WEALTH AND PROPERTY TAXATION IN THE UNITED STATES

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HISTORY OF THE FIRST WEALTH TAX: THE US PROPERTY 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, used to be a tax on all property, not just on real estate.
- Comprehensive coverage of US wealth since early 1800s
- Measure of wealth for all US states and counties + 300 largest cities
- Rich sources of variation in taxes across space & time

IN THIS PAPER

- 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 over Time and Across the US
- 4. Correlates of Wealth for Cities, Counties, and States
- 5. The Effects of the Property Tax

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Brief History of Property Tax in the US (1/2)

- Property tax in the colonies
 - Borrowed from England (first recorded in 10th century: the *danegeld* on land), started as a essentially tax on land

• American principles from early 1800s

- Uniformity: taxable property should be taxed at the same rate
- **Universality**: all property should be taxed, including moveable and intangible
- **Localism**: local taxes to fund local gvt enforced by local elected officials
- **Exemptions** were strictly defined and carefully enumerated.
- Based on Jeffersonian/Jacksonian views of local democracy

 \Rightarrow The US created the first comprehensive tax on all forms of wealth

Brief History of Property Tax in the US (2/2)

- 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 (enforcement, assessment, etc)
 - Classification
 - Increased enforcement (equalization, State tax commissions)
- The demise after 1930s
 - Great Depression: increase in exemptions (e.g. for homestead), and property tax limitation laws
 - Increase in other sources of revenue (including from income tax)

PROPERTY TAX AS BACKBONE OF STATE REVENUE



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.

WEALTH IMPERFECTLY CORRELATED WITH INCOME

Real wealth per capita against real income per capita at the state-year level 1840-1939.



Correlation: 0.60, R2 from plain vanilla regression: 0.36 (N = 3890 state-year observations over 1840-1939)

PROPERTY TAX: TYPES

- 1. General Property Tax: The regular property tax, whose assessment and collection apply to the "average" citizen
- 2. Special Property Taxes: can typically be thought of as property taxes on businesses because they primarily tax business wealth.
 - 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: INSTITUTIONAL SETTING

- 1. Ad valorem: Taxation on the basis of property value
- 2. In rem: Imposed based on property itself ("indirect tax")
- 3. Local: Administered and levied by state, counties, and cities
 - No equivalent federal property tax.
 - Layered tax on property based on all residing jurisdiction (county tax, city tax, school district tax, ...)
- 4. Tax day when value assessed and tax collected
 - Changes in value/locations throughout the year no recognized until next year's tax day.
 - Exceptions for property subject to manipulation for tax avoidance (e.g. average value used for merchants' inventory).



We, the subscribers, Assessors of the Town of Reading, respectfully call the attention of the inhabitants to the following laws in relation to taxing the property in their possession on the first day of May.

GENERAL STATUTES OF MASSACHUSETTS.

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, bank stocks).
- 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. corporate stock subject to special property taxes not taxed twice)

4. **Public Utilities Corporations** (railroad, streetcar, telegraph, telephone, bridge): Classified as real, personal or "other" property and assessed by state boards.

EXAMPLE OF PERSONAL PROPERTY: CONNECTICUT

CATEGORIES OF PERSONAL WEALTH



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DATA COLLECTION

- 1. State reports: collected for 48 States (+DC and Hawaii)
 - Since early 1800s
- 2. Census Annual Financial Statistics: State (1915-1939)
 - N=905, 48 States (+DC and Hawaii)
- 3. Census Annual Financial Statistics: City (1899-1938)
 - N=7,390, T=38, I= 327 biggest cities (> 30k 1899-1930, > 100k 1931-1938)
 - also data on 150 small cities for 1903 only (8-25k)
- 4. Census Decennial Wealth Debt Taxation (1850-1932).
- 5. Legislation database : collected from remote sources.
 - At state level from various sources (Jensen, Census, Benson, NTA digest, Ely, Benson), mostly as of a given year: 1886 (Ely), 1917 (Lutz) 1930-31 (Jensen and Benson)

MEASURING WEALTH FROM REPORTED STATISTICS

1. Assessment \neq Market Value

$$r_{it} = \tau_{it} \cdot b_{it}$$
$$= \tau_{it} \cdot \gamma_{it} \cdot h_{it}$$

- r: property tax revenues; t: tax rate on assessed value of property; b: Assessed value of property measured by assessors
- We want to measure true market value \boldsymbol{h}
- "Assessment ratio" : $\gamma = \frac{b}{h}$
 - Legally, $\gamma=1$ in most states, in practice, $\gamma<1$
 - We use direct measures of γ_{it} for both real and personal property from historical sources (Census, etc.)

2. **Property** \neq Wealth

- Real property taxed at location
- Intangible/personal property taxed at residence

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^{th} and 75^{th} 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).

DATA COVERAGE



FINAL DATA

- Property value^{1,2,3}
- \bullet Assessed value of real property : Town Property, Land, and Improvements 4
- Assessed valuation of general property : Real, Personal and Other Property 1,2,3
- Rate of poll taxes⁴
- Tax rate on assessed property value^{1,2,4}
- Average rate of property tax for all purposes (state, county, local)⁴
- Levy of property tax: Amount^{1,2,3}
- Levy of the general property tax: Amount^{1,2,3}
- Assessment ratio 1,2,3

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

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)

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INCOME: US OVERTOOK EUROPE IN 19-TH 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 SLAVES BY REGION (1830-1940)


SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT Wealth Rank Persistence for Counties



SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT Wealth Rank Persistence for States



SPATIAL WEALTH INEQUALITY IS VERY PERSISTENT Wealth Rank Persistence for Cities



... IS HIGHLY CORRELATED WITH OUTCOMES TODAY... County Level Wealth in 1920 vs Opportunity Atlas Income Data



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Personal Income-to-Wealth Ratio: 1850-1859

WA NH MT VT ND MN ID MA SD WY RI IA PA NE NJ NV UT DE WV co MD VA DC ĸs MO κΥ NC TN ок ΑZ AR NM SC GA AL MS ΤХ LA 1.18 - 4.61 0.76 - 1.180.55 - 0.76 FL 0.45 - 0.550.36 - 0.45 0.31 - 0.36 0.13 - 0.31No data Not in Union







Personal Income-to-Wealth Ratio: 1890-1899

WA NH ME MT VT ND OR MN ID MA WI NY SD WY MI RI IA PA NE NV ОН NJ DE UT IN IL CA co MD VA DC KS MO NC TN ок AZ AR NM SC GA AL MS ΤХ LA 1.18 - 4.61 0.76 - 1.180.55 - 0.76 FL 0.45 - 0.550.36 - 0.45 0.31 - 0.36 0.13 - 0.31No data Not in Union









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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.

CITY SUMMARY STATISTICS

| | | 19 | 10 | | | 1930 | | | | |
|---|----------|---------------|------------------|------------|----------|---------------|------------------|--------------|--|--|
| | All | Top Decile | Bottom Decile | Difference | All | Top Decile | Bottom Decile | Difference | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | | |
| A. Wealth | | | | | | | | | | |
| Property Value Per Capita (2012 prices) | 30.73 | 60.14 | 14.68 | 45.46*** | 37.31 | 80.49 | 15.77 | 64.73*** | | |
| | (13.34) | (11.63) | (1.92) | [0.00] | (21.15) | (36.98) | (3.18) | [0.00] | | |
| City Property Tax Rate (%) | 0.79 | 0.51 | 1.22 | -0.71*** | 1.32 | 0.85 | 2.47 | -1.62*** | | |
| | (0.32) | (0.20) | (0.40) | [0.00] | (0.66) | (0.30) | (0.74) | [0.00] | | |
| B. Economics | | | | | | | | | | |
| Number of Patents | 71.73 | 183.50 | 27.16 | 156.34 | 53.49 | 177.19 | 16.38 | 160.82** | | |
| | (192.45) | (442.96) | (23.30) | [0.13] | (184.45) | (434.06) | (19.88) | [0.04] | | |
| % Living on a Farm | 0.99 | 0.99 | 0.99 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | | |
| | (0.01) | (0.01) | (0.01) | [0.93] | (0.01) | (0.00) | (0.01) | [0.92] | | |
| Railroad Length (km) | 1.00 | 0.87 | 1.19 | -0.32 | 0.16 | 0.14 | 0.20 | -0.07 | | |
| | (0.83) | (0.69) | (1.18) | [0.33] | (0.16) | (0.21) | (0.12) | [0.13] | | |
| Oil Discovery | 0.01 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.09 | -0.09* | | |
| ÷ | (0.07) | (0.00) | (0.00) | [.] | (0.15) | (0.00) | (0.30) | [0.08] | | |
| % Population in Commerce | 0.74 | 0.69 | 0.77 | -0.09*** | 0.55 | 0.54 | 0.53 | 0.02 | | |
| | (0.09) | (0.08) | (0.08) | [0.00] | (0.07) | (0.06) | (0.06) | [0.23] | | |
| C. Demographics | | | | | | | | | | |
| Population | 148.44 | 409.23 | 58.63 | 350.60 | 152.84 | 487.52 | 72.93 | 414.59^{*} | | |
| | (407.40) | (1, 104.24) | (29.74) | [0.17] | (470.82) | (1, 266.17) | (79.53) | [0.07] | | |
| % Population Literate | 0.78 | 0.80 | 0.75 | 0.05*** | 0.80 | 0.82 | 0.79 | 0.03*** | | |
| | (0.04) | (0.05) | (0.05) | [0.00] | (0.03) | (0.03) | (0.04) | [0.00] | | |
| % Male | 0.50 | 0.52 | 0.51 | 0.02 | 0.49 | 0.49 | 0.50 | -0.01* | | |
| | (0.03) | (0.05) | (0.02) | [0.18] | (0.02) | (0.02) | (0.02) | [0.06] | | |
| % White | 0.92 | 0.93 | 0.96 | -0.03 | 0.92 | 0.91 | 0.94 | -0.02 | | |
| | (0.13) | (0.11) | (0.08) | [0.43] | (0.11) | (0.09) | (0.11) | [0.40] | | |
| % Population Literate | 0.78 | 0.80 | 0.75 | 0.05*** | 0.80 | 0.82 | 0.79 | 0.03*** | | |
| * | (0.04) | (0.05) | (0.05) | [0.00] | (0.03) | (0.03) | (0.04) | [0.00] | | |
| % Foreigners | 0.21 | 0.23 | 0.28 | -0.05 | 0.15 | 0.17 | 0.17 | -0.01 | | |
| - | (0.12) | (0.11) | (0.15) | [0.28] | (0.10) | (0.08) | (0.11) | [0.75] | | |
| Number of cities | 184 | 18 | 19 | | 311 | 31 | 32 | | | |

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

CITY WEALTH DETERMINANTS

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|--|--|--------------------|--------------------|-----------------------|--|--|----------------------|
| | | | Dependent | variable: Log | Property Value | Per Capita (2 | 012 prices) | | |
| A. Public Policy | | | | | | | | | |
| $\overline{L_{10\sim 15}}$ Enforcement - State Tax Commission | 0.15*** (0.04) | (0.03) (0.04) | 0.02 (0.05) | -0.02 (0.04) | -0.01 (0.04) | 0.01 (0.05) | -0.00 (0.03) | 0.04 (0.03) | 0.06** (0.03) |
| $L_{10\sim15}$ Enforcement - Tax Ferret | -0.06 (0.04) | -0.09** (0.04) | -0.10^{**} (0.04) | -0.11*** (0.04) | -0.10*** (0.04) | -0.12*** (0.04) | $\begin{pmatrix} 0.02 \\ (0.03) \end{pmatrix}$ | $\begin{pmatrix} 0.03 \\ (0.02) \end{pmatrix}$ | 0.04^{*} (0.03) |
| $L_{10\sim 15}$ Property Tax Classification | $\begin{array}{c} 0.05 \\ (0.04) \end{array}$ | $\begin{array}{c} 0.00\\ (0.04) \end{array}$ | -0.02 (0.04) | -0.05 (0.04) | -0.02 (0.03) | -0.02 (0.04) | -0.03 (0.03) | $\begin{array}{c} 0.00\\ (0.03) \end{array}$ | -0.00 (0.03) |
| $L_{10\sim15}$ Log (1- Property Tax Rate) | 36.43*** (3.51) | 40.82^{***} (4.28) | 42.21*** (4.86) | 49.06*** (3.89) | 45.79*** (5.03) | 44.68*** (5.39) | 2.24 (2.16) | 2.39 (1.66) | (1.38) (1.81) |
| B. Economics | | | | | | | | | |
| $L_{10\sim 15}$ Log Number of Patents | | 0.08^{***} (0.01) | 0.04^{**} (0.02) | | 0.08**** (0.01) | 0.05^{**} (0.02) | | -0.06*** (0.02) | -0.05*** (0.02) |
| $L_{10\sim 15}$ % Living on a Farm | | -4.24*** (1.54) | -5.59*** (1.58) | | -3.36 (2.11) | -3.42 (2.07) | | -2.36* (1.29) | -2.65** (1.28) |
| $L_{10\sim 15}$ Log Railroad Length | | (0.02) (0.02) | 0.00 (0.03) | | 0.01 (0.02) | 0.00 (0.03) | | -0.34** (0.14) | -0.20 (0.13) |
| $L_{10\sim15}$ Oil Discovery | | -0.18^{*} (0.10) | -0.19^{*} (0.11) | | -0.15 (0.11) | -0.17 (0.11) | | -0.29*** (0.05) | -0.29*** (0.05) |
| $L_{10\sim15}$ % Population in Commerce | | -1.95*** (0.16) | -2.19*** (0.18) | | -0.83** (0.39) | -1.39*** (0.53) | | -2.63^{***} (0.53) | -1.54*** (0.58) |
| C. Demographics | | | | | | | | | |
| $L_{10\sim15}$ Log Population | | | 0.08^{**} (0.03) | | | 0.06^{*} (0.03) | | | -0.02 (0.05) |
| $L_{10\sim 15}$ % Population Literate | | | -0.36 (0.76) | | | 0.15 (0.79) | | | -0.70 (1.23) |
| $L_{10\sim15}$ % Male | | | -3.50*** (1.33) | | | -2.34 (1.48) | | | 4.99*** (1.64) |
| $L_{10\sim15}$ % White | | | -0.16 (0.26) | | | -0.14 (0.25) | | | -0.89 (0.86) |
| $L_{10\sim15}$ % For eigners | | | $\begin{pmatrix} 0.16 \\ (0.37) \end{pmatrix}$ | | | -0.01 (0.36) | | | -1.31 (0.92) |
| Observations | 4,608 | 2,578 | 2,577 | 4,608 | 2,578 | 2,577 | 4,584 | 2,554 | 2,554 |
| Number of units | 251 | 250 | 249 | 251 | 250 | 249 | 227 | 226 | 226 |
| Period Advised D2 | 1909-1938 | 1910-1935 | 1910-1935 | 1909-1938 | 1910-1935 | 1910-1935 | 1909-1938 | 1910-1935 | 1910-1935 |
| Aujusted n ⁻ Vear fixed effect | 0.16 | 0.38 | 0.41 | 0.42 X | 0.43 X | 0.44 X | 0.83 X | 0.85 X | 0.85 X |
| City fixed effect | | | | ~ | ~ | ~ | x | x | x |

Notes: Standard errors clustered at the city level.

Geography and Wealth: Cities 1/2

| | Dependent vo | ariable: Log Rea | al Property Val | ue per capita |
|---|------------------|------------------|------------------|------------------|
| | (1) 1899-1909 | (2) 1909-1919 | (3) 1919-1929 | (4) 1929-1939 |
| Average Min. January Temperature in Celsius Degrees | 0.01 | 0.07 | 0.27*** | 0.22*** |
| | (0.08) | (0.09) | (0.09) | (0.07) |
| Average Max. July Temperature in Celsius Degrees | -0.08 | -0.12* | -0.24*** | -0.16** |
| | (0.07) | (0.07) | (0.08) | (0.07) |
| Average Soil Nutrient Availability | -0.00 | 0.01 | 0.01 | 0.01 |
| | (0.03) | (0.03) | (0.03) | (0.03) |
| Average Soil Net Primary Productivity | -0.05 | -0.08 | -0.04 | 0.03 |
| | (0.05) | (0.06) | (0.04) | (0.04) |
| Average Elevation in meters | 0.11* | 0.01 | -0.20** | -0.18** |
| | (0.06) | (0.07) | (0.08) | (0.07) |
| Average Ruggedness | 0.00 | 0.07** | 0.09*** | 0.11*** |
| | (0.03) | (0.03) | (0.03) | (0.03) |
| Average January Precipitation | -0.02 | -0.08 | -0.19*** | -0.14*** |
| | (0.05) | (0.05) | (0.06) | (0.05) |
| Average July Precipitation | -0.01 | 0.00 | 0.13*** | 0.10*** |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| Min. Distance to Coast | -0.04 | -0.06 | 0.05 | 0.03 |
| | (0.04) | (0.05) | (0.05) | (0.05) |
| Min. Distance to Canal | 0.09 | -0.01 | -0.08 | -0.08 |
| | (0.06) | (0.06) | (0.06) | (0.06) |
| Min. Distance to Steamboat-Navigated River | -0.11** | -0.02 | 0.23*** | 0.19*** |
| | (0.05) | (0.07) | (0.07) | (0.07) |
| Observations | 183 | 228 | 272 | 308 |
| Adjusted R ² | 0.08 | 0.04 | 0.14 | 0.10 |
| Mean Dependent Variable | 10.18 | 10.15 | 10.22 | 10.44 |

Geography and Wealth: Cities 2/2

| | De | pendent variab | le: |
|---|------------------|------------------|------------------|
| | Log 1 | Real Property V | alue |
| | | per capita | |
| | (1) 1899-1919 | (2) 1919-1939 | (3) 1899-1939 |
| Average Min. January Temperature in Celsius Degrees | 0.06 | 0.25*** | 0.18*** |
| | (0.08) | (0.07) | (0.06) |
| Average Max. July Temperature in Celsius Degrees | -0.11* | -0.21*** | -0.15** |
| | (0.07) | (0.07) | (0.07) |
| Average Soil Nutrient Availability | -0.00 | 0.01 | -0.01 |
| | (0.03) | (0.03) | (0.02) |
| Average Soil Net Primary Productivity | -0.06 | -0.00 | -0.06* |
| incluge confree Filming Floraceiting | (0.06) | (0.04) | (0.03) |
| Amongon Florentian in motors | 0.04 | 0.90*** | 0.01 |
| Average Elevation in meters | (0.04) | (0.07) | (0.01) |
| | | 0.10888 | 0.00 |
| Average Ruggedness | (0.03) | (0.03) | -0.02 |
| | (0.00) | (0.00) | (010-) |
| Average January Precipitation | -0.06 | -0.16*** | -0.12*** |
| | (0.05) | (0.05) | (0.04) |
| Average July Precipitation | 0.00 | 0.12*** | 0.02 |
| | (0.04) | (0.04) | (0.04) |
| Min. Distance to Coast | -0.05 | 0.05 | -0.06 |
| | (0.05) | (0.05) | (0.04) |
| Min. Distance to Canal | 0.02 | -0.08 | -0.03 |
| | (0.06) | (0.06) | (0.04) |
| Min. Distance to Steenboot Nanimted Diren | 0.04 | 0.99*** | 0.02 |
| Mill. Distance to Steamboat-Navigated River | -0.04 (0.06) | (0.06) | (0.06) |
| Observations | 240 | 312 | 580 |
| Adjusted R ² | 0.04 | 0.12 | 0.05 |
| Mean Dependent Variable | 10.15 | 10.32 | 10.14 |

County Summary Statistics

| | | 18 | 80 | | 1920 | | | | | |
|--------------------------------|---------|---------------|------------------|---------------|---------|---------------|------------------|------------|--|--|
| | All | Top Decile | Bottom Decile | Difference | All | Top Decile | Bottom Decile | Difference | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | | |
| A. Wealth | | | | | | | | | | |
| Real Property Value Per Capita | 14.76 | 42.29 | 3.77 | 38.52*** | 23.51 | 60.24 | 5.77 | 54.48*** | | |
| | (17.67) | (43.40) | (0.73) | [0.00] | (16.37) | (13.01) | (1.18) | [0.00] | | |
| Property Tax Rate (%) | 0.62 | 0.56 | 0.62 | -0.06** | 1.20 | 0.75 | 1.53 | -0.78*** | | |
| | (0.28) | (0.23) | (0.25) | [0.01] | (0.64) | (0.32) | (1.05) | [0.00] | | |
| B. Economics | | | | | | | | | | |
| Number of Patents | 5.00 | 20.44 | 0.19 | 20.24^{***} | 8.05 | 5.42 | 0.74 | 4.68** | | |
| | (34.96) | (96.17) | (0.53) | [0.00] | (51.91) | (26.88) | (1.74) | [0.01] | | |
| % Living on a Farm | 0.44 | 0.57 | 0.32 | 0.25*** | 0.49 | 0.49 | 0.28 | 0.21*** | | |
| | (0.20) | (0.22) | (0.16) | [0.00] | (0.23) | (0.17) | (0.17) | [0.00] | | |
| Railroad Length (km) | 372.69 | 373.68 | 373.68 | 0.00 | 507.27 | 509.12 | 501.18 | 7.94** | | |
| | (19.28) | (0.00) | (0.00) | [.] | (30.67) | (0.00) | (63.15) | [0.04] | | |
| Oil Discovery | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.00 | | |
| | (0.00) | (0.00) | (0.00) | [.] | (0.03) | (0.00) | (0.06) | [0.30] | | |
| % Population in Commerce | 0.25 | 0.37 | 0.13 | 0.24*** | 0.24 | 0.22 | 0.14 | 0.08*** | | |
| - | (0.15) | (0.17) | (0.07) | [0.00] | (0.11) | (0.07) | (0.07) | [0.00] | | |
| C. Demographics | | | | | | | | | | |
| Population | 21.44 | 38.70 | 10.36 | 28.34^{***} | 34.15 | 21.21 | 18.98 | 2.23 | | |
| | (44.67) | (111.53) | (6.70) | [0.00] | (96.77) | (55.30) | (11.08) | [0.53] | | |
| % Population Literate | 0.56 | 0.71 | 0.37 | 0.34*** | 0.71 | 0.77 | 0.60 | 0.16*** | | |
| - | (0.17) | (0.06) | (0.12) | [0.00] | (0.09) | (0.03) | (0.08) | [0.00] | | |
| % Male | 0.53 | 0.57 | 0.51 | 0.06*** | 0.52 | 0.53 | 0.51 | 0.02*** | | |
| | (0.05) | (0.08) | (0.03) | [0.00] | (0.02) | (0.03) | (0.01) | [0.00] | | |
| % White | 0.85 | 0.96 | 0.75 | 0.22*** | 0.88 | 0.98 | 0.73 | 0.24*** | | |
| | (0.22) | (0.07) | (0.26) | [0.00] | (0.20) | (0.05) | (0.25) | [0.00] | | |
| % Foreigners | 0.11 | 0.22 | 0.02 | 0.19*** | 0.07 | 0.09 | 0.01 | 0.09*** | | |
| | (0.13) | (0.12) | (0.08) | [0.00] | (0.08) | (0.06) | (0.02) | [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) |
|---|--------------------|--------------------|------------------------|----------------------|--|---|------------------------|--|------------------------|
| | | | Depen | dent variable: | Log Real Prope | rty Value Per 0 | Capita | | |
| A. Public Policy | | | | | | | | | |
| $\overline{L^{10}$ 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) |
| ${\cal L}^{10}$ Enforcement - Tax Ferret | -0.01 (0.03) | 0.11*** (0.02) | 0.10^{***} (0.02) | -0.09*** (0.03) | $\begin{pmatrix} 0.02 \\ (0.02) \end{pmatrix}$ | 0.07*** (0.02) | 0.12^{***} (0.01) | 0.12^{***} (0.01) | 0.11^{***} (0.01) |
| L^{10} 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) |
| L^{10} 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. Economics | | | | | | | | | |
| ${\cal L}^{10}$ 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) |
| $L^{10}~\%$ 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) |
| L^{10} 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) |
| L^{10} 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) |
| $L^{10}~\%$ Population in Commerce | | 1.26*** (0.12) | -0.05 (0.10) | | 1.46^{***} (0.13) | $\begin{array}{c} 0.03 \\ (0.10) \end{array}$ | | $\begin{array}{c} 0.17\\ (0.14) \end{array}$ | 0.16 (0.13) |
| C. Demographics | | | | | | | | | |
| L^{10} % Log Population | | | -0.17*** (0.01) | | | -0.17*** (0.01) | | | -0.09*** (0.02) |
| $L^{10}~\%$ Population Literate | | | 3.28*** (0.08) | | | 3.38*** (0.10) | | | 0.97*** (0.14) |
| $L^{10}~\%$ Male | | | 0.59^{*} (0.30) | | | 0.82*** (0.30) | | | 2.36*** (0.38) |
| $L^{10}~\%$ White | | | -0.24*** (0.04) | | | -0.31*** (0.05) | | | -0.22 (0.22) |
| L^{10} % For eigners | | | 0.95^{***} (0.08) | | | $\begin{array}{c} 0.83^{***} \\ (0.08) \end{array}$ | | | -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 |
| Aujustea R* Decede fixed offect | 0.04 | 0.20 | 0.01 | 0.07 Y | 0.23 X | 0.63 V | 0.81 V | 0.80 V | 0.82 V |
| County fixed effect | | | | | | | x | x | X |

Notes: Standard errors clustered at the county level.

Geography and Wealth: Counties 1/2

| | Dependent variable: Log Real Property Value Per Capita | | | | | | | | |
|---|--|---|-----------------------|-------------------|---|---|--|--|--|
| | (1) | (2) | (3) | (4) | (5) | (6) | | | |
| | 1865-1875 | 1875-1885 | 1885-1895 | 1895-1905 | 1905-1915 | 1915-1925 | | | |
| Average Min. January Temperature - °C | -0.03 | 0.06 | 0.32*** | 0.17*** | 0.08^{*} | 0.06 | | | |
| | (0.09) | (0.07) | (0.07) | (0.05) | (0.05) | (0.04) | | | |
| Average Max. July Temperature - $^{\rm o}{\rm C}$ | -0.51*** | -0.32*** | -0.41*** | -0.40*** | -0.24*** | -0.24*** | | | |
| | (0.14) | (0.08) | (0.08) | (0.07) | (0.06) | (0.05) | | | |
| Average Soil Nutrient Availability | -0.20*** | -0.15*** | -0.23^{***} | -0.24*** | -0.21*** | -0.18*** | | | |
| | (0.03) | (0.03) | (0.03) | (0.02) | (0.02) | (0.02) | | | |
| Average Soil Net Primary Productivity | -0.11* (0.06) | $ \begin{array}{c} 0.03 \\ (0.04) \end{array} $ | -0.01 (0.04) | -0.07** (0.03) | -0.02 (0.03) | -0.01 (0.03) | | | |
| Average Elevation in meters | $\begin{array}{c} 0.02\\ (0.07) \end{array}$ | 0.07 (0.08) | 0.11^{*} (0.06) | 0.04 (0.05) | -0.14*** (0.05) | -0.08* (0.04) | | | |
| Average Ruggedness | -0.16** | -0.18*** | -0.15*** | -0.16*** | -0.00 | -0.01 | | | |
| | (0.08) | (0.05) | (0.04) | (0.04) | (0.03) | (0.02) | | | |
| Average January Precipitation | -0.14** | -0.20*** | -0.31*** | -0.28*** | -0.20*** | -0.20*** | | | |
| | (0.05) | (0.05) | (0.06) | (0.04) | (0.05) | (0.04) | | | |
| Average July Precipitation | -0.10*** | -0.17*** | -0.26*** | -0.25*** | -0.18*** | -0.10*** | | | |
| | (0.04) | (0.03) | (0.03) | (0.03) | (0.02) | (0.02) | | | |
| Min. Distance to Coast | $\begin{array}{c} 0.08\\(0.09)\end{array}$ | -0.05 (0.04) | 0.05 (0.03) | -0.01 (0.03) | 0.01 (0.03) | $\begin{array}{c} 0.03 \\ (0.02) \end{array}$ | | | |
| Does a Canal cross | 0.32^{***} (0.10) | (0.30^{**}) (0.13) | 0.24^{**} (0.10) | 0.26*** (0.08) | $ \begin{array}{c} 0.08 \\ (0.06) \end{array} $ | -0.00 (0.10) | | | |
| Does a Steamboat-Navigated River cross | 0.15^{***} (0.05) | $ \begin{array}{c} 0.03 \\ (0.04) \end{array} $ | 0.01 (0.04) | 0.02 (0.04) | -0.06* (0.03) | -0.06^{*} (0.03) | | | |
| Observations | 491 | 677 | 906 | 1079 | 1271 | 1498 | | | |
| Adjusted R ² | 0.45 | 0.48 | 0.53 | 0.54 | 0.36 | 0.35 | | | |
| Mean Dependent Variable | 8.75 | 9.34 | 9.88 | 9.96 | 10.06 | 9.89 | | | |

Geography and Wealth: Counties 2/2

| | | Dependent | variable: | |
|--|------------------|------------------|------------------|------------------|
| | Log | Real Property | Value Per Cap | vita |
| | (1) 1865-1885 | (2) 1885-1905 | (3) 1905-1925 | (4) 1865-1925 |
| Average Min. January Temperature - °C | 0.06 | 0.30*** | 0.08* | 0.20*** |
| | (0.06) | (0.06) | (0.04) | (0.04) |
| Average Max. July Temperature - °C | -0.45*** | -0.47*** | -0.26*** | -0.44*** |
| | (0.08) | (0.07) | (0.05) | (0.05) |
| Average Soil Nutrient Availability | -0.17*** | -0.24*** | -0.19*** | -0.21*** |
| | (0.02) | (0.02) | (0.02) | (0.02) |
| Average Soil Net Primary Productivity | -0.03 | -0.06* | -0.02 | -0.06*** |
| | (0.04) | (0.03) | (0.02) | (0.02) |
| Average Elevation in meters | 0.01 | 0.04 | -0.15*** | -0.12*** |
| | (0.07) | (0.05) | (0.04) | (0.04) |
| Average Ruggedness | -0.19*** | -0.17*** | 0.01 | -0.10*** |
| | (0.05) | (0.04) | (0.02) | (0.03) |
| Average January Precipitation | -0.19*** | -0.32*** | -0.21*** | -0.28*** |
| | (0.04) | (0.05) | (0.04) | (0.04) |
| Average July Precipitation | -0.14*** | -0.25*** | -0.14*** | -0.20*** |
| · · · | (0.02) | (0.03) | (0.02) | (0.02) |
| Min. Distance to Coast | 0.03 | 0.03 | 0.02 | 0.04** |
| | (0.04) | (0.03) | (0.02) | (0.02) |
| Does a Canal cross | 0.36*** | 0.29*** | 0.03 | 0.22*** |
| | (0.11) | (0.09) | (0.07) | (0.08) |
| Does a Steamboat-Navigated River cross | 0.06 | 0.02 | -0.07** | -0.01 |
| 0 | (0.04) | (0.04) | (0.03) | (0.03) |
| Observations | 677 | 1080 | 1498 | 1820 |
| Adjusted R ² | 0.52 | 0.54 | 0.36 | 0.50 |
| Mean Dependent Variable | 9.07 | 9.94 | 9.98 | 9.78 |

STATE SUMMARY STATISTICS

| | | 18 | 70 | | | 19 | 30 | |
|---|----------|------------|---------------|------------|-------------|-------------|---------------|-------------|
| | All | Top 50% | Bottom 50% | Difference | All | Top 50% | Bottom 50% | Difference |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| A. Wealth | | | | | | | | |
| Private Wealth Per Capita (2012 prices) | 10.37 | 14.27 | 6.48 | 7.78*** | 29.31 | 39.85 | 18.76 | 21.09*** |
| | (5.65) | (5.37) | (2.19) | [0.00] | (12.74) | (7.69) | (6.35) | [0.00] |
| State Property Tax Rate (%) | 0.21 | 0.21 | 0.21 | 0.00 | 0.18 | 0.13 | 0.24 | -0.11** |
| | (0.11) | (0.09) | (0.15) | [0.95] | (0.16) | (0.10) | (0.19) | [0.02] |
| B. Economics | | | | | | | | |
| Number of Patents | 1.50 | 2.00 | 1.00 | 1.00 | 1.15 | 1.08 | 1.21 | -0.13 |
| | (1.91) | (2.65) | (0.00) | [0.13] | (0.50) | (0.28) | (0.66) | [0.40] |
| Fraction of state population living on a farm | 0.58 | 0.64 | 0.52 | 0.12** | 0.70 | 0.76 | 0.63 | 0.13^{**} |
| | (0.16) | (0.17) | (0.13) | [0.03] | (0.17) | (0.14) | (0.18) | [0.01] |
| Railroad Length (km) | 1.75 | 2.23 | 1.27 | 0.96* | 7.99 | 8.74 | 7.23 | 1.51 |
| | (1.61) | (2.01) | (0.89) | [0.08] | (5.10) | (5.66) | (4.46) | [0.31] |
| Oil Discovery | 0.15 | 0.06 | 0.24 | -0.18 | 0.15 | 0.04 | 0.25 | -0.21** |
| | (0.36) | (0.24) | (0.44) | [0.16] | (0.36) | (0.20) | (0.44) | [0.04] |
| % Population in Commerce | 0.32 | 0.42 | 0.22 | 0.21*** | 0.39 | 0.42 | 0.36 | 0.06** |
| | (0.16) | (0.15) | (0.07) | [0.00] | (0.09) | (0.09) | (0.09) | [0.03] |
| C. Demographics | | | | | | | | |
| Population | 1,000.78 | 1,276.51 | 725.06 | 551.44^* | 2,547.67 | 3,014.49 | 2,080.85 | 933.64 |
| | (863.79) | (1,081.79) | (455.07) | [0.06] | (2, 529.21) | (3, 271.57) | (1, 383.47) | [0.20] |
| % Population Literate | 0.56 | 0.66 | 0.46 | 0.19*** | 0.76 | 0.79 | 0.73 | 0.07*** |
| | (0.17) | (0.10) | (0.18) | [0.00] | (0.06) | (0.02) | (0.06) | [0.00] |
| % Male | 0.52 | 0.51 | 0.53 | -0.02 | 0.51 | 0.51 | 0.51 | 0.01 |
| | (0.05) | (0.03) | (0.07) | [0.26] | (0.02) | (0.02) | (0.01) | [0.23] |
| % White | 0.84 | 0.94 | 0.74 | 0.20*** | 0.89 | 0.96 | 0.83 | 0.13*** |
| | (0.20) | (0.13) | (0.21) | [0.00] | (0.13) | (0.04) | (0.16) | [0.00] |
| % Foreigners | 0.14 | 0.18 | 0.10 | 0.08* | 0.10 | 0.13 | 0.07 | 0.05** |
| | (0.12) | (0.09) | (0.14) | [0.05] | (0.08) | (0.06) | (0.08) | [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) |
|--|--------------------|-------------------------|-------------------------|---------------------|---|------------------------|---|--|---|
| | | | Dependent | variable: Log | Private Wealth | Per Capita (2) | 012 prices) | | |
| A. Public Policy | | | | | | | | | |
| $L_{10\sim 15}$ 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) | $\begin{array}{c} 0.01 \\ (0.05) \end{array}$ | 0.03 (0.06) | 0.05 (0.05) |
| $L_{10\sim15}$ 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) | $\begin{array}{c} 0.06\\ (0.05) \end{array}$ | 0.10^{**} (0.04) |
| $L_{10\sim 15}$ 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) | $\begin{array}{c} 0.05\\ (0.06) \end{array}$ | $\begin{array}{c} 0.01 \\ (0.05) \end{array}$ |
| $L_{10\sim15}$ 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. Economics | | | | | | | | | |
| $L_{10\sim 15}$ Log Number of Patents | | (0.02) (0.15) | -0.09 (0.13) | | $\begin{array}{c} 0.03 \\ (0.13) \end{array}$ | -0.05 (0.12) | | 0.06^{**} (0.03) | 0.06^{**} (0.03) |
| $L_{10\sim 15}$ % Living on a Farm | | 2.12*** (0.44) | 1.13*** (0.40) | | 1.84*** (0.50) | 1.12*** (0.40) | | $\begin{pmatrix} 0.32 \\ (0.55) \end{pmatrix}$ | 0.91 (0.73) |
| $L_{10\sim 15}$ 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) |
| $L_{10\sim 15}$ Oil Discovery | | -0.29 (0.21) | -0.23* (0.12) | | -0.28 (0.21) | -0.23* (0.13) | | 0.00 (.) | 0.00 (.) |
| $L_{10\sim15}$ % 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) |
| C. Demographics | | | | | | | | | |
| $L_{10\sim15}$ Log Population | | | -0.08 (0.07) | | | -0.04 (0.08) | | | -1.03*** (0.19) |
| $L_{10\sim 15}$ % Population Literate | | | 4.18**** (0.88) | | | 4.64*** (1.13) | | | -0.77 (1.53) |
| $L_{10\sim15}$ % Male | | | -7.60*** (2.30) | | | -6.58*** (2.32) | | | 1.23 (2.74) |
| $L_{10\sim15}$ % White | | | 0.13 (0.29) | | | -0.08 (0.38) | | | 3.49 (2.41) |
| $L_{10\sim15}$ % For eigners | | | 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 Adjusted P ² | 1880-1940 | 1880-1935 | 1880-1935 | 1880-1940 | 1880-1935 | 1880-1935 | 1880-1940 | 1880-1935 | 1880-1935 |
| Year fixed effect | 0.15 | 0.40 | 0.07 | 0.17 X | 0.42 X | 0.08 X | 0.84 X | 0.80 X | 0.89 X |
| State fixed effect | | | | | | | x | x | x |

Notes: Standard errors clustered at the State level.

OUTLINE

1. A Brief History of the Property Tax in the US

2. Data

- 3. Wealth over Time and Across the US
- 4. Correlates of Wealth for Cities, Counties, and States
- 5. The Effects of the Property Tax

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 \grave{a} la Bai [2009]
 - Allows aggregation of multiple synthetic control experiments
 - And dimension reduction \grave{a} la Abadie & L'Hour [2009]

• Individual Synthetic Controls Events

TAX RATES AROUND TAX INCREASE EVENTS

GENERALIZED SYNTHETIC CONTROL ESTIMATES



TOTAL PROPERTY VALUE: TAX INCREASES Generalized Synthetic Control Estimates: Property Value



Implied Elast. K Income w.r.t Net-of-Tax Rate on Income: $\varepsilon \approx .70$

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: $\varepsilon_W \approx .44$

EXTENSIVE VS INTENSIVE RESPONSES

GENERALIZED SYNTHETIC CONTROL ESTIMATES: PER CAPITA PROPERTY VALUE



Implied Elasticity of Pop. w.r.t Net-of-Tax Rate on Income: $\varepsilon_N \approx .26$ \triangleright Comparison to Literature

DECOMPOSING PER CAPITA WEALTH RESPONSES

- 1. Selective Migration:
 - Little evidence that effect driven by selective migration • Selective Migration
- 2. Reporting / Evasion:
 - Sharp responses of personal property per capita
 - Indicative of strong avoidance/evasion behaviors
 - But enforcement & assessment ratios increase
 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

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
Comparison to Goldsmith [1951]



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

























Weighted by population (baseline)
Weighted by wealth 1860







Share of Tax Revenue from Property Tax



SHARE OF STATE REVENUE FROM POLL TAX



10-year moving average

Share of Tax Revenue from Poll Tax



10-year moving average

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.

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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









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





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





Wealth As Share of GDP (%): 1840-1849

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





Wealth As Share of GDP (%): 1860





Wealth As Share of GDP (%): 1860-1869



Wealth As Share of GDP (%): 1870





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



Wealth As Share of GDP (%): 1880-1889



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

▶ Back



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



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



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 $^{\rm GDP}$



The Geography of Wealth in the US state's Wealth share of GDP as Fraction of National Wealth share of GDP $^{\rm GDP}$






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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: 1860-1869





Ratio State-to-National Wealth Share: 1870-1879





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





THE GEOGRAPHY OF WEALTH IN THE US STATE'S WEALTH SHARE OF GDP AS FRACTION OF NATIONAL WEALTH SHARE OF GDP



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





AVERAGE EFFECTIVE RATES OF TAXATION



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



DATA-DRIVEN SELECTION OF TAX REFORM EVENTS

- Select large variation:
 - Top 100 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
- 18 events (10 increases, 8 decreases)
- Ex-post manual validation using local historical sources
 - Check absence of other obvious confounders (change in city boundaries, local shocks, etc)

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TAX RATES AROUND TAX DECREASE EVENTS



TAX RATES: FALL RIVER, MA

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





PROPERTY PC: FALL RIVER, MA

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



TAX REVENUES PC: FALL RIVER, MA

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



TAX RATES: FALL RIVER, MA

Synthetic Control Estimates A la Abadie & L'Hour [2020]





PROPERTY PC: FALL RIVER, MA

Synthetic Control Estimates á la Abadie & L'Hour [2020]



TAX REVENUES PC: FALL RIVER, MA Synthetic Control Estimates á la Abadie & L'Hour [2020]





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'HAULTFŒUILLE [2020]



PROPERTY PC AROUND TAX INCREASE EVENTS TWFE MODEL ESTIMATES Á LA DE CHAISEMARTIN & D'HAULTFŒUILLE [2020]



REVENUES PC AROUND TAX INCREASE EVENTS TWFE MODEL ESTIMATES Á LA DE CHAISEMARTIN & D'HAULTFŒUILLE [2020]





ESTIMATES OF MIGRATION ELASTICITIES IN LITERATURE



TOTAL GVT SPENDING: TAX INCREASES



PERSONAL PROPERTY PER CAPITA: TAX INCREASES



REAL PROPERTY PER CAPITA: TAX INCREASES



Assessment Ratios: Tax Increases

GENERALIZED SYNTHETIC CONTROL ESTIMATES: ASST RATIO PERSONAL PROPERTY



Assessment Ratios: Tax Increases

GENERALIZED SYNTHETIC CONTROL ESTIMATES: ASST RATIO REAL PROPERTY



Solow Residual

- Solow residual over the 19th century using property value as a measure of capital
- Measured as A_t from equation $ln(Y_t) = \alpha + A_t + \beta ln(K_t) + \delta ln(N_t) + \varepsilon_t$
- GDP and Labor Force from US Census

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Solow Residual



FLUCTUATIONS IN SOLOW RESIDUAL



Deviation from linear trend
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Deviation from Trend

DATA COVERAGE: US CITIES



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Adjustments Used

1. **+Early Period**: Property valuation is calculated as the product of revenue and the first observed rate.

2. +Linear Interpolation: Linear Interpolation of Property Valuation, calculated as the product of revenue and the first observed rate.

NO ADJUSTEMENT



```
+ Early period
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+ LINEAR INTERPOLATION



RAW PRIVATE WEALTH OBSERVATIONS

Private Wealth as Share of GDP (%)



+Early Period

Private Wealth as Share of GDP (%)



+LINEAR INTERPOLATION

Private Wealth as Share of GDP (%)



Average City Property Tax (%)



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

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Personal Property as Share of GDP (%)





Average City Property Tax (%)





State Rate of Property Tax







Property Tax as % of Government Revenue: 1790-1799



Property Tax as % of Government Revenue: 1800-1809



Property Tax as % of Government Revenue: 1810-1819



Property Tax as % of Government Revenue: 1820-1829



Property Tax as % of Government Revenue: 1830-1839



Property Tax as % of Government Revenue: 1840-1849



Property Tax as % of Government Revenue: 1850-1859



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