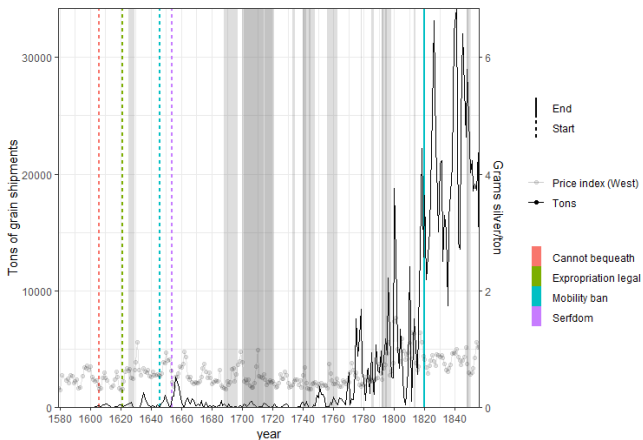


Figure 10: Tons exported and de-jure coercion (constant borders), 1579-1856

# De-jure findings - Mecklenburg



**Figure 11:** Grain exports and unfree labor in Mecklenburg, 1579-1856

This figure presents the specific example for Mecklenburg, for which unfree labor reforms are well documented. Figure is based on Sound Toll (exports), our de-jure reform data, and the price index we construct. Dark shaded years are those with wars involving Mecklenburg based on Brecke (1999), which could be potential omitted variables, but they do not coincide with de-jure reforms. Ports with grain exports attributed to Mecklenburg include: Kirchdorff, Mecklenburg, Rostock, Schwerin, Warnemünde, Wismar.

## Methodology micro (de-facto)

- Use standardized ExportPotential index as single, interpretable variable of interest
- Similar to Kopsidis and Wolf's (2012) Prussian county market potential index (that uses city population instead of exports)
- ① Sum port's  $p$  exports in  $t$  over  $\tau$  years:  $\sum_{t-\tau}^t GrainExports_{pt}$
- ② Divide by distance between county/village/estate ( $c$ ) and port
- ③ Sum over all ports ( $P$ )

$$ExportPotential_{ct} = \sum_p^P \frac{\sum_{t-\tau}^t GrainExports_{pt}}{Distance_{cp}}$$

- Outcomes ( $Y$ ): wages, corvée days, land inequality
- $\mathbf{X}$ : vector of controls (e.g. land-labor ratio)
- $\alpha_t$  and  $\sigma_c$  are year and county/village fixed effects

$$Y_{ct} = \beta_0 + \beta_1 ExportPotential_{ct} + \beta_2' \mathbf{X}_{ct} + \alpha_t + \sigma_c + \epsilon_{ct}$$



# Denmark

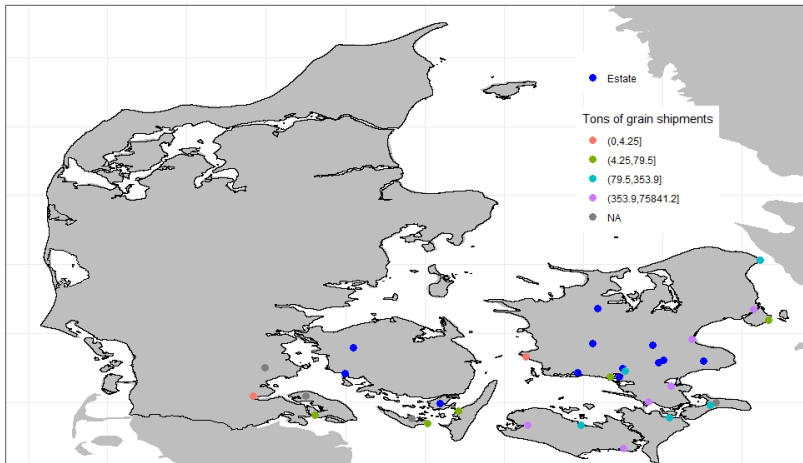
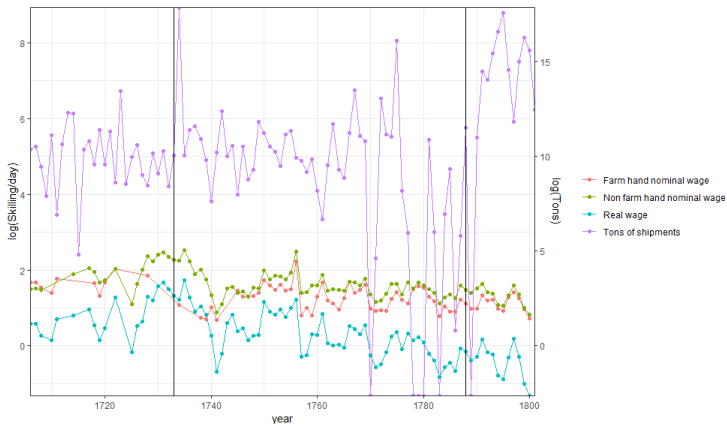


Figure 12: Denmark estate and export port location, 1706-1801

Notes: Figure shows the location of the 12 estates in the sample and the tons of grain shipped (sum of the 1705-1801 period in the Sound Toll) from ports in the surrounding. Missing port observations are ports that did not export grains in the considered period but at some earlier or later point.

# Denmark - diff-diff: farm-hand vs. rest, pre-post serfdom



**Figure 13:** Denmark wages (farm hand vs. rest) and exports, 1706-1801

*Notes:* Vertical lines show introduction and abolition of serfdom. Tons of grain are aggregated from all ports shown in Figure on previous slide. Real wage is nominal wage for both farm hands and other workers deflated using average grain prices of the grain sales of all estates.

- Observe sharp pre-post 1733 farm-rest wage differential

# Estonia

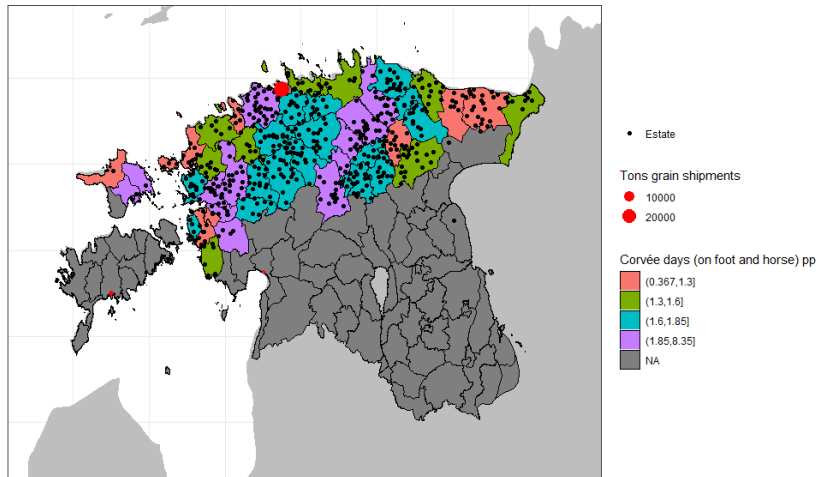


Figure 14: Estonia estate, corvée, and export port location, 1732

Notes: Figures show the location of estates and in which quantile of weekly corvée days per person (summing days with and without own draught animal) by parish. Missing observations are parishes in Estonia, but outside of those in sample. The location of grain export ports and how many tons they exported to the West during the last 10 years is also shown. The vast majority of exports appear to be concentrated in Tallinn in the north and not in the other port cities of Pärnau more south or Narva in the very north-east at the border with the Russian heartland.

Table 1: Results Estonia, 1732

	HH's corvéé days per week					
	Without draught animal		With draught animal		With and without draught animal	
	(1)	(2)	(3)	(4)	(5)	(6)
Distance to Tallinn (in km)	-0.015*** (0.001)	-0.032*** (0.003)	-0.005*** (0.0004)	-0.007*** (0.001)	-0.012*** (0.001)	-0.033*** (0.003)
Distance to Pärnau (in km)	0.011*** (0.001)	0.024*** (0.002)	0.008*** (0.0003)	0.008*** (0.001)	0.011*** (0.001)	0.027*** (0.002)
Used land (in 12,5 ha)	3.291*** (0.325)	4.084*** (0.824)	2.689*** (0.104)	2.919*** (0.192)	5.357*** (0.335)	6.222*** (0.873)
Unused land (in 12,5 ha)	-0.049 (0.196)	-0.532 (0.413)	0.088 (0.065)	-0.160 (0.099)	0.362* (0.213)	-0.282 (0.447)
# HH member	0.158*** (0.029)	0.119* (0.066)	0.115*** (0.009)	0.117*** (0.016)	0.302*** (0.031)	0.337*** (0.071)
# horses	0.339*** (0.061)	0.747*** (0.137)	0.064*** (0.020)	0.060* (0.033)	0.413*** (0.064)	0.842*** (0.147)
Forested land (in 12,5 ha)		-0.233*** (0.064)		0.050*** (0.015)		-0.099 (0.067)
Constant	-1.141*** (0.287)	-0.658 (2.147)	0.929*** (0.091)	0.239 (0.220)	-0.689** (0.287)	-2.554** (1.005)
Observations	4,955	1,868	6,154	2,179	6,265	2,206
Adjusted R <sup>2</sup>	0.248	0.388	0.473	0.464	0.280	0.320
<b>Additional controls:</b>						
Type of manor	Y	Y	Y	Y	Y	Y
Farm animals	Y	Y	Y	Y	Y	Y
Other dues	Y	Y	Y	Y	Y	Y
Potential yield	Y	Y	Y	Y	Y	Y
Drought intensity	Y	Y	Y	Y	Y	Y

Notes: Cross-section of Northern Estonian households as recorded in the *Wackenbuch* of their manor. Type of manor distinguishes between church, knight and state manors. Multiply the coefficients by 1440, the number of minutes per day, to convert them to the change in corvéé minutes per household per week. 1 km closer to Tallinn, *ceteris paribus*, implies 21 min more corvéé per week (Column 1). Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Without Pärnau

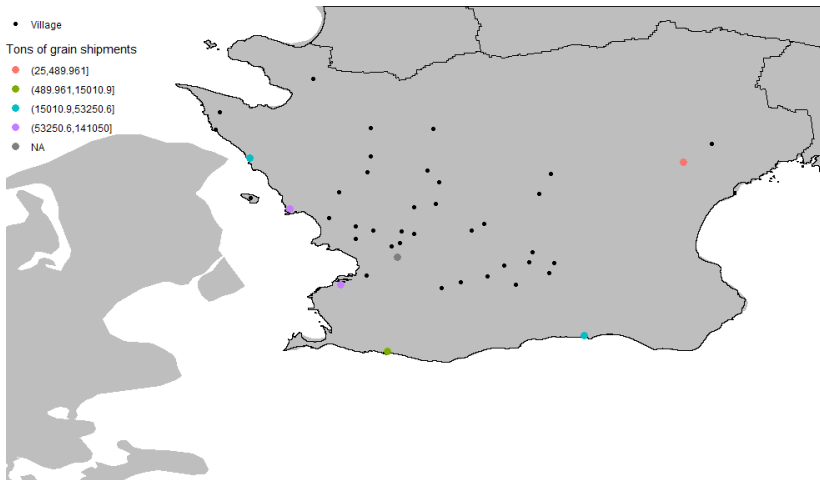
## Prussia, 1816, 1849, 1858

Table 2: Results Prussia, 1816, 1849, 1858

	% large estates (standardized)				% emancipated serfs (standardized)	
	(1)	(2)	(3)	(4)	(5)	(6)
ExportPotential (standardized)	0.175*** (0.0455)	0.169*** (0.0508)	0.166*** (0.0609)	0.147** (0.0636)	-0.215*** (0.0582)	-0.0909* (0.0523)
Primary school enrollment				-0.661 (0.411)		2.749*** (0.579)
Constant	0.484*** (0.0780)	0.468*** (0.0894)	0.467*** (0.0533)	-0.111 (1.674)	0.0158 (0.0589)	-0.967 (1.191)
Observations	453	453	453	453	143	143
# counties	151	151	151	151	143	143
R-squared			0.037	0.180	0.088	0.446
Controls	N	N	N	Y	N	Y
Year FE	N	Y	Y	Y	NA	NA
County FE	N	N	Y	Y	NA	NA

Notes: Panel of East-Elbian Prussian counties (1800 constant borders) in 1816, 1849 and, 1858 (Columns 1-4) and cross-section of share of manumitted serfs (Column 5). *Grundsteuerreinertrag* proxies for agricultural productivity. Further controls include % protestant, % urban, % industrial, % agricultural, child dependency ratio, population density, school density, % first language not German. Time invariant controls include soil conditions and river access. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Scanian villages



**Figure 15:** Scania villages and export port location, 1702-1856

*Notes:* Figures shows the villages in Scania and the location of export ports and how much they exported across the entire period. Grey shaded dots represent ports that exported prior to 1702, but not in 1702-1856

# Landownership and grain exports

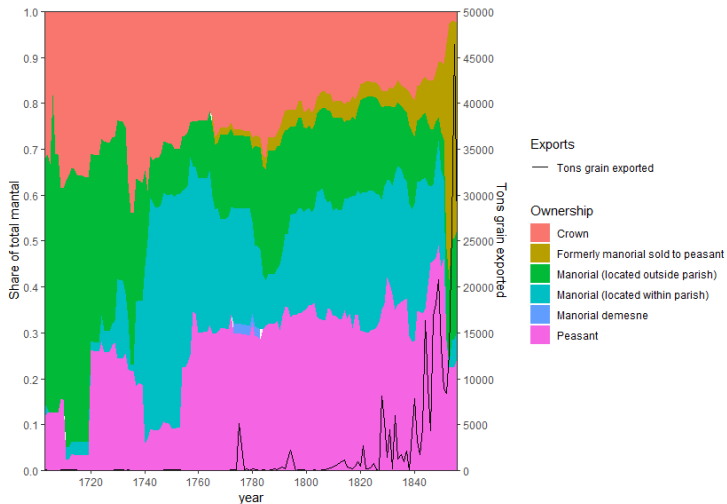


Figure 16: Landownership by manal and grain exports, 1702-1856

Notes: Constructed from the Historical Database of Scanian Agriculture (Olsson et al., 2017) and the Sound Toll.

Further descriptive statistics

# Scania, 1702-1856 - Share of large estates

**Table 3:** Results Scania share of large estates, 1702-1856

	Village's share of large estates		
	(1)	(2)	(3)
ExportPotential	-0.000848*** (0.000146)	-0.000438** (0.000175)	-0.000533*** (0.000174)
Grain production (in stooks)	-1.77e-05 (5.45e-05)	0.000200*** (5.82e-05)	0.000192*** (5.77e-05)
# plots of land	-0.000484** (0.000231)	-0.000458* (0.000241)	-0.000457* (0.000247)
Constant	0.0428*** (0.00930)	0.250*** (0.0468)	0.253*** (0.0458)
Observations	3,617	3,617	3,617
Number of villages	47	47	47
R-squared	0.1086	0.1223	0.121
Village FE	N	N	Y
Year FE	N	Y	Y

*Notes:* Mean and s.d. of ExportPotential are 1.3 and 5.9, respectively. Panel of Scanian villages observed, at most, annually from 1702 to 1856. Dependent variable is the share of large land plots in a village. Crown lands are excluded. Grain production include amount of grains produced (rye, barley, oats, wheat, buckwheat, and mixed) in stooks. # plots of land gives the number of land plots in a village, which would increase if existing plots were partitioned. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



# Scania, 1702-1856 - Peasant owns land?

Table 4: Results Scania peasant landowners, 1702-1856

	Peasant owns land? [0/1]				
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) Probit/mfx
ExportPotential	0.00120** (0.000590)	0.00122** (0.000578)	0.00122** (0.000584)	0.00122** (0.000583)	0.302*** (0.0564)
Grain produced (in stooks)			-0.000630 (0.000529)	-0.000622 (0.000519)	1.520*** (0.348)
Cultivator changed? [0/1]				-0.00102 (0.00128)	-0.391 (0.366)
Cultivator widowed? [0/1]				0.0103 (0.00755)	2.454*** (0.350)
Constant	0.461*** (0.0364)	0.420*** (0.0112)	0.422*** (0.0117)	0.422*** (0.0116)	
Observations	59,716	59,716	59,716	59,716	59,716
Number of plots	1,963	1,963	1,963	1,963	
Land plot FE	N	N	Y	Y	Y
Year FE	N	Y	Y	Y	N
R-squared	0.000	0.034	0.034	0.035	

Notes: Mean and s.d. of ExportPotential are 1.5 and 5.6, respectively. Panel of Scania land plots observed, at most, annually from 1702 to 1856. Dependent variable is binary indicator whether peasant owns land (*skatte*), or whether land is manorial. Crown lands are excluded. Grain produced include amount of grains produced (rye, barley, oats, wheat, buckwheat, and mixed) in stooks. Note that since we use land plot fixed effects, probit results are not bound by 0 and 1. Village-level cluster robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Conclusion

- Evidence *for* export hypothesis on de-jure coercion around the Baltic Sea and on de-facto coercion in Estonia and Prussia
  - Worker's (real) wages appear to rise with trade - even under serfdom - in Denmark
  - Internal migration appears to dominate any export hypothesis in the Russian heartland
- Evidence *against* export hypothesis in Scania where concurrent opening of land market to peasants supposedly allowed them to benefit from trade despite unregulated dues
  - This is an understudied consequence of wealth policies
- Eastern European coastal cities not only appear to provide few outside options, but also foster coercion through grain exports
  - Future labor-coercion models may take this into account

# Trade, Inequality and Social Conflict

Tom Raster  
PhD Proposal  
Paris School of Economics

June 13, 2019

# Outline

How does trade create or re-inforce within- and between-country inequalities and how do these translate into social conflict?

## Specific projects:

- 1 Extensions Master Thesis
- 2 The Slow Emancipation of Peasants and the Rise of Socialism in Prussia
- 3 Participation and Trade during the Hansa
- 4 Import Substitution in the European East
- 5 Terms of Trade Compared to Trade Volumes

# Extensions Master Thesis

- Engerman and Sokoloff (1997) hold that **economies of scale** foster coercion
  - Test this by grain type with Scania land plot and corvée data
- **Export hypothesis on manorial land in Scania?**  
Estate-level corvée data Scania – More corvée with better export potential like in Estonia?
- **Exogenous transport cost shifter** to improve identification
  - E.g. railroads in Prussia starting in 1840 (Hornung, 2015)
- Extend Estonia HH data to more  $t$ 
  - How are **dues converted** between corvée, in-kind and monetary?
  - How do are **dues adjusted** during crop failures and international price busts?
  - Eddie's (2013) Freedom's Price: Do landowners provide '**insurance**' in exchange for dues (*Konservation*)?
  - Link to modern development literature

# The Slow Emancipation of Peasants and the Rise of Socialism in Prussia

- Slow phasing out of serfdom (1821–) and rise of socialism despite bans (1869–)
- How do enduring inequalities (*Sonderweg*) interact with this emerging ideology based on solidarity?
- Local variations in the extent of emancipation can be exploited and linked to electoral outcomes
- Consequences of serfdom are well documented for Russia (e.g. Buggle and Nafziger, 2016; Markevich and Zhuravskaya, 2018), but Prussia is set apart by its democratization and data abundance (e.g. Dell, 2005)

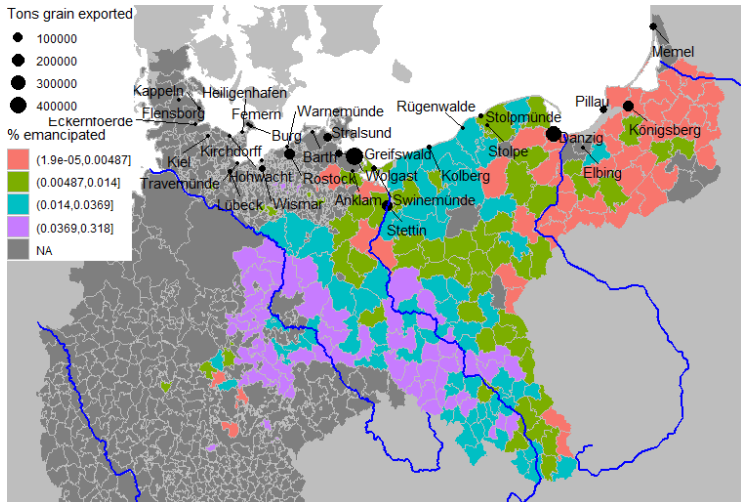


Figure 17: Share of emancipated peasants in 1848

Notes: Manumissions compiled from Meitzen (1869). Numerator is number settled emancipation cases of those who previously had lifetime duties and from the Dissolution Ordinance of 1821 to 1848 has redeemed them (*Dienst- und Agabenpflichtige, welche abgelöst haben*). Denominator is population eligible for such emissions, i.e. the rural population, recorded in the 1849 census, that had strong enough tenure rights (*spannfähige bäuerliche Nahrungen*) (Meitzen, 1869, p.307). Sound Toll trade during 5 prior years.

## Wahlkreisergebnisse bei der Wahl zum Norddeutschen Reichstag am 12. Februar 1867

publiziert von G. A. B. v. S. 1867

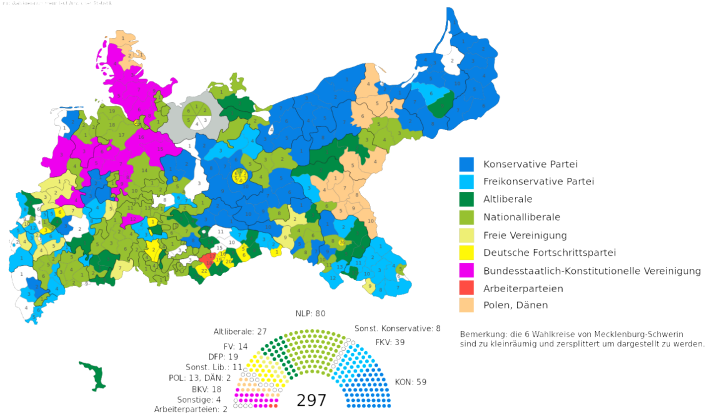


Figure 18: Constituencies' winning party in North German Confederation election, 1867. Source: Maximilian Dörrbecke Weak tenure rights

- Turnout 65% in 236 Prussian constituencies
- Men aged  $\geq 25$  not receiving welfare allowed to vote ( $\approx 19.4\%$  of population, 53% aged  $\geq 25$  among males, 50% male)
- Following elections: 1871, 1874, 1877, 1878, 1881, 1884...



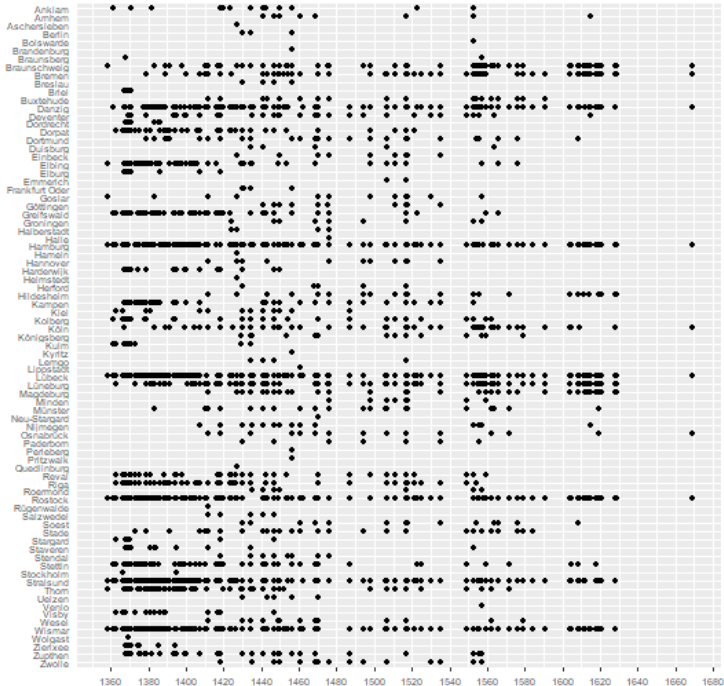
# Participation and Trade during the Hansa

- Ongoing debate whether merchant guilds rely predominantly on formal rules (Edwards and Ogilvie, 2012) or multilateral reputation mechanisms (Greif, 2012)
- Studying a guild - the Hansa - that has not been quantitatively researched before may provide new insights on institutions

## The Hansa:

- Was a trade alliance between cities rather than merchants
  - max. 200 members, e.g. Hamburg, Lübeck, Danzig, and Riga
- Conducted much of the trade in the North and Baltic Sea from 1358 to 1669
- Has been compared to the European Union and modern trade agreements (e.g. Fink, 2012)
- Held Hansa Diets that reveal membership and influence
- Viner's (1950) trade diversion framework can be applied
- Sound Toll reveals origin and destination city and if ships sails for Hansa since this requires Hansa city as captain's domicile



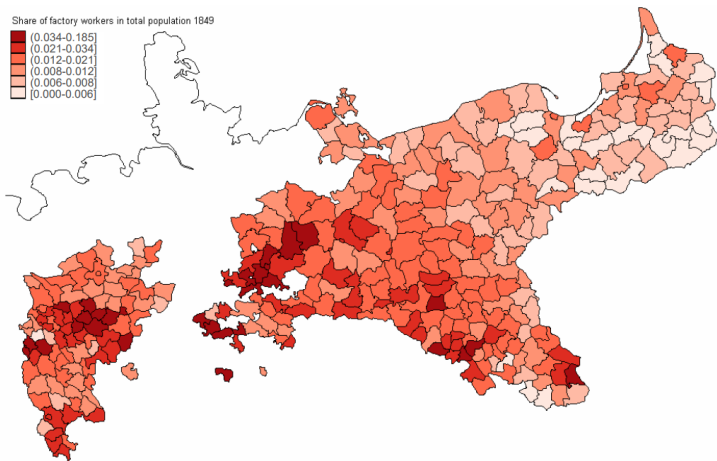


# Import Substitution in the European East

- Present-day developing world is concerned with import substitution - evidence from history?
- Eastern Europe predominantly exported primary products and, in return, it imported manufactured goods, such as textiles, from the West.
- Did this trade stifle the East's own industrial development? Or did it encourage it through providing opportunities to copy and learn?
- Did coercion limit the availability of labor for the industrial sector and curb its development?

## Data:

- Sound Toll reveals penetration of industrial imports of sub-national entities
- Prussian and Swedish censuses provide proxies for industrialization



*Notes:* County-level depiction based on the 1849 Factory Census. The delimiters correspond roughly to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the variable. See Appendix A for data details.

## Figure 19: Share of workers employed in manufacturing in 1849

*Notes:* Taken from Becker et al. (2009) and originally based on Prussian census.

# Terms of Trade Compared to Trade Volumes

- Terms of trade informs many studies (e.g. Jacks, 2004; Williamson, 2008; Frankema et al., 2018), but it may be an imprecise proxy for market integration, especially when:
  - inflation is volatile
  - currencies are debased
  - product quality is varied
- Sound Toll is a single source that reveals the actual extent of trade that can be compared to ToT
- Supply shocks that falsely suggest ToT-based market integration can be controlled for using grid-cell tree ring growth data
- Findings may caution against relying on ToT in certain circumstances

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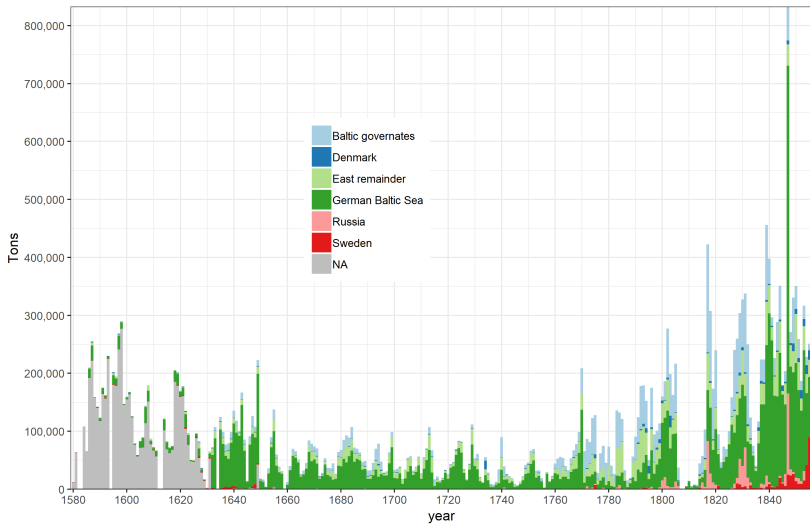
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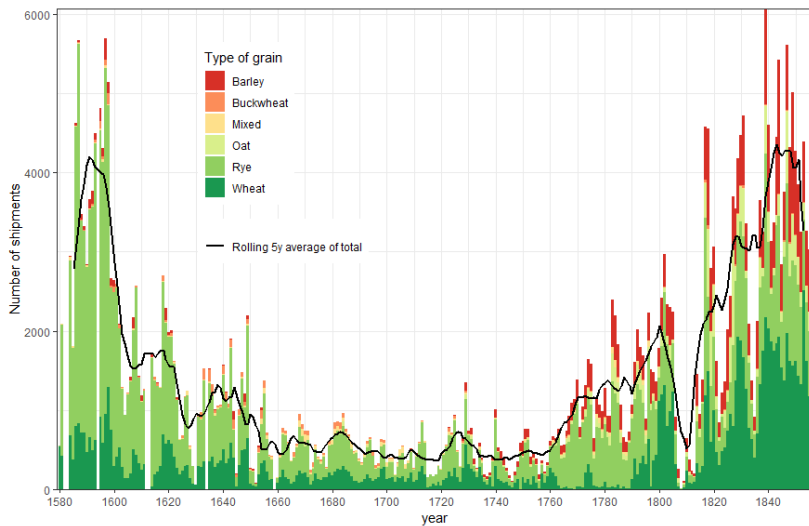


# Grain exports by origin

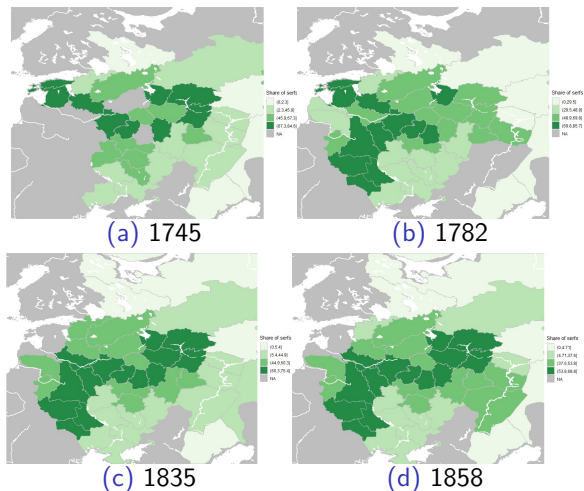




# Grain exports by grain type



# The Export Hypothesis in the Russian Heartland

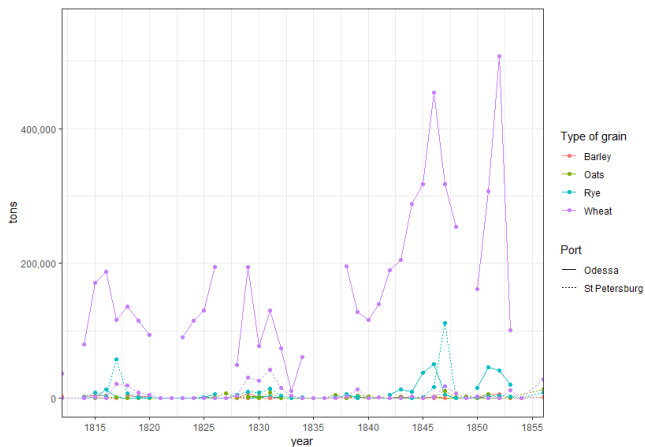


**Figure 21:** Share of serfs in Russia, 1745, 1782, 1835, 1858

*Notes:* Based on Russian censuses spreadsheets and shapefiles taken from Kessler and Markevich (2015). Shares are out of total population and plotted based on quartile in each panel. The shown panels represent the 4 earliest Russian censuses. Missing values stem from either territories not belonging to the Russian Empire at the time or those not captured by the census. In the case of Estonian and Livonia (present-day Latvia), their abolition of serfdom (in 1816 and 1819, respectively) explains why they are missing in the 1835 and 1858 census.



# Odessa vs. St Petersburg



**Figure 22:** Russia's Baltic and Black Sea grain exports by grain type, 1812-56

*Notes:* St. Petersburg exports based on Sound Toll, implying that they might be understated since they do not include intra-Baltic trade. Odessa export data obtained from the Black Sea Project, see <https://cities.blacksea.gr/en/odessa/5-7/>.

# Estonia excluding distance to Pärnau, 1732

Table 6: Estonia findings excluding distance to Pärnau, 1732

	HH's corvéé days per week					
	Without draught animal		With draught animal		With and without draught animal	
	(1)	(2)	(3)	(4)	(5)	(6)
Distance to Tallinn (in km)	-0.005*** (0.001)	-0.006*** (0.001)	-0.003*** (0.0002)	-0.002*** (0.0003)	-0.0002 (0.001)	-0.004*** (0.001)
Constant	-1.141*** (0.287)	-0.658 (2.147)	0.929*** (0.091)	0.239 (0.220)	-0.689** (0.287)	-2.554** (1.005)
Observations	4,955	1,868	6,154	2,179	6,265	2,206
R <sup>2</sup>	0.233	0.354	0.421	0.404	0.268	0.286
Adjusted R <sup>2</sup>	0.230	0.349	0.420	0.401	0.266	0.282
<b>Additional controls:</b>						
Type of manor	Y	Y	Y	Y	Y	Y
Farm animals	Y	Y	Y	Y	Y	Y
Other dues	Y	Y	Y	Y	Y	Y
Potential yield	Y	Y	Y	Y	Y	Y
Drought intensity	Y	Y	Y	Y	Y	Y
Forested land	N	Y	N	Y	N	Y

Notes: Cross-section of Northern Estonian households as recorded in the *Wackenbuch* of their manor. Type of manor distinguishes between church, knight and state manors. Multiply the coefficients by 1440, the number of minutes per day, to convert them to the change in corvéé minutes per household per week. 1 km closer to Tallinn, *ceteris paribus*, implies 21 min more corvéé per week (Column 1). Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Estonia - Further Descriptive Statistics

**Table 7:** Descriptive statistics for key variables in the *Wackenbücher*

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Distance to Tallinn	32,508	120.492	71.817	3.985	59.693	156.329	198.483
# corvée days/week per HH member with draught animal	12,150	0.963	0.491	0.125	0.667	1.000	6.000
# corvée days/week per HH member without draught animal	10,634	0.964	0.863	0.000	0.500	1.000	18.000
# able-bodied adult men	21,060	1.476	0.656	0.000	1.000	2.000	5.000
# able-bodied adult women	19,788	1.396	0.612	1.000	1.000	2.000	8.000
# total HH member	24,884	3.207	1.471	1.000	2.000	4.000	21.000
Used land	32,608	0.137	0.218	0	0	0.2	14
Unused land	32,608	0.145	0.573	0	0	0	15
# horses	14,669	1.431	0.608	1.000	1.000	2.000	5.000
# cows	16,414	1.901	0.929	1.000	1.000	2.000	12.000
# sheep	9,808	0.640	0.297	0.000	0.500	1.000	4.000
# chicken	7,108	1.591	0.982	0.000	1.000	2.000	8.000

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# Denmark (1/3)

$$\begin{aligned} \log(\text{DailyWage})_{iet} = & \beta_0 + \beta_1 \text{Serfdom}_t + \beta_2 \text{Farmhand}_{iet} + \beta_3 (\text{Serfdom}_t \times \text{Farmhand}_{iet}) + \\ & \beta_4 \text{ExportPotential}_{et} + \beta_5 (\text{ExportPotential}_{et} \times \text{Serfdom}_t) + \\ & \beta_6 (\text{ExportPotential}_{et} \times \text{Farmhand}_{iet}) + \\ & \beta_7 (\text{ExportPotential}_{et} \times \text{Farmhand}_{iet} \times \text{Serfdom}_t) + \beta_8' \mathbf{X}_{iet} + \sigma_e + \epsilon_{iet} \end{aligned}$$

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Table 8: Results Denmark, 1726-1801

	Individual's log(Daily Wage in Skilling)					
	Jensen et al.'s (2018) approach		Including ExportPotential			
	(1)	(2)	(3)	(4)	(5)	(6)
Serfdom	-0.116*** (0.012)	-0.051*** (0.012)	-0.142*** (0.013)	-0.076*** (0.013)	-0.144*** (0.013)	-0.080*** (0.013)
FarmWorker	-0.099*** (0.023)	-0.062*** (0.021)	-0.107*** (0.025)	-0.036 (0.023)	-0.145*** (0.028)	-0.083*** (0.026)
Serfdom × FarmWorker	-0.069** (0.028)	-0.061** (0.026)	-0.062** (0.030)	-0.087*** (0.027)	0.012 (0.040)	-0.002 (0.036)
ExportPotential			-0.029*** (0.005)	-0.027*** (0.005)	-0.033*** (0.006)	-0.030*** (0.005)
Serfdom × ExportPotential					0.005 (0.011)	0.002 (0.011)
FarmWorker × ExportPotential					0.112*** (0.037)	0.141*** (0.033)
Serfdom × FarmWorker × ExportPotential					0.026 (0.099)	0.008 (0.089)
GrainSales (tons)	0.0001 (0.0001)	0.0001 (0.0001)	0.00003 (0.0001)	-0.0001 (0.0001)	0.00003 (0.0001)	-0.00004 (0.0001)
Constant	1.625*** (0.042)	1.807*** (0.045)	1.640*** (0.046)	1.835*** (0.046)	1.647*** (0.046)	1.844*** (0.046)
Observations	8,595	8,595	8,595	8,595	8,595	8,595
Number of estates	12	12	12	12	12	12
Adjusted R <sup>2</sup>	0.342	0.467	0.343	0.470	0.344	0.472
Estate FE	N	Y	N	Y	N	Y

Notes: Repeated cross-section of individuals hired by estates to do farm or other work (Andersen and Pedersen, 2004). We control for the worker's gender, seniority (master, regular worker, or helper), whether the worker is a child, in which season the worker is employed, and the worker's job category based on the HISCO system. We also control for the island the manor is located on, how many tons of grain the manor sold in a given year net of purchases and a grain price index. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Denmark (3/3)

Table 9: Descriptive statistics for key variables for Denmark

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Net grain sales of estate (tons)	11,977	22.301	48.495	-100.888	-4.800	52.438	264.913
% farm worker	12,507	0.103	0.304	0	0	0	1
% of observations when serfdom was in place	12,507	0.777	0.416	0	1	1	1
% children	12,507	0.005	0.071	0	0	0	1
% male	12,507	0.982	0.133	0	1	1	1
% master	12,507	0.053	0.224	0	0	0	1

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# Mathematical Derivation I

Start by focusing on what sets our model in motion: exogenous changes in domestic ( $D_{\text{domestic}}$ ) and foreign demand ( $D_{\text{foreign}}$ ) that (through a function  $f$ ) drive determine the price  $p$  at which grains sell both domestically and internationally:

$$p = f \left[ \underset{(+)}{D_{\text{domestic}}} \left( \underset{(+)}{Pop_{\text{rural}}}, \underset{(+)}{Pop_{\text{urban}}} \right), \underset{(+)}{D_{\text{foreign}}} \right] \quad (1)$$

$D_{\text{domestic}}$  depends positively on rural ( $Pop_{\text{rural}}$ ) and urban population ( $Pop_{\text{urban}}$ ).  $Pop_{\text{rural}}$  can be used as labor ( $L$ ) in grain production:

$$Pop_{\text{rural}} = L \quad (2)$$

## Mathematical Derivation II

The amount of available land is fixed and set equal to 1, such that the land-labor ratio equals  $\frac{1}{L}$ . The production function ( $g$ ) determines the produced quantity  $q$  of grain solely depends on  $L$ :

$$q = g(L) = \alpha(L_f + L_c) \quad \text{s.t.} \quad 0 < \alpha < 1, \quad (3)$$
$$L_f + L_c = L$$

Labor can either be free ( $L_f$ ), in which case it is paid a wage  $w$  based on its marginal productivity, or coerced ( $L_c$ ).  $L_f$  and  $L_c$  sum to  $L$ , the maximum amount of labor.  $L_f$  can be converted into  $L_c$  and vice-versa. Coerced labor is paid a small subsistence wage ( $\sigma$ ) that does not depend on its marginal product. Coercion costs coercion effort  $\chi$  per coerced unit of labor. Free and coerced labor are assumed to be equally productive contributing to output by a factor  $\alpha$ . Note that the landowner's output is always the same as a result. The landowner's profit ( $\pi$ ) maximization writes as follows:



## Mathematical Derivation III

$$\max_{L_f, L_c} \pi = p\alpha(L_f + L_c) - wL_f - (\sigma + \chi)L_c \quad (4)$$

$$\text{s.t. } 0 < \sigma < 1,$$

$$0 < \chi < 1,$$

$$w = h\left(\underset{(-)}{L}, \underset{(+)}{p}\right) = h\left(\underset{(-)}{L}, f\left[D_{\text{domestic}}\left(\underset{(+)}{Pop}_{\text{rural}}, \underset{(+)}{Pop}_{\text{urban}}\right), \underset{(+)}{D}_{\text{foreign}}\right]\right)$$

The landowner can choose how much free and much coerced labor to employ, i.e. can convert free into coerced labor. Given  $\frac{\partial w}{\partial p} > 0$ , the landowner will employ more free labor as long as  $w < \sigma + \chi$ , but will employ more coerced labor as soon as  $w > \sigma + \chi$  in order to avoid paying wages. This consequence of rise in the price (that stems from foreign and domestic demand surges) is the aforementioned *direct* effect. We now turn to the 2 indirect effects.

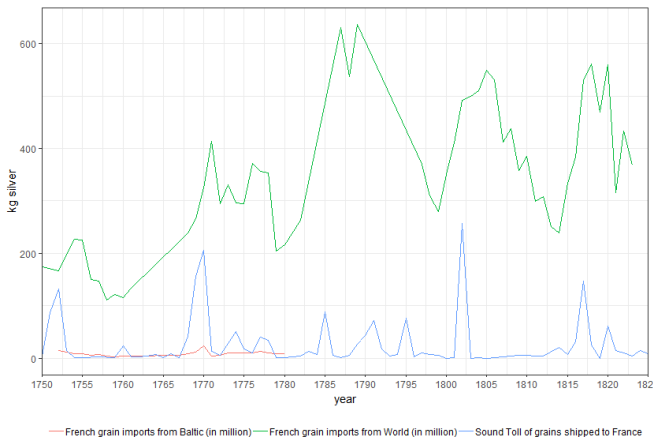
## Mathematical Derivation IV

The first indirect effect focuses on outside options (proxied by by urban population in our model) that increase the cost of coercion ( $\chi$ ) according to a function  $i$ :

$$\chi = i(\underset{(+)}{Pop_{urban}}) \quad (5)$$

Thus, given that an increase in  $Pop_{urban}$  not only leads to an rise in  $w$  (through  $p$ ), but also and increase in  $\chi$ , its effects on the equilibrium condition for more coercion ( $w > \sigma + \chi$ ) are ambiguous. A rise in coercion is made even more improbable by the second indirect effect, which dampens wage growth (given  $w = h(\underset{(-)}{L}, \underset{(+)}{p}))$  due to increased abundance of labor following an increase in  $Pop_{rural}$ . As mentioned before, in our model an increase in  $D_{foreign}$  only has a direct effect and, thus, unambiguously increases coercion.

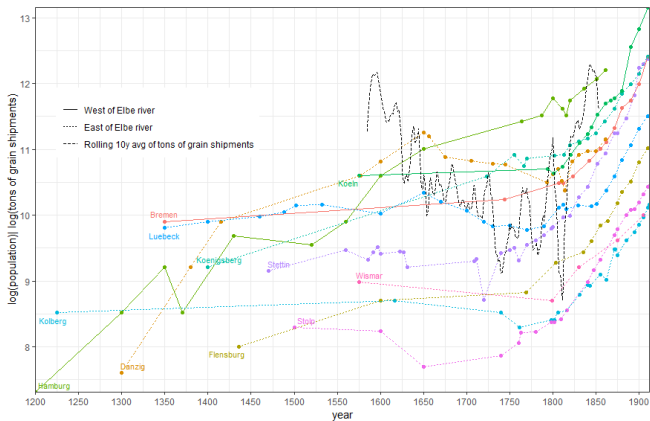
# French Trade



**Figure 23:** Value of french grain imports as recorded by local sources and toll on Baltic exports to France, 1750-1825

*Notes:* Based on Charles and Daudin (2018) and Sound Toll. All variables are denoted in kg of silver. Note that Sound Toll revenues are not in millions.

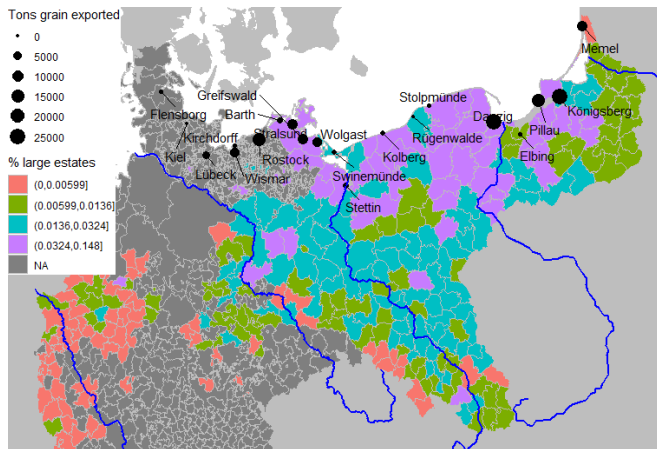
# Trade and City growth



**Figure 24:** Grain exports and growth of selected, German cities, 1200-1856

*Notes:* Figure shows the population across time of selected cities and the aggregated grain exports of East-Elbian, German cities. We observe a break in population growth for Danzig and Lübeck (and other East-Elbian cities) that is in stark contrast to that of Hamburg (and other West-Elbian cities). Population data transcribed from the commonly-used German city books (Städtebücher) (Kayser, 1939, 1941, 1952, 1954, 1956; Stob et al., 1995; Engel et al., 2000).

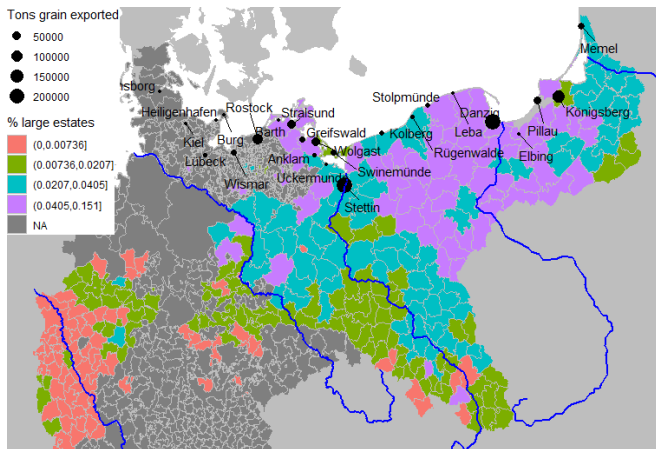
# Prussia 1816



**Figure 25:** Distribution of large estates and grain exports in Prussia, 1849

*Notes:* Share large estates (>50 hectare): Prussian census (Becker et al., 2014), Exports: Author's calculations based on Sound Toll

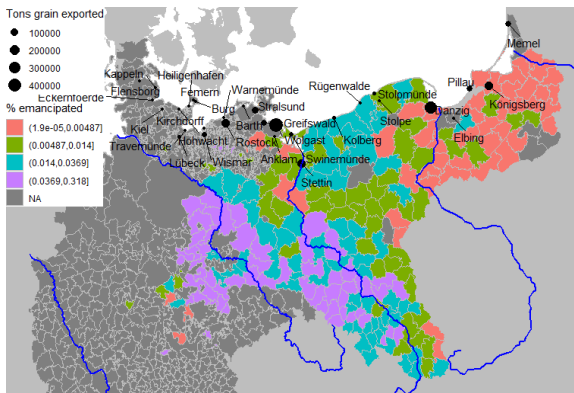
# Prussia 1864



**Figure 26:** Distribution of large estates and grain exports in Prussia, 1849

*Notes:* Share large estates (>50 hectare): Prussian census (Becker et al., 2014), Exports: Author's calculations based on Sound Toll

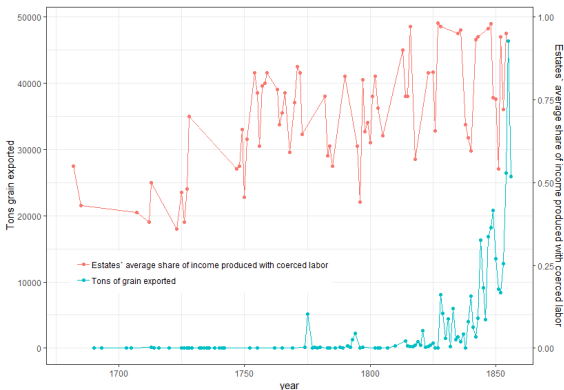
# Prussia Emancipation 1848



**Figure 27: Distribution of large estates and grain exports in Prussia, 1849**

*Notes:* Manumissions compiled from Meitzen (1869). Numerator is number settled emancipation cases of those who previously had lifetime duties and from the Dissolution Ordinance of 1821 to 1848 has redeemed them (*Dienst- und Agabepflichtige, welche abgelöst haben*). Denominator is population eligible for such emissions, i.e. the rural population, recorded in the 1849 census, that had strong enough tenure rights (*spannfähige bäuerliche Nahrungen*) (Meitzen, 1869, p.307). Sound Toll trade during 5 prior years.

# Scania - Share of demesne income

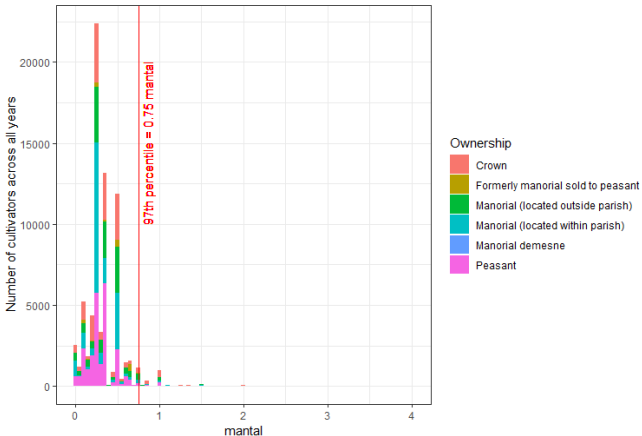


**Figure 28:** Share of estates' income from coerced labor versus wage labor and grain exports, 1680-1856

*Notes:* This figure shows the share of income that a manor declares as having been generated by coerced, that is unpaid, *corvée* labor. Based on the 9 estates for which this information is provided disaggregated in Olsson (2002). More data will be provided by Mats Olsson in the future that will allow us to assess whether these trends are affected by export potential.



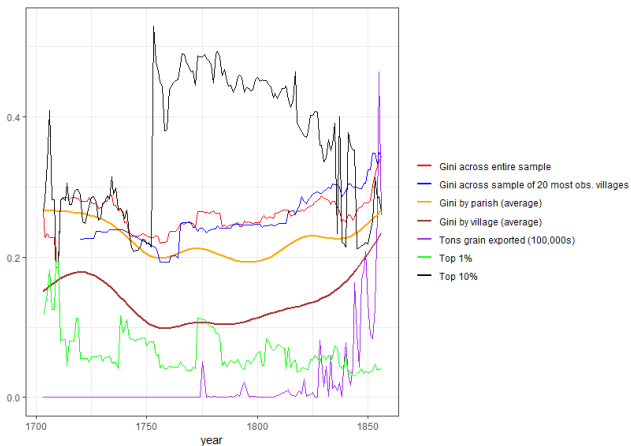
# Scania - Distribution Mantal



**Figure 29:** Distribution of mantals by cultivators across all years, 1702-1856

Notes: Figures shows the distribution of mantals by cultivators. Note that only peasant land and former manorial land is actually owner by the cultivator. The red vertical lines the thresholds that defines large estates.

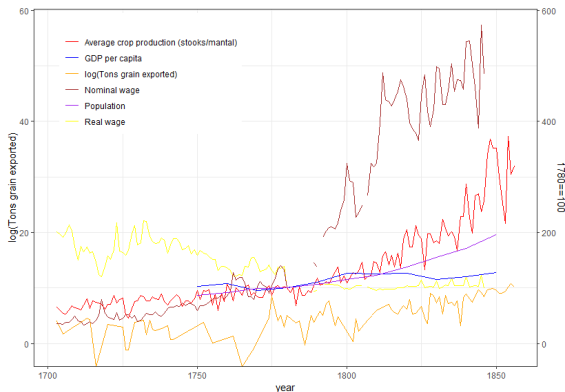
# Scania - Top Wealth Share and Gini



**Figure 30:** landownership and grain exports, 1702-1856

*Notes:* Constructed from the Historical Database of Scanian Agriculture (Olsson et al., 2017) and the Sound Toll. Note that the used data specifically refers to Scania rather than the whole of Sweden.

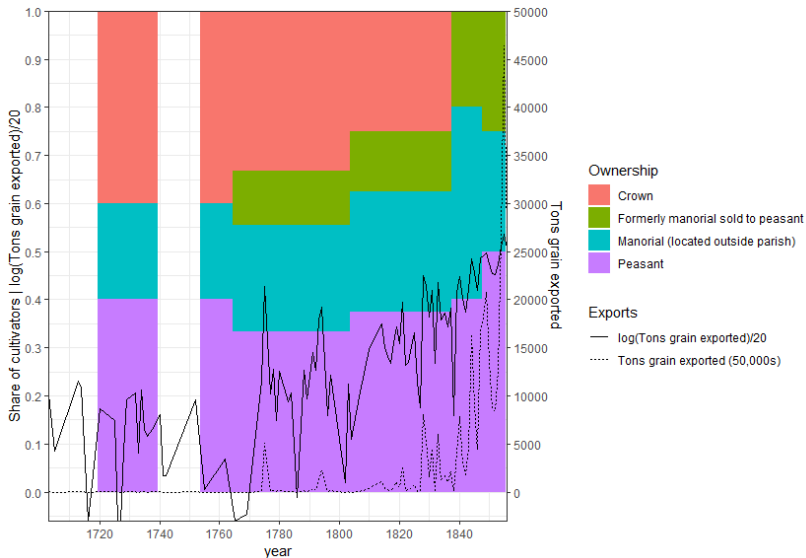
# Scania - Macro Statistics



**Figure 31:** Scania (1703-1856): Trade, wages, harvest, GDP, and population

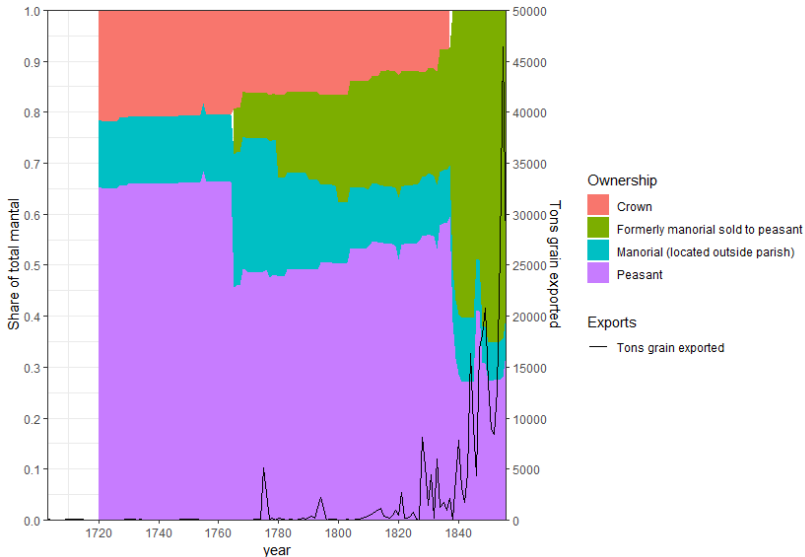
*Notes:* Figure plots macro statistics specific for Scania to assess the economy-wide effects of trade liberalization and/or land markets. Real and nominal wage data for rural, male, annual workers in Scania taken from Gary (2018) who uses a respectability basket for Malmö to deflate. Production per mantal calculated from our usual Scania data. Population and GDP calculated from Enflo and Missiaia (2018) using the Kristianstads and Malmöhus districts.

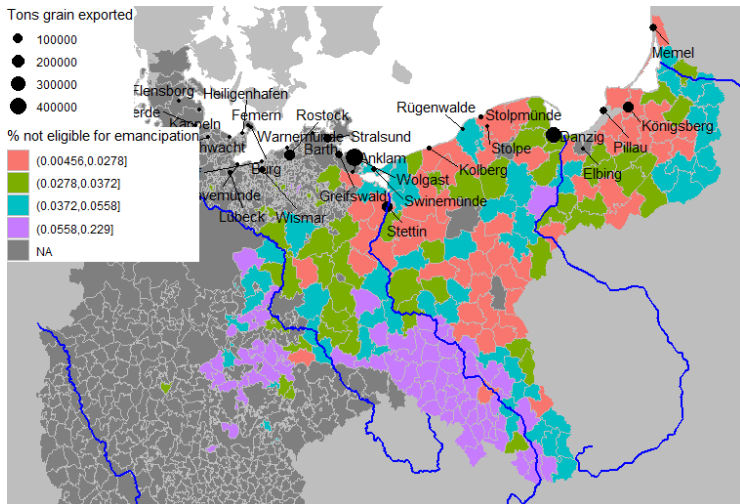
# Share cultivator (20 most frequently obs. villages)





## Share mantal (20 most frequently obs. villages)





**Figure 32: Share of peasants with weak tenure rights in 1848**

Notes: Numerator is that had no strong enough tenure rights (*spannfähige bäuerliche Nahrungen*) (Meitzen, 1869, p.307) to qualify for manumission. Denominator is rural population recorded in the 1849 census. Sound Toll trade during 5 prior years.