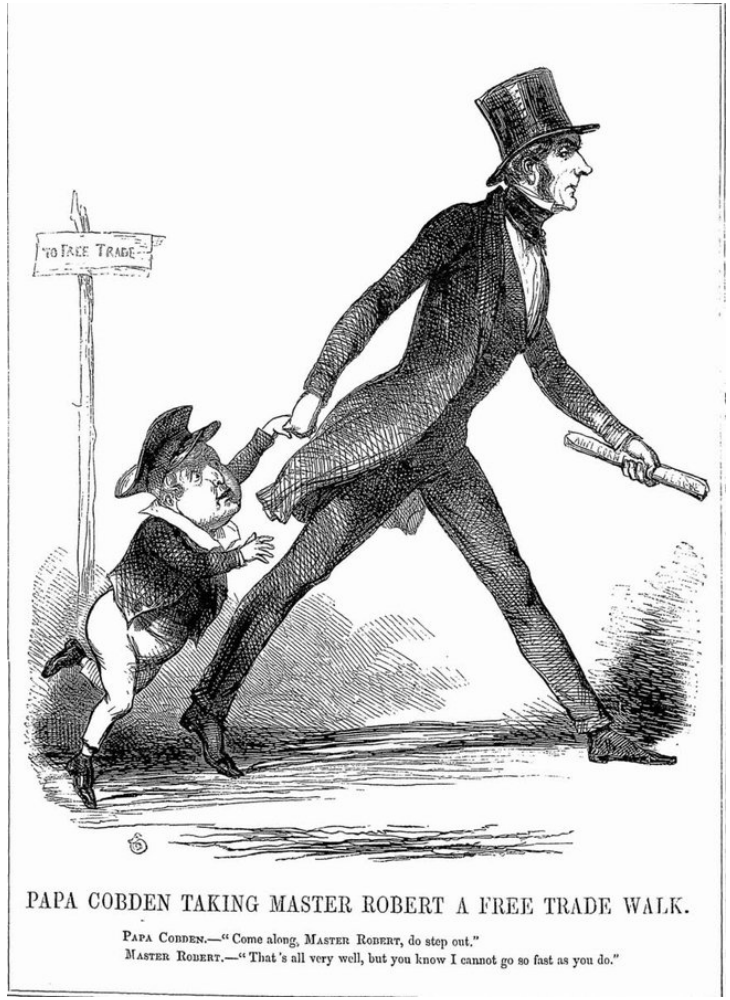
The Distributional Consequences of Trade: Evidence from the Repeal of the Corn Laws

Stephan Heblich, Stephen J. Redding and Yanos Zylberberg



PAPA COBDEN TAKING MASTER ROBERT A FREE TRADE WALK.

PAPA COBDEN.—"Come along, MASTER ROBERT, do step out."
MASTER ROBERT.—"That 's all very well, but you know I cannot go so fast as you do."

Motivation

- Resurgence of interest in the distributional consequences of trade
  - China shock: Autor, Dorn & Hanson (2013, 2016, 2020)

Motivation

- Resurgence of interest in the distributional consequences of trade
  - China shock: Autor, Dorn & Hanson (2013, 2016, 2020)

- We provide new theory and evidence on these distributional consequences using the 1846 repeal of the Corn Laws in Britain
  - Opened British markets to the New World "grain invasion" in the second half of the 19th century (especially after the end of American Civil War)
  - Distributional conflict between urban proletariat and rural aristocracy

Motivation

- Resurgence of interest in the distributional consequences of trade
  - China shock: Autor, Dorn & Hanson (2013, 2016, 2020)
- We provide new theory and evidence on these distributional consequences using the 1846 repeal of the Corn Laws in Britain
  - Opened British markets to the New World "grain invasion" in the second half of the 19th century (especially after the end of American Civil War)
  - Distributional conflict between urban proletariat and rural aristocracy
- Research on the Corn Laws has traditionally emphasized the distributional effects across factors or industries
  - Heckscher-Ohlin and Specific-Factors models

Motivation

- Resurgence of interest in the distributional consequences of trade
  - China shock: Autor, Dorn & Hanson (2013, 2016, 2020)
- We provide new theory and evidence on these distributional consequences using the 1846 repeal of the Corn Laws in Britain
  - Opened British markets to the New World "grain invasion" in the second half of the 19th century (especially after the end of American Civil War)
  - Distributional conflict between urban proletariat and rural aristocracy
- Research on the Corn Laws has traditionally emphasized the distributional effects across factors or industries
  - Heckscher-Ohlin and Specific-Factors models
- We provide evidence on distributional consequences across different geographical areas within England and Wales
  - New, spatially-disaggregated data on population, employment and land values for around 11,000 parishes from 1801-1911
  - Exogenous trade exposure measure based on agroclimatic conditions
  - Quantitative spatial model to evaluate the impact of this trade shock on industrialization, urbanization and income distribution

Main Findings

- Key advantage of empirical setting is the difference in agroclimatic conditions between Western and Eastern parts of England and Wales
  - Warm ocean current of North Atlantic Drift and prevailing SW winds
  - Western areas have greater cloud cover, more precipitation and lower average temperatures, and also more mountainous
  - Western grazing (pastoral) and Eastern corn (arable) locations
  - Exogenous exposure measure based on agroclimatic suitability for wheat

Main Findings

- Key advantage of empirical setting is the difference in agroclimatic conditions between Western and Eastern parts of England and Wales
  - Warm ocean current of North Atlantic Drift and prevailing SW winds
  - Western areas have greater cloud cover, more precipitation and lower average temperatures, and also more mountainous
  - Western grazing (pastoral) and Eastern corn (arable) locations
  - Exogenous exposure measure based on agroclimatic suitability for wheat
- Substantial estimated treatment effects of the grain invasion following the Repeal of the Corn Laws for high-wheat suitability regions
  - Population (around −20 percent)
  - Migration (track individuals over time)
  - Structural transformation
  - Poverty (poor law data)
  - Reallocation agricultural land use
  - Urbanization
  - Rateable values (land and buildings)

Main Findings

- Key advantage of empirical setting is the difference in agroclimatic conditions between Western and Eastern parts of England and Wales
  - Warm ocean current of North Atlantic Drift and prevailing SW winds
  - Western areas have greater cloud cover, more precipitation and lower average temperatures, and also more mountainous
  - Western grazing (pastoral) and Eastern corn (arable) locations
  - Exogenous exposure measure based on agroclimatic suitability for wheat
- Substantial estimated treatment effects of the grain invasion following the Repeal of the Corn Laws for high-wheat suitability regions
  - Population (around -20 percent)
  - Migration (track individuals over time)
  - Structural transformation
  - Poverty (poor law data)
  - Reallocation agricultural land use
  - Urbanization
  - Rateable values (land and buildings)
- Consistent with historical narrative of "great agricultural depression"

Related Literature

- Local labor market effects of international trade shocks
  - Topalova (2010), Autor, Dorn & Hanson (2013, 2016, 2020), Autor et al. (2014), Kovak (2013), Kovak & Dix-Carneiro (2015), Feenstra (2019), Eriksson et al. (2020)
- Distributional consequences of international trade
  - Stolper & Samuelson (1941), Jones (1971), Mussa (1974)
- Urbanization and structural transformation
  - Matsuyama (1992), Uy, Yi & Zhang (2013), Bustos, Caprettini & Ponticelli (2016, 2020), Fajgelbaum & Redding (2018), Eckert & Peters (2018)
- Quantitative spatial models
  - Redding & Sturm (2008), Allen & Arkolakis (2014), Redding (2016), Ramondo, Rodríguez-Clare & Saborío-Rodríguez (2016), Redding & Rossi-Hansberg (2017), Desmet, Nagy & Rossi-Hansberg (2018), Caliendo, Parro, Rossi-Hansberg & Sarte (2018), Galle, Rodríguez-Clare & Yi (2018), Allen & Donaldson (2018), Monte, Redding & Rossi-Hansberg (2018), Fajgelbaum & Redding (2018), Caliendo, Parro & Dvorkin (2019), Fajgelbaum, Morales, Suárez Serrato & Zidar (2019)
- Economic history of the corn laws, agricultural depression, industrial revolution, and decline of aristocracy in 19th-century Britain
  - Graham (1892), Nicholson (1904), Barnes (1930), Irwin (1989), Williamson (1990), O'Rourke (1997), Taylor (1999), Clark (2002), Schonhardt-Bailey (2006), Sharp (2009), Cannadine (2019), Caprettini & Voth (2019), Irwin & Chepeliev (2020)

Outline

- Historical Background
- Data
- Reduced-form Evidence
- Theoretical Model
- Quantitative Evidence

Historical Background

- Origins of the corn laws date back to laws of 1463 and 1670
  - Sliding scale of import duties that were part of regulations to stabilize the price of bread as the main source of sustenance
  - Initially, mostly self-sufficient in wheat and suspended in scarcity

Historical Background

- Origins of the corn laws date back to laws of 1463 and 1670
  - Sliding scale of import duties that were part of regulations to stabilize the price of bread as the main source of sustenance
  - Initially, mostly self-sufficient in wheat and suspended in scarcity
- Population and economic growth with industrial revolution after 1760
  - Britain systematic net importer of wheat (mostly from Prussia/Russia)

Historical Background

- Origins of the corn laws date back to laws of 1463 and 1670
  - Sliding scale of import duties that were part of regulations to stabilize the price of bread as the main source of sustenance
  - Initially, mostly self-sufficient in wheat and suspended in scarcity
- Population and economic growth with industrial revolution after 1760
  - Britain systematic net importer of wheat (mostly from Prussia/Russia)
- Revolutionary and Napoleonic Wars from 1792-1815
  - Loss of wheat imports from continental Europe (blockade)
  - Large rise of domestic wheat price and wheat production

Historical Background

- Origins of the corn laws date back to laws of 1463 and 1670
  - Sliding scale of import duties that were part of regulations to stabilize the price of bread as the main source of sustenance
  - Initially, mostly self-sufficient in wheat and suspended in scarcity
- Population and economic growth with industrial revolution after 1760
  - Britain systematic net importer of wheat (mostly from Prussia/Russia)
- Revolutionary and Napoleonic Wars from 1792-1815
  - Loss of wheat imports from continental Europe (blockade)
  - Large rise of domestic wheat price and wheat production
- Corn Law of 1815 motivated by fears of agricultural crisis
  - Prohibited wheat imports when price was under 82.5 shillings per quarter (ports largely closed to wheat imports until 1825)
  - Political conflict between wheat consumers (urban proletariat and Anti-Corn Law League) and producers (rural aristocracy)

Historical Background

- Origins of the corn laws date back to laws of 1463 and 1670
  - Sliding scale of import duties that were part of regulations to stabilize the price of bread as the main source of sustenance
  - Initially, mostly self-sufficient in wheat and suspended in scarcity
- Population and economic growth with industrial revolution after 1760
  - Britain systematic net importer of wheat (mostly from Prussia/Russia)
- Revolutionary and Napoleonic Wars from 1792-1815
  - Loss of wheat imports from continental Europe (blockade)
  - Large rise of domestic wheat price and wheat production
- Corn Law of 1815 motivated by fears of agricultural crisis
  - Prohibited wheat imports when price was under 82.5 shillings per quarter (ports largely closed to wheat imports until 1825)
  - Political conflict between wheat consumers (urban proletariat and Anti-Corn Law League) and producers (rural aristocracy)
- Repeal of Corn Laws 1846 by Robert Peel to stem political discontent

Historical Background

- Origins of the corn laws date back to laws of 1463 and 1670
  - Sliding scale of import duties that were part of regulations to stabilize the price of bread as the main source of sustenance
  - Initially, mostly self-sufficient in wheat and suspended in scarcity
- Population and economic growth with industrial revolution after 1760
  - Britain systematic net importer of wheat (mostly from Prussia/Russia)
- Revolutionary and Napoleonic Wars from 1792-1815
  - Loss of wheat imports from continental Europe (blockade)
  - Large rise of domestic wheat price and wheat production
- Corn Law of 1815 motivated by fears of agricultural crisis
  - Prohibited wheat imports when price was under 82.5 shillings per quarter (ports largely closed to wheat imports until 1825)
  - Political conflict between wheat consumers (urban proletariat and Anti-Corn Law League) and producers (rural aristocracy)
- Repeal of Corn Laws 1846 by Robert Peel to stem political discontent
- Following American Civil War of 1861-65, new transport technologies of steamship and railroad led to new-world "grain invasion"
  - Repeal ensured that British markets remain open
  - "Great agricultural depression" after 1870

Outline

- Historical Background
- Data
- Reduced-form Evidence
- Theoretical Model
- Quantitative Evidence

Data

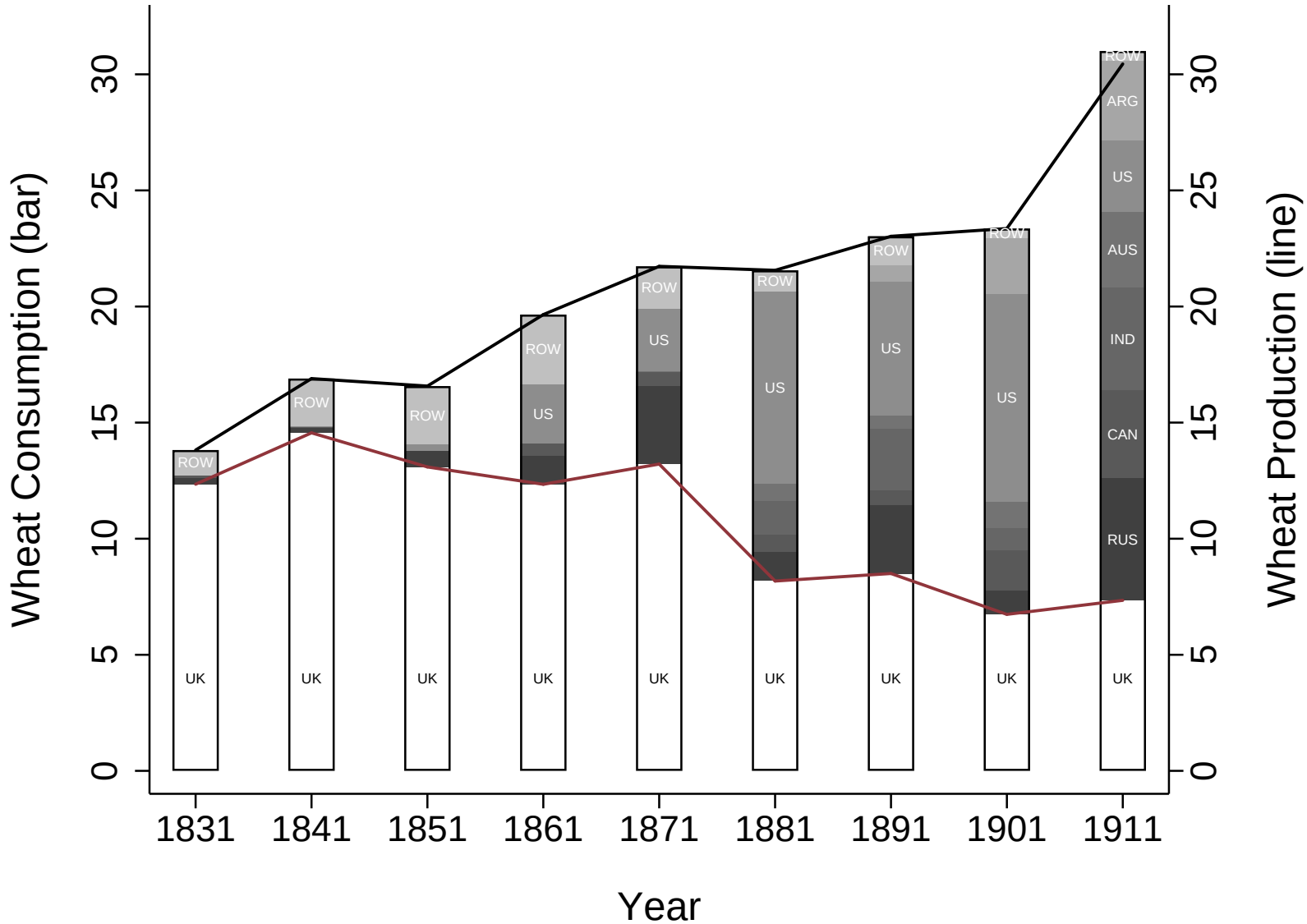
- Parish-level Population Census data for England and Wales
  - Around 11,000 parishes, aggregated into poor law unions and counties
  - Population by residence from 1801-1911
  - Employment by occupation from 1851 onwards
- Individual-level population census data
  - Name match individuals across population census waves (migration)
  - Data for 1851, 1861 and every census decade from 1881-1901
- Rateable value data
  - Rateable value data by parish from 1815-1896
  - Market rental value of land and buildings after deducting expenses for repair and maintenance
- Domestic prices, import values and quantities of wheat
- Global Agro-Ecological Zones (GAEZ) crop suitability, endowments of other natural resources (e.g. coal and iron), urban & rural status etc

Outline

- Historical Background
- Data
- Reduced-form Evidence
- Theoretical Model
- Quantitative Evidence

Corn Laws & Grain Invasion

UK Consumption, Production and Imports of Wheat

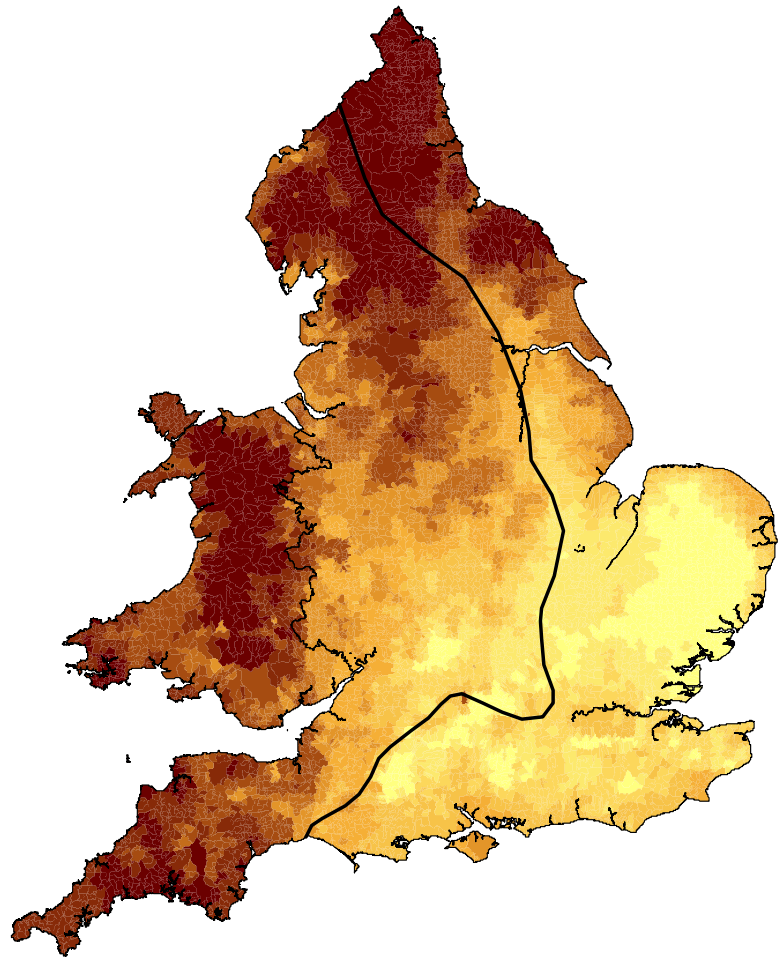


Wheat Suitability

Wheat Suitability

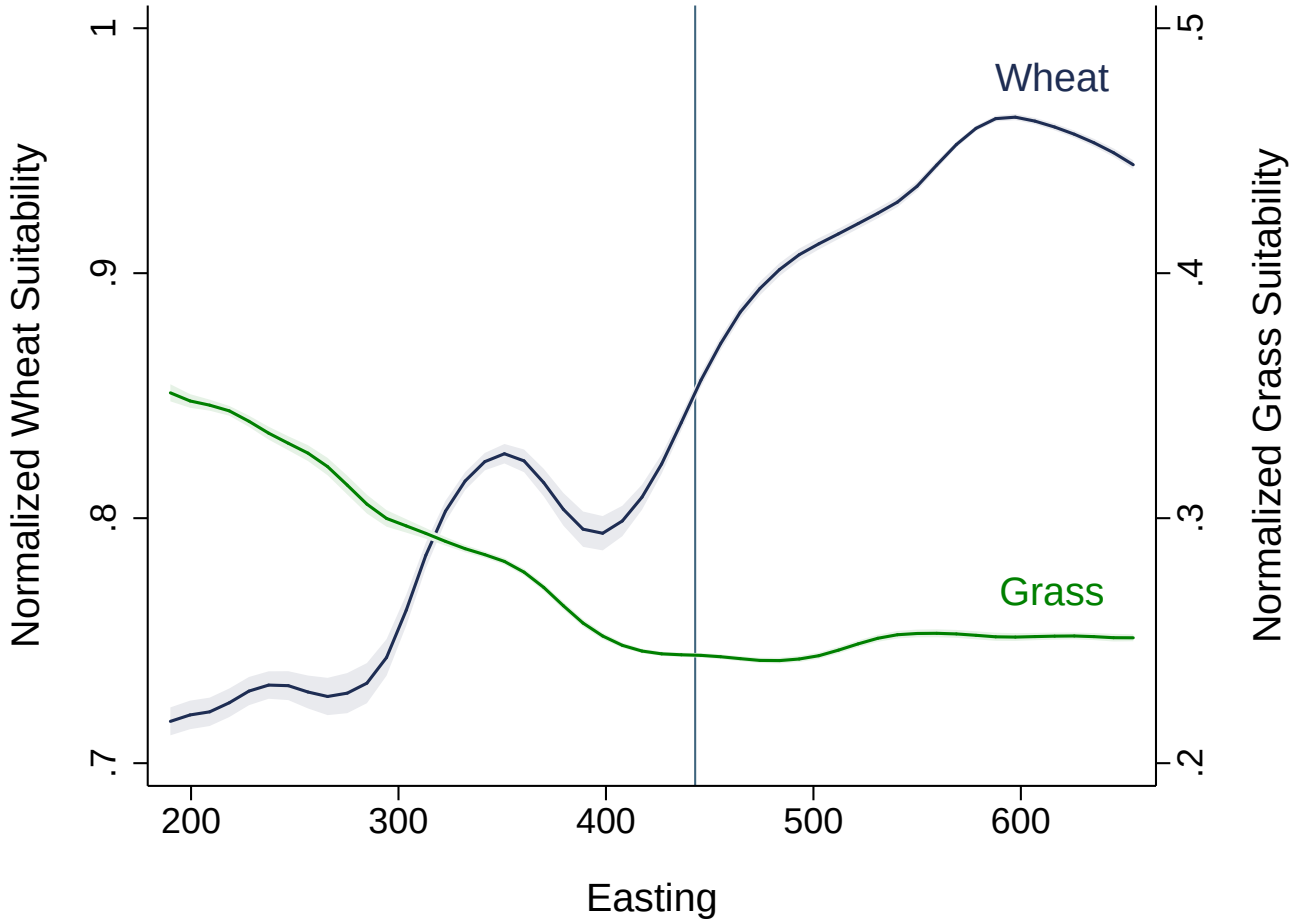


(a) Caird (1852)



(b) Wheat Suitability (UN GAEZ)

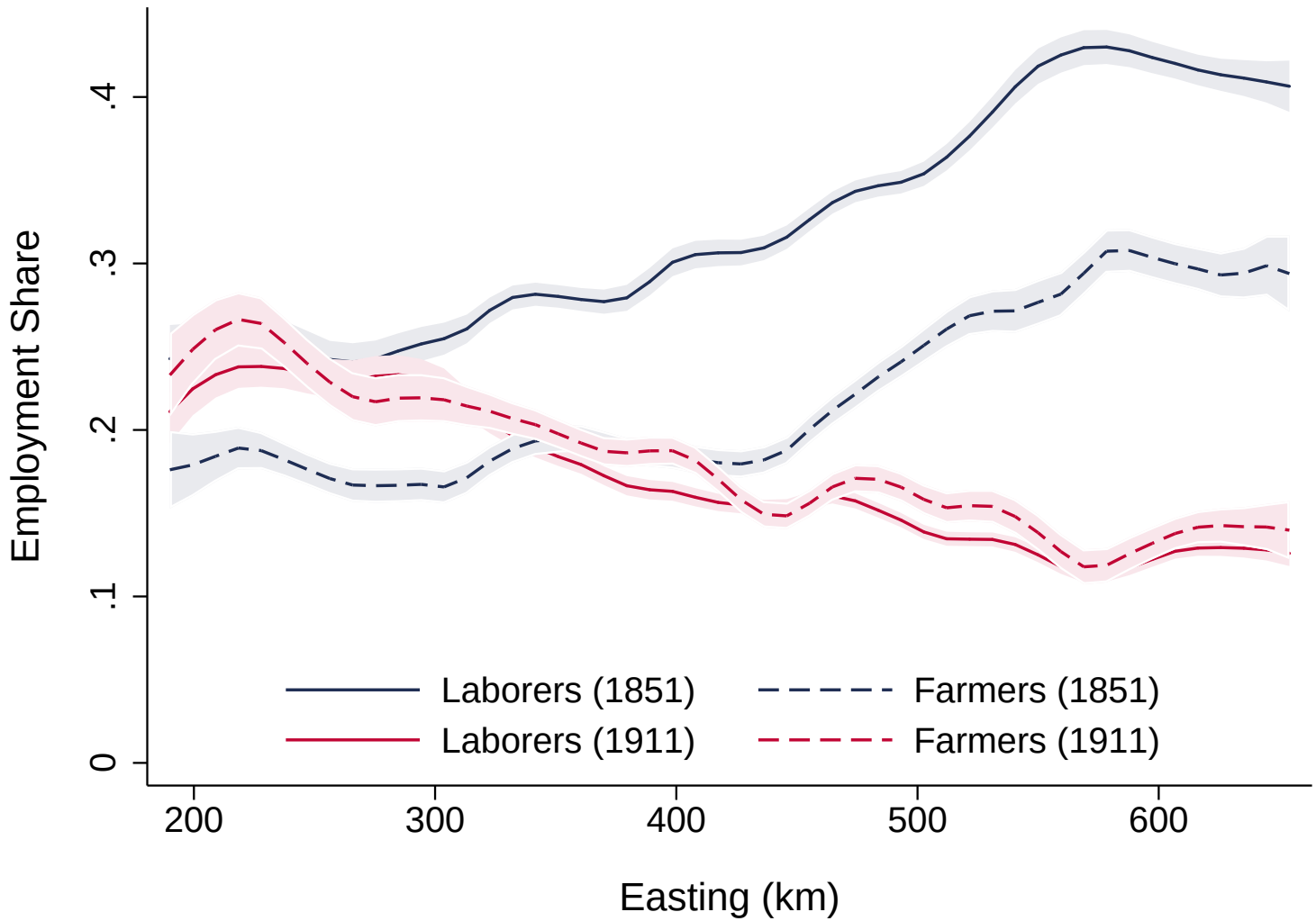
Average Wheat Suitability



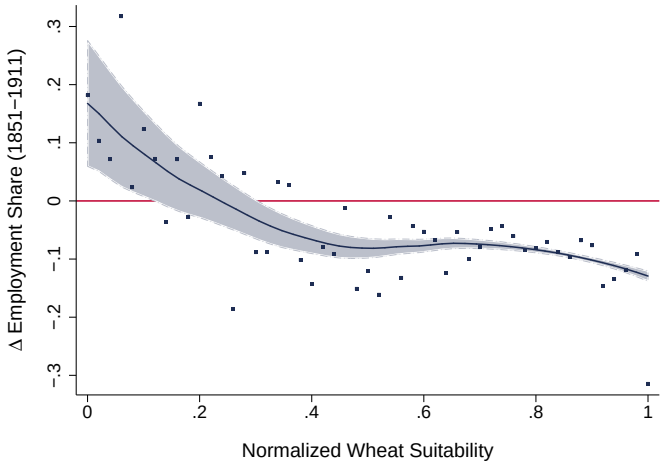
- Eastings of British National Grid (London Guildhall: 532)
- Vertical line: Avg. easting of Caird line separating grazing and corn counties

Structural Transformation

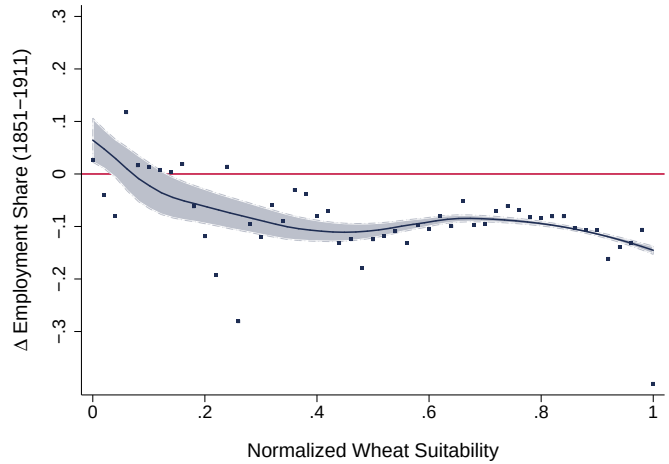
Laborers and Farmers 1851 & 1911



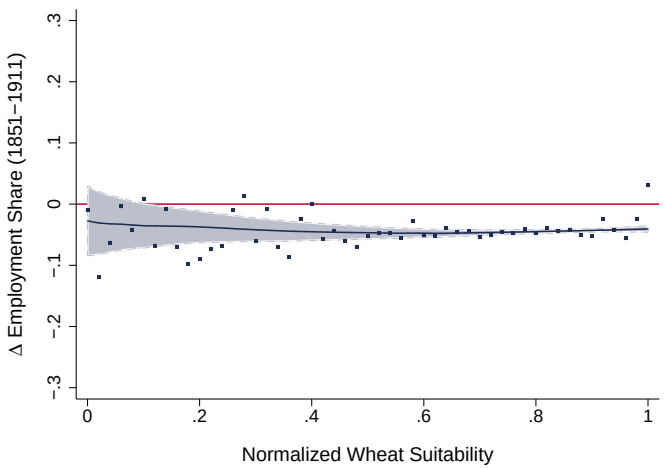
Change in Employment Shares



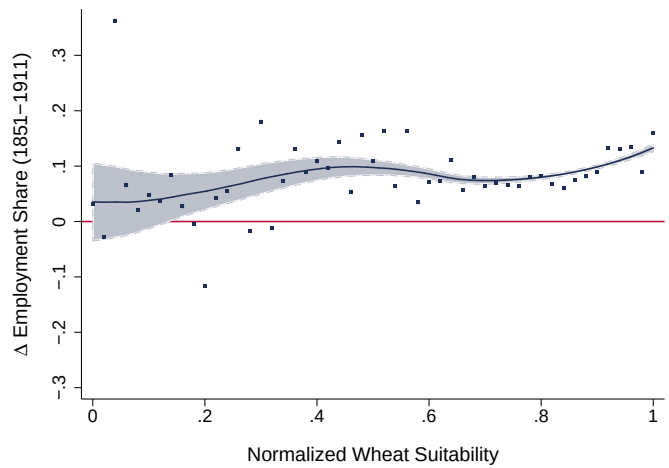
(a) Agriculture



(b) Agricultural Laborers



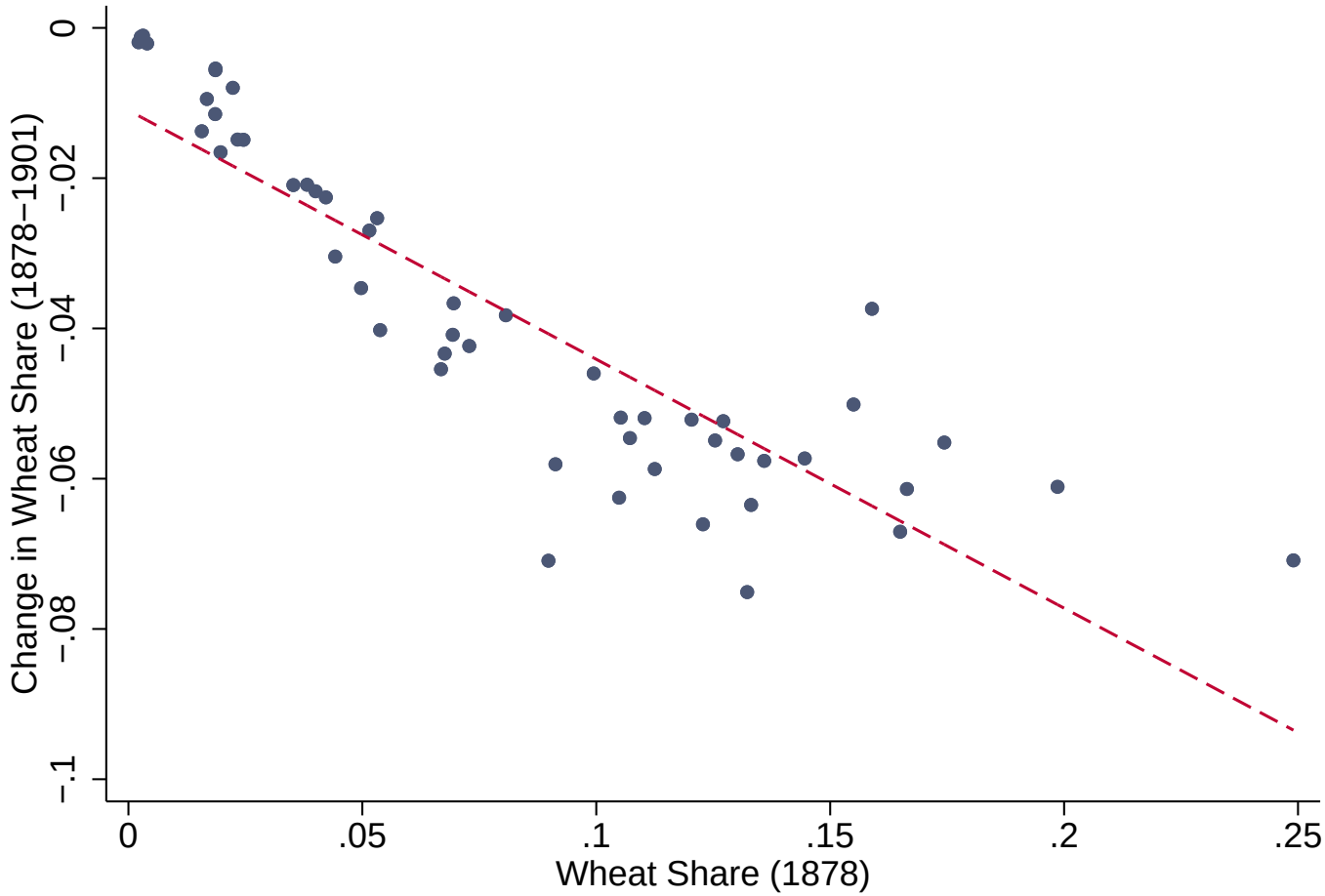
(c) Manufacturing



(d) Services

Arable Land Reallocation Away from Wheat

- County data from the agricultural census from the 1870s onwards

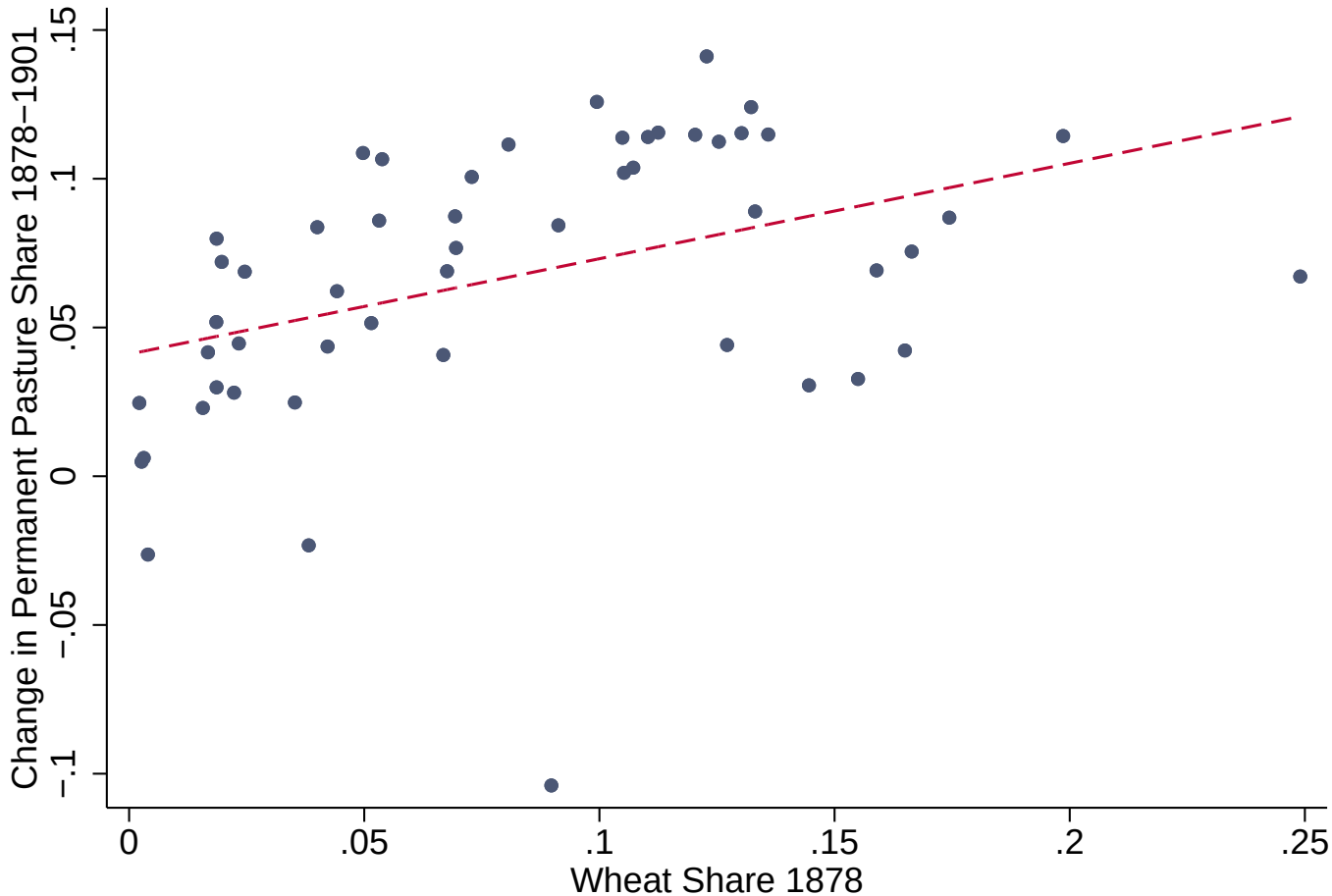


Note: Slope coefficient: −0.3312; standard error: 0.0327; R−squared: 0.7679.

▸ mean

Arable Land Reallocation to Permanent Pasture

- County data from the agricultural census from the 1870s onwards



Note: Slope coefficient: 0.3208; standard error: 0.0922; R−squared: 0.1620.

▸ acreage ▸ wages ▸ agbank

Event-Study Specifications

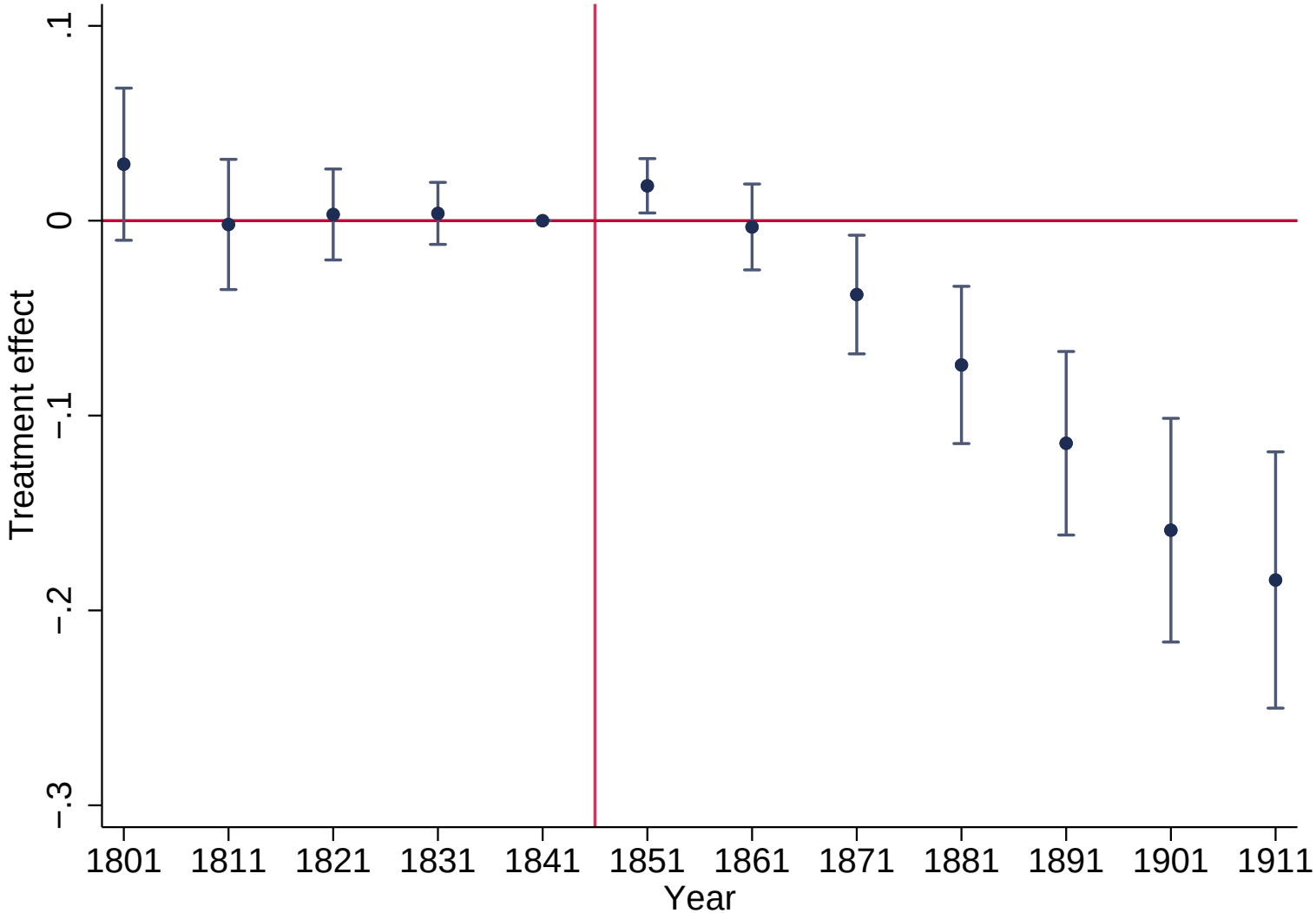
Reduced-Form Regressions

- "Difference-in-differences" regression specification

$$\ln Pop_{it} = \eta_i + \sum_{\tau=-T}^{\tau=T} \beta_\tau \left(\mathbb{I}_\tau \times \text{Wheat}_i \right) + \left(X_i \times \delta_t \right) + d_t + u_{it}$$

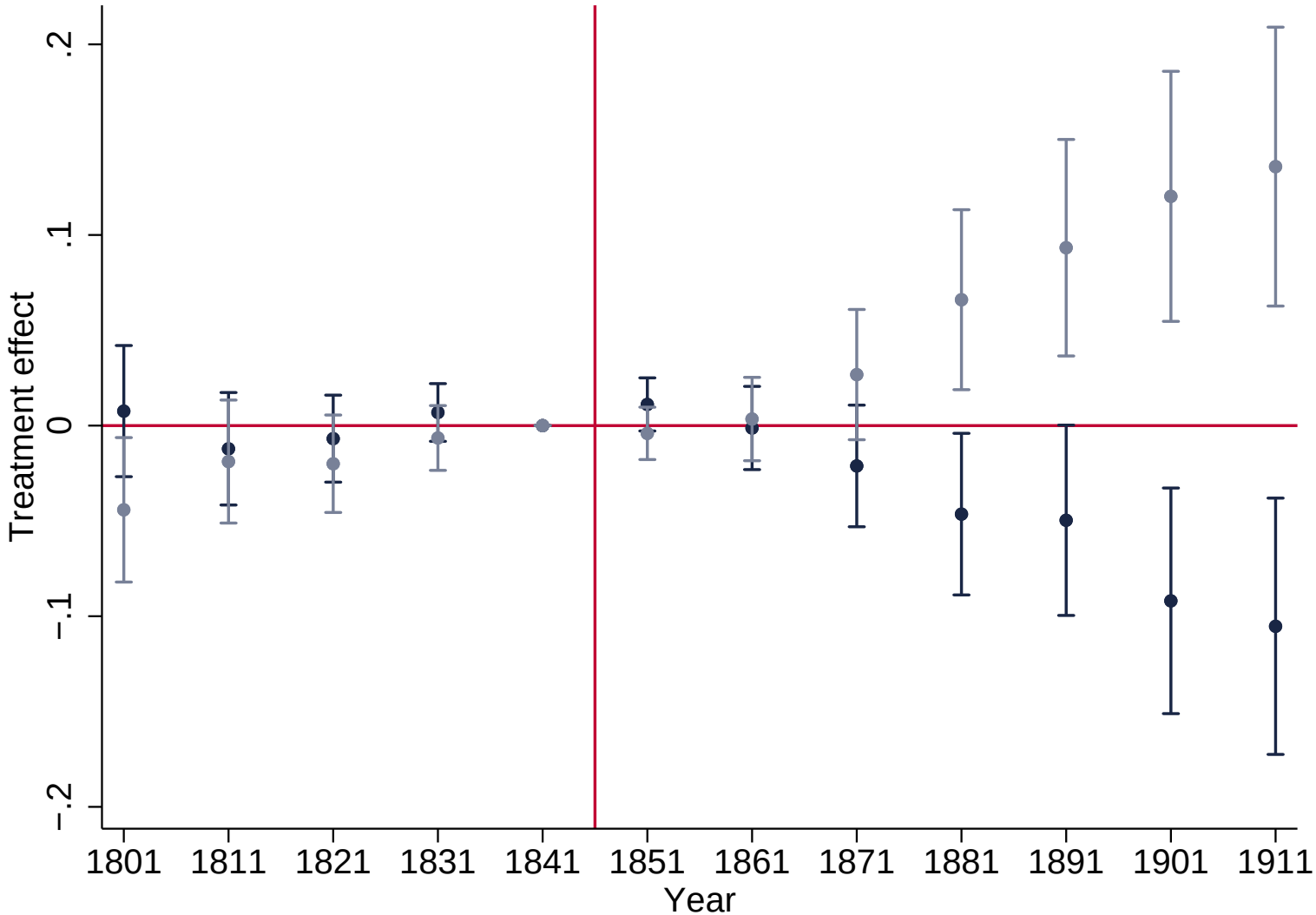
- Parishes i, calendar year t and treatment year τ
- $\mathbb{I}_\tau$: Indicator for treatment year τ (1841 excluded)
- Wheat_i: Indicator for parishes with above average wheat suitability
- X_{it}: Controls for
  - Distance to nearest of 76 industrial centers $\times$ year
  - Distance to London $\times$ year
  - Distance to Manchester $\times$ year
  - Distance to nearest coalfield $\times$ year
  - Urban indicator (based on 1801 population density) $\times$ year
  - Wales indicator $\times$ year
- Standard errors clustered by poor law union
  - Robustness tests using Heteroscedasticity and Autocorrelation Consistent (HAC) standard errors following Conley (1999) and standard errors clustered by 100 bins wheat suitability and poor law union

High Wheat Suitability

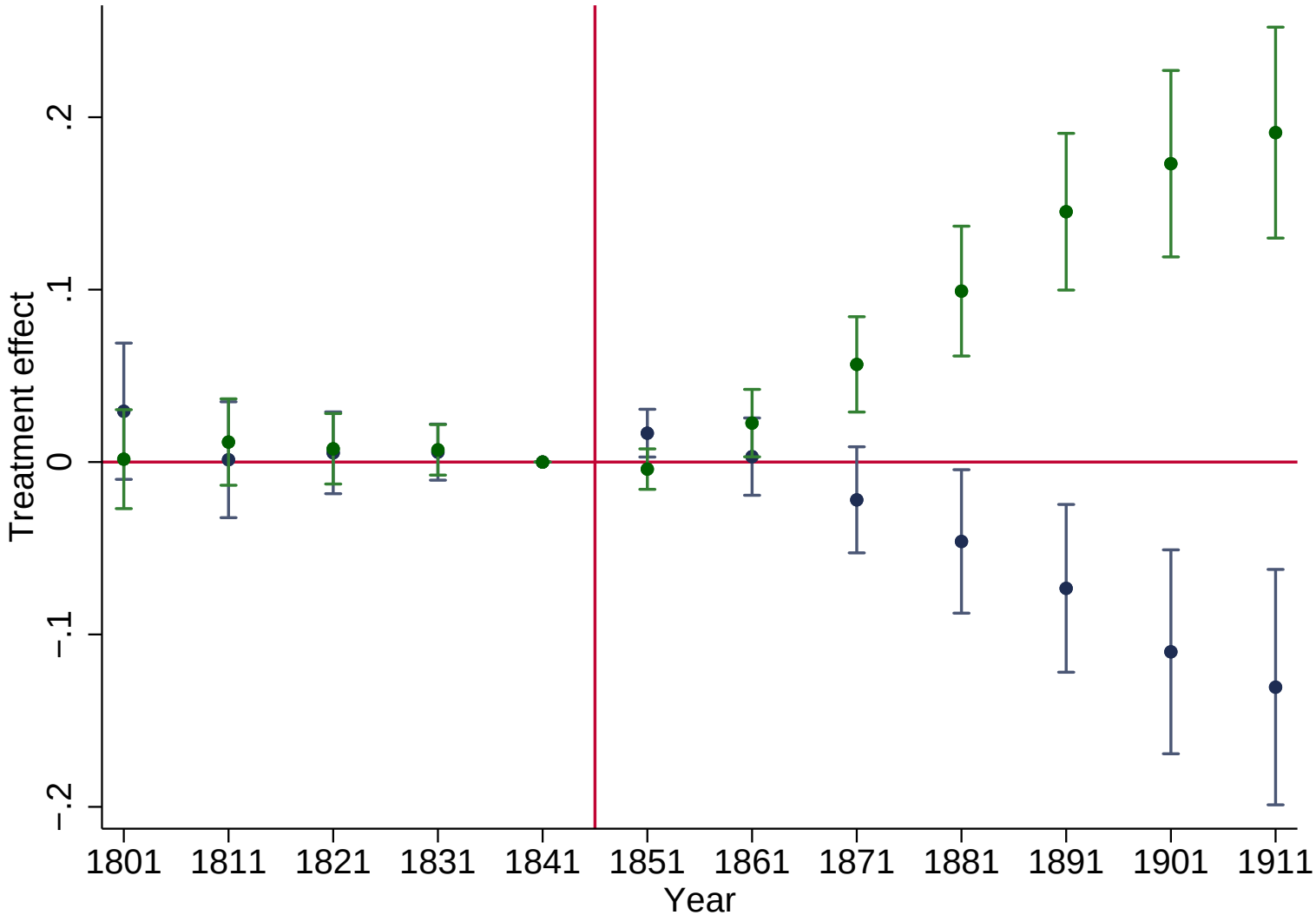


more

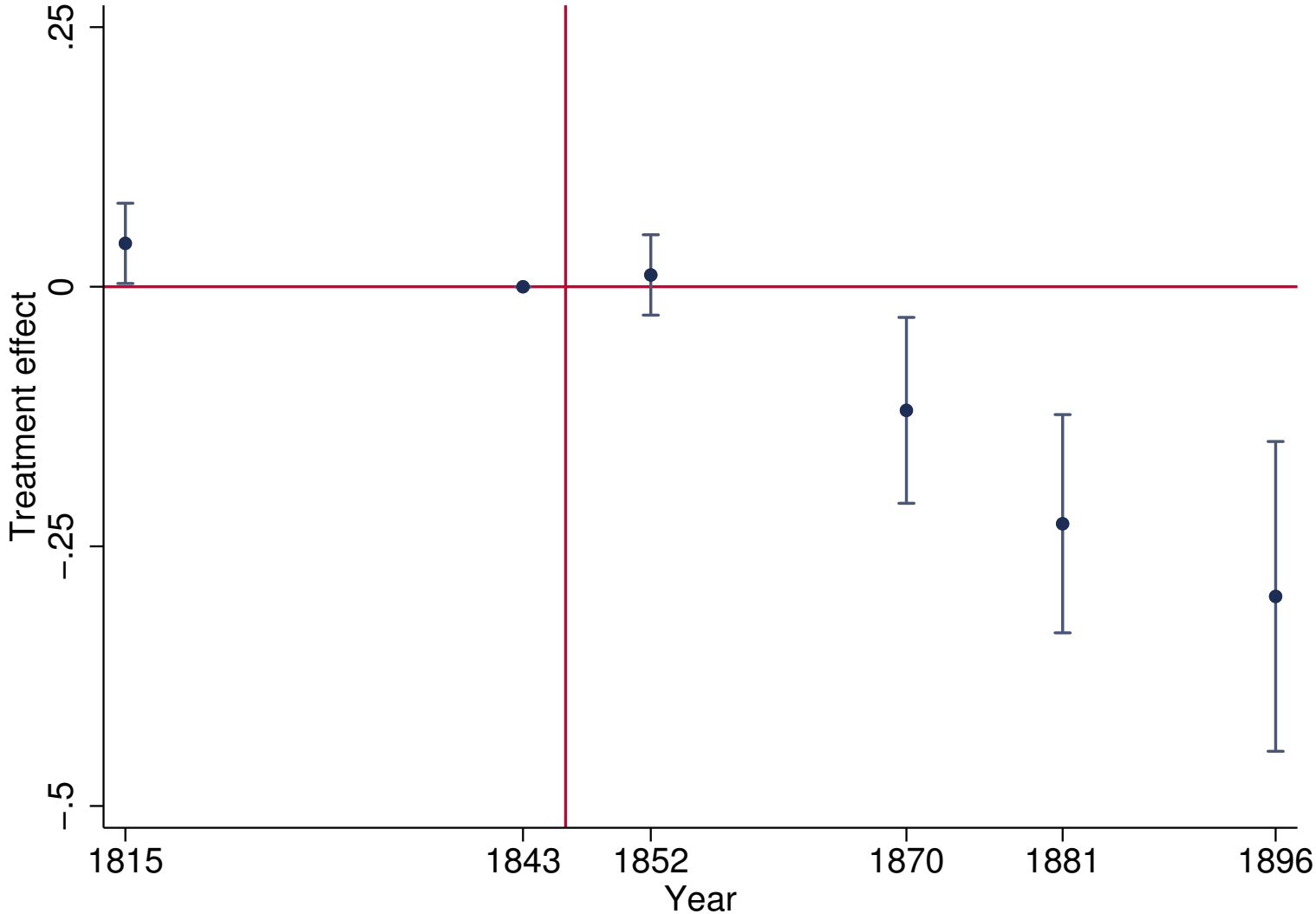
Wheat Suitability Terciles



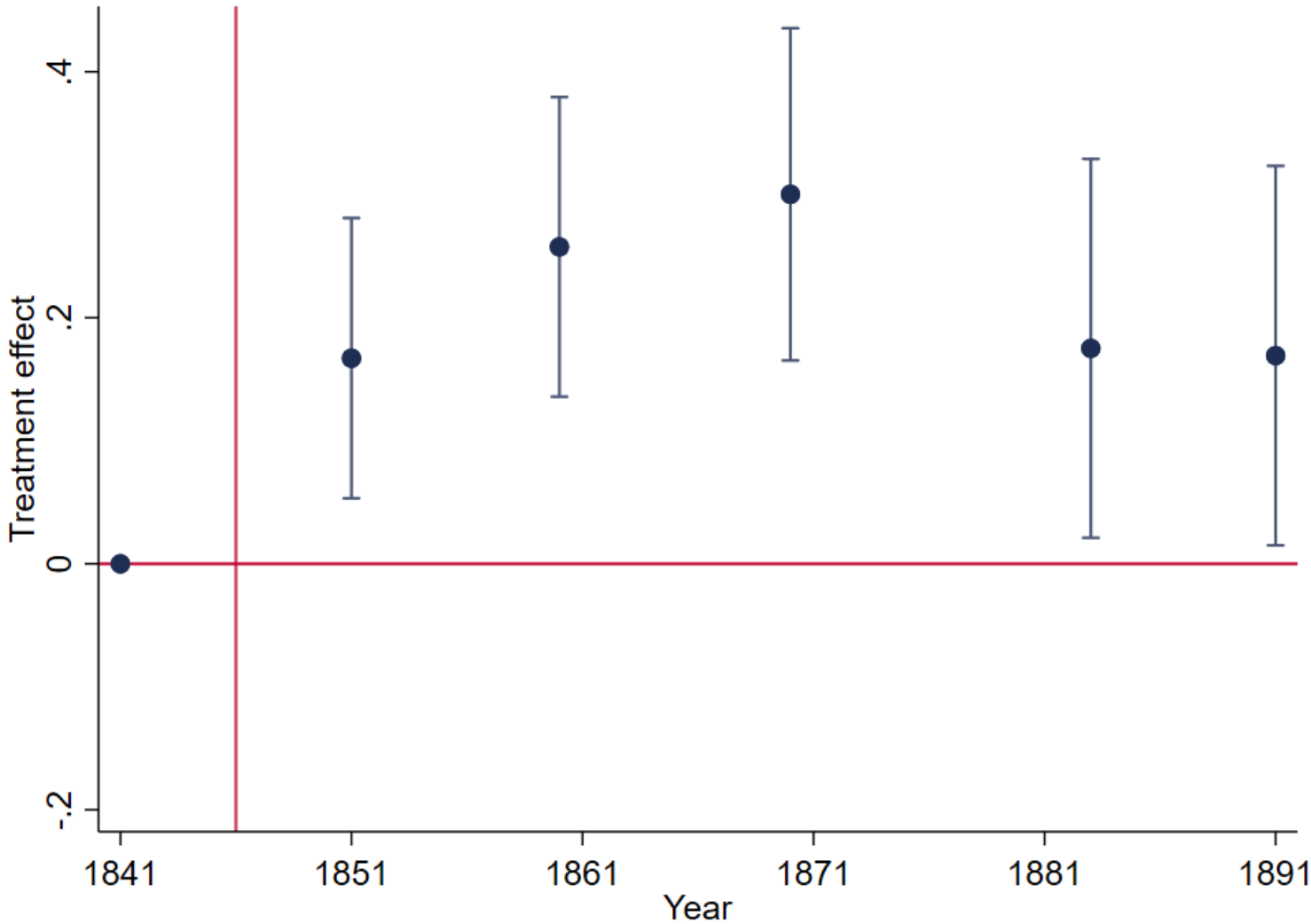
Placebo: High Grass Suitability



Rateable Values

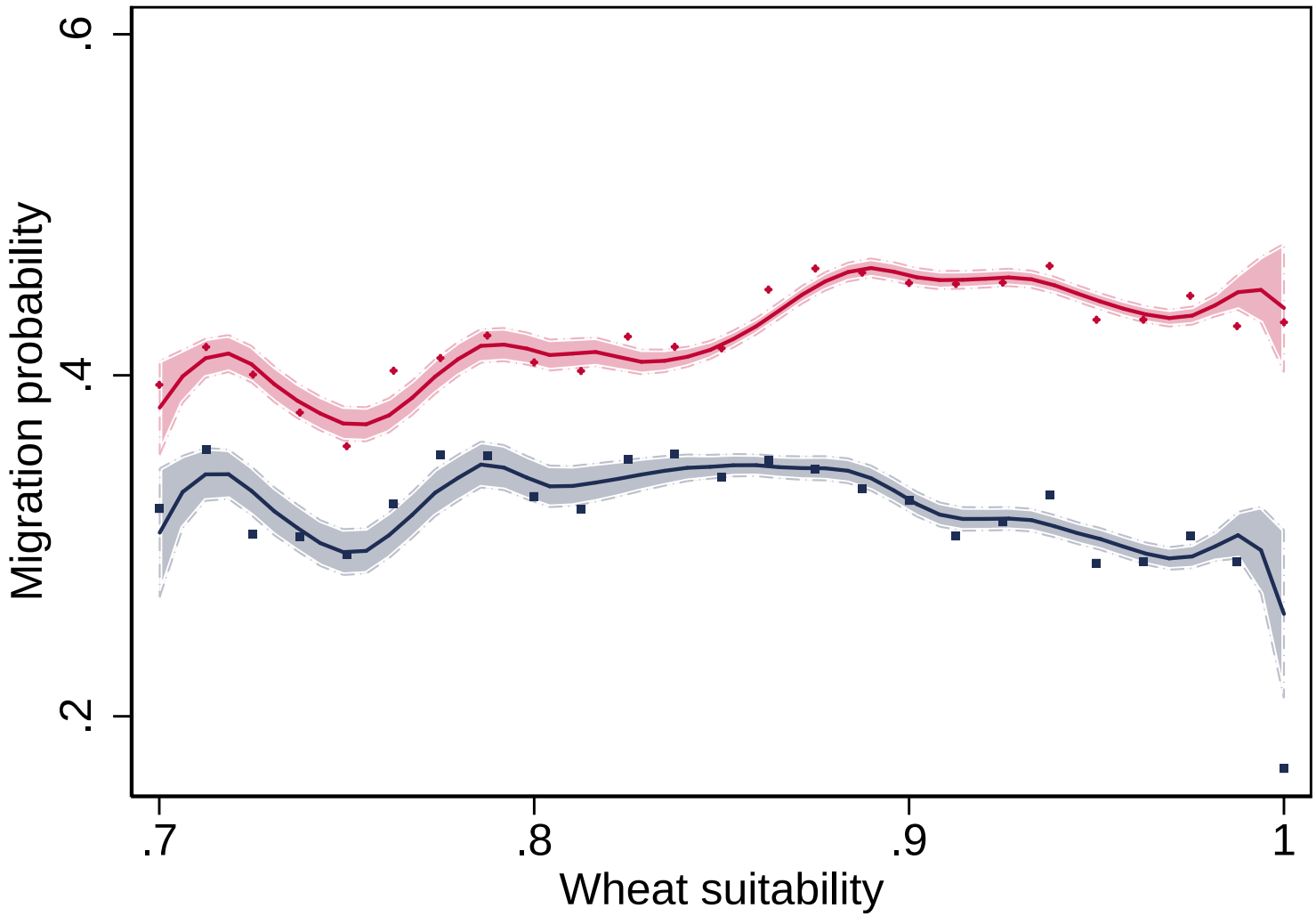


Log Paupers per Capita



Migration
Individual-Level Data

Out Migration & Wheat Suitability



- Blue (1851-1861); Red (1861-1881, 1881-1891 and 1891-1901)

Outline

- Historical Background
- Data
- Reduced-form Evidence
- Theoretical Model
- Quantitative Evidence

Model Outline

- World economy consists of many locations indexed by $i, n, m \in N$
  - Subset of locations are in England & Wales: N^E
  - Subset of locations are foreign countries: N^R
- Two types of agents: workers and landlords
  - Landlords immobile and earn income and consume where born
  - Workers mobile within countries but immobile across countries (can be extended to allow for mobility across countries)
- Each worker can migrate from location i to n within a country by incurring a bilateral migration cost
- Economic activity takes place in a number of sectors $k, j, \ell \in K$, including agriculture, manufacturing and services
- Locations can differ in amenities, sectoral productivities and bilateral trade and migration costs
- We use the model to examine the impact of an international trade shock that is concentrated in a sector (grain invasion) across locations that differ in sectoral specialization

Conclusions

- Distributional consequences of trade is one of the central questions in international economics
- Examine one of the most influential historical trade shocks following the 1846 repeal of the Corn Laws in 19th-century Britain
- Traditionally, research on the Corn Laws has emphasized the distributional effects across factors or industries
  - Heckscher-Ohlin and Specific-Factors models
- We provide new evidence on the distributional consequences of the repeal of the Corn Laws across local labor markets
  - New, spatially-disaggregated data on population, employment and land values for around 11,000 parishes in England & Wales from 1801-1911
  - Exogenous trade exposure measure based on agroclimatic conditions
  - Substantial estimated reduced-form treatment effects
  - Quantitative spatial model to evaluate the impact of this trade shock on industrialization, urbanization and income distribution

Thank You