

Railways and the European Fertility Transition

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Question and Motivation

Question

Did railways affect fertility in Europe during the continent's fertility transition?

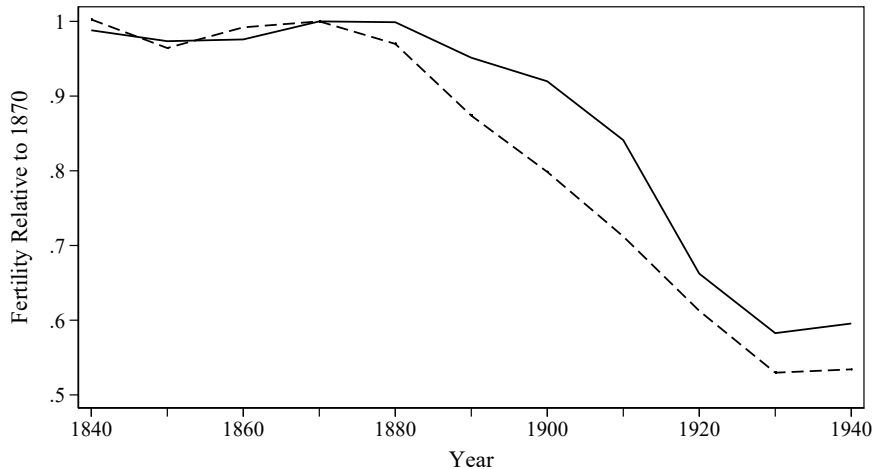
Motivation

- Europe's declining fertility in the long nineteenth century (e.g. crude birth rates fell in the UK by 33%, 1880-1910) was necessary for modern economic growth (Crafts and Mills, 2020; Galor and Weil, 1999).
- Europe's railway network more than doubled in length between 1870 and 1910 (Martí-Henneberg, 2013).
- If railways increased urbanization or the returns to child quality, they may have sped up the decline in fertility...
- ...but if railways increased incomes or the returns to child labor they may have slowed the decline in fertility.

This Paper

- We create an unbalanced panel of locations (\sim NUTS 3 regions) combining data on fertility from the Princeton European Fertility Project and railways from Martí-Henneberg (2013).
- We show, in a regression with fixed effects for locations and decades, that market access slowed the fertility decline.
 - A one standard deviation increase in market access predicts fertility is greater by 0.14 standard deviations.
- We use access to markets more than 500km away as an instrument for market access, confirming our OLS results.
- Results are consistent with children as a normal good:
 - Greater nuptiality of women aged 20-24 is an intermediate mechanism.
 - Income per capita rises in locations that gain market access.
 - Effects are greatest in ultimately developed locations where schooling and female labor force participation lagged.
- Results are robust to tests of the parallel trends assumption, to exploiting within-country variation, and other checks.

In a Nutshell



— Top Quartile Gain in Market Access, 1870-1910
- - - Bottom Quartile Gain in Market Access, 1870-1910

Contribution

- To the literature on fertility transitions (e.g. Aaronson et al, 2014; Bleakley and Lange, 2009):
 - Guinnane (2011): “Despite at least one hundred years of academic and official interest in the decline of fertility, this question is not one for which economists have a clear, empirically well-founded explanation.”
 - Europe’s fertility transition may have been due to economic motives (Becker and Lewis, 1973; Fernihough, 2017) or culture (Beach and Hanlon, forthcoming; Spolaore and Wacziarg, 2022)...or both...or neither...
 - Railways provide (hopefully) a window into both economic and cultural explanations.
- To the literature on railroads (e.g. Fogel, 1964; Donaldson, 2018):
 - There is an extensive literature on how railroads have shaped economic geography, structural transformation, etc...
 - The literature on human capital outcomes is smaller (e.g. Andersson et al. 2023; Zimran 2020), and multi-country studies with meso-level data are rare.
 - The closest paper, Guldi and Rahman (2022), finds that market access reduced fertility via specialization in the United States.
 - We focus on Europe, introduce novel market access measures and an instrumental variables approach, and find different results through other mechanisms.

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Empirical strategy

$$Fertility_{ld} = \beta \ln(MarketAccess)_{ld} + x_l' \eta_d + \delta_l + \eta_d + \epsilon_{ld} \quad (1)$$

- $Fertility_{ld}$ is a measure of fertility in location l in decade $d \in 1840, \dots, 1940$.
 - Generally I_f , a ratio between 0 and 100 of fertility to the highest ever recorded.
- $\ln(MarketAccess)_{ld}$ is a measure of how connected location l is to other locations in decade d .
 - In our baseline, this only changes over time due to the spread of the railway.
- As an instrumental variable, we compute $\ln(DistantMarketAccess)_{ld}$ using only markets at least 500km away (Chan, 2023).
- x_l is time-invariant controls, usually geographic, interacted with decade fixed effects η_d .
- δ_l and η_d are fixed effects for location and decade.
- We cluster standard errors by location.

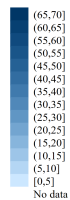
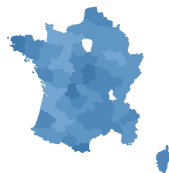
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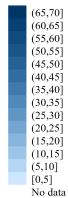
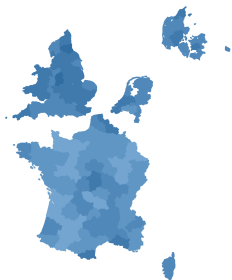
Data: Fertility

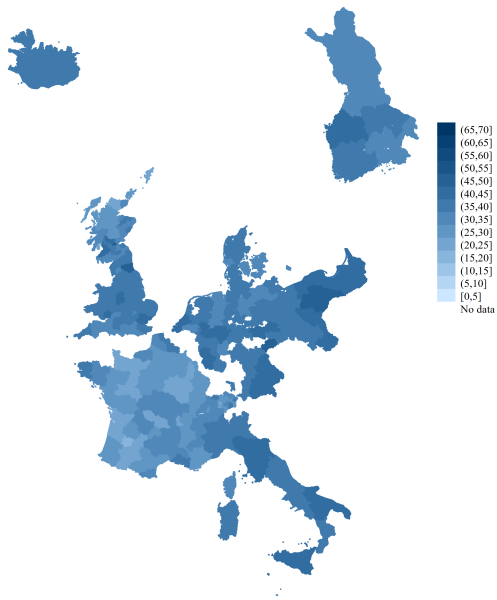
- Data come from the Princeton project on the decline of fertility in Europe (Coale and Watkins, 1986).
- These cover 1229 European “provinces and smaller districts” between 1787 and 1970.
- The main fertility measure we use is I_f , the ratio of births to a “maximum” measured using data on Hutterites:

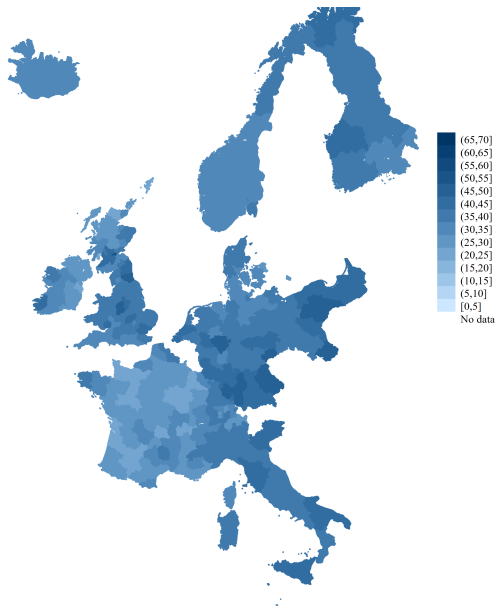
$$I_f = \frac{B_f}{\sum_a f_a h_a}$$

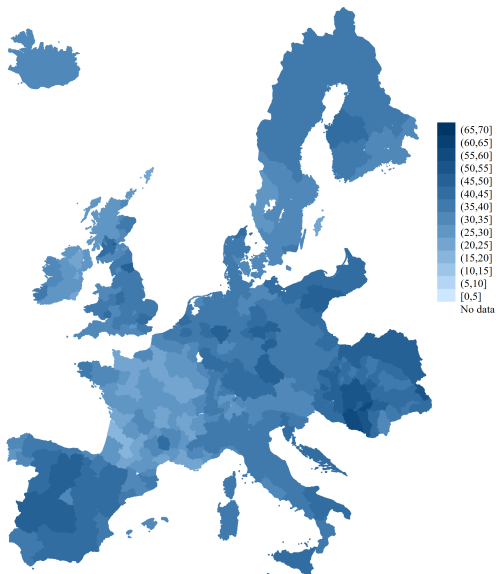
- Here:
 - B_f is all births.
 - a is an age bin (e.g. 25-29).
 - f_a is the number of women in age bin a .
 - h_a is the Hutterite fertility rate in age bin a .
- The data also report analogous rates of marital fertility (I_g) and non-marital fertility (I_h).
- These data are extremely unbalanced, and so we collapse them to a decadal panel by averaging over observations in a decade.
- We multiply I_f and other fertility measures by 100 for coefficient interpretability.

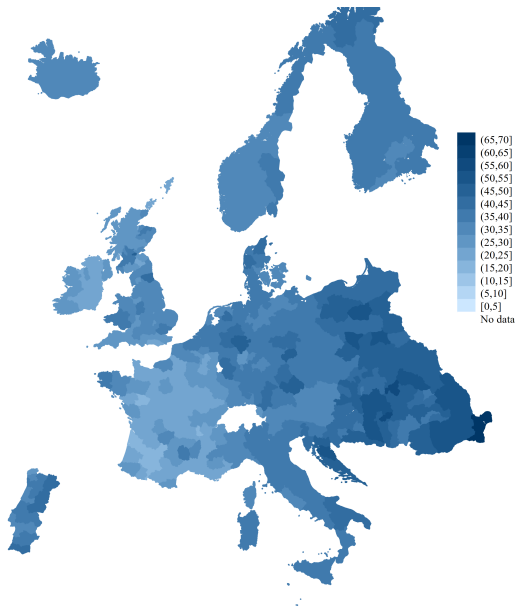
Fertility (I_f): 1840

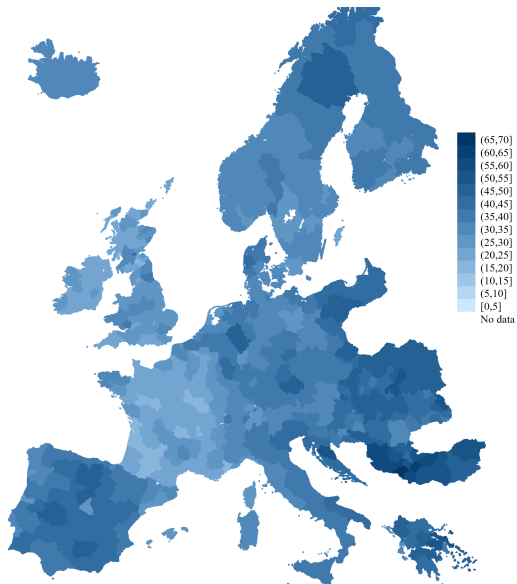
Fertility (I_f): 1850

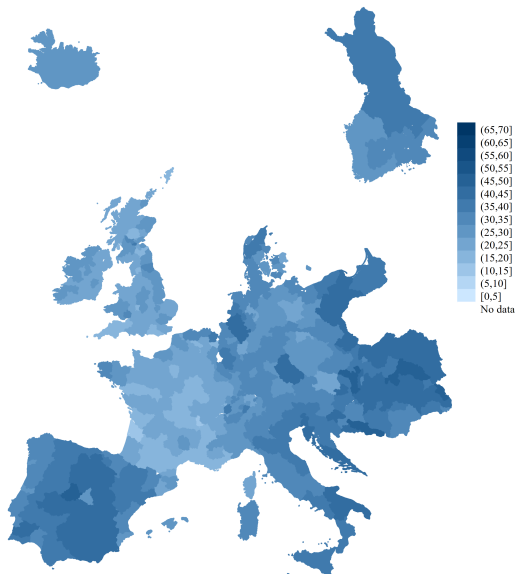
Fertility (I_f): 1860

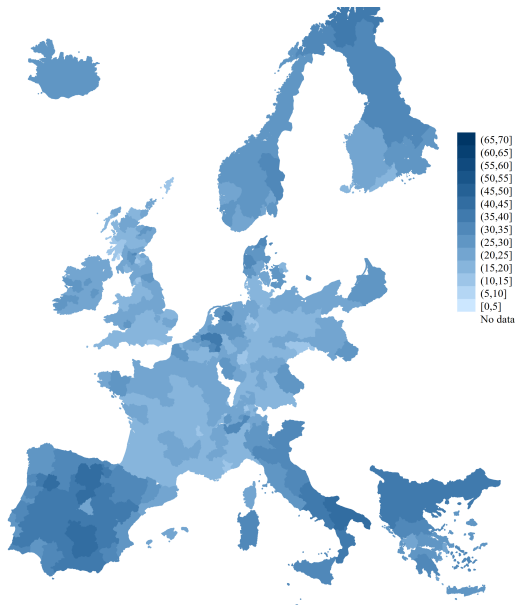
Fertility (I_f): 1870

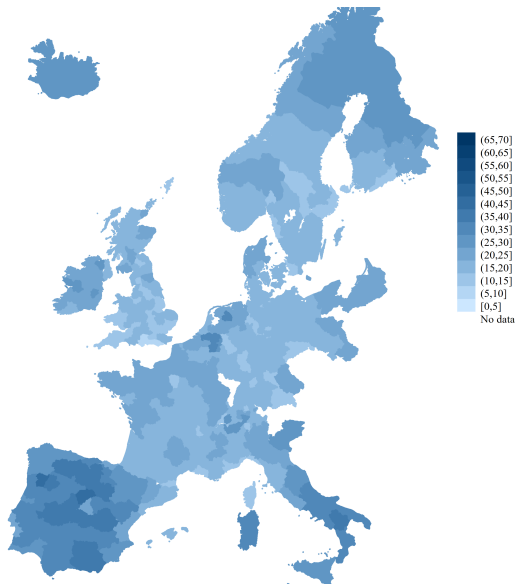
Fertility (I_f): 1880

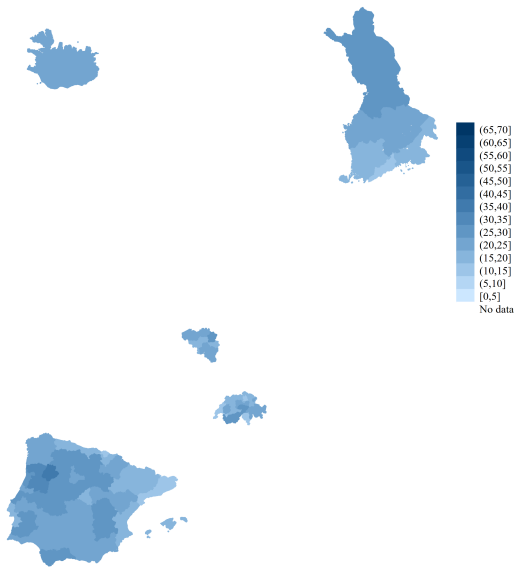
Fertility (I_f): 1890

Fertility (I_f): 1900

Fertility (I_f): 1910

Fertility (I_f): 1920

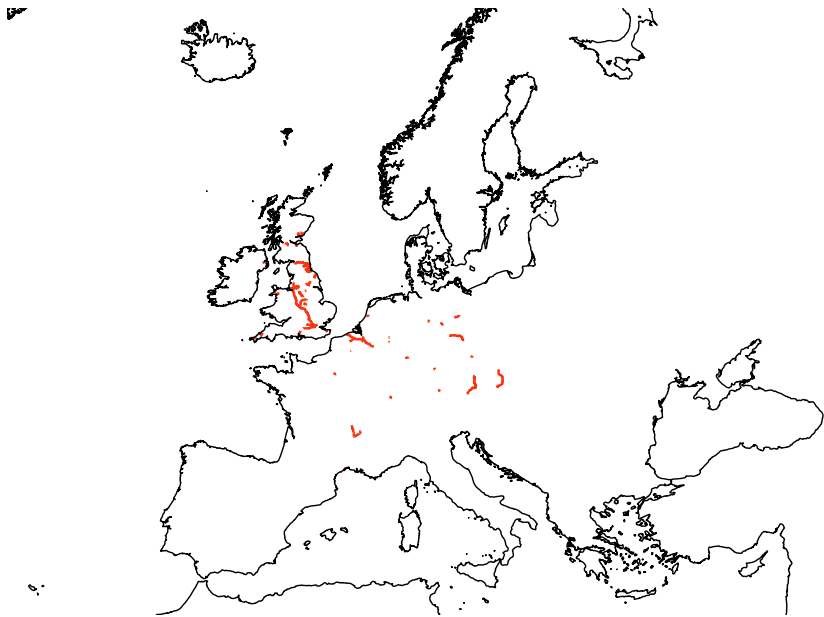
Fertility (I_f): 1930

Fertility (I_f): 1940

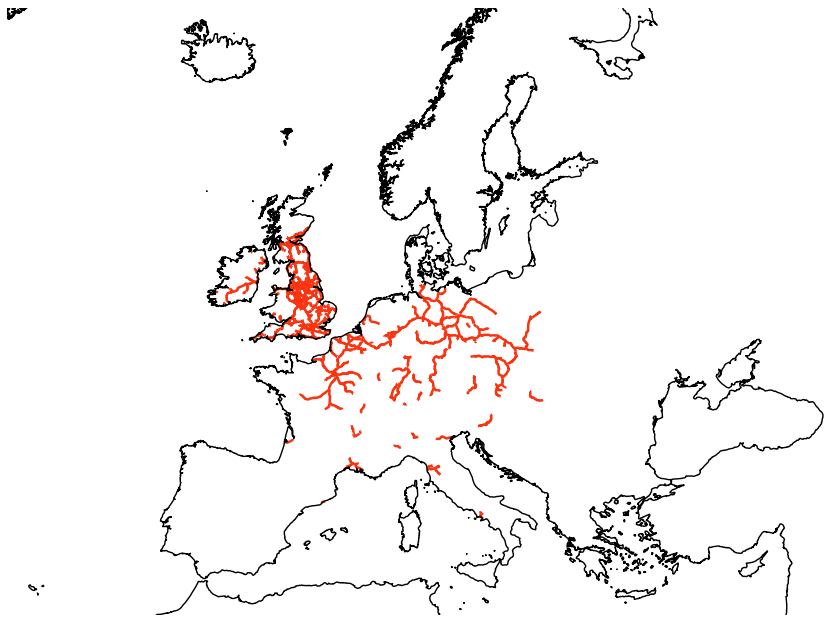
Data: Railroads

- Data on railways are taken from Martí-Henneberg (2013).
- He constructs a polyline shapefile of active railways in Europe west (roughly) of Minsk, every decade from 1840-2010.
- We merge the fertility and rail data using polygon maps of \sim NUTS 3 units from Max Planck Institute for Demographic Research (MPIDR, 2013).
 - Series 0 (one of 3 series reported in the fertility data) maps almost perfectly 1:1 with the MPIDR map for 1900.
 - Our unit of observation in our regression analysis will be MPIDR polygon \times decade.
- These polygons are also used to compute geographic control variables.

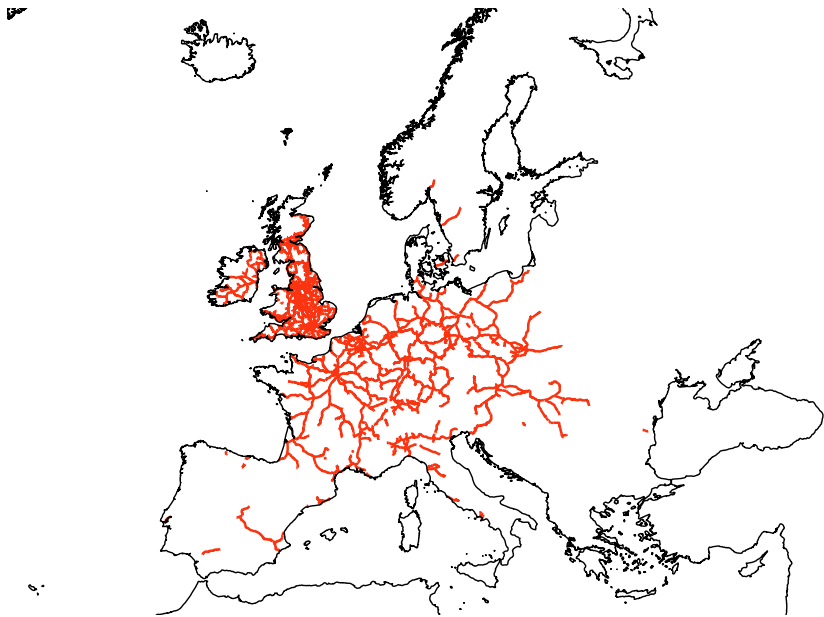
Railroads: 1840



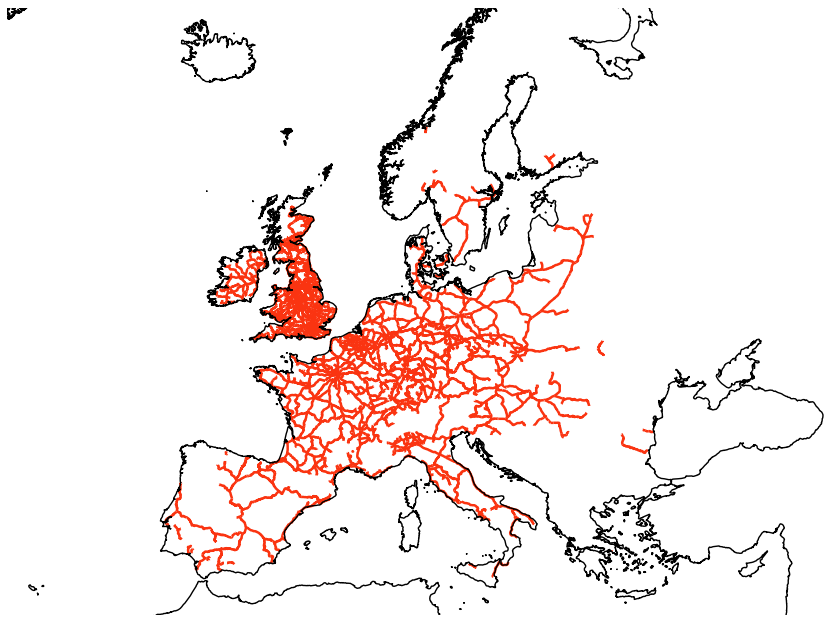
Railroads: 1850



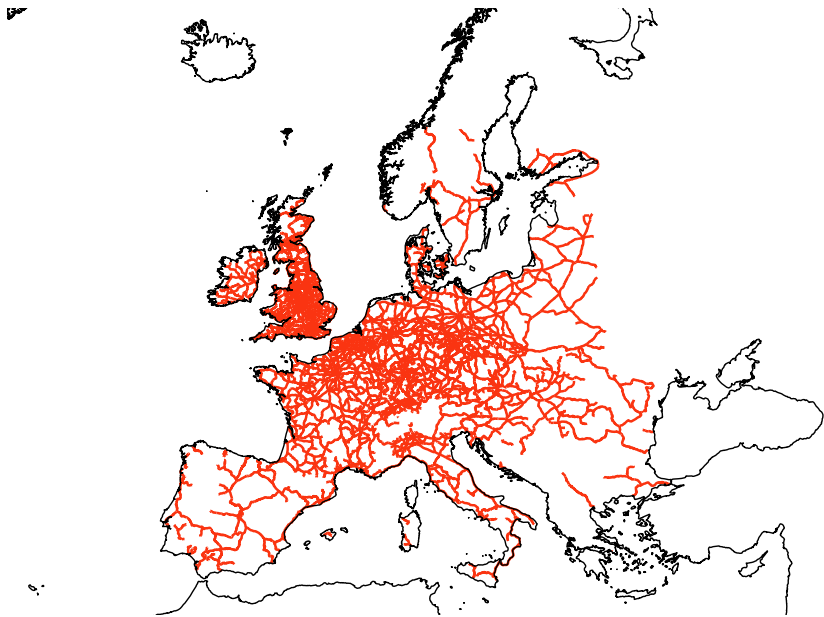
Railroads: 1860



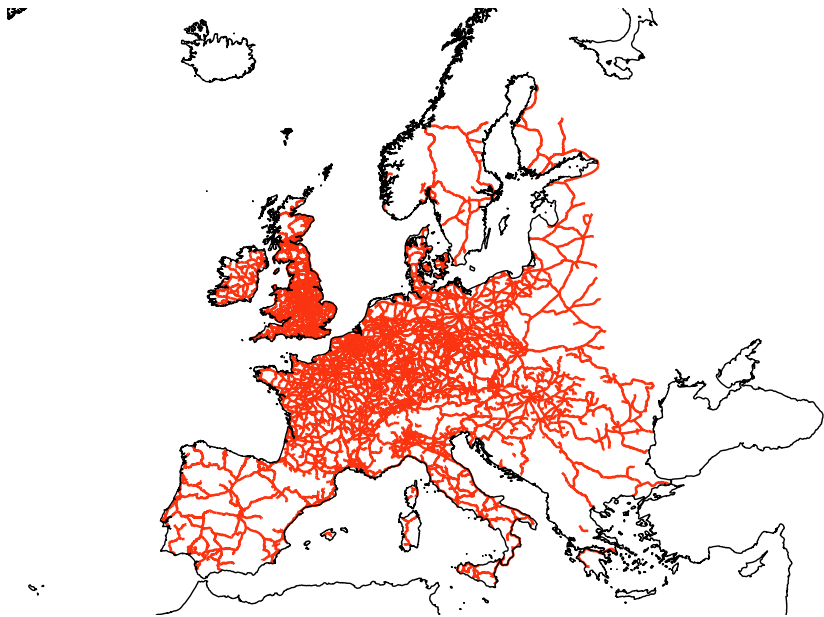
Railroads: 1870



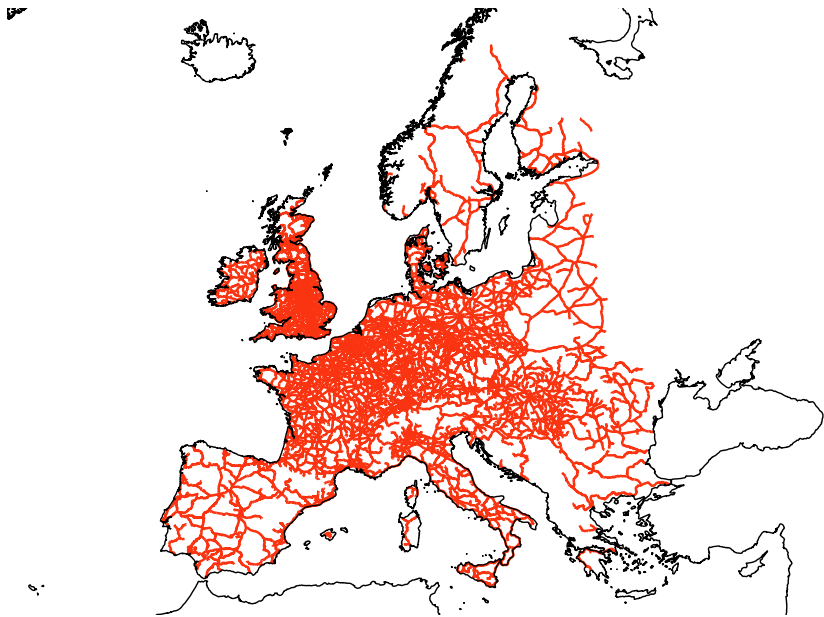
Railroads: 1880



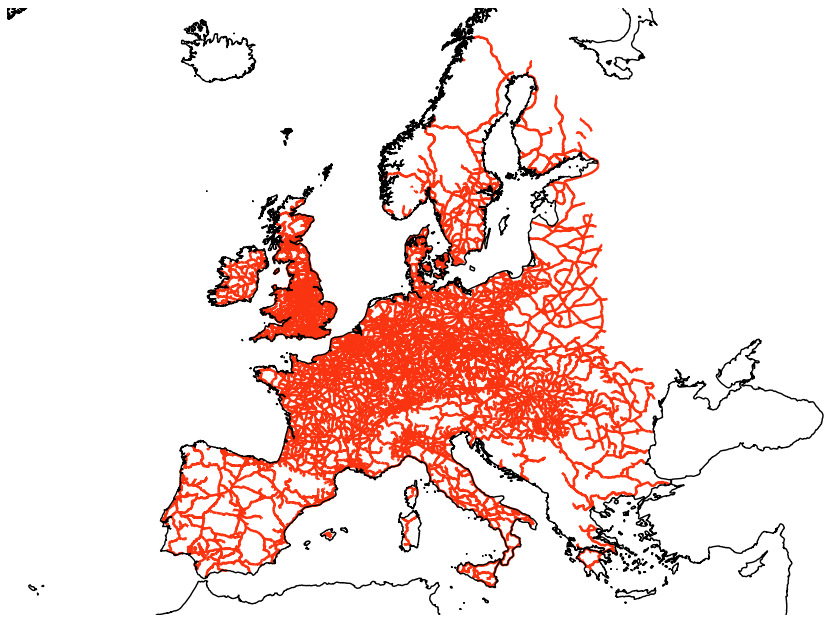
Railroads: 1890



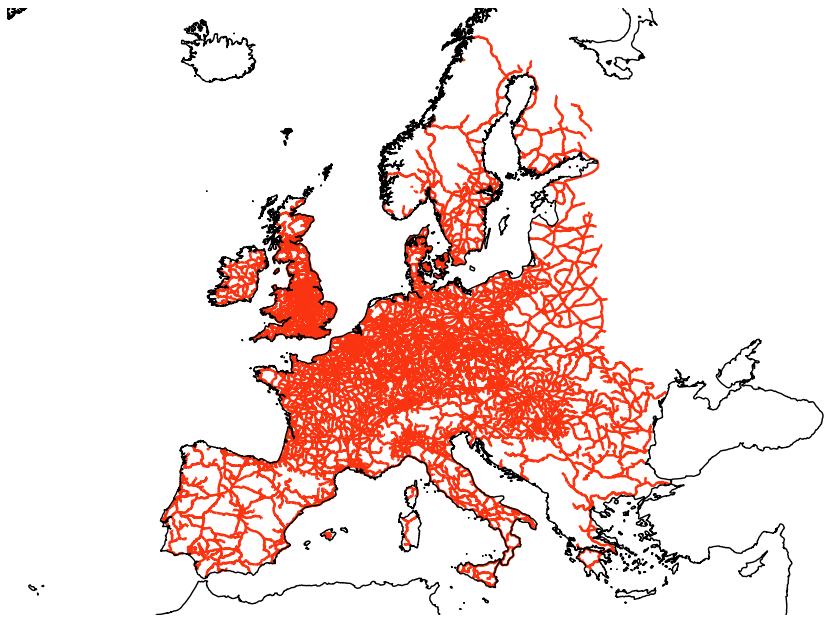
Railroads: 1900



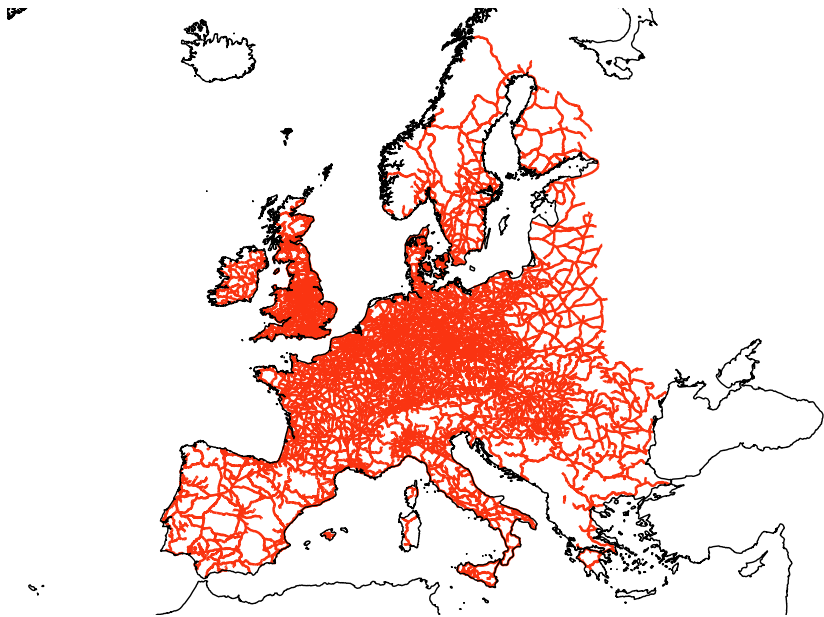
Railroads: 1910



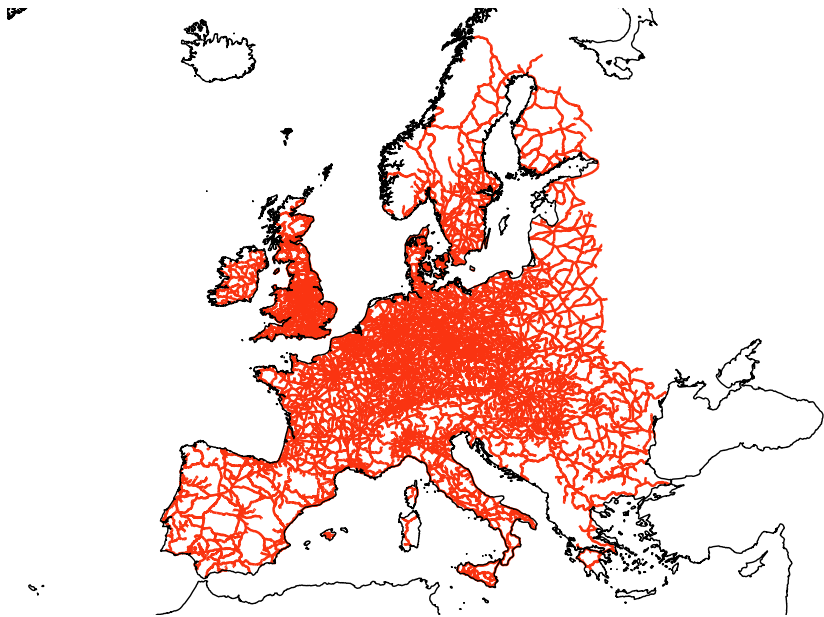
Railroads: 1920



Railroads: 1930



Railroads: 1940



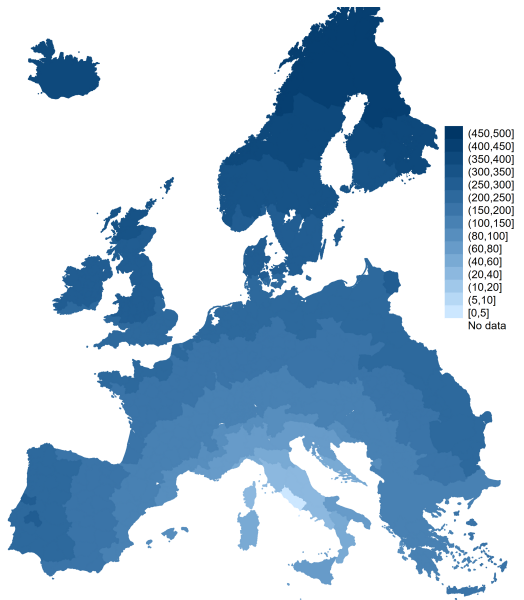
Data: Market Access

- We follow Donaldson and Hornbeck (2016) and use market access (MA_{ld}) to measure a location's l 's exposure to other markets in decade d :

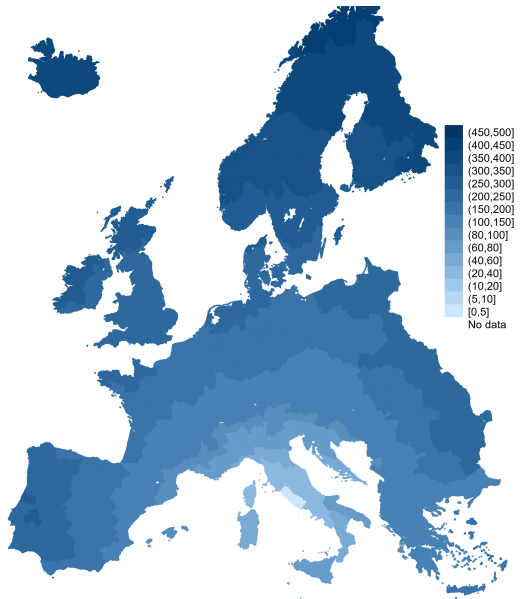
$$MA_{ld} = \sum_{l'} \frac{P_{l'd}}{\tau_{ll'd}^{\theta}}$$

- $P_{l'd}$ is population of location l' in decade d .
- $\tau_{ll'd}$ is the travel cost from the centroid of l to the centroid of l' in decade d .
- θ is the trade elasticity. We use 8.22 in our baseline.
- For $P_{l'd}$, we use populations from the HYDE database in 1830 as our baseline (Klein Goldewijk et al., 2013).
- To compute τ :
 - We construct a $0.1^{\circ} \times 0.1^{\circ}$ grid.
 - We use the Özak (2018, 2010) Human Mobility Index for non-rail travel times.
 - We use 60 km per hour as the travel time by rail.
 - $\tau_{ll'd}$ is the time taken by the fastest route from l to l' given the rail network in decade d .
- Our instrument, distant market access, excludes l' within 500km of l .

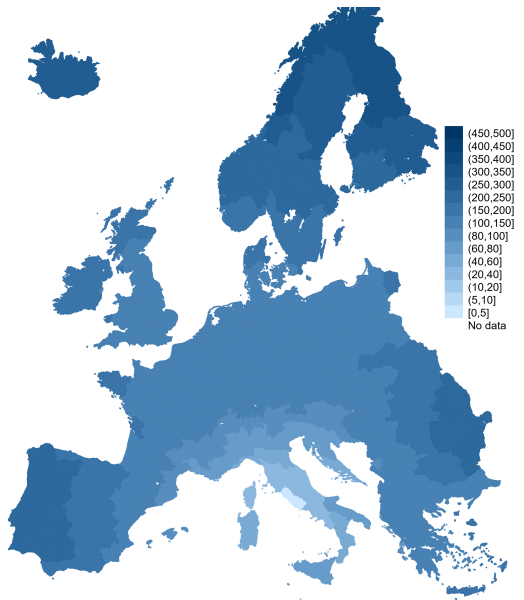
Hours to Rome: 1830



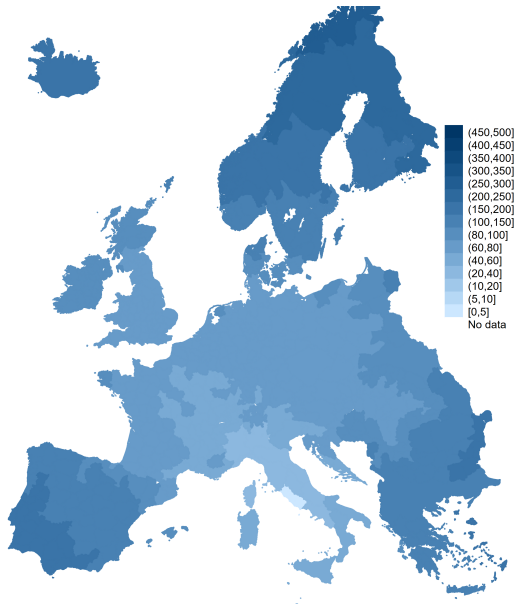
Hours to Rome: 1840



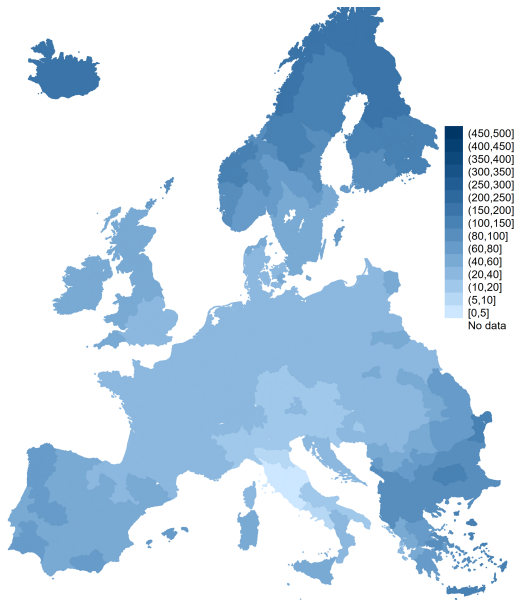
Hours to Rome: 1850



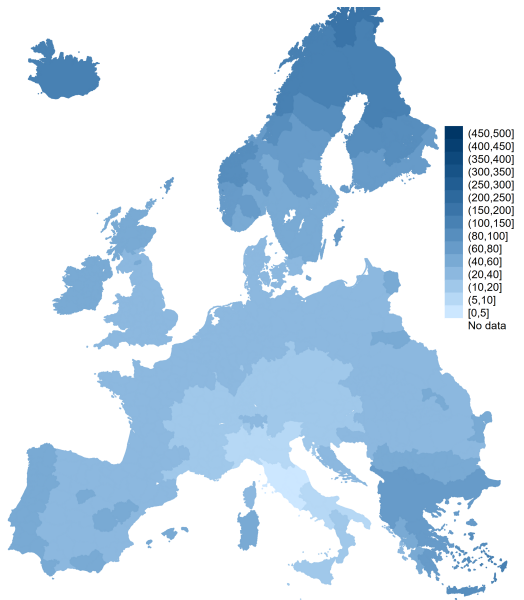
Hours to Rome: 1860



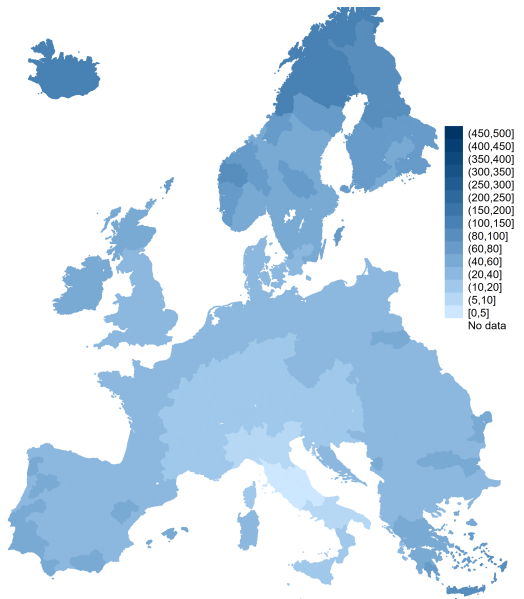
Hours to Rome: 1870



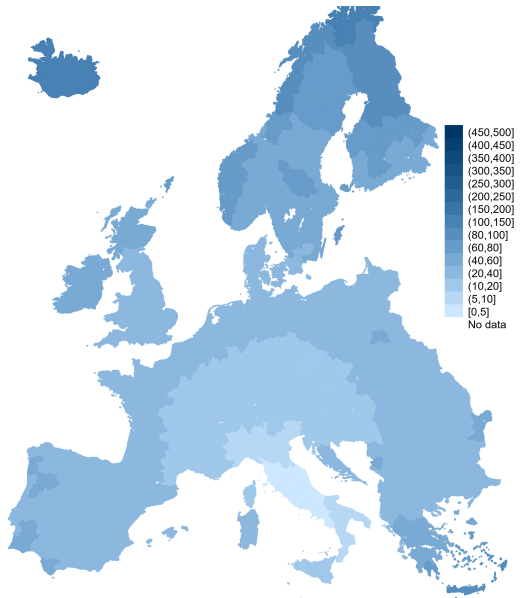
Hours to Rome: 1880



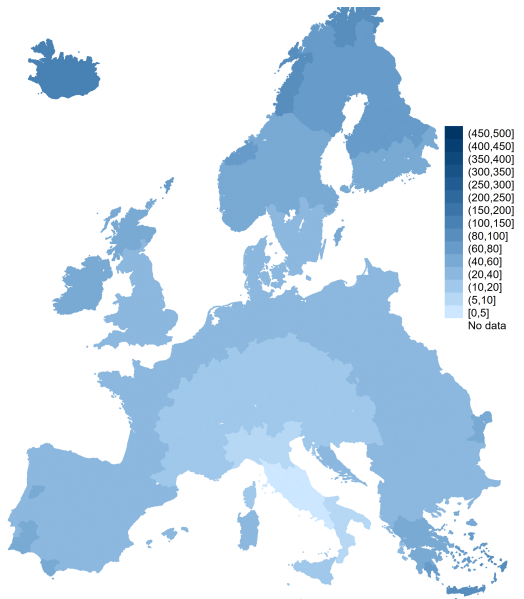
Hours to Rome: 1890



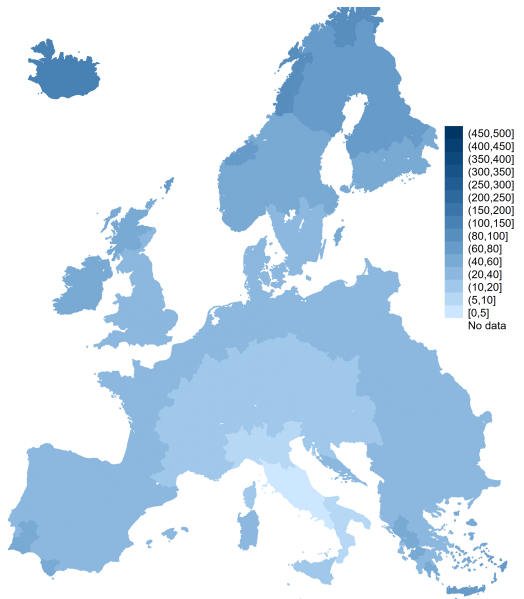
Hours to Rome: 1900



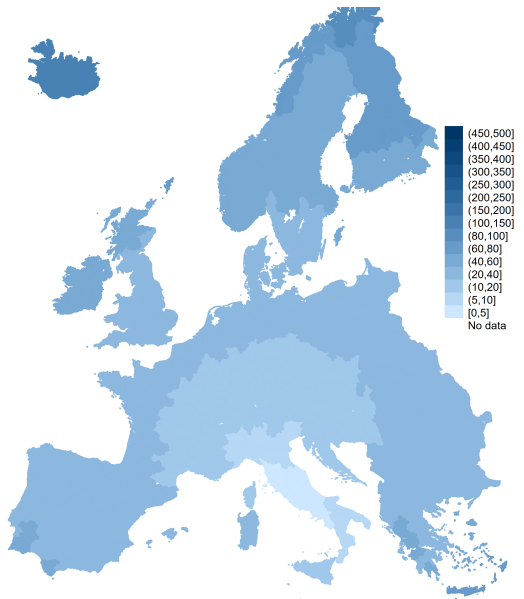
Hours to Rome: 1910



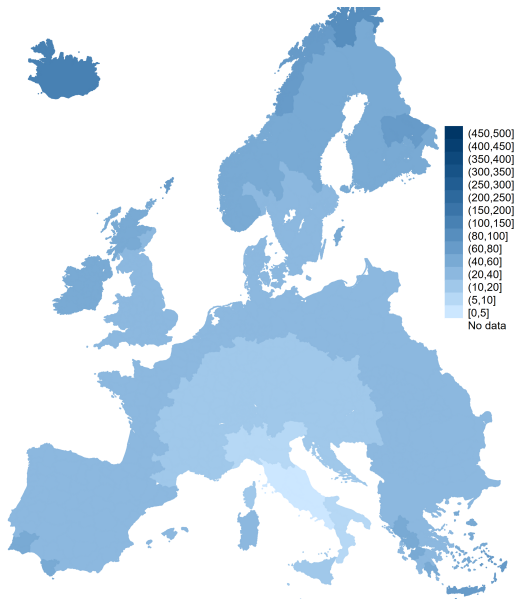
Hours to Rome: 1920



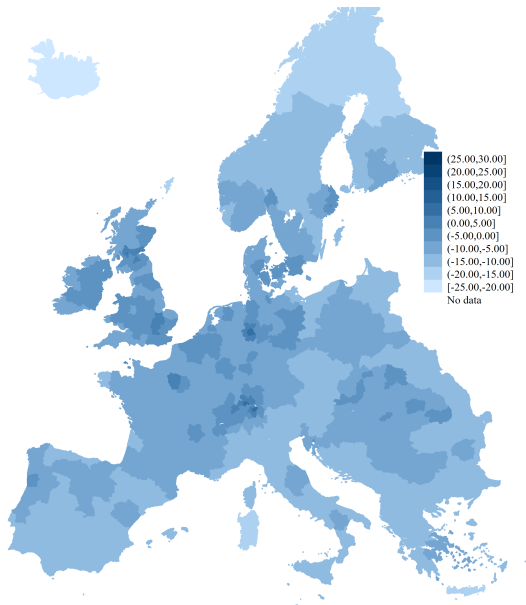
Hours to Rome: 1930



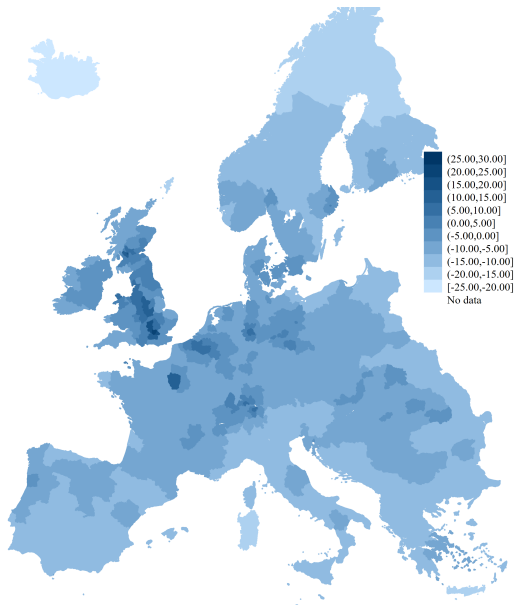
Hours to Rome: 1940



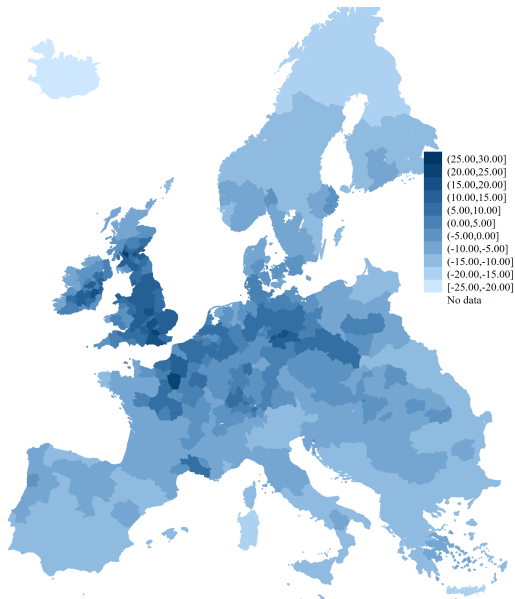
In Market Access: 1830



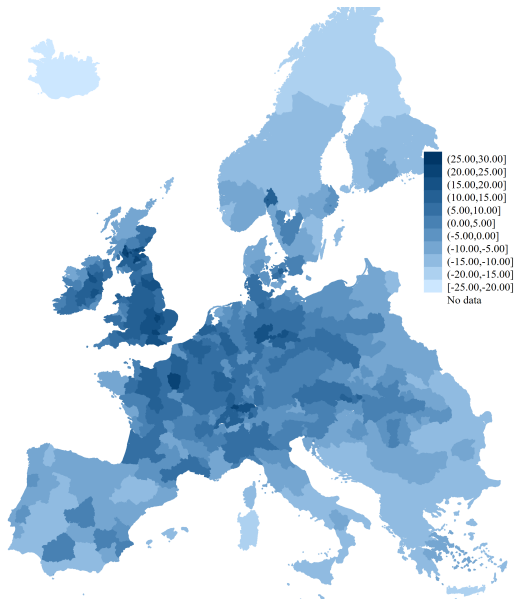
In Market Access: 1840



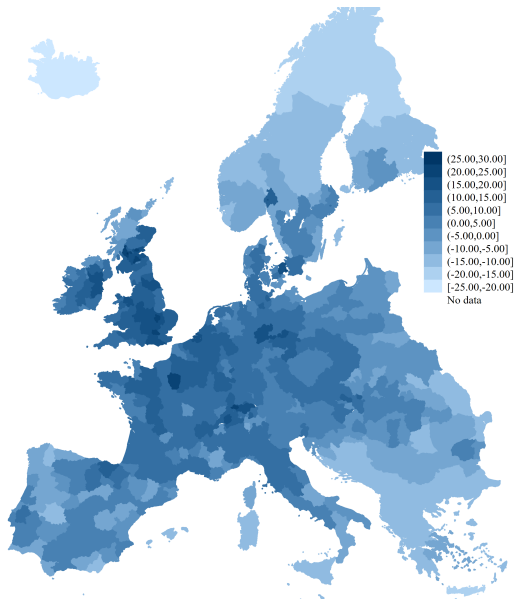
In Market Access: 1850



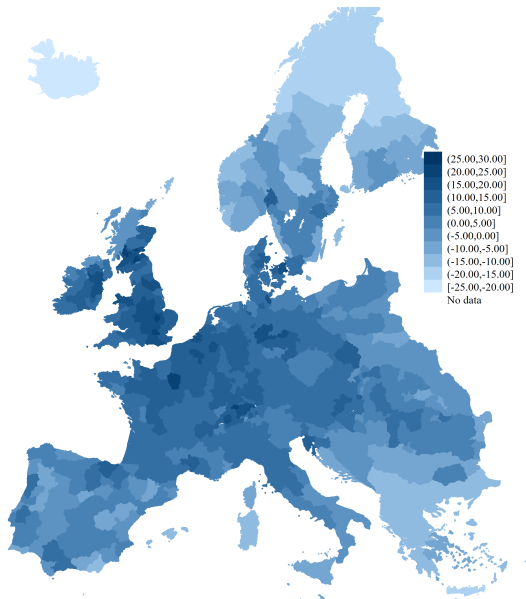
In Market Access: 1860



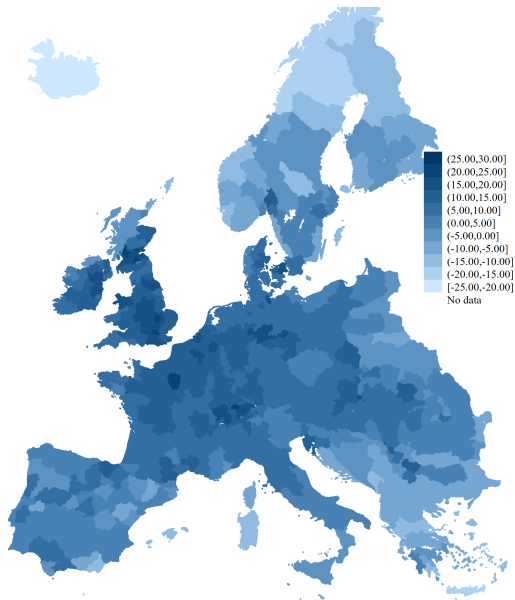
In Market Access: 1870



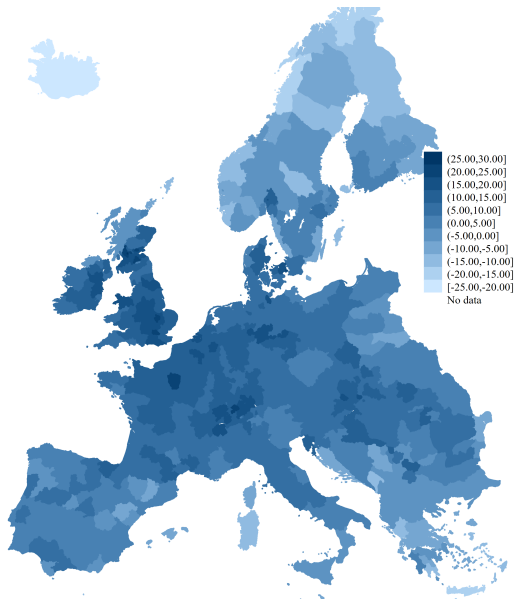
In Market Access: 1880



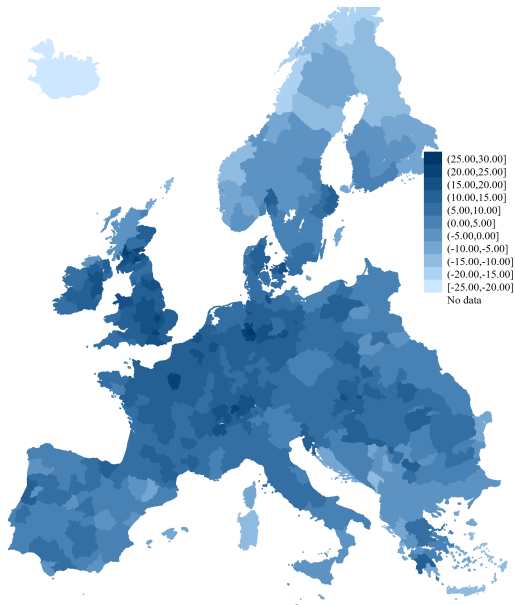
In Market Access: 1890



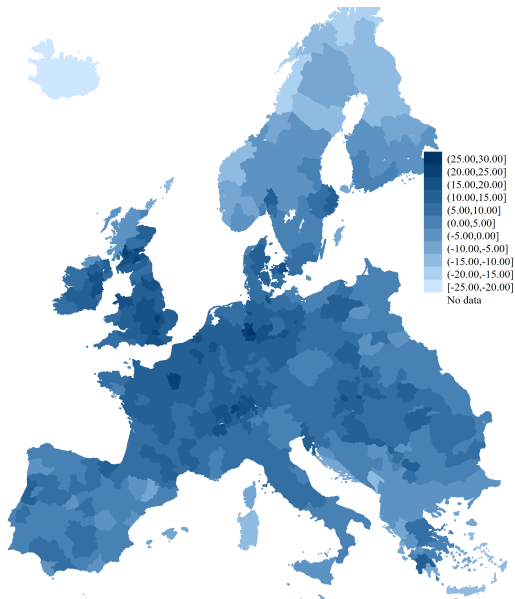
In Market Access: 1900



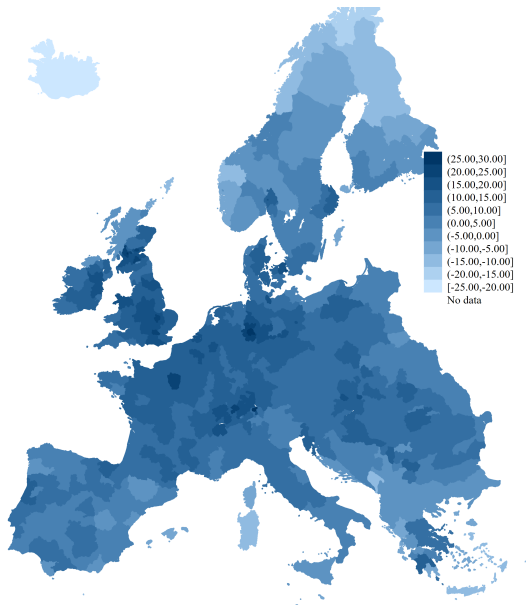
In Market Access: 1910



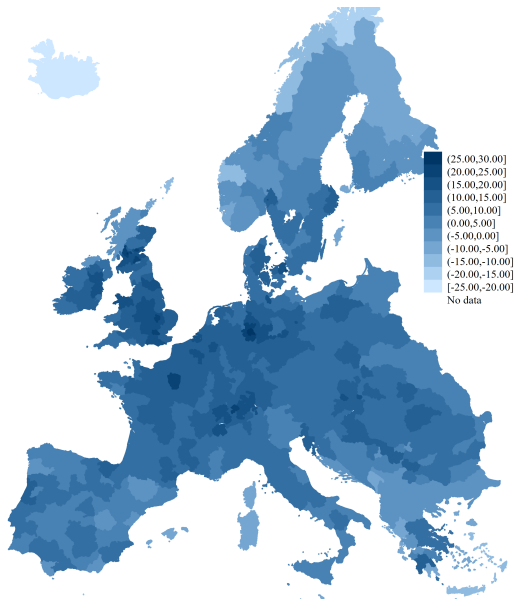
In Market Access: 1920



In Market Access: 1930



In Market Access: 1940



Data: Controls

- Latitude, longitude, and coast distance: computed ourselves.
- River: from Natural Earth Data.
- Altitude: from the World Digital Elevation Model.
- Population density in 1830: from Klein Goldewijk et al. (2013).
- Area: from MPIDR (2013).
- Caloric suitability: from Galor and Özak (2015, 2016).
- Suitability for barley, maize, rye, oats, and wheat: from the FAO-GAEZ project.
- Average precipitation: from WorldClim, originally from the CRU.
- Ruggedness: from Amatulli et al. (2018).
- ... and all are time-invariant and so interacted with the decade fixed effects.
- Maps are in the appendix.

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Overview

- Market access predicts greater fertility.
- Magnitude? A one standard deviation increase in market access predicts greater fertility by $\frac{7.91 \times 0.158}{8.93} \approx 0.14$ standard deviations.
- Or: compute counterfactual fertility as:

$$Fertility_{Id} - \hat{\beta}(\ln MA_{Id} - \ln MA_{I,1830})$$

- ... and fertility would have been $\sim 8\%$ lower in 1910.
- Our instrumental variables estimates are $\sim 30\%$ larger than our fixed effects estimates.

Results: Fixed Effects

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.158*** (0.032)	0.125*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results: Instrumental variables

	(1)	(2)
	Total Fertility	Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.206*** (0.044)	0.180*** (0.044)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes
KPF	539.7	535.4

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

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Conceptual Framework

- If children are a normal good, an increase in income would increase fertility (Asrhaf and Galor, 2011; Black et al., 2013).
- Gains to trade, then, can increase fertility if they encourage specialization in goods intensive in unskilled labor (Galor and Mountford, 2008).
- But there are channels through which rising incomes could reduce fertility:
 - Returns to skill and the quality-quantity tradeoff (Becker, 1973; Galor, 2022). Our results should be strongest where literacy and numeracy lagged.
 - Women's work and the opportunity cost of children (Guinnane, 2011). Our results should be strongest where opportunities were more limited for women.

Mechanisms: Evidence

- Results not in blue are in the appendix.
- Proximate mechanisms:
 - Marital and non-marital fertility both rise.
 - Rural marital fertility rises, but we have limited data on outcomes by rural/urban status.
 - Nuptiality rises for women aged 20-24.
- Economic mechanisms:
 - Market access increased GDP per capita, and we have suggestive evidence that GDP per capita mediates the results.
- Heterogeneity:
 - Results are driven by the 1870-1914 period, at the height of the fertility transition.
 - Results are driven by regions that, by 1900 had high incomes, lower shares of the labor force in agriculture, and higher shares in industry and services in data from Roses and Wolf (2020).
 - Results are larger for countries that lagged in schooling in 1900, or in 1870, and in numeracy in 1880 in the Clio Infra data.
 - Results are larger for countries that lagged in FLFP c. 1900.

Nuptiality rises for women aged 20-24

	(1) Age at Marriage	(2) Age at Marriage	(3) Pct. Married 20-24	(4) Pct. Married 20-24
In Market Access: (P=1830, $\theta=8.22$)	1.050 (0.770)	-1.069* (0.614)	0.286*** (0.059)	0.121** (0.050)
N	1,188	1,188	1,532	1,532
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Rising incomes

	(1) Total Fertility	(2) Total Fertility	(3) ln GDP per capita	(4) ln GDP per capita	(5) Total Fertility	(6) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.086* (0.050)	0.069 (0.043)	0.010*** (0.002)	0.004** (0.002)	0.058 (0.052)	0.054 (0.043)
In GDP per capita					2.629*** (0.845)	3.532*** (1.003)
N	2,742	2,742	2,752	2,752	2,742	2,742
Sample	All	All	All	All	All	All
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by GDP in 1900

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.245*** (0.039)	0.205*** (0.057)	0.031 (0.047)	-0.006 (0.041)
N	1,768	1,768	1,738	1,738
Sample	In RW	In RW	In RW	In RW
	GDP per	GDP per	GDP per	GDP per
	capita	capita	capita	capita
	Above	Above	Below	Below
	Median in	Median in	Median in	Median in
	1900	1900	1900	1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by schooling in 1900

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.014 (0.037)	0.024 (0.036)	0.259*** (0.055)	0.099** (0.046)
N	2,027	2,027	2,017	2,017
Sample	Above Median Years of Education in 1900	Above Median Years of Education in 1900	Below Median Years of Education in 1900	Below Median Years of Education in 1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by female labor force participation c. 1900

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.033 (0.050)	0.032 (0.000)	0.289*** (0.043)	0.273*** (0.047)
N	1,623	1,623	1,843	1,843
Sample	Above Median FLFP	Above Median FLFP	Below Median FLFP	Below Median FLFP
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative Mechanisms (1/2)

- Diffusion of norms?
 - Compute “fertility access” as $\sum_{l'} w_{l'd} F_{l'0}$.
 - Here, $w_{l'd} = \frac{\tau_{ll'd}^{-\theta}}{\sum_{l'} \tau_{ll'd}^{-\theta}}$.
 - $F_{l'0}$ is initial fertility of location l' , and $w_{l'd}$ are travel cost weights.
 - Diffusion of norms may have played a role, but the evidence is weak, with a standardized β of $\frac{0.287 \times 0.309}{8.93} \approx 0.001$.
- Results do not differ by neighbors' fertility, nor when controlling for neighbors' fertility or several measures of distance from France.
- Similarly, “mortality access” (i.e. access to infant mortality) reduces fertility with a standardized $\beta < 0.1$ that is not robust to controls.
- Reshaping the data to a panel of pairs: falling $\tau_{ll'd}$ does not predict fertility convergence.
- What matters – having a railway or being connected to other markets? Results survive controlling for railway density (length per unit area), and railway density has the opposite sign.
- Distance from rail has the opposite sign from market access, but we cannot implement the IV approach from Katz (2018).

Alternative Mechanisms (2/2)

- Sectoral change? Data on employment shares from Roses and Wolf (2020) suggest muted impacts on sectoral shares.
- Urbanization? The result survives controlling for urbanization.
- Human capital? The result survives controlling for country literacy in the Clio Infra data.
- Mortality? Results are driven by countries with greater life expectancy in 1870.
- Political connections? Results survive dropping capitals.
- Agglomeration? We can control for initial market access, and the effects are greater in locations with greater initial market access and in coastal locations.

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Robustness (1/2)

- Results survive:
 - Tests of the parallel trends assumption, including forward lags, long differences, and an event study.
 - Estimation in long differences – 1870 to 1910, and most other year combinations.
 - Alternative measures of market access.
 - Alternative θ ; census data on population from 1850 from Martí Henneberg; contemporary populations; country populations from Federico and Tena-Junguito; city populations from Reba et al. (2016), which are mostly from Chandler; city populations from Bosker et al. (2013), which are mostly from Bairoch.
 - Railway speed of 30 or 120 km per hour.
 - Add border costs. Add roads that predate the railway. Allow steam (i.e. rapid) travel over water.
 - Use costs per ton-km from Martí Henneberg.
 - City populations in 1850 from Martí Henneberg.
 - Conley (1999) standard errors.

Robustness (2/2)

- Results survive:
 - Alternative IV cutoff distances.
 - In Fertility.
 - Discarding Belgium.
 - Discarding periods after 1914.
 - Country trends, country-year fixed effects, polynomials in latitude and longitude.
 - Accounting for coal.
 - Discarding the 40% largest units by area – those for which market access and fertility may be most poorly measured.
 - Retaining only locations that appear 9 times. The maximum, 10, is <20% of the sample.

Tests of Parallel Trends

	(1) Total Fertility	(2) Total Fertility
F. In Market Access: (P=1830, $\theta=8.22$)	0.025 (0.041)	-0.007 (0.039)
In Market Access: (P=1830, $\theta=8.22$)	0.102*** (0.026)	0.044* (0.025)
L. In Market Access: (P=1830, $\theta=8.22$)	0.143*** (0.027)	0.106*** (0.027)
N	2,731	2,731
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Long Differences: 1870 to 1910

	(1)	(2)
	Δ Total Fertility	Δ Total Fertility
Δ In Market Access	0.340*** (0.062)	0.235*** (0.069)
N	347	347
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

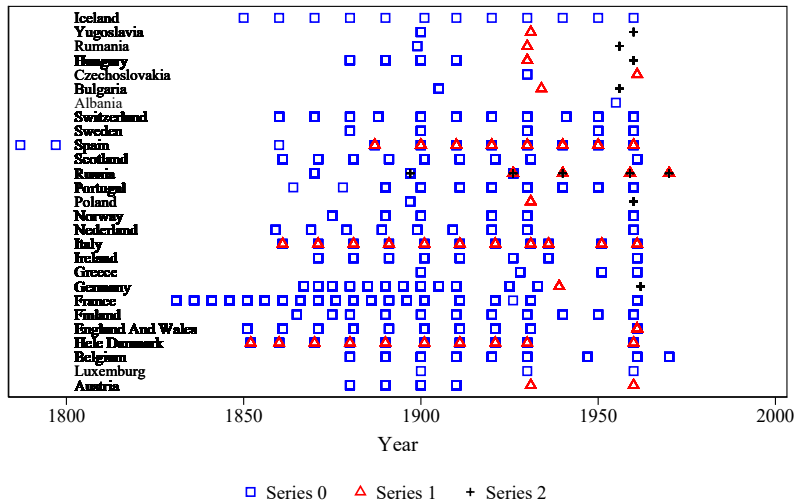
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Conclusion

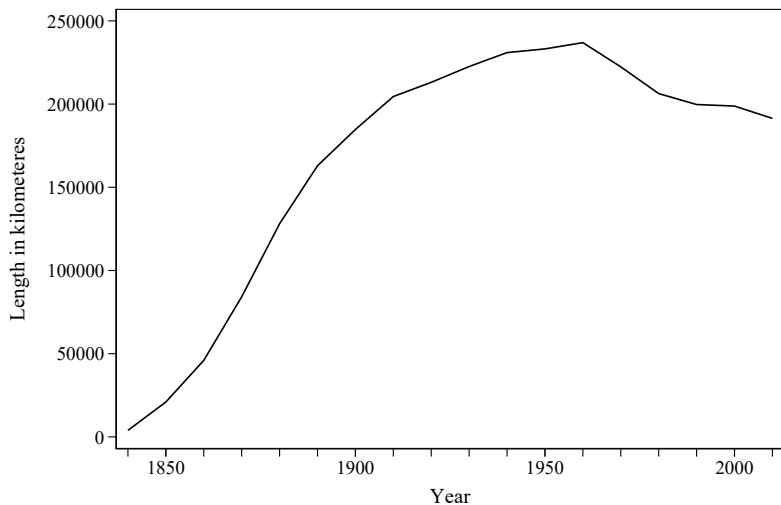
- Market access driven by railways predicts greater fertility in Europe, 1840-1940.
- Probable mechanism? Rising income:
 - Income itself increases with market access.
 - Nuptiality of women aged 20-24 is an intermediate mechanism.
 - The link is strongest in ultimately more developed locations where human capital and FLFP lagged.

- 8 Further Data Description
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- 11 Further Alternative Mechanisms
- 12 Additional Robustness
- 13 Maps of Controls

Fertility Data: Availability



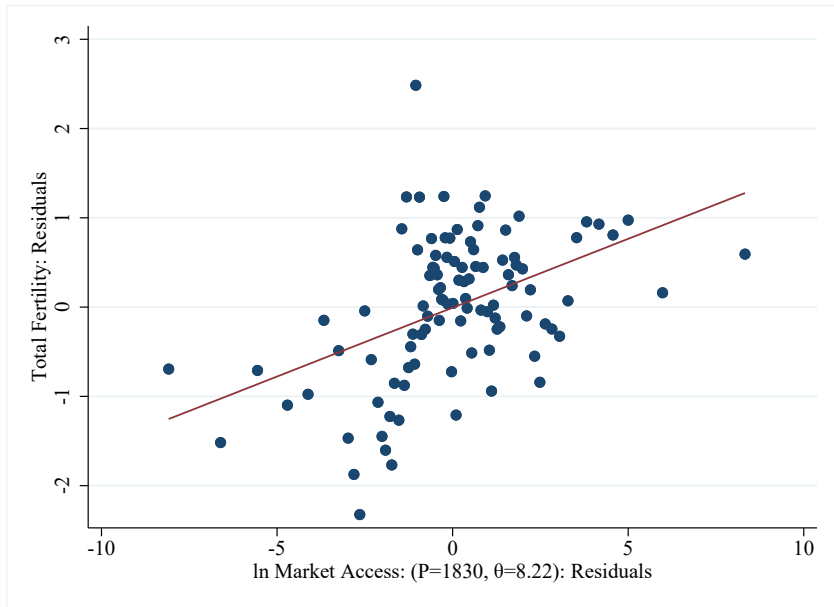
Railway length over time



Summary Statistics

	(1)	(2)	(3)	(4)	(5)
	mean	sd	min	max	N
Total Fertility	30.2	8.93	5.90	68.1	4,104
In Market Access: (P=1830, $\theta=8.22$)	6.98	7.91	-22.1	27.7	4,206
Latitude	49.6	5.75	35.2	70.0	4,206
Longitude	5.14	9.00	-18.6	29.7	4,206
Coast Distance	97.7	134	0	614	4,206
River	0.53	0.50	0	1	4,206
Altitude	318	340	-144	2,186	4,206
Population Density 1830	77.8	179	0.15	2,599	4,206
Area	7,138	12,013	12.3	166,762	4,206
Caloric Suitability	8,000	2,653	0	14,514	4,206
Barley Suitability	7,442	2,230	0	10,604	4,206
Maize Suitability	3,493	3,994	0	14,527	4,206
Rye Suitability	4,567	1,361	0	6,383	4,206
Oat Suitability	2,992	797	0	3,681	4,206
Wheat Suitability	7,286	2,158	0	10,303	4,206
Average Precipitation	73.5	25.2	28.7	231	4,206
Ruggedness	13.7	13.0	0.41	82.0	4,206
Year	1,895	25.1	1,840	1,940	4,206

Binned Scatterplot: Net of Fixed Effects



Results: First Stage

	(1)	(2)
	In Market Access: (P=1830 $\theta=8.22$)	In Market Access: (P=1830 $\theta=8.22$)
In Distant Market Access: 500 km	1.225*** (0.053)	1.705*** (0.074)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Counterfactual Fertility with 1830 Market Access



Marital and non-Marital Fertility

	(1) Marital Fertility	(2) Marital Fertility	(3) Non- Marital Fertility	(4) Non- Marital Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.268*** (0.055)	0.197*** (0.052)	0.046*** (0.011)	0.033*** (0.011)
N	4,040	4,040	4,034	4,034
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Urban Fertility (1/2)

	(1) Urban Fertility	(2) Urban Fertility	(3) Urban Marital Fertility	(4) Urban Marital Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.024 (0.061)	0.027 (0.064)	0.102 (0.114)	0.016 (0.111)
N	687	687	718	718
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Urban Fertility (2/2)

	(1) Urban Non- Marital Fertility	(2) Urban Non- Marital Fertility	(3) Urban Nuptiality	(4) Urban Nuptiality
In Market Access: (P=1830, $\theta=8.22$)	-0.044* (0.023)	0.029 (0.027)	-0.132** (0.057)	-0.017 (0.047)
N	687	687	737	737
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Rural Fertility (1/2)

	(1) Rural Fertility	(2) Rural Fertility	(3) Rural Marital Fertility	(4) Rural Marital Fertility
In Market Access: (P=1830, $\theta=8.22$)	-0.007 (0.046)	-0.002 (0.049)	0.168** (0.075)	0.022 (0.075)
N	888	888	936	936
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Rural Fertility (2/2)

	(1) Rural Non- Marital Fertility	(2) Rural Non- Marital Fertility	(3) Rural Nuptiality	(4) Rural Nuptiality
In Market Access: (P=1830, $\theta=8.22$)	-0.020 (0.024)	-0.024 (0.029)	-0.121** (0.048)	0.041 (0.046)
N	888	888	984	984
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Intermediate Outcomes (1/2)

	(1) Nuptiality	(2) Nuptiality	(3) Infant Mortality	(4) Infant Mortality
In Market Access: (P=1830, $\theta=8.22$)	0.033 (0.027)	0.048* (0.026)	-0.015 (0.039)	0.059 (0.039)
N	4,074	4,074	1,606	1,606
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Intermediate Outcomes (2/2)

	(1) Pct. Married by 50	(2) Pct. Married by 50	(3) Pct. Urban	(4) Pct. Urban
In Market Access: ($P=1830$, $\theta=8.22$)	0.067** (0.027)	0.030 (0.028)	-0.022 (0.136)	0.206 (0.000)
N	2,401	2,401	898	898
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by Population in 1900

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.254*** (0.040)	0.161*** (0.054)	0.035 (0.044)	-0.001 (0.039)
N	1,757	1,757	1,749	1,749
Sample	In RW Population Above Median in 1900	In RW Population Above Median in 1900	In RW Population Below Median in 1900	In RW Population Below Median in 1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by Labor Share in Agriculture in 1900

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: (P=1830, $\theta=8.22$)	-0.043 (0.047)	0.007 (0.039)	0.219*** (0.049)	0.225*** (0.054)
N	1,740	1,740	1,766	1,766
Sample	Agriculture Share Above Median in 1900	Agriculture Share Above Median in 1900	Agriculture Share Below Median in 1900	Agriculture Share Below Median in 1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by Labor Share in Industry in 1900

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.207*** (0.048)	0.208*** (0.053)	0.021 (0.049)	0.085* (0.044)
N	1,748	1,748	1,758	1,758
Sample	Industry	Industry	Industry	Industry
	Share	Share	Share	Share
	Above	Above	Below	Below
	Median in	Median in	Median in	Median in
	1900	1900	1900	1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by Labor Share in Services in 1900

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.248*** (0.050)	0.261*** (0.059)	-0.013 (0.044)	0.004 (0.034)
N	1,760	1,760	1,746	1,746
Sample	Services	Services	Services	Services
	Share	Share	Share	Share
	Above	Above	Below	Below
	Median in	Median in	Median in	Median in
	1900	1900	1900	1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by schooling in 1870

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.121** (0.048)	0.033 (0.046)	0.223*** (0.035)	0.141*** (0.038)
N	1,234	1,234	2,810	2,810
Sample	Above Median Years of Education in 1870	Above Median Years of Education in 1870	Below Median Years of Education in 1870	Below Median Years of Education in 1870
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by Numeracy in 1880

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.009 (0.041)	0.030 (0.039)	0.291*** (0.047)	0.177*** (0.040)
N	1,932	1,932	2,022	2,022
Sample	Above Median Numeracy in 1880	Above Median Numeracy in 1880	Below Median Numeracy in 1880	Below Median Numeracy in 1880
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by Numeracy in 1900

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	-0.059 (0.043)	0.009 (0.000)	0.191*** (0.059)	0.138*** (0.040)
N	1,740	1,740	1,726	1,726
Sample	Above Median Numeracy in 1900	Above Median Numeracy in 1900	Below Median Numeracy in 1900	Below Median Numeracy in 1900
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Heterogeneity by Fertility in Neighboring Locations

	(1)	(2)
	Total Fertility	Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.162*** (0.036)	0.121*** (0.031)
Neighbor Fertility \times In Market Access	0.012 (0.028)	-0.020 (0.028)
N	4,046	4,046
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for Fertility in Neighboring Locations × Decade Fixed Effects

	(1) Total Fertility	(2) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.166*** (0.032)	0.138*** (0.031)
N	4,046	4,046
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses. All specifications also control for initial fertility in locations within 500 kilometers, normalized, interacted with decade fixed effects.

Fertility Access

	(1) Total Fertility	(2) Total Fertility
In Weighted Fertility Access ($\theta=8.22$)	0.287 (0.640)	0.666 (0.437)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for genetic distance from France

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.130*** (0.034)	0.106*** (0.031)	0.122*** (0.034)	0.093*** (0.031)
N	3,374	3,374	3,374	3,374
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
France Distance	None	None	Genetic	Genetic

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses. Specifications also include the listed measure of distance from France interacted with decade fixed effects.

Control for linguistic and religious distance from France

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.169*** (0.031)	0.094*** (0.032)	0.149*** (0.033)	0.102*** (0.032)
N	3,374	3,374	3,374	3,374
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
France Distance	Religious	Religious	Linguistic	Linguistic

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses. Specifications also include the listed measure of distance from France interacted with decade fixed effects.

Pairwise Results

	(1) AD. Total Fertility	(2) AD. Total Fertility	(3) In Fertility Difference	(4) In Fertility Difference
Travel Time	-0.031*** (0.005)		-0.006*** (0.001)	
In Travel Time		-1.359*** (0.283)		-0.238*** (0.046)
N	901,455	901,455	897,947	897,947
Pair and Year FE	Yes	Yes	Yes	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Urban and Rural Market Access

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility	(5) Total Fertility	(6) Total Fertility
In Urban Market Access	0.175*** (0.031)	0.141*** (0.031)			0.409*** (0.131)	0.262*** (0.087)
In Rural Market Access			0.157*** (0.032)	0.125*** (0.030)	-0.232* (0.129)	-0.120 (0.082)
N	4,056	4,056	4,056	4,056	4,056	4,056
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Mortality Access

	(1) Total Fertility	(2) Total Fertility
In Weighted Mortality Access ($\theta=8.22$)	-3.529** (1.396)	-1.865 (1.332)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

By Life Expectancy in 1870

	(1)	(2)	(3)	(4)
	Total Fertility	Total Fertility	Total Fertility	Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.276*** (0.043)	0.272*** (0.047)	0.158*** (0.032)	0.023 (0.038)
N	1,753	1,753	4,056	2,291
Sample	Above Median Life Expectancy in 1870	Above Median Life Expectancy in 1870	Below Median Life Expectancy in 1870	Below Median Life Expectancy in 1870
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for Railway Density

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.153*** (0.031)	0.146*** (0.030)
Rail Density	-25.722*** (7.161)	-21.105*** (5.700)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Distance from rail

	(1) Total Fertility	(2) Total Fertility	(3) In Rail Distance	(4) In Rail Distance
In Spanning Tree Distance			-0.064 (0.041)	-0.023 (0.032)
In Node Distance			-0.050 (0.053)	-0.029 (0.052)
In Rail Distance	-0.332*** (0.113)	-0.164 (0.104)		
N	4,056	4,056	4,163	4,163
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Sectoral Shares

	(1) Agriculture Share	(2) Agriculture Share	(3) Industry Share	(4) Industry Share	(5) Services Share	(6) Services Share
In Market Access: (P=1830, $\theta=8.22$)	-0.002* (0.001)	-0.001 (0.001)	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
N	1,743	1,743	1,743	1,743	1,743	1,743
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by urbanization in 1830

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.133*** (0.039)	0.143*** (0.045)	0.182*** (0.049)	0.144*** (0.044)
N	2,087	2,087	1,969	1,969
Sample	Above Median Ur- banization in 1830	Above Median Ur- banization in 1830	Below Median Ur- banization in 1830	Below Median Ur- banization in 1830
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for the urbanization rate

	(1) Total Fertility	(2) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.140*** (0.032)	0.115*** (0.030)
HYDE Urbanization Rate	-16.080*** (2.263)	-10.595*** (2.174)
N	4,026	4,026
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses. All specifications also control for urbanization.

Urbanization rate as outcome

	(1) HYDE Urbanization Rate	(2) HYDE Urbanization Rate
In Market Access: ($P=1830$, $\theta=8.22$)	-0.001** (0.001)	-0.001* (0.000)
N	4,133	4,133
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for Country-Level Education

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.135*** (0.043)	0.105*** (0.037)
N	3,665	3,665
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for Country-Level Numeracy

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.163*** (0.031)	0.105*** (0.029)
N	3,463	3,463
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Drop Capitals

	(1) Total Fertility	(2) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.161*** (0.033)	0.121*** (0.030)
N	3,925	3,925
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Control for initial market access

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.126*** (0.030)	0.125*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses. All specifications control for initial market access, interacted with decade fixed effects.

Results by initial market access

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.215*** (0.041)	0.193*** (0.044)	0.007 (0.048)	0.018 (0.043)
N	2,434	2,434	1,622	1,622
Sample	Above Median 1830	Above Median 1830	Below Median 1830	Below Median 1830
	Market Access	Market Access	Market Access	Market Access
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

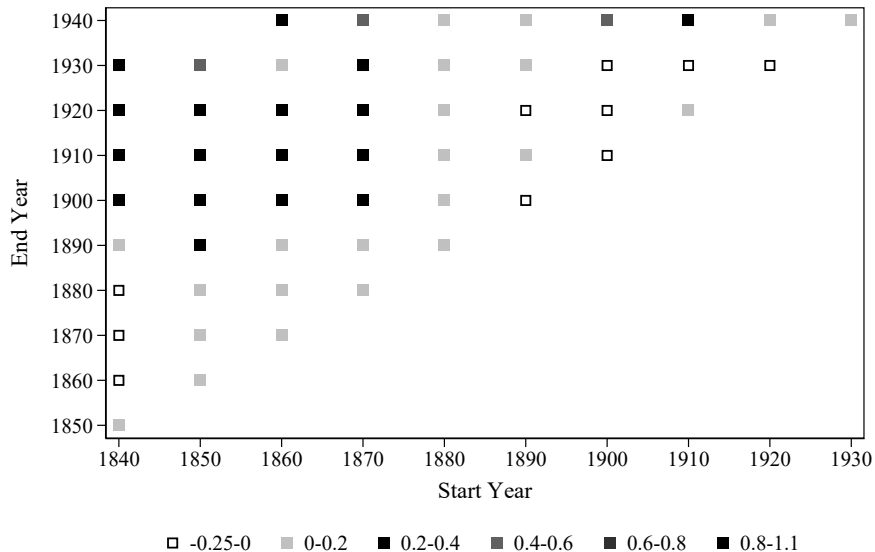
Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by coastal

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.176*** (0.044)	0.191*** (0.043)	0.148*** (0.045)	0.084** (0.037)
N	1,718	1,718	2,338	2,338
Sample	Coastal	Coastal	Non- Coastal	Non- Coastal
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Every Long Difference

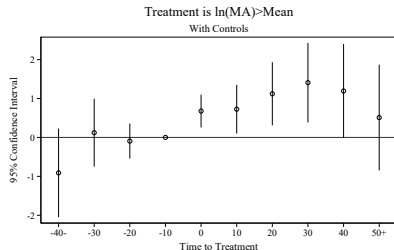
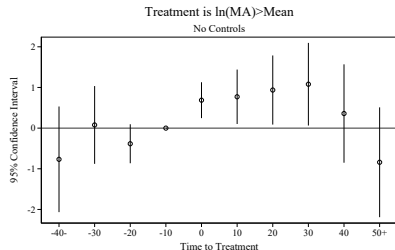


Long differences IV: 1870 to 1910

	(1)	(2)
	Δ Total Fertility	Δ Total Fertility
Δ In Market Access	0.562*** (0.104)	0.336*** (0.110)
N	347	347
Controls	No	Yes
KPF	89.13	141.4

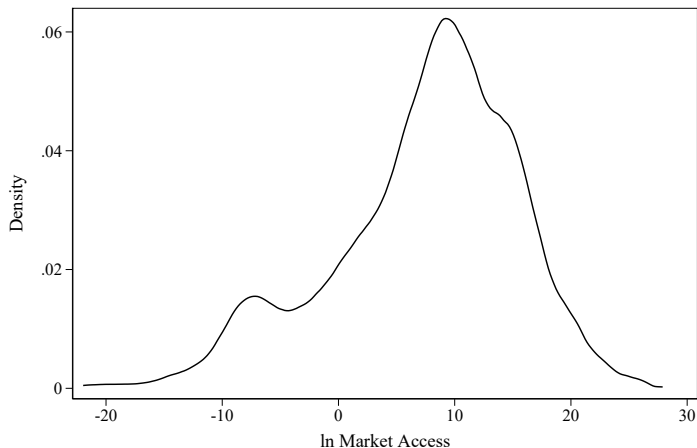
***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Controls are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Robust standard errors in parentheses.

Event Studies



Notes: This figure shows coefficient estimates from equation (9). All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors are clustered by location.

Distribution of Market Access



This figure shows a kernel density of log market access across all observations in the sample.

Alternative Market Access (1/6)

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: (P=1830, $\theta=1$)	3.721*** (0.548)	4.395*** (0.827)		
In Market Access: (P=1830, $\theta=3.60$)			0.526*** (0.092)	0.437*** (0.095)
N	4,056	4,056	4,056	4,056
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative Market Access (2/6)

	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: (P=1830, $\theta=12.86$)	0.095*** (0.019)	0.075*** (0.018)		
In Market Access: (P=1850, $\theta=8.22$)			0.157*** (0.032)	0.124*** (0.030)
N	4,056	4,056	4,056	4,056
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Standardized β by θ

	(1) Total Fertility	(2) Total Fertility	(3) Total Fertility	(4) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.111*** (0.026)			
In Market Access: (P=1830, $\theta=1$)		0.272*** (0.051)		
In Market Access: (P=1830, $\theta=3.60$)			0.149*** (0.032)	
In Market Access: (P=1830, $\theta=12.86$)				0.106*** (0.025)
N	4,056	4,056	4,056	4,056
Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative Market Access (3/6)

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=t$, $\theta=8.22$)	0.131*** (0.032)	0.103*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative Market Access (4/6)

	(1) Total Fertility	(2) Total Fertility
In Market Access ($\theta=8.22$, $P=FT$ 1830)	0.158*** (0.032)	0.125*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative Market Access (5/6)

	(1) Total Fertility	(2) Total Fertility
In Market Access ($\theta=8.22$, $P=Cities$ in 1830)	0.173*** (0.032)	0.131*** (0.031)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative Market Access (6/6)

	(1) Total Fertility	(2) Total Fertility
In Market Access ($\theta=8.22$, P=Cities in 1800)	0.178*** (0.033)	0.130*** (0.033)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Market Access with Cities in 1850

	(1) Total Fertility	(2) Total Fertility
In Market Access ($\theta=8.22$, $P=Cities\ 1850$)	0.159*** (0.032)	0.129*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Rail Speed of 30km per Hour

	(1) Total Fertility	(2) Total Fertility
In Market Access: (P=1830, $\theta=8.22$) 30km h	0.211*** (0.045)	0.169*** (0.041)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Rail Speed of 120km per Hour

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$) 120km h	0.122*** (0.024)	0.093*** (0.023)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

With Border Costs

	(1) Total Fertility	(2) Total Fertility
In Market Access with borders ($\theta=8.22$, $P=1830$)	0.157*** (0.031)	0.124*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

With parameterized market access

	(1) Total Fertility	(2) Total Fertility
In Parameterized Market Access ($\theta=8.22$, $P=1830$)	0.199*** (0.058)	0.160*** (0.052)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

With Roads

	(1) Total Fertility	(2) Total Fertility
In Market Access with roads ($\theta=8.22$, $P=1830$)	0.131*** (0.031)	0.107*** (0.029)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

With Steam Travel Over Water

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$) with steam	0.156*** (0.032)	0.123*** (0.030)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

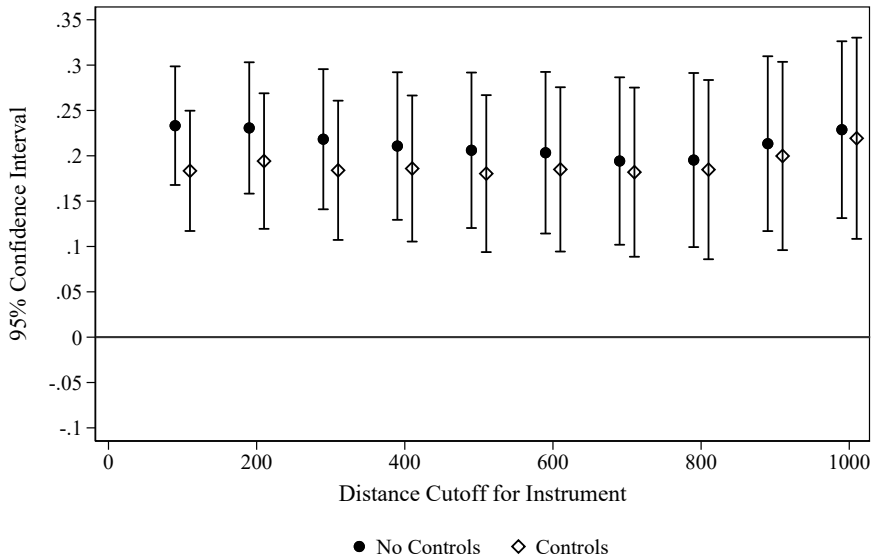
Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Conley Standard Errors

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.158*	0.125***
250 km	(0.086)	(0.043)
500 km	(0.076)	(0.050)
750 km	(0.050)	(0.050)
1000 km	(0.020)	(0.049)
N	4,104	4,104
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Alternative IV Cutoff Distances



Binned scatterplot with quadratic fit: net of fixed effects



This figure represents estimates of equation (1) as a binned scatterplot with 100 bins and allowing log market access to enter quadratically. We residualize both fertility and market access to be net of both location and decade fixed effects. The corresponding binned scatterplot and best quadratic fit are shown.

In Fertility

	(1) In Total Fertility	(2) In Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.007*** (0.001)	0.005*** (0.001)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Country Trends

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.055** (0.027)	0.063** (0.026)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Country-Year Fixed Effects

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.092*** (0.025)	0.084*** (0.026)
N	4,044	4,044
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Polynomial in latitude and longitude

	(1)	(2)
	Total Fertility	Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.148*** (0.030)	0.109*** (0.031)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

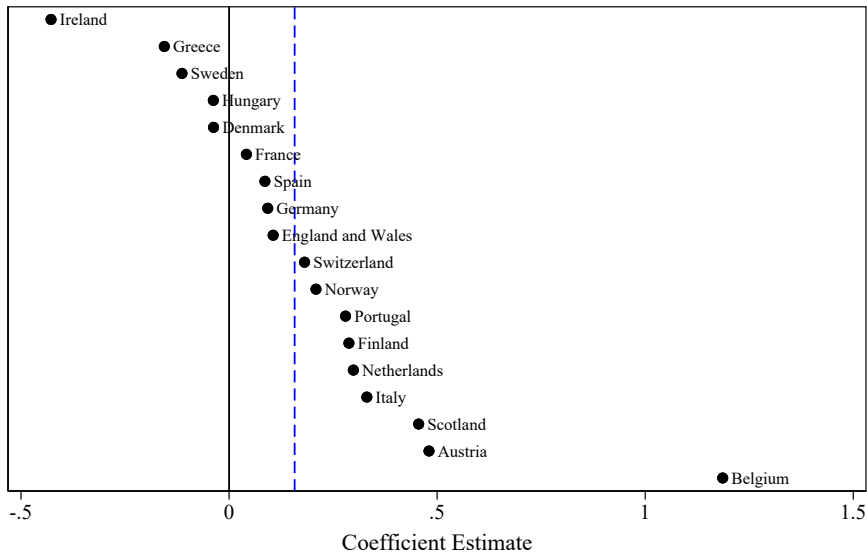
Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses. All specifications additionally control for interactions of decade fixed effects with latitude squared, longitude squared, and the interaction of latitude and longitude.

Controlling for coal

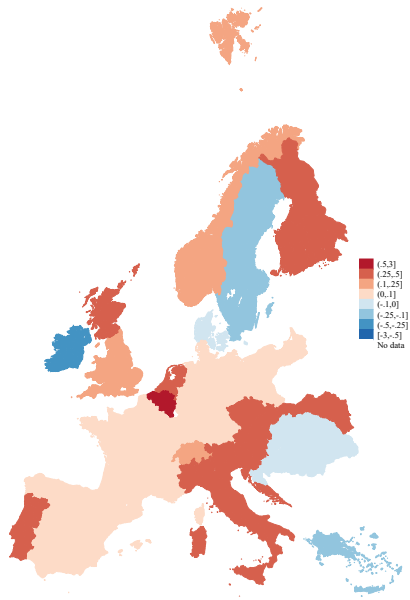
	(1)	(2)	(3)	(4)
	Total	Total	Total	Total
	Fertility	Fertility	Fertility	Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.158*** (0.031)	0.124*** (0.030)	0.155*** (0.032)	0.125*** (0.030)
N	4,056	4,056	4,056	4,056
Coal Control	Coal	Coal	Carbon	Carbon
	Share	Share	Share	Share
Fixed Effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Belgium? Results by Country...



Results by Country: Coefficient Estimates



No Belgium

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.159*** (0.032)	0.125*** (0.030)
N	3,993	3,993
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Smaller Regions Only

	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.231*** (0.038)	0.173*** (0.041)
N	2,437	2,437
Fixed Effects	Yes	Yes
Controls	No	Yes

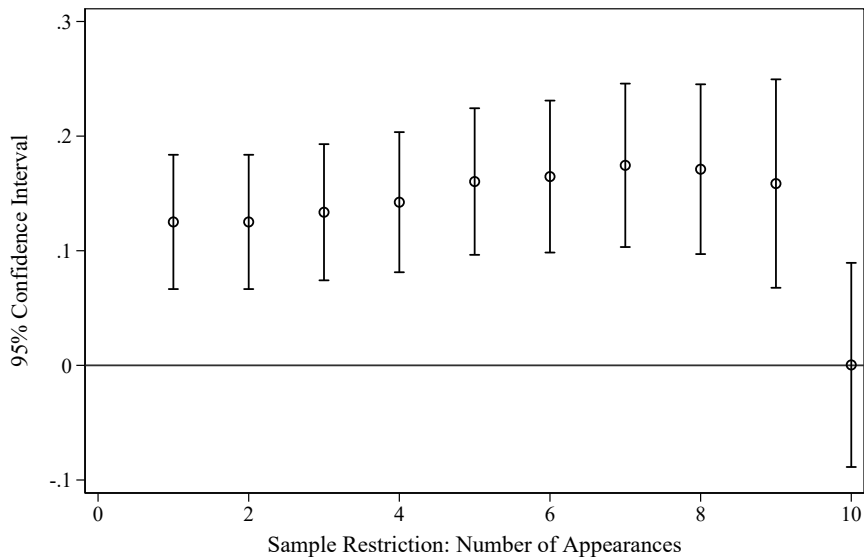
Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Large and small city market access

	(1)	(2)
	Total Fertility	Total Fertility
In Big City Market Access	0.113*	0.043
	(0.063)	(0.068)
In Small City Market Access	0.114**	0.131**
	(0.054)	(0.053)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Restrict Sample by Appearances



Results by Time Period

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Fertility	Total Fertility	Total Fertility	Total Fertility	Total Fertility	Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.242*** (0.039)	0.102*** (0.038)	-0.089 (0.133)	0.012 (0.057)	-0.039** (0.016)	0.003 (0.019)
N	2,447	2,447	1,005	1,005	416	416
Period	1870 to 1910	1870 to 1910	After 1910	After 1910	Before 1870	Before 1870
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Results by fertility transition onset

	(1) Total Fertility	(2) Total Fertility
In Market Access: (P=1830, $\theta=8.22$)	0.116*** (0.024)	0.126*** (0.026)
Fertility Transition X Market Access	-0.171*** (0.023)	-0.168*** (0.026)
Fertility Transition	-3.941*** (0.284)	-2.838*** (0.306)
N	4,056	4,056
Fixed Effects	Yes	Yes
Controls	No	Yes

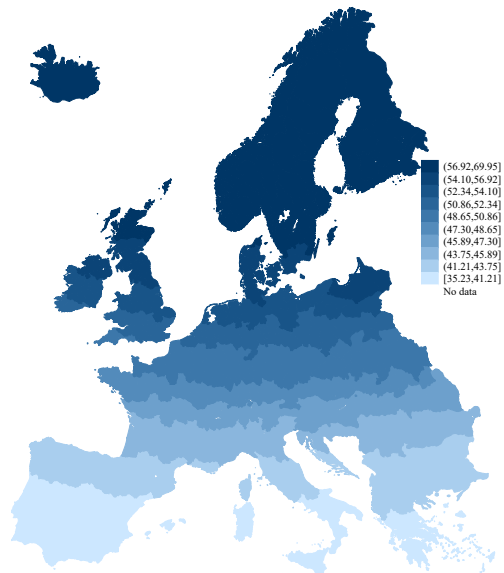
Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

Before 1914

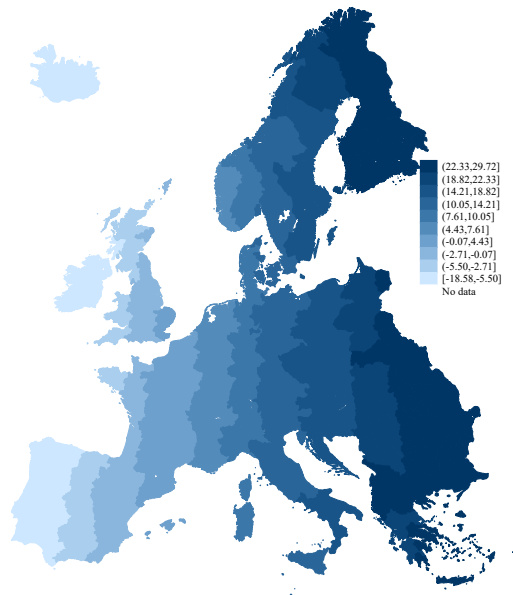
	(1) Total Fertility	(2) Total Fertility
In Market Access: ($P=1830$, $\theta=8.22$)	0.199*** (0.024)	0.127*** (0.026)
N	2,996	2,996
Fixed Effects	Yes	Yes
Controls	No	Yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. All specifications include a constant. Fixed effects are for location and decade. Time-invariant controls interacted with decade fixed effects are latitude, longitude, caloric suitability, coast distance, river, altitude, population density in 1830, area, average precipitation, ruggedness, and suitability for barley, maize, rye, oats and wheat. Standard errors clustered by location in parentheses.

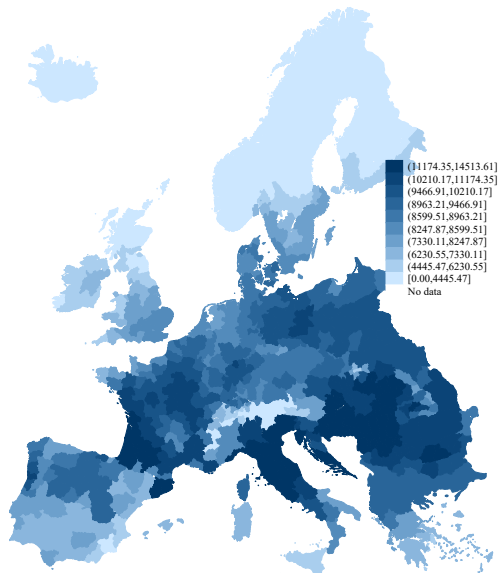
Controls: Latitude



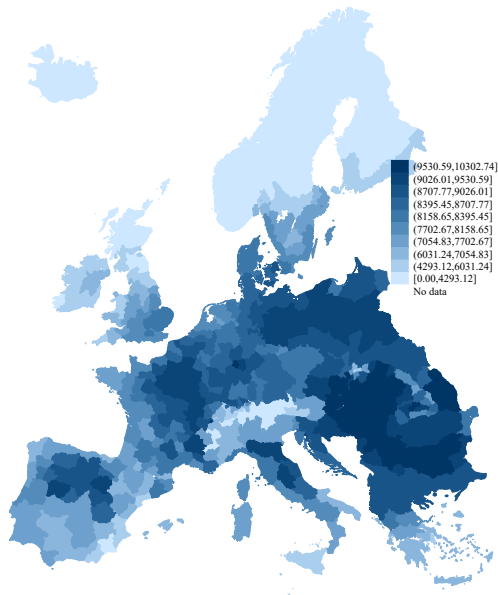
Controls: Longitude



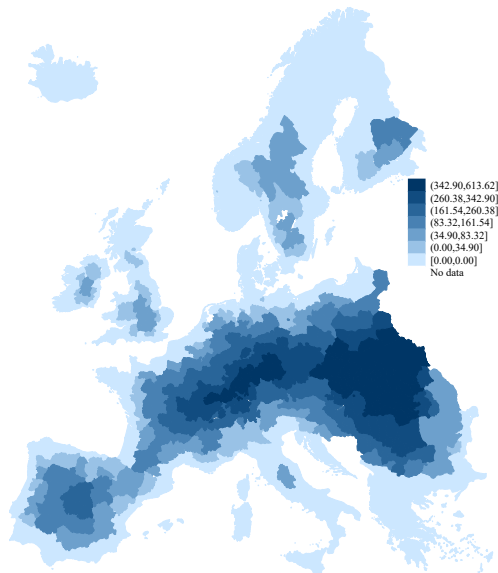
Controls: Caloric Suitability



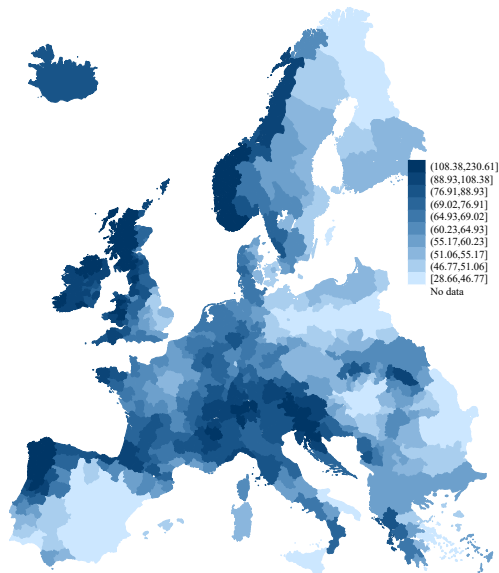
Controls: Wheat Suitability



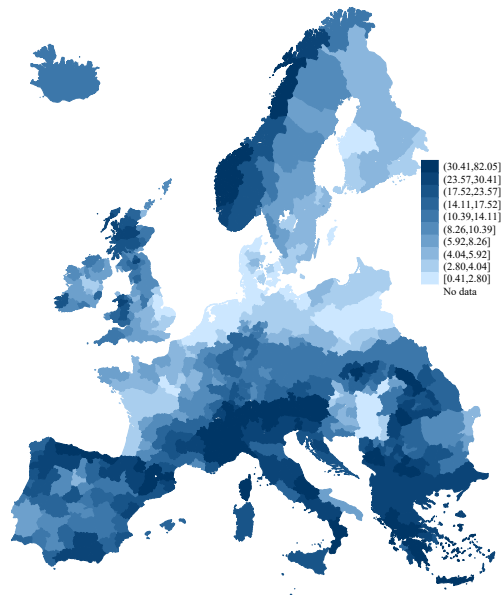
Controls: Coast Distance



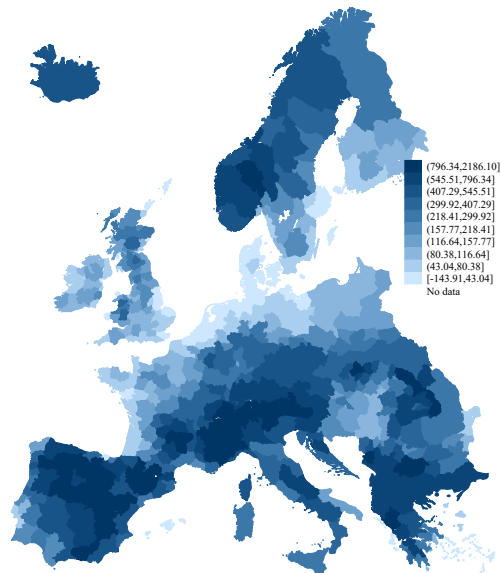
Controls: Average Precipitation



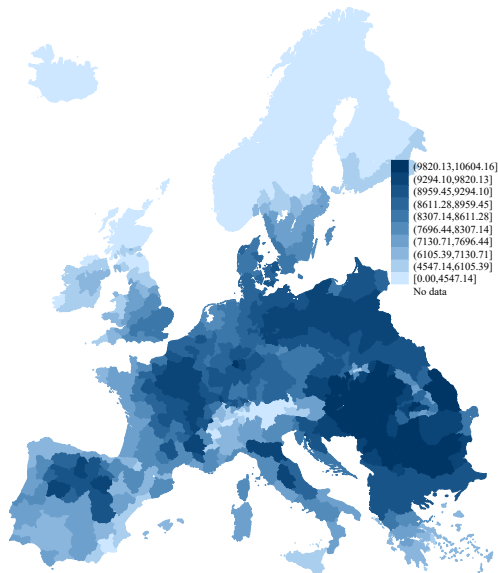
Controls: Ruggedness



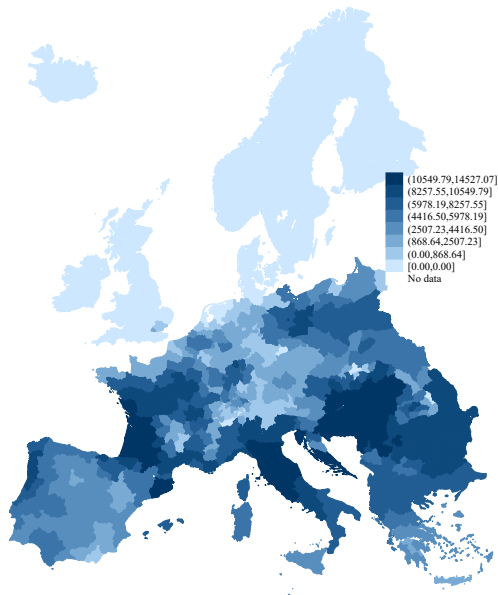
Controls: Altitude



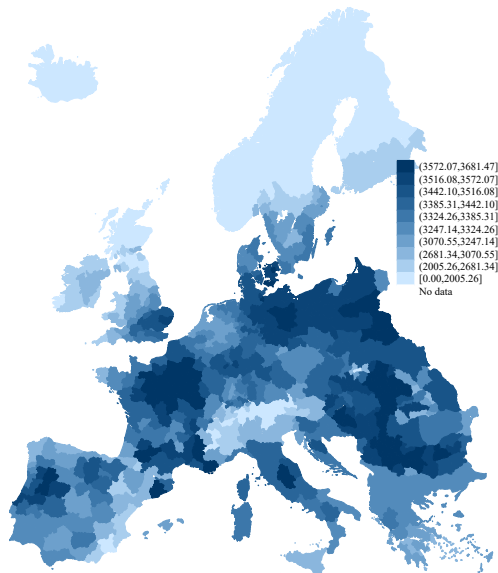
Controls: Barley Suitability



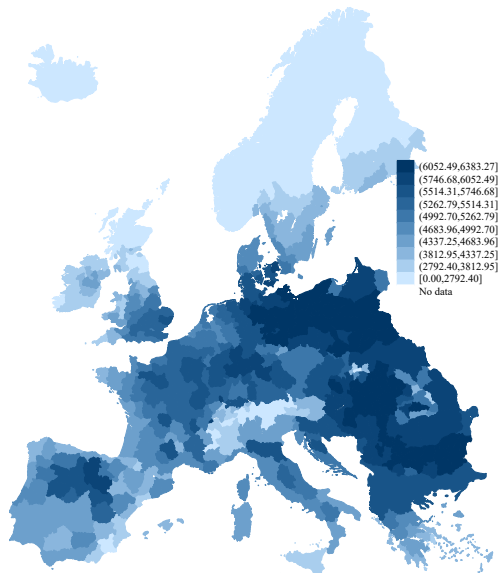
Controls: Maize Suitability



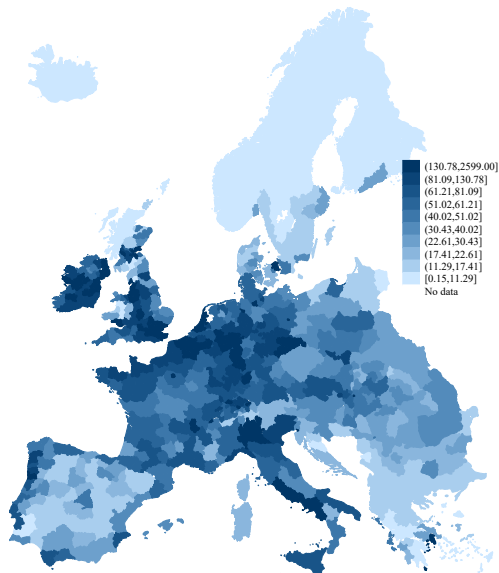
Controls: Oat Suitability



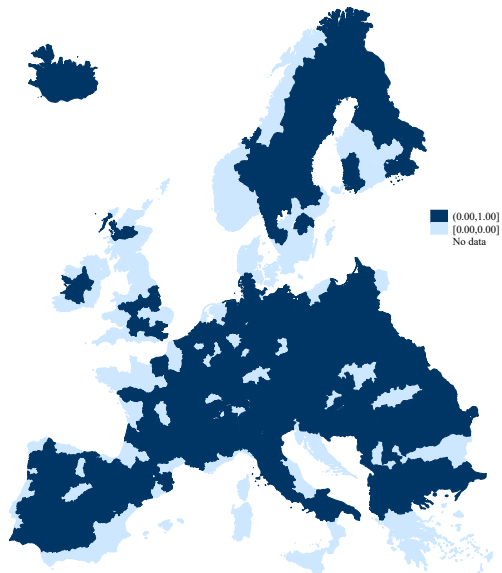
Controls: Rye Suitability



Controls: Pop. Density 1830



Controls: River



Controls: Area

