

# WEALTH AND PROPERTY TAXATION IN THE UNITED STATES

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# MOTIVATION: THE FIRST WEALTH TAX

- Renewed debate about wealth and capital taxation
- But limited by:
  - lack of long-run data on wealth
  - lack of quasi-experimental variation
- Leverage history of “first wealth tax”: the US general property tax
  - Unlike today, tax on all property, not just on real estate.
- Comprehensive coverage of US wealth since early 1800s
  - Measure wealth for all US states and counties + 300 largest cities
  - Rich sources of variation in taxes across space & time

# THIS PROJECT

1. **New source of historical data on wealth**
2. **New descriptive facts about wealth accumulation & spatial inequality in the US**
3. **New estimates of effects of taxation on local wealth accumulation**

# OUTLINE

1. A Brief History of the Property Tax in the US
2. Data
3. Wealth in the US: Descriptive Facts
4. The Effects of the Property Tax on Wealth Accumulation

# PROPERTY TAX IN THE COLONIES

- Borrowed from England (first recorded in 10th century: the *danegeld* on land), started as a essentially tax on land
- Key “American innovation” was to apply it on all classes of property, not just land.
- Two movements transformed the existing local property taxes into an American institution, the “General Property Tax,” with main characteristics common to all states.
  - New or revised state constitutions after 1820 introduced principles of uniformity & universality.
  - After 1842 depression, states needed revenues that did not come from investments in private corporations or public debt.
- Was primarily a local tax, but its main characteristics were common to all states.
- Based on Jeffersonian/Jacksonian views of local democracy

# AMERICAN PRINCIPLES AFTER THE EARLY 1800S

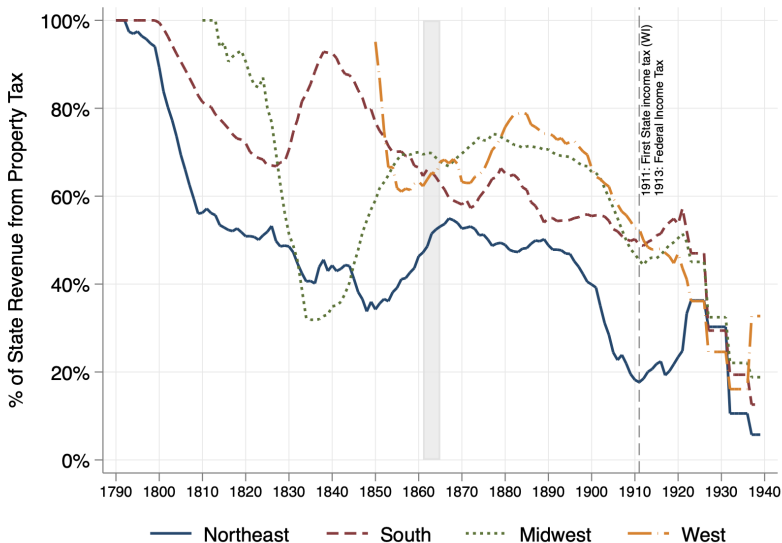
- **Universality:** all property should be taxed, including moveable and intangible. Exemptions strictly defined and limited.
- **Ad valorem:** on basis of value.
- **Uniformity:** taxable property should be taxed at the same rate.
- **In rem:** tax levied against property itself, not against owner.
- **Localism:** local taxes to fund local gvt enforced by local elected officials. Layered tax on property based on all residing jurisdictions (state, counties, special districts (e.g., schools) & cities). No equivalent federal tax.

⇒ The US created 1st comprehensive tax on all forms of wealth

# CRITICISMS AND REFORMS AT THE TURN OF THE 20TH CENTURY

- **Debates around the turn of 1900s** (role of economists)
  - Criticism based on (i) failure to reach all forms of property (ii) regressivity (iii) double taxation.
- **Movement of reforms**
  - Classification (replacing uniformity clause, allowing lower tax on intangible property)
  - Increased enforcement (equalization, State tax commissions to regulate assessment)
- **The demise after 1930s**
  - New Deal: vast expansion of national government over local government
  - Great Depression & Post-WWII: increase in exemptions (e.g. for homestead) and property tax limitation laws
  - Increase in other sources of revenue (including from income tax & sales tax)

# PROPERTY TAX AS BACKBONE OF STATE REVENUE

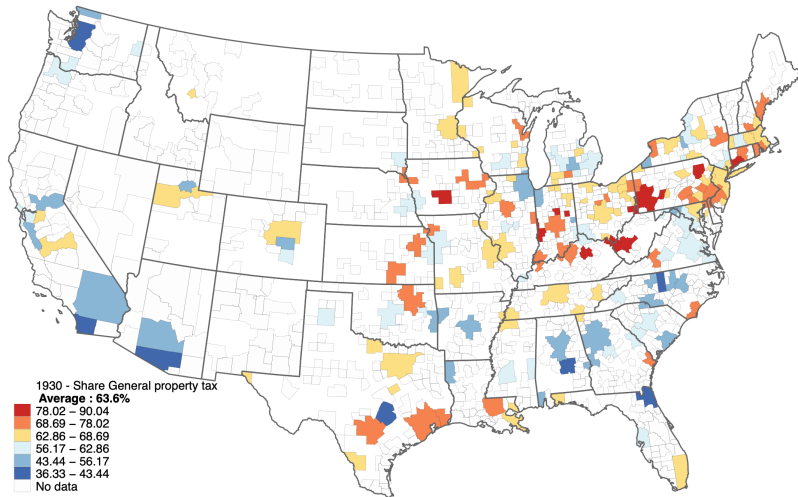


► Share Tax Revenue

► Poll Tax

# PROPERTY TAX AS BACKBONE OF CITY REVENUE

% of city revenue from general property tax: 64% on average



The average city value is plotted on core based statistical areas for readability.

# PROPERTY TAX: TYPES

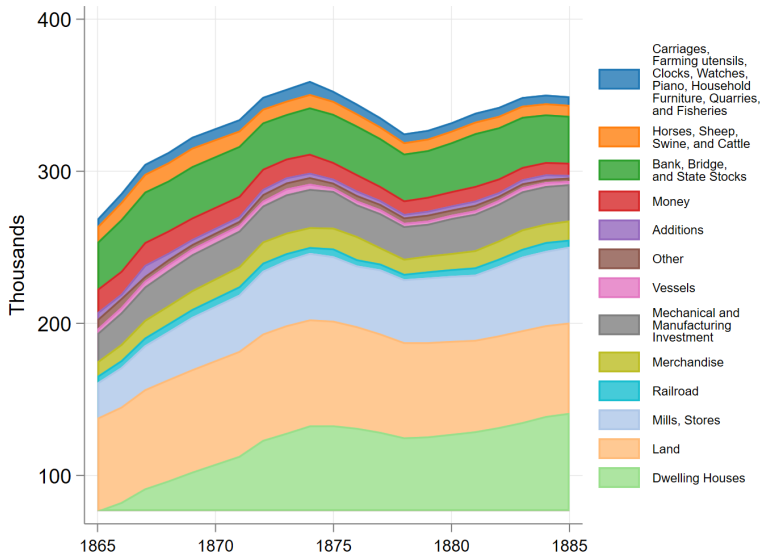
1. **General Property Tax:** The regular property tax, whose assessment and collection apply to the “average” citizen
2. **Special Property Taxes:** mainly applied to specific businesses
  - corporation taxes (on value of corporate property)
  - bank taxes (on value of capital stock)
  - security taxes
  - mortgage taxes
  - frontage taxes
  - tonnage taxes
  - merchants’ taxes
  - manufacturers’ taxes

# PROPERTY TAX: TAX BASE

1. **Real Property:** Value of land, buildings & improvements
2. **Personal Property:** Varies by state but includes most forms of property:
  - Tangible property (furniture, livestock, merchandise, valuables).
  - Intangible property (money and bank deposits, mortgages, debts and credits, stocks, bonds).
3. **Exemptions:** Varies by state (and add'l exemptions in Southern localities), on :
  - Public property (land, public buildings)
  - Religious property (churches, cemeteries, religious societies).
  - Charities, hospitals, schools and libraries
  - On account of public policy: Treasury bonds, abatement for individuals (one \$25 watch in VT) or specific sectors (10 bee stands & beet sugar factories in IA)
  - Provisions to avoid double taxation (e.g. if some utilities tax directly, stocks/bonds exempt)
  - → we can add back exemptions

# EXAMPLE OF PRIVATE PROPERTY: CONNECTICUT

## CATEGORIES OF PERSONAL WEALTH



# OUTLINE

1. A Brief History of the Property Tax in the US
2. Data
3. Wealth in the US: Descriptive Facts
4. The Effects of the Property Tax on Wealth Accumulation

# DATA CONTRIBUTION

- Existing data on wealth is sparse [▶ Details](#)
- Income has well-known measurement issues
  - Imputed from occupations & occupations ranking from 1950
  - Wealth measures something conceptually different than income [▶ Income vs Wealth](#)
- Property tax data collected has higher granularity over time and space
- Property values can provide good measure of private wealth
  1. Account for double counting by excluding corporate property
  2. Account for cross-jurisdiction ownership of real estate wealth (at aggregate level)
  3. Account for wedge between assessed and market values

# MEASURING WEALTH FROM REPORTED STATISTICS

## 1. Double counting of corporate assets?

- Intangible and tangible personal property taxed at residence in the GP Tax (e.g. shares in companies)
- Corporate assets taxed at location with special/different taxes (may lead to double tax).
- We only count corporate assets once, on the owner side.

## 2. Cross-Border Real Assets

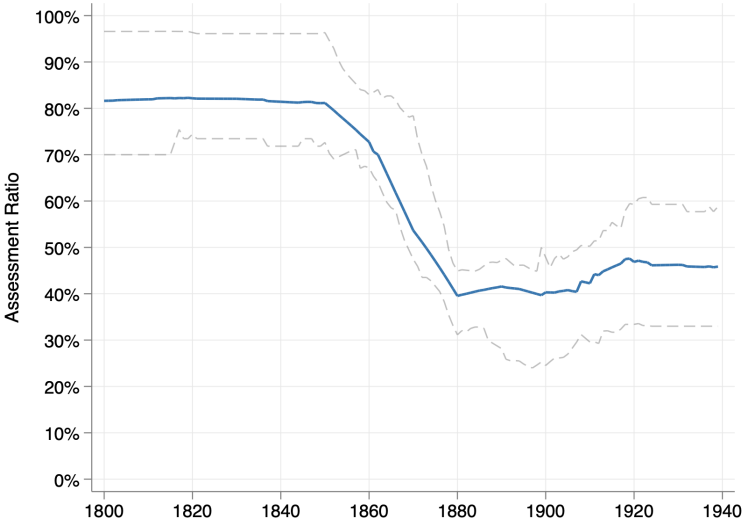
- Real property taxed at location
- Issue if real assets held across boundaries
- Limited in practice (+ solved by aggregation at higher geo. level)

## 3. Assessment $\neq$ Market Value

$$\begin{aligned}r_{it} &= \tau_{it} \cdot b_{it} \\ &= \tau_{it} \cdot \gamma_{it} \cdot h_{it}\end{aligned}$$

- $r$ : property tax revenues;  $\tau$ : tax rate on assessed value of property;  $b$ : Assessed value of property measured by assessors
- We want to measure true market value  $h$
- "Assessment ratio":  $\gamma = \frac{b}{h}$ 
  - Legally,  $\gamma = 1$  in most states, in practice,  $\gamma < 1$

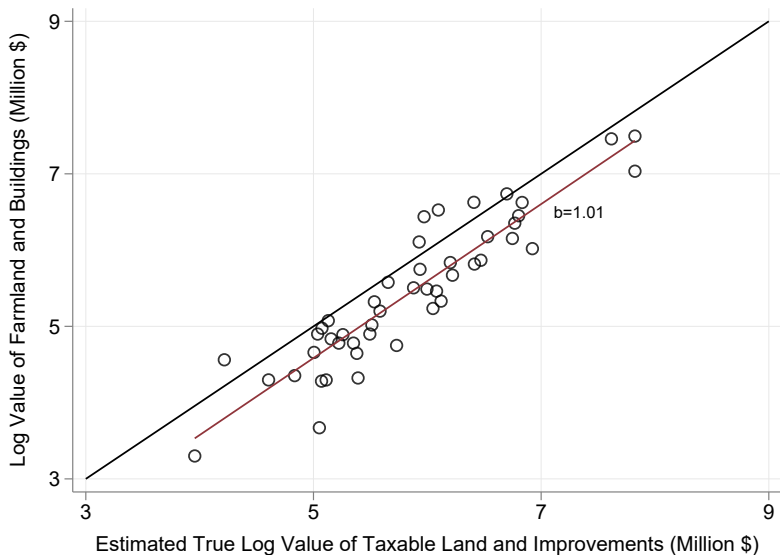
# ASSESSMENT RATIO



*Notes:* The figure shows the average effective ratio of assessed to true value of all property used for state property taxation. Dashed lines indicate the 25<sup>th</sup> and 75<sup>th</sup> percentiles. Decline in 1860-1880 happens as intangible property gained in importance during the industrialization (share of personal property in tax base is stable), increase from 1910 is due to adoption of state tax commissions and increased enforcement (average year of adoption: 1908).

# VALIDATION USING DATA ON MARKET VALUES

ESTIMATED VALUE OF TAXABLE LAND VS CENSUS OF AGRICULTURE VALUE OF LAND (STATE-YEAR LEVEL)



# NEW WEALTH DATA

## State-level Wealth Series

- Collected from annual State reports on property taxation
- Additional sources: Ely (1888), Annual Financial Statistics of States 1915-1939
- Covers all 50 States (+DC and Puerto Rico) for 1793-1940, N = 4,583

## County-level Wealth Series

- Digitized Census report on Wealth, Debt, Taxation (1870-1920)
- Covers all counties every decade for 1870-1920, N = 18,242

## City-level Wealth Series

- Digitized Census annual Financial Statistics (1899-1938)
- Covers large U.S. cities (> 30k 1899-1930, > 100k 1931-1938), N=7,026, n= 327 cities
- Also have data on additional 259 small cities for 1903 (8,000 - 25,000 population)

# NEW WEALTH DATA II

## State- & county level property tax legislation:

- Collected from state reports for all states since 1790
- Secondary sources by contemporary economists and legal scholars: Ely (1888), Stimson (1886), Lutz (1917), NICB (1923, 1925), NTA conferences (1907-1925), Jensen (1931)
- Data on (i) assessment ratio (ii) exemptions (iii) general vs classified property taxation (iv) enforcement

## City-level property tax legislation:

- Digitized Census Annual Financial Statistics 1899-1938
- Data on assessment ratio and general vs classified property taxation
- Rauch (1995) on forms of government.

## Existing wealth series: used for benchmarking

- Census question on 1850 (real estate only), 1860, 1870 (problems..)
- Piketty-Zucman (2014): national wealth data for selected years: 1774, average 1805-1810 and 8 years during 1850-1940.

## Additional Data [▶ Details](#)

# SOURCES AND COVERAGE FOR CONNECTICUT

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Admission	Sample period	Sources
1788	1798 - 1940	Biennial Reports of the Tax Commissioner (1905-1922) Reports of the Comptroller (1901-1923) Reports of the Treasurer (1903-1920) Assessment and Collection of Taxes by Town Officials (1907-1908) Report of the Connecticut Tax Study Commission (1959)

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# TAX LISTS FROM CONNECTICUT

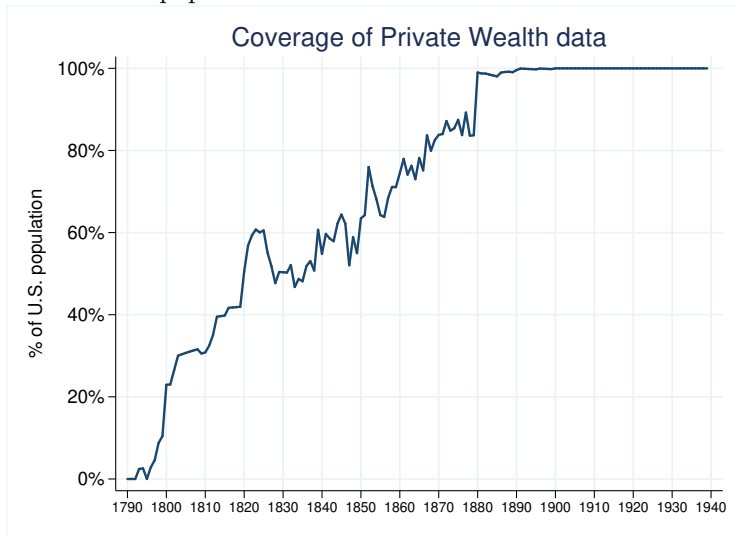
TABLE No. 2

TOTAL GRAND LISTS OF THE STATE SINCE 1796 AS FURNISHED  
 BY TOWN CLERKS, ADDITIONS BY BOARD OF EQUALIZATION,  
 FINAL STATE GRAND LISTS, AND THE STATE TAX RATE  
 SINCE 1851

Year.	Town grand lists.	Year.	Town grand lists.	Year.	Town grand lists.	State Tax Mills.
1796,	\$5,882,826	1817,	\$5,534,070	1838,	\$4,287,515	
1797,	6,034,469	1818,	5,553,882	1839,	4,363,059	
1798,	6,096,517	1819,	4,113,138	1840,	4,354,946	
1799,	6,051,889	1820,	3,907,135	1841,	4,398,714	
1800,	5,874,018	1821,	3,746,289	1842,	4,385,800	
1801,	6,012,312	1822,	3,798,927	1843,	4,012,998	
1802,	6,016,887	1823,	3,787,469	1844,	4,077,596	
1803,	6,026,450	1824,	3,830,923	1845,	4,143,698	
1804,	6,089,640	1825,	3,885,726	1846,	4,278,025	
1805,	5,657,074	1826,	3,625,692	1847,	4,427,589	
1806,	5,607,872	1827,	3,679,169	1848,	4,622,620	
1807,	5,577,274	1828,	3,715,676	1849,	4,719,153	
1808,	5,552,927	1829,	3,764,486	1850,	4,704,611	
1809,	5,565,123	1830,	3,734,009	1851,	5,802,953	10
1810,	5,615,873	1831,	3,798,415	1852,	6,092,960	10
1811,	5,658,712	1832,	3,829,269	1853,	6,531,435	10
1812,	5,661,206	1833,	3,930,130	1854,	6,819,191	10
1813,	5,649,183	1834,	3,974,163	1855,	7,012,937	10

# DATA COVERAGE AT STATE-LEVEL

Share of population covered in state-level wealth series



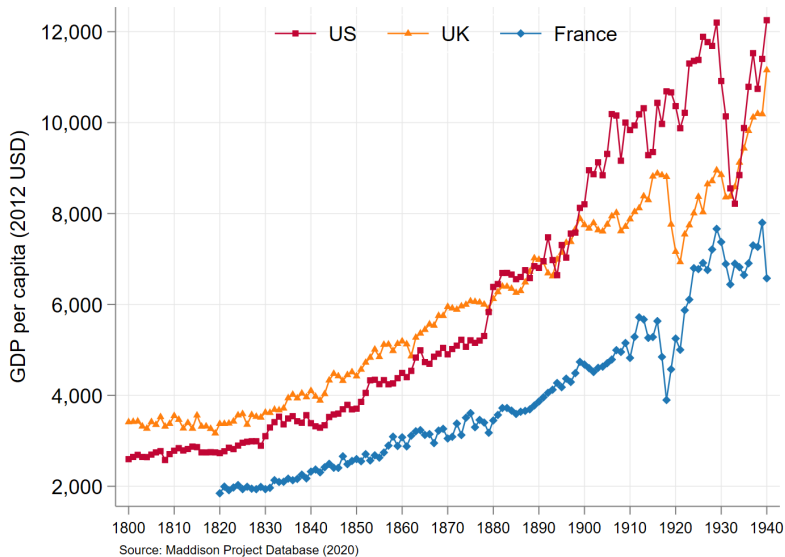
► [More details on coverage / sources](#)

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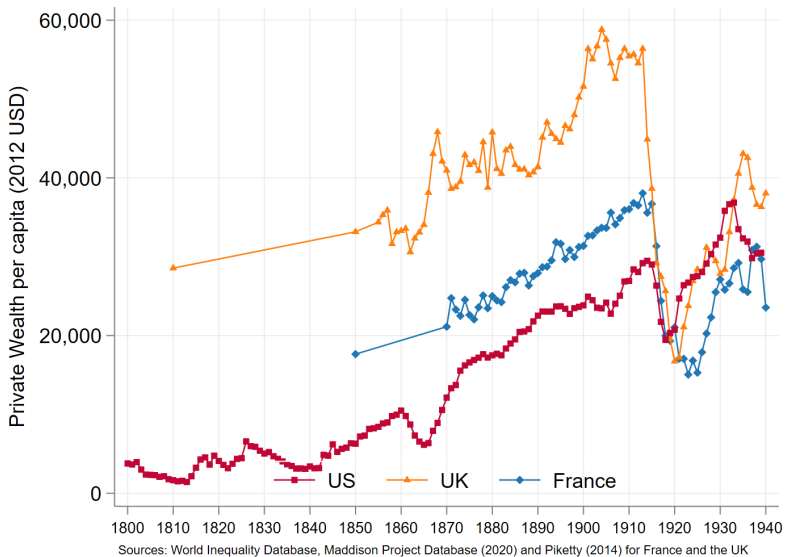
# INCOME: US OVERTOOK EUROPE IN 19TH CENTURY

GDP PER CAPITA: US, UK & FRANCE (1800-1940)



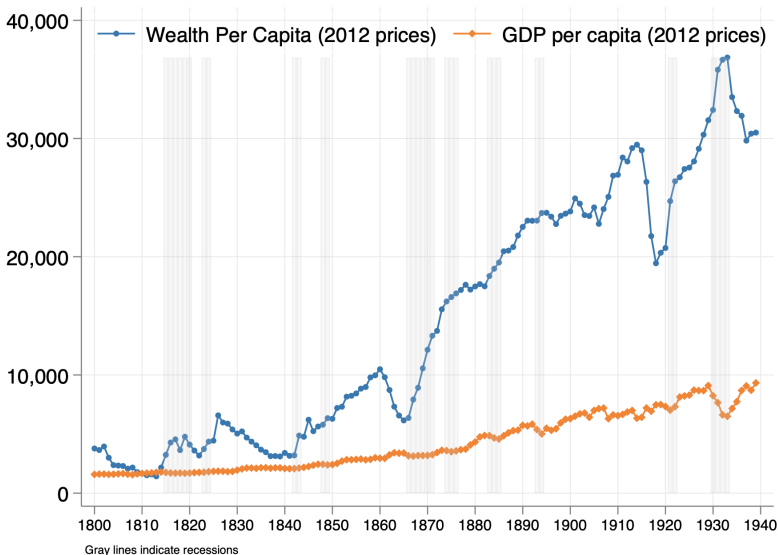
# BUT US REMAINED “POOR” RELATIVE TO EUROPE

PRIVATE WEALTH PER CAPITA: US, UK & FRANCE (1800-1940)



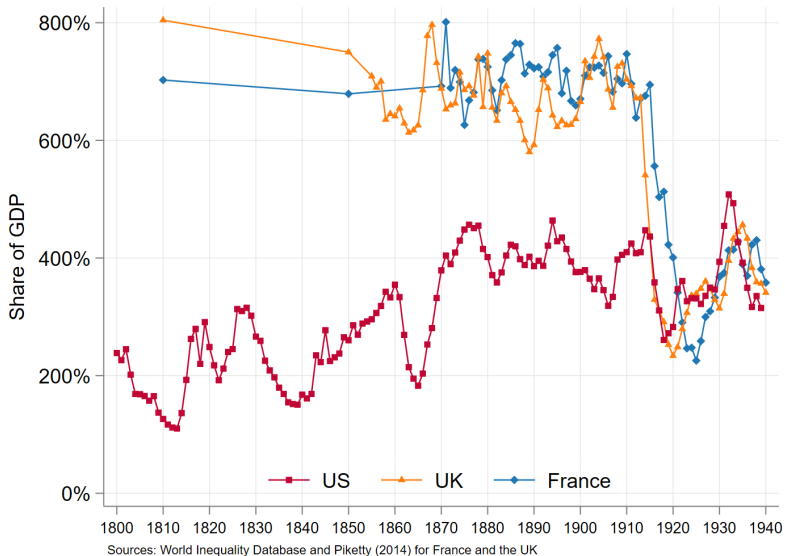
# WEALTH GREW MUCH FASTER THAN INCOME

PRIVATE WEALTH & GDP PER CAPITA: US (1800-1940)



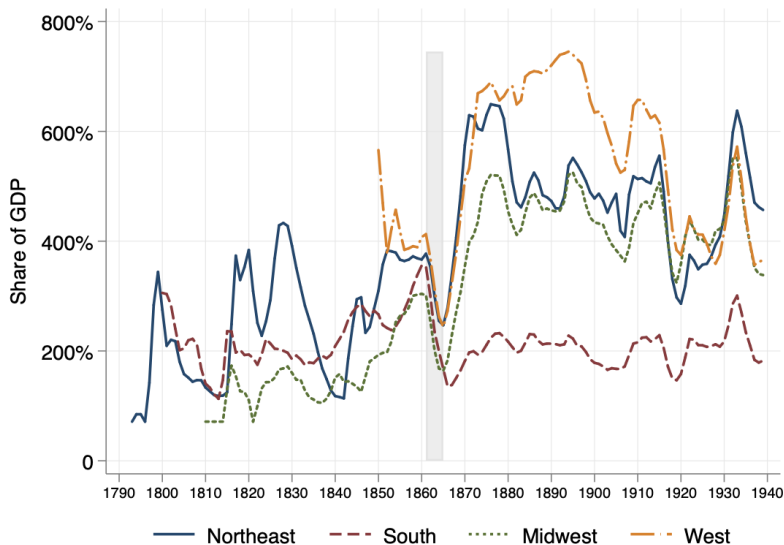
# BUT INITIAL WEALTH TO GDP VERY LOW

PRIVATE WEALTH TO GDP RATIOS: US, UK & FRANCE (1800-1940)



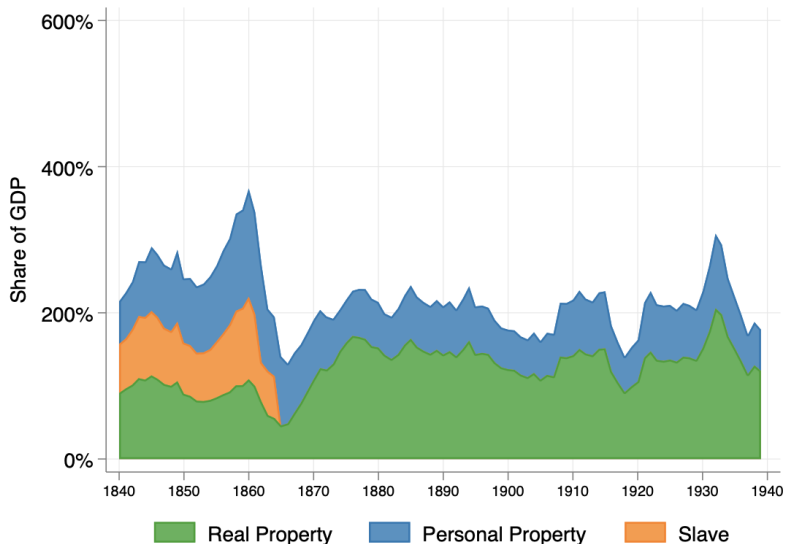
# THE DEMISE OF THE RICH SOUTH?

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY REGION  
(1790-1940)



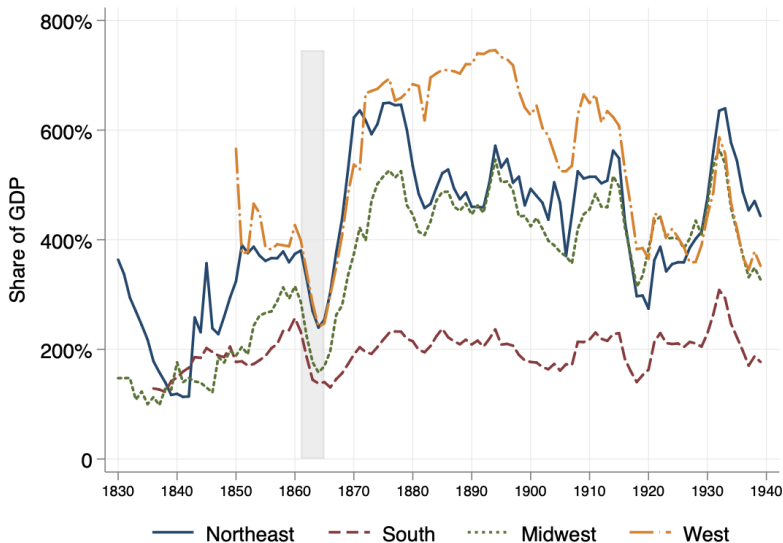
# THE STRUCTURE OF WEALTH IN THE SOUTH

DECOMPOSITION OF WEALTH PER CAPITA IN SOUTHERN STATES (1830-1940)



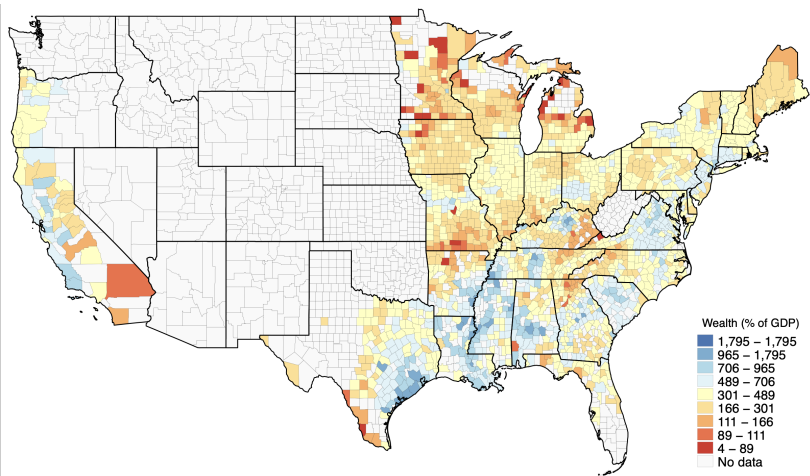
# THE SOUTH HAS ALWAYS BEEN POOR

WEALTH PER CAPITA EXCLUDING ENSLAVED PEOPLE BY REGION (1830-1940)



# THE GEOGRAPHY OF WEALTH IN THE US

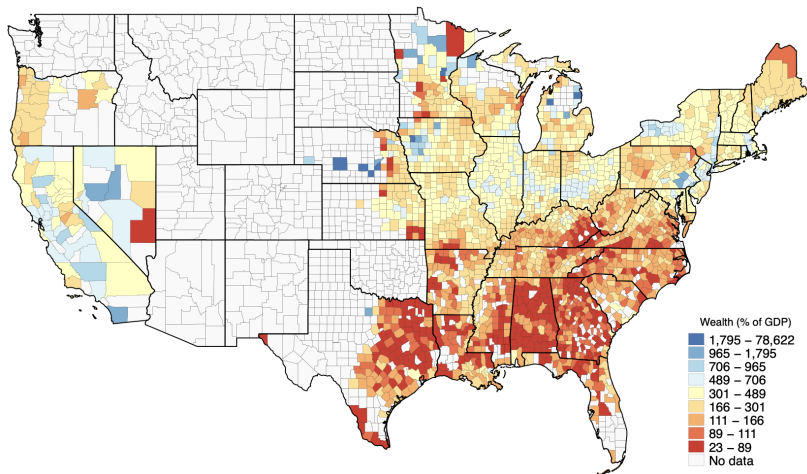
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1860



▶ State Maps

# THE GEOGRAPHY OF WEALTH IN THE US

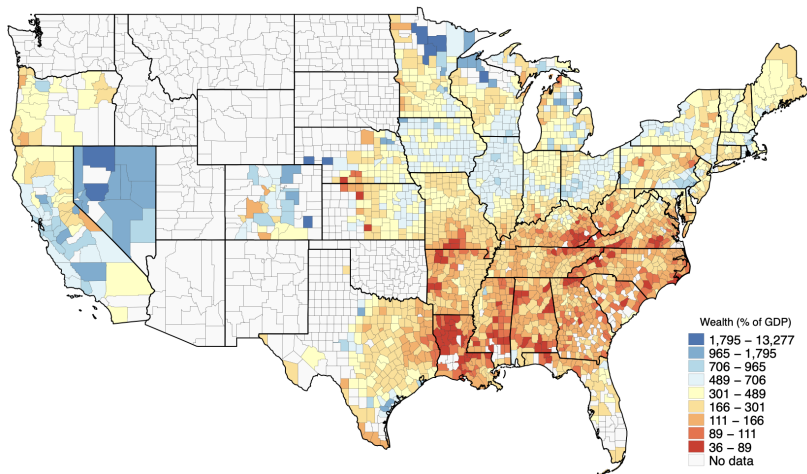
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1870



▶ State Maps

# THE GEOGRAPHY OF WEALTH IN THE US

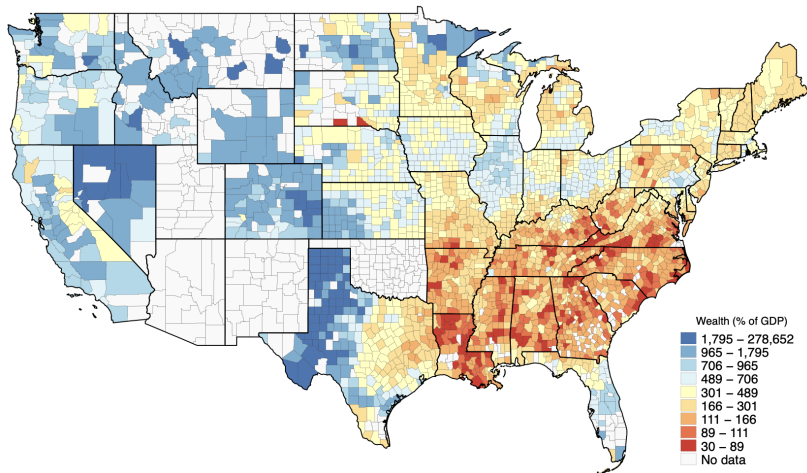
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1880



▶ State Maps

# THE GEOGRAPHY OF WEALTH IN THE US

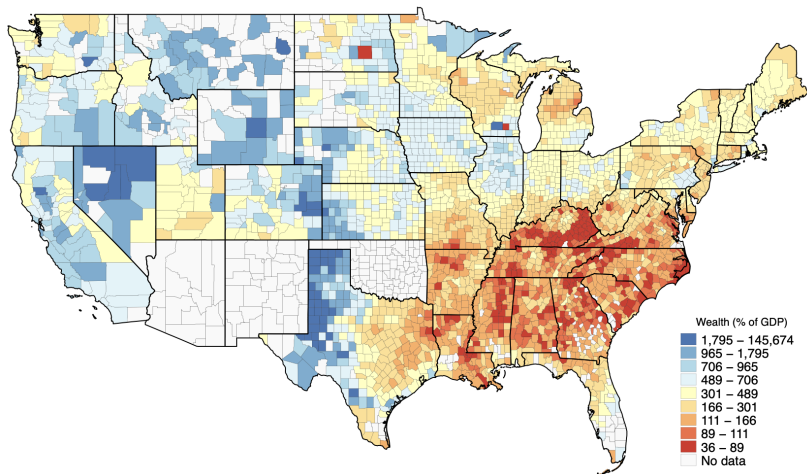
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1890



▶ State Maps

# THE GEOGRAPHY OF WEALTH IN THE US

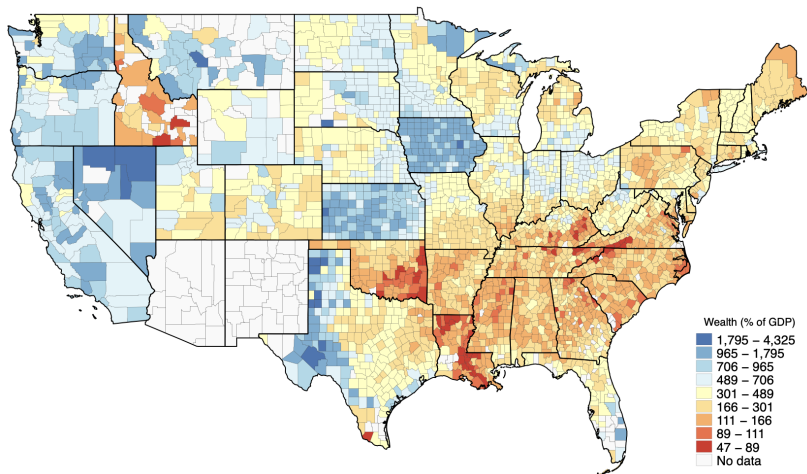
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1900



▶ State Maps

# THE GEOGRAPHY OF WEALTH IN THE US

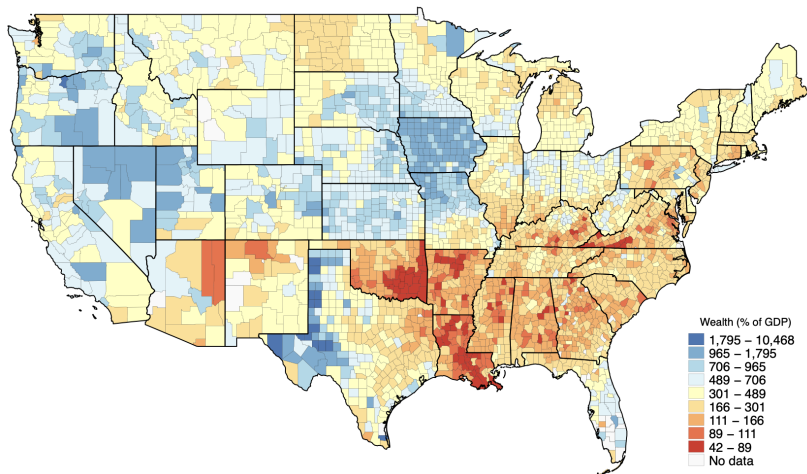
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1910



▶ State Maps

# THE GEOGRAPHY OF WEALTH IN THE US

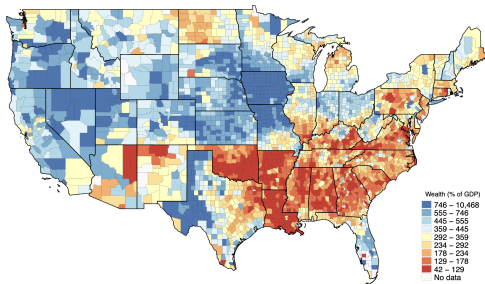
WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY COUNTY 1920



▶ State Maps

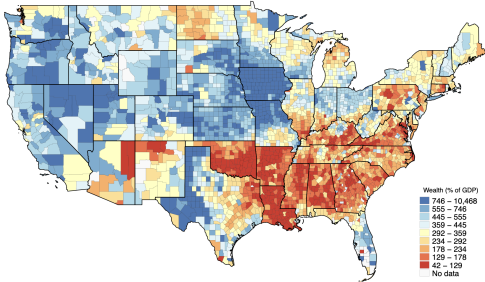
# CORRELATION WITH GEOGRAPHY OF INCOME TODAY

COUNTY LEVEL WEALTH IN 1920 VS OPPORTUNITY ATLAS INCOME DATA

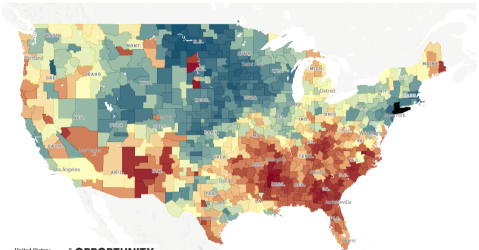


# CORRELATION WITH GEOGRAPHY OF INCOME TODAY

## COUNTY LEVEL WEALTH IN 1920 VS OPPORTUNITY ATLAS INCOME DATA

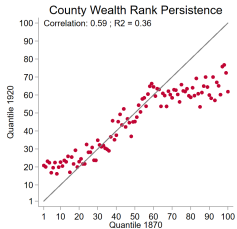
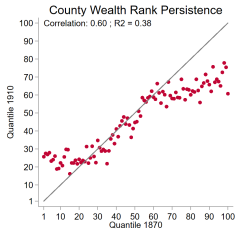
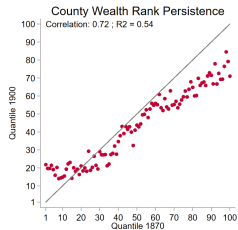
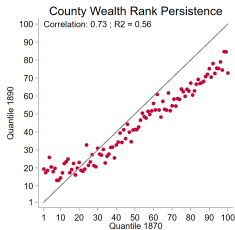
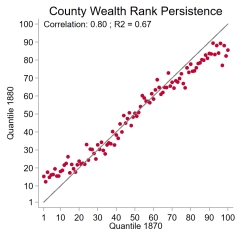


Household Income for U.S. Natives for Children



# SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT

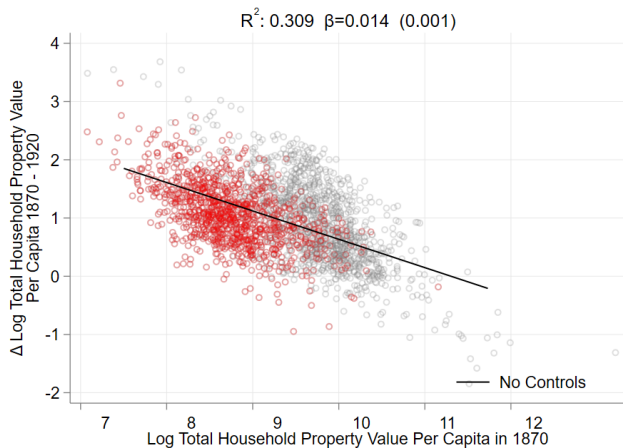
## WEALTH RANK PERSISTENCE FOR COUNTIES



► Persistence Across States

# $\beta$ -CONVERGENCE

## INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY



$$\log(y_{i,t}/y_{i,t-1}) = a_{i,t} - (1 - \exp(-\beta)) \cdot \log(y_{i,t-1}) + u_{it}$$

# $\beta$ -CONVERGENCE

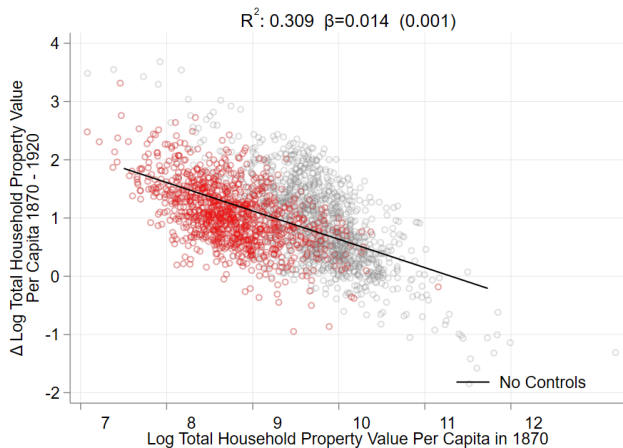
INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY



$\beta$ -convergence 2 times slower than Barro & Sala-i-Martin (2004)  
at state level

# $\beta$ -CONVERGENCE

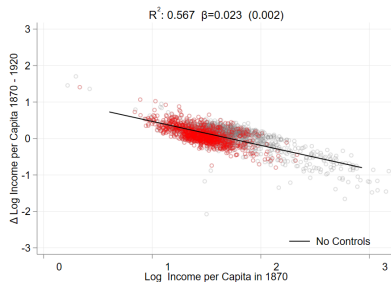
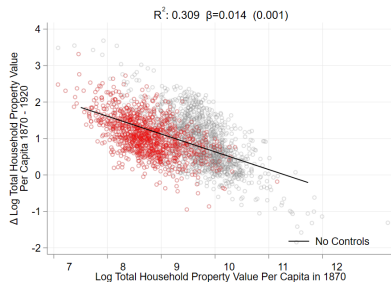
INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY



Slow convergence driven by Southern counties.  $\beta = 0.049$  excluding South.

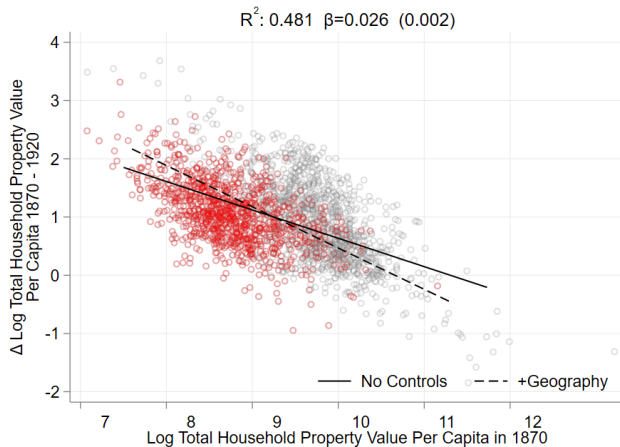
# $\beta$ -CONVERGENCE

INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY  
COMPARISON TO COUNTY INCOME



# $\beta$ -CONVERGENCE

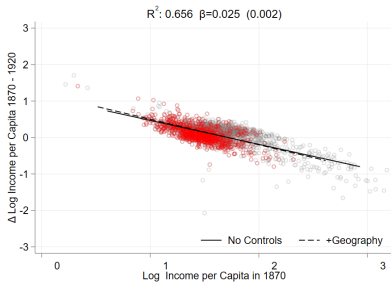
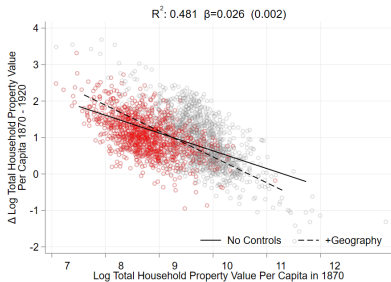
INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY



Conditional on geography, convergence much stronger

# $\beta$ -CONVERGENCE

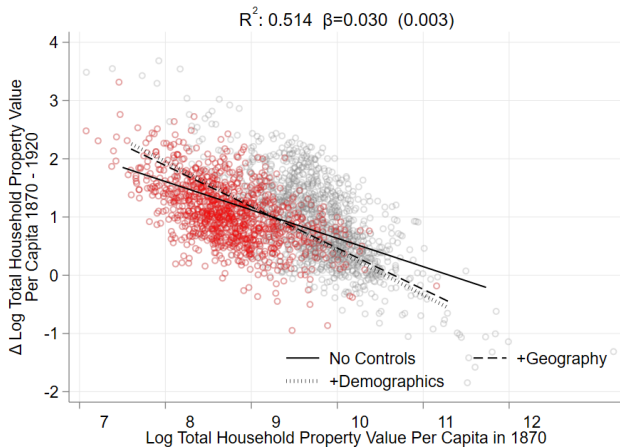
INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY  
COMPARISON TO COUNTY INCOME



Conditional on geography, convergence much stronger

# $\beta$ -CONVERGENCE

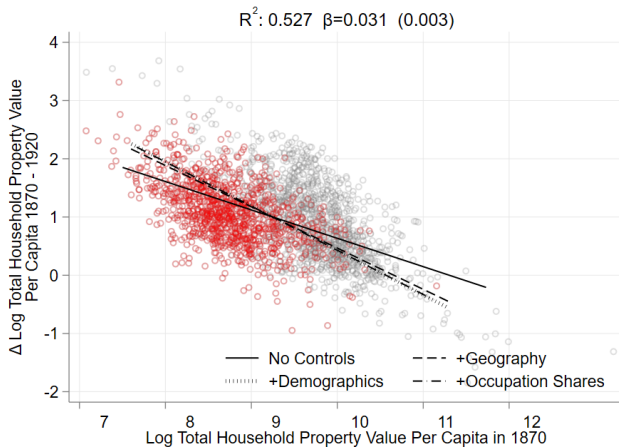
INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY



Conditional on geography, convergence much stronger

# $\beta$ -CONVERGENCE

INITIAL WEALTH VS GROWTH RATE OF WEALTH BY COUNTY



Conditional on geography, convergence much stronger

# NO $\sigma$ -CONVERGENCE IN WEALTH ACROSS THE US

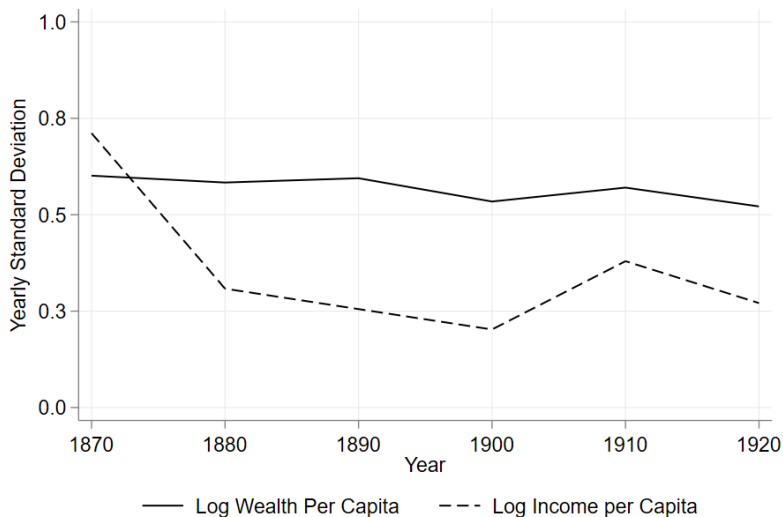
EVOLUTION OF WEALTH DISPERSION ACROSS US COUNTIES WITH COMPARISON TO INCOME



All Counties

# NO $\sigma$ -CONVERGENCE IN WEALTH ACROSS THE US

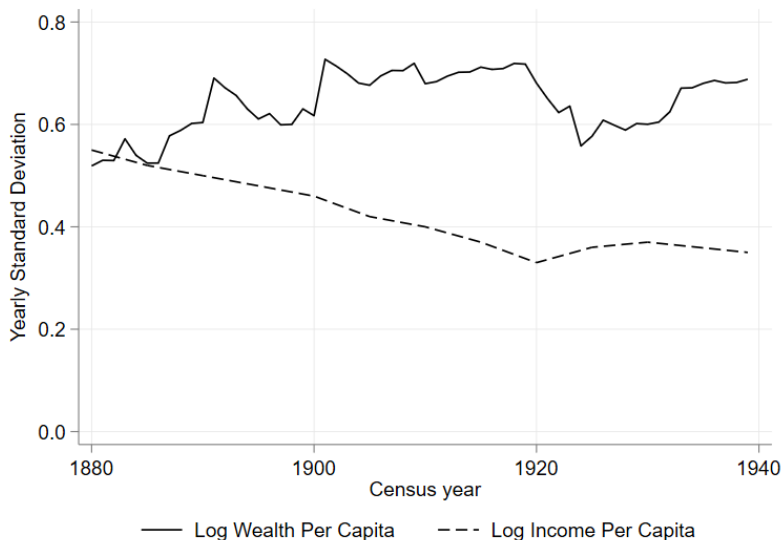
EVOLUTION OF WEALTH DISPERSION ACROSS US COUNTIES WITH COMPARISON TO INCOME



Non-Southern Counties

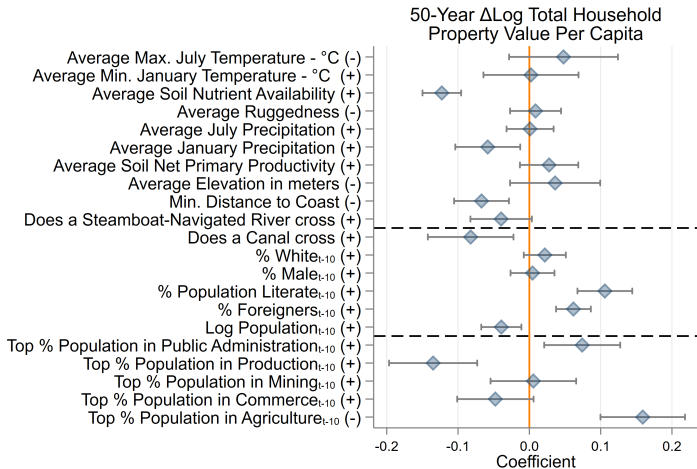
# NO $\sigma$ -CONVERGENCE IN WEALTH ACROSS THE US

EVOLUTION OF WEALTH DISPERSION ACROSS US STATES WITH COMPARISON TO BARRO & SALA-I-MARTIN (2004)



# CORRELATES OF WEALTH GROWTH

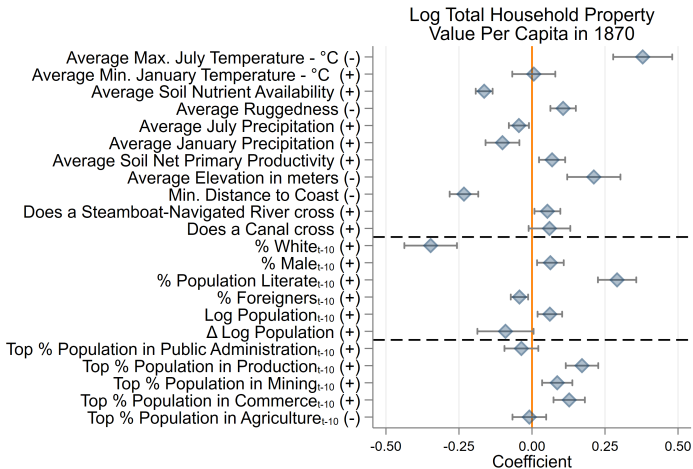
COUNTY LEVEL ESTIMATES (1870-1920)



► Table

# CORRELATES OF WEALTH GROWTH

COUNTY LEVEL ESTIMATES (1870-1920)



▶ Table

# OUTLINE

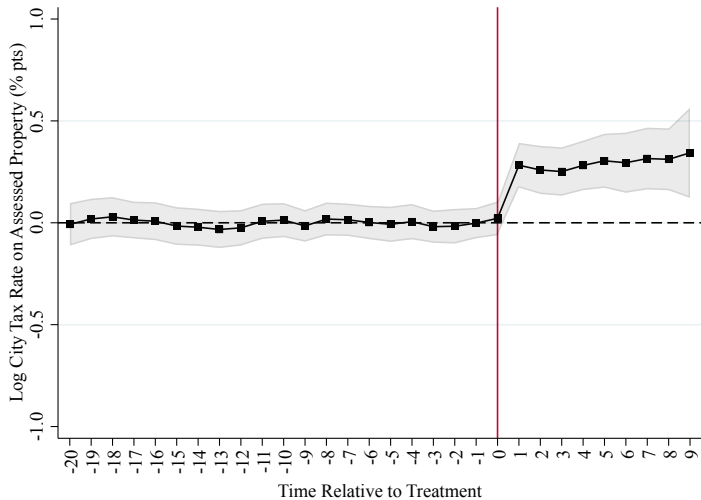
1. A Brief History of the Property Tax in the US
2. Data
3. Wealth in the US: Descriptive Facts
4. The Effects of the Property Tax on Wealth Accumulation

# PROPERTY TAXATION & WEALTH ACCUMULATION

- How does property taxation affect wealth accumulation?
  - We leverage:
    1. Geographical depth of data: large variation in property tax rates across 300+ municipalities ▶ City Effective Tax Rates
    2. Historical depth: annual frequency over long time period (40yrs)
  - Identify episodes of large, sudden and persistent increases (decreases) in effective property tax rate ▶ Selection Algorithm
  - Generalized Synthetic Control Approach (Xu [2017])
    - Generalized IFE model *à la* Bai [2009]
    - Allows aggregation of multiple synthetic control experiments
    - And dimension reduction *à la* Abadie & L'Hour [2009]
- ▶ Individual Synthetic Controls Events

# TAX RATES AROUND TAX INCREASE EVENTS

GENERALIZED SYNTHETIC CONTROL ESTIMATES



▶ Gvt Spending

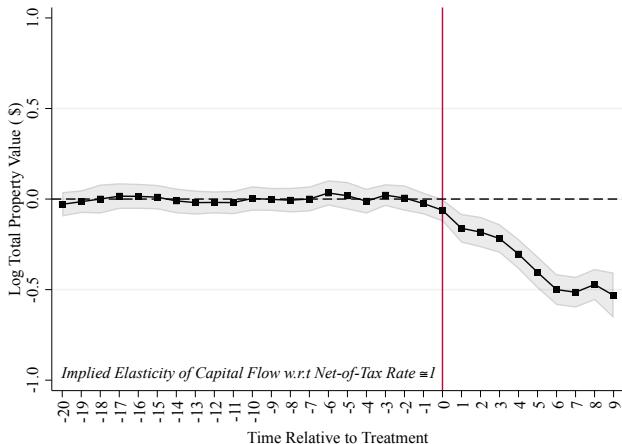
▶ Individual SC Events

▶ Augmented SC

▶ TWFE

# TOTAL PROPERTY VALUE: TAX INCREASES

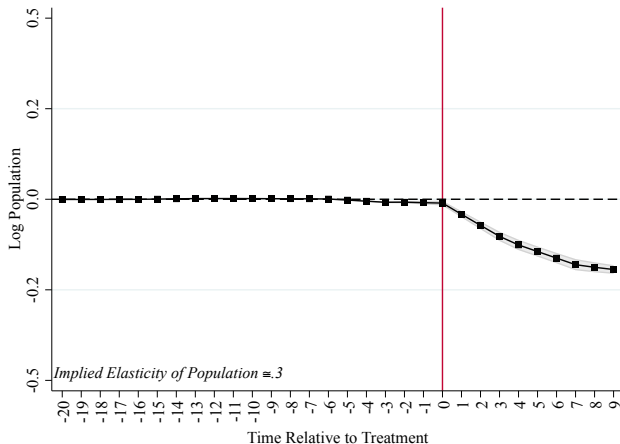
GENERALIZED SYNTHETIC CONTROL ESTIMATES: PROPERTY VALUE



**Implied Elast. K Income w.r.t Net-of-Tax Rate on  
Income:  $\varepsilon \approx 1$**

# EXTENSIVE VS INTENSIVE RESPONSES

GENERALIZED SYNTHETIC CONTROL ESTIMATES: POPULATION

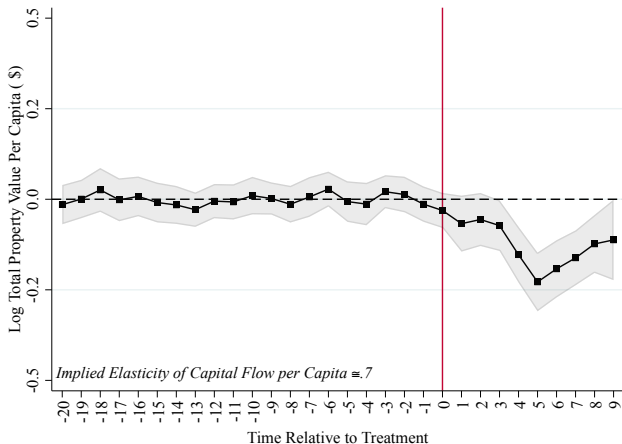


Elasticity of Pop. w.r.t Net-of-Tax Rate on Income:

$$\epsilon_N \approx .3 \quad \blacktriangleright \text{Comparison to Literature}$$

# EXTENSIVE VS INTENSIVE RESPONSES

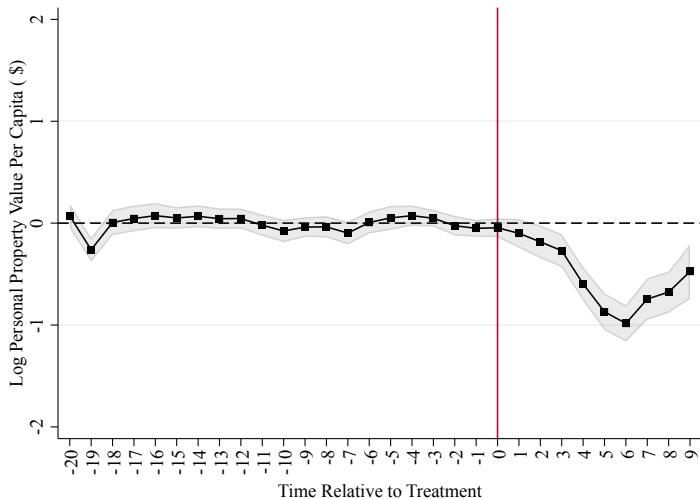
GENERALIZED SYNTHETIC CONTROL ESTIMATES: PER CAPITA PROPERTY VALUE



**Elast. Per Capita K Income w.r.t Net-of-Tax Rate on  
Income:  $\varepsilon_W \approx .7$**

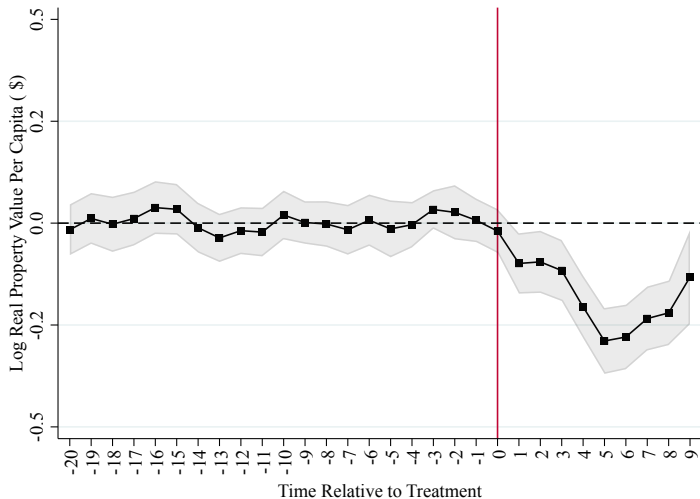
# PERSONAL PROPERTY PER CAPITA

GENERALIZED SYNTHETIC CONTROL ESTIMATES



# REAL PROPERTY PER CAPITA

## GENERALIZED SYNTHETIC CONTROL ESTIMATES



# DECOMPOSING PER CAPITA WEALTH RESPONSES

## 1. Selective Migration:

- Little evidence that effect driven by selective migration

▶ Selective Migration

## 2. Reporting / Evasion:

- Significant responses of personal property per capita

▶ Personal Property

- Indicative of possible avoidance/evasion behaviors
- But enforcement & assessment ratios do not fall

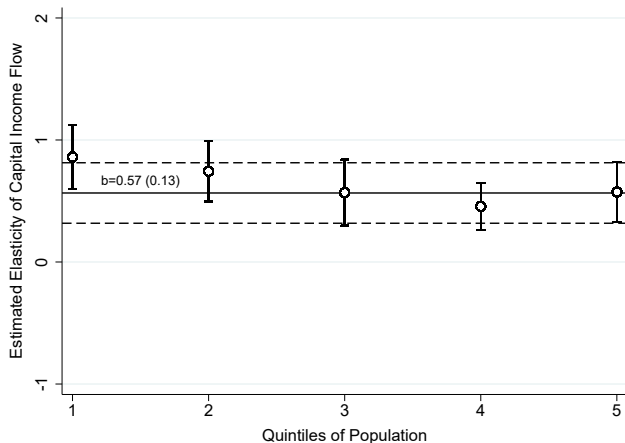
▶ Assessment Ratios

## 3. Capitalization:

- Semi-elasticity of real estate property value in first five years  
 $\approx .25$  ▶ Real Property
- *Prima facie* evidence of significant capitalization of local property taxes into prices of local assets

# HETEROGENEITY ANALYSIS

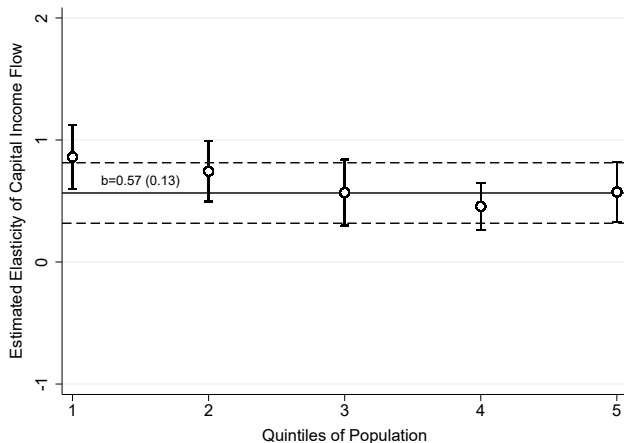
TWFE ESTIMATES USING ALL VARIATION ACROSS CITIES



Run TWFE Models Using All Variation

# HETEROGENEITY ANALYSIS

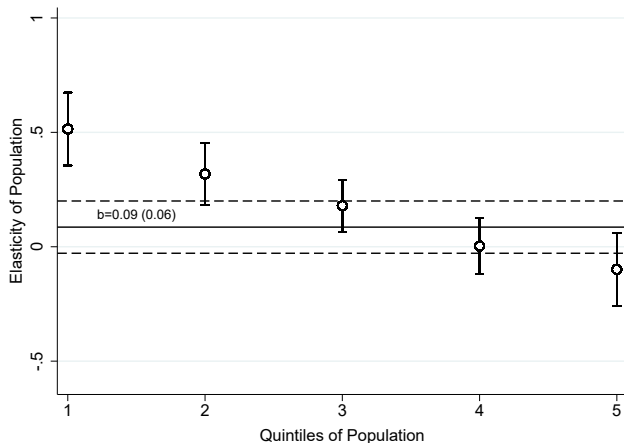
TWFE ESTIMATES USING ALL VARIATION ACROSS CITIES



**Overall Elast. Strongly Decreasing With Pop Size**

# HETEROGENEITY ANALYSIS

TWFE ESTIMATES USING ALL VARIATION ACROSS CITIES



**Bc Elast. of Pop. Strongly Decreasing With Pop Size**

# CONCLUSION

- We offer new historical source of data on wealth and local public finances in the US over very long run
  - Open source and available online very soon
- We document patterns of wealth accumulation in the long run and across space
  - US was relatively “poor” throughout 19th century
  - Spatial inequality in wealth extremely persistent over time
- We estimate impact of property tax on wealth accumulation
  - Find large responses, driven by migration & capitalization

# Appendix

# Data Sources

# FINAL DATA

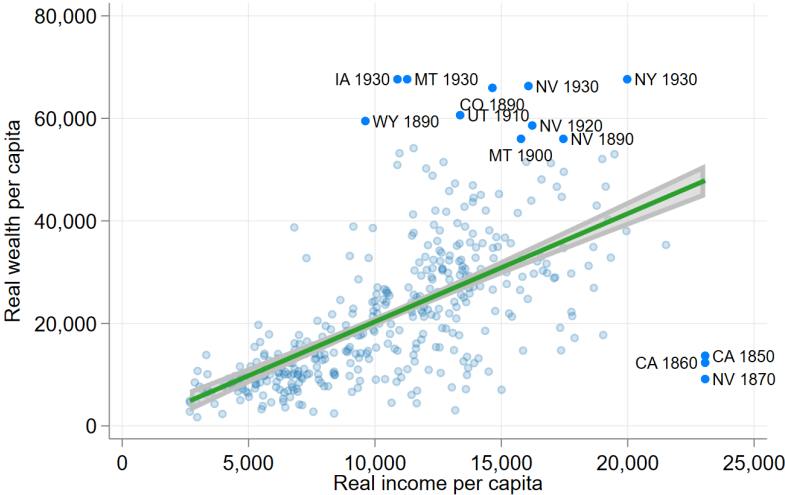
- Property value<sup>1,2,3</sup>
- Assessed value of real property : Town Property, Land, and Improvements<sup>4</sup>
- Assessed valuation of general property : Real, Personal and Other Property<sup>1,2,3</sup>
- Rate of poll taxes<sup>4</sup>
- Tax rate on assessed property value<sup>1,2,4</sup>
- Average rate of property tax for all purposes (state, county, local)<sup>4</sup>
- Levy of property tax: Amount<sup>1,2,3</sup>
- Levy of the general property tax: Amount<sup>1,2,3</sup>
- Assessment ratio<sup>1,2,3</sup>

Superscripts indicate the level of data: 1 City, 2 County, 3 State, 4 State from State Reports

# EXISTING DATA ON WEALTH IS SPARSE

- **National wealth:**
  - Alice Hanson Jones estimates from probate records in 1774.
  - Blodget (1806) estimates for average 1805-1810.
  - Census questions for 1850 (only real estate) 1860 and 1870.
  - Goldsmith series (HSUS Ce233-256) for selected years in 19th century
  - Annual wealth estimates for 1916-1945 from Kopczuk and Saez (2004) based on balance sheets of Goldsmith (1952) and Wolff (1989).
  - Harmonized series using sources above in Piketty and Zucman (2013), including annual series 1870-1916 assuming a constant rate of real capital gains per decade.
- **State-level:** Sylla Legler Wallis (1993) and Holt (1977) for assessed property value but partial coverage of years/countries.
- **County-level:** No existing series.
- **City-level:** Studies on selected cities using assessed property value (e.g. Tabellini (2019: 42 cities for 3 Census years))

# WEALTH IS NOT THE SAME AS INCOME



Correlation: 0.64,  $R^2$  from plain vanilla regression: 0.41  
(N = 410 state-decade observations over 1840-1939)

# CONSTRUCTION OF STATE-LEVEL WEALTH

Steps to construct final wealth variable.

1. Start from total assessed property value per state-year
  - Pre-1860: use first rate value available if only know property tax revenue (20% obs for Vermont)
  - US wealth series: linear extrapolation of state values if missing to maintain panel composition (for descriptive graphs only)  
▶ Sensitivity
2. Obtain total property value using assessment ratio
  - Using ratio from state reports and Census  
▶ Robustness fixed ratio
3. Add value of enslaved people 1790-1864 from Einhorn (2001)
4. Exclude corporate property (“other”) for double taxation
5. Construct average wealth per capita as share of national GDP per capita  
▶ Robustness: use wealth in 1860 as weight
6. Construction of national wealth: add exempted property
  - Use bounds on ratio of exempt to taxable property from NICB (1923)

# CONSTRUCTION OF COUNTY-LEVEL WEALTH

1. Start from total assessed property value per county-decade
2. Obtain total property value using state-level assessment ratio
  - Using ratio calculated by Census every decade and Tax Commissions
  - Exclude self-reported ratios
3. Construct national wealth using total taxable property value and state-level share of exempt property

# CONSTRUCTION OF CITY-LEVEL WEALTH

1. Start from total assessed property value per city-year
2. Obtain true property value using city-level assessment ratio
  - Using assessment ratio reported by local tax officials
  - Rescale using state-level ratio to correct for reporting bias
    - Using state ratio from Census and state sources (State tax commission + others)
    - Correction such that average city ratio is equal to state ratio
3. Construct national wealth using total taxable property value and state-level share of exempt property

## ADDITIONAL DATA

1. Temperature, Precipitations, Elevation and Soil Characteristics from Allen and Donaldson (2020)
2. Interest Rates and Yields from Historical Statistics of the US
3. US Post Offices info from Blevins and Helbock (2021)
4. Geographic characteristics from Bazzi et al. (2020), Atack (2015,2017) and the National Oceanic and Atmospheric Administration (NOAA)
5. State revenue and expenditure from Sylla Legler Wallis (2006) and Hindman (2010). Breakdown: [▶ Revenue](#)  
[▶ Expenditure](#)
6. Connecticut detailed grand list of property 1864-1995 from Ely (1888)

[▶ Back](#)

# SYLLA-LEGLER-WALLYS (2006) AND HINDMAN (2010): EXPENDITURE BREAKDOWN

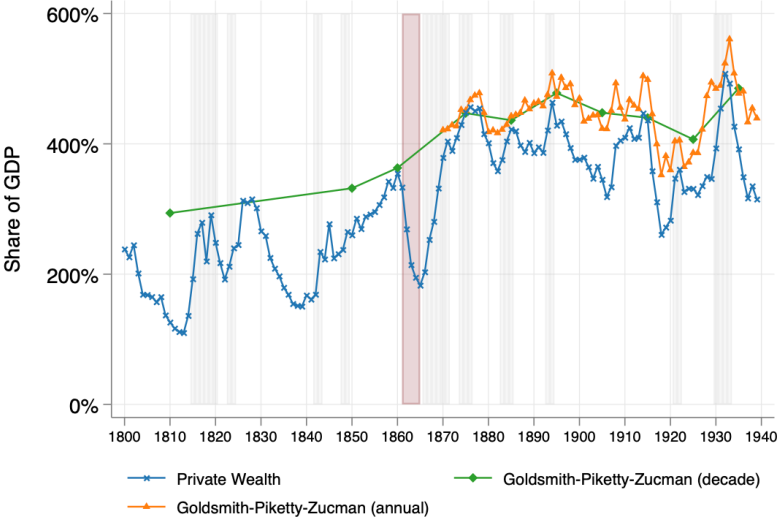
- Expenditure
  - Education and libraries
  - Transportation
  - Public safety and protection of property
  - Public welfare, social services, and charities
  - Health and sanitation
  - Charities, hospitals, and corrections, n.e.c.
  - Veterans' services
  - Housing and community development
  - Natural resources and agriculture
  - Liquor store
  - Utilities
  - Insurance trust
  - Intergovernmental, n.e.c.

# SYLLA-LEGLER-WALLYS (2006) AND HINDMAN (2010): REVENUE BREAKDOWN

- Revenue
  - Property taxes
  - Sales taxes
  - Income taxes
  - License taxes
  - Estate or gift taxes
  - Severance taxes
  - Poll taxes
  - Taxes, n.e.c.
  - Special assessments
  - Liquor store
  - Utility revenue
  - Insurance trust
  - Lottery
  - General Property taxes
  - Special, selective, or corporate revenue
  - Tax revenue
  - Intergovernmental revenue

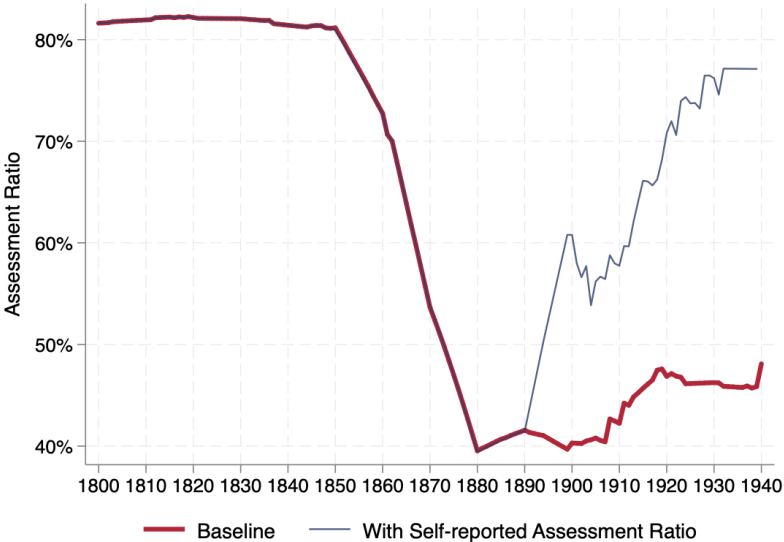
# Sensitivity Checks Wealth Series

# COMPARISON TO GOLDSMITH [1951]

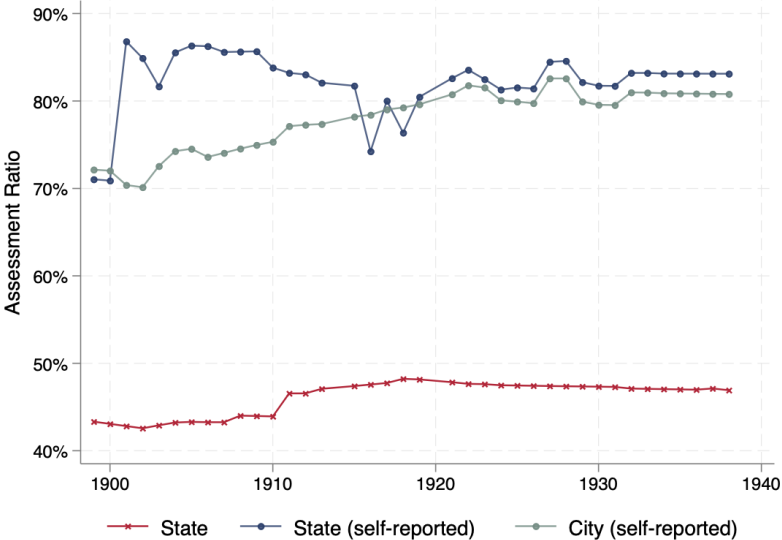


Gray lines indicate recessions. Red area indicates the Civil War.

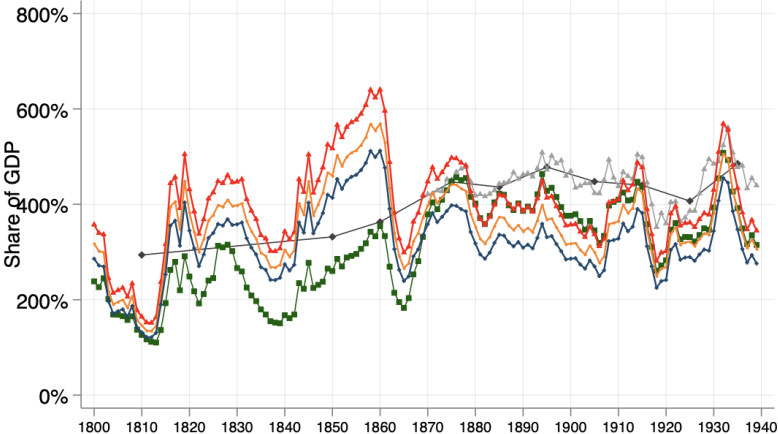
# SENSITIVITY



# SENSITIVITY

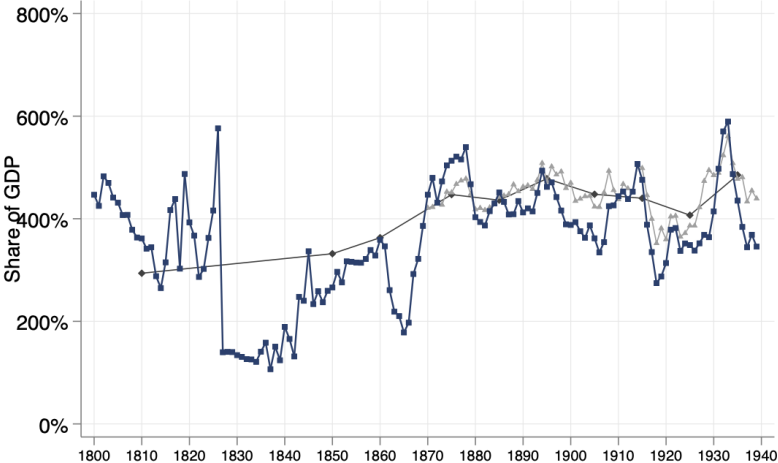


# SENSITIVITY



- Baseline
- ◆— Constant 45% Ratio
- ◇— Goldsmith-Piketty-Zucman (decade)
- ▲— Constant 40% Ratio
- Constant 50% Ratio
- ▲— Goldsmith-Piketty-Zucman (annua)

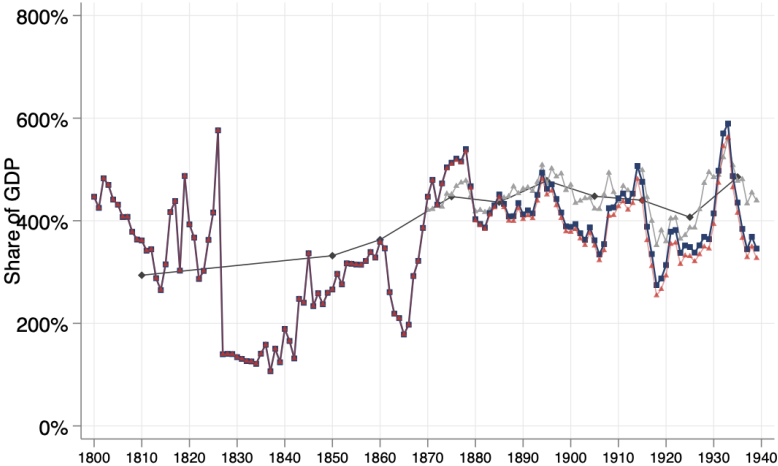
# SENSITIVITY



◆ Goldsmith-Piketty-Zucman (decade)    ▲ Goldsmith-Piketty-Zucman (annua)  
■ Property Value

▶ Back

# SENSITIVITY

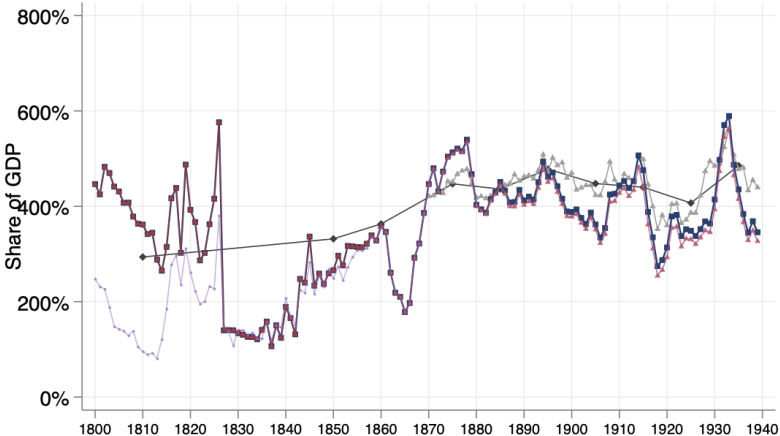


◆ Goldsmith-Piketty-Zucman (decade)    ◆ Goldsmith-Piketty-Zucman (annual)  
■ Property Value    ▲ Private Wealth

▶ Back

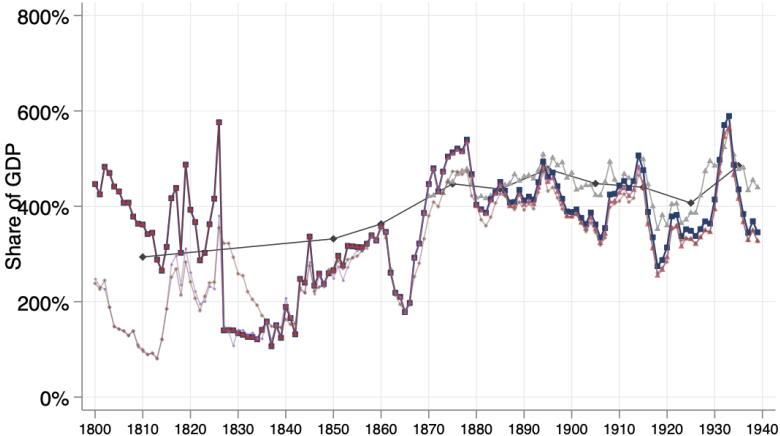
▶ Wealth to GDP

# SENSITIVITY



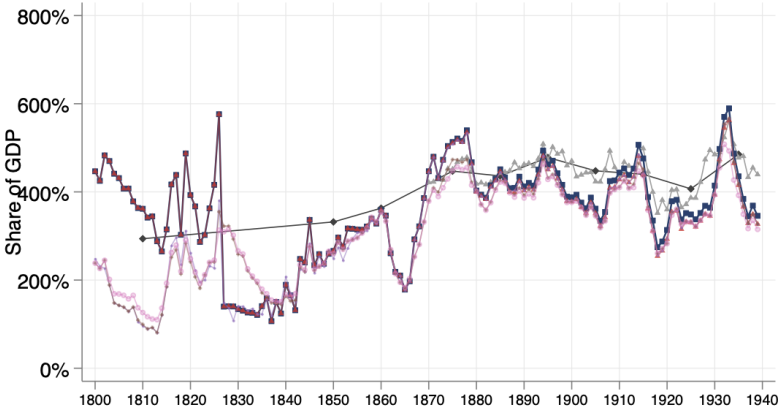
- ◆ Goldsmith-Piketty-Zucman (decade)
- ◆ Goldsmith-Piketty-Zucman (annual)
- Property Value
- ▲ Private Wealth
- + Early period

# SENSITIVITY



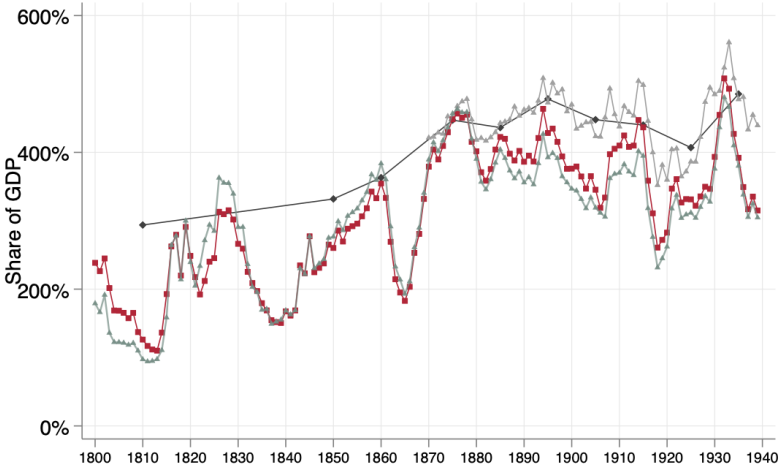
- ◆ Goldsmith-Piketty-Zucman (decade)
- ◆ Goldsmith-Piketty-Zucman (annual)
- Property Value
- ▲ Private Wealth
- ▲ + Early period
- ▲ + Linear interpolation

# SENSITIVITY



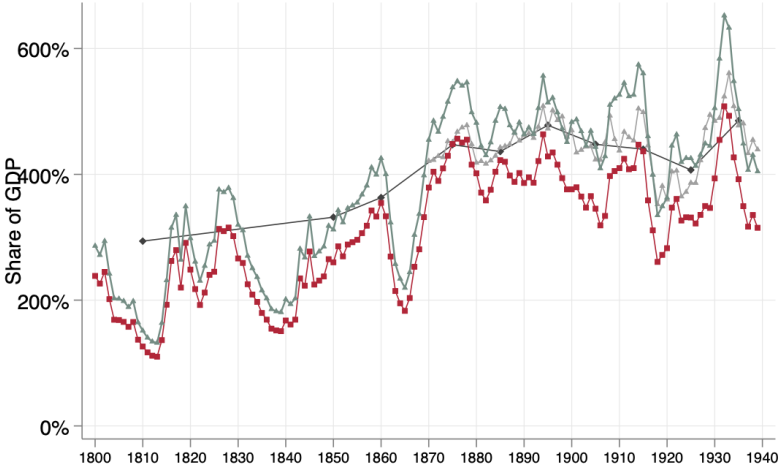
- ◆ Goldsmith-Piketty-Zucman (decade)
- Property Value
- ▲ + Early period
- + Winsorized
- ▲ Goldsmith-Piketty-Zucman (annual)
- ▲ Private Wealth
- ▲ + Linear interpolation

# SENSITIVITY

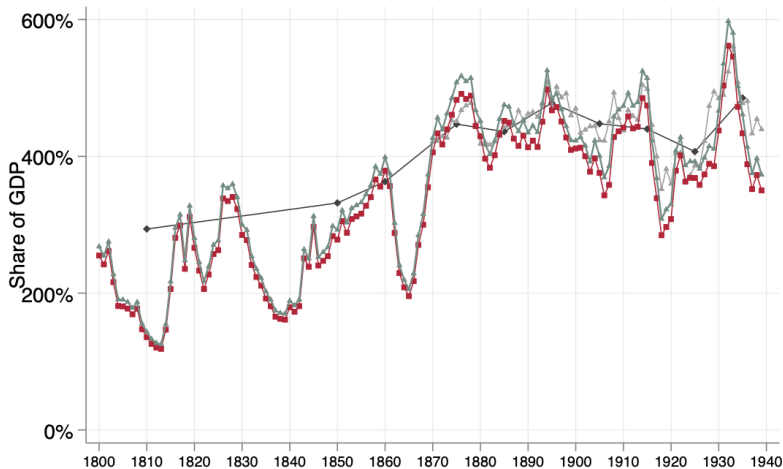


- ◆ Goldsmith-Piketty-Zucman (decade)
- ▲ Goldsmith-Piketty-Zucman (annua)
- Weighted by population (baseline)
- ▲ Weighted by wealth 1860

# SENSITIVITY



- Baseline
- ▲— With Upward Adjustments
- ◆— Goldsmith-Piketty-Zucman (decade)
- ▲— Goldsmith-Piketty-Zucman (annual)



—■ National Wealth (Lower Bound)    —▲ National Wealth (Upper Bound)  
—◆ Goldsmith-Piketty-Zucman (decade)    —◆ Goldsmith-Piketty-Zucman (annual)

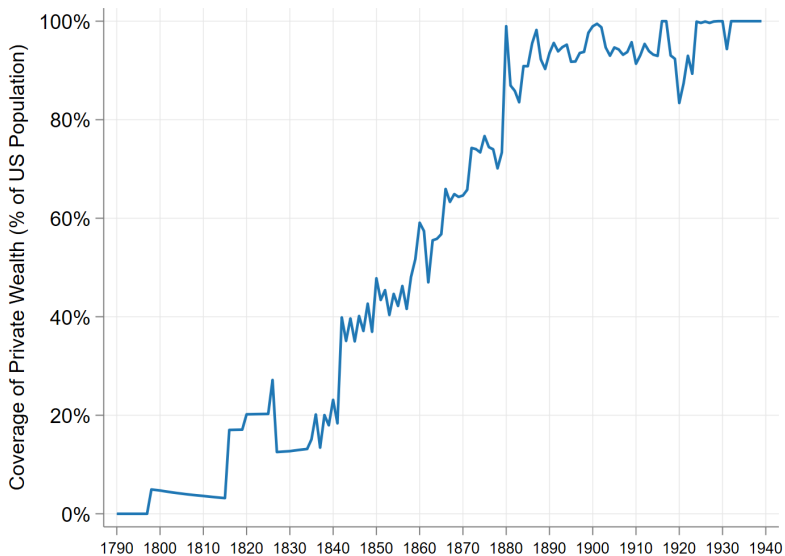
# WEALTH DEFINITIONS AND ADJUSTMENTS

1. **General property value:** Value of property subject to general property tax
2. **Private wealth:** Excludes corporate property subject to property tax (public utility companies: railway, gas, electricity, water supply)
3. **National wealth:** Rescale to account for value of property excluded from property tax (public property and other exemptions) Early period: Property valuation is calculated as the product of revenue and the first observed rate.

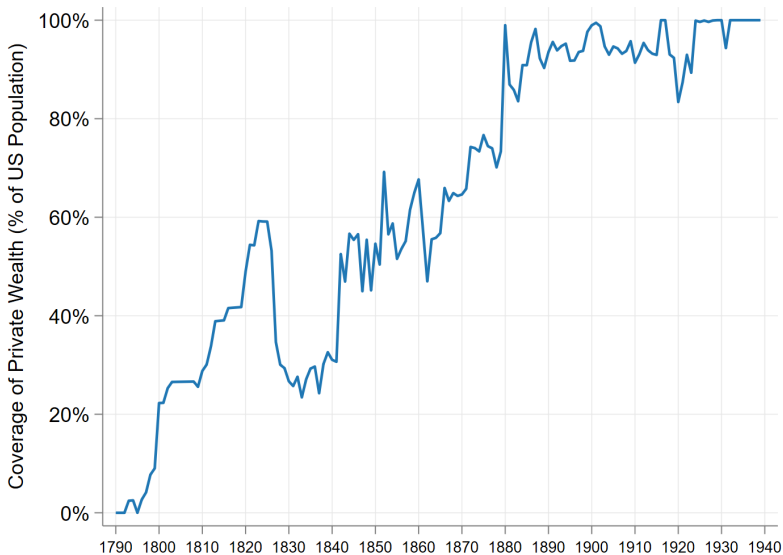
## DEFINITIONS OF ADJUSTMENTS

1. **Early Period:** Property valuation is calculated as the product of revenue and the first observed rate.
2. **Linear Interpolation** for US wealth series descriptive graphs only
3. **Upward adjustment:** Increase wealth by 20% to account for under-assessment following Piketty-Zucman adjustments
4. **Higher/lower bound:** Bound on the share of total wealth excluded from property taxation (from 7-19%) using NCIB calculations for New Jersey and New York (only states available).

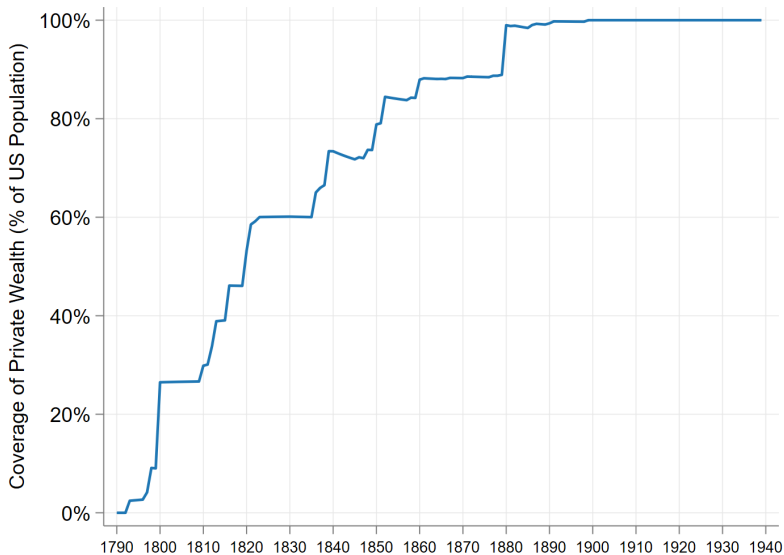
# NO ADJUSTEMENT



## + EARLY PERIOD

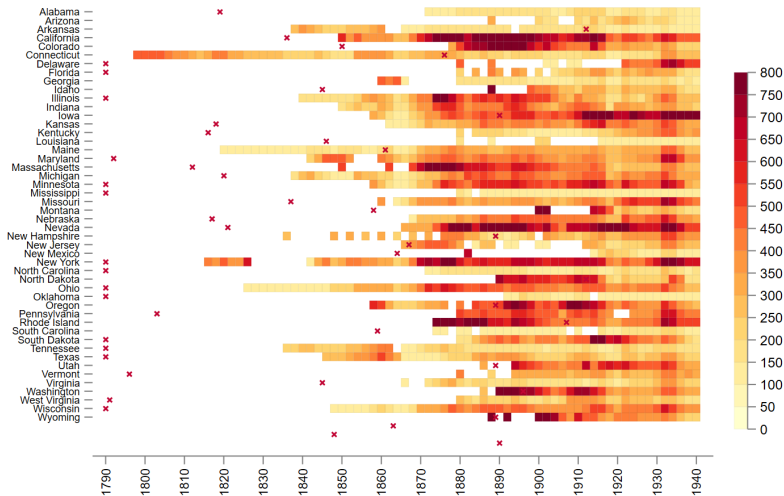


# + LINEAR INTERPOLATION



# RAW PRIVATE WEALTH OBSERVATIONS

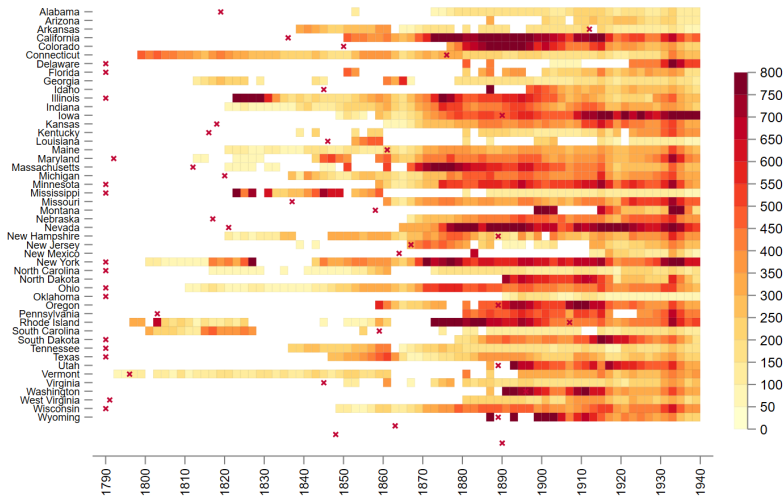
## Private Wealth as Share of GDP (%)



Winsorized for 5th and 95th percentile. Red cross indicates year of admission to the Union.

# +EARLY PERIOD

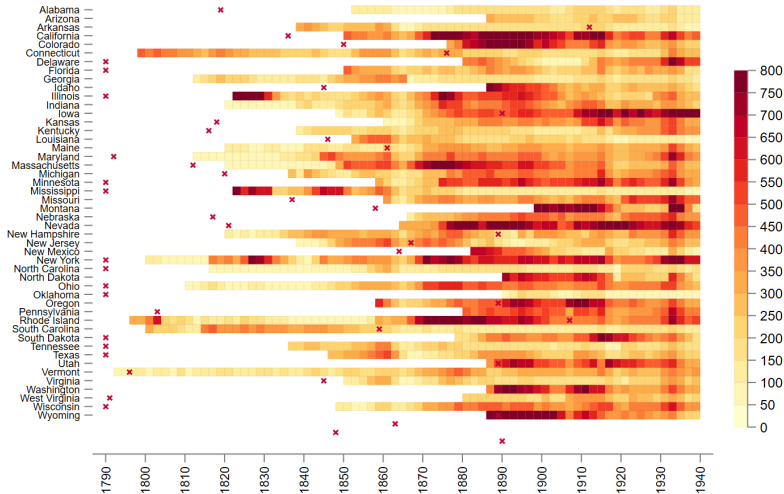
## Private Wealth as Share of GDP (%)



Winsorized for 5th and 95th percentile. Red cross indicates year of admission to the Union.

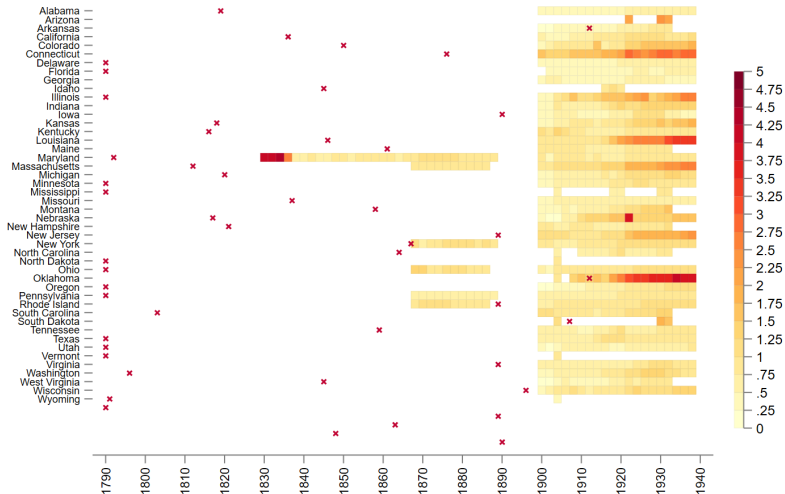
# +LINEAR INTERPOLATION

## Private Wealth as Share of GDP (%)



Winsorized for 5th and 95th percentile. Red cross indicates year of admission to the Union.

# Average City Property Tax (%)



Winsorized. Red cross indicates year of admission to the Union.

▶ Back

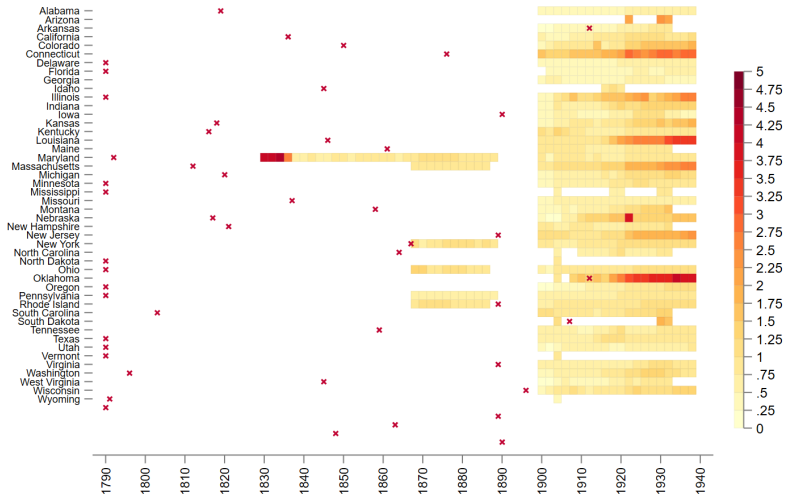
# Personal Property as Share of GDP (%)



Winsorized for 5th and 95th percentile. Red cross indicates year of admission to the Union.

▶ Back

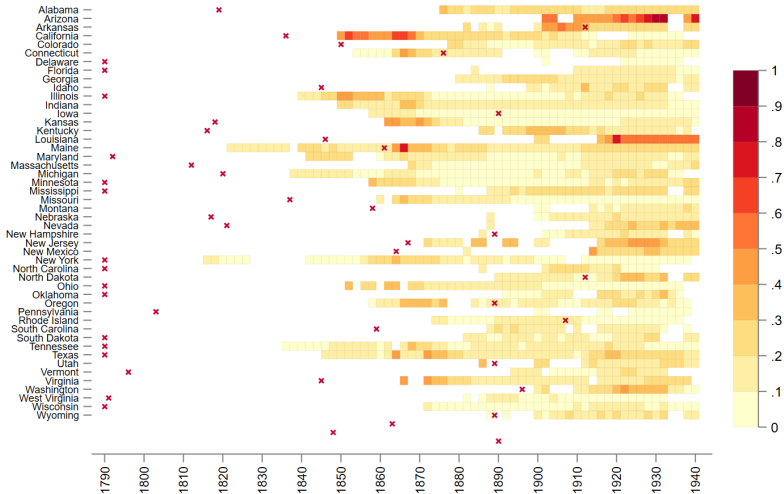
# Average City Property Tax (%)



Winsorized for 5th and 95th percentile. Red cross indicates year of admission to the Union.

▶ Back

# State Rate of Property Tax

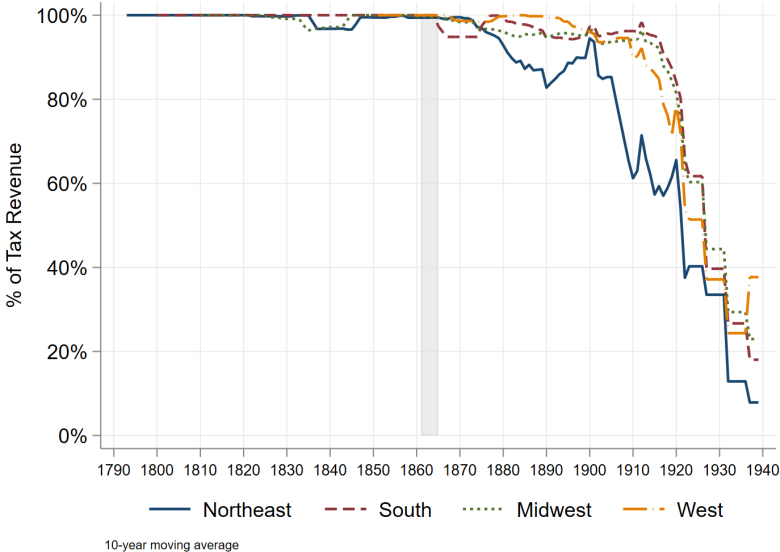


Winsorized at for 5th and 95th percentile. Red cross indicates year of admission to the Union.

► Back

# Additional Wealth Statistics

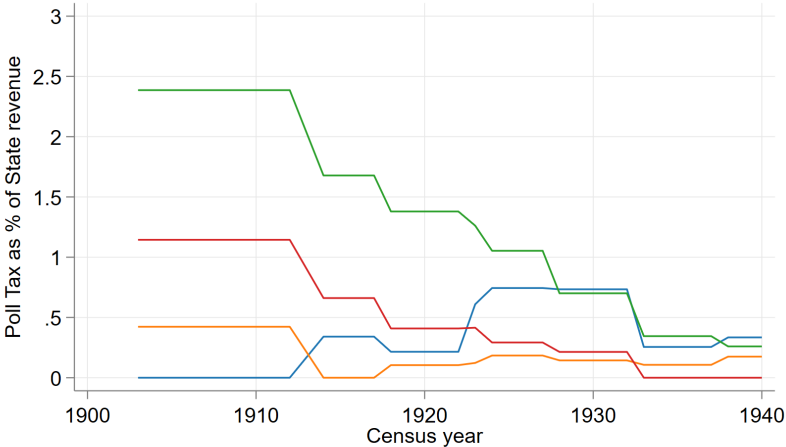
# SHARE OF TAX REVENUE FROM PROPERTY TAX



► Share State Revenue

► Poll Tax

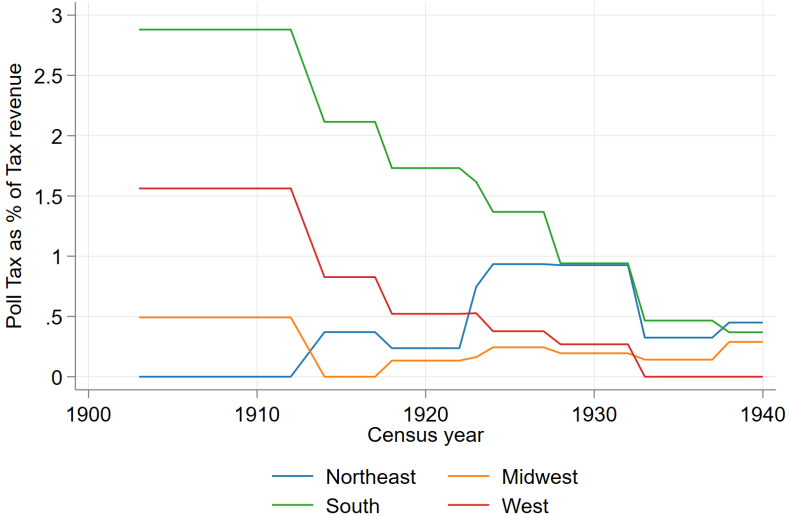
# SHARE OF STATE REVENUE FROM POLL TAX



— Northeast    — Midwest  
— South        — West

10-year moving average

# SHARE OF TAX REVENUE FROM POLL TAX

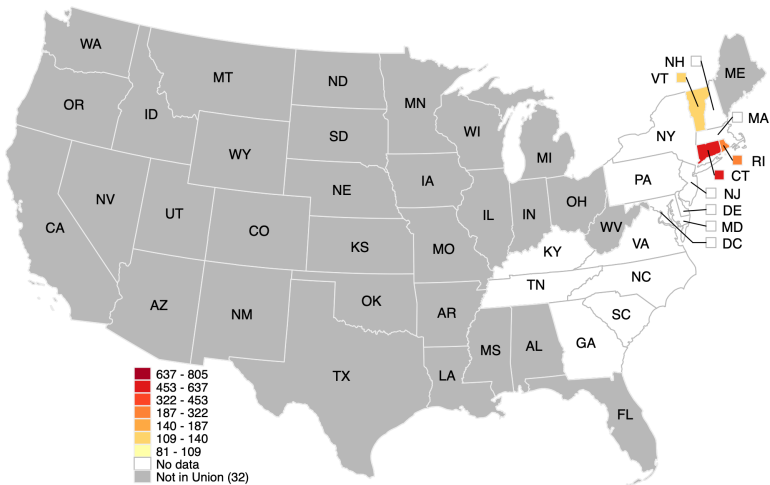


10-year moving average

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1790-1799

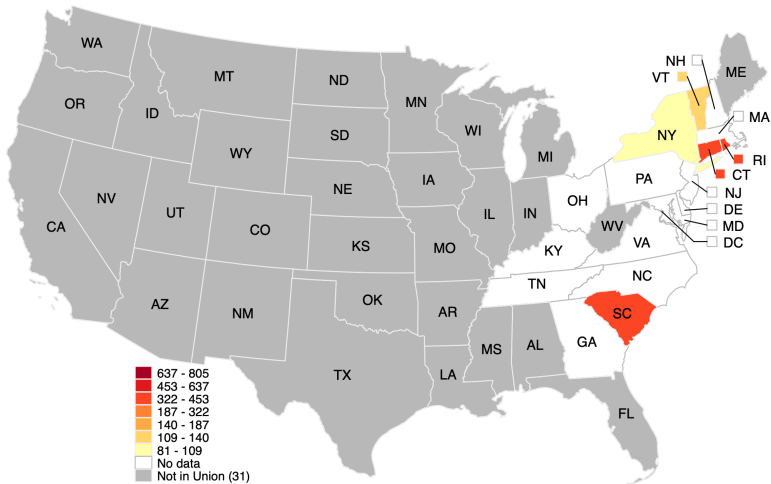


▶ Back

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1800-1809

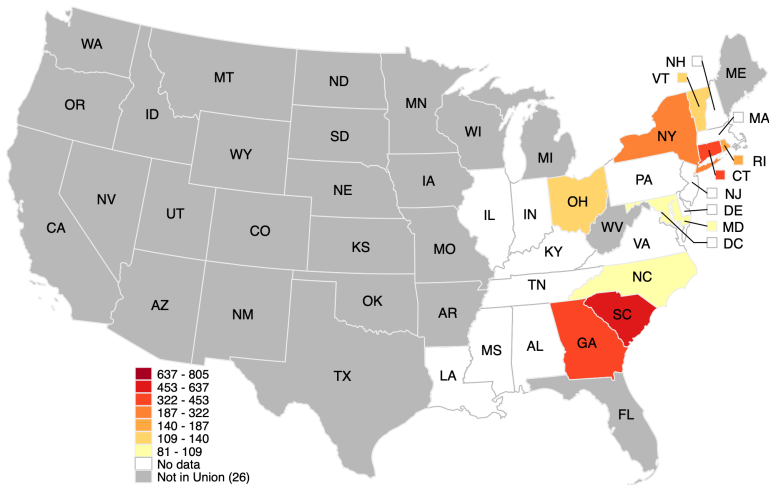


▶ Back

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1810-1819

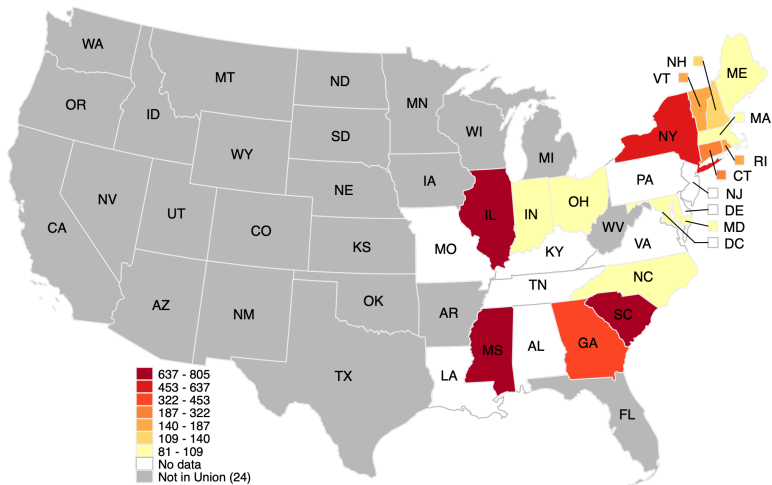


▶ Back

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1820-1829

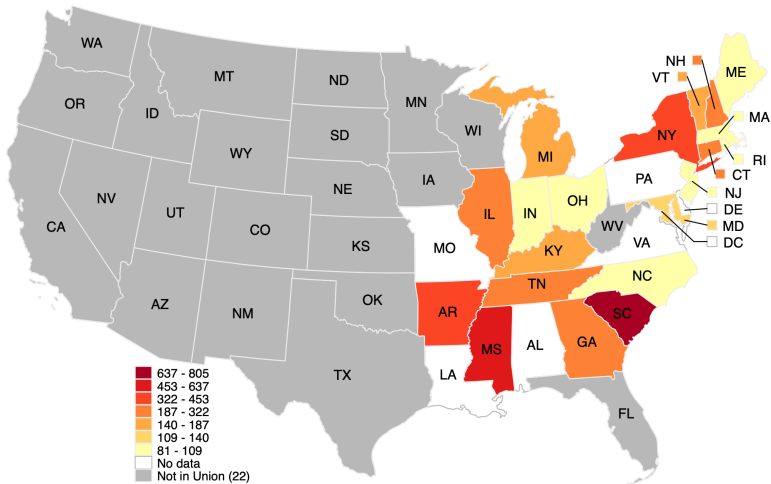


▶ Back

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1830-1839



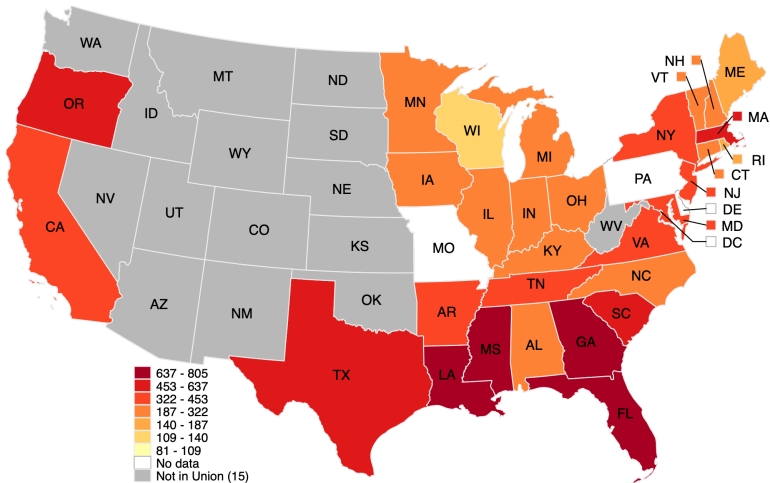
▶ Back



# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1850-1859



▶ Back

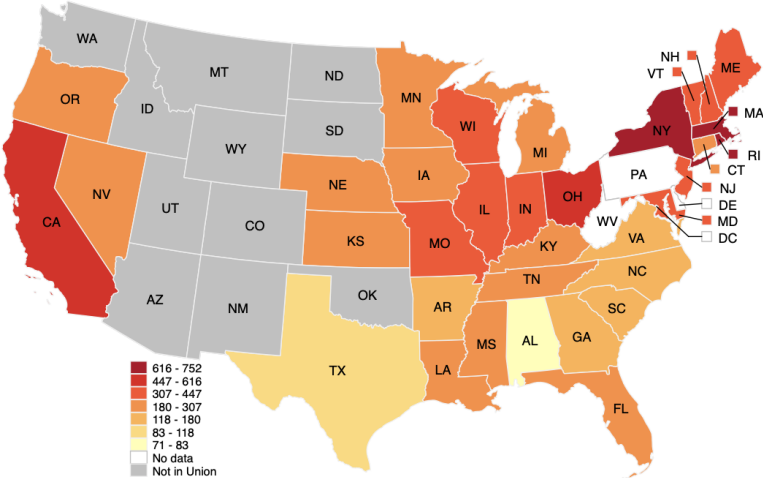




# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1870

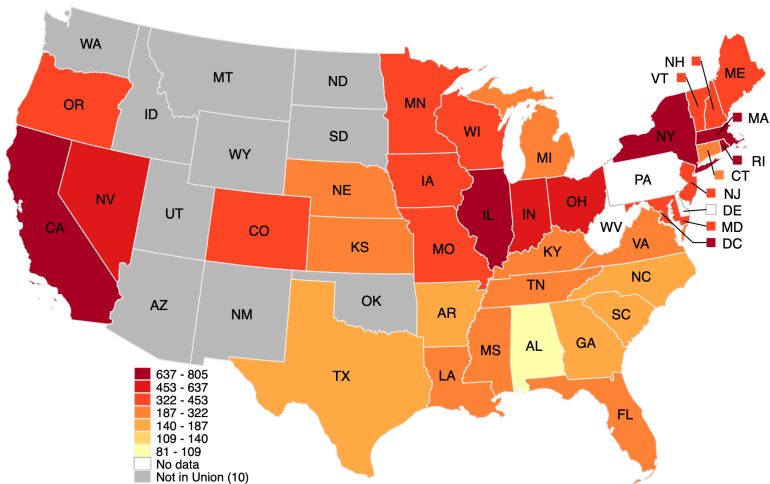


▶ Back

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1870-1879



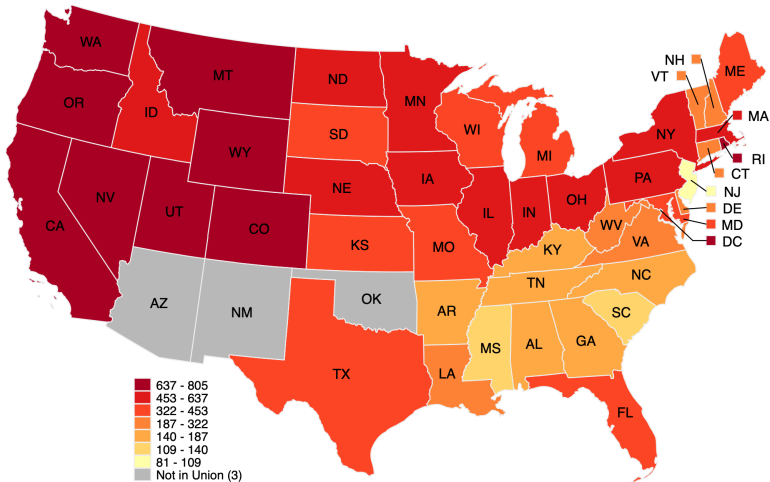
▶ Back



# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1890-1899

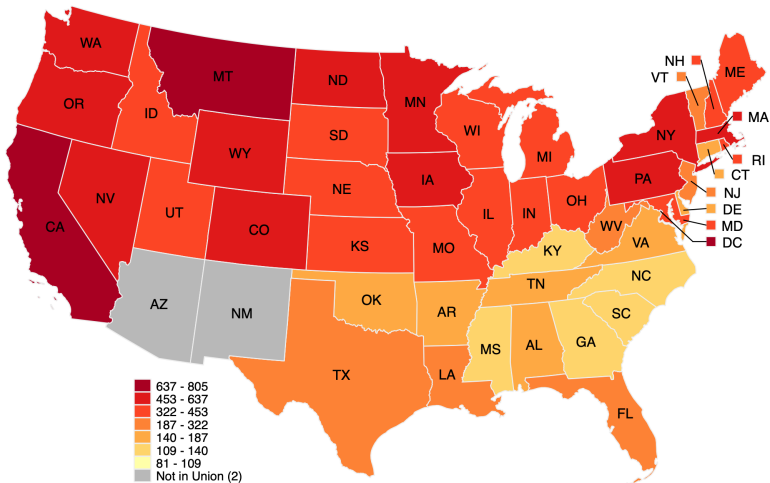


▶ Back

# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1900-1909

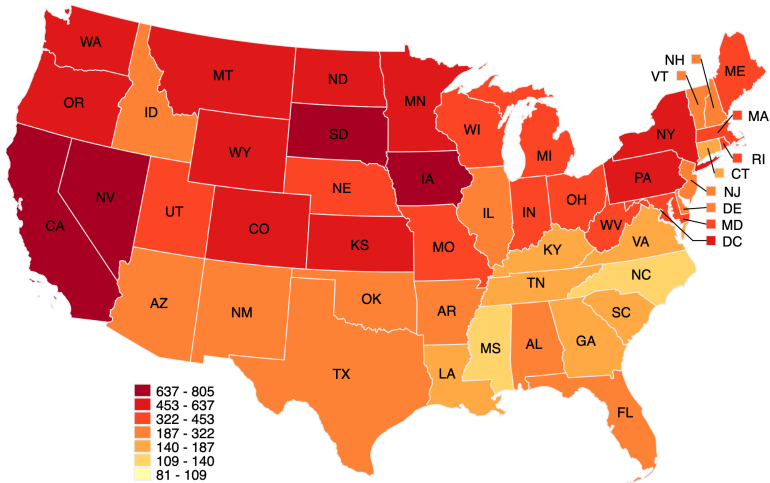


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# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1910-1919

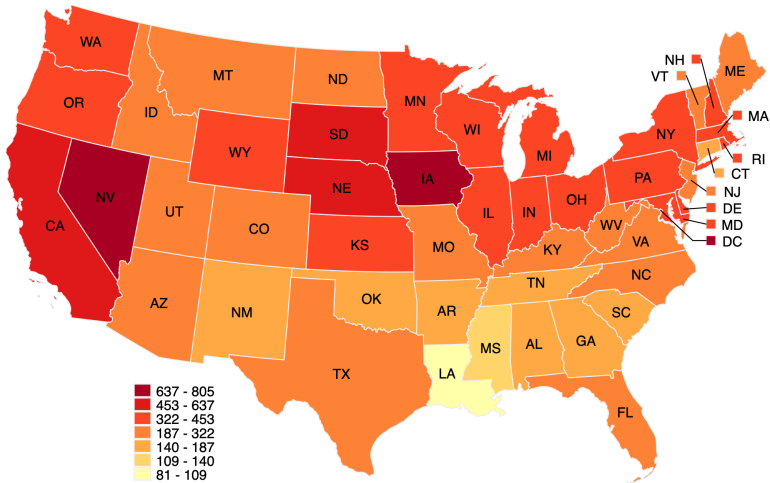


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# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1920-1929

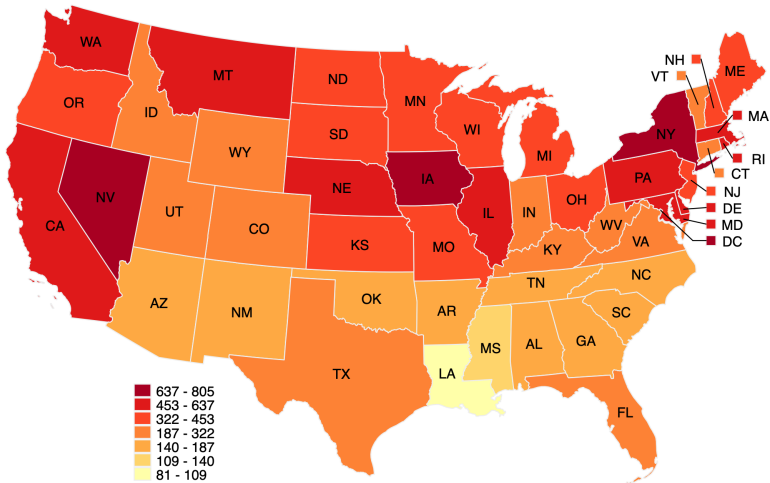


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# THE GEOGRAPHY OF WEALTH IN THE US

WEALTH PER CAPITA AS FRACTION OF US GDP PER CAPITA BY STATE

Wealth As Share of GDP (%): 1930-1939

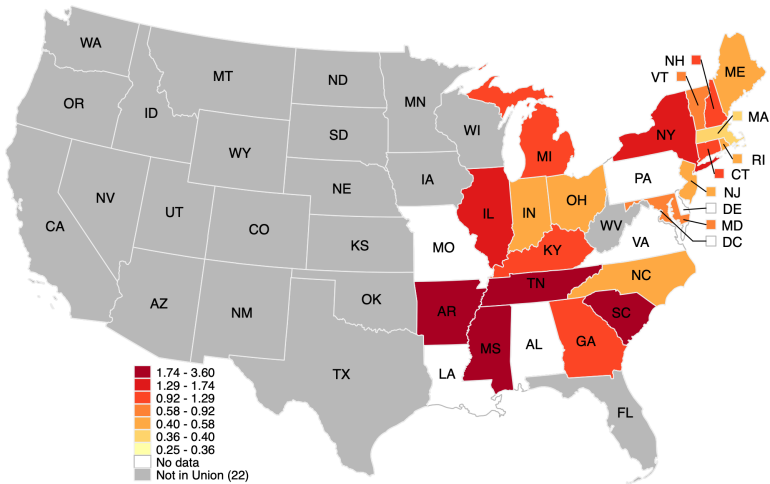


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1830-1839

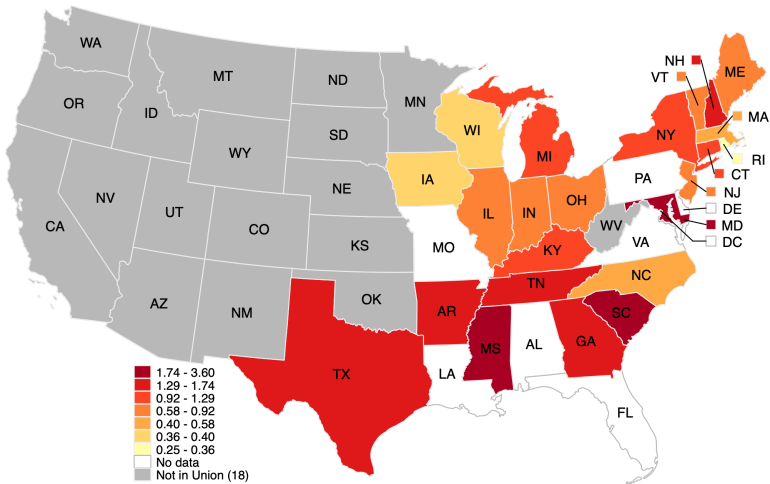


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1840-1849

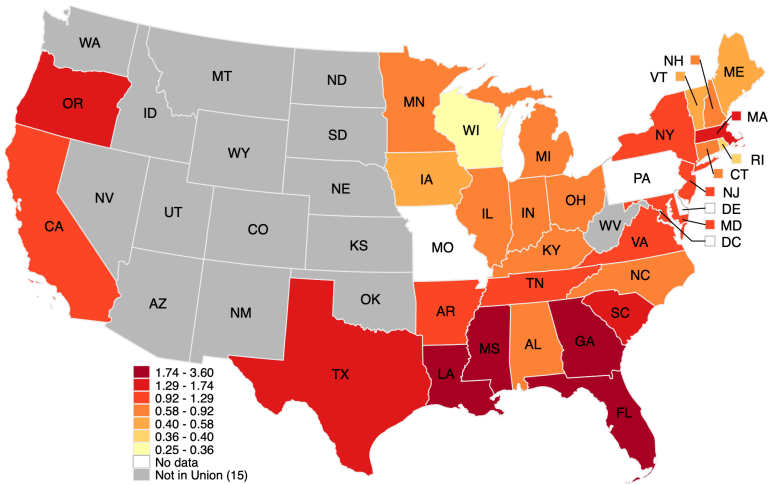


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1850-1859



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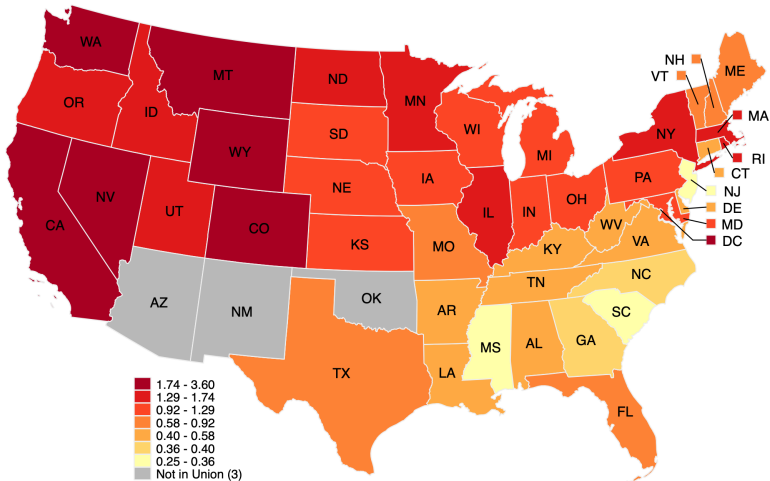




# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1890-1899

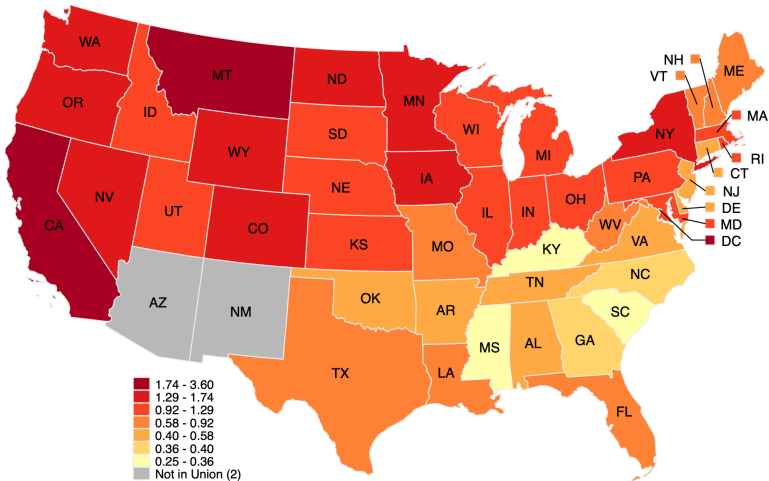


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1900-1909

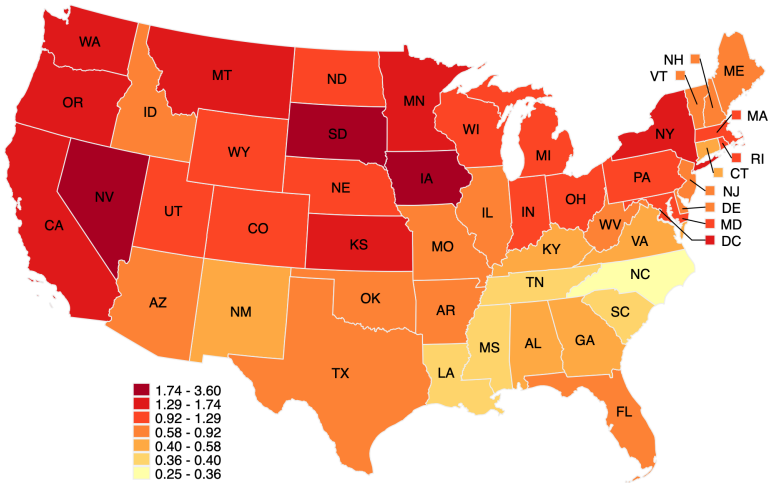


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1910-1919

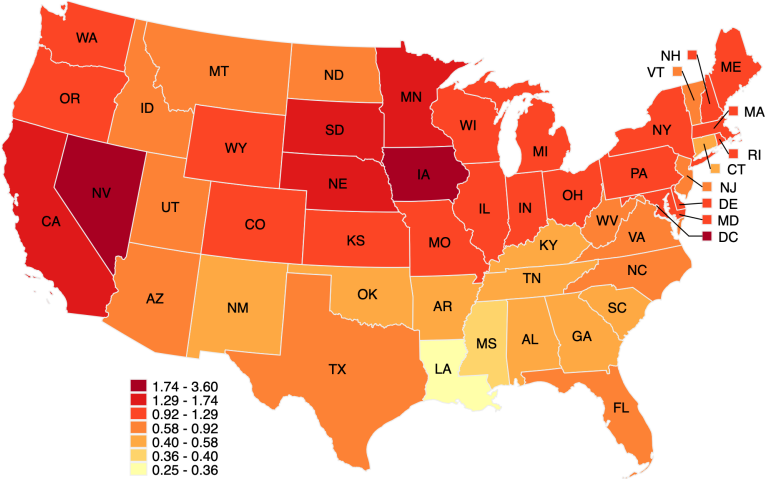


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1920-1929

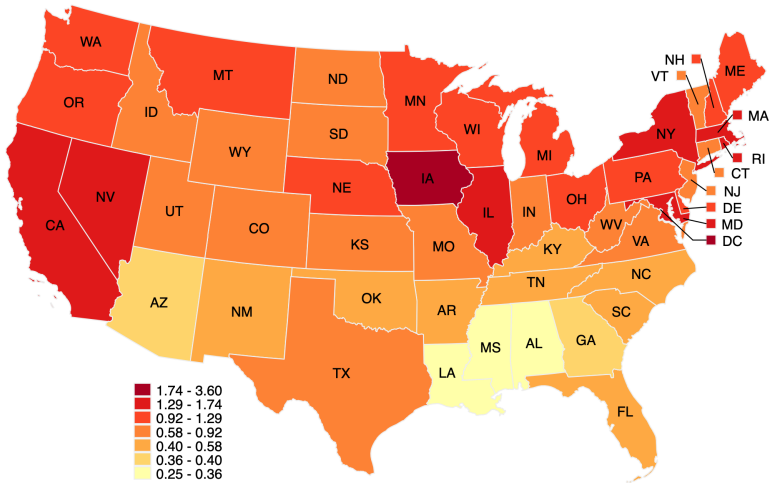


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# THE GEOGRAPHY OF WEALTH IN THE US

STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP

Ratio State-to-National Wealth Share: 1930-1939

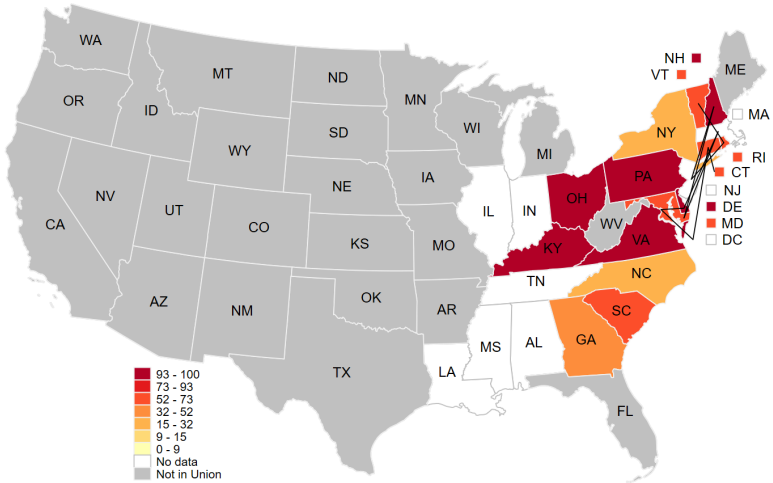


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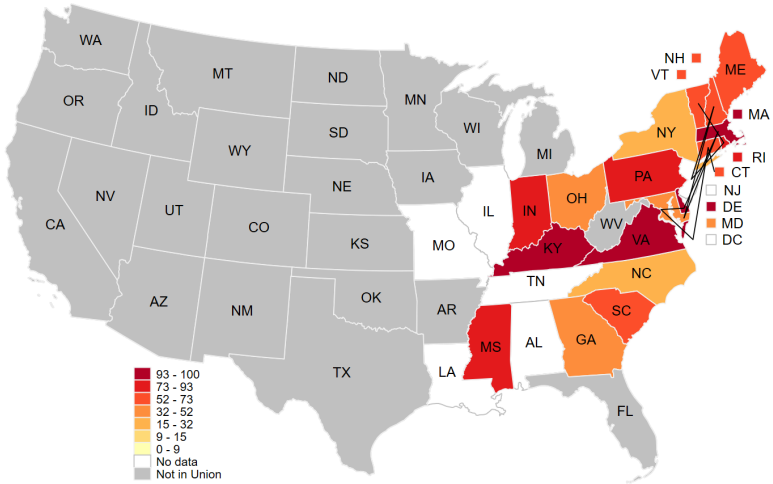




# Property Tax as % of Government Revenue: 1810-1819



# Property Tax as % of Government Revenue: 1820-1829

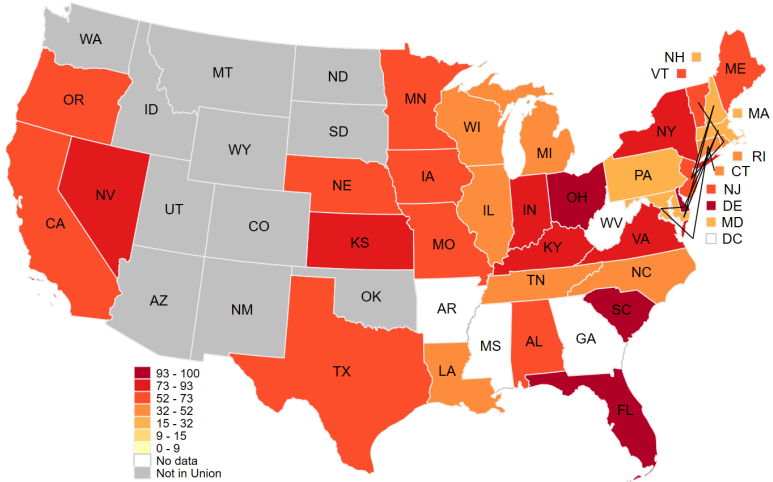




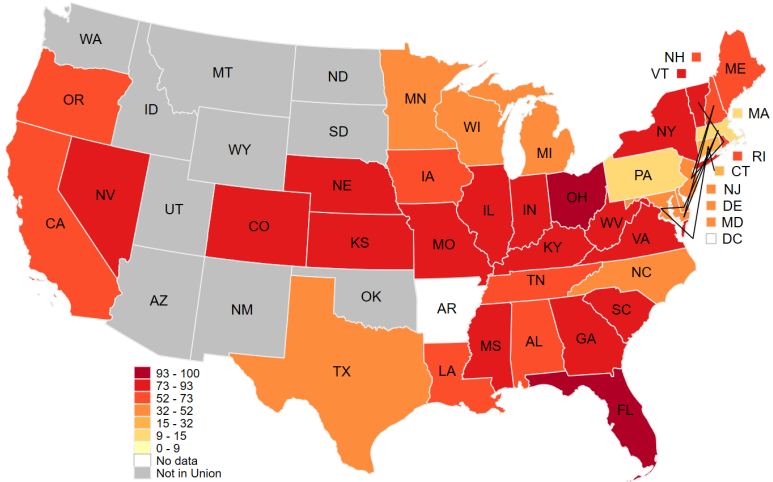




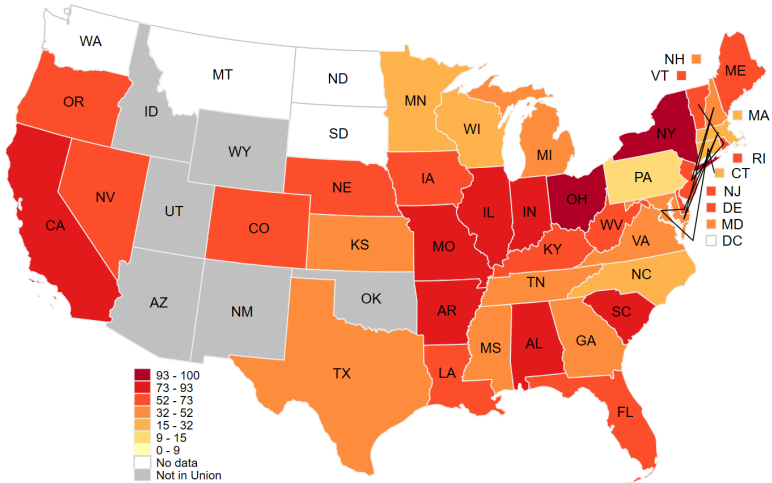
# Property Tax as % of Government Revenue: 1860-1869



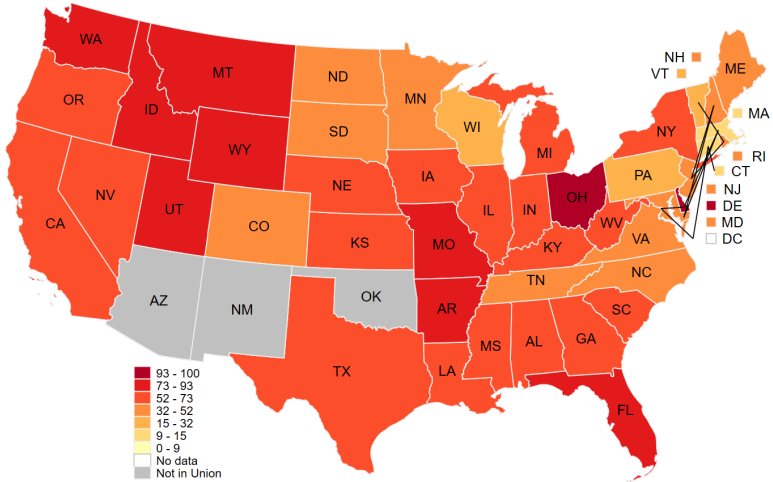
# Property Tax as % of Government Revenue: 1870-1879



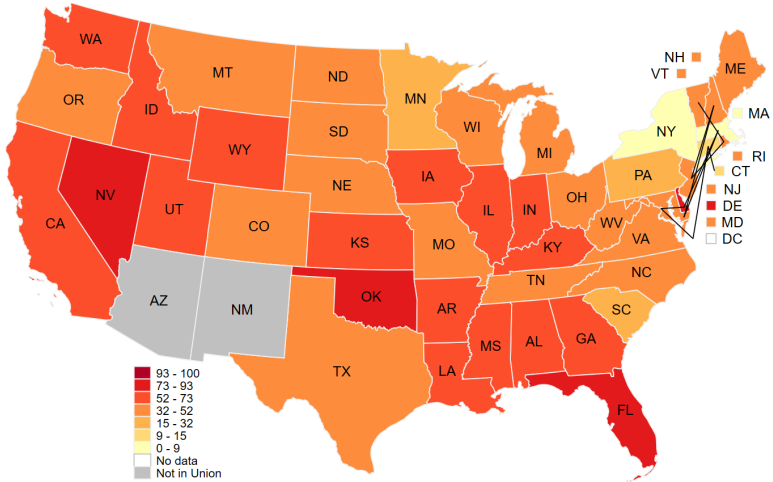
# Property Tax as % of Government Revenue: 1880-1889



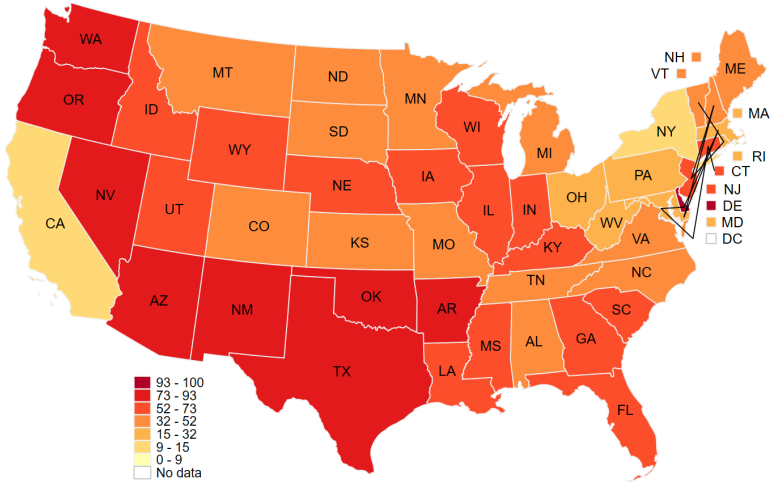
# Property Tax as % of Government Revenue: 1890-1899



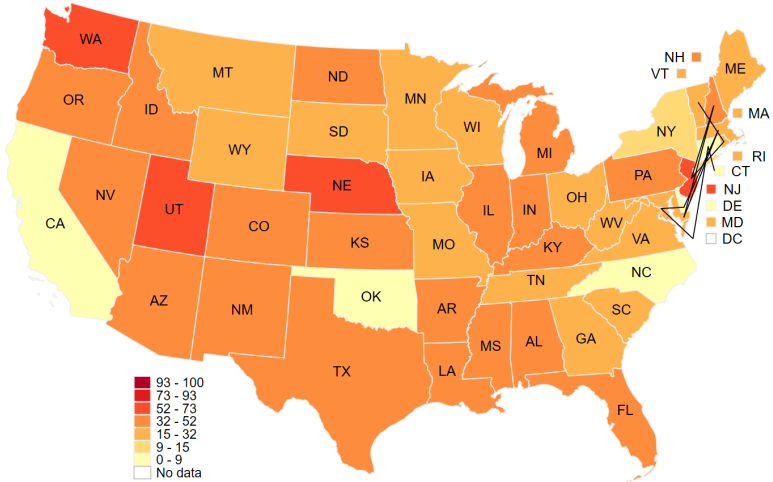
# Property Tax as % of Government Revenue: 1900-1909



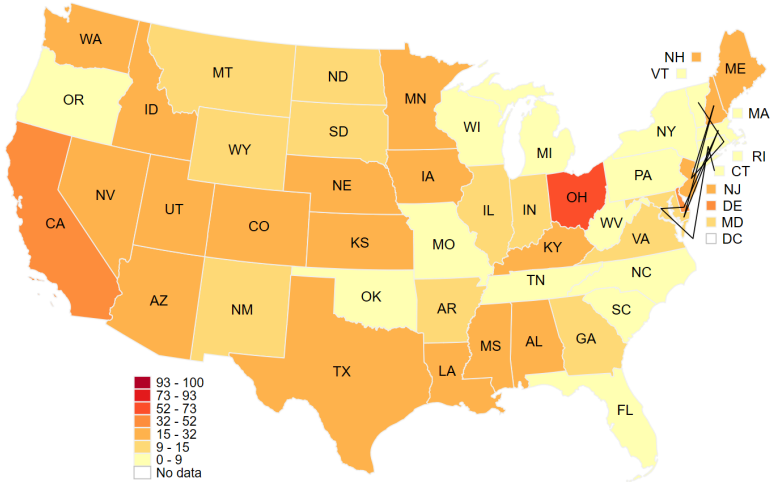
# Property Tax as % of Government Revenue: 1910-1919



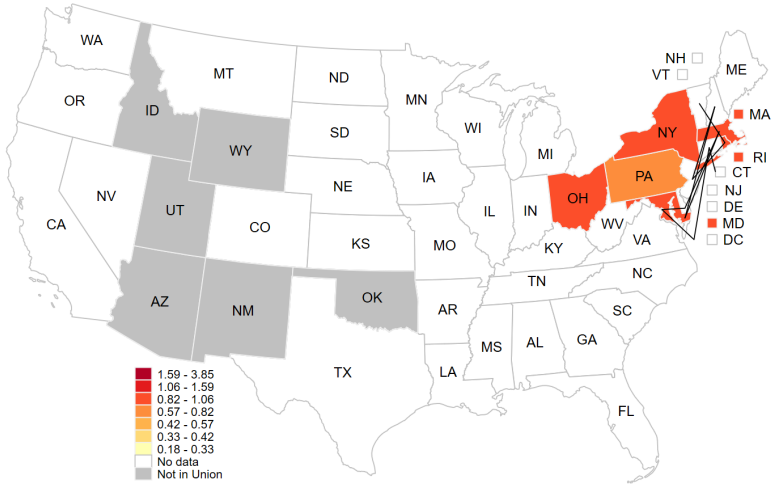
# Property Tax as % of Government Revenue: 1920-1929



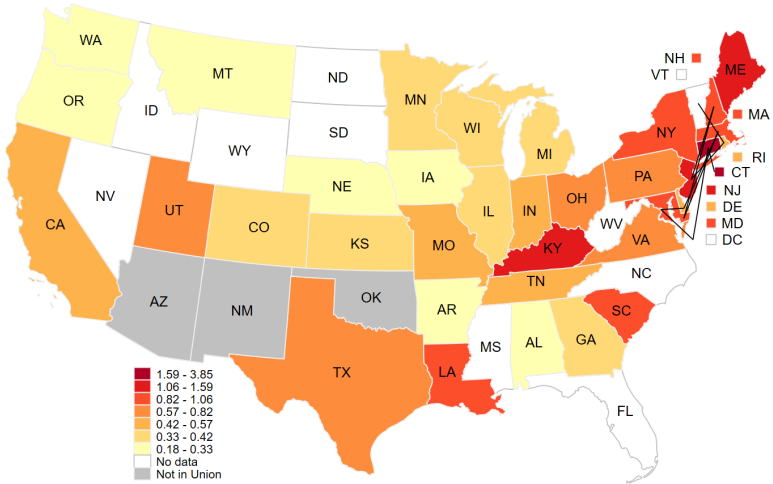
# Property Tax as % of Government Revenue: 1930-1939



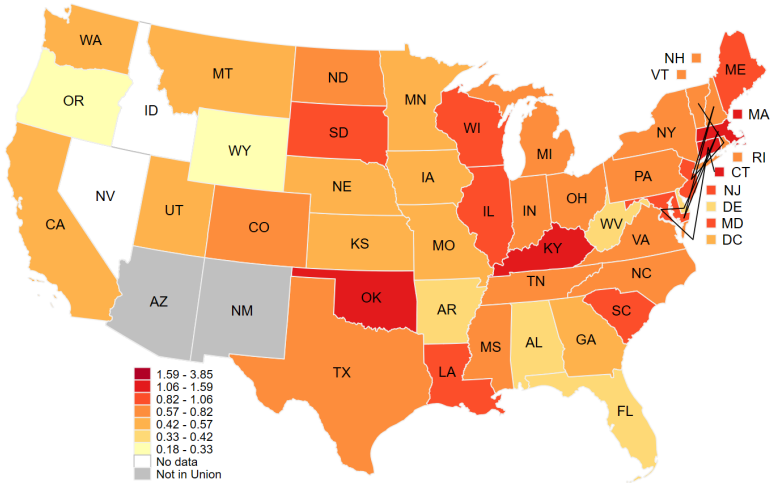
Average City Property Tax (%): 1880-1889



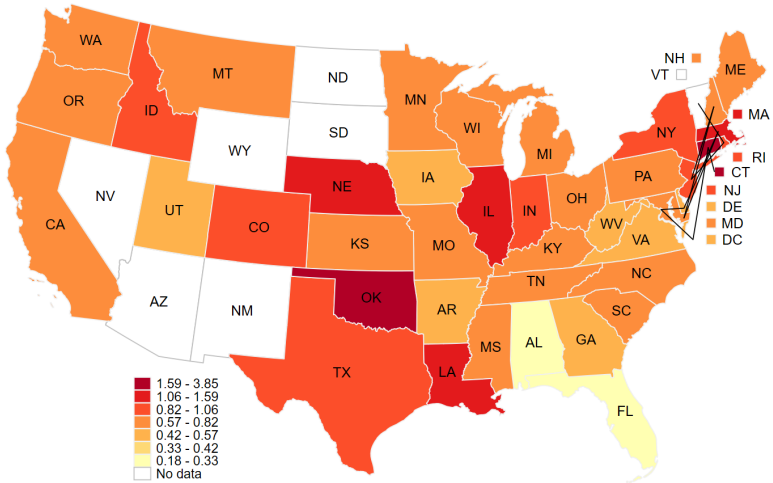
Average City Property Tax (%): 1890-1899



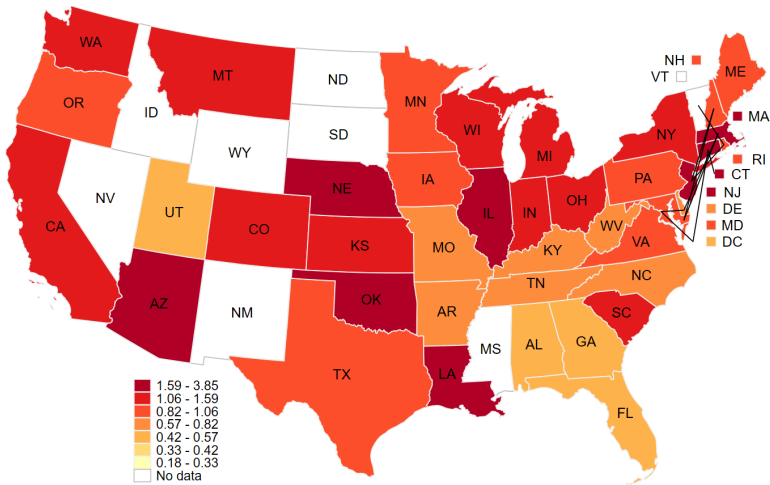
Average City Property Tax (%): 1900-1909



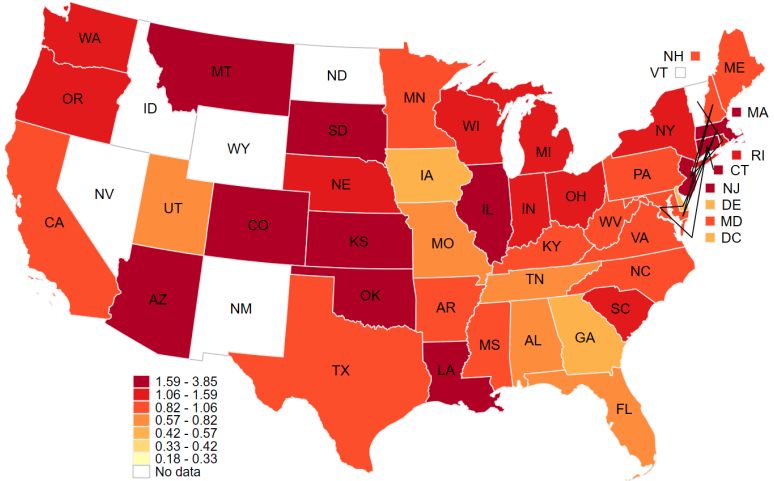
Average City Property Tax (%): 1910-1919



Average City Property Tax (%): 1920-1929



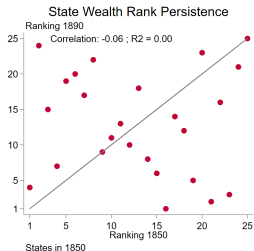
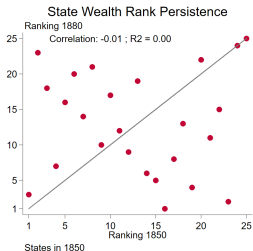
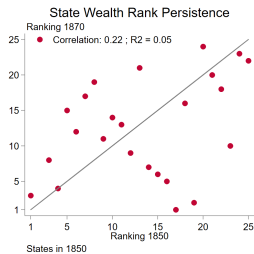
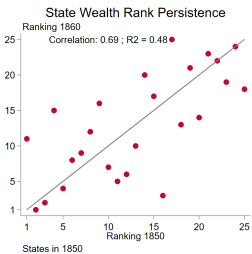
Average City Property Tax (%): 1930-1939



# Back-up Slides Wealth Determinants

# SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT

## WEALTH RANK PERSISTENCE FOR STATES

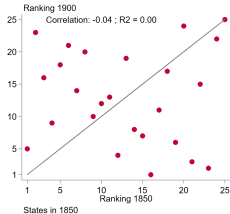


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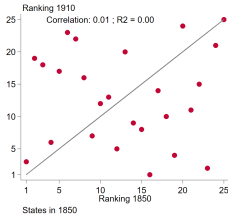
# SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT

## WEALTH RANK PERSISTENCE FOR STATES

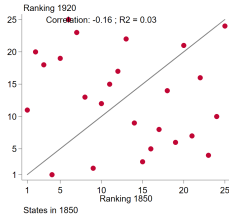
State Wealth Rank Persistence



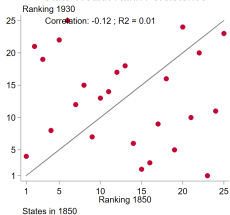
State Wealth Rank Persistence



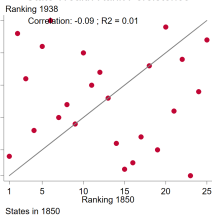
State Wealth Rank Persistence



State Wealth Rank Persistence



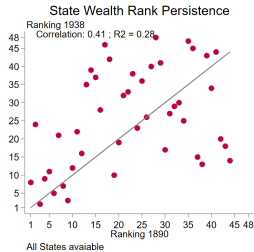
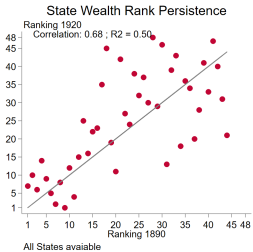
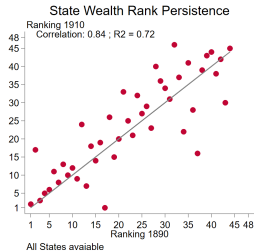
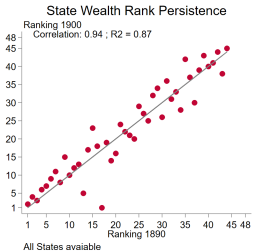
State Wealth Rank Persistence



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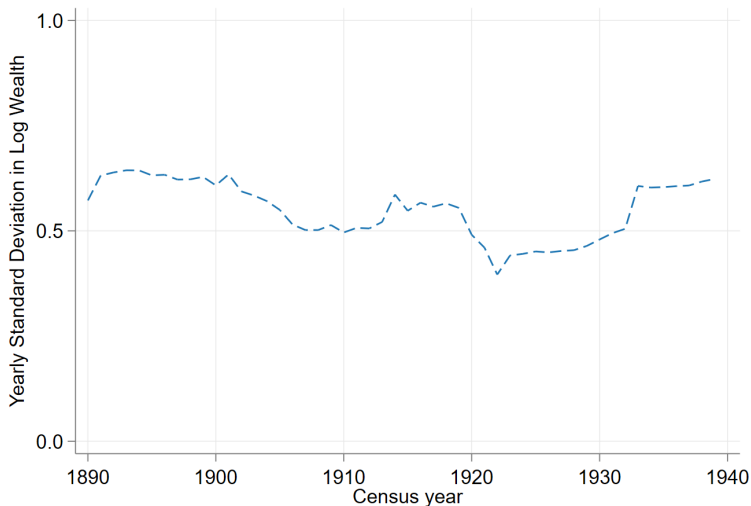
# SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT

## WEALTH RANK PERSISTENCE FOR STATES



# SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT

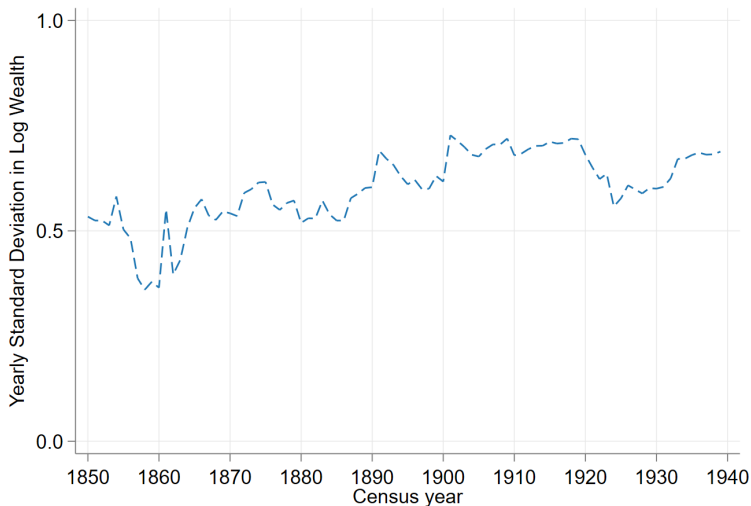
## WEALTH DISPERSION FOR STATES



All States available

# SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT

## WEALTH DISPERSION FOR STATES

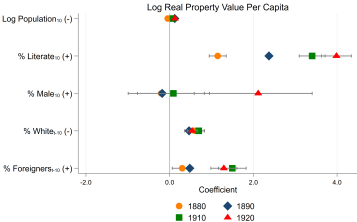
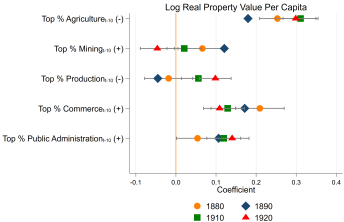
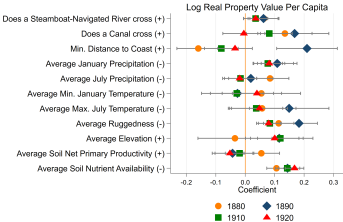


25 States

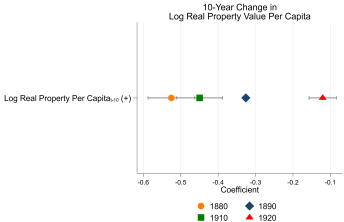
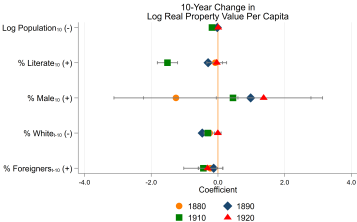
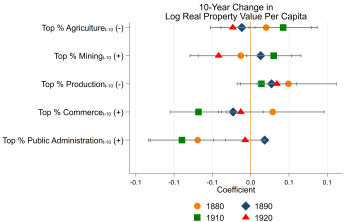
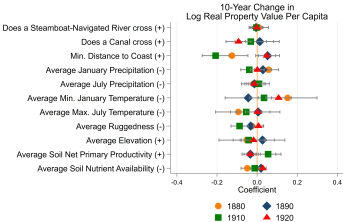
# COUNTY DETERMINANTS

	Dependent variable: Log Total Household Property Value Per Capita					
	(1)	(2)	(3)	(4)	(5)	(6)
	10-Year $\Delta$	10-Year $\Delta$	10-Year $\Delta$	10-Year $\Delta$	50-Year $\Delta$	in 1870
$L^{10}$ Log Total Household Property Value Per Capita	-0.278*** (0.008)	-0.471*** (0.013)	-0.576*** (0.015)	-0.588*** (0.015)	-0.784*** (0.037)	
<b>A. Geography</b>						
Average Min. January Temperature - °C		0.024 (0.019)	0.058*** (0.018)	0.044** (0.019)	0.003 (0.041)	0.006 (0.045)
Average Max. July Temperature - °C		-0.139*** (0.023)	-0.104*** (0.022)	-0.098*** (0.022)	-0.046 (0.046)	-0.379*** (0.061)
Average Soil Nutrient Availability		-0.111*** (0.008)	-0.101*** (0.008)	-0.104*** (0.008)	-0.122*** (0.016)	-0.164*** (0.018)
Average Soil Net Primary Productivity		0.030*** (0.011)	0.074*** (0.013)	0.063*** (0.013)	0.029 (0.025)	0.069** (0.027)
Average Elevation in meters		-0.046** (0.019)	-0.085*** (0.017)	-0.096*** (0.018)	-0.035 (0.038)	-0.212*** (0.055)
Average Ruggedness		-0.032*** (0.010)	-0.000 (0.010)	0.001 (0.010)	-0.010 (0.022)	-0.107*** (0.026)
Average January Precipitation		-0.089*** (0.017)	-0.105*** (0.016)	-0.101*** (0.016)	-0.055** (0.028)	-0.101*** (0.035)
Average July Precipitation		-0.085*** (0.009)	-0.045*** (0.010)	-0.051*** (0.010)	0.000 (0.020)	-0.045** (0.021)
Min. Distance to Coast		0.010 (0.010)	0.063*** (0.011)	0.069*** (0.011)	0.069*** (0.023)	0.233*** (0.030)
Does a Canal cross		0.066*** (0.022)	0.124*** (0.026)	0.111*** (0.026)	-0.056 (0.043)	0.060 (0.043)
Does a Streamboat-Navigated River cross		-0.012 (0.012)	-0.023* (0.013)	-0.027** (0.013)	-0.039 (0.026)	0.053* (0.027)
<b>B. Demographics</b>						
$L^{10}$ Log Population			-0.056*** (0.011)	-0.073*** (0.011)	-0.041** (0.017)	0.061** (0.026)
$L^{10}$ % Population Literate			0.194*** (0.013)	0.175*** (0.013)	0.106*** (0.023)	0.291*** (0.040)
$L^{10}$ % Male			0.033*** (0.012)	0.027** (0.010)	0.004 (0.019)	0.063** (0.028)
$L^{10}$ % White			-0.109*** (0.010)	-0.106*** (0.009)	0.022 (0.018)	-0.347*** (0.055)
$L^{10}$ % Foreigners			0.045*** (0.009)	0.027*** (0.009)	0.064*** (0.015)	-0.044** (0.018)
$\Delta$ Log Population			-0.125*** (0.026)	-0.128*** (0.026)		-0.091 (0.058)
<b>C. Occupations</b>						
$L^{10}$ Top % Population in Agriculture				-0.067*** (0.015)	-0.159*** (0.036)	0.009 (0.035)
$L^{10}$ Top % Population in Mining				0.020 (0.016)	0.001 (0.036)	0.086*** (0.031)
$L^{10}$ Top % Population in Production				0.040*** (0.014)	-0.141*** (0.037)	0.171*** (0.034)
$L^{10}$ Top % Population in Commerce				0.027* (0.015)	-0.049 (0.035)	0.127*** (0.033)
$L^{10}$ Top % Population in Public Administration				0.013 (0.014)	0.075** (0.032)	-0.036 (0.035)
Observations	15,040	10,562	8,641	8,631	1,546	1,435
Number of units	2,946	2,017	2,016	2,016	1,546	1,435
Period	1870-1920	1870-1920	1870-1920	1870-1920	1870	1860
Adjusted $R^2$	0.37	0.50	0.57	0.57	0.52	0.58
Implied Convergence	0.033	0.064	0.086	0.089	0.031	

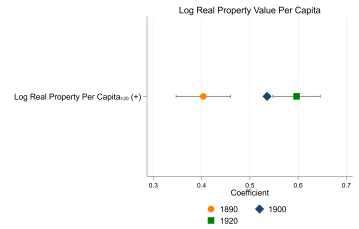
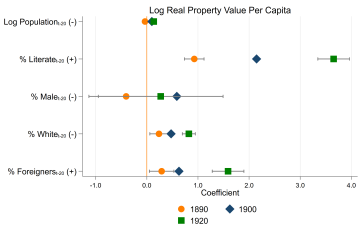
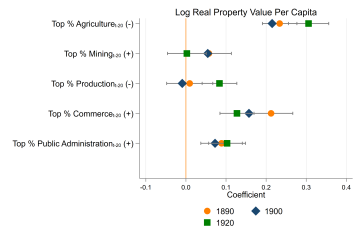
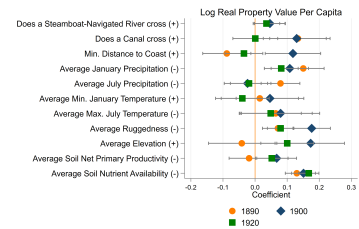
# COUNTY WEALTH DETERMINANTS



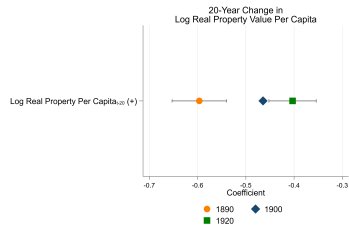
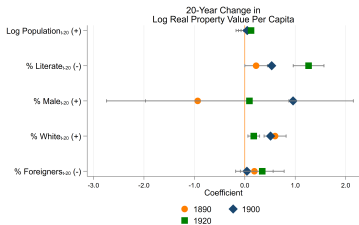
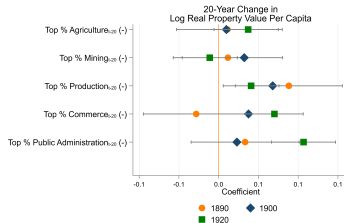
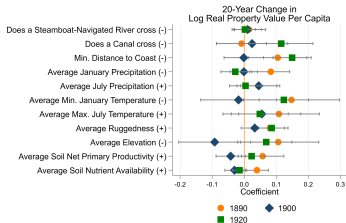
# COUNTY WEALTH DETERMINANTS



# COUNTY WEALTH DETERMINANTS



# COUNTY WEALTH DETERMINANTS



## VARIABLE DEFINITIONS

- **Property Tax Classification:** indicator taking value 1 if a state enacted a reduced tax regime for classes of property more prone to evasion ( typically intangible or personal property).
- **Tax Ferret:** indicator taking value 1 if a state hired tax officials to search for omitted property subject to taxation.
- **State Tax Commission:** indicator taking value 1 every year since the adoption of the State Tax Commission.
- **Oil Discovery:** indicator taking value 1 every year since the discovery of oil within a State.

# COUNTY SUMMARY STATISTICS

	1880				1920			
	All	Top Decile	Bottom Decile	Difference	All	Top Decile	Bottom Decile	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b><u>A. Wealth</u></b>								
Real Property Value Per Capita	14.76 (17.67)	42.29 (43.40)	3.77 (0.73)	38.52*** [0.00]	23.51 (16.37)	60.24 (13.01)	5.77 (1.18)	54.48*** [0.00]
Property Tax Rate (%)	0.62 (0.28)	0.56 (0.23)	0.62 (0.25)	-0.06** [0.01]	1.20 (0.64)	0.75 (0.32)	1.53 (1.05)	-0.78*** [0.00]
<b><u>B. Economics</u></b>								
Number of Patents	5.00 (34.96)	20.44 (96.17)	0.19 (0.53)	20.24*** [0.00]	8.05 (51.91)	5.42 (26.88)	0.74 (1.74)	4.68** [0.01]
% Living on a Farm	0.44 (0.20)	0.57 (0.22)	0.32 (0.16)	0.25*** [0.00]	0.49 (0.23)	0.49 (0.17)	0.28 (0.17)	0.21*** [0.00]
Railroad Length (km)	372.69 (19.28)	373.68 (0.00)	373.68 (0.00)	0.00 [.]	507.27 (30.67)	509.12 (0.00)	501.18 (63.15)	7.94** [0.04]
Oil Discovery	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 [.]	0.00 (0.03)	0.00 (0.00)	0.00 (0.06)	-0.00 [0.30]
% Population in Commerce	0.25 (0.15)	0.37 (0.17)	0.13 (0.07)	0.24*** [0.00]	0.24 (0.11)	0.22 (0.07)	0.14 (0.07)	0.08*** [0.00]
<b><u>C. Demographics</u></b>								
Population	21.44 (44.67)	38.70 (111.53)	10.36 (6.70)	28.34*** [0.00]	34.15 (96.77)	21.21 (55.30)	18.98 (11.08)	2.23 [0.53]
% Population Literate	0.56 (0.17)	0.71 (0.06)	0.37 (0.12)	0.34*** [0.00]	0.71 (0.09)	0.77 (0.03)	0.60 (0.08)	0.16*** [0.00]
% Male	0.53 (0.05)	0.57 (0.08)	0.51 (0.03)	0.06*** [0.00]	0.52 (0.02)	0.53 (0.03)	0.51 (0.01)	0.02*** [0.00]
% White	0.85 (0.22)	0.96 (0.07)	0.75 (0.26)	0.22*** [0.00]	0.88 (0.20)	0.98 (0.05)	0.73 (0.25)	0.24*** [0.00]
% Foreigners	0.11 (0.13)	0.22 (0.12)	0.02 (0.08)	0.19*** [0.00]	0.07 (0.08)	0.09 (0.06)	0.01 (0.02)	0.09*** [0.00]
Number of counties	2,247	227	218		2,738	277	256	

*Notes:* Deciles are calculated for Property Value Per Capita. Property Value per Capita, Railroad Length, and Population are expressed in thousands.

# COUNTY WEALTH DETERMINANTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Dependent variable: Log Real Property Value Per Capita</i>									
<b>A. Public Policy</b>									
<i>L</i> <sup>10</sup> Enforcement - State Tax Commission	0.20*** (0.02)	0.07*** (0.02)	-0.13*** (0.01)	0.20*** (0.02)	0.06*** (0.02)	-0.07*** (0.01)	-0.05*** (0.01)	-0.06*** (0.01)	-0.05*** (0.01)
<i>L</i> <sup>10</sup> Enforcement - Tax Ferret	-0.01 (0.03)	0.11*** (0.02)	0.10*** (0.02)	-0.09*** (0.03)	0.02 (0.02)	0.07*** (0.02)	0.12*** (0.01)	0.12*** (0.01)	0.11*** (0.01)
<i>L</i> <sup>10</sup> Property Tax Classification	-0.42*** (0.03)	-0.59*** (0.02)	-0.36*** (0.02)	-0.42*** (0.03)	-0.60*** (0.02)	-0.33*** (0.02)	-0.11*** (0.02)	-0.16*** (0.02)	-0.14*** (0.02)
<i>L</i> <sup>10</sup> Log (1 - Property Tax Rate)	3.75 (2.52)	33.59*** (3.48)	47.08*** (3.53)	4.54* (2.48)	33.88*** (3.45)	44.97*** (3.47)	11.51*** (2.39)	8.98*** (3.19)	5.05* (3.00)
<b>B. Economics</b>									
<i>L</i> <sup>10</sup> Log Number of Patents		0.03*** (0.01)	0.06*** (0.01)		0.02** (0.01)	0.07*** (0.01)		-0.04*** (0.01)	-0.01 (0.01)
<i>L</i> <sup>10</sup> % Living on a Farm		0.48*** (0.09)	0.56*** (0.06)		0.31*** (0.09)	0.46*** (0.06)		-0.01 (0.07)	0.03 (0.07)
<i>L</i> <sup>10</sup> Log Railroad Length		0.00*** (0.00)	-0.00 (0.00)		0.00* (0.00)	-0.00 (0.00)		0.00 (0.00)	0.00 (0.00)
<i>L</i> <sup>10</sup> Oil Discovery		-0.02 (0.20)	-0.06 (0.15)		-0.32 (0.20)	0.04 (0.16)		-0.03 (0.11)	-0.05 (0.10)
<i>L</i> <sup>10</sup> % Population in Commerce		1.26*** (0.12)	-0.05 (0.10)		1.46*** (0.13)	0.03 (0.10)		0.17 (0.14)	0.16 (0.13)
<b>C. Demographics</b>									
<i>L</i> <sup>10</sup> % Log Population			-0.17*** (0.01)			-0.17*** (0.01)			-0.09*** (0.02)
<i>L</i> <sup>10</sup> % Population Literate			3.28*** (0.08)			3.38*** (0.10)			0.97*** (0.14)
<i>L</i> <sup>10</sup> % Male			0.59* (0.30)			0.82*** (0.30)			2.36*** (0.38)
<i>L</i> <sup>10</sup> % White			-0.24*** (0.04)			-0.31*** (0.05)			-0.22 (0.22)
<i>L</i> <sup>10</sup> % Foreigners			0.95*** (0.08)			0.83*** (0.08)			-0.83*** (0.19)
Observations	10,402	7,765	7,764	10,402	7,765	7,764	10,277	7,654	7,652
Number of units	2,803	2,776	2,776	2,803	2,776	2,776	2,678	2,665	2,664
Period	1890-1920	1890-1920	1890-1920	1890-1920	1890-1920	1890-1920	1890-1920	1890-1920	1890-1920
Adjusted <i>R</i> <sup>2</sup>	0.04	0.20	0.61	0.07	0.23	0.63	0.81	0.80	0.82
Decade fixed effect				X	X	X	X	X	X
County fixed effect							X	X	X

Notes: Standard errors clustered at the county level.

# STATE SUMMARY STATISTICS

	1870				1930			
	All	Top 50%	Bottom 50%	Difference	All	Top 50%	Bottom 50%	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b><u>A. Wealth</u></b>								
Private Wealth Per Capita (2012 prices)	10.37 (5.65)	14.27 (5.37)	6.48 (2.19)	7.78*** [0.00]	29.31 (12.74)	39.85 (7.69)	18.76 (6.35)	21.09*** [0.00]
State Property Tax Rate (%)	0.21 (0.11)	0.21 (0.09)	0.21 (0.15)	0.00 [0.95]	0.18 (0.16)	0.13 (0.10)	0.24 (0.19)	-0.11** [0.02]
<b><u>B. Economics</u></b>								
Number of Patents	1.50 (1.91)	2.00 (2.65)	1.00 (0.00)	1.00 [0.13]	1.15 (0.50)	1.08 (0.28)	1.21 (0.66)	-0.13 [0.40]
Fraction of state population living on a farm	0.58 (0.16)	0.64 (0.17)	0.52 (0.13)	0.12** [0.03]	0.70 (0.17)	0.76 (0.14)	0.63 (0.18)	0.13** [0.01]
Railroad Length (km)	1.75 (1.61)	2.23 (2.01)	1.27 (0.89)	0.96* [0.08]	7.99 (5.10)	8.74 (5.66)	7.23 (4.46)	1.51 [0.31]
Oil Discovery	0.15 (0.36)	0.06 (0.24)	0.24 (0.44)	-0.18 [0.16]	0.15 (0.36)	0.04 (0.20)	0.25 (0.44)	-0.21** [0.04]
% Population in Commerce	0.32 (0.16)	0.42 (0.15)	0.22 (0.07)	0.21*** [0.00]	0.39 (0.09)	0.42 (0.09)	0.36 (0.09)	0.06** [0.03]
<b><u>C. Demographics</u></b>								
Population	1,000.78 (863.79)	1,276.51 (1,081.79)	725.06 (455.07)	551.44* [0.06]	2,547.67 (2,529.21)	3,014.49 (3,271.57)	2,080.85 (1,383.47)	933.64 [0.20]
% Population Literate	0.56 (0.17)	0.66 (0.10)	0.46 (0.18)	0.19*** [0.00]	0.76 (0.06)	0.79 (0.02)	0.73 (0.06)	0.07*** [0.00]
% Male	0.52 (0.05)	0.51 (0.03)	0.53 (0.07)	-0.02 [0.26]	0.51 (0.02)	0.51 (0.02)	0.51 (0.01)	0.01 [0.23]
% White	0.84 (0.20)	0.94 (0.13)	0.74 (0.21)	0.20*** [0.00]	0.89 (0.13)	0.96 (0.04)	0.83 (0.16)	0.13*** [0.00]
% Foreigners	0.14 (0.12)	0.18 (0.09)	0.10 (0.14)	0.08* [0.05]	0.10 (0.08)	0.13 (0.06)	0.07 (0.08)	0.05** [0.02]
Number of States	34	17	17		48	24	24	

*Notes:* Deciles are calculated for Property Value Per Capita. Property Value per Capita, Railroad Length, and Population are expressed in thousands.

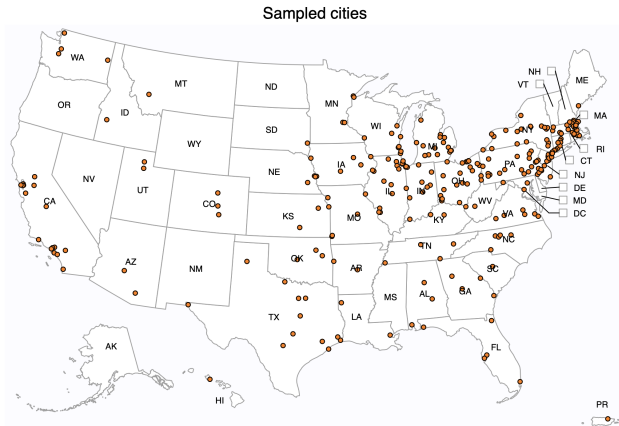
# STATE WEALTH DETERMINANTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Dependent variable: Log Private Wealth Per Capita (2012 prices)</i>									
<b>A. Public Policy</b>									
$L_{10-15}$ Enforcement - State Tax Commission	0.04 (0.10)	-0.04 (0.09)	-0.22*** (0.07)	-0.04 (0.14)	-0.10 (0.12)	-0.19** (0.08)	0.01 (0.05)	0.03 (0.06)	0.05 (0.05)
$L_{10-15}$ Enforcement - Tax Ferret	-0.35** (0.14)	-0.16** (0.08)	-0.14*** (0.05)	-0.34** (0.14)	-0.15* (0.08)	-0.13** (0.05)	-0.01 (0.05)	0.06 (0.05)	0.10** (0.04)
$L_{10-15}$ Property Tax Classification	-0.03 (0.12)	-0.07 (0.10)	-0.05 (0.06)	-0.05 (0.13)	-0.10 (0.10)	-0.02 (0.06)	-0.02 (0.06)	0.05 (0.06)	0.01 (0.05)
$L_{10-15}$ Log (1- Property Tax Rate)	24.96** (10.36)	28.61** (10.69)	28.97*** (8.24)	31.76*** (11.74)	33.59** (12.80)	30.88*** (9.54)	12.97* (7.27)	8.32 (6.31)	4.56 (4.68)
<b>B. Economics</b>									
$L_{10-15}$ Log Number of Patents		0.02 (0.15)	-0.09 (0.13)		0.03 (0.13)	-0.05 (0.12)		0.06** (0.03)	0.06** (0.03)
$L_{10-15}$ % Living on a Farm		2.12*** (0.44)	1.13*** (0.40)		1.84*** (0.50)	1.12*** (0.40)		0.32 (0.55)	0.91 (0.73)
$L_{10-15}$ Log Railroad Length		0.15** (0.06)	0.06 (0.09)		0.15** (0.06)	0.04 (0.10)		-0.64*** (0.19)	-0.38** (0.19)
$L_{10-15}$ Oil Discovery		-0.29 (0.21)	-0.23* (0.12)		-0.28 (0.21)	-0.23* (0.13)		0.00 (.)	0.00 (.)
$L_{10-15}$ % Population in Commerce		-0.90** (0.39)	-2.49*** (0.47)		-0.43 (0.47)	-2.68*** (0.52)		-0.42 (0.52)	-1.38*** (0.48)
<b>C. Demographics</b>									
$L_{10-15}$ Log Population			-0.08 (0.07)			-0.04 (0.08)			-1.03*** (0.19)
$L_{10-15}$ % Population Literate			4.18*** (0.88)			4.64*** (1.13)			-0.77 (1.53)
$L_{10-15}$ % Male			-7.60*** (2.30)			-6.58*** (2.32)			1.23 (2.74)
$L_{10-15}$ % White			0.13 (0.29)			-0.08 (0.38)			3.49 (2.41)
$L_{10-15}$ % Foreigners			1.93*** (0.50)			1.96*** (0.47)			-1.18 (1.20)
Observations	1,292	737	737	1,292	737	737	1,292	737	737
Number of units	46	46	46	46	46	46	46	46	46
Period	1880-1940	1880-1935	1880-1935	1880-1940	1880-1935	1880-1935	1880-1940	1880-1935	1880-1935
Adjusted $R^2$	0.13	0.40	0.67	0.17	0.42	0.68	0.84	0.86	0.89
Year fixed effect				X	X	X	X	X	X
State fixed effect							X	X	X

Notes: Standard errors clustered at the State level.

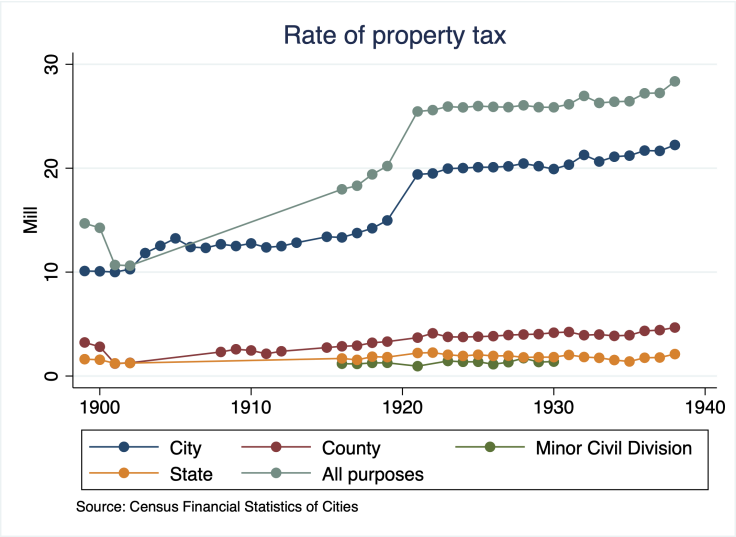
# Back-up Slides Event Studies

# DATA COVERAGE: US CITIES



▶ Back

# AVERAGE EFFECTIVE RATES OF TAXATION



Minor Civil Divisions are the primary divisions of a county (see Census).

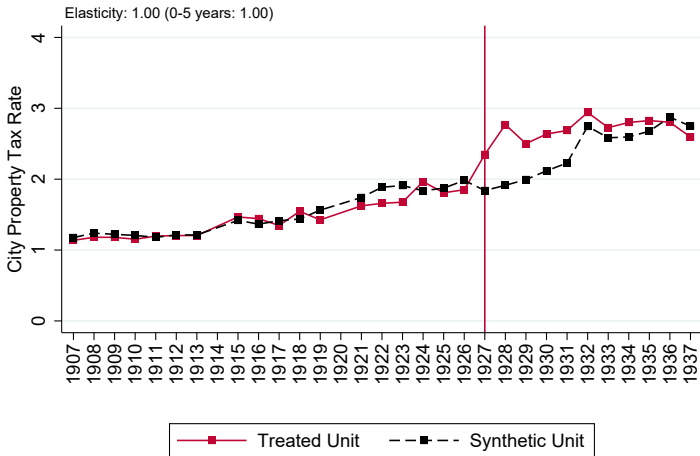
▶ Back

# DATA-DRIVEN SELECTION OF TAX REFORM EVENTS

- Select large variation:
  - Top 400 largest y-o-y variation in city tax rates by decade
- Select cities with only one large event per decade
- Select persistent variation only
  - Tax rate must remain persistently larger (lower) in 10 years following event
- 8 “increase” events
- Ex-post manual validation using local historical sources
  - Check absence of other obvious confounders (change in city boundaries, local shocks, etc)

# TAX RATES: FALL RIVER, MA

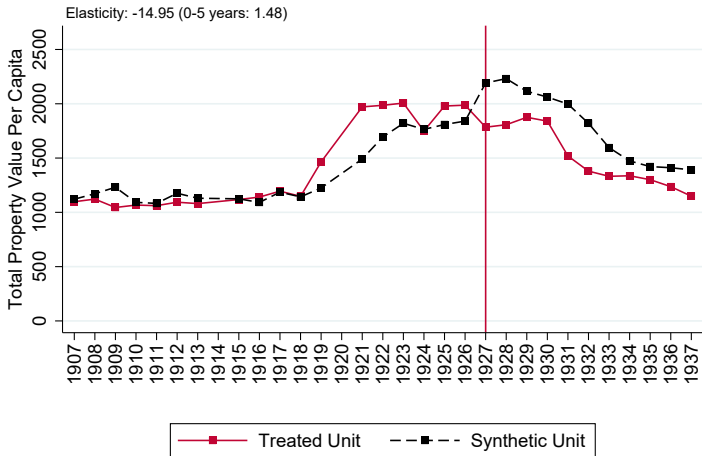
MATCHING & SYNTHETIC CONTROL ESTIMATES Á LA KELLOGG & AL. [2020]



MASC used 2 cities not converging to 0.  
Phi\_hat (Matching Weight): 1.00  
M\_hat (Nearest Neighbor): 2

# PROPERTY PC: FALL RIVER, MA

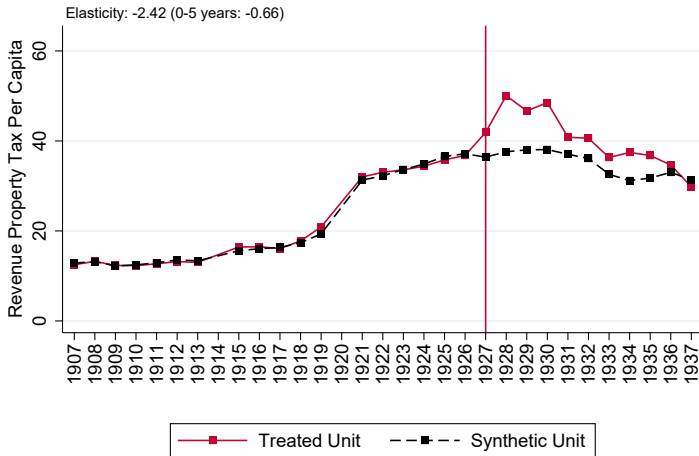
MATCHING & SYNTHETIC CONTROL ESTIMATES Á LA KELLOGG & AL. [2020]



MASC used 12 cities not converging to 0.  
 $\hat{\Phi}$  (Matching Weight): 1.00  
 $\hat{M}$  (Nearest Neighbor): 8

# TAX REVENUES PC: FALL RIVER, MA

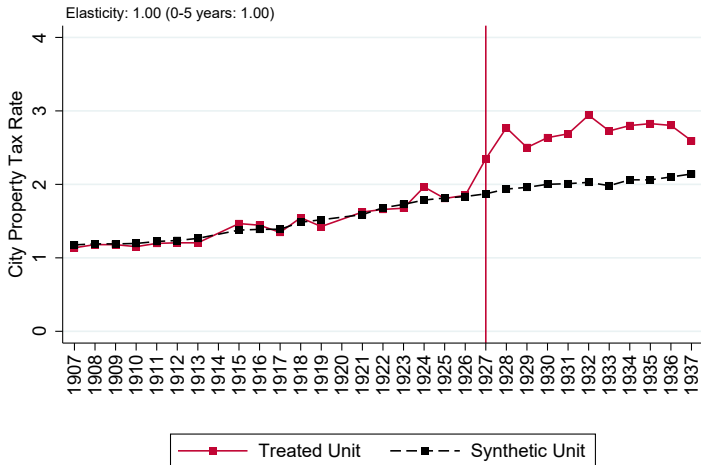
MATCHING & SYNTHETIC CONTROL ESTIMATES Á LA KELLOGG & AL. [2020]



MASC used 11 cities not converging to 0.  
 $\hat{\Phi}$  (Matching Weight): 0.00  
 $\hat{M}$  (Nearest Neighbor): 2

# TAX RATES: FALL RIVER, MA

SYNTHETIC CONTROL ESTIMATES Á LA ABADIE & L' HOUR [2020]

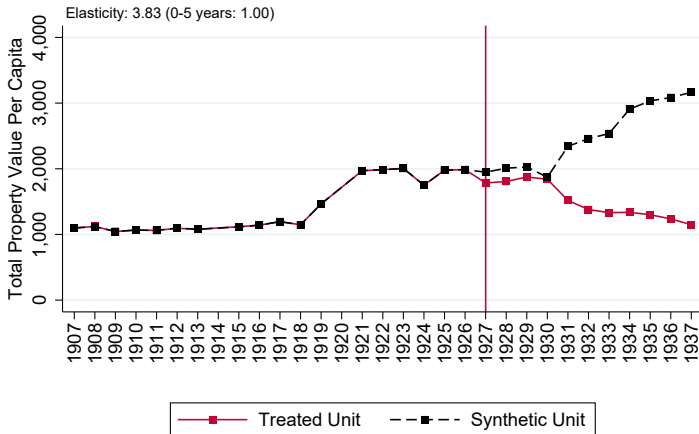


Synthetic using 6 cities.

Donor cities: Washington DC Atlanta GA Indianapolis IN Syracuse NY Chattanooga TN Norfolk VA

# PROPERTY PC: FALL RIVER, MA

SYNTHETIC CONTROL ESTIMATES Á LA ABADIE & L' HOUR [2020]

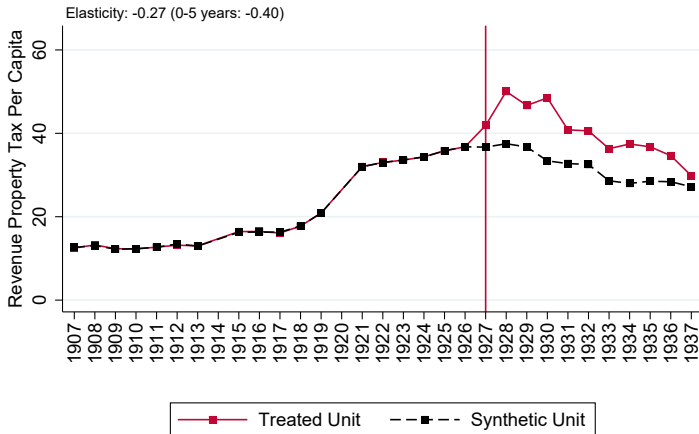


Synthetic using 35 cities.

Donor cities: San Francisco CA Denver CO Washington DC Atlanta GA Chicago IL Peoria IL Fort Wayne IN Indianapolis IN South Bend IN Des Moines IA Wichita KS Louisville KY New Orleans LA Lowell MA New Bedford MA St Louis MO Omaha NE Camden NJ Buffalo NY New York NY Syracuse NY Utica NY Canton OH Cincinnati OH Columbus OH Oklahoma City OK Erie PA Providence RI Chattanooga TN Knoxville TN Memphis TN Nashville TN Houston TX Salt Lake City UT Norfolk

# TAX REVENUES PC: FALL RIVER, MA

SYNTHETIC CONTROL ESTIMATES Á LA ABADIE & L'HOUE [2020]

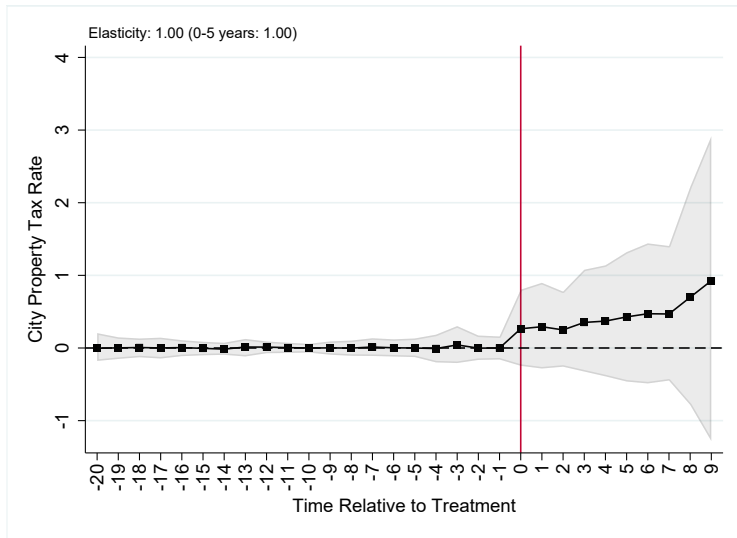


Synthetic using 35 cities.

Donor cities: San Francisco CA Denver CO Washington DC Atlanta GA Chicago IL Peoria IL Fort Wayne IN Indianapolis IN South Bend IN Des Moines IA Wichita KS Louisville KY New Orleans LA Lowell MA New Bedford MA St Louis MO Omaha NE Camden NJ Buffalo NY New York NY Syracuse NY Utica NY Canton OH Cincinnati OH Columbus OH Oklahoma City OK Erie PA Providence RI Chattanooga TN Knoxville TN Memphis TN Nashville TN Houston TX Salt Lake City UT Norfolk

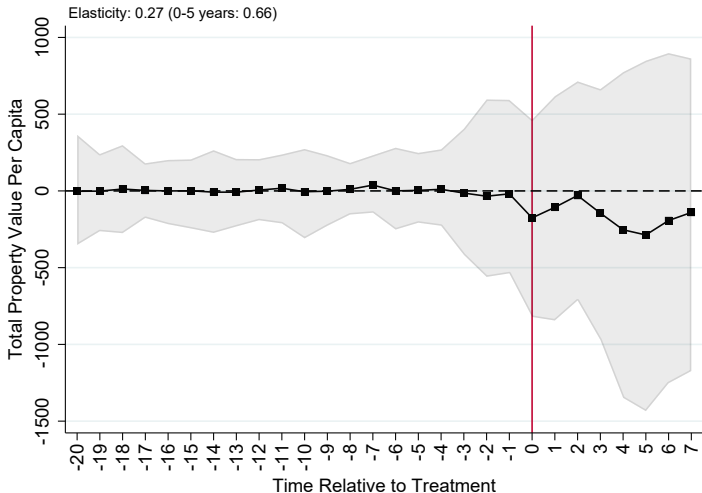
# TAX RATES AROUND TAX INCREASE EVENTS

AUGMENTED SYNTHETIC CONTROL ESTIMATES Á LA ROTHSTEIN & AL. [2021]



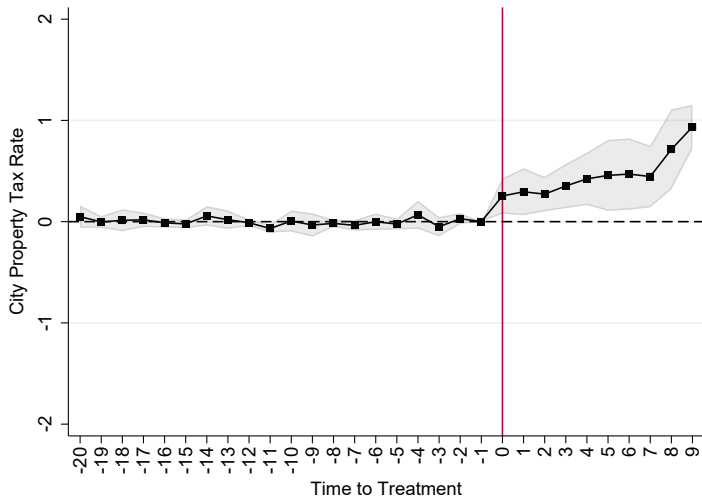
# PROPERTY PC AROUND TAX INCREASE EVENTS

AUGMENTED SYNTHETIC CONTROL ESTIMATES Á LA ROTHSTEIN & AL. [2021]



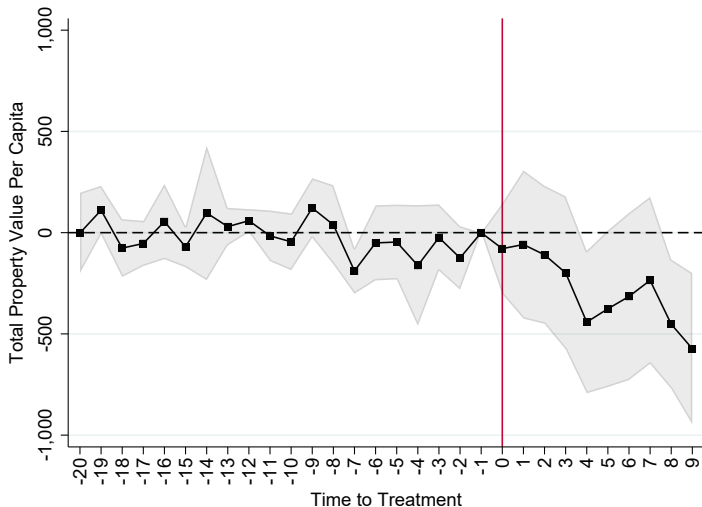
# TAX RATES AROUND TAX INCREASE EVENTS

TWFE MODEL ESTIMATES Á LA DE CHAISEMARTIN & D'HAULTFÈUILLE [2020]



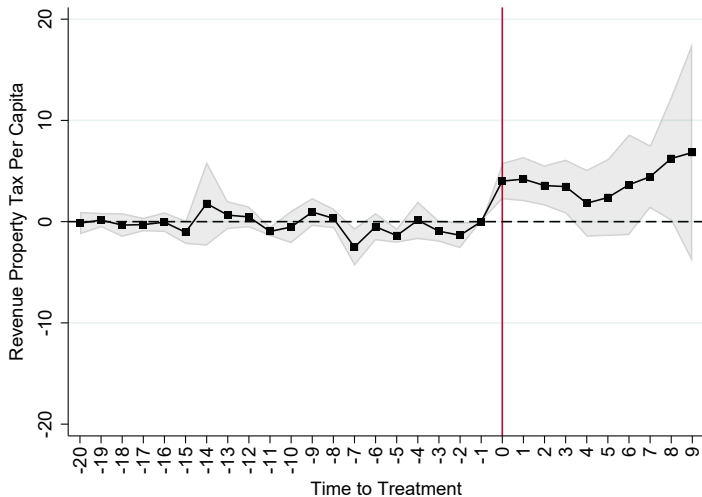
# PROPERTY PC AROUND TAX INCREASE EVENTS

TWFE MODEL ESTIMATES À LA DE CHAISEMARTIN & D'HAULTFÈUILLE [2020]

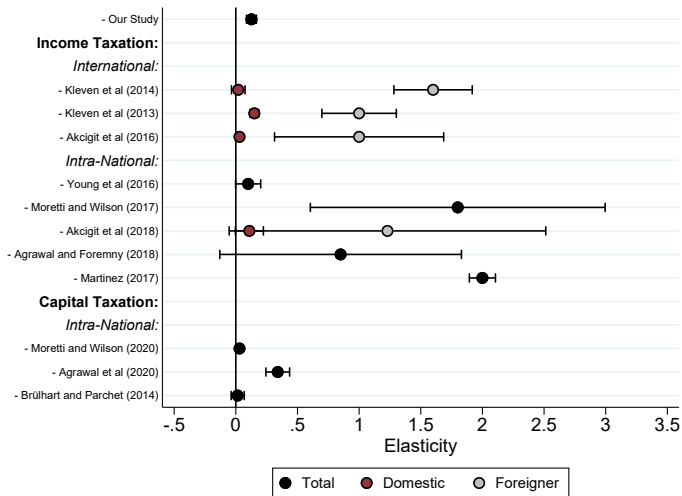


# REVENUES PC AROUND TAX INCREASE EVENTS

TWFE MODEL ESTIMATES Á LA DE CHAISEMARTIN & D'HAULTFÈUILLE [2020]

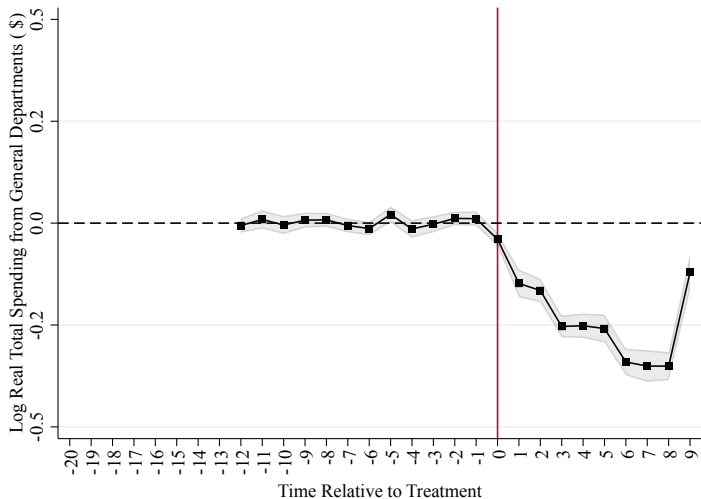


# ESTIMATES OF MIGRATION ELASTICITIES IN LITERATURE

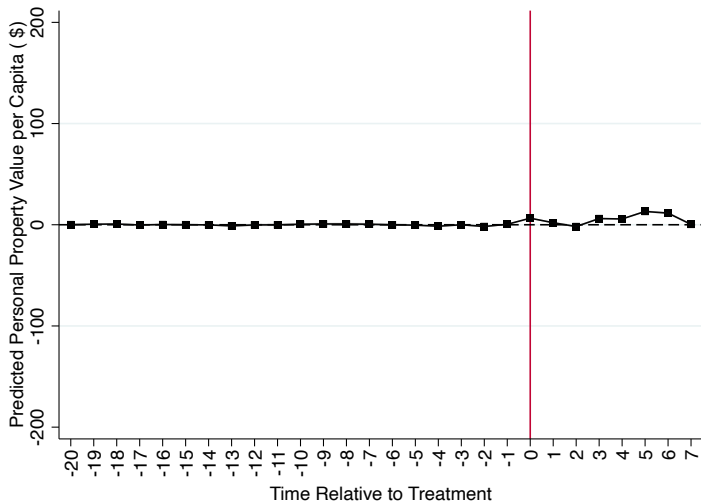


# TOTAL GVT SPENDING: TAX INCREASES

GENERALIZED SYNTHETIC CONTROL ESTIMATES



# PREDICTED PERSONAL PROPERTY PER CAPITA: GENERALIZED SYNTHETIC CONTROL ESTIMATES



# ASSESSMENT RATIOS: TAX INCREASES

GENERALIZED SYNTHETIC CONTROL ESTIMATES: ASST RATIO

