ONLINE APPENDIX

for "Wealth and Property Taxation in the United States"

by Sacha Dray, Camille Landais, and Stefanie Stantcheva

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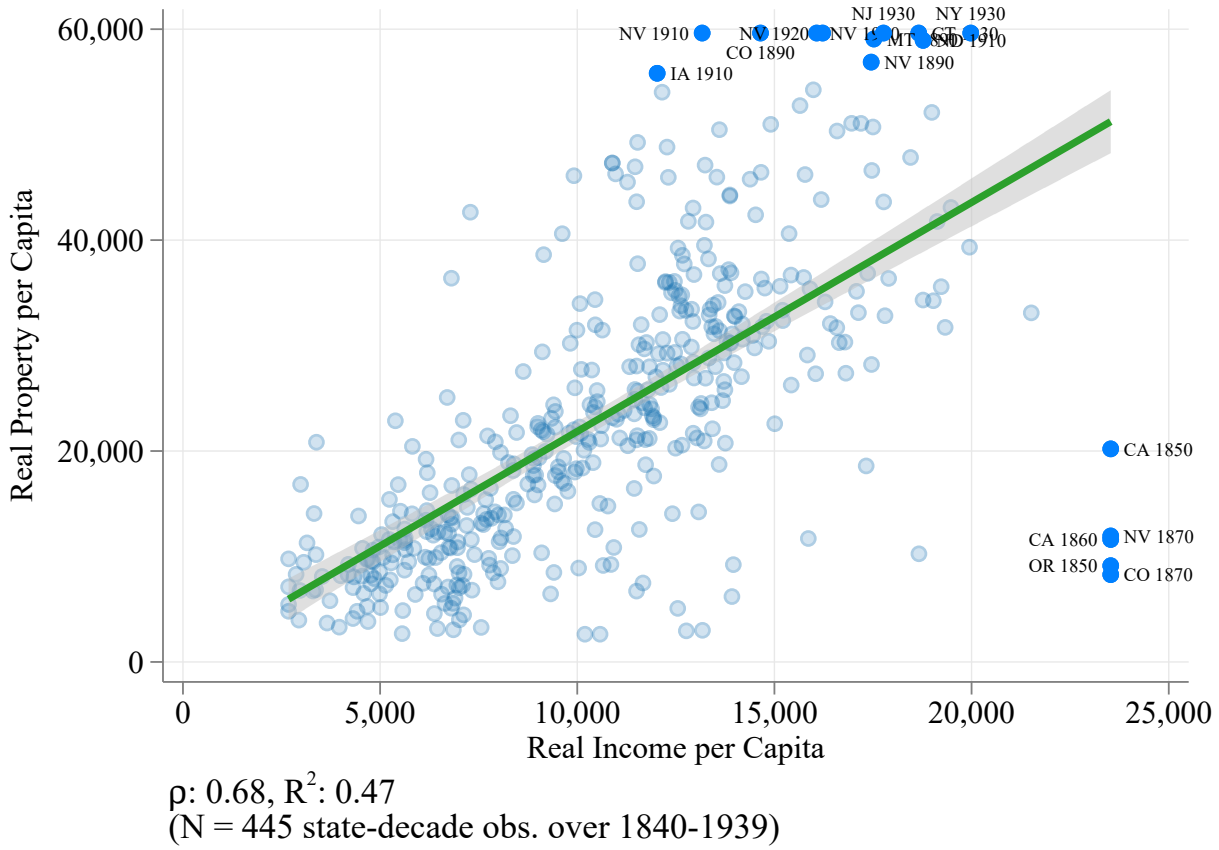
I. Additional Tables and Figures

Figure A1: Property and Income Per Capita

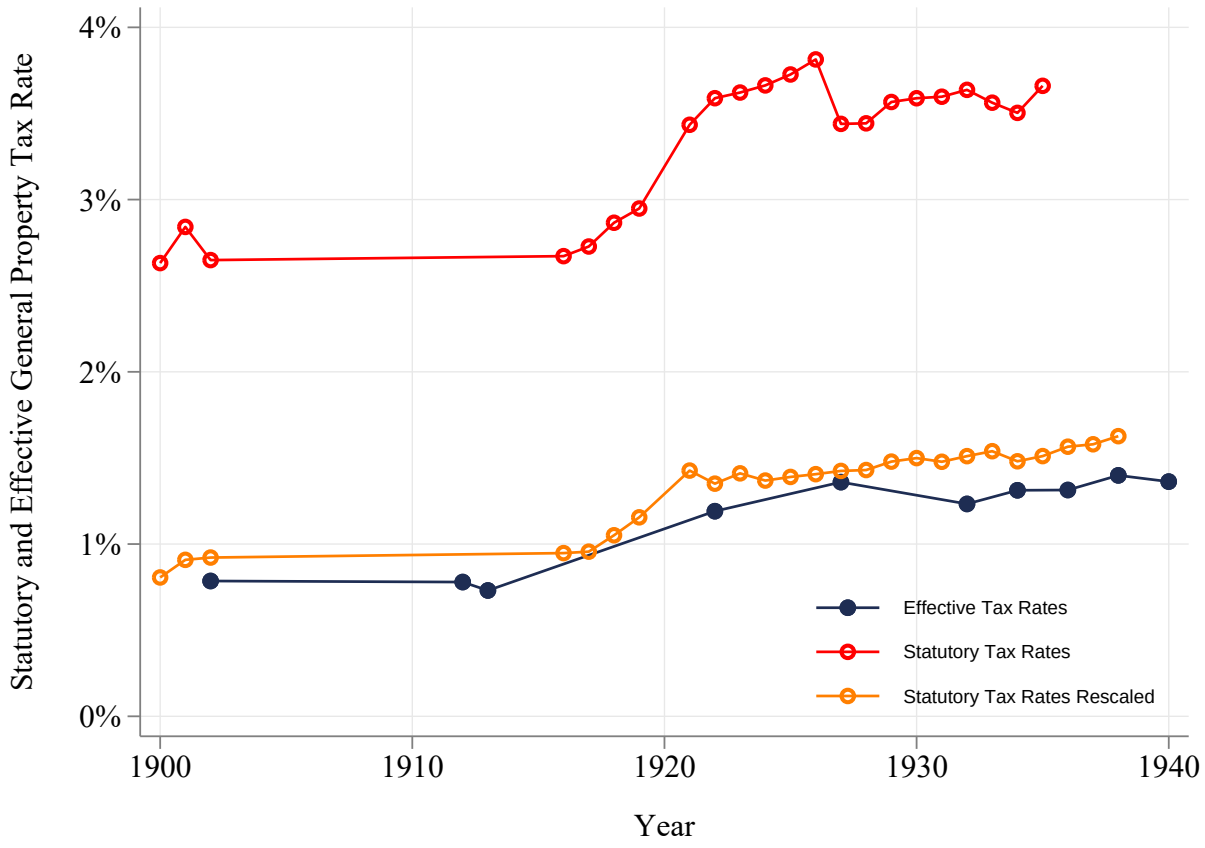


Notes: This graph plots the relationship between real property per capita and real income per capita between 1840 and 1939 at the state level. The values are winsorized at 1% and 99%.

Figure A2: State Property Tax Rates

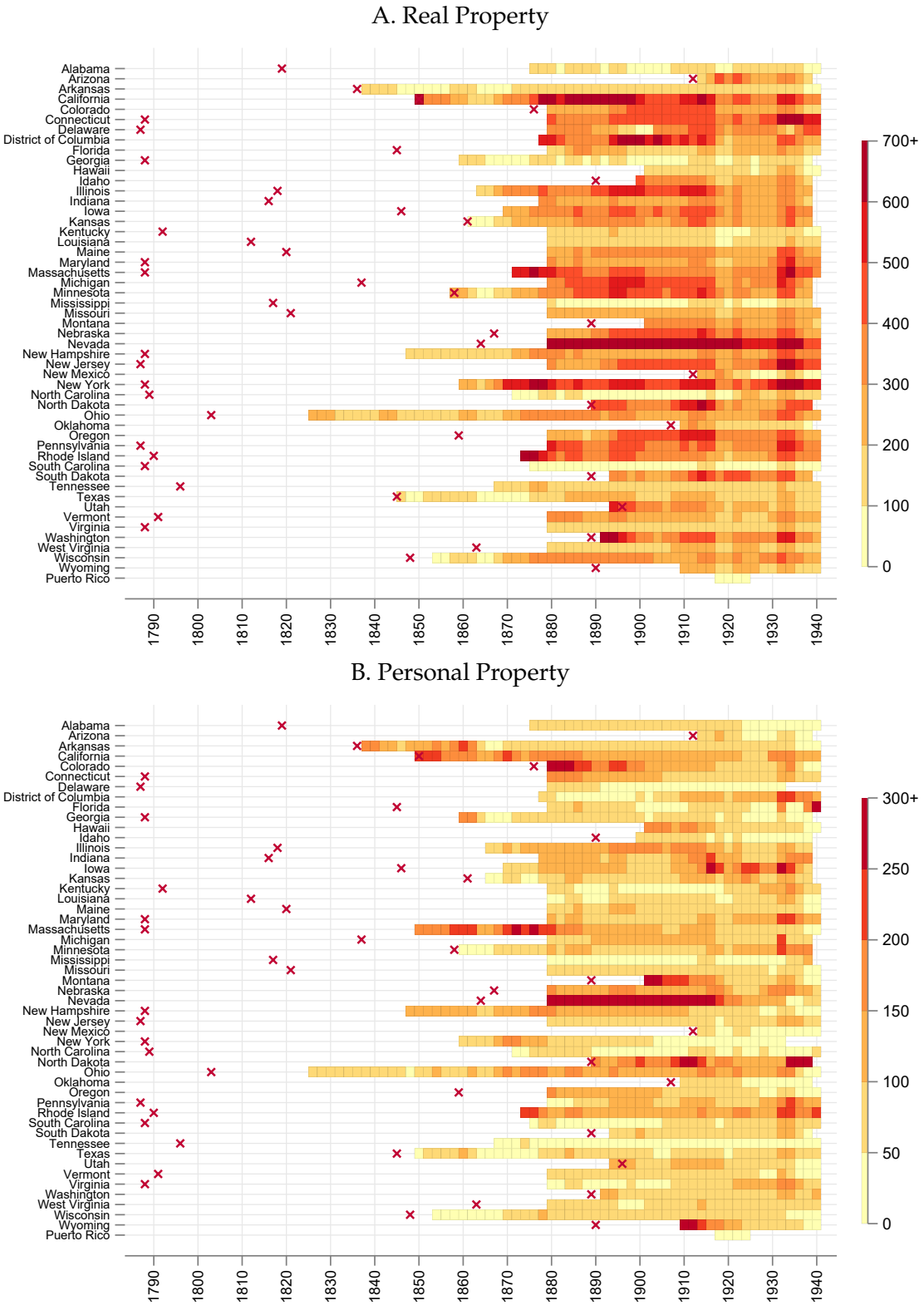
Notes: This figure shows the effective state property tax rates for all states, the District of Columbia and Puerto Rico. Values are interpolated every year at the state level and winsorized for 5th and 95th percentile. Red crosses indicate the year of the admission of the state to the Union.

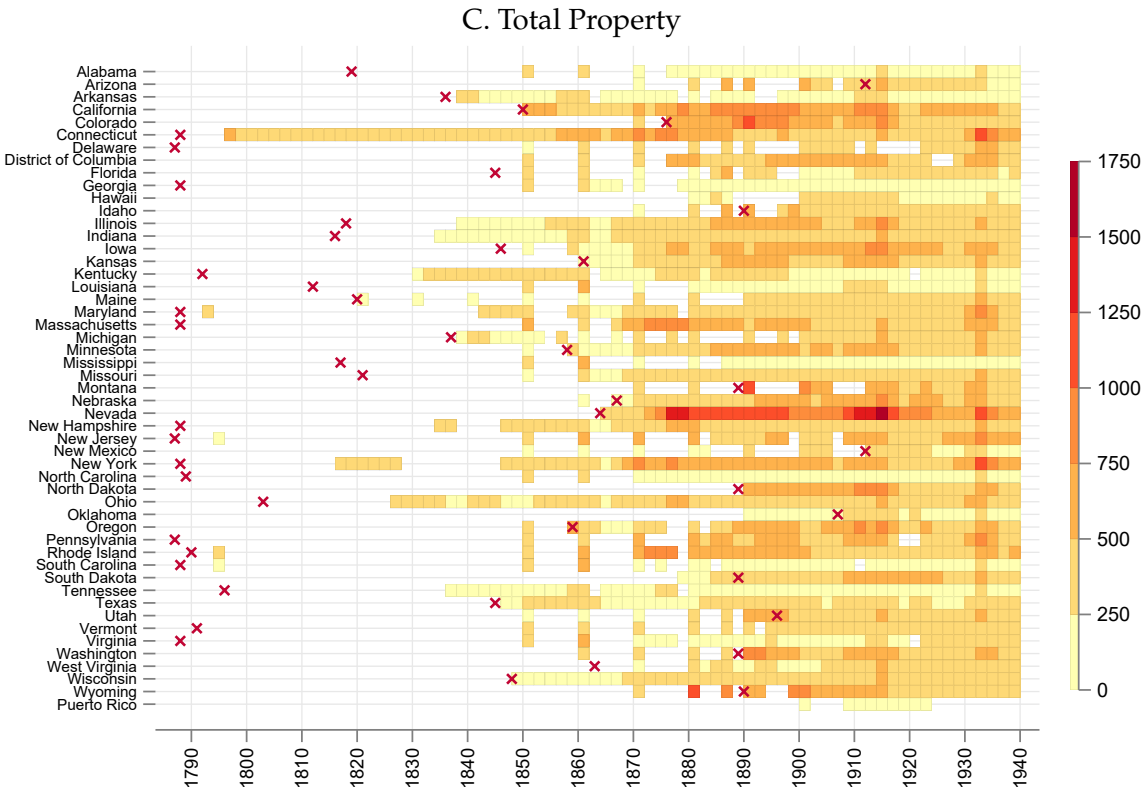
Figure A3: Total Statutory and Effective Tax Rates (%)



Notes: This graph plots the statutory tax rates on the general property tax, the statutory rate rescaled by the assessment ratio, and the effective tax rates (computed as the ratio of tax revenue to the tax base). For the data sources and construction, see Appendix III.9.

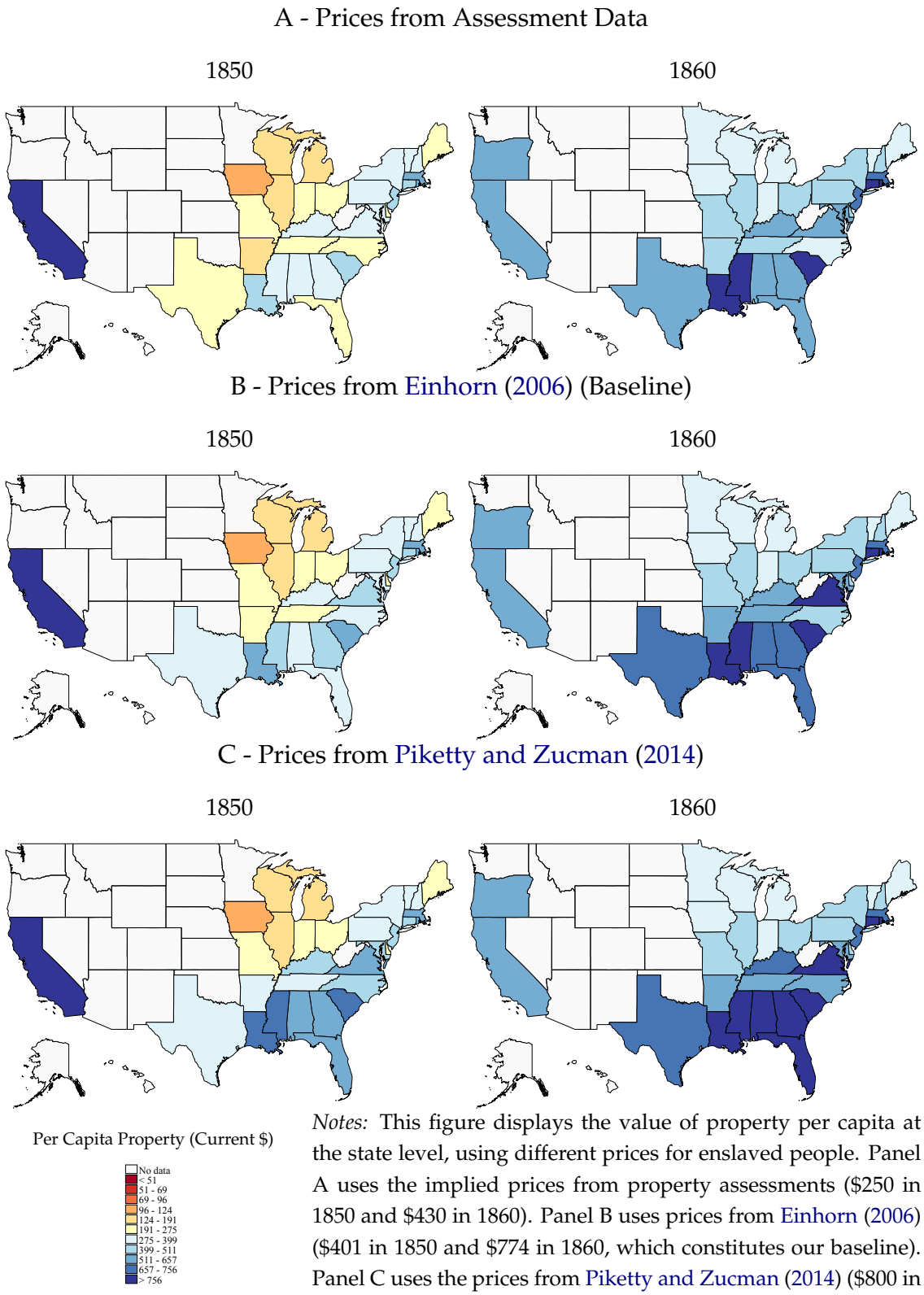
Figure A4: Real, Personal, and Total Property per Capita at the State Level as a Share of U.S. GDP (%)





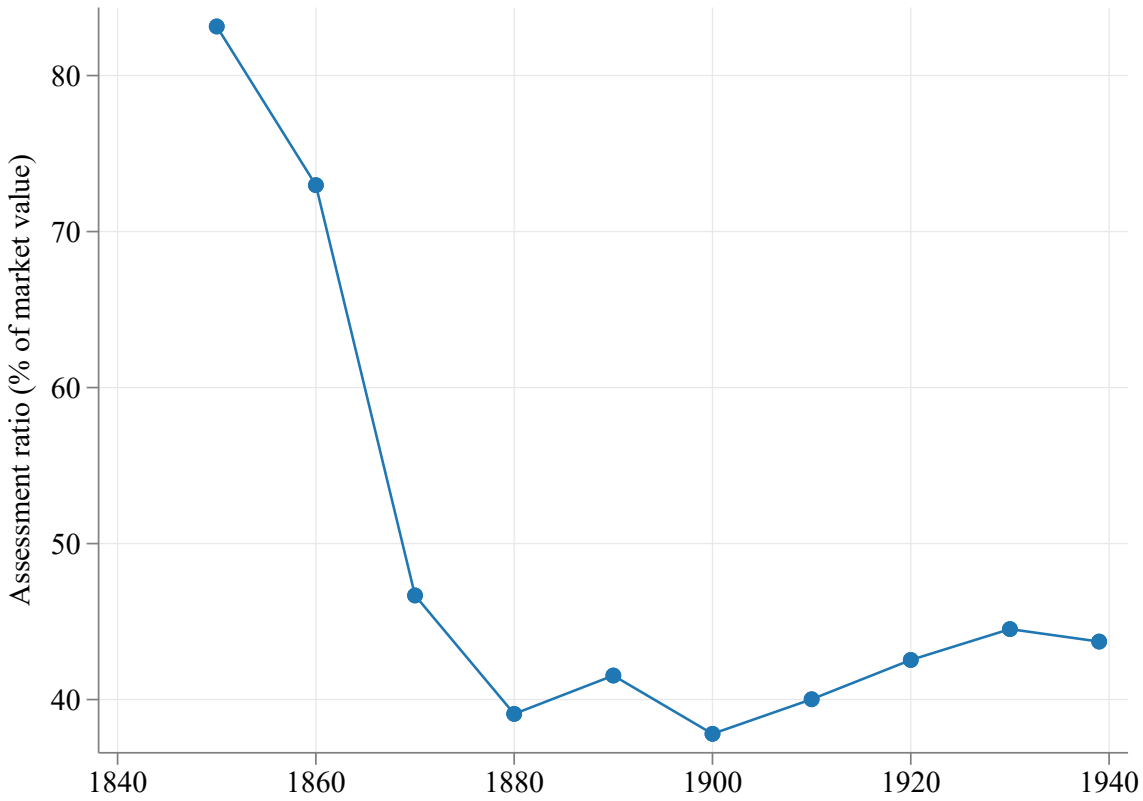
Notes: The figure shows the coverage for two major subcomponents of property: real property (in Panel A) and personal property (Panel B) for all 50 states, the District of Columbia and Puerto Rico. Panel C shows total property per capita. Real, personal, and total property are expressed as a share of national GDP per capita. Red crosses indicate the year of the admission of the state to the Union.

Figure A5: Sensitivity Analysis: State-Level Property in 1850 and 1860 using Different Prices for Enslaved People



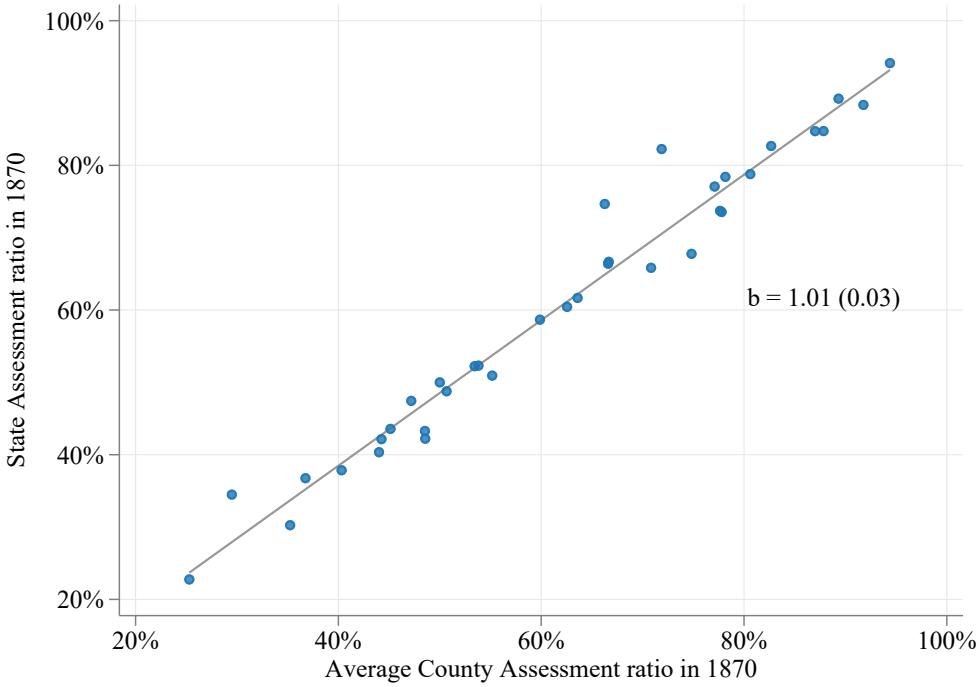
Notes: This figure displays the value of property per capita at the state level, using different prices for enslaved people. Panel A uses the implied prices from property assessments ($250 in 1850 and $430 in 1860). Panel B uses prices from Einhorn (2006) ($401 in 1850 and $774 in 1860, which constitutes our baseline). Panel C uses the prices from Piketty and Zucman (2014) ($800 in 1850 and $1000 in 1860).

Figure A6: Assessment Ratio



Notes: The figure shows the average assessment ratios over time. It is conjectured that the decline in 1850-1880 is due to the increase in importance of intangible property during industrialization (the share of personal property in the tax base remains stable). The increase after 1910 is likely due to adoption of state tax commissions and increased enforcement (average year of adoption: 1908).

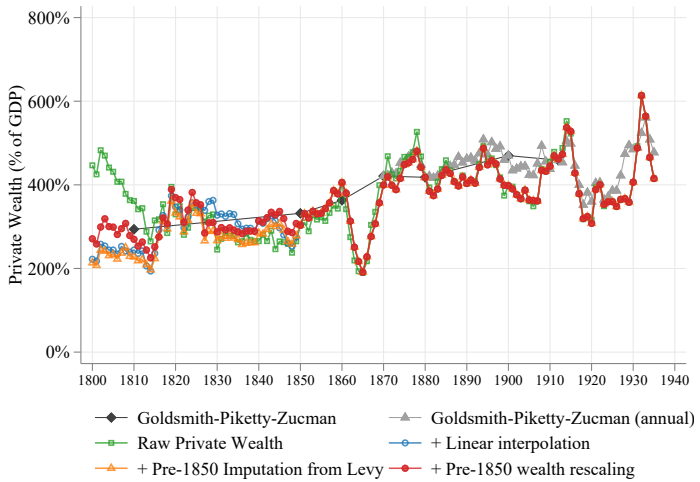
Figure A7: Comparison of State and Counties Assessment Ratios in 1870



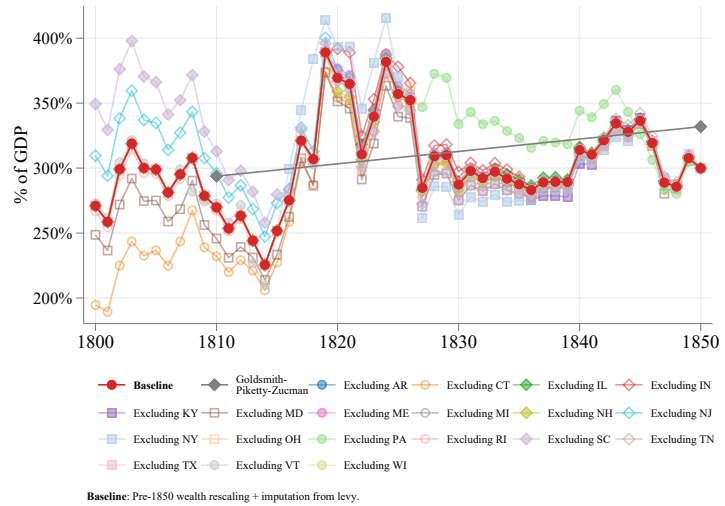
Notes: The figure compares the state assessment ratios (on the vertical axis) to the average, population-weighted assessment ratios across counties in the state. The correlation is 1.01.

Figure A8: Sensitivity of National Wealth Estimates

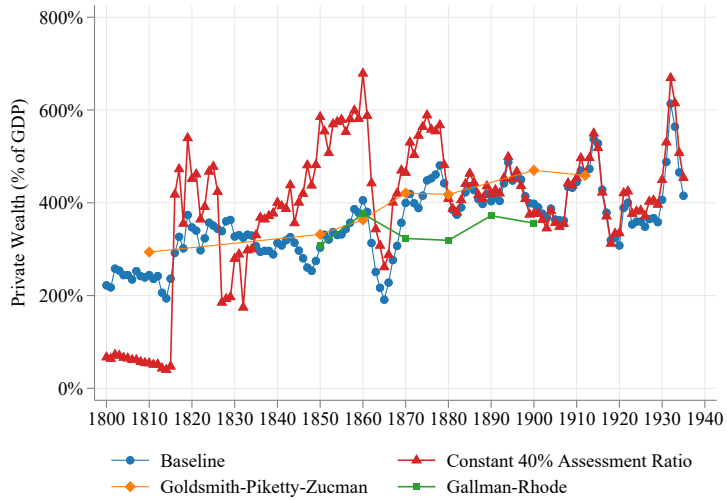
A. Comparison of Private Wealth Estimates



B. Robustness of U.S. Wealth Estimates

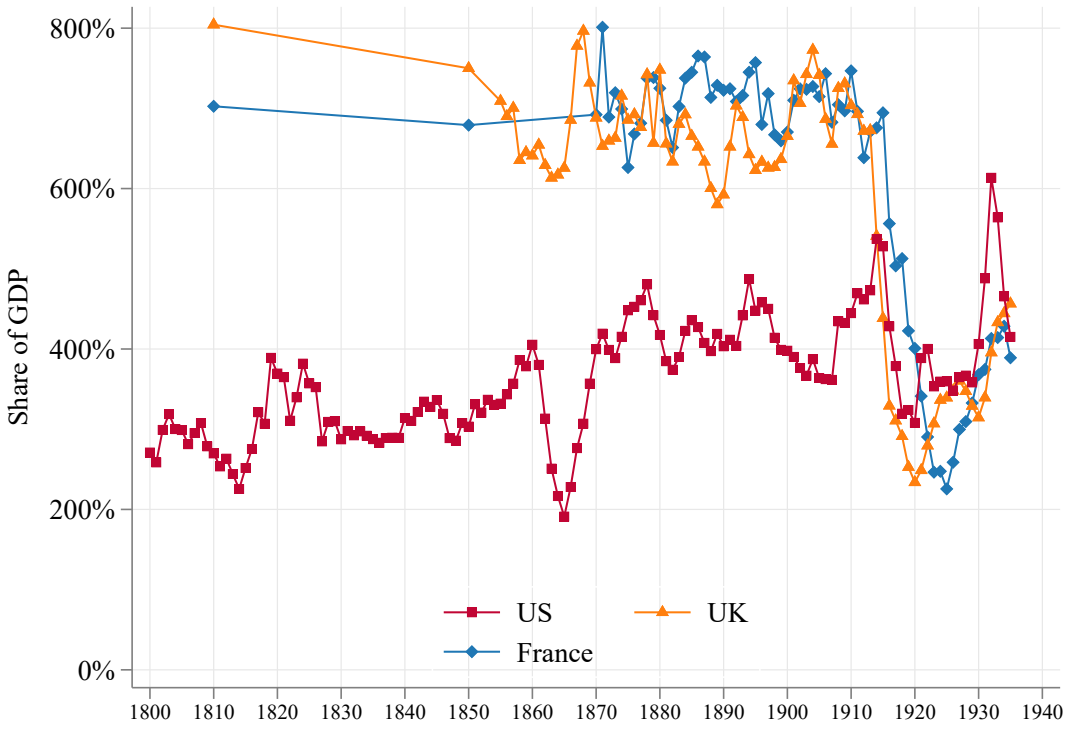


C. Sensitivity to Assessment Ratio



Notes: The figure performs the sensitivity analyses described in Appendix III.5. Panel A compares different core wealth estimates. Panel B compares the estimates' sensitivity to excluding specific states. Panel C compares our wealth estimate and those from Goldsmith (1951) and Piketty and Zucman (2014) to that obtained by assuming a constant assessment ratio equal to 40%.

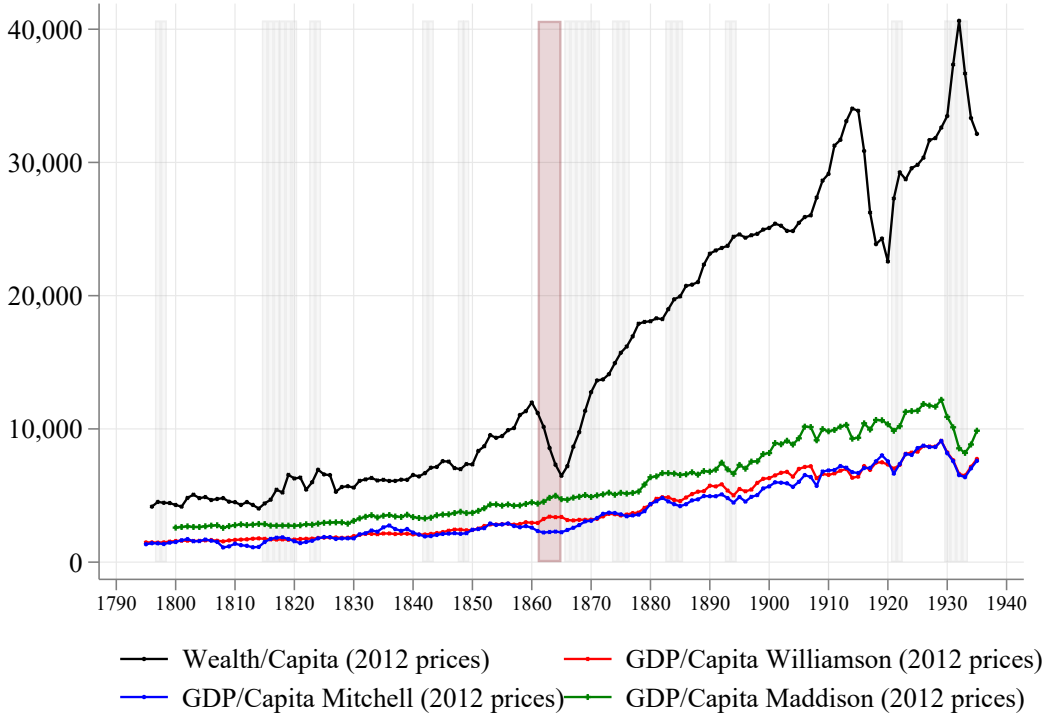
Figure A9: Wealth-to-GDP Ratios in the United States, France, and United Kingdom



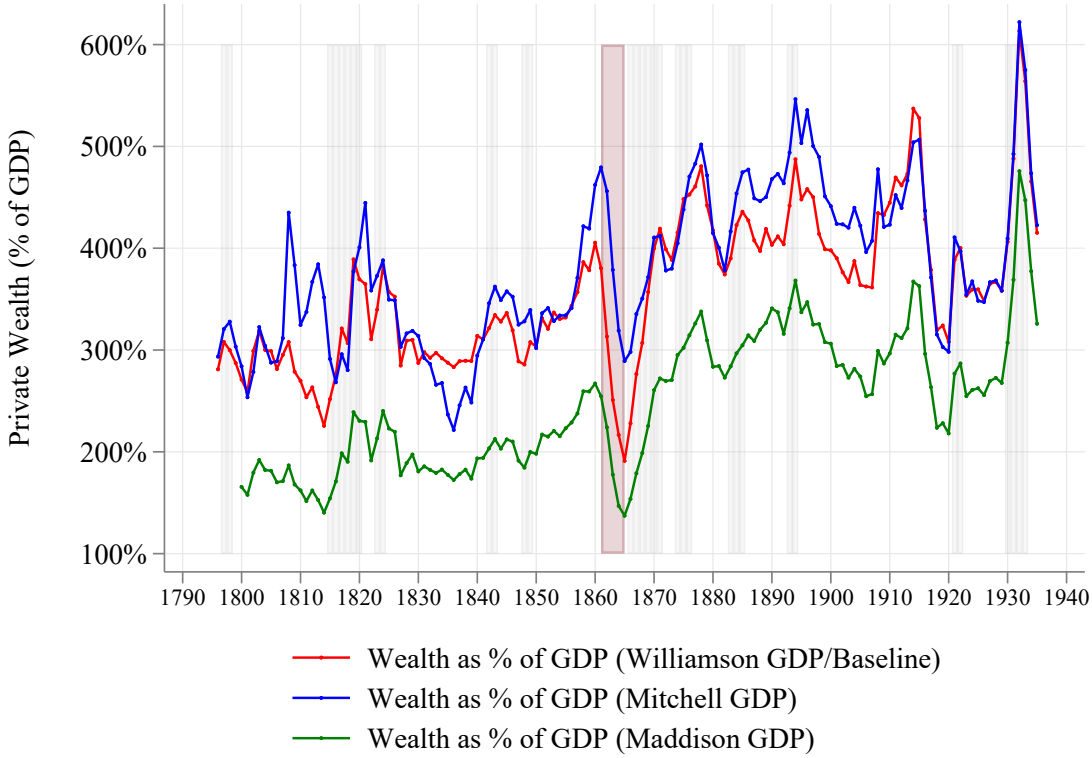
Notes: The figure shows the evolution of the private wealth-to-GDP ratio for the United States, France, and the United Kingdom. Data for the United Kingdom and France come from the World Inequality Database and Piketty (2014).

Figure A10: Sensitivity to Alternative GDP Series

A. National Wealth and GDP estimates

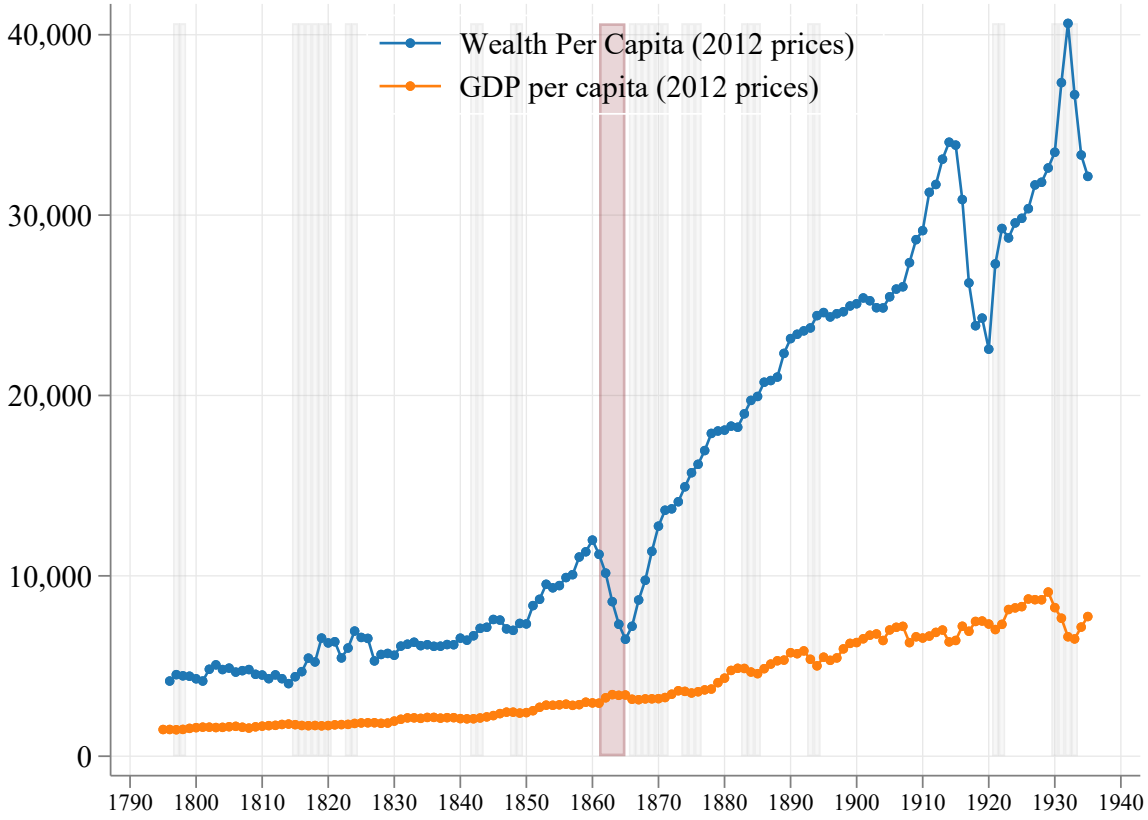


B. Sensitivity of the Wealth-to-GDP Ratio to Different GDP estimates



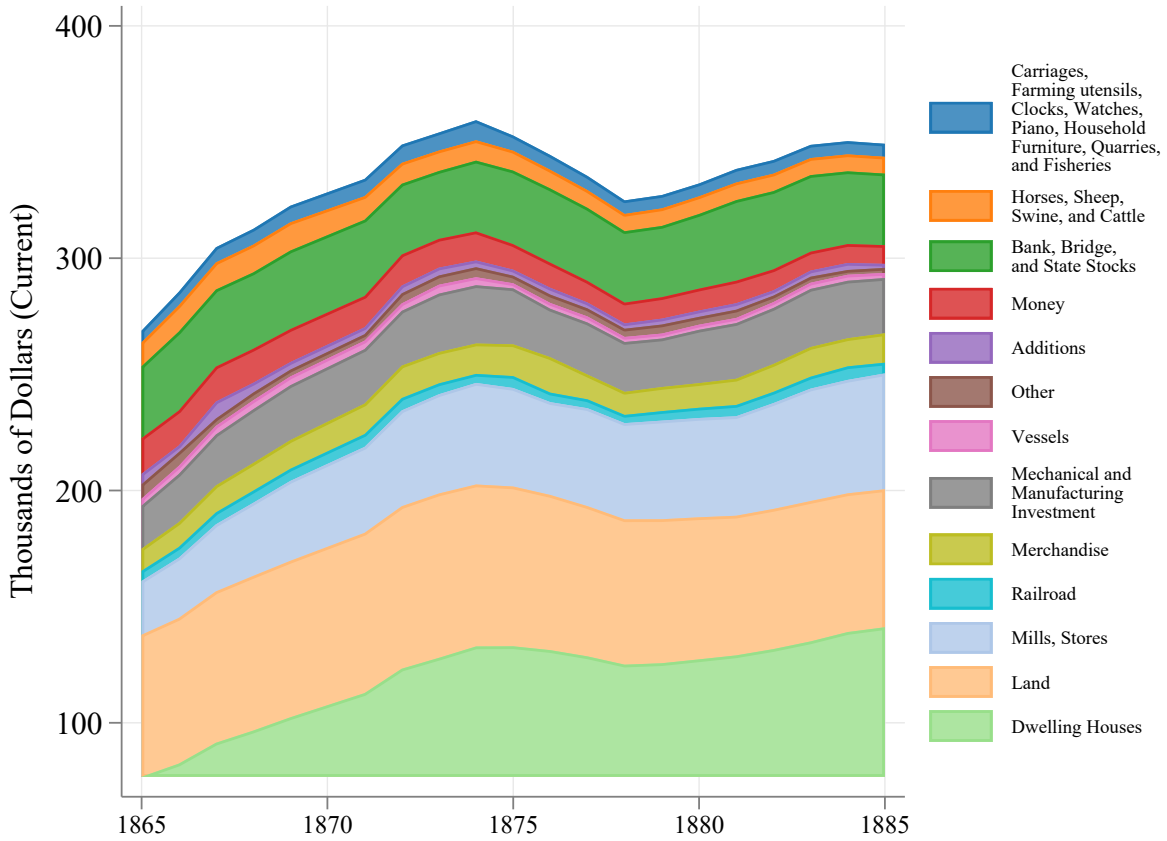
Notes: The figure explores different existing GDP estimates. Panel A shows our wealth estimate and compares it to different GDP estimates from Johnston and Williamson (2020) (in red), Mitchell (2007) (in blue), and Bolt and Van Zanden (2020) (in green). Panel B displays our estimated national wealth as a share of GDP, where the GDP measure is taken from the three different sources.

Figure A11: Private Wealth & GDP Per Capita: U.S. (1795-1935)



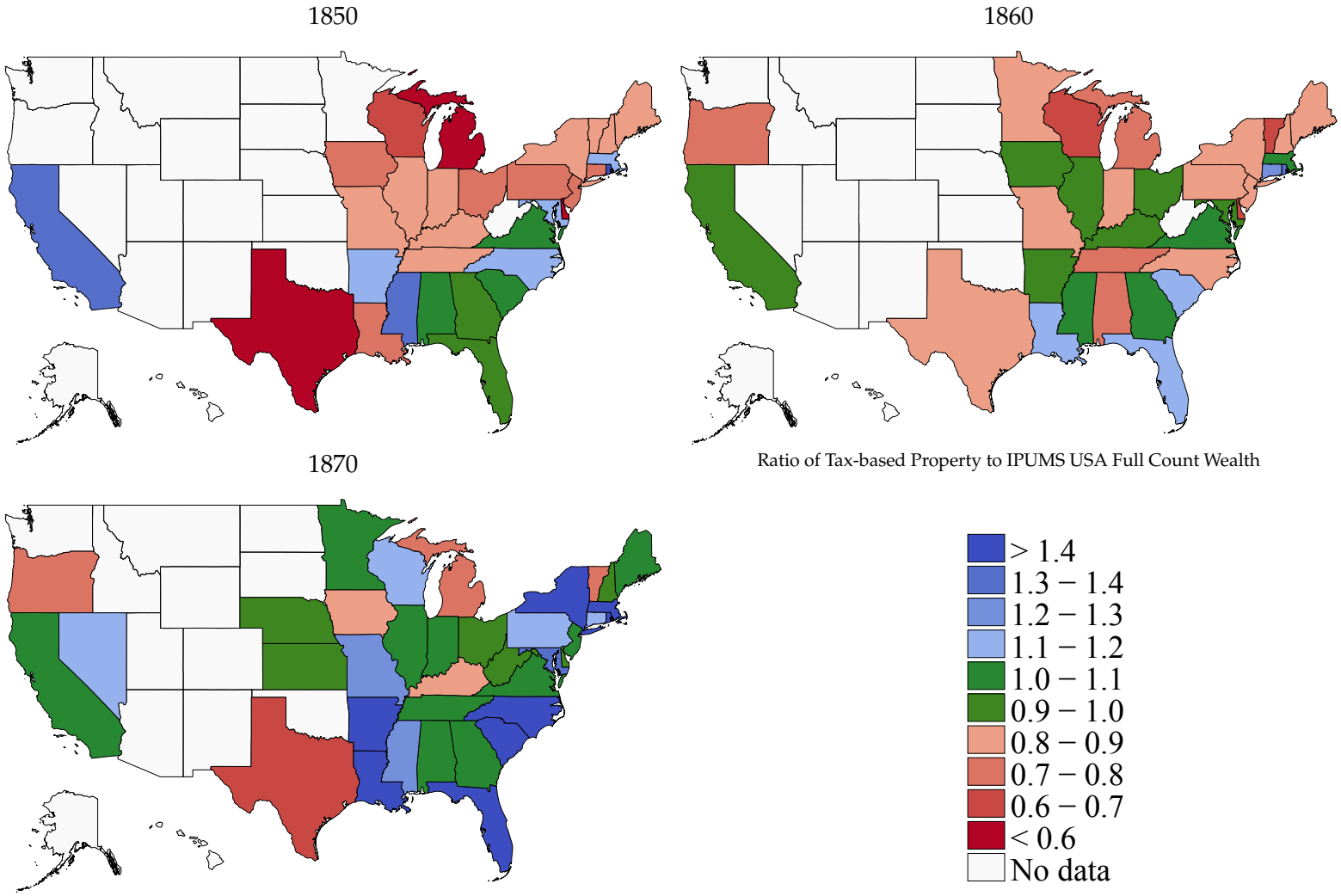
Notes: The figure displays both Wealth per capita (the numerator) and GDP per capita (the denominator) over the same period. Grey areas indicate recessions; the red shaded area indicates the Civil War.

Figure A12: Composition of Private Property in Connecticut



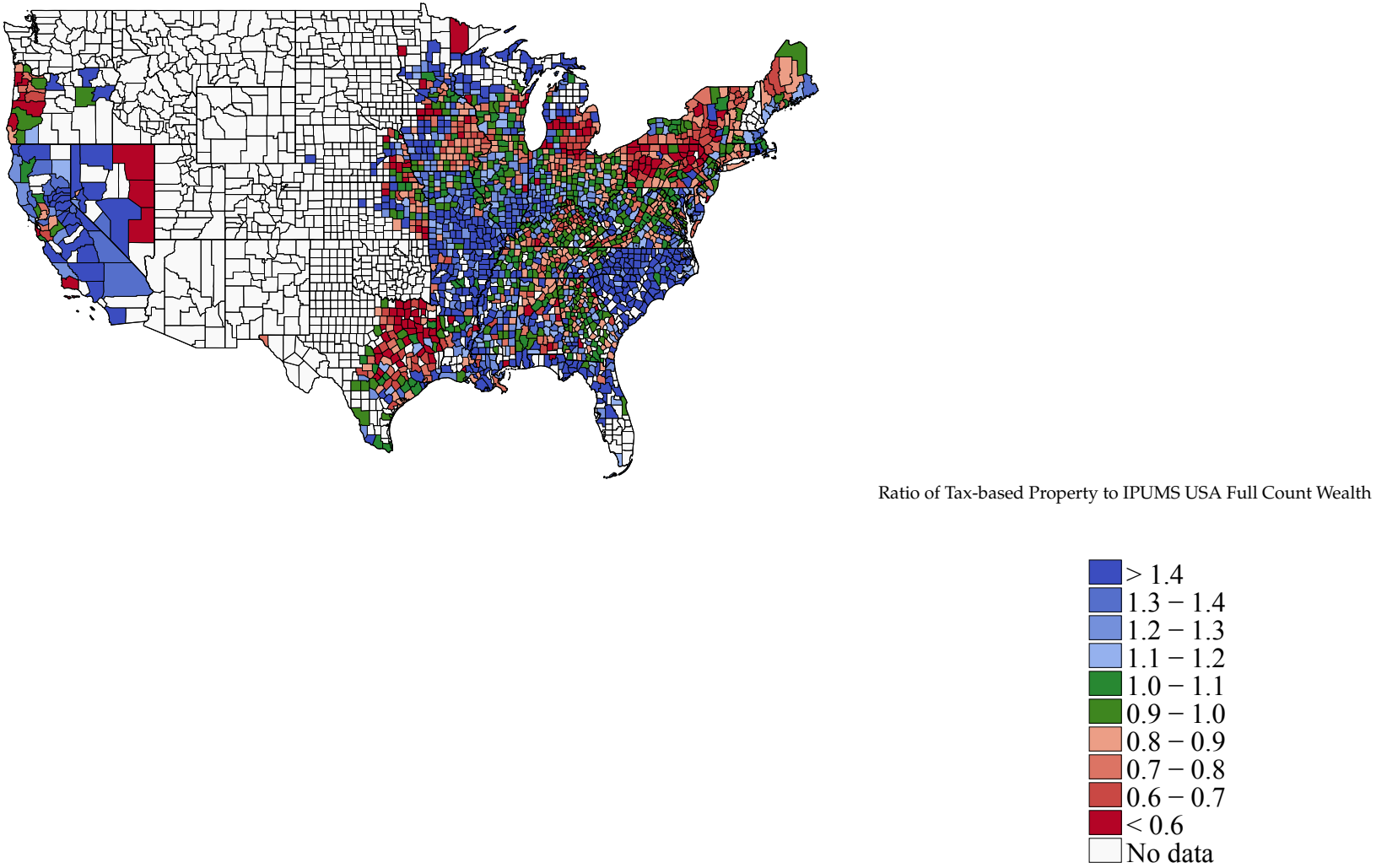
Notes: This figure shows the decomposition of private property subject to the general property tax in Connecticut. The data comes from the *Grand List of Connecticut* as presented by Ely (1888, pp. 503–506).

Figure A13: Comparison to the IPUMS USA Full Count Wealth Measure: Ratio of Tax-based Property and IPUMS USA Full Count Wealth Measure at the State Level 1850-1870



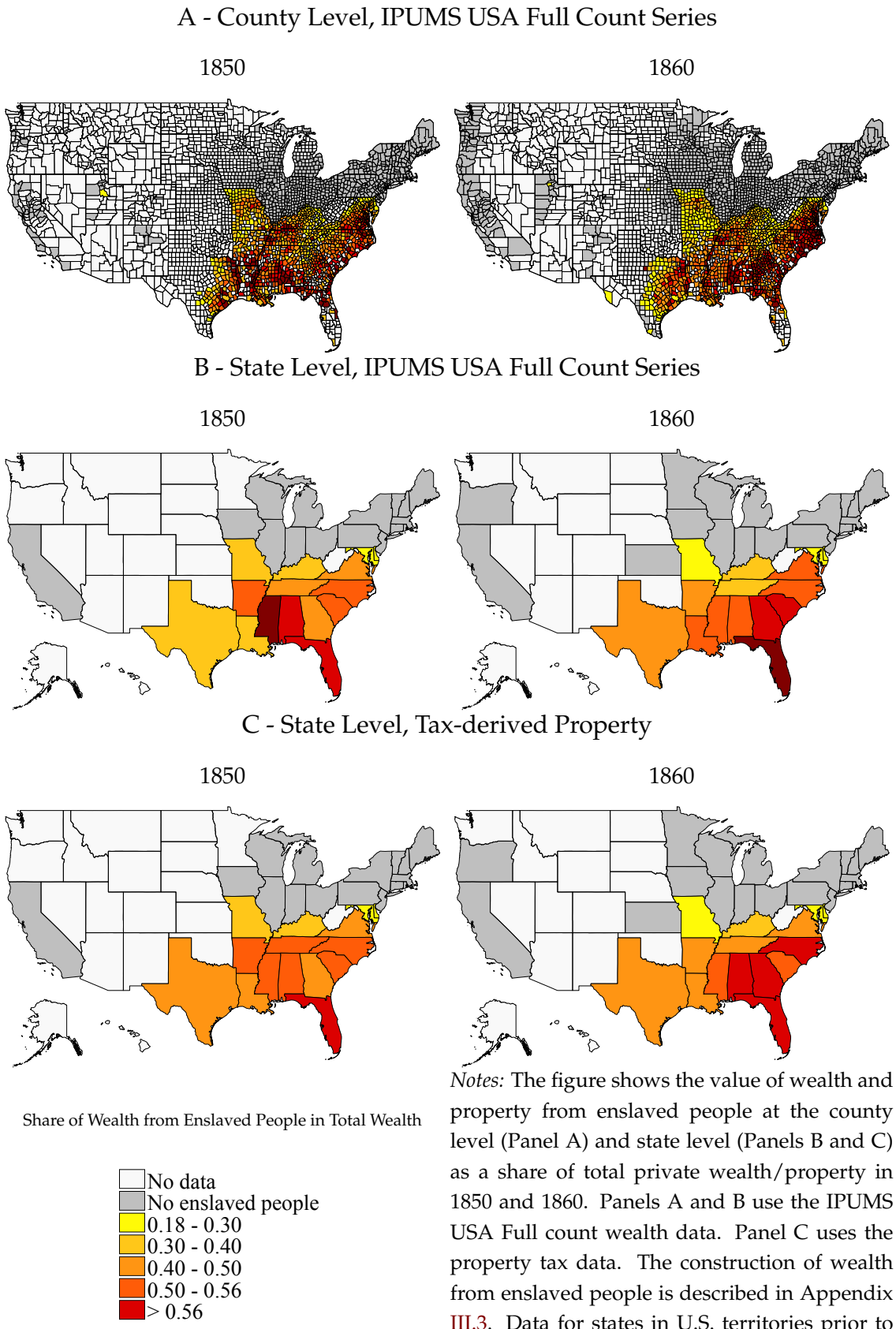
Notes: The figure shows the ratio of the tax-based property measure to the IPUMS USA Full Count wealth measure at the state level, for 1850, 1860, and 1870. Data for states in U.S. territories prior to admission in the Union are not displayed.

Figure A14: Comparison to the IPUMS USA Full Count Wealth Measures: Ratio of Tax-based Property and IPUMS USA Full Count Wealth Measures at the County Level in 1870



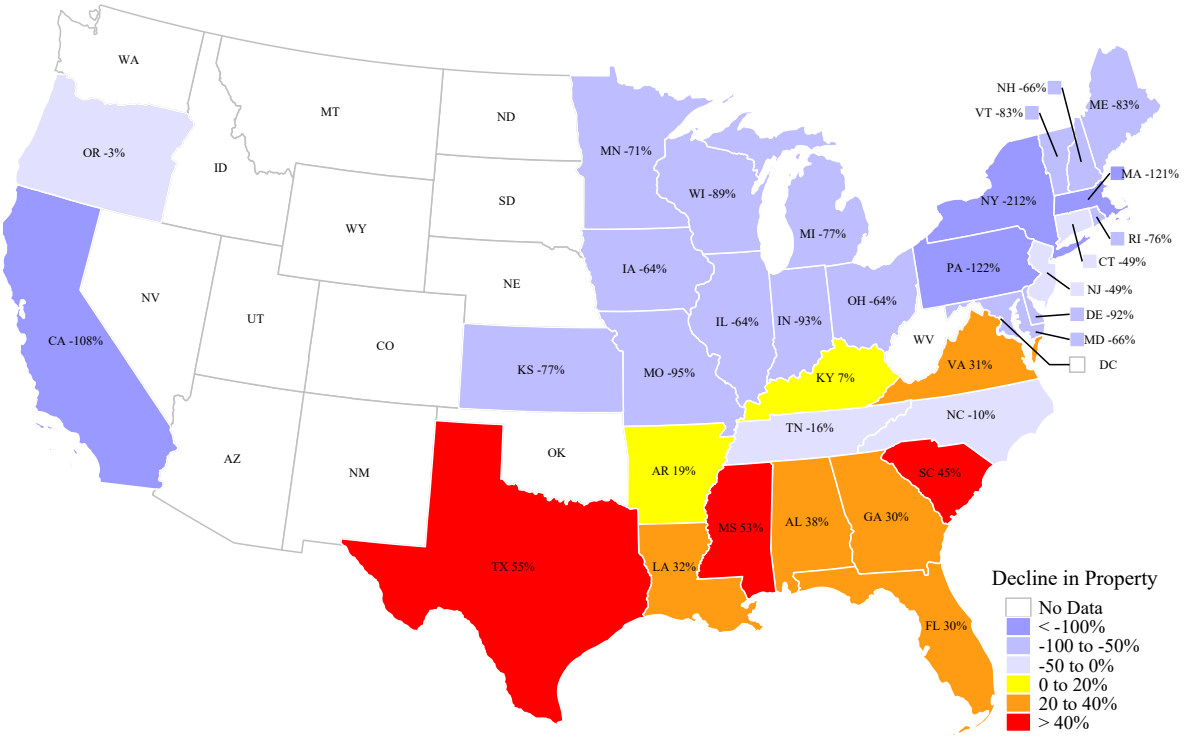
Notes: The figure shows the ratio of the tax-based to the IPUMS USA Full Count wealth measure at the county level in 1870.

Figure A15: Comparison of Data Sources: Share of Wealth and Property from Enslaved People



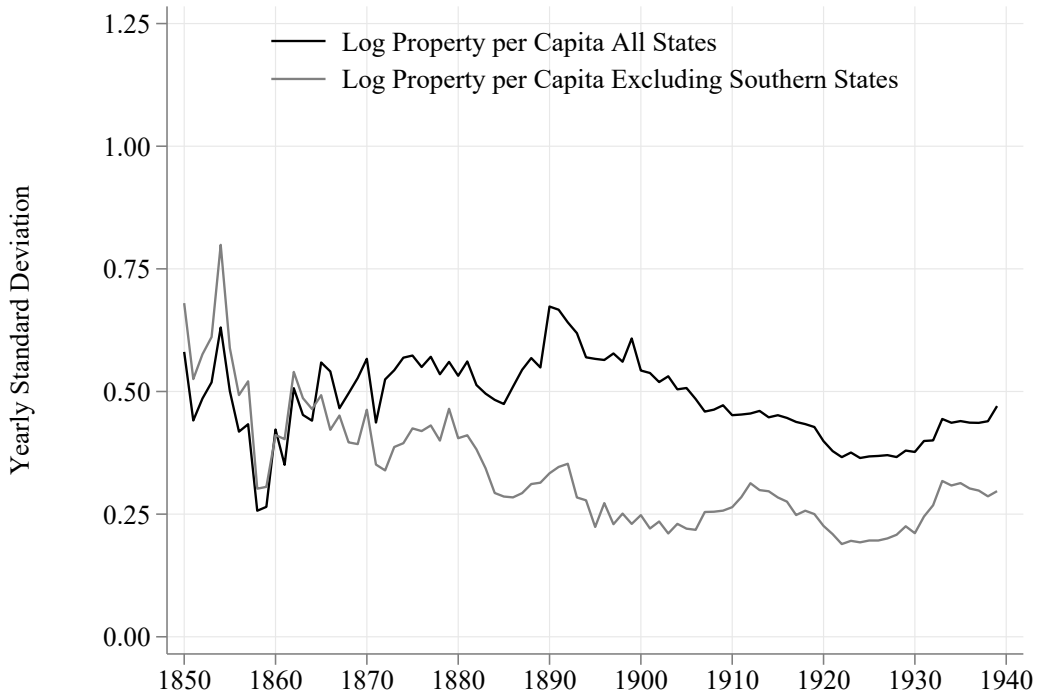
Notes: The figure shows the value of wealth and property from enslaved people at the county level (Panel A) and state level (Panels B and C) as a share of total private wealth/property in 1850 and 1860. Panels A and B use the IPUMS USA Full count wealth data. Panel C uses the property tax data. The construction of wealth from enslaved people is described in Appendix III.3. Data for states in U.S. territories prior to admission in the Union are not displayed.

Figure A16: Decline in Property per Capita from 1860 to 1870 beyond Enslaved Property



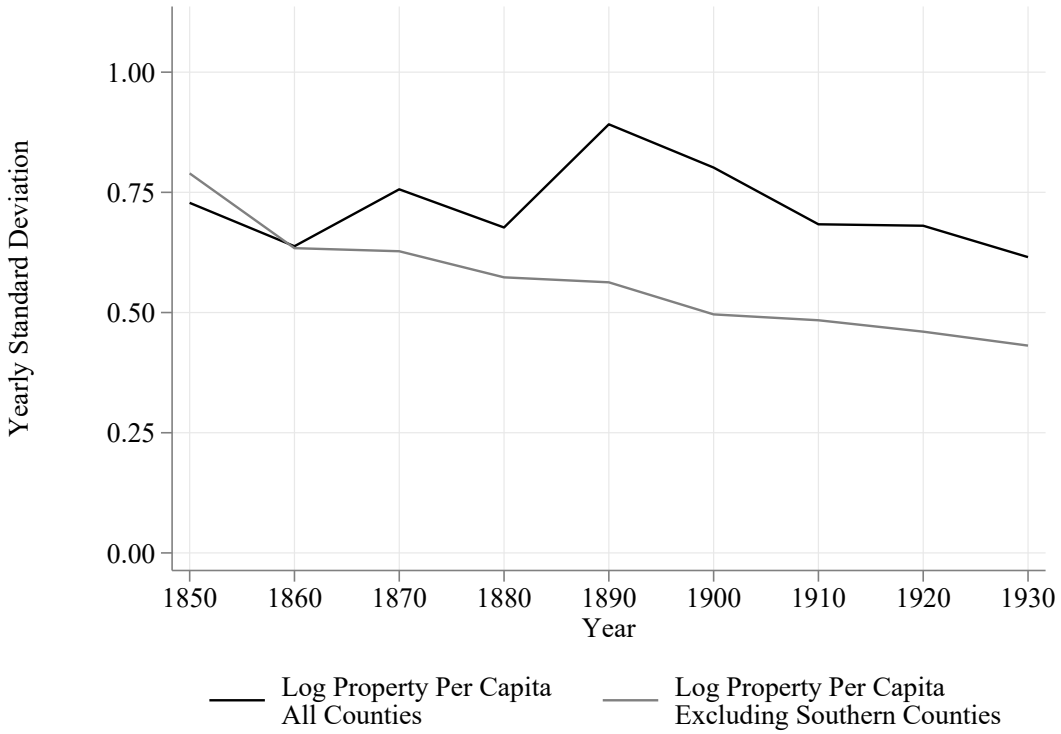
Notes: The figure displays the percent decline in per capita property above and beyond the one following the freeing of the enslaved property. A value of 0 means the property per capita in 1870 is equal to the property per capita in 1860 excluding enslaved property, i.e., $1 - \frac{W_{i,1870}}{(1-S_{i,1860})W_{i,1860}}$, where i is the state, $W_{i,t}$ the total property in the state in year t, and $S_{i,1860}$ the share of enslaved property in total property in 1860. Enslaved people are always counted in the population total.

Figure A17: Dispersion in Property per Capita across States over Time



Notes: The figure plots the yearly standard deviation of property per capita across states for all states (solid black line) and excluding Southern states (grey line).

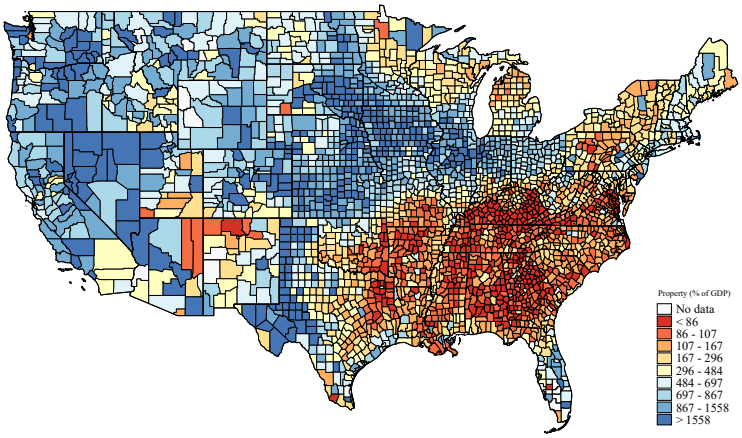
Figure A18: Dispersion in Property across Counties over Time



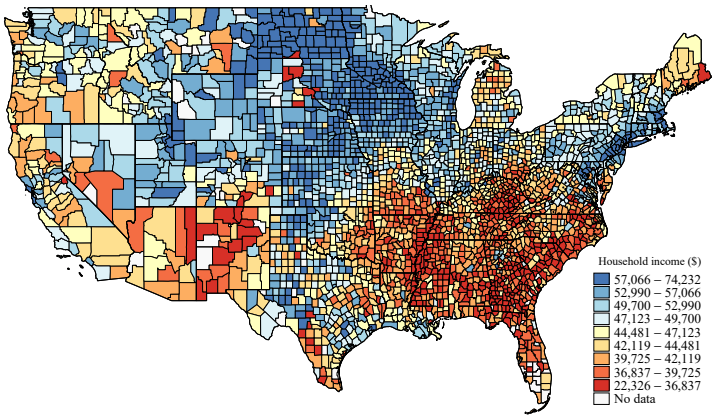
Notes: The figure displays the yearly standard deviation of property per capita across counties for all counties (solid black line) and excluding Southern counties (grey line).

Figure A19: County Level Property in 1920 and Income in 2014 (Opportunity Atlas Data)

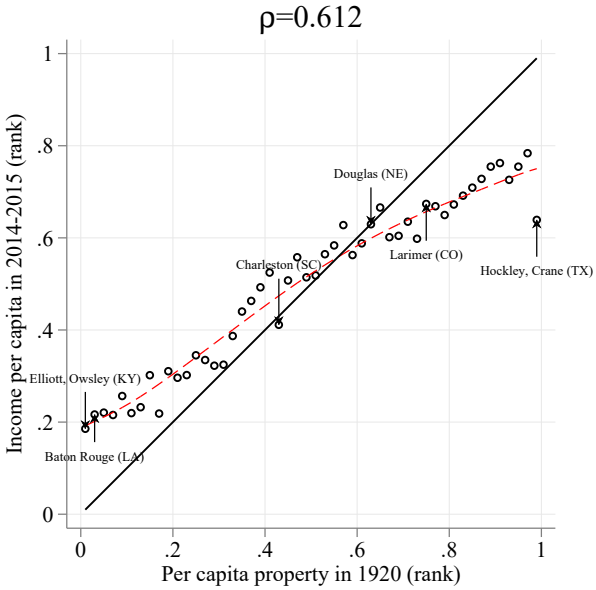
A. Property per Capita in 1920



B. Income in 2014 (Opportunity Atlas Data)



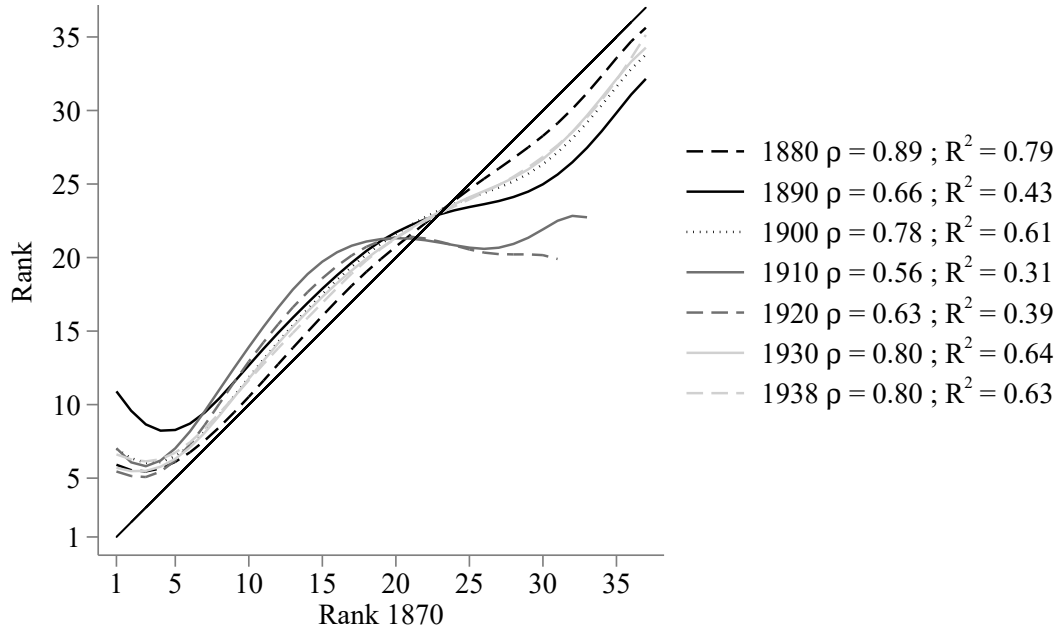
C. Persistence of Property and Income



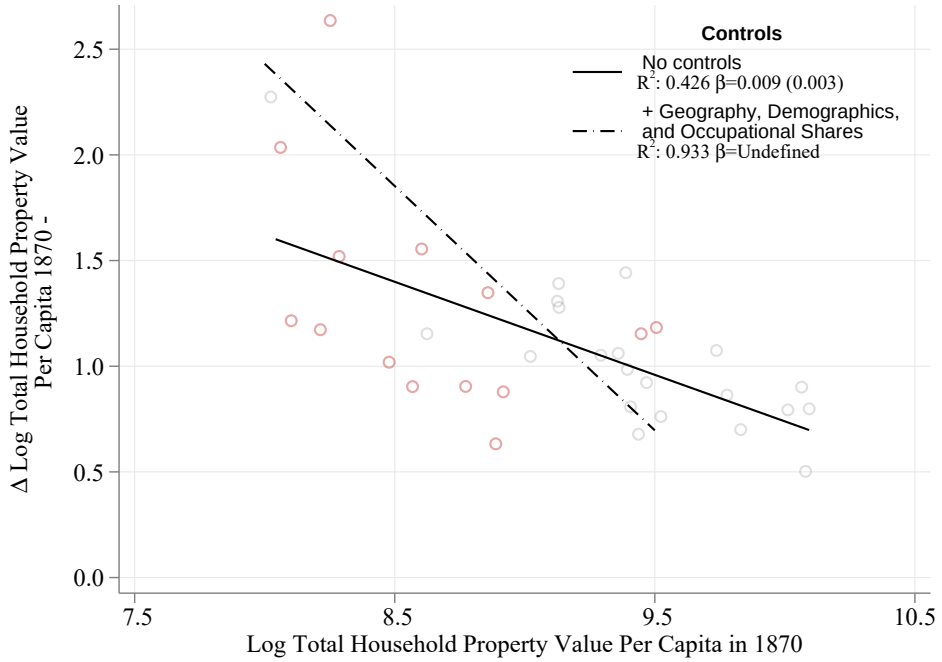
Notes: Panel A shows county property per capita as a share of national GDP per capita in 1920; Panel B depicts average annual household income in 2014 and 2015 for children whose mothers grew up in the United States, with data from the Opportunity Atlas. Panel C shows the rank-rank correlation between property per capita in 1920 and Income in 2014/15.

Figure A20: State Persistence and Convergence

A. State Persistence

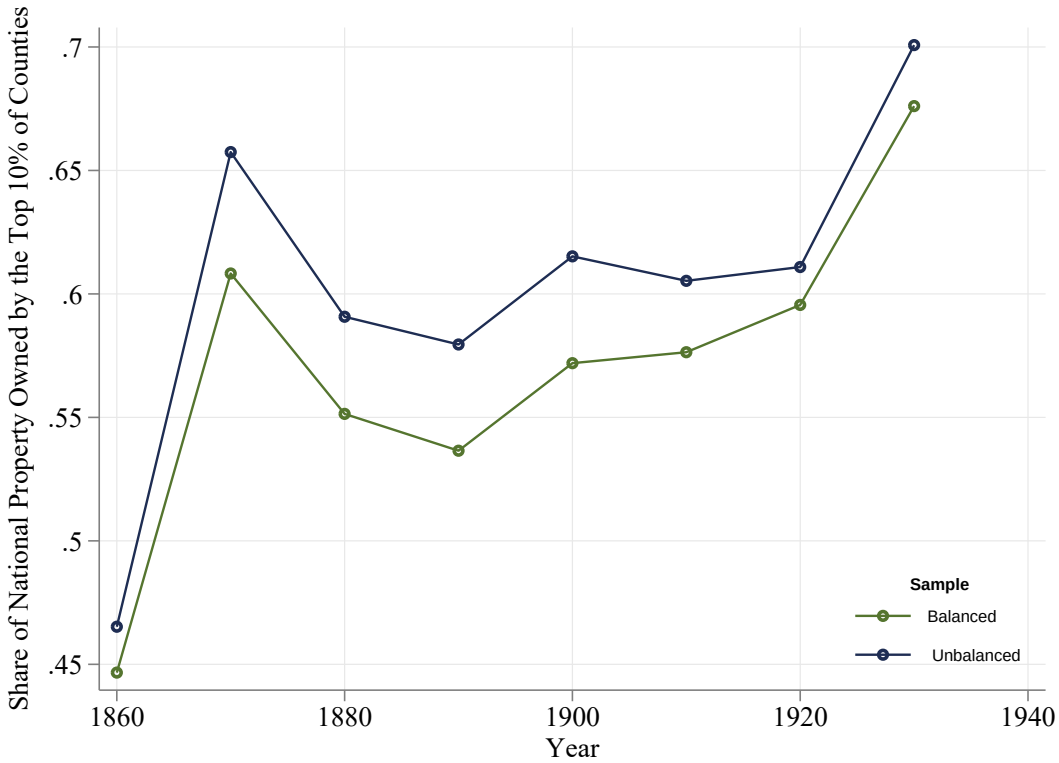


B. β - Convergence - Property per Capita from 1870



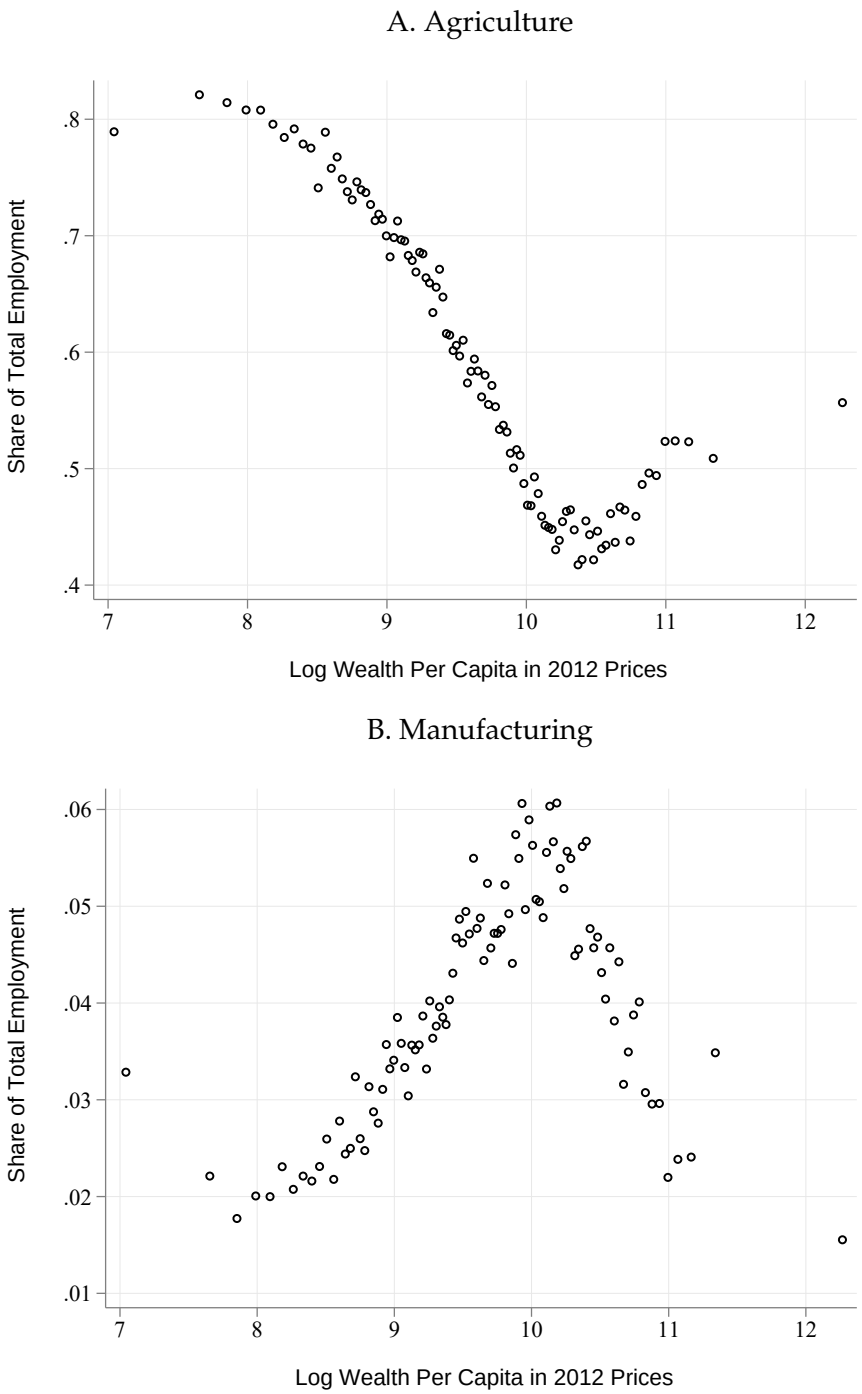
Notes: Panel A shows the rank-rank correlation of state-level property per capita for different years (ρ) and the R^2 for each year t of a simple regression of state-level property capita in year t on state level property per capita in 1870. Panel B shows the relationship between the growth rate of state level property per capita between 1870 and 1930 and initial property per capita in 1870, without controls (solid line) or adding controls for geography, demographics, and occupational shares (dashed line). Southern states are represented in red.

Figure A21: Evolution of Spatial Inequality across Counties Based on Share of National Property Owned by the Top 10%



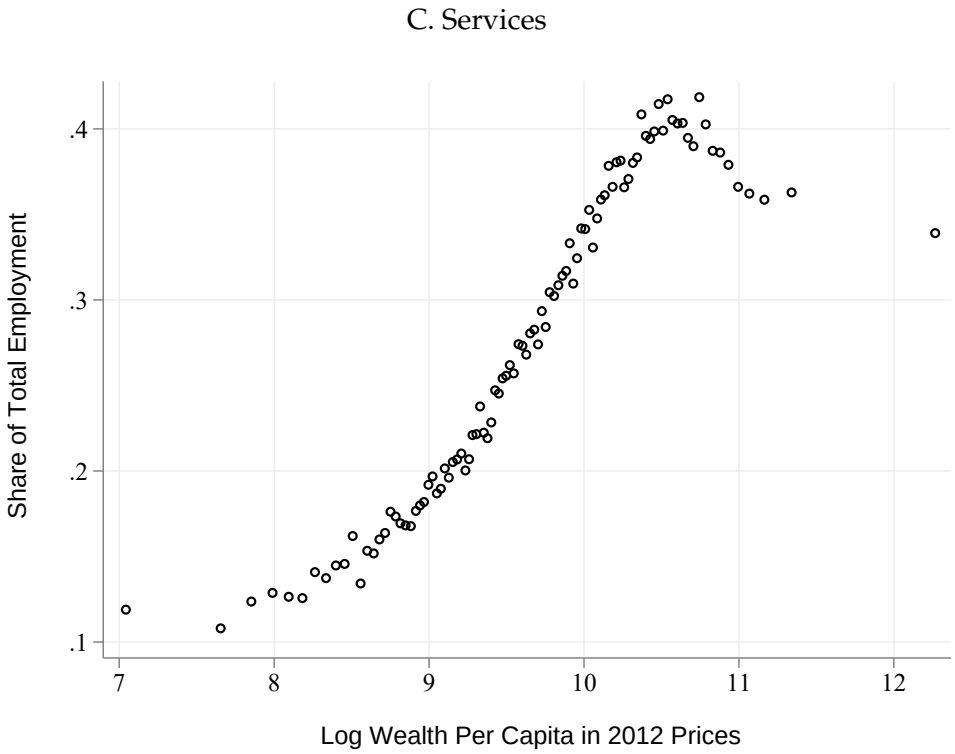
Notes: The figure displays the evolution of the share of national property owned by the top 10% wealthiest counties between 1860 and 1930. The balanced panel only keeps counties for which we have values for all decades between 1860 and 1930. The unbalanced panel keeps all counties.

Figure A22: Structural Transformation of Economic Sectors with Structural Transformation Over the Course of Development: Occupational Shares in Total Employment and Log Property Per Capita by County



Notes: Panel A displays the relationship between the share of agriculture in the total employment in the county and the log of the county property per capita expressed in 2012 U.S. dollars for the period between 1860 and 1940. Panel B displays the relationship between the share of manufacturing industry in the total employment in the county and the log of the county property per capita expressed in 2012 U.S. dollars. Counties are ranked by this measure of log of property per capita in 100 bins pooling all years.

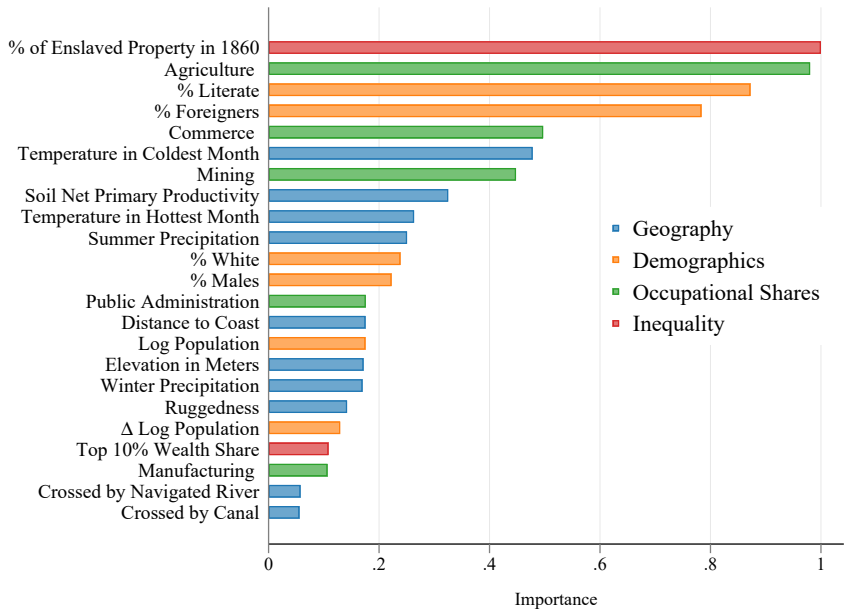
Figure A22: Structural Transformation Over the Course of Development: Occupational Shares in Total Employment and Log Property Per Capita by County



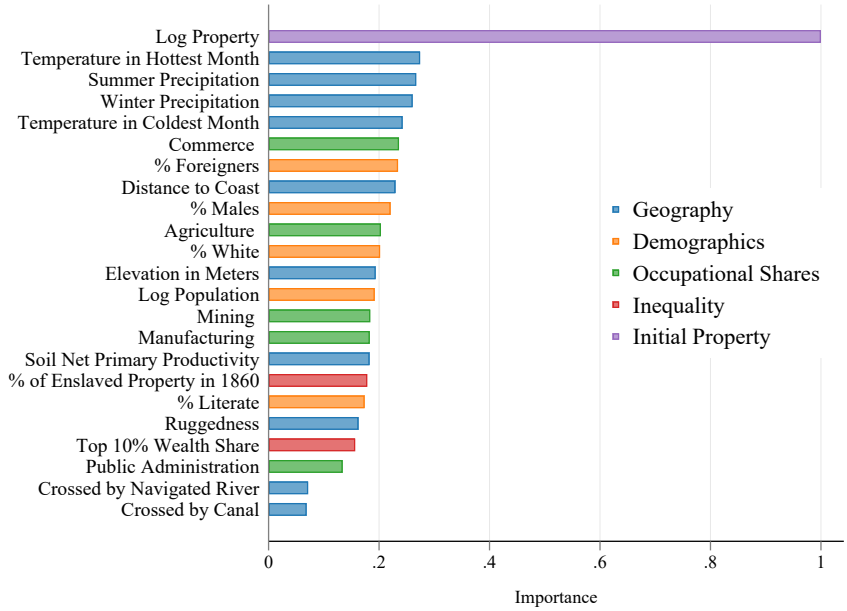
Notes: Panel C presents the relationship between the share of services in the total employment in the county and the log of the county property per capita expressed in 2012 U.S. dollars for the period between 1860 and 1940. The service sector is built by adding the fraction of people working in business, retail, finance, transport and public administration sectors. Counties are ranked by this measure of log of property per capita in 100 bins pooling all years.

Figure A23: Variable Importance Plot Using Random Forest Algorithm

A. Property Value per Capita in 1870



B. 60-year Growth in Property per Capita (1870 to 1930)

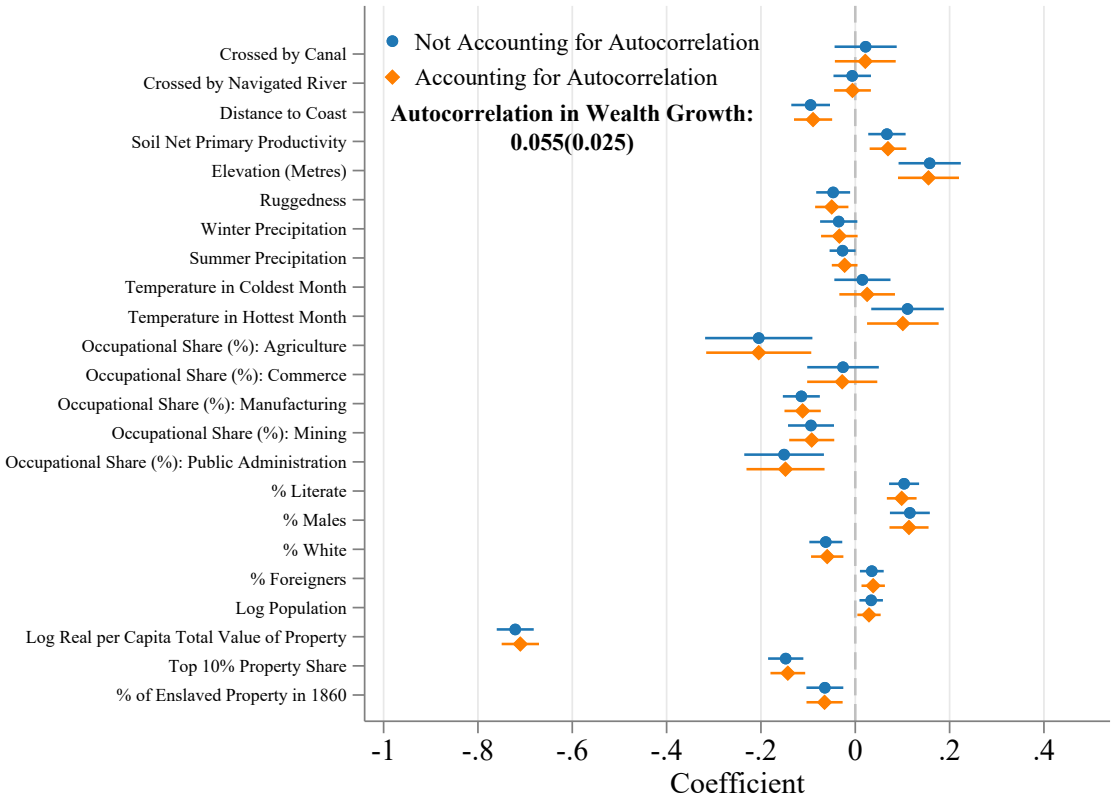


Notes: The figure displays the ranking of variables by importance based on their explanatory power for the value of property per capita in 1870 (Panel A) and conditional growth between 1870 and 1930 (Panel B). The importance ranking is obtained using a random forest approach. We depict the "Mean Decrease in Impurity," which is derived by summing the improvements in the objective function (RMSE) for each variable, given in the splitting criterion over all internal nodes of a tree and across all trees in the forest, normalized by that of the variable with the highest importance. More specifically, we grow 1000 trees with a training sample (40% of all observations). For each tree, we do a bagging (i.e., using only a random subset of observations to reduce overfitting). The remaining observations for each tree constitute our out-of-bag samples. After growing each tree, we pass along the out-of-bag samples down the tree, and at each split of the tree, the improvement in RMSE is recorded and attributed to the variable used for the split.

Figure A24: Correlation between Top 10% Wealth Share in 1870 and Share of Enslaved Property in 1860 at the County Level

Notes: This figure displays the correlation between the share of enslaved property in 1860 and the top 10% share of total wealth in 1870. Top 10% wealth share measures the fraction of total wealth owned by the top 10% of wealthiest individuals in the county, measured in the Census data. Counties are ranked by share of the total wealth owned by the top 10% in 100 bins.

Figure A25: Controlling for Spatial Auto-Correlation, Baseline vs Spatial Auto-Regressive Model



Notes: This figure reproduces our convergence analysis in our baseline model, and when taking spatial autocorrelation into account. The Moran test is statistically significant, indicating the presence of spatial autocorrelation. In order to deal with spatial autocorrelation, we add to the model a spatial lag of the outcome specified by a spatial weighting matrix where weights are based on the inverse of the distance between counties. Despite the presence of spatial autocorrelation, convergence results are extremely similar and are virtually unchanged for all regressors of interest.

Table A1: Correlates of Property at the County Level

	Dependent variable: Log Total Household Property Value Per Capita					
	(1)	(2)	(3)	(4)	(5)	(6)
	10-Year Δ	10-Year Δ	10-Year Δ	10-Year Δ	60-Year Δ	in 1870
Log Real Per capita Total Value of property	-0.209***	-0.315***	-0.383***	-0.401***	-0.721***	
	(0.008)	(0.011)	(0.013)	(0.012)	(0.025)	
A. Geography						
Temperature in Hottest Month		-0.031**	-0.004	0.000	0.141***	-0.156***
		(0.013)	(0.015)	(0.014)	(0.048)	(0.055)
Temperature in Coldest Month		0.001	0.053***	0.040***	-0.001	-0.127***
		(0.012)	(0.012)	(0.012)	(0.038)	(0.041)
Summer Precipitation		-0.074***	-0.024***	-0.026***	-0.029*	0.022
		(0.006)	(0.006)	(0.006)	(0.016)	(0.021)
Winter Precipitation		-0.053***	-0.045***	-0.034***	-0.014	-0.041
		(0.009)	(0.010)	(0.010)	(0.025)	(0.026)
Ruggedness		-0.023***	-0.013*	-0.013*	-0.039*	-0.094***
		(0.007)	(0.008)	(0.008)	(0.020)	(0.023)
Elevation in meters		0.008	0.004	-0.001	0.148***	-0.180***
		(0.011)	(0.011)	(0.011)	(0.041)	(0.049)
Soil Net Primary Productivity		0.025***	-0.002	-0.006	0.065***	0.009
		(0.007)	(0.008)	(0.008)	(0.023)	(0.027)
Distance to Coast		-0.009	0.008	0.007	-0.100***	0.054*
		(0.007)	(0.007)	(0.007)	(0.023)	(0.028)
Crossed by Navigated River		0.007	0.006	0.004	-0.003	0.095***
		(0.008)	(0.008)	(0.008)	(0.020)	(0.025)
Crossed by Canal		0.003	-0.005	0.007	0.015	0.003
		(0.014)	(0.014)	(0.014)	(0.030)	(0.040)
B. Demographics						
% Literate			0.169***	0.154***	0.097***	0.208***
			(0.011)	(0.011)	(0.019)	(0.022)
% Foreigners			0.064***	0.058***	0.038***	-0.114***
			(0.008)	(0.007)	(0.013)	(0.018)
Log Population			-0.029***	-0.041***	0.039**	0.102***
			(0.007)	(0.007)	(0.016)	(0.021)
Δ Log Population			-0.223***	-0.221***		0.237***
			(0.025)	(0.023)		(0.065)
% Males			0.033***	0.026***	0.063**	0.214***
			(0.012)	(0.009)	(0.025)	(0.042)
% White			-0.009	-0.005	-0.061***	-0.109***
			(0.007)	(0.006)	(0.020)	(0.025)
C. Occupational shares:						
Public Administration				0.032***	0.028**	0.033**
				(0.004)	(0.011)	(0.014)
Manufacturing				-0.021***	-0.046***	-0.018
				(0.004)	(0.012)	(0.015)
Mining				-0.004	0.017	0.029*
				(0.004)	(0.012)	(0.016)
Commerce				0.005	0.015	0.063***
				(0.004)	(0.010)	(0.013)
Agriculture				-0.042***	-0.087***	-0.068***
				(0.004)	(0.012)	(0.015)
D. Inequality						
Top 10% Wealth Share					-0.165***	0.130***
					(0.022)	(0.031)
% of Enslaved Property in 1860					-0.065**	-0.233***
					(0.027)	(0.041)
Observations	16,112	13,360	11,075	11,063	1,617	1,619
Number of units						
Period Dep. Variable						
Adjusted R^2	0.31	0.36	0.43	0.44	0.57	0.62
Implied Convergence						

Notes: Columns 1-4 report the coefficients obtained by regressing the 10-year change in log property on initial property, geography variables, demographics, occupational shares, inequality variables, and year fixed effects. Column 5 reports the set of coefficients from the regression of the change in log property between 1870 and 1930 on 1870 property, 1870 controls, and the 1860 share of enslaved property, as described in the main text equation (2). Column 6 presents the set of coefficients from the regression of log property in 1870 on 1870 controls and 1860 share of enslaved property as described in equation (3).

Table A2: Correlates of Property at the County Level, with State Fixed Effects

	Dependent variable: Log Total Household Property Value Per Capita					
	(1)	(2)	(3)	(4)	(5)	(6)
	10-Year Δ	10-Year Δ	10-Year Δ	10-Year Δ	60-Year Δ	in 1870
Log Real Per capita Total Value of property	-0.390***	-0.419***	-0.449***	-0.466***	-0.732***	
	(0.010)	(0.011)	(0.013)	(0.012)	(0.025)	
A. Geography						
Temperature in Hottest Month		0.023	0.025	0.024	0.079	0.100
		(0.019)	(0.020)	(0.019)	(0.061)	(0.070)
Temperature in Coldest Month		-0.019	-0.008	-0.025	-0.058	-0.051
		(0.016)	(0.017)	(0.017)	(0.054)	(0.060)
Summer Precipitation		-0.004	0.003	-0.000	-0.003	0.006
		(0.010)	(0.010)	(0.010)	(0.028)	(0.032)
Winter Precipitation		-0.052***	-0.054***	-0.047***	-0.056*	-0.049*
		(0.009)	(0.010)	(0.010)	(0.029)	(0.029)
Ruggedness		-0.034***	-0.022***	-0.022***	-0.029	-0.071***
		(0.008)	(0.008)	(0.008)	(0.025)	(0.024)
Elevation in meters		0.053***	0.025	0.018	0.108*	0.061
		(0.016)	(0.017)	(0.017)	(0.057)	(0.059)
Soil Net Primary Productivity		0.029***	0.023**	0.016	0.046*	0.038
		(0.010)	(0.010)	(0.010)	(0.026)	(0.030)
Distance to Coast		-0.074***	-0.049***	-0.044***	-0.232***	-0.071**
		(0.010)	(0.011)	(0.011)	(0.030)	(0.035)
Crossed by Navigated River		0.016**	0.013	0.010	-0.010	0.043**
		(0.008)	(0.008)	(0.008)	(0.018)	(0.021)
Crossed by Canal		0.039**	0.027*	0.031*	0.049	0.019
		(0.016)	(0.016)	(0.016)	(0.032)	(0.040)
B. Demographics						
% Literate			0.135***	0.120***	0.044**	0.177***
			(0.011)	(0.011)	(0.018)	(0.022)
% Foreigners			0.045***	0.040***	0.028*	-0.063***
			(0.009)	(0.008)	(0.015)	(0.020)
Log Population			-0.017**	-0.034***	0.074***	0.019
			(0.008)	(0.008)	(0.015)	(0.025)
Δ Log Population			-0.214***	-0.219***		0.386***
			(0.023)	(0.022)		(0.066)
% Males			0.036***	0.030***	0.057*	0.048
			(0.013)	(0.010)	(0.031)	(0.048)
% White			-0.016**	-0.014*	-0.042*	-0.209***
			(0.008)	(0.007)	(0.022)	(0.028)
C. Occupational shares:						
Public Administration				0.027***	0.012	0.043***
				(0.004)	(0.010)	(0.013)
Manufacturing				-0.012***	-0.029***	-0.007
				(0.004)	(0.011)	(0.014)
Mining				0.000	-0.002	0.017
				(0.004)	(0.011)	(0.015)
Commerce				0.010***	0.015*	0.060***
				(0.004)	(0.009)	(0.012)
Agriculture				-0.038***	-0.069***	-0.067***
				(0.004)	(0.011)	(0.013)
D. Inequality						
Top 10% Wealth Share					-0.096***	0.109***
					(0.021)	(0.029)
% of Enslaved Property in 1860					-0.061**	-0.183***
					(0.029)	(0.043)
Observations	16,112	13,360	11,075	11,063	1,617	1,619
Number of units						
Period Dep. Variable						
Adjusted R^2	0.43	0.45	0.49	0.49	0.67	0.73
Implied Convergence						

Notes: Columns 1-4 report the coefficients obtained by regressing the 10-year change in log property on initial property, geography variables, demographics, occupational shares, inequality variables, state fixed effects, and year fixed effects. Column 5 reports the set of coefficients from the regression of the change in log property between 1870 and 1930 on 1870 property, 1870 controls, and the 1860 share of enslaved property, as described in the main text equation (2). Column 6 presents the set of coefficients from the regression of log property in 1870 on 1870 controls and 1860 share of enslaved property as described in equation (3).

Table A3: Effect of Enslaved Property in 1870 on 60-Year Property Growth

	Dependent variable: 60-year Growth in Property per Capita				
	(1)	(2)	(3)	(4)	(5)
	Baseline	Geography	Demographics	**Occupation**	Top 10% Share
Enslaved Property (Ψ)	-0.229 (0.070)	-0.183 (0.076)	-0.179 (0.090)	**-0.178** **(0.089)**	-0.146 (0.091)
Property in 1870	-0.495 (0.023)	-0.564 (0.025)	-0.633 (0.028)	**-0.666** **(0.029)**	-0.663 (0.029)
Controls:					
Geography		X	X	**X**	X
Demographics			X	**X**	X
Occupation				**X**	X
Top 10% Share					X
Observations	863	863	863	863	863

Notes: The table presents the results from a regression of the 60-Year Property Growth per capita on the share of enslaved property in the county. Column 1 is the most parsimonious specification, with only the initial log of property per capita in 1870 as a control. Column 2 adds geography controls: the temperature in hottest month and in coldest month, the summer precipitation, the winter precipitation, the elevation, the ruggedness, the soil net primary productivity, the distance to coast and dummies if the county is crossed by a navigated river or by a canal. Column 3 adds demographics controls including the % of literate, the % of foreigners, the log of the population of the county, the % of males and the % of whites in the county. Column 4 is the main specification, which adds the occupational shares in public administration, manufacturing, mining, commerce, and agriculture. Column 5 adds the share of the total wealth owned by the top 10% as a control.

Table A4: Effect of Top 10% Share of Property in 1870 on 60-Year Property Growth

	Dependent variable: 60-year Growth in Property per Capita				
	(1)	(2)	(3)	(4)	(5)
	Baseline	Geography	Demographics	**Occupational Shares**	Enslaved Property
Top 10% Wealth Share (Λ)	-2.581	-1.828	-1.663	**-1.911**	-2.211
	(0.162)	(0.182)	(0.194)	**(0.193)**	(0.242)
Property in 1870	-0.501	-0.655	-0.751	**-0.774**	-0.741
	(0.014)	(0.016)	(0.017)	**(0.017)**	(0.020)
Controls:					
Geography		X	X	**X**	X
Demographics			X	**X**	X
Occupation				**X**	X
Enslaved Property					X
Observations	1797	1797	1797	1797	1617

Notes: The table presents the results from a regression of the 60-Year Property Growth per capita on the share of wealth held by the top 10% wealthiest people in the county. Column 1 is the most parsimonious specification, with only the initial log of property per capita in 1870 as a control. Column 2 adds geography controls: the temperature in hottest month and in coldest month, the summer precipitation, the winter precipitation, the elevation, the ruggedness, the soil net primary productivity, the distance to coast and dummies if the county is crossed by a navigated river or by a canal. Column 3 adds demographics controls including the % of literate, the % of foreigners, the log of the population of the county, the % of males and the % of whites in the county. Column 4 is the main specification, which adds the occupational shares in public administration, manufacturing, mining, commerce, and agriculture. Column 5 adds the share of enslaved property in 1860 as a control.

Table A5: Mediation of the Effect of Top 10% Share of Property in 1870 on 60-Year Property Growth

		Estimated Λ from specification (4): -1.911
Mediators	Change in Estimated Λ when adding mediator to specification (4)	Fraction of Λ explained by mediator
Average ETR	.048	2%
Demographics:		
Δ % Literate	.423	16%
Δ % Foreigners	.065	3%
Δ Log(Population)	.003	0%
Δ Males	.005	0%
Δ White	.003	0%
Δ ***Top 10% of Population in***:		
Public Administration	.024	1%
Production	-.009	0%
Mining	-.027	-1%
Commerce	.007	0%
Agriculture	.129	5%

Notes: This table presents the mediation analysis of the effect of Top 10% Share of Wealth on 60-Year property growth. We use the baseline specification from column 4 (in bold) in Table A4 that includes controls for geography, demographics, and occupational shares. The algorithm is as follows. Pick one of the mediating variables, Z_j. We select the mediator variables from the vector $\mathbb{Z} = \{Z_1, Z_2, ...Z_n\}$ in a random sequence and repeat this sequencing x times. For each random sequence, we add the mediating variables sequentially to the regression, in the order of the sequence. We measure the importance of the mediating effect of Z_j on Λ by computing for each sequence the change in estimated Λ between the specification just before Z_j is introduced and the one in which Z_j is introduced, and we average this change in estimated Λ over all x sequences.

II. Institutional and Historical Appendix

This section provides additional information on the institutional and historical background of the general property tax.

II.1. Historical Sources on Property Tax Laws, Administration & Enforcement

While property tax legislation shared many important features across U.S. states, it still differed in each state, which can make it complicated to precisely follow the historical developments of property tax laws for each state. But a series of key historical sources enable to have a panoptic view of property tax legislation and its evolution.

First, the Decennial Censuses of Wealth offer every decade a state by state account of the main provisions of the property tax. These accounts start in 1880 (U.S. Census Bureau (1880)), and are very detailed starting in 1890 (U.S. Census Bureau (1890)). The 1902, 1912 and 1922 versions are particularly useful (U.S. Census Bureau (1902), U.S. Census Bureau (1912) and U.S. Census Bureau (1922)) offering a separate digest of all property tax laws for each state. Importantly, the reports provide important details on the administration of the property tax, methods of assessments, etc. As we discuss below, they also provide a very thorough estimate of the assessment ratio (i.e. the ratio between the assessed value of property and the true market value of property).

Second, a series of publications by academics and tax practitioners of that time offer crucial insights about some differences in tax legislations and practices. Jensen (1931) is, from that point of view, a very unique source, offering a comprehensive snapshot of property taxation across all states at the end of the 1920s.

Third, state reports offer very precise information about property tax legislation and its developments for each state. The Tax Commission and Board of Equalization reports are particularly useful. We provide a full list of references and links to these publications in section III.2 below.

II.2. Tax base

Uniformity and universality The universality provision principle implied that, unless otherwise specified, all properties were subject to the general property tax. Some states specifically required that both people and corporations were subject to the property tax (Illinois, Idaho, Nebraska, Utah, Washington). It was common for state constitutions to

have a provision requiring that all property should be taxed (e.g. in New Hampshire, Arizona, Wyoming, California, Texas, Utah, Virginia, and Washington) or specifically require that corporate property be included in the tax base for property taxation (e.g. Arkansas, Colorado, Georgia, Louisiana, among others), see Jensen (1931, pp. 101–103). Table A6 below provides information for all states relative to their constitutional requirements and actual practice of universality and uniformity.

Corporate assets Provisions for the taxation of corporate assets were in place to avoid double taxation of share-holders and corporations. No state required both the owner side and the corporate side to be taxed for the same asset (Jensen (1931, pp. 122–124)). For instance, Pennsylvania valued and taxed the capital stock owned by corporations, and exempted holders from paying taxes on their shares. On the contrary, Maryland required corporations to report resident shareholders and taxed them on the value of their bonds and stocks (Jensen (1931, pp. 190–194)). Commercial banks were often taxed treated separately and taxed on the value of the shares (Jensen (1931, p. 206)).

Debt Specific provisions allowed the deduction of debt and mortgages from the property tax base so that the assets they finance were not double counted. At least eighteen states allowed the deduction of debt from the taxpayer's solvent credits in 1931 (Arizona, Arkansas, Colorado, Connecticut, Illinois, Indiana, Kansas, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New Mexico, North Carolina, South Carolina, Texas, Utah, and West Virginia), and all states exempted debts from securities of the federal government or a state's own bonds. To prevent taxpayers from artificially declaring large debts, all states restricted the privilege of deduction to "debts owing in good faith", and usually further restricted the category of deductible debts. For instance, West Virginia prevented the deduction of contingent liabilities (Jensen (1931, p. 116)). The nature of mortgage deductions varied from state to state. In 13 states, the lender of a mortgage was liable to the property tax on the mortgage value while mortgagors could deduct its amount from the value of land. In other states, borrowers were liable to the property tax and lenders could deduct the value of the mortgage from personal property. See U.S. Census Bureau (1902, pp. 622–623) for more details.

Table A6: Dates of admission in the Union, Constitution requirement and actual practice of universality and uniformity

State	Admission to Union	First observed practice of universality in assessment of property	First observed practice of uniformity for taxation of property	First appearance of universality requirements in State Constitution	First appearance of uniformity requirements in State Constitution
Alabama	1819	1850	1870		
Alaska	1959	1906			
Arizona	1912	1870	1893		
Arkansas	1836	1838	1838	1868	1836
California	1850	1850	1850	1849	1849
Colorado	1876	1870	1876		
Connecticut	1788	1808	1795		
Delaware	1787	1776	1776		1897
District of Columbia	N/A	1850	1903		
Florida	1845	1850	1884	1868	1838
Georgia	1788	1755	1796		1868
Hawaii	1959	1881	1912		
Idaho	1890	1870	1887		
Illinois	1818	1839	1839		
Indiana	1816	1835	1835	1851	1851
Iowa	1846	1850	1858		
Kansas	1861	1860	1861	1858	1855
Kentucky	1792	1795	1795	1890	1890
Louisiana	1812	1850	1870		1845
Maine	1820	1820	1820		1819
Maryland	1788	1793	1793		
Massachusetts	1788	1792	1792		
Michigan	1837	1838	1838		
Minnesota	1858	1850	1858		1857
Mississippi	1817	1850	1880	1868	1868
Missouri	1821	1850	1860		1820
Montana	1889	1870	1888	1889	1868
Nebraska	1867	1860	1867		
Nevada	1864	1865	1869	1864	1864
New Hampshire	1788	1772	1793		
New Jersey	1787	1794	1794		1844
New Mexico	1912	1850	1882		
New York	1788	1788	1788		
North Carolina	1789	1868	1868	1868	1868
North Dakota	1889	1890	1890	1889	1868
Ohio	1803	1826	1826	1851	1851
Oklahoma	1907	1890	1891		
Oregon	1859	1850	1858	1857	1857
Pennsylvania	1787	1788	1788		
Puerto Rico	N/A	1901	1909		
Rhode Island	1790	1796	1769		
South Carolina	1788	1794	1794	1868	1868
South Dakota	1889	1879	1881	1889	1868
Tennessee	1796	1836	1836		1834
Texas	1845	1846	1846	1845	1845
Utah	1896	1850	1886	1895	1895
Vermont	1791	1796	1796		
Virginia	1788	1793	1793	1850	1850
Washington	1889	1860	1890	1889	1868
West Virginia	1863	1870	1880	1863	1863
Wisconsin	1848	1848	1850		1848
Wyoming	1890	1870	1887	1889	1868

Notes: This table shows for each state the date of first appearance of the general property tax principles of universality in the assessment of property and the use of a uniform rate of taxation for all property types. The data are given both as a first appearance of universality and uniformity requirements in state constitutions, as well as the first observed appearance of these practices in state reports. The practice of universal assessment of property refers to the assessment of real and personal property with limited exemptions. The practice of uniformity refers to using a single tax rate or apportionment system on the aggregate value of all property instead of different rates by type of property.

Source: Jensen (1931) and Benson et al. (1965) for the first appearance in State constitutions ; State reports for the first observed practices (see Appendix table on State coverages and Sources); Wolcott (1796) and Rabushka (2008) for additional information on practice of assessment and uniformity prior to 1800 in the Thirteen Colonies , Kentucky, Tennessee and Vermont.

Exemptions There were some exemptions from the property tax, which varied by state. Most exemptions were related to public property (e.g. federal land, public buildings, etc), religious property (e.g., churches, cemeteries, religious societies), charities, hospitals, schools, and libraries. Exemptions related mostly to the public good nature of the property considered. Exemptions of specific private wealth were rare, because it directly contradicted the universality principle that was at the heart of the general property tax, and enshrined in constitutional requirements for most states. Nevertheless, there may be specific, nonsystematic private property exemptions. Some examples include Treasury bonds, abatements for individuals (e.g., one $25 watch in Vermont), or specific sectors (e.g., ten bee stands and beet sugar factories in Indiana, mining in New Mexico).[1]

The Census Bureau conducted very thorough analyses of the value of exempted property for each state for its decennial Census. We therefore have precise information about the value of exempted property, relative to total property, for each state, for 1890, 1900, 1904, 1912, and 1922 (see U.S. Census Bureau (1922) "Estimated National Wealth", Table 7 p.25). The Census Bureau also produced an estimate for 1880 of the total value of exempted property at the national level, without breaking it down by state. Finally, the National Industrial Conference Board published estimates of the total value of exempted property for years 1922 to 1937 (National Industrial Conference Board (1939)). Figure A26 reports the evolution of the total value of exemptions as a fraction of total national wealth from 1880 to 1937. And Figure A27 shows how the fraction of exempt property to total true value of property varied across states from 1890 to 1922. Three main insights emerge from this evidence.

First, the value of all exemptions as a fraction of total wealth is small overall, around 6 to 7%. Second, the value of exemptions in total wealth is remarkably stable over time in the period 1880 to 1930. The small and stable value of exemption in total wealth reflects the broad and continuous application of the universality and uniformity principles of the general property tax over this period. Interestingly, we note that exemptions increased in the early 1930s. This reflects the introduction of exemption and classification of real estate property in various states in the aftermath of the Great Depression. As we discuss in the main text, this movement coincides with the start of the demise of the general property tax in local public finances.

The third insight that emerges from the figures is that despite most states having very little exempted property as a fraction of total wealth, there is a bit if geographical dispersion. In fact, a few U.S. territories exhibit large exempted property, in the late 1800s,

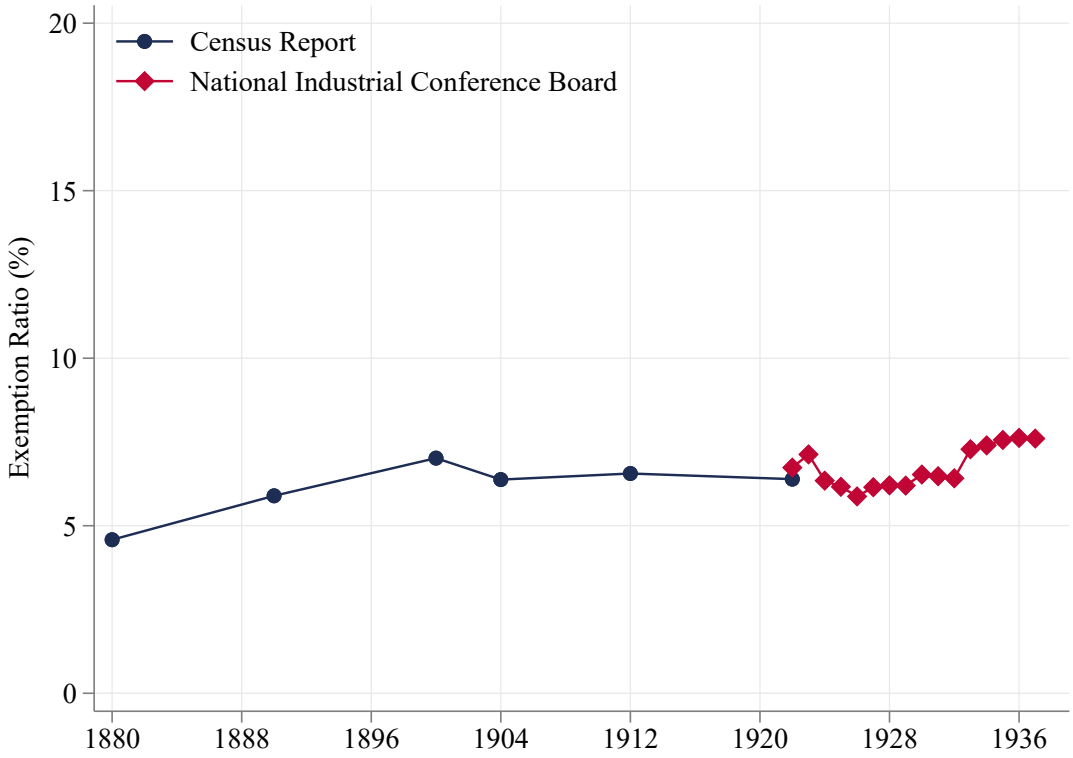
[1] We can follow the evolution of these exemptions state by state in the very detailed digests of property tax laws compiled by the Census every ten years from 1880 to 1922.

prior to their accession to statehood. This reflects first the fact that in these U.S. Territories, a very large share of land was property of the federal government in the 1880s, and that federal land was progressively transferred to individuals through homesteading, explaining the quick decline in the fraction of exempted property over time in these regions west of the Mississippi River.[2] Second, in these territories, mining boom was supported by temporary exemptions on mining claims in the late 1800s. These temporary exemptions (typically 10 years, as in Arizona or New Mexico) were progressively abandoned in the early 1900s.

A final important point is in order: There is a critical conceptual difference between exemption and assessment. In other words, the fact that the exemption rate was very small stemmed from the universality principle, stating that all forms of properties should be taxed. But a low rate of exemption was not necessarily synonymous with a high effective rate of assessment of taxable property. Some real or personal property may have "escaped" taxation because of classification or low assessment ratios. This will be captured by assessment practices, which we discuss extensively below.

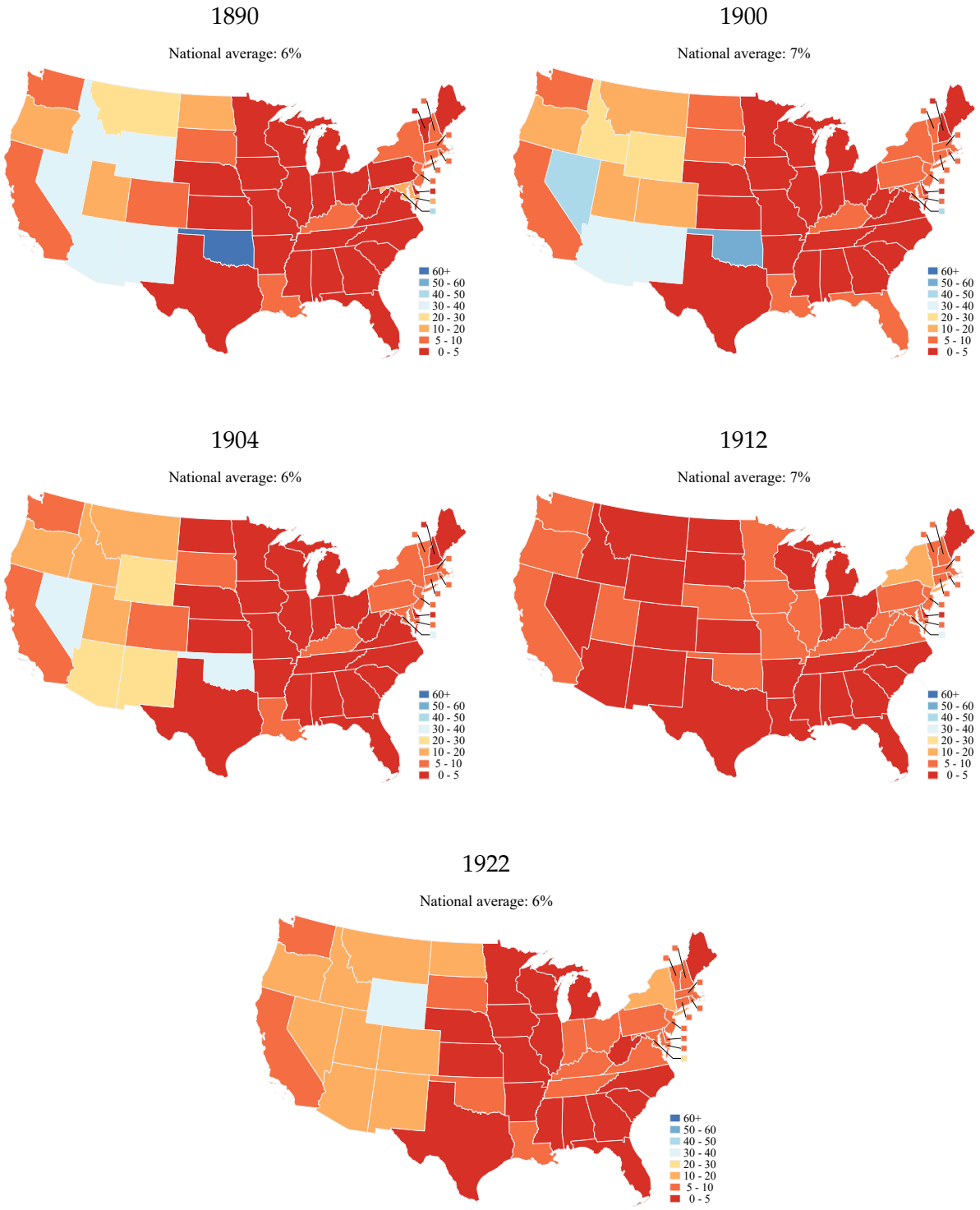
[2]Example: Oklahoma before statehood in 1907: U.S. territory, with Indian reservations, and Unassigned Land, property of federal gvt. Big land runs on unassigned lands after 1890. New Mexico: statehood on 1912. same thing, lots of federal land + Legal issues about common ownership of millions of acres in land grants + temporary 10 year exemptions on mines, from the date of discovery.

Figure A26: Ratio of Exemptable Property to Total Property



Notes: This figure shows the ratio of exemptable property to total property at the national level. The blue series is taken from U.S. Census Bureau (1922), which has estimates for 1880, 1890, 1900, 1904, 1912 and 1922. The red series comes from National Industrial Conference Board (1939), who report total exempted property from 1922-1937, which we combine with our constructed total property series (i.e. for the denominator) to calculate the exemption ratio. See Appendix III.1 for further details on that series' data sources, and how it is constructed.

Figure A27: Ratio of Exemptable Property to Total Property, by State



Notes: This figure shows the ratio of exemptable property to total property for each state, as reported in U.S. Census Bureau (1922), which has values for 1890, 1900, 1904, 1912 and 1922.

II.3. Tax administration

Steps to implement a general property tax Taken from Fisher (1996, pp. 80–81)

1. **Define taxable property**. Need a legal definition, and attribute rights to owners when not clear (e.g. multiple owners, mortgages)

2. **Define value**. Usually not explicit but refers to "selling price".

3. **Define jurisdiction to tax**. It is necessary that the jurisdiction be defined so that all property has one and only one tax location.

4. **Establish a tax date**. Ideally, same day across jurisdiction to avoid double taxation and avoidance.

5. **List taxable property**. Requires physical inspection, and complete cadastral maps. Each property must be assigned a taxing location.

6. **Value every parcel or item of property**. This compound the usual issue of appraising value, maintaining geographical equality and preventing political pressures to keep valuation low (also used for apportionment which pushes for low assessment).

7. **Levy taxes**. Official act of imposing the tax. States regulate the procedures to be followed by each jurisdiction and can impose levy limits.

8. **Compute tax rates and tax bills**. Apportioned dollar amounts must be converted to rates.

9. **Collect taxes**. Taxes levied in rem become an automatic lien on the property and good title cannot be passed until taxes are paid.

10. **Distribute the proceeds to local governments** if tax collector collect taxes for several units of government.

The administration of the property tax shared many important features across the U.S. Taxes were collected annually, on a specific tax day. The property tax was levied at the place and at its value on a specific day of the year. [3] The assessment of property was done

[3] Loss of value or changes in location during the year were not recognized until tax day of the next year. There were early exceptions to this rule for property subject to manipulation for tax avoidance or to avoid obvious inequities. For instance, merchants' and manufacturers' inventories were made on the basis of average values rather than on a specific day.

by assessors – usually elected officials and often local residents– who listed and valued property and collected property taxes. Etc.

Despite these common features, the administration of the tax varied significantly across states. But these variations are well documented. In particular, the Census produced every ten years in its digest of property tax laws a detailed account of the concrete administrative features of the property tax, for each state (see U.S. Census Bureau (1890), U.S. Census Bureau (1902), U.S. Census Bureau (1912), and U.S. Census Bureau (1922)). State reports, in particular reports of the state comptroller, reports of the state tax commission, or of the state board of equalization, also offer a granular vision of local administrative practices of the property tax.

In general, the state laws leave wide discretionary powers to the local governments as to matters relating to taxation, but in each state there are some statutory provisions of a general character intended to bring about uniformity in the levy and collection, even of local taxes, within the state. In particular, tax commissions and boards of equalization were key institutions set up in almost all states to guarantee uniformity in the administration of the property tax.[4] In section III.2.3 below, we provide state by state information about the creations of each of these institutions and how they affected the administration of the property tax. Dates of creations of these institutions are also reported for each state in Figures A29 to A37.

II.4. Assessment Practices

In terms of administration and enforcement practices, knowing how assessments took place is a critically important for estimating the true value of property across space and over time. While most states stipulated that all property should be assessed at its market value, it is well understood that assessment ratios were quite systematically significantly smaller than 1.

Importantly, we have precise information about assessment practices and how they differed across states and over time. The **Census Bureau** conducted decennial investigations to precisely estimate state assessment ratios. These investigations were authorized by Congress since 1850 and were part of a "national inventory or stock taking" of wealth in the United States (U.S. Census Bureau (1902, p. 3)). The method of investigation differed by class of property and decade. Below is a description of some of the methods used

[4]There were also local legislative bodies at the city or county level whose role was to adjust differences in individual assessments by local assessors, and hear appeals. It is unclear whether these bodies had any prerogative to adjust the definition of what counts as property or other parameters. These documents – such as city charters or ordinances– have never been reviewed by any of the sources we identified.

by the Census.

- In 1850, 1860, and 1870:
  U.S. marshals were tasked with obtaining estimates of the "true valuation" while conducting Census enumeration. They were given information that precisely made the distinction between the value of property as assessed for taxation, and the true valuation of property, and asked to obtain both values.

- For 1880 and 1890:
  the Census relied on a a survey of more than 25,000 bankers, real estate agents, business men, and public officials connected with the valuation of taxable property, and found an average assessment ratio of 65 percent for real property. The true value of personal property was then directly estimated by the Census, which allows us to obtain an overall assessment ratio for all property.

- For 1900:
  Census enumerators conducted separate exercises for real and non-real property.

  For real property, they separately appraised the true value of real property used for farming and that used for manufacturing purposes using the extensive work conducted for the U.S. Census of Agriculture, and the U.S. Census of Manufacturing. Regarding residential real property, the Census Bureau sought to recover the ratio of assessed to true value of real property by a fairly sophisticated process that is based on the combination of the 5 following methods described below: (1) for counties in which farm land constitutes at least 85 percent of the assessed acre property (2,000 out of the 2,800 counties), the ratio computed for land used the Census' appraisal of farm land is used for all real property.
  (2) An alternative ratio was obtained using records of sales of real property as a check on the first method. This second method resulted in only slight differences for state-level assessment ratio.[5]
  (3) Census Bureau agents visited all cities with over 4,000 inhabitants as part of the 1900 enumeration and surveyed all "competent persons" that could give information on the assessment ratio for real property. This was again used as a check on the method (1) and (2), and used whenever a ratio could not be obtained if not separate assessed value of acre property was available (most of the adjustments did not occur at the state-level but county-level, which is not used for our analysis).

[5]The difference was less than 1 percent and 0.1 percent in Ohio and Iowa

(4) Ratios given in financial journals and publications were used as check. This information generally came from analysis of people with knowledge of local affairs who compiled this information for the basis of municipal credit.
(5) Analysis conducted by the state tax commissions on the question of assessment ratio was compiled and used whenever more precise information on the assessment was available.[6]

Regarding **personal property**, a measure of true value was appraised by census enumerators directly for livestock,[7] farm equipment, manufacturing machinery,[8] gold and silver.[9] The true value of other classes of property, such as railroads, street railways, or canals, was also separately ascertained by the Census.

- 1912 and 1922:
  A similar approach as in 1900 was taken in 1912 and 1922, although less detailed in the appraisal of real property. The Census obtained assessment ratios from state reports in 1912 (U.S. Census Bureau (1912, p. 16)), and requested state and county officials to provide a ratio for real property based on sales records in 1922 (U.S. Census Bureau (1922, p. 4)). For both years, the true value of personal and other property was separately estimated by the Census Bureau as detailed above for 1902, with the explicit objective of striving for continuity in the estimation methods. (U.S. Census Bureau (1922)).

In addition, we gathered assessment ratios estimates from other sources such as State tax commissions, auditor reports, independent analyses by contemporaneous economists or tax specialists, and annual statistics reported in the Financial Statistics of States. These help us detect more granular changes in methods of assessment. These changes in assessment ratios can generally be traced to changes in tax legislation or practices. These data sources and the assessment ratios we construct are described in detail in Appendix III.2.

[6] A sixth test is employed to verify the assessment ratio obtained through indirect methods 2-5, but only applies to counties.
[7] Using values from the Department of Agriculture.
[8] using values from the Census of manufactures.
[9] Using values from the Director of the Mint.

III. Data Appendix

In this section, we present details about the historical series we constructed. We start with a brief overview of all the series we constructed (variables, geographical level, time span, etc) in section III.1. Then, we present our state level series of private wealth in section III.2, which form the backbone of our analysis: almost all other series (county level, national level) stem from this data. These series do require special adjustments to account for the value of enslaved people. We present these adjustments in section III.3. We then present how we constructed series at the county level in section III.4. And we present how we constructed national wealth series in section III.5. After this, we present in section III.6 existing data sources of wealth, and wealth series that have been constructed in the literature. We explain how our series differ in terms of sources and methodologies from these estimates, and compare our results in sections III.7 and III.8. Finally, in sections III.9 and III.10, we present other auxiliary data we use for our analysis (data on property tax revenues, data on geography, etc).

III.1. General Overview of Series Constructed

Our approach consists in following the method used by the Historical Censuses of Wealth, namely to start from the assessed values of property and correct them by the assessment ratios to get at the market value.

The first and most important series we constructed are therefore series of assessment ratios.

In terms of property, we constructed series of estimates of the true market value of property for three main types of property outcomes: total private property, real property and personal property. Real property includes land, improvements, town lots. Personal property includes merchants and manufacturers' stock, 'money and credits' (wealth held in bank account, stocks, bonds and credits), equipment, livestock, watches, pianos, etc.

We finally constructed series of "nominal" tax rates (applied on the assessed value of property) and "effective" tax rates (taxes paid as a fraction of true value of property).

For all these outcomes, series are available at two subnational geographical levels: state level, county level. The backbone of all estimates are the state level data series. For example, county level estimates of assessment ratios are indirectly derived from key information on assessment available at the state level (see details in subsection below). National level series are obtained from aggregating state level series, following methodologies explained below.

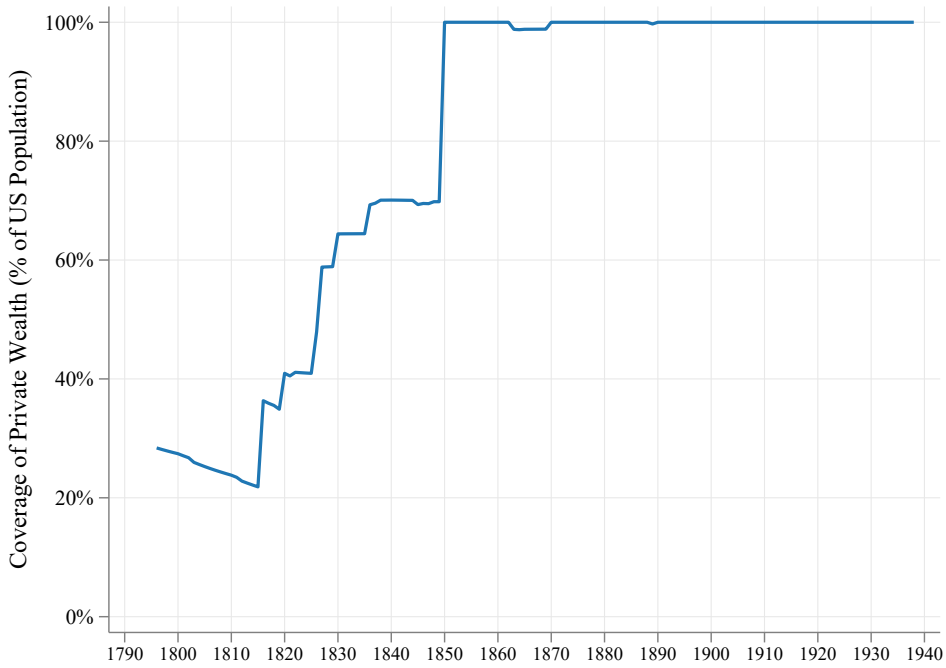
After constructing these series, we are able to measure private wealth for a significant portion of the U.S. population, going back as far as 1793 for our state-level measure in some cases. We measure private wealth for close to 100% of the U.S. population from 1850 onwards. The below exhibits summarize the coverage of our data. Table A7 below details all the property series that we constructed, their main sources and time coverage. Figure A28 shows the fraction of the population for which we have private property data per each year. This is also illustrated at the state-level in Figure 3, which shows the total value of private property for each state as a share of U.S. GDP.

Table A7: Overview of wealth data series constructed

Variable	Unit	Period	Frequency	Sample	Sources	Note
Assessment ratio	County	1860-1930	Decennial	All counties	*US Census of Wealth - Census Bureau* 1870, 1890, 1900 and 1904	$N = 23,071, n = 3,368$
	State	1798-1940	Annual	All States + Washington DC and Puerto Rico	*US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939) State reports & special studies (e.g. Jensen (1931))	$N = 5,289, n = 52$
Total Private Property	County	1850-1930	Decennial	All counties	Full Count Population Census (1850, 1850, 1870) *US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939)	$N = 18,242, n = 3,159$
	State	1793-1940	Annual	All States + Alaska, Washington DC and Puerto Rico	State reports, Ely (1888), U.S. Census Bureau (1941) *US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939)	$N = 4,583, n = 52$
Real Property	County	1850-1930	Decennial	All counties	Full Count Population Census (1850, 1850, 1870) *US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939)	$N = 10,200, n = 3,089$
	State	1826-1940	Annual	All States + Washington DC and Puerto Rico	State reports, Ely (1888), U.S. Census Bureau (1941) *US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939)	$N = 2,227, n = 51$
Personal Property	County	1850-1930	Decennial	All counties	Full Count Population Census (1850, 1850, 1870) *US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939)	$N = 10,160, n = 3,092$
	State	1826-1940	Annual	All States + Washington DC and Puerto Rico	State reports, Ely (1888), U.S. Census Bureau (1941) *US Census of Wealth - Census Bureau* (1850-1922) *Financial Statistics of States* (1915-1939)	$N = 2,161, n = 51$
Property tax rates	County	1870-1930	Decennial	All counties	*US Census of Wealth - Census Bureau* & *Financial Statistics of States* (1930)	$N = 16,243, n = 3,204$
	State	1816-1940	Annual	All States + Washington DC and Puerto Rico	State reports, Ely (1888) Financial Statistics of States (1915-1939)	$N = 2,753, n = 51$

Notes: N denotes the total number of observations in the series. For county-level series, this represents the number of county-year observations. n denotes the number of unique units in the series. For county-level series, this corresponds to the number of distinct counties in the dataset. All property series are created by dividing the assessed value of property by the assessment ratio. We use the same assessment ratio for creating the real property series, personal property series, and total property series. The sources listed for the property series correspond to where the information regarding the assessed value of property is coming from. For assessment ratio series at the county level, our baseline series for property are created using for each county, the state-level assessment ratio. But we also created 4 alternative series of assessment ratios (described in Appendix section III.4.2) where we use information about variation in assessment ratios within state across counties available in the *US Census of Wealth - Census Bureau* for 1870, 1890, 1900 and 1904 . Alternative series of property at the county level can therefore easily be reconstructed using these alternative AR series. For property tax rates, we created two series. One of nominal tax rates and one of effective tax rates (i.e. total taxes paid divided by total market value of property).

Figure A28: Share of the Population Covered in the Property Data



Notes: This figure shows the fraction of the national population for which data on private property is available in any given year.

III.2. State Level Property Data

In this section we describe our data and approach for the construction of assessed values of property, assessment ratios and market value of wealth at the state level.

III.2.1. Assessed value of property.

For each state, we constructed harmonized series measuring the total assessed value of property. These series come from three main types of sources:

(i) the assessed values of property published each decade in the Historical Censuses of Wealth for the period 1850 to 1922 (also referred to as the *Wealth, Debt, Taxation* publications from the U.S. Census Bureau). (See main text, section 4.1 for details on these publications)

(ii) the annual series published in the *Financial Statistics of States* from the U.S. Census

Bureau for the period 1915 to 1943. (See main text, section 4.1 for details on these publications)

(iii) The assessed valuation of property available in State reports. Information on assessed values of property is typically reported in the reports from the State Auditor, the State Board of Equalization, or the State Tax Commission. Table A8 below lists all the State reports that we consulted. Note that in a companion paper, Dray, Landais and Stantcheva (2025), we provide further details on these important data sources: we document their origins, structure, and general content. We also discuss how the information contained in these State reports can be used for further research. We finally provide a list of links where these State reports can be downloaded or of libraries where hard copies can be consulted.

From these sources, we were able to reconstruct a measure of total assessed property value typically since around after statehood to 1930. Note that when multiple sources were available, we prioritized assessed values reported in the State reports, which tend to be more complete, provide further details (such as breakdown by large classes of property types, etc), and are often the original source of information for the series of assessed values published by the Historical Censuses of Wealth or the Financial Statistics of States.

In very few cases (128 observations out of 3,409), no information was reported for assessed valuations in State reports, but we were able to retrieve an assessed value of property from information on the tax rate and the revenue of the general property tax. More precisely, we use the the identity: $\tilde{W}_{it} = \frac{R_{it}}{\tilde{\tau}_{it}}$ where $\tilde{W}_{it}$ indicates the assessed value of property in state i and year t, R_{it} the property tax revenue, and $\tilde{\tau}_{it}$ the tax rate on assessed property value.[10]

We also created series of assessed value of personal property and real property. The breakdown of total property between personal property and real property is typically available for all sources, except in some early State reports.

[10]We excluded estimates of assessed value of property coming from this computation for the following states and years, as we could not cross-verify their accuracy and they were an order of magnitude different from valuations provided by either State reports or Census reports in neighboring years: Iowa (1919), Indiana (1904), Maryland (1841 - 1844, 1899), Missouri (1920), New Jersey (1891 - 1894), New Mexico (1913), New York (1842 - 1845), Rhode Island (1878-1879), Utah (1911), Virginia (1866). We also excluded the assessed value for Vermont in 1920 (from State reports, inconsistent with the series from the Financial Statistics of States for 1915 - 1939).

Table A8: State Coverage and Sources

State	Admission	Sample period	Sources
Alabama	1819	1850 - 1939	Reports of the State Auditor Reports of the Treasurer
Alaska	1959	1906 - 1940	Reports to the Secretary of the Interior Reports of the Governor Revenue and Taxation in Alaska (1962) Survey of Taxation in Alaska (1938)
Arizona	1912	1870 - 1939	Reports of the State Tax Commission of Arizona Reports of the Territorial Auditor, Reports of the Territorial Treasurer Reports of the Bank Comptroller Reports of the Treasurer
Arkansas	1836	1838 - 1939	Biennial Reports of the Auditor Biennial Reports of the Secretary of State Biennial Reports of the Treasurer of State Biennial Reports of the Arkansas Tax Commission
California	1850	1850 - 1939	Reports of the State Board of Equalization Biennial Reports of the State Comptroller Biennial Reports of the State Treasurer
Colorado	1876	1870 - 1939	Biennial Reports of the Auditor of State Reports of the State Board of Equalization Annual Reports of the Colorado Tax Commission Annual Reports of the Public Examiner

Table A8 continued from previous page

State	Admission	Sample period	Sources
Connecticut	1788	1796 - 1940	Biennial Reports of the Tax Commissioner Reports of the Comptroller Reports of the Treasurer Assessment and Collection of Taxes by Town Officials Report of the Connecticut Tax Study Commission (1959)
Delaware	1787	1850 - 1939	Annual Reports of the State Auditor Biennial Reports of the Treasury Department Reports of the Delaware State Revenue and Taxation Commission
District of Columbia	N/A	1850 - 1939	Reports of the Assessor Reports of the Auditor
Florida	1845	1850 - 1939	Reports of the Comptroller Reports of the State Treasurer Biennial Reports of the Tax Commission
Georgia	1788	1850 - 1939	Annual Reports of the Comptroller General Instructions of the Comptroller-General to Tax Collectors Annual Reports of the State Tax Commissioner
Hawaii	1959	1881 - 1939	Reports of the Auditing Department Reports of the Minister of Finance Annual Reports of the Governor of Hawaii Statement of the Revenues and Expenditures

Table A8 continued from previous page

State	Admission	Sample period	Sources
Idaho	1890	1870 - 1939	Proceedings of the State Board of Equalization Biennial Reports of the Department of Finance Biennial Reports of the Territorial Treasurer Biennial Reports of the State Treasurer
Illinois	1818	1822 - 1939	Biennial Reports of the Auditor of Public Accounts Biennial Reports of the Treasurer Proceedings of the Illinois State Board of Equalization Haig (1914)
Indiana	1816	1820 - 1939	Annual Reports of the Auditor of State Annual Reports of the Treasurer Proceedings of the Indiana State Board of Tax Commissioners
Iowa	1846	1850 - 1939	Biennial Reports of the Auditor of State Biennial Reports of the Treasurer of State Reports on Municipal Finances
Kansas	1861	1860 - 1939	Biennial Reports of the Auditor of State Reports of the Treasurer of State Reports to the Legislature by the Tax Commission
Kentucky	1792	1850 - 1939	Annual Reports of the Auditor of Public Accounts Reports of the Kentucky Tax Commission Biennial Reports of the State Treasurer Reports of the Comptroller Reports and proceedings of State Board of Equalization

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State	Admission	Sample period	Sources
Louisiana	1812	1850 - 1939	Annual Reports of the Louisiana Tax Commission Annual Reports of the Commissioner of the Department of Public Finance Biennial Reports of the Auditor of Public Accounts Reports of the State Board of Equalization
Maine	1820	1820 - 1940	Reports of the State Auditor Annual Reports of the Board of the State Assessors Reports of the Commissioners on the valuation of the State of Maine (1881) Maine State Valuation Reports Reports of the Treasurer Reports of the Tax Commission
Maryland	1788	1793 - 1939	Annual Reports of the Comptroller Reports of the State Tax Commissioner
Massachusetts	1788	1850 - 1939	Reports of the Auditor of Accounts Aggregates of Polls, Property, Taxes, Etc Reports of the Treasurer and Receiver-General Reports of the Tax Commissioner Bullock (1916)
Michigan	1837	1837 - 1939	Reports of the Auditor General Annual Reports of the Board State of Auditors
Minnesota	1858	1850 - 1939	Reports of the Auditor of State Annual Reports of the State Treasurer Minnesota Tax Commission Report
Mississippi	1817	1850 - 1939	Biennial Reports of the Auditor of Public Accounts

Table A8 continued from previous page

State	Admission	Sample period	Sources
Missouri	1821	1850 - 1939	Reports of the State Auditor Journals of the State Board of Equalization Biennial Reports of the State Treasurer Biennial Reports of the Missouri State Tax Commission
Montana	1889	1870 - 1940	Annual Reports of the Auditor Annual Reports of the Treasurer Annual Reports of the State Board of Equalization Annual Reports of the State Examiner Biennial Reports of the Montana State Tax Commission.
Nebraska	1867	1860 - 1939	Annual Reports of the State Tax Commissioner Biennial Reports of the State Board of Equalization and Assessment Biennial Reports of the State Treasurer Biennial Reports of the Auditor of Public Accounts
Nevada	1864	1865 - 1940	Reports of the State Board of Assessors and Equalization Annual Reports of the State Treasurer Reports of the Nevada Tax Commission Adams (1918)
New Hampshire	1788	1820 - 1939	Annual Reports of the State Tax Commission Reports of the Board of Equalization Reports of the State Auditor
New Jersey	1787	1794 - 1939	Annual of the Comptroller of the Treasury Annual Reports of the State Board of Assessors

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State	Admission	Sample period	Sources
New Mexico	1912	1850 - 1940	Reports of the Auditor Reports of the Traveling Auditor and Bank Examiner Reports of the Treasurer Biennial Reports of the State Tax Commission
New York	1788	1816 - 1939	Annual Reports of the State Tax Commission Annual Reports of the State Treasurer Annual Reports of the Comptroller
North Carolina	1789	1850 - 1939	Reports of the Commissioner of Revenue Biennial Reports of the Treasurer Reports of the Comptroller of Public Accounts Annual Reports of the Auditor Annual Reports of the State Board of Assessment Forster et al. (1942) Lewis (1951)
North Dakota	1889	1890 - 1939	Biennial Reports of the State Auditor Proceedings of the State Board of Equalization Reports of the North Dakota Tax Commission
Ohio	1803	1826 - 1939	Annual Reports of the Auditor of State Annual Reports of the Tax Commission Comparative Statistics Counties of Ohio (1906)

Table A8 continued from previous page

State	Admission	Sample period	Sources
Oklahoma	1907	1890 - 1939	Biennial Reports of the State Treasurer Biennial Reports of the State Auditor Annual Reports of the State Examiner Annual Reports of the Inspector of the State Reports of the Governor of Oklahoma Governor's messages to the Legislature
Oregon	1859	1850 - 1939	Reports of the Board of Commissioners Biennial Reports of the Secretary of State Biennial Reports of the State Treasurer
Pennsylvania	1787	1827 - 1939	Reports of the Auditor General Receipts and expenditures in the Treasury of Pennsylvania Annual Reports of the Secretary of Internal Affairs Reports of the State Treasurer Reports of the Tax Commission
Puerto Rico	N/A	1901 - 1923	Reports of the Auditor Reports of the Treasurer
Rhode Island	1790	1795 - 1939	Reports of the Auditor Assessor's valuation of taxable property Reports of the Board of State Valuation Reports of the Governor Reports of the State Treasurer Reports of the Tax Commission
South Carolina	1788	1794 - 1939	Annual Reports of the South Carolina Tax Commission

Table A8 continued from previous page

State	Admission	Sample period	Sources
South Dakota	1889	1879 - 1939	Reports of the Auditor
Tennessee	1796	1836 - 1939	Reports of Department of Finance and Taxation Biennial Reports of the State Tax commissioner Biennial Reports of the Comptroller
Texas	1845	1846 - 1940	Annual Reports of the Tax Commissioner Annual Reports of the Treasurer Miller (1916)
Utah	1896	1850 - 1939	Biennial Reports of the State Auditor Biennial Reports of the State Treasurer County financial Reports Reports of the State Board of Equalization
Vermont	1791	1796 - 1939	Biennial Reports of the Commissioner of Taxes Biennial Reports of the Treasurer Biennial Reports of the Auditor of Accounts
Virginia	1788	1850 - 1939	Reports of the State Tax Commission Reports relative to the Assessment of Taxes on Property of Corporations Tax Bulletins Annual Reports of the Treasurer Annual Reports of the State Accountant Reports of the Second Auditor Annual Reports of the Auditor of Public Accounts Sydenstricker (1915)

Table A8 continued from previous page

State	Admission	Sample period	Sources
Washington	1889	1860 - 1939	Biennial Reports of the State Tax Commissioner Biennial Reports of the State Treasurer Biennial Reports of the State Auditor Comparative Statistics by the Department of Auditor of State Minutes and official proceedings of the State Equalization Committee
West Virginia	1863	1870 - 1939	Biennial Reports of the Auditor of State Annual Report, Audit of the Finances Biennial Reports of the Treasurer of West Virginia Public Hearings of West Virginia Tax Commissions Armentrout and Haygood (1953)
Wisconsin	1848	1848 - 1940	Biennial Reports of the State Treasurer Biennial Reports of the Wisconsin Tax Commission Proceedings of the meeting of the Supervisors of Assessments Rosa (1925)
Wyoming	1890	1870 - 1939	Biennial Reports of the State Board of Equalization Biennial Reports of the Treasurer Biennial Reports of the Commissioner of Taxation

III.2.2. Assessment ratios.

Next, we estimate the market value of private property by constructing an annual assessment ratio for each state. This assessment ratio is the ratio of assessed to market value of property.

We systematically collected information on the assessment ratio using:

(i) Assessment ratio calculations done by the Census Bureau over the period 1850 - 1922 in the *Historical Censuses of Wealth*; (see section II.4 above for details on how these assessment ratios were constructed).

(ii) State reports: we relied on the rich and systematic information on assessment practices collected in annual state reports, in particular by state tax commissions and boards of equalization. For instance, in various states (e.g. in New York, Minnesota, Kansas, California, Maryland, Indiana, Illinois, Wisconsin), state tax commissions accumulated considerable information about sales values of real property and other assets, in order to measure assessment ratios and their distribution across counties. For example, in Kansas, the tax commission gathered information on 40,000 real estate sales for the years 1903 to 1907 in order to compare sale prices to assessed values, offering unique insights on the within-state spatial dispersion of assessment ratios.[11] Furthermore, state reports tend to systematically record and describe significant reforms to the way property assessments are carried out, enabling us to detect variation in assessment ratios at higher frequency than the decadal Census estimates.

(iii) Secondary sources: wherever available, we also collected information from contemporaneous studies by economists, historians, and tax scholars (for instance, Ely (1888); Adams, Thomas S., George E. Benton, Brough, Charles Hillman Schmeckebier and Frederick (1900); Snavely (1916); Blakey and Blakey. (1927); National Industrial Conference Board (1923, 1925); Blakey (1930); Nelson and Mitchell (1931)) that collected ample information on sale prices of assets and documented the ratio of assessment to market values of property. Of particular usefulness are Lutz (1921) and Chapter 12 in Jensen (1931), which contain summaries of studies of assessment ratios by tax commissions across multiple states. The proceedings of the National Tax Association conferences from 1907 to 1925 also offer useful information.

[11] See the Report of the Tax Commission of Kansas for 1908, p. 10. For a similar exercise in Maryland, see the Report of the Commission for the Revision of the Taxation System of the State of Maryland and City of Baltimore, 1912, pp. 73–168.

(iv) Information on assessment ratios given by state tax officials between 1915-1930. These assessment ratios, collected by the Census of *Financial Statistics of States* correspond to self-reported assessment ratios by local assessors.[12]

Our approach to construct annual assessment ratios for each state from this information is the following

1. First, we start from the Census ratios available for approximately one year per decade from 1850 to 1920.[13] As discussed in section II.4, the Census Bureau devoted considerable resources to the exercise of measuring assessment ratios and the true value of property. As a consequence, the Census data from the decadal *Historical Censuses of Wealth* publications is the most reliable, comprehensive and consistent source of information about assessment ratios across states.

2. In general, changes in assessment practices are slow-moving. As a result, our baseline approach consists in linearly interpolating decadal assessment ratios from the Census for each state to obtain annual assessment ratios series.

3. But in some instances, assessment practices may change abruptly in between two Census publications. Indeed, we note the presence of sharp breaks in some of the time series of assessed values of property. When this is the case, we rely on additional information on assessment ratios provided by State reports and legislation, by secondary sources, or by the *Financial Statistics of States*, capturing assessment basis used by assessors. This information helps us better identify the timing of changes in assessment ratios. We can for instance check in these State sources for the presence of major events (such as the creation of a tax commission or of a State board of equalization) or changes in legislation, which explain these sudden breaks in assessment. Take Ohio for instance. Assessed values exhibit a large and sudden increase from 1910 to 1911. This corresponds to the creation of the State Tax Commission, which led to a large increase in assessment ratios in Ohio, well-documented in the reports of the State Tax Commission.

In section III.2.3 below, we describe the construction of assessment ratios for each state separately: we provide a detailed account of all the variations in assessment practices that

[12]Because of their self-reported nature, the Census characterizes these ratios as being "only approximately correct" (Census 1921, p. 21). We only use them to detect and validate time variations in our estimates from other sources, but not to ascertain the true levels of assessment ratios.

[13]For 1880 and 1902, the Census Bureau did not construct an estimated true value of property from which we can obtain an implicit assessment ratio. Rather, they only provide a tax rate on the true property value. As this number is less precise, we only use it for states in 1880 and 1902 where we have no other information available. This is detailed for each state in Section III.2.3.

can be identified in all existing sources that we compiled and how we used this information to build our series of assessment ratios at an annual frequency.

After having created assessment ratio series for each state and year for which we have assessed valuations of property, we divide the assessed valuations by the assessment ratio to obtain a market value of property. We did not attempt to reconstruct separate assessment ratios for real property and personal property. As a result, we obtain our estimates of market value of real and personal property by dividing the assessed values of personal and real property by the same assessment ratio. We finally apply corrections for the value of enslaved individuals, described in section III.3 below.

III.2.3. State-by-state information on assessment ratios

This section describes in more detail the construction of assessment ratios for each state. We also depict the time series of assessed wealth, assessment ratios, and the market value of property in each state.

Alabama

- Use Census ratios for 1850, 1860 and 1870.
- Use 1880 Census ratio for 1876 - 1879. Note that the decrease in assessed wealth in 1875-1881 is due to the 1873 Panic and the subsequent economic Depression (1873-1879) that had a severe impact on Alabama's economy. Bank failures, reduced investments, and a downturn in the cotton market affected both agricultural and industrial sectors.
- In 1881, efforts are made towards a better equalization of assessed values, as mentioned in the Report of the Auditor. This effort is reflected in an increase in assessed values in 1881. To account for this increase in assessment ratios, we set the 1881 AR such that the (ratio of 1881 AR to 1880 AR) equals the (ratio of 1881 assessed value to 1880 assessed value).
- After this increase in assessment ratio, there is a steady decline in assessment practices, clearly indicated by the Report of the Auditor.
- After the 1886 Report of the Auditor expressed dissatisfaction with underassessments, a gradual increase in assessment ratios is put in place starting in 1887, as explained in the 1887 Report of the Auditor.
- Use 1890 Census ratio for 1891 - 1893.
- Use 1900 Census ratio for 1894 - 1899.

- Linearly interpolate between Census ratios for 1900-1904, and 1904 - 1912.
- Use 1912 Census ratio for 1912 - 1919.
- Use 1922 Census ratio for years 1920 and later.

Alaska Note that Alaska did not levy a general property tax at the level of the whole Territory before 1949, but incorporated towns did. The annual reports of the governor of Alaska provides detailed information about valuation of taxable property for all incorporated towns. A thorough Survey of Taxation exists for 1938. It indicates an average assessment ratio of 60% across towns (see Survey of Taxation 1938, page 31).

- We use 60% assessment ratio as a baseline for all years
- Set 1911-1913 ARs to 0.4 and interpolate between 1907 and 1911. It smooths unjustified drop in the series around 1910.

Arizona

- Use Census ratios for 1870 and 1880.
- Use 1890 Census ratio for 1887.
- Use 20% Census ratio for 1900 to 1904.
- Use 25% assessment ratio for 1905 - 1911.
- Use 1912 Census ratio for 1912.
- Set the 1913-1920 ARs to .8. This accounts for the broadening of the tax base (e.g. intangible property) and the improvement of assessment practices starting in 1913.
- Note that the peak in private wealth from 1913 to 1920 reflects a mining boom, as Arizona was a leading producer of copper. The demand for copper skyrocketed during World War I. Following the end of WWI, reduced copper prices and stockpiled bullion left from the years of high production caused a bust to Arizona's economy.
- Set the 1921 AR to .73.
- Use 1922 Census ratio for years post 1922.

Arkansas

- Use 1850 Census ratio for years 1850 and earlier.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, and 1904-1912.
- Use 1912 Census ratio for 1912 - 1921.
- Use 1922 Census ratio for years 1922 and later.

California

- The Historical Censuses of Wealth publication indicates a total true value of property of $21,923,173 for 1850. The Report of the state controller of California in 1854 provides much larger assessed valuations for 1850. The discrepancy could be due to (i) the fact that 1850 was the year that California was integrated in the Union, and (ii) the Historical Censuses of Wealth publication indicates that for some territories, only partial information had been collected. We therefore take the assessed valuation produced in the state reports of the controller as our valuation of property for California for 1850.
- We use the assessment ratio produced by the 1860 Census (Historical Censuses of Wealth publication) for years 1860 and earlier.
- Linearly interpolate between Census ratios for 1860-1870, 1880-1890, 1890-1900, 1900-1902, 1900-1904, 1904-1912, and 1912-1922.
- Set the 1871 AR to the 1870 Census AR.
- The jump in assessment ratios in 1872 reflects the increase in assessed property due to the renovation of the State Board of Assessors and Equalization and the formalization of assessment practices, thanks to the first adoption of the California Political Code on the 12th March 1872 which demanded that all property be assessed at its full cash value. Subsequently, the State Board issued rules and regulations to the Assessors (see Report of the State Board of Equalization for 1872-1873, p.4-6)
- Set the 1879 AR to the 1880 Census AR.
- Linearly interpolate between 1872 and 1879.
- Use 1922 Census ratio for years 1922 and later.

Colorado

- Use Census ratio for 1870.
- Use Census ratio for 1880 for years 1877 to 1870.
- Linearly interpolate between Census ratios between 1880-1890, 1890-1900.
- Use Census ratio for 1900 and 1904.
- We smooth the jump in assessed values around 1900-1904 to smooth unjustified jumps in private wealth by (i) setting the 1901 AR such that the (ratio of 1900 AR to 1901 AR) equals the (ratio of 1900 assessed value to 1901 assessed value), (ii) setting the 1902 AR to .36, (iii) setting the 1903 AR to the 1904 Census ratio.
- Linearly interpolate the Census ratios between 1904-1912.
- Set the 1913 AR to the 1922 Census ratio. This jump in assessment ratio is well-documented in State reports and accounts for the creation of the Colorado State Tax

Commission (see 1913 Report of Tax Commission, p.3-7; and 1914 Report of Tax Commission, p.3)

- The 1915 drop in assessed values is due to a law decreasing the assessment ratio of mining property (see 1915 Report of the Tax Commission, p.8). To account for this change in AR, we (i) set the 1916 AR such that the (ratio of 1913 AR to 1916 AR) equals the (ratio of 1913 assessed value to 1916 assessed value), and (ii) interpolate between 1913 and 1919, passing by 1916.
- Use 1922 Census ratio for 1919 and later

We note that the large peak of wealth observable around 1890 corresponds to the well-documented historical episode of the Colorado Silver Boom, following the discovery of a major silver lode near Leadville in 1878. The Sherman Silver Purchase Act of 1890 invigorated silver mining, and Colorado's last, but greatest, gold strike at Cripple Creek a few months later lured a new generation of gold seekers. The repeal of the Sherman Silver Purchase Act in 1893 led to a staggering collapse of the mining and agricultural economy of Colorado.[14]

Connecticut

- Connecticut had a particular system whereby assessors were asked to estimate property at its full cash value, but report a percentage of this value into a grand list to be used as tax base. The 1808 Statutes of Connecticut, Title 102, Chapter 1, Section 14, reports that 6% of the full cash value of intangible were to be reported in the grand list (as quoted in the State Tax Commission of 1922, p. 54).
- Note that until 1896, the grand list that is reported in the annual reports is the "Town Grand List". This List has typically a lower total assessed value than the State Grand List, or than the total assessed value of property estimated in Historical Censuses of Wealth for years 1850 to 1922. For consistency, we therefore report assessed values as the value assessed in the Town Grand List. To convert these assessed values into a true value, we use the fact that for all Historical Censuses of Wealth years, we do have precise estimates from Historical Censuses of Wealth of the total true value of property. Our Census assessment ratios reported in Figure A30 panel A therefore corresponds to the ratio of the Historical Censuses of Wealth estimate of total true value for that year divided by the assessed value in the Town Grand List for the same year available from State reports.
- Use 6% assessment ratio stipulated by the 1808 Statutes for year 1790 - 1820.

[14] See https://en.wikipedia.org/wiki/Colorado_Silver_Boom

- For the period 1808 to 1850, we observe (i) discontinuous drops in aggregate valuation of property in the grand list in 1821, 1828, and 1845. This decline in assessment ratios over the period is attested by the fact that the 1850 Census estimated a 3% assessment ratio, despite the assessment ratio of 6% indicated in the 1808 Statutes and in state records. To account for this, we adjust downwards the assessment ratio in three steps, to reflect the observed decline in assessed values in 1821, 1828, and 1845. More precisely, we use 4.4% assessment ratio for 1821 - 1827, 4% for 1828 - 1844, and 3.6% for 1845.
- Use 1850 Census ratio for 1850 and linearly interpolate assessment ratio between 1846 and 1850. Note that the 3% assessment ratio corresponds to the ratio mentioned in the revision of the statutes of 1851, p.53, Section 8.
- Linearly interpolate between 1850 and 1861 using 1850 and 1860 Census ratios, and following the same trend for 1861
- In 1860, property was required to be set in the Grand List at its actual valuation. The change becomes effective in the Grand List in 1862. This leads to a large increase in assessed values. To account for the fact that properties did not end up assessed at their full value, we use instead the assessment ratio estimated by the Census in 1870 for all years 1862 to 1870.
- Linearly interpolate between ratios for 1870-1880, 1880-1890, 1890-1900, 1900-1904, and 1904-1912
- Set 1913-1920 ARs to 1912 ratio
- Use 1922 Census ratio for years 1921 and later

Note also that from 1910 to 1922, Connecticut conducted a detailed quadrennial survey of the value of all tax-exempt property. The State of Connecticut also published manuals destined to assessors for property valuations, which offer a unique description of assessment practices.

Delaware

- Use Census ratio for years 1850, 1860, 1870, 1880.
- Linearly interpolate between Census ratios for 1880-1890, 1890-1900, and 1912-1922
- Set 1901 and 1902 AR to the 1912 Census ratio to smooth the drop in assessed values in this period. The drop is actually due to the change on the manufactures' tax due to the passage of the Act of March 12, 1901 (see 1913 Report of the Tax Commission, p.12-13)
- Use 1904 Census ratio for 1903 - 1911
- Use 1922 Census ratio for years 1922 and later

District of Columbia

- Use Census ratio for years 1850, 1860 and 1870
- Set 1877-1878 ARs to 1870 Census ratio to turn the unjustified sudden increase in private wealth into a smooth increase
- Linearly interpolate between Census ratios for 1880-1890, and 1890-1900
- Set (i) 1902,1903 and 1905 to the 1904 Census ratio, (ii) 1906-1908 AR to .45, and (iii) 1909-1917 AR to 1912 Census ratio to smooth the drop in 1902 assessed value and retrive a justified trend in private wealth
- Set 1918-1921 ARs to .7 to smooth the private wealth series, in order to compensate for the jump in assessed value du to the introduction of intangible property into the property tax (see 1919-1920 Report of the Auditor, p.6)
- Use 1922 Census ratio for years 1922 and later

Florida

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Use 1922 Census ratio for years 1922 and later

The boom in private wealth and assessed values in the 1920s is due to the Florida land boom, that faded away in the second half of the 1920s[15]. Thus, growth in total assessed valuation in those years is mostly driven by the growth in the valuation of real estate (see 1929 Report of the Comptroller, p.434).

Georgia

- Use Census ratios for years 1850 and 1860
- Use 1860 Census ratio for 1860-1864
- Use 1870 Census ratio for 1865-1874
- Use 1880 Census ratio for 1879-1880
- Linearly interpolate between Census ratios for 1880-1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Use 1921 ratio in the Financial Statistics of States for 1920
- Use 1922 Census ratio for years 1922 and later

[15] see https://en.wikipedia.org/wiki/History_of_Florida and https://en.wikipedia.org/wiki/Florida_land_boom_of_the_1920s

The increase in per capita assessed property in 1860-64 has two main explanations:

(i) In April 1863, an extra session of the Legislature requiring all persons to return their property at its fair market value. It led to a tremendous increase in the property returned in 1863 compared with 1862 (see 1863 Report of the Comptroller General, partI p.4-5)
(ii) The prices of lands surged (see 1863 Report of the Comptroller General, part I p.5, part II p.2-5; and 1864, part I p.5, part II p.134-7).

The drop in per capita assessed property in 1866 is consistent with reports and the historical context:

(i) the drop in property following the Civil War under its 1860 value (see 1866 Report of the Comptroller General, part 1, p.27 and Tables A to E in part 2, p.2-31)
(ii) the devastating effects of Sherman's march in Georgia which started in December 1864 (see https://en.wikipedia.org/wiki/History_of_Georgia_(U.S._state)).

Our adjustment in AR series aim at taking those historical facts into account.

Also note that the decrease in assessed values and private wealth in the middle of the 1890s is due to a financial depression (see 1902 Report of the Comptroller General, p.5)

Hawaii

- The Historical Censuses of Wealth reports did not estimate the property of Hawaii.
- We use the 1930 assessment ratio reported in the Financial Statistics of States throughout.

Idaho

- We use Census ratio for years 1850 and 1860.
- We linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904.
- Use 1904 Census ratio for 1905 - 1910
- In early 1910s, Idaho made important reforms to assessment and equalization practices (see e.g. recommendations of the State Auditor in his 1909-1910 Reports) leading up to the creation of the State Tax Commission. Assessment ratios were increased significantly in 1911 as a result. While State sources indicate that assessment ratios went from 40% to 100%, this seems unrealistic. First because the 40%

ratio in 1910 appears too high relative to Census estimates for 1900 and 1904. Second, because the 100% ratio appears too high relative to the 1912 Census ratio. We therefore keep the 1910 ratio to the 1904 Census ratio level and we set the 1911 AR to .7 to match the observed increase in assessed value between 1910 and 1911.

- We linearly interpolate between Census ratios for 1912-1922.
- Use 1922 Census ratio for years 1922 and later.

Illinois

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1880-1890, 1890-1900, 1900-1904
- The creation of the Board of Equalization in 1873 led to a significant but temporary increase in assessment ratios documented in State reports. Concretely, we: (i) use 1870 Census ratio for 1870-1872; (ii) set the 1873 AR so that the (ratio of 1872 AR to 1873 AR) equals the (ratio of 1872 assessed value to 1873 assessed value); (iii) linearly interpolate from 1874 to 1880 to reach the 1880 Census ratio.
- In 1899 and 1900, the small jump and subsequent drop in assessed value is entirely driven by a temporary change in assessment practices in Cook county. This is abundantly commented in the Reports of the Illinois State of Board of Equalization of 1899 and 1900. The change in assessment practices in Cook county was sufficiently large that it made newspapers headlines throughout the U.S. (see for instance, this article of New York Times of June 2nd 1899.) We have decided not to adjust the value of the Illinois state assessment ratio for this historical episode, as this change in assessment only affected Cook county.
- In 1909, assessment ratios increased in exchange for a decrease in the rate of the state property tax, although no specific regulation was passed to specify a new rate of assessment. In order to smooth the jump in assessed value in 1909, we: (i) apply the 1900-1904 slope in ARs to 1905-1908; (ii) set the 1909 AR such that the (ratio of 1908 AR to 1909 AR) equals the (ratio of 1908 assessed value to 1909 assessed value); (iii) linearly interpolate from 1909 to 1912, to reach the 1912 Census ratio value.
- The creation of the Tax Commission in 1919 led to a sharp rise in assessment ratios due to improved assessment practices that are well-documented in the reports of the board of equalization. Concretely we: (i) use the 1922 Census ratio for 1919-1926; (ii) set the 1918 AR such that the (ratio of 1918 AR to 1919 AR) equals the (ratio of 1918 assessed value to 1919 assessed value); (iii) linearly interpolate between the 1912 Census ratio and 1918

- There is a well-documented increase in assessment ratios in 1927 (see for instance reported basis of assessment in practice for Illinois in the Financial Statistics of States). The overall levels of these reported ratios are generally too high relative to the ratios estimated by the Decennal Census reports. We therefore match the jump in ratios reported in 1927 by the Financial Statistics of States for Illinois, but not the levels. Concretely, we use a 40 % assessment ratio for years 1927-1930.

Indiana

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870.
- There is a significant increase in assessed values in 1873, but the exact changes in assessment practices responsible for this increase is not well documented. To account for this increase in assessment, we: (i) set the 1873 AR such that the (ratio of 1873 AR to 1872 AR) equals the (ratio of 1873 assessed value to 1872 assessed value); (ii) linearly interpolate between 1873 and 1880 to reach the 1880 Census ratio
- Linearly interpolate between Census ratios for 1880-1890.
- The creation of the Tax Commission in 1891 led to an increase in assessment in 1891. We account for this by increasing the AR in 1891 to the Census 1900 ratio level.
- We linearly interpolate between Census ratios for 1900-1910
- Set the 1903 AR to the 1902 AR to slightly smooth the series.
- Assessed values surged due to the extended powers given to the Board of Tax Commissioners in 1918. This surge is well-documented in the reports of the Tax Commission. In practice we: (i) set the 1918 AR to the 1918 State Records ratio[16], and (ii) linearly interpolate between the 1912 Census ratio and the 1918 State Records ratio
- We use the 1922 Census ratio for 1919 and later.

Iowa

- We use 1850 Census ratio for 1850.
- We linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Use 1922 Census ratio for 1922-1930

[16]The State Tax Commission of 1918 estimated that the assessment of property varied across the State, but gave plausible estimates ranging from 10%, 25%, and 40% for real property. We use the middle range estimate of 25%. See for reference the discussion pp. 122-123.

Kansas

- Use 1850 Census ratio for 1850.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, and 1912-1922
- The creation of the Tax Commission led to a surge in assessed values. This is surge is well-documented in various sources. In practice, we: (i) use 16.5% ratio for 1907[17]; (ii) linearly interpolate between 1904 Census ratio and 1907; (iii) use 80% assessment ratio for 1908[18]; (iv) linearly interpolate between 1908 and the 1912 Census ratio
- Use 1922 Census ratio for 1922 and after

Note that the rise and fall of private property around 1920 is due to the Kansas Oil Boom following the discovery of the El Dorado oil field in 1915, as well as the expansion of the farm economy during WWI. The collapse of wheat prices led to a bust in property values starting in 1922. The report of the Tax Commission speaks of "falling market prices of almost all classes of animals in the state, and of the different varieties of grain held by farmers, and by the general tendency downward of prices of most kinds of personal property" (see 1921-1922 Report of the Tax Commission, p.179).

Kentucky

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912
- The creation of the Tax Commission led to a well-documented jump in assessment ratios. In practice we: (i) use 1912 Census ratio for 1912-1914; (ii) set 1915-1917 AR to 50%; (iii) use 1922 Census ratio for 1918 and later years

Louisiana

- Use 1850 Census ratio for 1850.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912
- Use 1912 Census ratio for 1912-1917
- The creation of the Tax Commission led to a sharp increase in assessment ratios in 1918. We use 50% ratio for 1918-1921 (in line with Financial Statistics of States)
- Use 1922 Census ratio for 1922 and later years

[17] cf Proceedings of 1908 National Tax Association conference reported in its digest, p. 225.

[18] Reform of the basis of assessment in 1908 cf. Jensen (1931, p. 473), the Historical Censuses of Wealth 1912 estimated the new assessment ratio to be around 80% (see p. 20)

Maine

- Use 1850 Census ratio for 1850 and earlier years
- Use Census ratios for 1860, 1870, 1880 and 1890.
- Linearly interpolate between Census ratios for 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Use 1922 Census ratio for 1922 and later years

Maryland

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1912, and 1912-1922
- The jump in assessed values in 1896 is due to a change in assessment laws and the appointment of a Boards of Control and Review (see 1897 Report of the Tax Commission, p.6,8-9). To smooth this jump, we: (i) set the 1896 AR so that the ratio of 1894 AR to 1896 AR equals the ratio of 1894 assessed value to 1896 assessed value; (ii) linearly interpolate between 1896 and the 1900 Census ratio
- Use 1922 Census ratio for 1922 and later years

Massachusetts

- Use 1850 Census ratio for 1850
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Use 1922 Census ratio for 1922 and later years

Michigan

- Use 1850 Census ratio for 1850 and earlier years
- The creation of the Board of Equalization led to a sharp increase in assessments. In practice, we: (i) set the 1851 AR to 40% and the 1852 AR to 30%; (ii) set the 1853 AR to 68%; (iii) use 1860 Census ratio for 1854-1860
- Linearly interpolate between Census ratios for 1860-1870, 1870-1880, 1880-1890, 1890-1904, 1904-1912
- Set the 1903 AR to 1904 Census ratio to account for the jump in assessed value in 1903 due to the entry of railroads, and express, telephone and telegraph companies into the *ad valorem* tax from March 1, 1903 on (see Act No. 173 of the 1901 Legislature discussed in the 1903-1904 Report of the Tax Commission, p.8-9)

- Use 1912 Census ratio for 1912-1919
- Use 1922 Census ratio for 1920 and later years

Minnesota

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1860-1870, 1880-1890, 1890-1900, and 1904-1912
- In 1873, the Board of Equalization significantly increased the assessments of property values. The increases in assessment ratios mandated by the new equalization procedure, county by county, are very well-documented (see for instance, 1873 Report of the Auditor, p.53). To account for this surge, we: (i) set 1871-1873 AR to the 1870 Census ratio; (ii) set the 1874 AR so that the (ratio of 1873 AR to 1874 AR) equals the (ratio of 1873 assessed value to 1874 assessed value); (iii) linearly interpolate between 1874 ratio and 1880 Census ratio
- Use 1900 Census ratio for 1900-1901, use 1904 Census ratio for 1902-1904
- Use 1912 Census ratio for 1912 - 1919
- Set 1920 AR to 32%, set 1921 AR to 30% to account for the temporary increase in assessment ratios documented in the Financial Statistics of States.
- Use 1922 Census ratio for 1922 and later years

Note that the drop in property values in 1896 corresponds to a regional banking panic crisis that hit Minnesota[19].

Mississippi

- Use Census ratios for 1850, 1860, 1870 and 1880
- Linearly interpolate between Census ratios for 1880-1890, 1890-1900, 1900-1904, and 1904-1912
- The creation of the State Tax Commission led to an increase in assessments. In practice, we: (i) use 25% assessment ratio for 1915-1916 (i.e. the Financial Statistics ratio for 1915) (ii) linearly interpolate AR between the 1912 Census ratio and the 1915 Financial Statistics ratio (iii) we use the 1922 Census ratio for 1917 and later years

Missouri

[19] see https://www.federalreservehistory.org/essays/banking-panics-of-the-gilded-age

- Use Census ratios for 1850 and 1860
- Use 1870 Census ratio for 1861-1870
- Linearly interpolate between Census ratios for 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912
- Use 1912 Census ratio for 1912-1920,
- Set 1921 AR to 33.6% (Financial Statistics 1918)
- Use 1922 Census ratio for 1922 and later years

Note the belated effect of the creation of the Tax Commission on assessed values. It only became effective after, in 1921, a representative from the Tax Commission visited various counties to give "help, information and instructions to the various officers as would promote efficiency and uniform compliance with the law" (see 1921-1922 Report of the Tax Commission, p.36-38).

Montana

- Use Census ratios for 1870, 1880 and 1890.
- Linearly interpolate between Census ratios for 1900-1912
- There is a drop in assessment ratios in 1920 following the banking crisis in Montana. We stick closely to the documented evolution of ARs in the Financial Statistics. In practice, we: (i) set the 1918 AR such that the ratio of 1918 AR to 1920 AR equals the ratio of 1918 assessed value to 1920 assessed value; (ii) linearly interpolate between 1912 Census ratio and 1918 ratio
- Use 1922 Census ratio for 1920 and later years

Note: The economy of Montana was badly hit by the post WWI slump, with agricultural prices plummeting. This led to a statewide banking crisis, with more than half of banks disappearing in Montana over the period 1920-25. See https://mhs.mt.gov/education/WWI/MontanaBanking1910-1925_1.pdf.

Nebraska

- Use 1860 Census ratio for 1860
- Linearly interpolate between Census ratios for 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1904-1912
- Use 1900 Census ratio for 1900-1903
- Use 1912 Census ratio for 1912-1919

- The creation of the Tax Commission led to a sharp increase in AR. We stick closely to the documented increase in AR in the Financial Statistics. In practice, we: (i) Use 16% ratio in 1920 (ii) use 1922 Census ratio for 1921 and later years

Nevada

- Use 1870 Census ratio for 1870 and earlier years
- Linearly interpolate between Census ratios for 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Set the 1901 ratio to the 1902 ratio
- Use 1922 Census ratio for 1921 and later years

Note that the tremendous increase in assessed property starting in 1904 is driven by the mining boom. The surge is particularly impressive for years 1906 to 1907 (see Report of the State Controller from 1907 on, p.22) and due to counties like Esmeralda, Lincoln, Nye where gold and silver production more than tripled in 1906-1907 (see Annual Report of the State Controller for detailed county tables - 1906: p.33, 1907: p.31). Also note that the annual assessment for 1906 is described as "incomplete" in Reports of the State Controller, even in later years (e.g 1918 summary table, p.22). It actually seems that the assessed value of property is unreported in the Nye County in 1906 (p.33). Thus, the series might slightly overestimate the true jump in assessed property between 1906 and 1907.

New Hampshire

- Use Census ratio for 1850, 1960, 1870 and 1880.
- Linearly interpolate between Census ratios for 1880-1890, 1890-1900, 1904-1912, and 1912-1922
- Set 1902 ratio to 45%
- Use 1904 Census ratio for 1903-1904
- The drop in assessed values in 1909 is due to savings bank deposit, building and loan association capital stock, and insurance capital not being reported in state reports anymore. To account for this change in assessed property reported, we set the 1909 AR such that the ratio of 1908 AR to 1909 AR equals the ratio of 1908 assessed value to 1909 assessed value
- The creation of the Tax Commission led to an increase in assessed values. We set the 1911 AR such that the ratio of 1912 AR to 1911 AR equals the ratio of 1912 assessed value to 1911 assessed value.

- Linearly interpolate between 1909 and 1911
- Use 1922 Census ratio for 1922 and later years

New Jersey

- Use 1850 Census ratio for 1850, 1860, 1870 and 1880.
- Linearly interpolate between Census ratios for 1880- 1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922
- Use 1922 Census ratio for 1922 and later years

New Mexico

- Use Census ratio for 1850, 1860, 1870, 1880.
- Use 1870 Census ratio for 1870-1879 and 1881
- In 1882, the creation of the state board of equalization led to an increase in assessed values. We set the 1882 AR such that the private wealth value in 1882 corresponds to a linear interpolation between the Census true values of 1880 and 1890.
- Use Census ratio for 1890
- Linearly interpolate assessment ratios between 1900 and 1904 for which we have assessment ratio estimates from the Census (i.e. in effect, this sets the 1902 ratio to 18%).
- Use 1912 Census ratio for 1912-1915
- The creation of the Tax Commission led to a sharp increase in assessments in 1916, which is well documented, and also observable in the AR reported in Financial Statistics. We account for this surge by setting the 1916-1921 ratio to 50%
- Use 1922 Census ratio for 1922 and later years

New York

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1904-1912, and 1912-1922
- Use 1900 Census ratio for 1900-1903
- Use 1922 Census ratio for 1921 and later years

North Carolina

- Use Census ratio for 1850, 1860 and 1870.

- Linearly interpolate between Census ratios for 1870-1880, 1880-1890, 1890-1900, 1900-1904, and 1904-1912
- The creation of the Tax Commission led to a well-documented increase in assessment ratios. In practice we: (i) set 1902 AR to 1901; (ii) set 1903 AR to 1904 Census ratio
- Before the Revaluation Act, assessment ratios continued to decline. We therefore prolong the 1904-1912 declining trend in ARs to the period 1913-1919
- The 1919 Revaluation act had an important impact on AR, by standardizing property valuation. This is well documented in a special report of the state Tax Commission for 1920.[20] We set 1920 AR to 80%
- Use 1922 Census ratio for 1921 and later years

North Dakota

- Use 1890 Census ratio for 1890 or earlier years
- Linearly interpolate between Census ratios for 1890-1900, 1900-1904, 1904-1912
- Use 1912 Census ratio for 1912-1919
- Note that in 1919, North Dakota experienced an important change in the basis of assessment which considerably increased all valuations (see 1932 Proceedings of the Board of Equalization of 1932, p. 96).[21]
- Use 1922 Census ratio for 1920-1922
- Use 50 % ratio for 1923 or later years (ratio estimated by the Board of Equalization in 1932, p.95)

The sharp increase in private wealth starting in 1915 corresponds to the agricultural boom and bust due to World War I. The demand for wheat and other crops surged, leading to higher prices and increased farming activity. After the war, European agricultural production recovered, leading to a drop in demand for American crops. This resulted in plummeting prices and financial distress for North Dakota farmers.

Ohio

- Use 33% ratio for 1846 or earlier years

[20] See Report of State Tax Commission on Revaluation, available here.

[21] The State Constitution was limiting tax rates on property to 4 mills. Owing to the fact that sufficient state revenues could not be raised due to the assessment ratios prescribed by the Classification Law of 1917, the Legislature in 1919 passed a new Classification Law under the provisions of which property was divided into two classes. Class One (essentially railroads and other public utilities) was required to be valued and assessed at 100% of true value and Class Two at 50% of true value.

- Use 1850 Census ratio for 1847-1849,
- Note that there were several well-documented revaluations of real property. The most important happened in 1847, 1854, 1871. These revaluations led to increases in assessment ratios.
- The largest of these, in 1847, was due to the "Kelley Law". While the Ohio General Assembly had established a general property tax in 1825, the Kelley Law specified for the first time that all real and personal property should be subject to taxation, amending the previous legislation, which left much personal property exempt (Bates, 1888; Scheiber, 1978).
- Apart from these episodes of revaluations, we linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1910 and 1912-1922
- In 1911, there was a sudden increase in assessment ratios following the creation of the State Tax Commission. The surge in assessment ratios is well-documented. In practice, we (i) use 33% assessment ratio for 1910 (this ratio is the one documented in Historical Censuses of Wealth for the period just before the creation of the State Tax Commission, cf. Historical Censuses of Wealth 1912 Assessed Valuation p. 28. available here, (ii) use 1912 Census ratio for 1911
- Note that there were also small partial revaluations, under the Warnes law, in 1914, 1915 and 1920. But in the absence of precise information and given their limited effect on assessed values, we did not attempt to correct for them.
- We use 1922 Census ratio for 1922 and later years

Oklahoma

- Use 1900 Census ratio for 1900 and earlier years
- Linearly interpolate between Census ratios for 1900 - 1904
- There was a decline in assessment ratio prior to 1907. We set ratios to 17% in 1905, 14.5% in 1906, 11% in 1907
- In 1907, Oklahoma entered the Union and moved to a full cash basis for assessment, leading to a very sharp increase in assessment ratios to 51.5% in 1908.
- We apply the same trend in AR decline in assessment to 1908-1912 after reform towards use full cash basis for assessment: 49% in 1909, 46.5% in 1910, 44% in 1911
- Use 1912 Census ratio for 1912-1918
- Use 1922 Census ratio for 1919 and later years

Oregon

- Use 1850 Census ratio for 1850.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1890-1900, 1900-1904, and 1912-1922
- For the period 1884 to 1890, we account for the observed decline in assessed values by linearly interpolating between the Census ratio for 1880 and an AR of 25% for 1889. The resulting increase in AR between 1889 and 1890 does match the observed increase in assessed values.
- Use 40% ratio for 1907-1909 and linearly interpolate between 1904 Census ratio and 1907
- Use 1912 Census ratio for 1910-1912
- Use 1922 Census ratio for 1922 and later years

Pennsylvania

- Use 1850 Census ratio for 1850.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, and 1900-1904
- Use 1922 Census ratio for 1913 and later years

Puerto Rico

- No information on assessment ratio: use conservative estimate of full assessment ratio.

Rhode Island

- Use 1850 Census ratio for 1850. We assume a similar ratio for 1795.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1880-1890, 1890-1900, 1900-1904, and 1912-1922
- Use 1870 Census ratio for 1871-1879
- Set the 1881 AR such that the (ratio of 1880 Census ratio to 1881 AR) equals the (ratio of 1880 assessed value to 1881 assessed value)
- Linearly interpolate between 1881 and 1890
- Set the 1905 AR such that the (ratio of 1904 AR to 1905 AR) equals the (ratio of 1904 assessed value to 1905 assessed value)
- Set 1902 AR to 1905 AR
- Set the 1911 AR such that the (ratio of 1912 AR to 1911 AR) equals the (ratio of 1912 assessed value to 1911 assessed value)

- Linearly interpolate between 1905 and 1911
- Use 1922 Census ratio for 1922 and later years

South Carolina

- Use 1850 Census ratio for 1850. We assume a similar ratio for 1795.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1912, and 1912-1922
- Use 1922 Census ratio for 1922 and later years

South Dakota

- Use 1890 Census ratio for 1890 and earlier years
- Linearly interpolate between Census ratios for 1890-1900, 1900-1904, 1904-1912
- The creation of the state tax commission led to a sharp and well-documented increase in assessment ratio. We use 75% ratio for 1913-1918 (Financial Statistics ratio for 1915), and 80% ratio for 1919-1920 (Financial Statistics ratio for 1918.
- Use 1922 Census ratio for 1921 and later years

Tennessee

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850-1860, 1870-1880, 1880-1890, 1890-1900, 1900-1904, 1904-1912
- Use 1860 Census ratio for 1860-1864
- Use 1870 Census ratio for 1865-1870
- Extrapolate declining trend 1904-1912 for 1913-1919
- The 1919 jump in assessed values results from the extension of the Board of Equalization following legislative action. After its creation in 1895 and until 1919, it had just been dedicated to railroads and telegraphs. This new Board of Equalization started its work in 1919, with first effects in 1920 (see 1922 Report of the State Tax Commissioner, part 1, p.28). This led to a well-documented jump in AR jumps to 60% ratio (see Tax Commission 1922).
- Use 1922 Census ratio for 1922 and later years

Texas

- Use 1850 Census ratio for 1850 and earlier years

- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1904, and 1912-1922
- Use 1904 Census ratio for 1904-1907
- Use 1912 Census ratio for 1908-1912
- Use 1922 Census ratio for 1922 and later years

Utah

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1900-1904, and 1904-1912
- Use 1880 Census ratio for 1880-1886
- Use 1890 Census ratio for 1887-1893
- Use 1900 Census ratio for 1894-1900
- Extrapolate trend 1904-1912 during 1913-1915
- In 1915, the 1915 Legislature passed a law limiting the levies and necessitating a sharp and well documented increase in assessment of all property. (see 1915-16 Report of the Board of Equalization, p.5). We use a 50% assessment ratio for 1916-1920 (Financial Statistics 1915)
- Use 1922 Census ratio for 1921 and later years

Vermont

- Use 1850 Census ratio for 1850.
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, 1900-1912, and 1912-1922
- Use 1922 Census ratio for 1922 and later years

Note that the 1890 peak in the assessed value is due to the introduction of a statewide property tax (see the 1893-1894 Report of the Tax Commission, p.3 mentionning the "Laws of 1890"; and https://vermonthistory.org/journal/76/VHS760101_1-18.pdf).

Virginia

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1880-1890, 1890-1900, 1900-1904, 1904-1912, and 1912-1922

- Use 1870 Census ratio for 1870-1877
- Use 1880 Census ratio for 1878-1880
- Use 1912 Census ratio for 1912-1921
- Use 1922 Census ratio for 1922 and later years

Washington

- Use 1860 Census ratio for 1860 and earlier years
- Linearly interpolate between Census ratios for 1860-1870, 1870-1880, 1880-1890, 1900-1904, and 1912-1922
- Use 1900 Census ratio for 1891-1900
- Set the 1892 AR such that the (ratio of 1891 AR to 1892 AR) equals the (ratio of 1891 assessed value to 1892 assessed value), to take into account the fact that assessed property was highly undervalued in 1892 according to the State Auditor (see 1891-1892 Report of the State Auditor 1891-92, p.15).
- Use 1904 Census ratio for 1904-1905
- Use 1912 Census ratio for 1906-1912
- Use 1922 Census ratio for 1922 and later years

Note the particularly impressive boom and bust of private wealth around 1890. The bust followed the *Panic of 1893*, which led to the first large scale depression in Western states, hitting particularly badly Washington State. This episode is well-documented in Ramsey, Bruce (2018). The Panic of 1893: The Untold Story of Washington State's First Depression. Caxton Press. ISBN 978-0870046216.

West Virginia

- Use 1870 Census ratio for 1870.
- Linearly interpolate between Census ratios for 1870-1880, 1890-1900, and 1900-1904.
- Use 1880 Census ratio for 1880-1884
- Use 1890 Census ratio for 1885-1890
- Extrapolate 1900-1904 trend for 1905
- The creation of the tax commission led to a sharp increase in assessment ratios to 60% in 1905 (See Proceedings of 1907 National Tax Association conference reported in its digest, p. 17).
- Linearly interpolate between 1905 and 1912 Census ratio
- Use 1912 Census ratio for 1912-1917
- Use 1922 Census ratio for 1918 and later years

Wisconsin

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850-1860, 1860-1870, 1870-1880, 1880-1890, 1890-1900, and 1904-1912
- The creation of the tax commission led to an increase in assessments starting in 1901. In practice we set 1901-1903 ARs to 1904 Census ratio
- Set 1912-1915 and 1920-1921 ARs to the 1912 Census ratio
- Set the 1916 AR such that the (ratio of 1915 AR to 1916 AR) equals the (ratio of 1915 assessed value to 1916 assessed value)
- Interpolate between 1916 and 1920
- Use 1922 Census ratio for 1922 and later years

Note that the 1899-1902 period covers a transition towards more efforts in the assessment process, to secure a better compliance with the law (see 1901-1902 Report of the Tax Commission, p.11 and p.16). It echoes the increasing trend in assessed values observed in this period.

Since 1903, railroads have been assessed by the State Tax Commission on an *ad valorem* basis – under the "Unit Rule" – and taxed at the average state rate (see 1954 Report of the Tax Commission, p.6). Before 1903, an annual license fee was instead used, in lieu of taxes upon property and franchises. Street railway and Telegraph companies experienced the same transition in 1907-1908 (see 1905-1906 Report of the Tax Commission, p.123; and 1907-1908 Report of the Tax Commission, p.89). In 1925, other utilities were brought under this same Unit Rule of assessment, and taxed at the average state rate in 1929.

In 1927, the legislature repealed the long standing statute which provided for the assessment of the shares of banks as general property and substituted therefor the corporation income tax (see 1930 Report of the Tax Commission, p.38).

Wyoming

- Use 1870 Census ratio for 1870 and earlier years
- Linearly interpolate between Census ratios for 1880-1890, 1890-1900, and 1900-1904
- Use 1870 Census ratio for 1870-1879
- Use 1904 Census ratio for 1905-1906
- Set the 1907-1908 ARs such that the (ratio of 1906 AR to 1907 AR) equals the (ratio of 1906 assessed value to 1907 assessed value)
- The creation of the tax commission in 1909 led to a well-documented increase in assessment ratios. In practice, we set the 1909 AR such that the (ratio of 1908 AR to

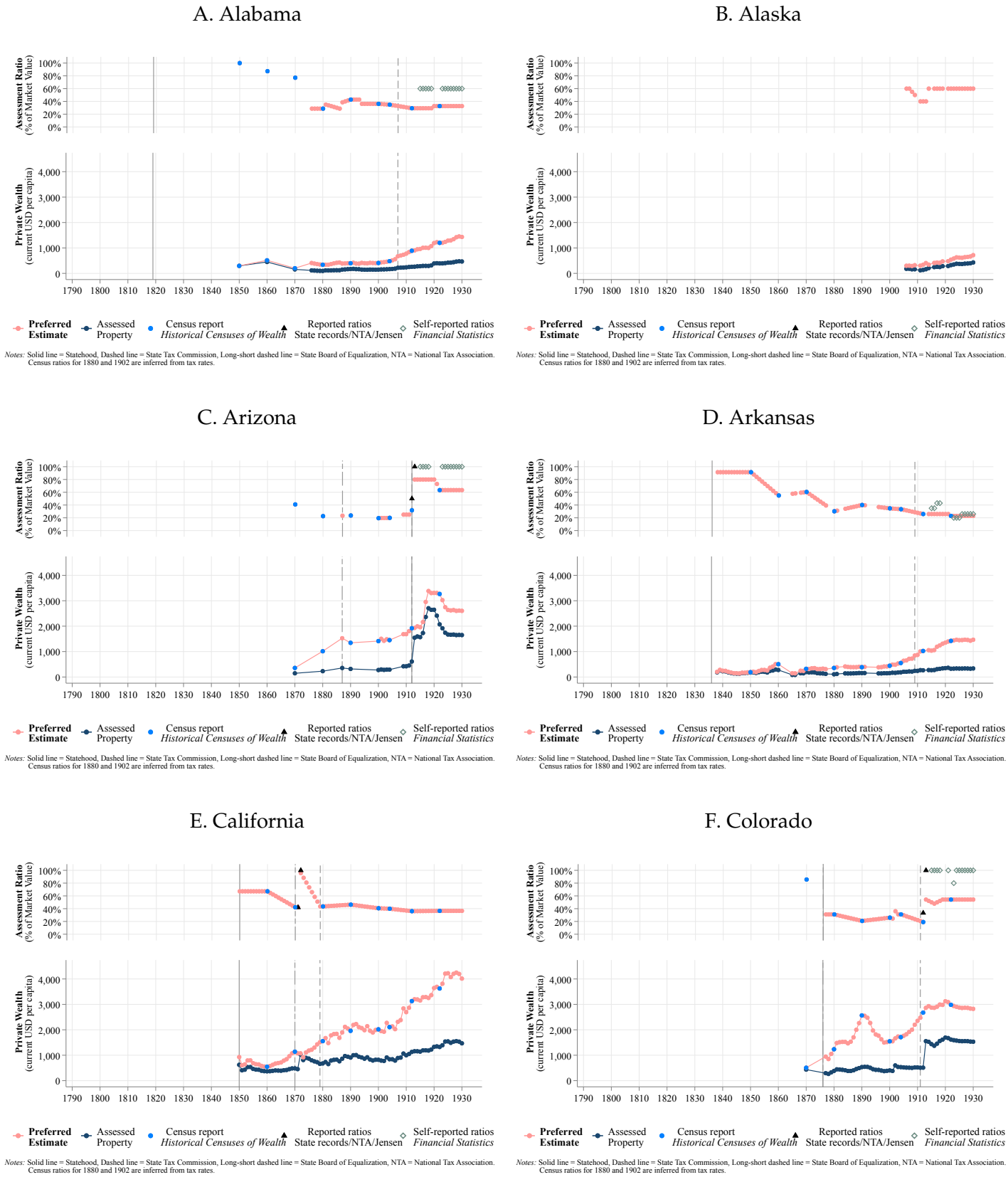
1909 AR) equals the (ratio of 1908 assessed value to 1909 assessed value)

- Linearly interpolate between 1909 and 1912 Census ratio
- Use 1922 Census ratio for 1913-1919 and 1922
- Use 60% ratio for 1920-1921 and 70% ratio for 1923 and later years (Financial Statistics of States for 1921 and 1923-1930 respectively)

Note the impressive increase in property values from the 1870s to the mid 1880s. It corresponds to the well-documented "Wyoming cattle boom" (1868-1886). The boom was led to an end by arctic winter temperatures for a series of winters that decimated herds, while global beef prices were also plummeting.[22]

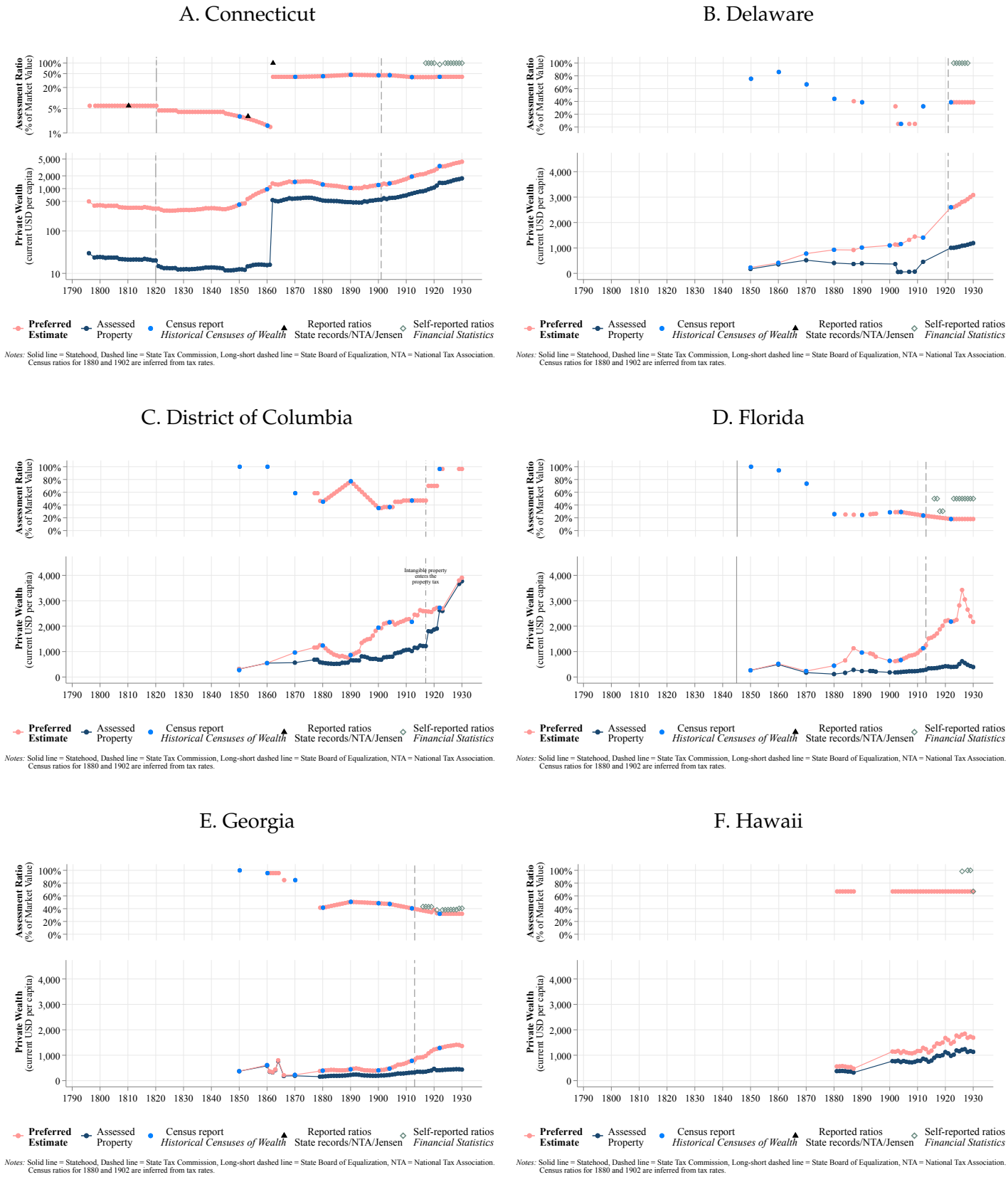
[22]See for instance https://www.wyohistory.org/encyclopedia/wyoming-cattle-boom-1868-1886

Figure A29: Assessed Property Value, Assessment Ratio and Private Wealth series



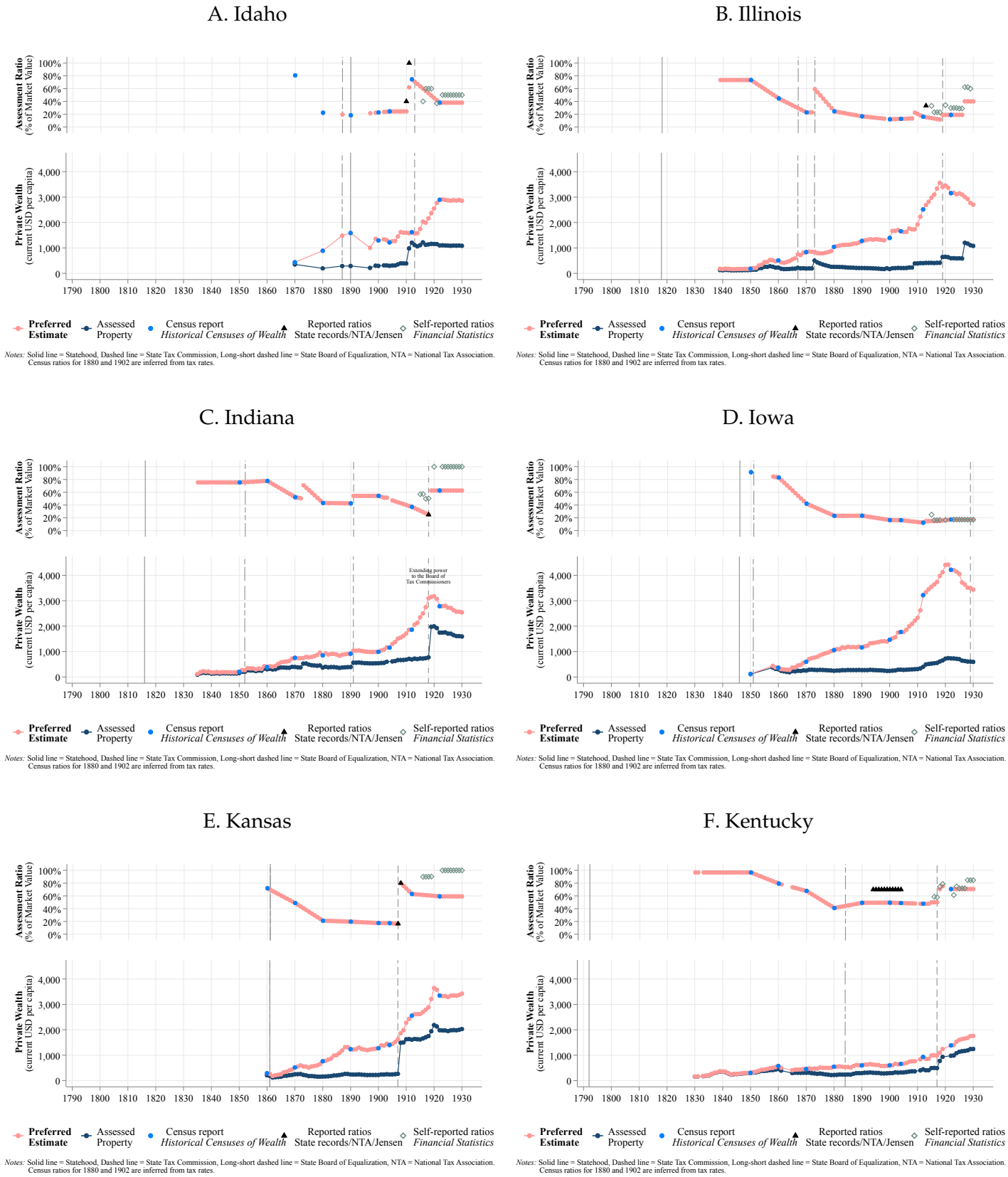
Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions).

Figure A30: Assessed Property Value, Assessment Ratio and Private Wealth series



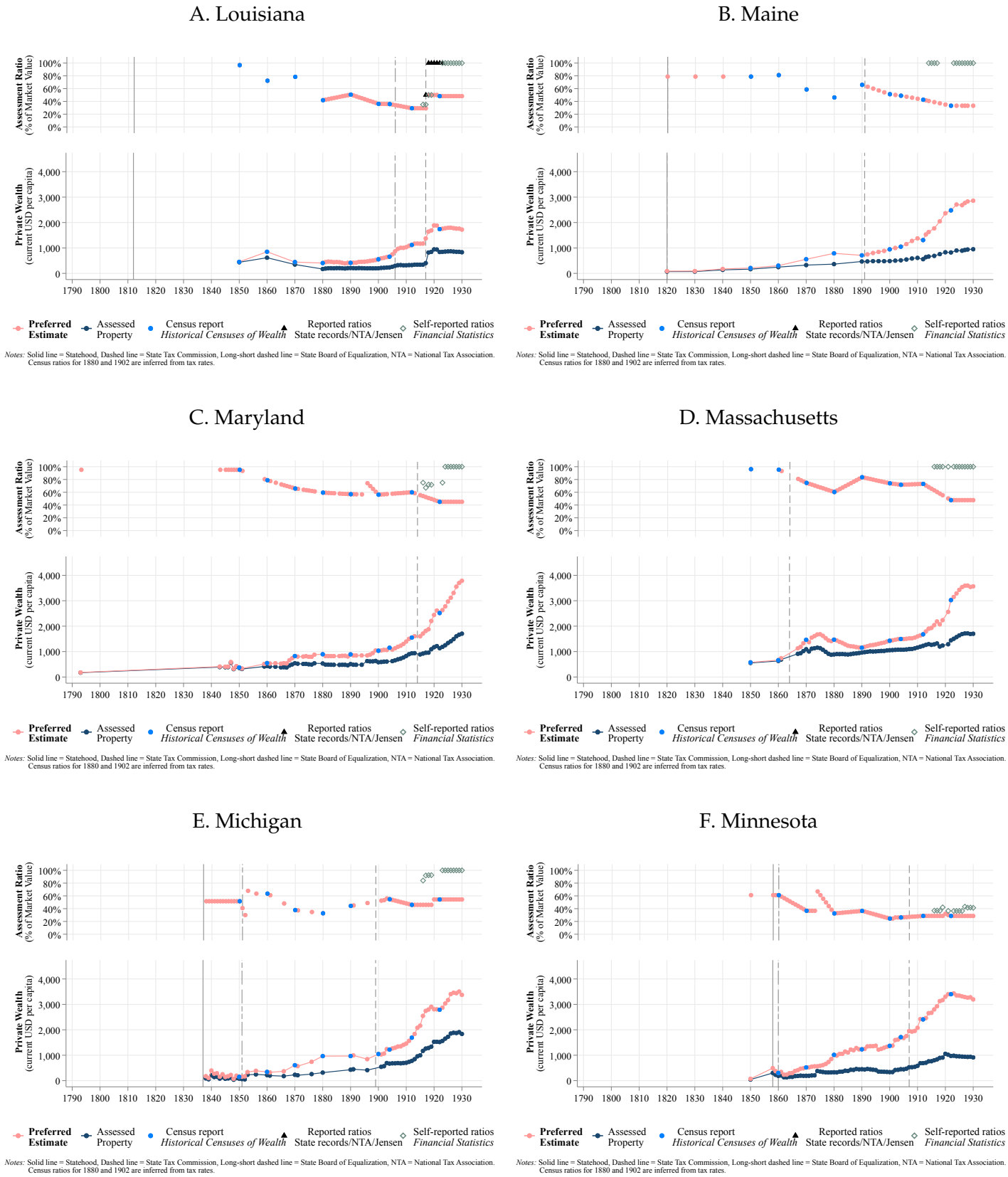
Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions). A log transformation is applied to the y-axis of Connecticut.

Figure A31: Assessed Property Value, Assessment Ratio and Private Wealth series



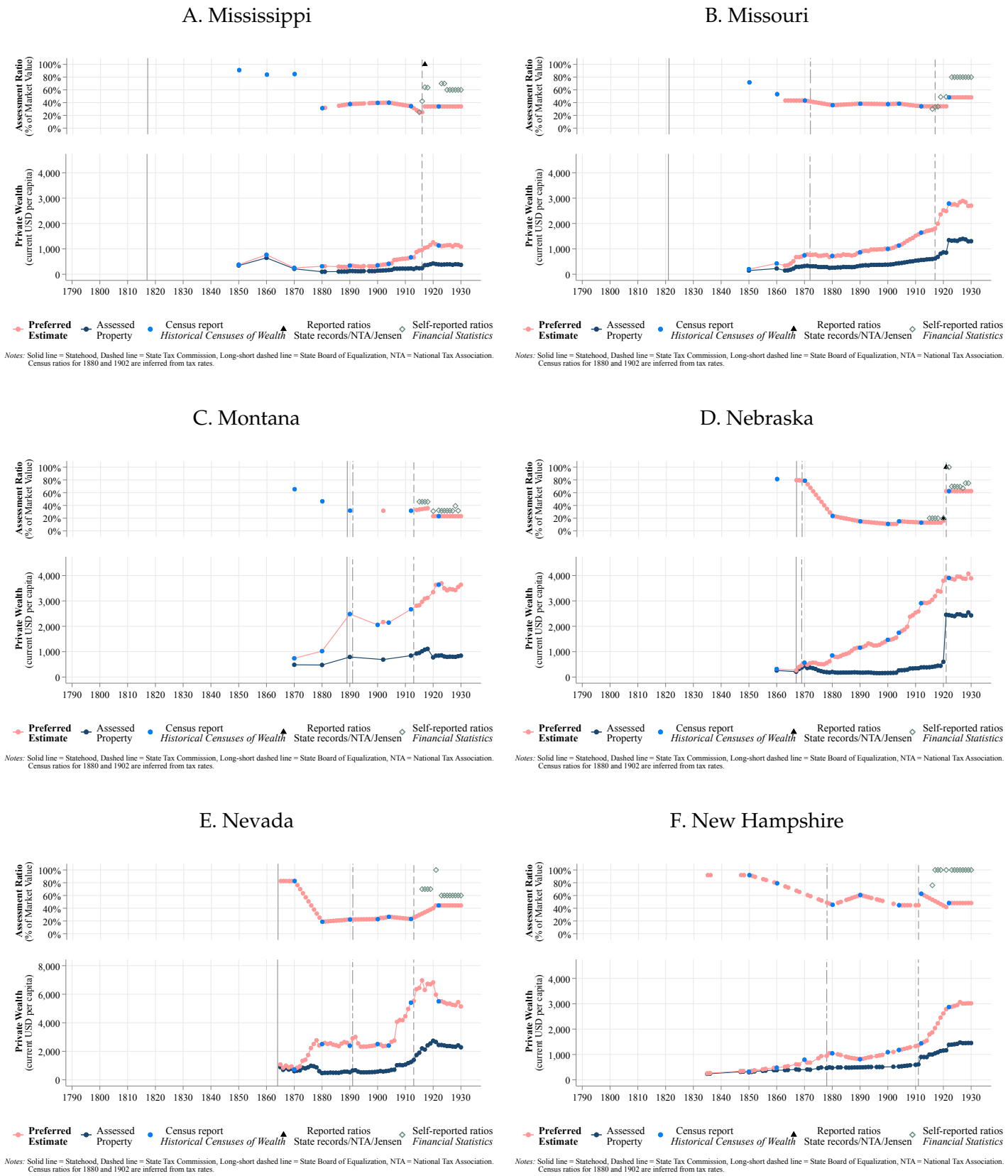
Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions).

Figure A32: Assessed Property Value, Assessment Ratio and Private Wealth series



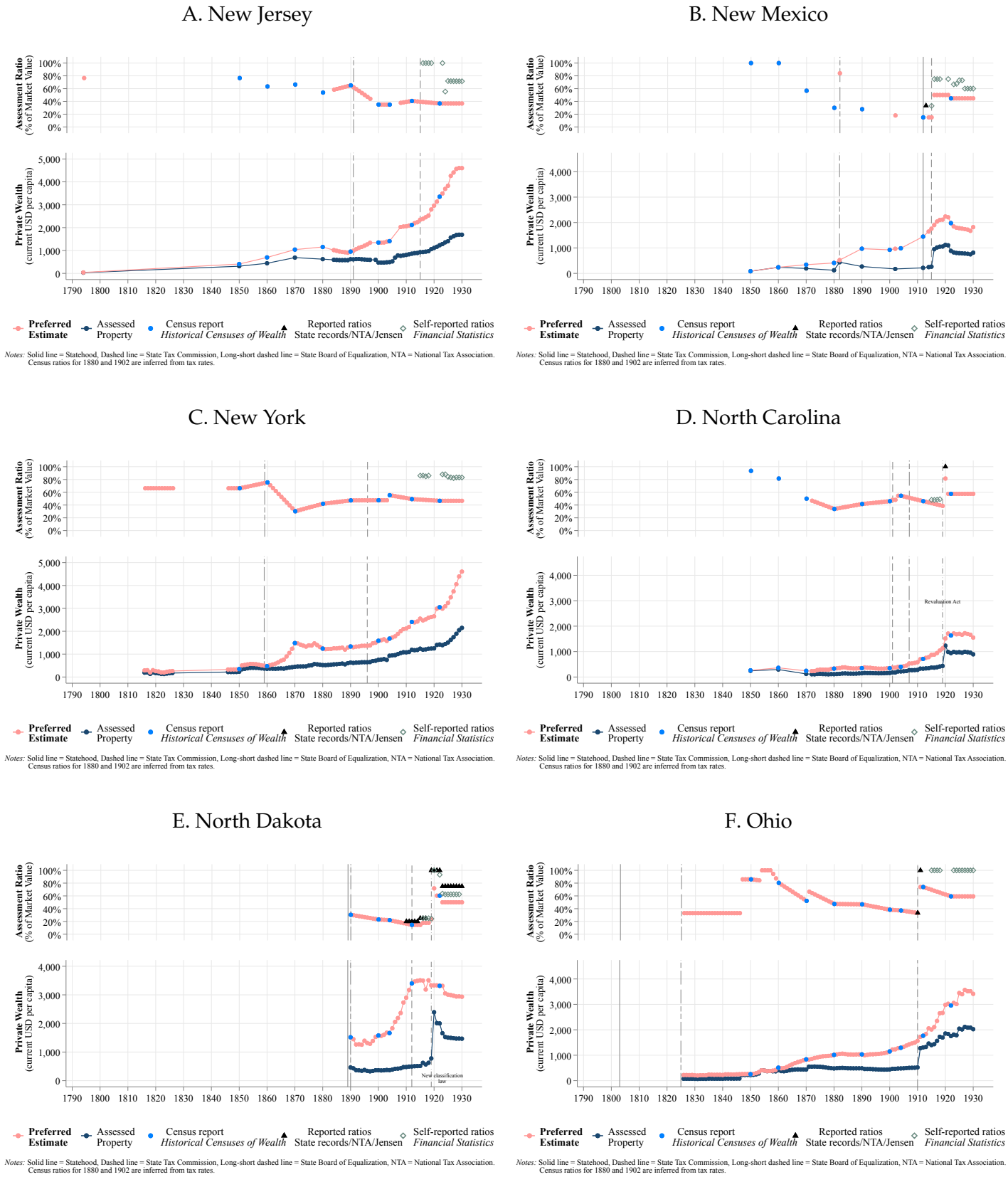
Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions).

Figure A33: Assessed Property Value, Assessment Ratio and Private Wealth series



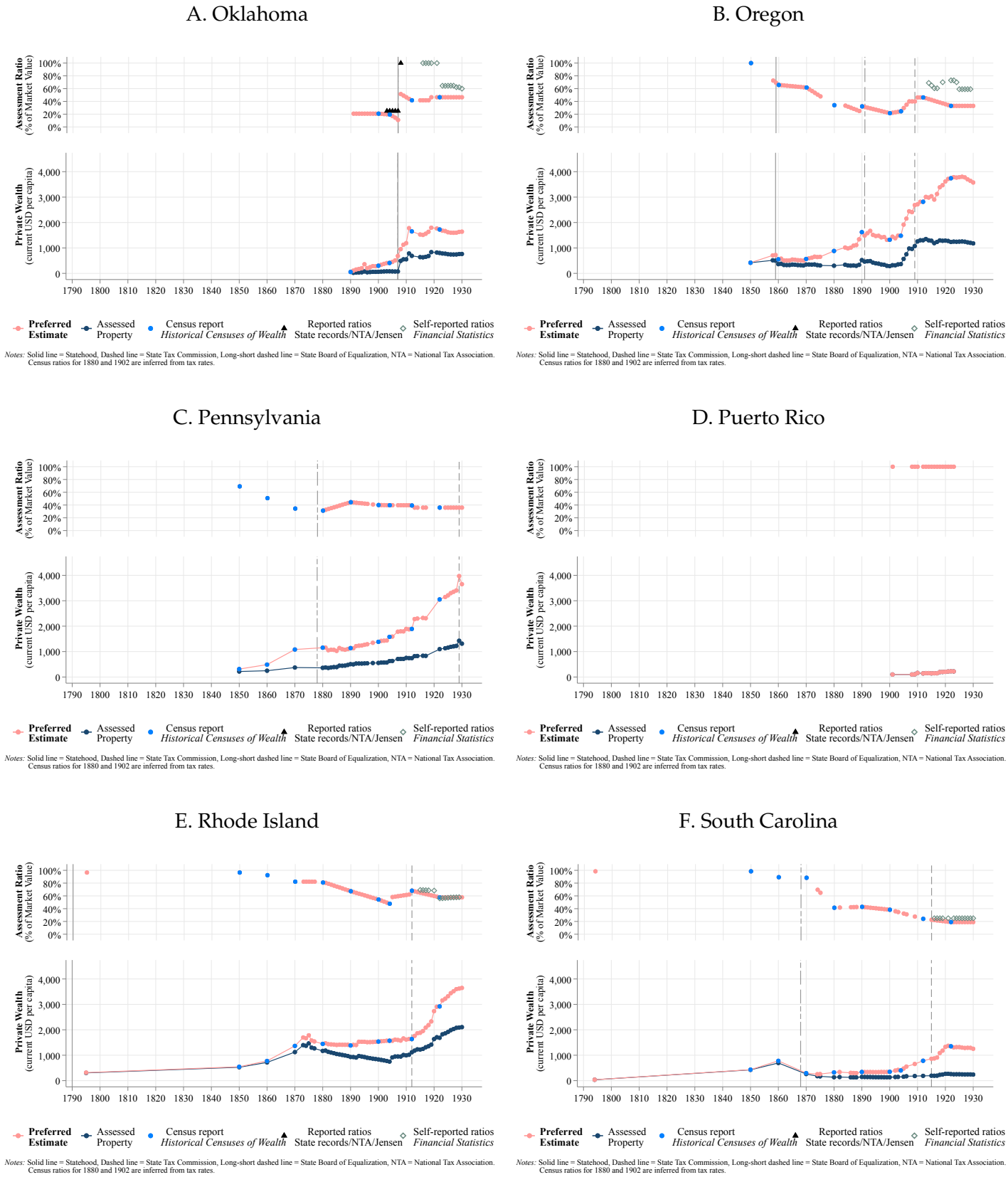
Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions). Please note the change in y-axis scale for Nevada.

Figure A34: Assessed Property Value, Assessment Ratio and Private Wealth series



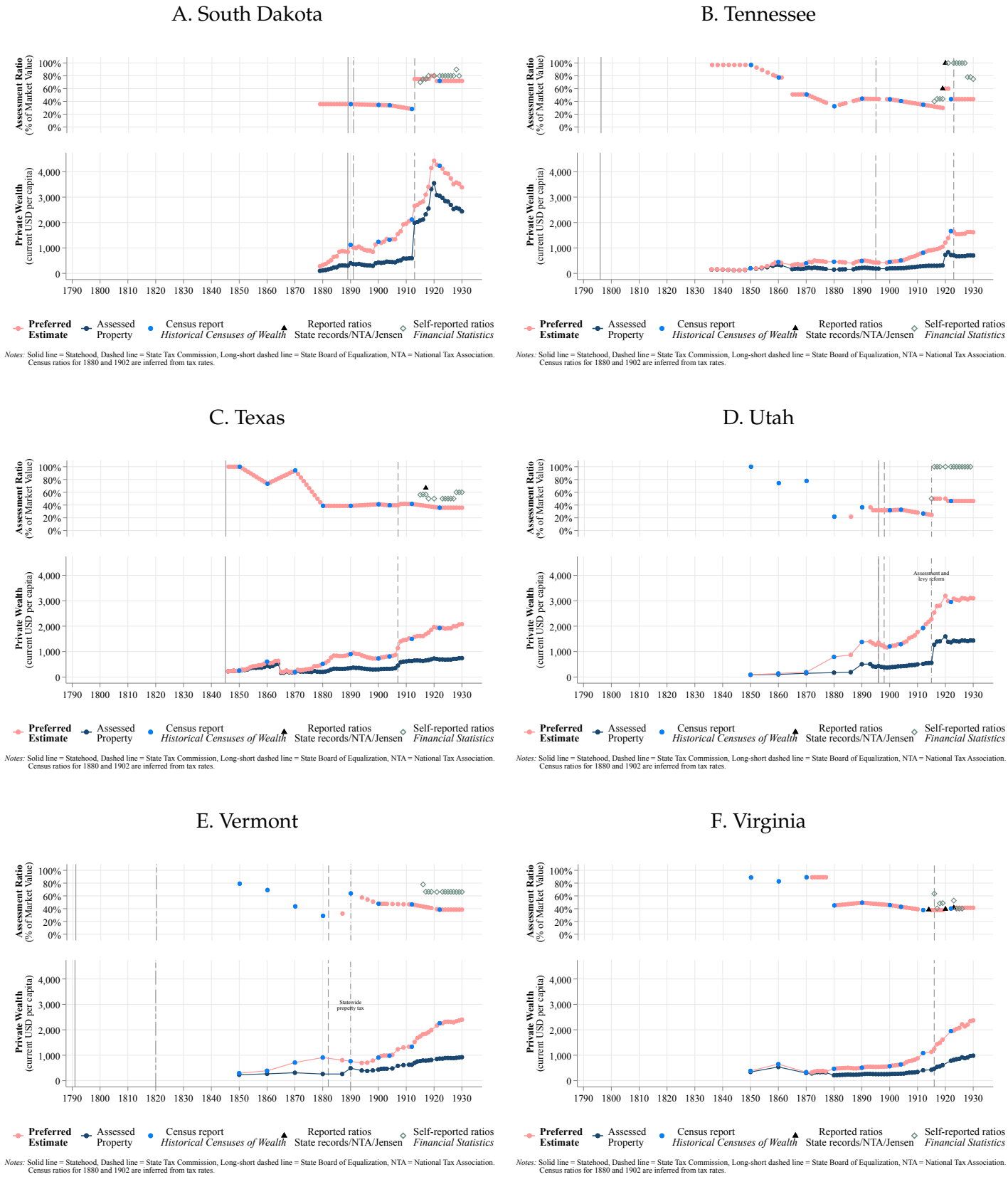
Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions). Please note the change in y-axis scale for New Jersey, New York, and North Dakota.

Figure A35: Assessed Property Value, Assessment Ratio and Private Wealth series



Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions).

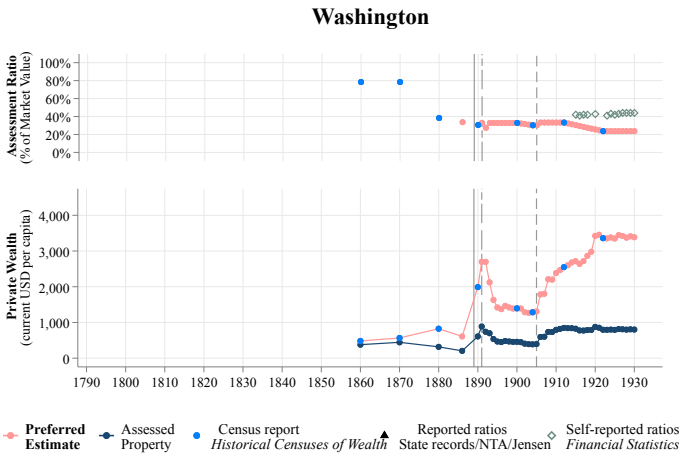
Figure A36: Assessed Property Value, Assessment Ratio and Private Wealth series



Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions).

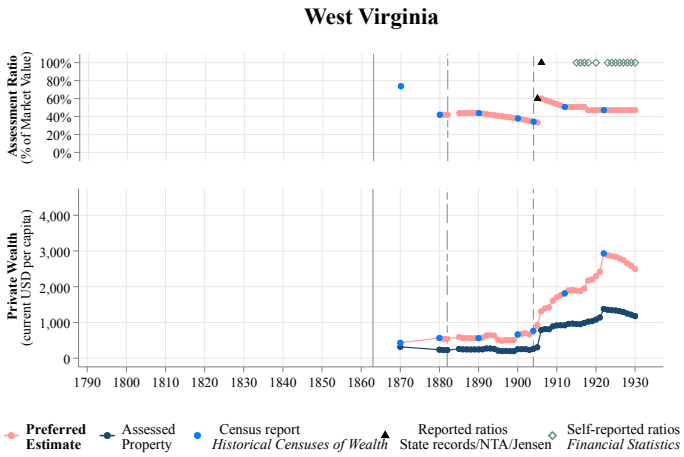
Figure A37: Assessed Property Value, Assessment Ratio and Private Wealth series

A. Washington



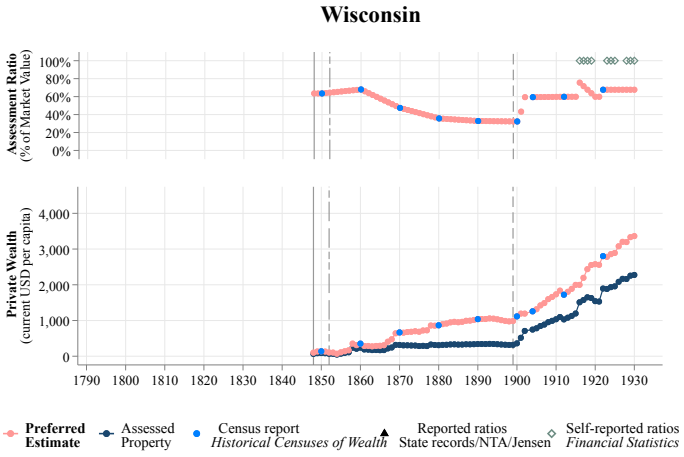
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

B. West Virginia



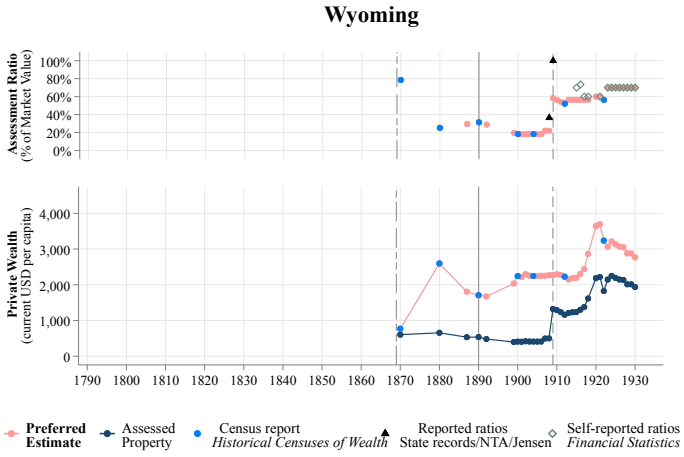
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

C. Wisconsin



Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

D. Wyoming



Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Notes: Those wealth series are not corrected for slave prices and property before 1865, i.e. the corrections described in Appendix III.3 are not applied yet. For 1900 and 1904, Historical Censuses of Wealth assessed values are missing. Thus, 1900 and 1904 assessment ratios are retrieved from mixed sources: (i) Report assessed valuations and (ii) Historical Censuses of Wealth true value of taxable wealth. These wealth series do not include property exempt from property tax (e.g. federal land, etc. See section II for details on exemptions).

III.3. Value of wealth from enslaved people

Prices of enslaved people. The literature provides a wide range of estimates for the market price of an enslaved person. Select estimates are summarized in Table A9. Piketty and Zucman (2014) use prices of $800 for 1850 and $1000 for 1860. For these same years, Einhorn (2006) estimates the prices to be $401 and $774, based on three-year moving average of the estimations of Ransom and Sutch (1988, p. 150), who give a close estimate of $377 and $778. Philipps (1966) estimates a higher price of $958 in 1860. Our tax-derived data series which comes from U.S. Census Bureau (1870) imply an average price of $150 for 1805, $250 for 1850, and $420 for 1860. Those values were estimated for 1805 by Goldsmith (1952, p. 318); for 1850 by Goldsmith (1952, p. 317), and for 1860 by U.S. Census Bureau (1870) (pp. 8–10). There are good reasons to believe that the assessed wealth from enslaved people was under-estimated by tax assessors (U.S. Census Bureau (1870, p. 8), and Piketty and Zucman (2014, p. 63 of Appendix)).

Table A9: Prices Estimates of Enslaved Persons 1810-1860

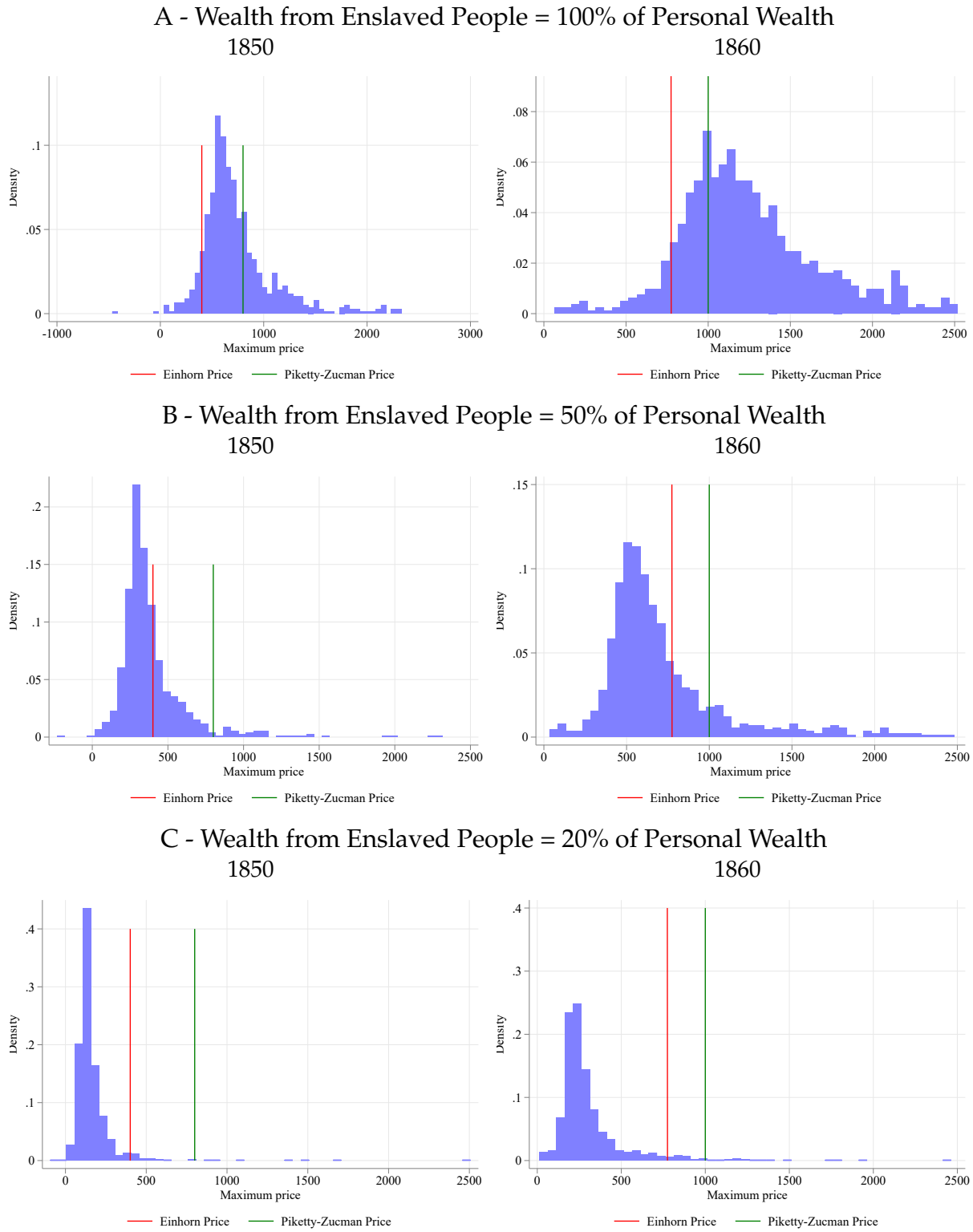
Series	U.S. Census Bureau (1870)	Piketty and Zucman (2014)	Einhorn (2006)	Ransom and Sutch (1988)
1810	-	500	265	277
1850	250	800	401	377
1860	420	1000	774	778

Notes: Column 3 (Einhorn, 2006) corresponds to a 3-year average of Ransom and Sutch (1988).

States do not typically separately report their property from enslaved people in their annual state reports. The exceptions are Georgia (from 1860 to 1864) and Texas (from 1846 to 1861 and in 1864). Those property values imply an enslaved person price of $306 and $584 in Texas in 1850 and 1860, and $655 in Georgia in 1860. The figures are higher than the enslaved price estimates from U.S. Census Bureau (1870), but still somewhat lower than those in Einhorn (2006).

To get a sense of possible bounds on the price of enslaved people, Figure A38 shows the distribution of the implied price per enslaved person in 1850 and 1860 under three hypothetical scenarios, namely that wealth from enslaved people represents i) 100%, ii) 50%, or iii) 20% of Personal Wealth measured in the Census for Southern states. The prices by Einhorn (2006) which we use seem reasonable given these distributions. The prices implied in the tax data of $250 for 1850 and $420 for 1860 appear indeed too low, given that wealth from enslaved people was a significant share of Personal Wealth in Southern states.

Figure A38: Distribution of the Upper Bounds on Prices of Enslaved People



Notes: The figure represents the distribution of the upper bounds on prices of enslaved people by county. The prices are obtained by assuming that wealth from enslaved people represents a share X of Personal Wealth in Southern states in 1850 and 1860 and dividing by the number of enslaved people in the county. Panel A assumes the share X is 100%; Panels B assumes it is 50%; and Panels C assumes it is 20%. The vertical lines are prices from Einhorn (2006) and Piketty and Zucman (2014).

Computing wealth from enslaved people. To compute the wealth from enslaved people, we use the number of enslaved people at the county and state levels from Haines, university Consortium for Political and Research (2010) and Gibson and Jung (2002) and multiply it by a given price for each year. We call this variable *slaveprop* (county level) or *val_true_slave* (state level). Our benchmark case uses the 3-year moving average prices from Einhorn (2006), available for each year from 1805 to 1860.

Figure A15 shows the share of wealth from enslaved people i) at the county, ii) at the state level using IPUMS USA Full Count series, and iii) at the state-level using our property tax-based measure.

Computing wealth from enslaved people and correcting for the under-valuation of wealth from enslaved people at the state level. There is evidence that the assessments of wealth from enslaved people for property tax purposes were under-estimates (U.S. Census Bureau (1870, p. 8), and Piketty and Zucman (2014, Appendix p. 63)). Therefore, we want to correct these assessed values by (i) subtracting the (underestimated) value of wealth from enslaved people, and (ii) adding the actual market price of wealth from enslaved people.

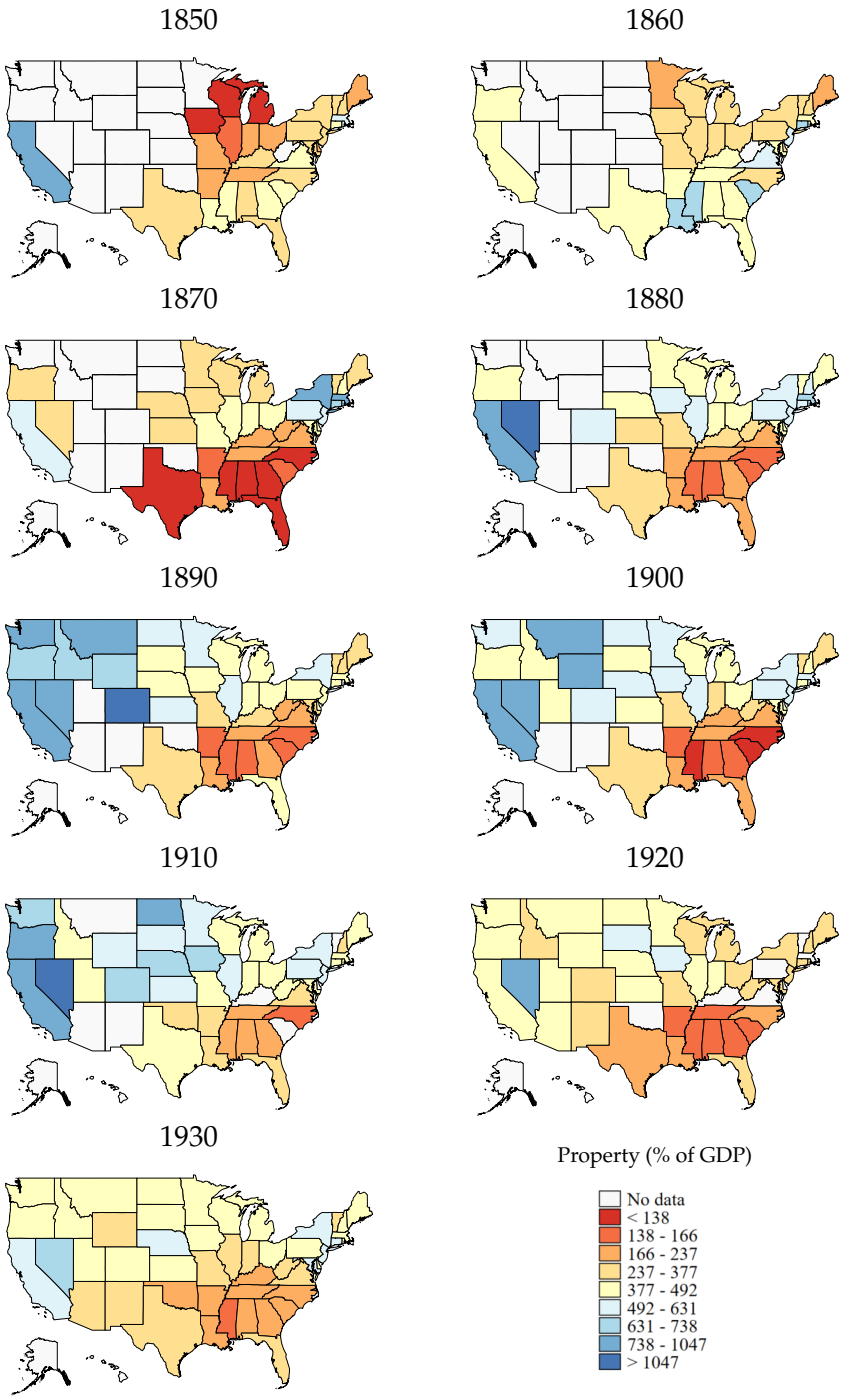
First, we subtract the (underestimated) value of wealth from enslaved people from tax-assessed wealth. To do so, we use the estimates of the implicit price per enslaved person used by assessors, referenced above, from Goldsmith (1952), p.318 for 1805 ($150), p. 317 for 1850 ($250), and U.S. Census Bureau (1870), p. 8 for 1860 ($420). We linearly interpolate these prices for missing years.

Second, we add actual market prices. To retrieve actual market prices, we use the prices from Einhorn (2006) to multiply the number of enslaved people at the state level, as explained in Appendix III.3.

This approach assumes that the price of enslaved people was the same across states in a given year. This was likely not the case in practice. Nevertheless, our correction for the undervaluation of wealth from enslaved people in the tax assessment data seems important, albeit imperfect.

We also have alternative sources of prices, as described in Appendix Section III.3, Table A9, which we can use for robustness instead of the prices in Einhorn (2006). Figure A5 shows the state-level wealth using these alternative prices. The picture remains similar in terms of the spatial distribution and time trends.

Figure A39: Property Per Capita by State As a Share of National GDP Per Capita



Notes: This figure shows the value of property per capita by state normalized by the national GDP per capita for each decade between 1850 and 1930. Data for states in U.S. territories prior to admission in the Union are not displayed.

III.4. County Level property data

III.4.1. General approach for construction of county level series

1870-1930 decadal data. We construct county-level property using assessed property for property tax purposes compiled in the Historical Censuses of Wealth for 1870-1930 every decade. We obtain a measure of the actual property by using state-level assessment ratios obtained from state reports, as described in Appendix Section III.2. For 1870, we have county-level assessment ratios from the Census report on Historical Censuses of Wealth[23]. We can thus compare the state assessment ratios described in Section III.2 to the average county-level assessment ratios. Figure A7 shows that these values are very similar, so that our assumption of using the state-level assessment ratio for the counties is well-justified.

1850 and 1860 wealth estimation based on Census data. For 1850 and 1860, we obtain county-level wealth data from the full count individual level Census, as described in Section III.7. The IPUMS USA Full count-derived wealth data at the county level for 1850 and 1860 is appended to our tax series which start in 1870 at the county level. We thus rescale these series in order to be consistent with the state-level tax derived data. If s is a state and c is a county in state s, we write $w_{c,t}$ the total wealth in county c in year t, and $W_{s,t}$ the total property in state s. We define the ratio

$$\rho_{s,t} = \frac{W_{s,t}}{\sum_{c \in s} w_{c,t}} \tag{1}$$

which is the correction ratio. If it is greater than 1 it means that state level property is greater than the aggregation of its counties wealth, and that we have to correct our IPUMS USA Full Count county series upwards. We hence define

$$\widetilde{w_{c,t}} = \rho_{s,t} * w_{c,t} \tag{2}$$

to be the corrected wealth at the county level. Now if we add up $\widetilde{w_{c,t}}$ for all counties in state s, we find $W_{s,t}$ which makes the series consistent. We therefore consider our new series $\widetilde{w_{c,t}}$ as our base series for 1850 and 1850.

Social Statistics Schedules. Note that for years 1850, 1860 and 1870, the Social Statistics Schedule of the Census did collect information at the county level on both assessed and

[23]See Ninth Census-Volume III, Tables 2 on wealth, taxation, and public indebtedness giving both assessed and true valuation of property for each county, from which we extract an assessment ratio.

true valuation of property.[24] The county level information we use for 1870 stems from these schedules. Unfortunately, these schedules were never systematically tabulated and published by the Census Bureau for 1850 and 1860, making it impossible to compute assessment ratios at the county level for all counties in the U.S. for these years. Margo (2000) has digitized some information on wages from these Schedules for a subset of states (see Table 2.3). Rusanov (2022) has also digitized social statistics schedules of counties for a subset of states, enabling him to provide for these states assessment ratios at the county level for 1850 and 1860.

County-level wealth excluding wealth from enslaved. To obtain series of wealth excluding the value of wealth from enslaved people, we subtract the series of wealth from enslaved people *Val. Enslaved*, the construction of which was described in Section III.3.

III.4.2. Alternative County-level series and Robustness

Construction of alternative county-level AR series This section presents the construction of alternative assessment ratios (ARs). The goal is to see whether results are robust to the use of county-specific ARs instead of state ARs. Because of data constraints, building such county-level ARs entails creating proxy ARs. Thus, we use some county-level information we were able to gather to build 4 main types of alternative ARs. By default, "AR" refers to the AR of total property.

AR1 – Using the 1870 data on county-level AR To construct alternative series AR1, we use Historical Censuses of Wealth data on county AR that exists for 1870. Unfortunately, this county-level information does not exist after 1870. For every year y, we then rescale our baseline AR by the 1870 county to state AR ratio:

$$\text{AR1}_{y,s,i} = \text{State AR}_{y,s} * \frac{\text{County AR}_{1870,s,i}}{\text{State AR}_{1870,s}} \tag{3}$$

AR2 – Using the 1900 data on county-level real property AR To construct alternative series AR2, we use 1900 data on real property AR at the county level. In 1900, AR are available in Historical Censuses of Wealth at the county level but only for real estate. We

[24] See example of such schedules here.

first retrieve a 1900 proxy for total property AR in county i and state s by applying the following formula:

$$\text{County proxy AR}_{1900,s,i} = \text{County real property AR}_{1900,s,i} * \frac{\text{State AR}_{1900,s}}{\text{State real property AR}_{1900,s}} \tag{4}$$

Then, we use this 1900 County proxy AR to rescale our baseline series by the 1900 county to state AR ratio:

$$\text{AR2}_{y,s,i} = \text{State AR}_{y,s} * \frac{\text{County proxy AR}_{1900,s,i}}{\text{State AR}_{1900,s}} \tag{5}$$

AR3 – Rescaling AR1 To build AR3, we use AR1 rescaled by the 1870 intra-state AR standard deviation. The goal for this new series is to keep the 1870 within-state standard deviation of county ARs constant over time. That is to say that for all year y, all state s and all counties 1 to N in state s, we want:

$$Var_{y,s}\left(\frac{1}{N}\sum_{i=1}^{N}\text{AR3}_{y,s,i}\right) = Var_{1870,s}\left(\frac{1}{N}\sum_{i=1}^{N}\text{county AR}_{1870,s,i}\right)$$

with $\frac{1}{N}\sum_{i=1}^{N}\text{county AR}_{y,s,i}$ the AR of state s in year y. Note that the sums can be weighted by county population.

The steps for building the AR3 series are the following:

1. We compute $sd_{1870,s}$ the 1870 standard deviation of state s's AR, computed using 1870 county-level AR.

2. For all county i in state s and year y , we rebuild AR1 (see equation (3)).

3. Then we compute $sd_{y,s}$, the standard deviation of state s's AR based on county AR1 for all years y.

4. Then, we rescale AR1 by the ratio of AR standard deviation in state s and year y to the AR standard deviation in state s and year 1870:

$$\text{AR3}_{y,s,i} = \text{AR1}_{y,s,i} * \frac{sd_{1870,s}}{sd_{y,s}} \tag{6}$$

5. Finally, we divide the assessed value of true property by AR3 to retrieve the true value of property at the county level for each year.

We derive this computation for 2 types of standard deviation values:

a. $sd_{1870,s}$ and $sd_{y,s}$ are computed at the state level without any weight on county AR

b. $sd_{1870,s}$ and $sd_{y,s}$ are computed at the state level using county population weights

AR4 – Rescaling AR2 To build AR4, we use AR2 rescaled by the 1900 intra-state AR standard deviation. The goal for this new series is to keep the 1900 within-state standard deviation of county ARs constant over time. That is to say that for all year y, all state s and all county 1 to N in state s, we want:

$$Var_{y,s}\left(\frac{1}{N}\sum_{i=1}^{N}\text{AR4}_{y,s,i}\right) = Var_{1900,s}\left(\frac{1}{N}\sum_{i=1}^{N}\text{county proxy AR}_{1900,s,i}\right)$$

with $\frac{1}{N}\sum_{i=1}^{N}$ county $\text{AR}_{y,s,i}$ the AR of state s in year y. Note that the sums can be weighted by county population.
Again, the 1900 county proxy AR is built from the proxy described in equation (4).

The steps for building the AR4 series are the following:

1. We compute $sd_{1900,s}$ the 1900 standard deviation of state s's AR, computed using 1900 county proxy described in equation (4).

2. For all county i in state s and year y, we rebuild AR2 (see equation (5)).

3. Then we compute $sd_{y,s}$, the standard deviation of state s's AR based on county AR2 for all years y.

4. Then, we rescale AR2 by the ratio of AR standard deviation in state s and year y to the AR standard deviation in state s and year 1900:

$$\text{AR4}_{y,s,i} = \text{AR2}_{y,s,i} * \frac{sd_{1900,s}}{sd_{y,s}} \tag{7}$$

5. Finally, we divide the assessed value of true property by AR4 to retrieve the true value of property at the county level for each year.

We derive this computation for 2 types of standard deviation values:

a. $sd_{1900,s}$ and $sd_{y,s}$ are computed at the state level without any weight on county AR

b. $sd_{1900,s}$ and $sd_{y,s}$ are computed at the state level using county population weights

These series allow us to explore how assessment ratios vary across counties. While there is clear evidence of dispersion across counties within states, there is reassuringly little correlation between assessment ratio and county-level observables, after controlling for state fixed-effects. We test for this by regressing assessment ratio on observable characteristics at the county level under various specifications. The results of these regressions are reported in Table A10.

In addition, in a robustness exercise, we compare the ranking of counties in terms of estimated true wealth using both the county assessment ratio versus the state assessment ratio, for 1870 and 1900. Figure A40 and Figure A41 show the scatterplots of these series, respectively. Reassuringly, we find that the ranking of the counties is strongly preserved, and the correlation between the two series is high, with β coefficient estimates of .91 and .95, and an R-squared of .83 and .90.

Together, these results suggest that while there is some spatial variation in assessment ratio within states, our procedure is unlikely to be biased as a result, and our constructed assessment ratio serves as a good proxy for the actual county assessment ratio.

Replication of results using alternative AR series Below, we check the sensitivity of our results to the use of these alternative county-level AR series. To this effect, we reproduce all our main results using these various AR series. Results prove very robust to the use of these alternative AR series.

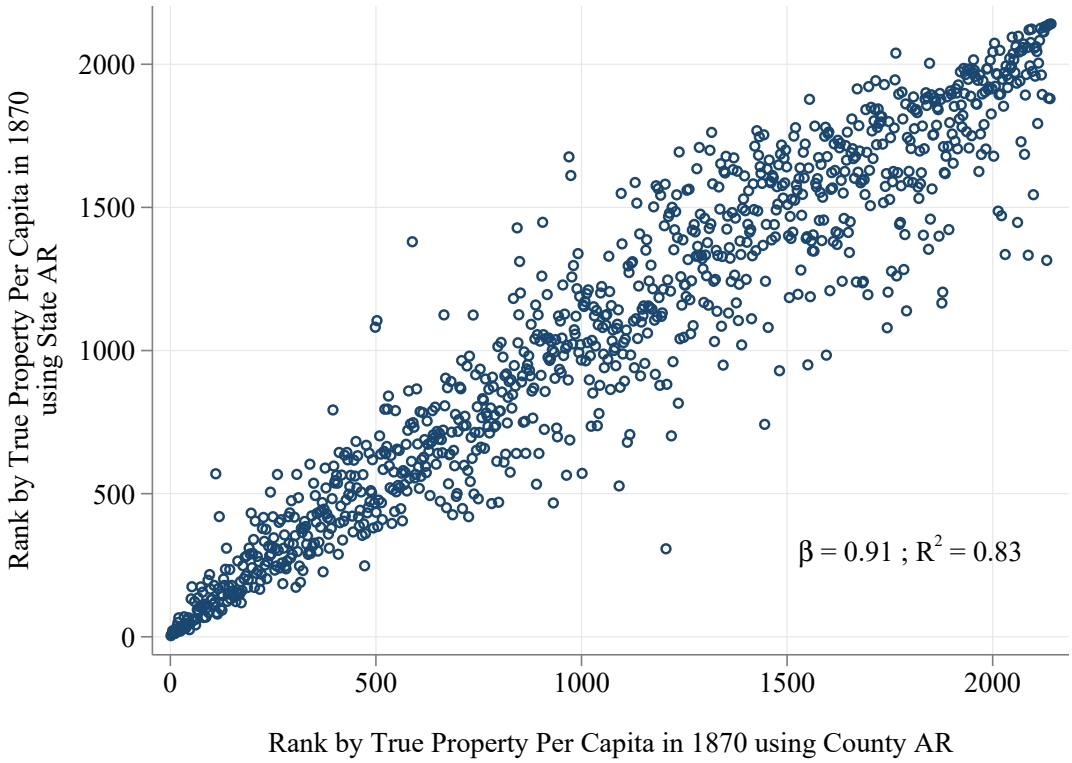
Table A10: Determinants of County-level AR in 1870

	(1) County AR	(2) County AR	(3) County AR	(4) County AR
A. Geography				
Temperature in coldest month	-0.036	-0.036	-0.009	-0.009
	(0.020)	(0.020)	(0.014)	(0.016)
Temperature in hottest month	0.074***	0.074**	0.029*	0.029*
	(0.020)	(0.022)	(0.014)	(0.013)
Winter precipitation	0.006	0.006	-0.011	-0.011
	(0.010)	(0.016)	(0.007)	(0.008)
Summer precipitation	0.013	0.013	0.007	0.007
	(0.011)	(0.008)	(0.008)	(0.008)
Elevation in metres	0.048*	0.048	0.031*	0.031*
	(0.021)	(0.026)	(0.014)	(0.015)
Ruggedness	-0.000	-0.000	0.004	0.004
	(0.009)	(0.007)	(0.006)	(0.005)
Soil Net Primary Productivity	-0.005	-0.005	-0.012	-0.012
	(0.010)	(0.011)	(0.007)	(0.007)
Distance to Coast	-0.024	-0.024	-0.024**	-0.024
	(0.013)	(0.020)	(0.009)	(0.013)
Crossed by Canal	0.001	0.001	-0.013	-0.013
	(0.015)	(0.017)	(0.010)	(0.010)
Crossed by Navigated River	0.017*	0.017	0.011	0.011
	(0.008)	(0.010)	(0.006)	(0.006)
B. Demographics				
Log population	-0.013*	-0.013	-0.020***	-0.020***
	(0.006)	(0.008)	(0.005)	(0.005)
% literate	0.006	0.006	-0.006	-0.006
	(0.007)	(0.008)	(0.006)	(0.008)
% males	0.023*	0.023**	0.017*	0.017**
	(0.009)	(0.008)	(0.007)	(0.006)
% white	-0.030*	-0.030	-0.009	-0.009
	(0.013)	(0.018)	(0.009)	(0.014)
% foreigners	-0.015*	-0.015*	-0.002	-0.002
	(0.006)	(0.007)	(0.004)	(0.005)
C. Occupational shares:				
Agriculture	0.001	0.001	0.004	0.004
	(0.005)	(0.005)	(0.003)	(0.003)
Mining	-0.006	-0.006	-0.000	-0.000
	(0.005)	(0.006)	(0.004)	(0.003)
Manufacturing	-0.005	-0.005	0.000	0.000
	(0.005)	(0.004)	(0.003)	(0.004)
Commerce	0.006	0.006	0.005	0.005
	(0.004)	(0.004)	(0.003)	(0.003)
Public Administration	0.003	0.003	0.002	0.002
	(0.004)	(0.004)	(0.003)	(0.002)
D. Inequality & Political:				
% of Enslaved People in 1860	-0.043**	-0.043**	-0.015	-0.015
	(0.014)	(0.016)	(0.010)	(0.012)
Top 10% Property Share	0.011	0.011	-0.009	-0.009
	(0.008)	(0.007)	(0.007)	(0.010)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$			-0.471***	-0.471***
			(0.068)	(0.076)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$ x Top 10% Property Share			0.021*	0.021
			(0.009)	(0.012)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$ x % males			-0.036***	-0.036**
			(0.010)	(0.010)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$ x % literate			0.016*	0.016
			(0.008)	(0.012)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$ x Log Population			0.023***	0.023**
			(0.007)	(0.008)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$ x $\mathbb{1}_{\text{Southern State}}$			0.009	0.009
			(0.018)	(0.051)
$(\mathbb{1}_{\text{(State AR-County AR)}>0})$ x Number of years since admitted in the Union			-0.075***	-0.075*
			(0.012)	(0.036)
Constant	0.747***	0.747***	0.898***	0.898***
	(0.053)	(0.075)	(0.046)	(0.045)
Observations	1644.000	1644.000	1644.000	1644.000
R^2	0.690	0.690	0.854	0.854
State clust.	No	Yes	No	Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Columns 1-2 report the coefficients obtained by regressing the value of county assessment ratios in 1870 (Historical Censuses of Wealth) on geography variables, demographics, occupational shares, inequality variables, and a state fixed effect. Columns 3-4 additionally control for a dummy equal to one if the difference between state and county AR is positive, and its interactions which is other variables of interest. Columns 2 and 4 clusterize errors at the state level.

Figure A40: Rank-rank relation between True Property Per Capita at the County level in 1870, using baseline AR v AR1

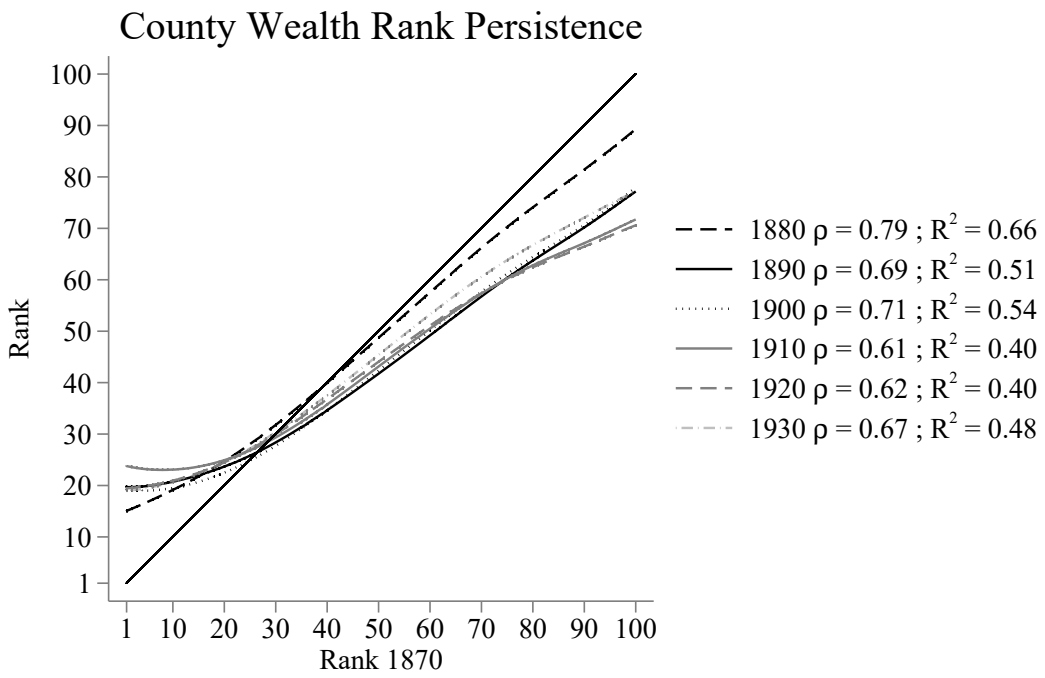


Notes: This graph compares the rank of true property per capita at the county level using baseline AR v AR1. Data points are gathered in 1000 bins. β is the regression coefficient associated with the rank of the true property per capita at the county level using AR1, when regressing the rank of the true property per capita at the county level using baseline AR on the rank of the true property per capita at the county level using AR1. R^2 stems from this same regression. The construction of AR1 is detailed in Appendix III.4.2.

Figure A41: Rank-rank relation between True Property Per Capita at the County level in 1900, using baseline AR v AR2

Notes: This graph compares the rank of true property per capita at the county level using baseline AR v AR2. Data points are gathered in 1000 bins. β is the regression coefficient associated with the rank of the true property per capita at the county level using AR2, when regressing the rank of the true property value at the county level using baseline AR on the rank of the true property per capita at the county level using AR2. R^2 stems from this same regression. The construction of AR2 is detailed in Appendix III.4.2.

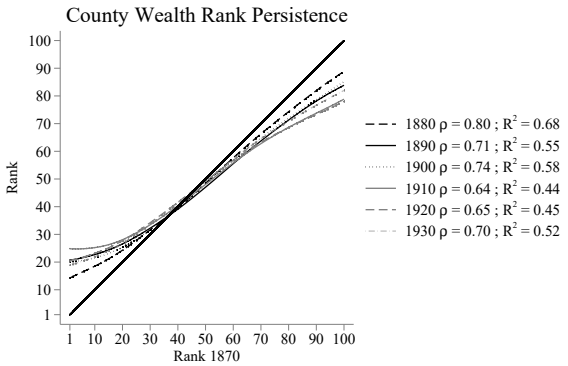
Figure A42: Rank Persistence of County Total Wealth Per Capita, baseline AR



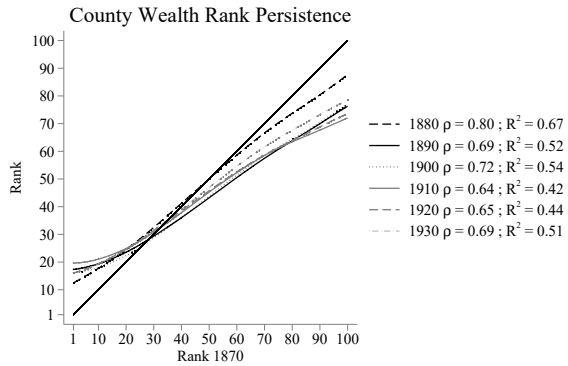
Notes: This figure shows the rank persistence of total wealth per capita in counties over time, using the baseline AR. It is broken down into percentiles. The 45-degree line represents a case of perfect persistence: the wealth per capita county ranking would be exactly the same between years 1870 and year y. ρ corresponds to the correlation coefficient between percentiles for years 1870 and year y. R^2 stem from the regression of the percentile in year y on the percentile in year 1870.

Figure A43: Rank Persistence of County Total Wealth Per Capita, alternative AR

AR1

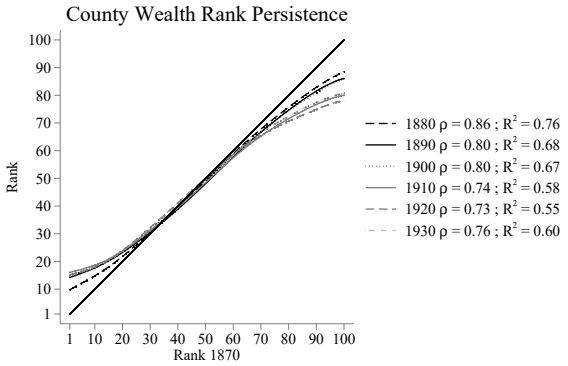


AR2

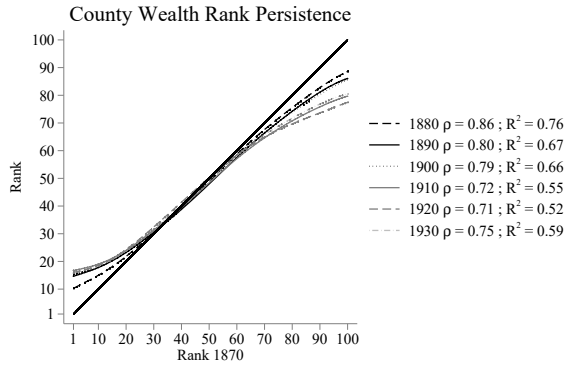


AR3 using:

No weight

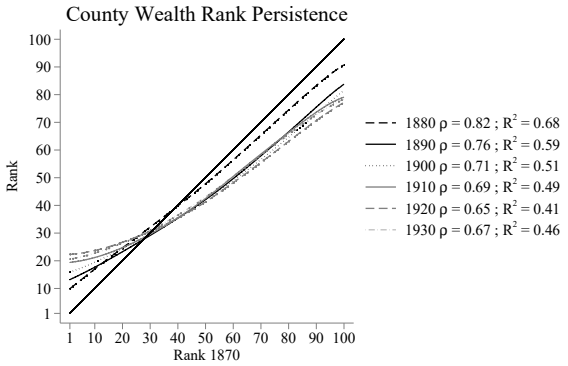


County population weights

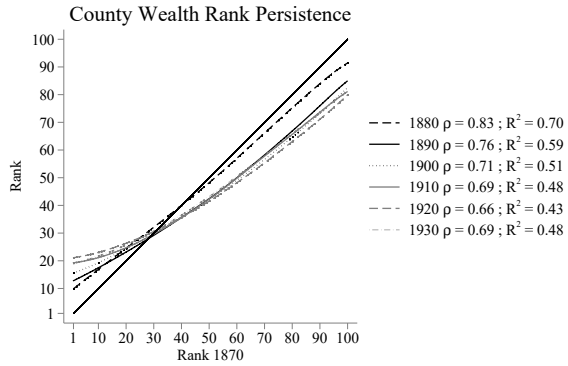


AR4 using:

No weight



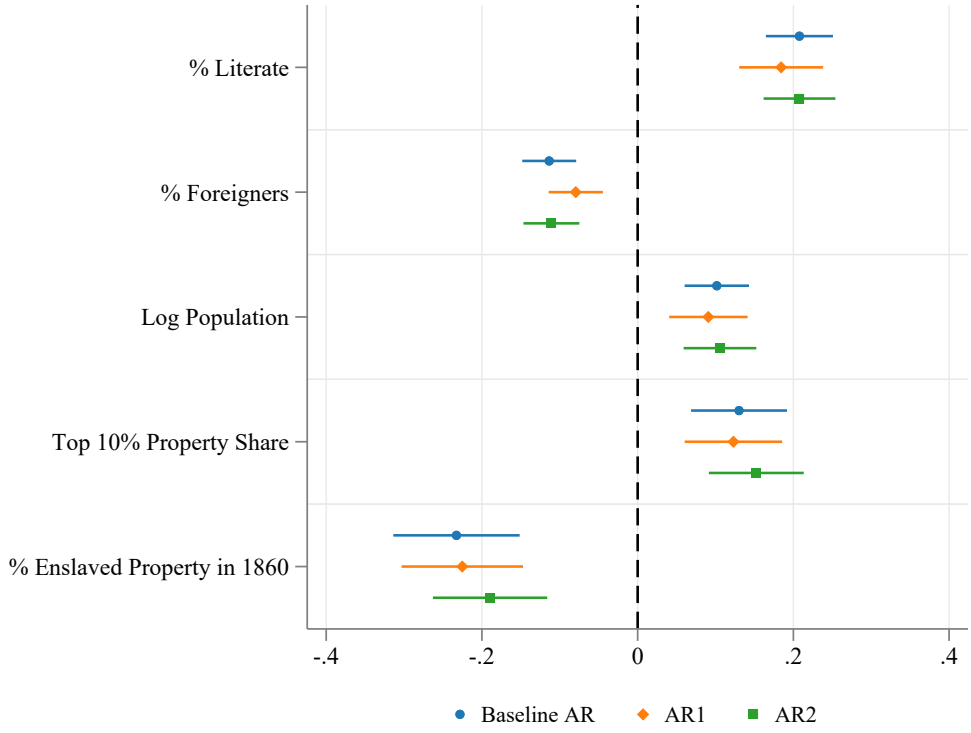
County population weights



Notes: Those figures show the rank persistence of total wealth per capita in counties over time, using alternative AR. It is broken down into percentiles. The 45-degree line represents a case of perfect persistence: the wealth per capita county ranking would be exactly the same between years 1870 and year y. ρ corresponds to the correlation coefficient between percentiles for years 1870 and year y. R^2 stem from the regression of the percentile in year y on the percentile in year 1870. The construction of alternative AR is detailed in Appendix III.4.2.

Figure A44: Determinants of County Total Property Per Capita in 1870, baseline AR v alternative ARs (coefficients of interest only)

A. Baseline v AR1 and AR2



B. Baseline v AR3

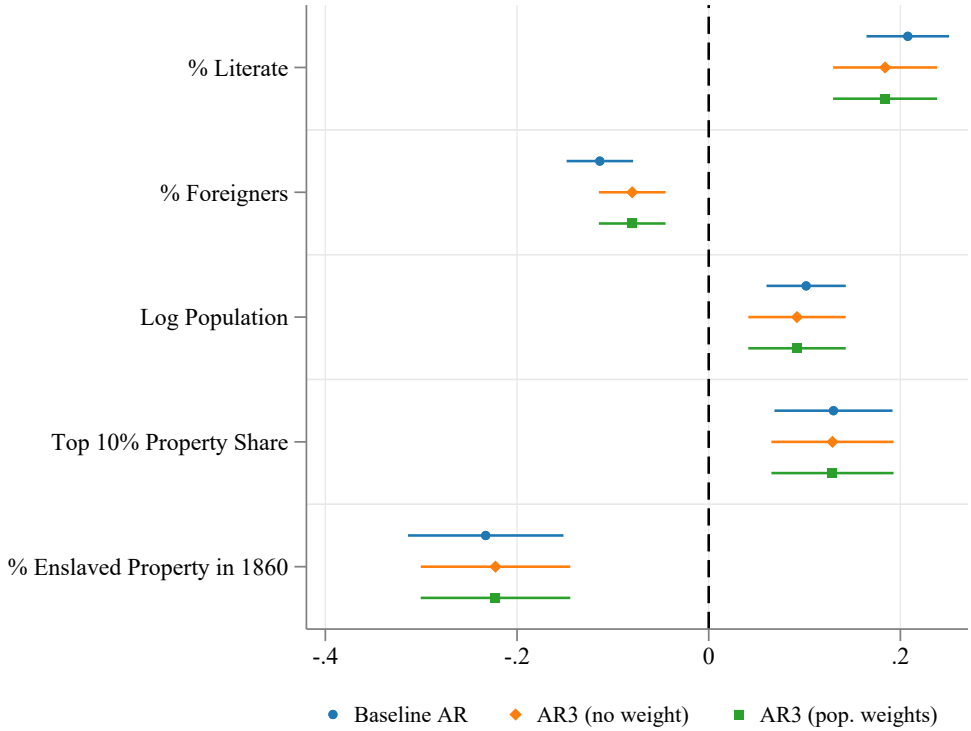
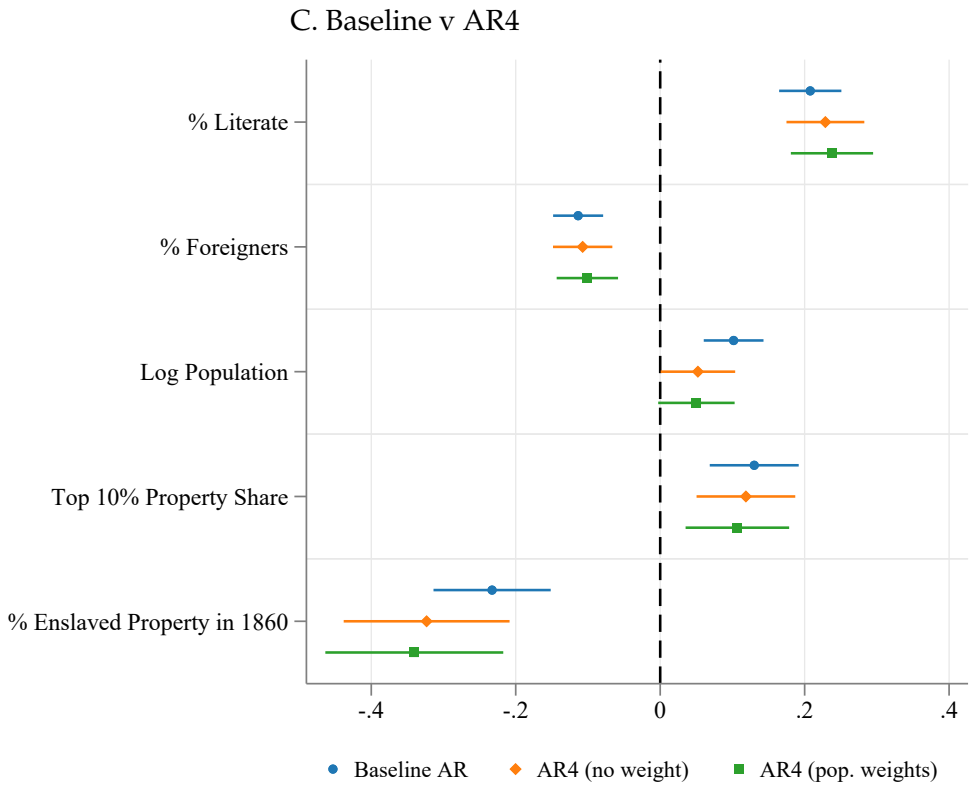


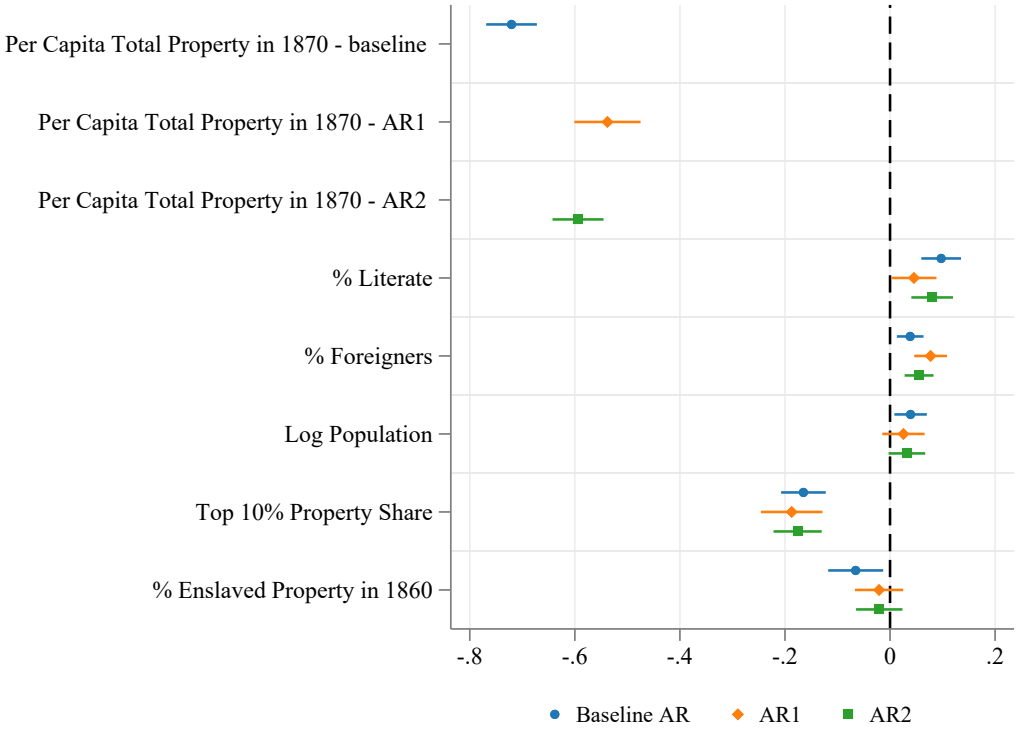
Figure A44: Determinants of County Total Property Per Capita in 1870, baseline AR v alternative AR (coefficients of interest only)



Notes: This figure presents coefficients from the regression of log property per capita in 1870 on inequality measures, and geographic, demographic, and economic characteristics from equation (3) of the paper. Each panel compares the results obtained with baseline v alternative AR for the main coefficients of interest. Controls are standardized, and described in Section 4.3 and Appendix III.10 of the paper. 95% confidence intervals are depicted.

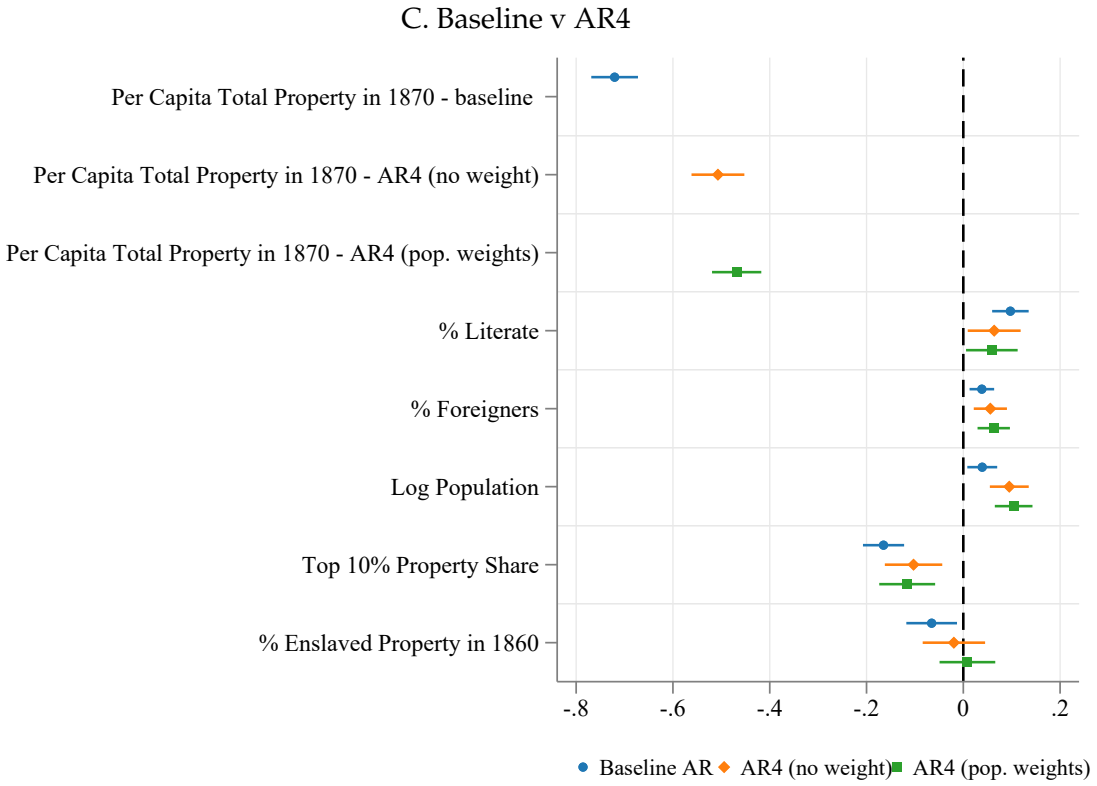
Figure A45: Determinants of County 1870-1930 Growth in Total Property Per Capita, baseline AR v alternative ARs (coefficients of interest only)

A. Baseline v AR1 and AR2



B. Baseline v AR3

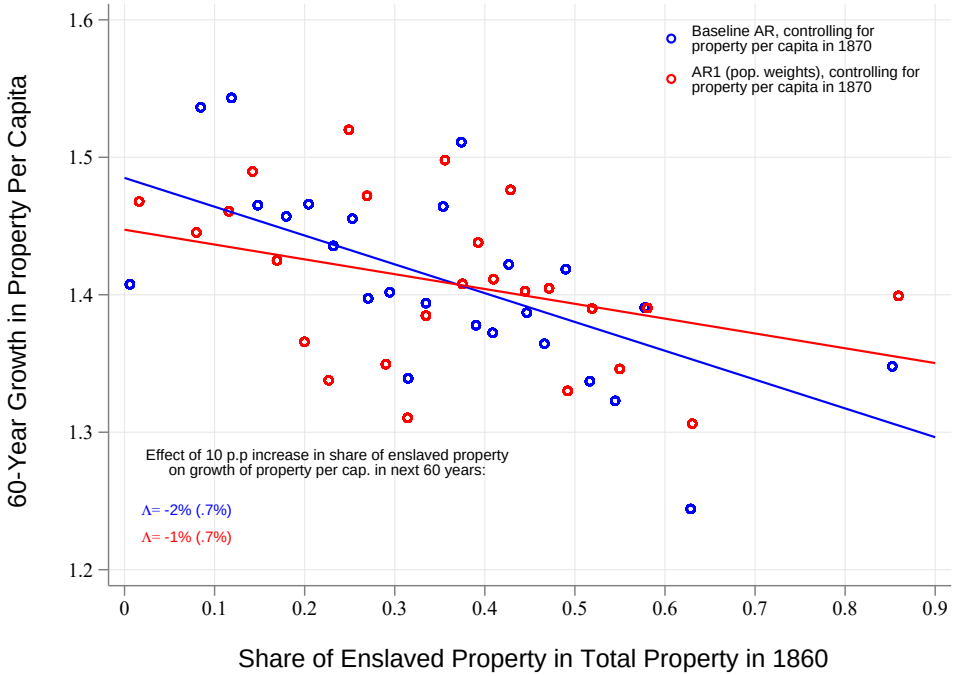
Figure A45: Determinants of County 1870-1930 Growth in Total Property Per Capita, baseline AR v alternative AR (coefficients of interest only)



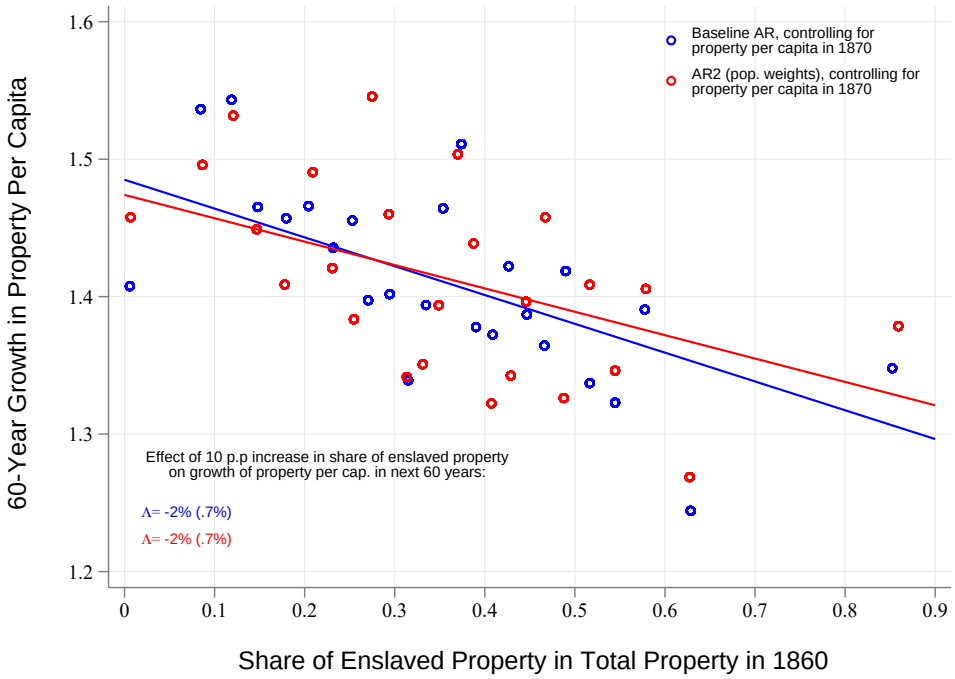
Notes: This figure presents coefficients from the regression of the 1870-1930 growth in total property per capita on inequality measures, and geographic, demographic, and economic characteristics from equation (2) of the paper. Each panel compares the results obtained with baseline v alternative AR for the main coefficients of interest. Controls are standardized, and described in Section 4.3 and Appendix III.10 of the paper. 95% confidence intervals are depicted.

Figure A46: The Legacy of Enslavement on Growth: County-Level Correlations, baseline v alternative ARs

A. Baseline v AR1



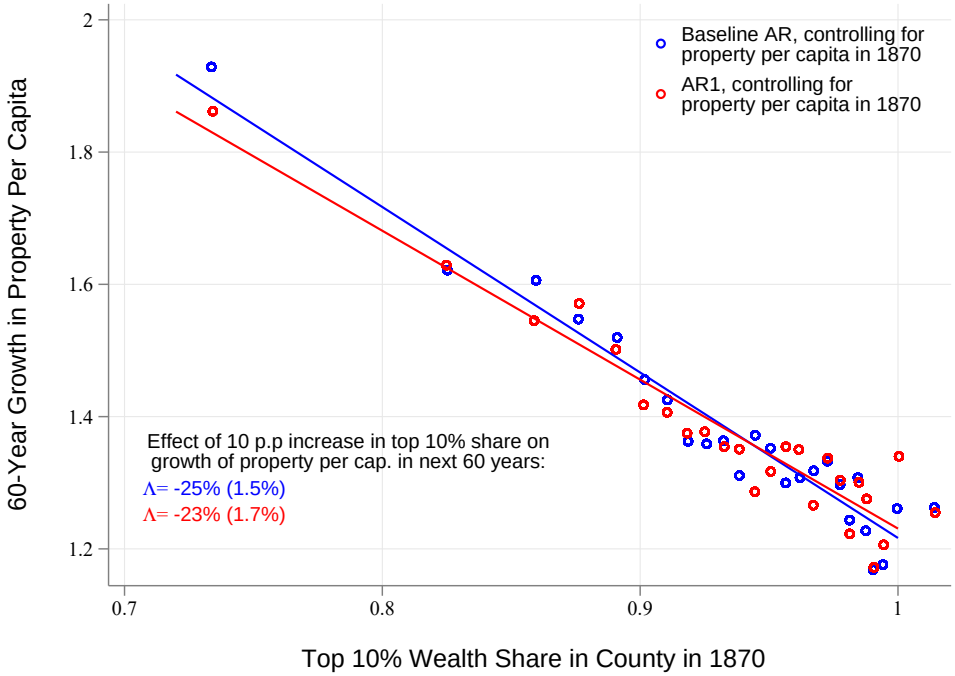
B. Baseline v AR2



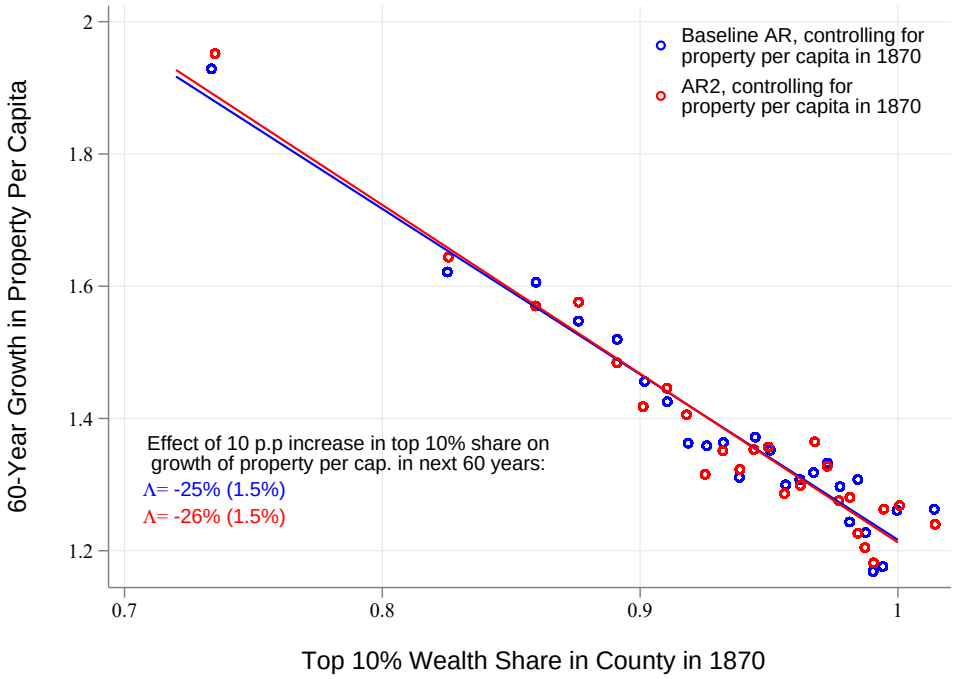
Notes: This figure displays binscatters of the county-level relation between the 60-year growth in property per capita between 1870 and 1930 and the share of property from enslaved people in total property in 1860, for baseline v alternative AR series. Counties are grouped into 25 equally-sized bins by their share of property from enslaved people. The correlation is residualized on county property per capita in 1870. The construction of alternative AR is detailed in Appendix III.4.2.

Figure A47: Inequality and Growth: County-Level Correlations, baseline v alternative ARs

A. Baseline v AR1



B. Baseline v AR2



Notes: The figure displays binscatters of the county-level relation between the 60-year growth in property per capita between 1870 and 1930 and the share of wealth held by the top 10% of wealth holders in a county in 1870, for baseline v alternative AR series. Counties are grouped into 25 equally-sized bins by their share of wealth held by the top 10%. The correlation is residualized on county property per capita in 1870. The construction of alternative AR is detailed in Appendix III.4.2.

III.5. National wealth series

Our national wealth series are based on the aggregation of state-level wealth series (from Appendix III.2).

The coverage of our data in terms of population is shown in Figure 3. As can be seen there and in Figure A48 (the blue series shows our raw coverage at the state-level), prior to 1850, we lack systematic information on wealth per capita for all states in the Union. As such, it is worth distinguishing between the methods used before and after 1850.

Because of this limitation, we estimate national wealth using two additional approaches:

(1) When assessed property value is missing for a state before 1850 but we observe the revenues (or levy) from property taxes, we impute property valuation using the first observed tax rate before 1850 and tax levy, such that:

$$\tilde{W}_{it} = \frac{R_{it}}{\tilde{\tau}_{it_{first}}} \tag{8}$$

where $\tilde{W}_{it}$ indicates the assessed value of property in state i and year $t \leq 1850$, R_{it} the property tax revenue, and $\tilde{\tau}_{it_{first}}$ the first-observed tax rate on assessed property value. The data coverage after performing these imputations and interpolating is the line "States with property data after interpolation and imputation (Baseline)" in Figure A48.

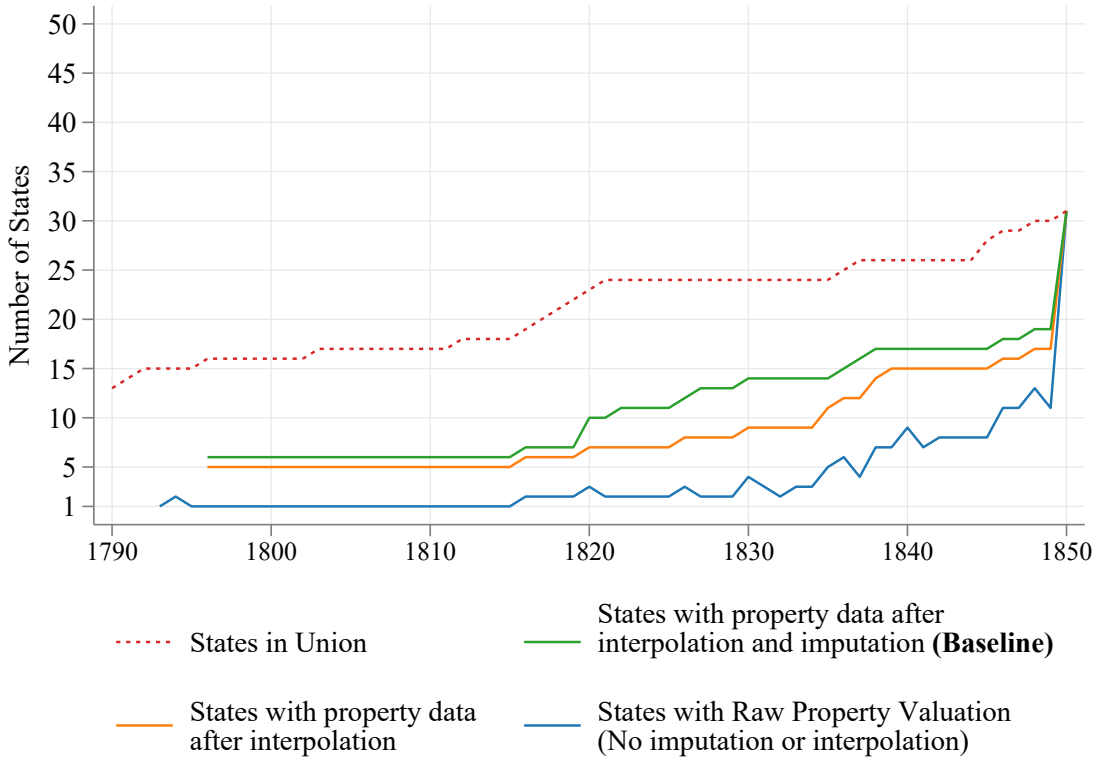
(2) We obtain a national wealth estimate for each year by rescaling the sum of total wealth from states with observed wealth in that year (either directly, or through the imputation in equation (8) by the share of national wealth from these states in 1850 (1850 is the first year when wealth is observed for all states in the Union). Specifically, for years $t \geq 1850$, national wealth is simply the aggregate of state-level wealth: $W_t^{nat} = \sum_i W_{it}$. For years $t < 1850$, let I_t be the set of states for which we have an estimate of wealth in year t. Our estimate of national wealth is then

$$W_t^{nat} = \sum_{i \in I_t} W_{it} \cdot \frac{W_{1850}^{nat}}{\sum_{i \in I_t} W_{i,1850)}} \tag{9}$$

Robustness and sensitivity analysis. We also construct national wealth series under alternative assumptions.

First, we examine how national wealth series change if we use fewer imputations. Panel A of Figure A8 reports these alternative methods that range from the least to the most imputations. The line "raw private wealth" shows the national series based on the property tax data from state-reports with no imputations for missing wealth estimates

Figure A48: Data Coverage at the State Level Before 1850



Notes: Panel A shows the number of state admitted to the Union for which data on private wealth is present in our database of state-level wealth.

pre-1850 (the blue series in Panel C of Figure A8). We then show national series that impute missing wealth using linear interpolations in state series (line "Linear interpolation") and also imputing missing wealth from property tax revenue pre-1850 following formula (8) (line "Pre-1850 Imputation from Levy"). In the final series, we also rescale pre-1850 national wealth series using formula (9) (line "Pre-1850 wealth rescaling"). As we can see in the Figure, these alternative assumptions only affect our estimates of national wealth for the very early years 1800-1818, for which the data is significantly scarcer and noisier. For the period 1800-1818 in which the uncertainty of our estimates is highest, our preferred estimates show a relatively constant national wealth at around 300% of GDP, while the alternative methods without imputations show a decline of wealth from about 500% to 300% of GDP between 1800 and 1818.

Second, we show an alternative method to rescaling wealth pre-1850 in Panel B of Figure A8. Our preferred rescaling in formula (9) uses all the available wealth data from states with non-missing property tax data. We can, however, test how sensitive the national wealth estimates are if we exclude one state at a time. Similar to the previous

alternative method, we find that most of the changes in national wealth estimates are concentrated in the first decades of our series, here between 1796-1816. Our preferred estimates of national wealth around 300% of GDP during this period is a medium estimates, with alternative methods varying from 150-400% of GDP depending of which state is excluded.

Third, we show in Panel C of Figure A8 the values of national wealth using a constant assessment ratio of 40%. As explained in Section III.2, assessment ratios were not uniform across State or time, and these estimates should only be seen as providing some bounds on uncertainty arising from assessment ratios. The value of 40% assessment ratio was chosen as this is the average ratio in our sample. As shown in the figure, these are some differences between our preferred national wealth estimates and national wealth obtained with a constant assessment ratio for the period 1880-1940. Using a state-specific assessment ratios based on all the data available leads to national wealth substantially below that predicted by a constant 40% assessment ratio prior to 1880, as the average assessment ratio for that period was on average 78% (see the evolution of assessment ratios by state and on average at the state level in Figure 4).

GDP estimates. We sometimes use GDP estimates at the national level as a scaling factor. To show the robustness of our results, we compare our results using three different GDP series in Appendix Figure A10:

- Our benchmark estimate is Johnston and Williamson (2020), who provide annual GDP data from 1790 to 2020, building on McCusker (2000), Weiss (1993), and Gallman (1966).
- Bolt and Van Zanden (2020) provide annual GDP data for many countries, including the United States from 1800 to 2020. Their work builds on Prados de la Escosura (2009) and Sutch (2006).
- Mitchell (2007) provides statistics from 1789 to 2005 on GNP (before 1993) and GDP (after 1993).

III.6. Existing Wealth Data in the U.S. 1770-1939

In addition to the assessed property tax data that we use, there exist limited other sources for wealth. These are typically only available at the national level and not at more disaggregated levels, such as state or county. Over the historical period we consider, there

are four alternative methods for measuring wealth, to which we compare our estimates in Section III.8:

1. **Measures based on individual-level Census questions.** The Census directly asked individuals about the value of their their real wealth (in 1850, 1860, and 1870) and personal wealth (in 1860 and 1870), as described in Section III.7. It has the advantage of directly measuring wealth that can be aggregated at city, county and state-level, but is only available for two years (since 1850 really only measures real wealth). We compare this data to our estimates at the state level, as detailed in Section III.8.

2. **Measures based on the perpetual inventory method.** This method indirectly estimates capital by cumulating past investment flows into a measure of the stock of capital, while also accounting for changes in relative prices. These national-level estimates are constructed by Goldsmith (1952) for almost every decade from 1850 to 1950, using capital expenditures provided in national accounts. They are used by Piketty and Zucman (2014), along with other estimates, to produce a long-term wealth series. We describe the data constructed by Piketty and Zucman (2014) in more detail in Section Section III.8.

3. **Measures of wealth based on national balance sheets data from national accounts.** Such information only becomes available in 1916 for the U.S., and, hence, does not cover most of our period of study. This data was used by Goldsmith (1952) to estimate national-level wealth from 1916 to 1945. It also forms the basis of wealth estimates in Piketty and Zucman (2014) for that period.

4. **Measures of wealth based on national accounts and Census data on the value of land.** This method relies on national accounts to measure the stock of capital in each sector and on Census data on the value of land. It was used in Gallman and Rhode (2019) to construct national-level wealth for every decade from 1850 to 1900.

There are some other methods for wealth estimation, but these are not available on a consistent basis. Garmon Jr (2014) studies the 10 most populous states in 1785-1815. Jones (1970) uses probate records for 1774 for some counties in Pennsylvania, New Jersey, and Delaware. Jones (1972) estimates the wealth of the Middle Colonies and New England in 1774. Soltow (1984) estimates wealth for 10-20% of counties in Maine, Massachusetts, Connecticut, New York, Pennsylvania, Maryland, North Carolina, Georgia, andTennessee for the period 1798-1860.

III.7. Comparison with Census (IPUMS USA Full Count) Data at the County, State and National Levels

For comparison with our data, we construct wealth series at the county and state levels using the IPUMS USA Full Count data (Ruggles et al. (2021*a*)) for 1850, 1860, and 1870. In these years the Census asked about real estate and personal wealth (only in 1860 and 1870) of households. In 1870, Marshalls were instructed to include "all bonds, stocks, mortgages, notes, live stock, plate, jewels, or furniture" in personal wealth, but exclude "wearing apparel". Real estate was supposed to be reported "without any deduction on account of mortgage or other incumbrance, whether within or without the Census subdivision or the county. The value meant is the full market value, known or estimated." In 1860, the instructions were similar for personal wealth: it was meant to include "all the property, possessions, or wealth of each individual which is not embraced in the column previous [real estate], consist of what it may; the value of bonds, mortgages, notes, slaves, live stock, plate, jewels, or furniture; in fine, the value of whatever constitutes the Personal Wealth of individuals." In 1860 and 1870, the elicited measures of wealth are, thus, supposed to encompass most of real and personal wealth. In 1860, personal wealth also includes wealth from enslaved people (which is not reported as a separate category).

Censoring and top-coding. Personal wealth is censored from below at \$100 in 1870. There is no such bottom censoring in 1850 and 1860. In 1850, 1860, and 1870 there is top-coding at \$999997 for both personal and real wealth separately.

Imputing personal wealth in 1850. In 1850, only real wealth is reported. We thus need to impute personal wealth. We do this by assuming that the ratio between personal wealth and real wealth is constant between 1850 and 1860 at the county level. Note that personal wealth is defined here as excluding enslaved property. This means that our procedure assumes that the rate of growth of personal property *excluding slaves* was the same as the rate of growth of real estate property. This is an important precision, because between 1850 and 1860, the rise in the price of enslaved property means that it is unlikely that the rate of growth of enslaved property is the same as that of real estate.

If c is a county and $W^{real}_{c,1860}$ is the real wealth in the county in 1860, $W^{pers}_{c,1860}$ is the personal wealth in the county in 1860, we consider the ratio between personal and real wealth:

$$\rho_{c,1860} = \frac{W^{pers}_{c,1860}}{W^{real}_{c,1860}} \ , \ \rho_{c,1850} = \frac{W^{pers}_{c,1850}}{W^{real}_{c,1850}} \tag{10}$$

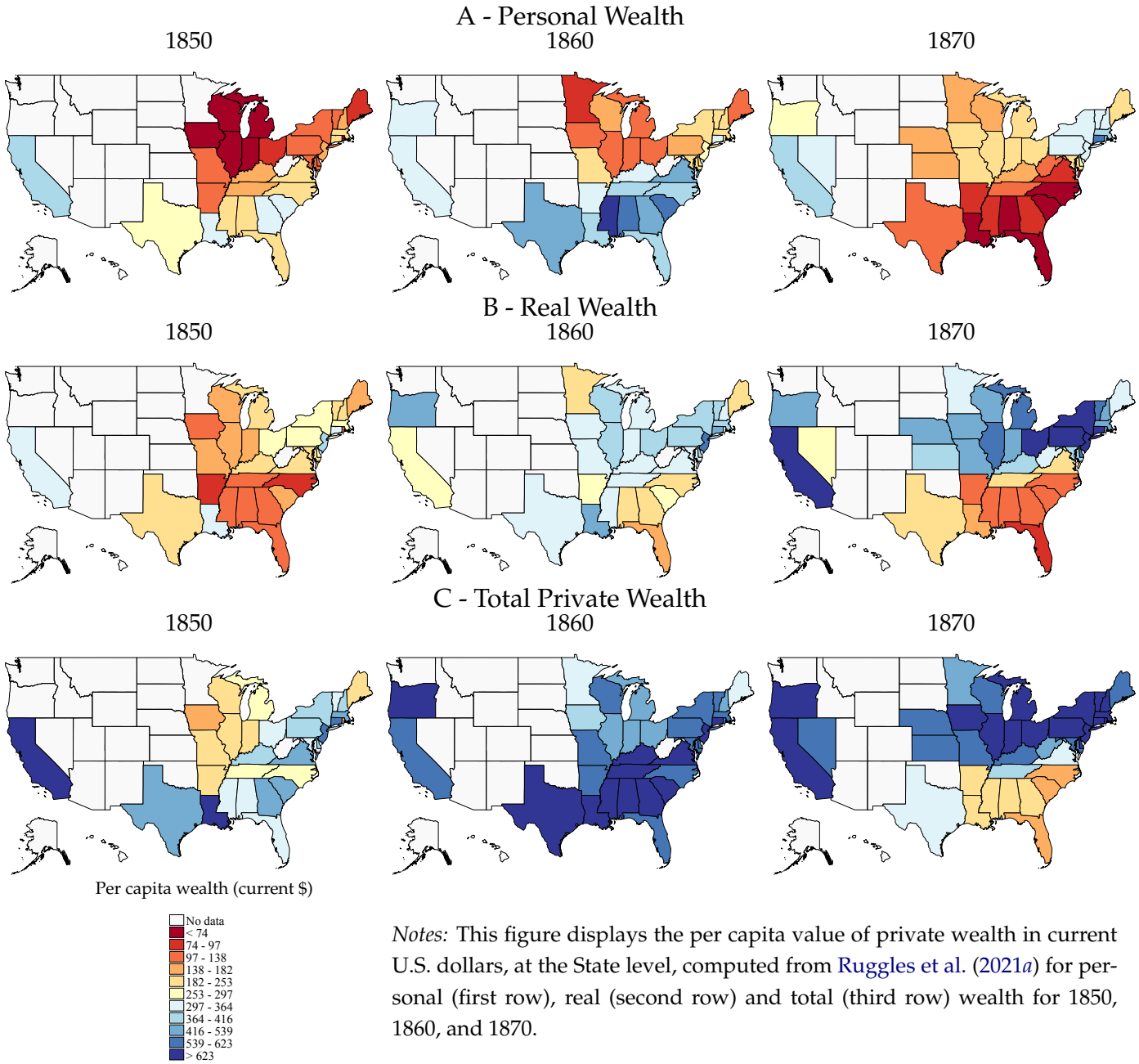
We consider that this ratio is constant over time : $\rho_c = \rho_{c,1860} = \rho_{c,1850}$. With available IPUMS USA full count data, we are able to compute $\rho_c = \rho_{c,1860}$, and then to retrieve:

$$W^{pers}_{c,1850} = \rho_{c,1850} * W^{real}_{c,1850} = \rho_c * W^{real}_{c,1850}$$

This allows us to impute personal wealth at the county level in 1850. To obtain state-level wealth, we simply aggregate county-level wealth up to the state level.

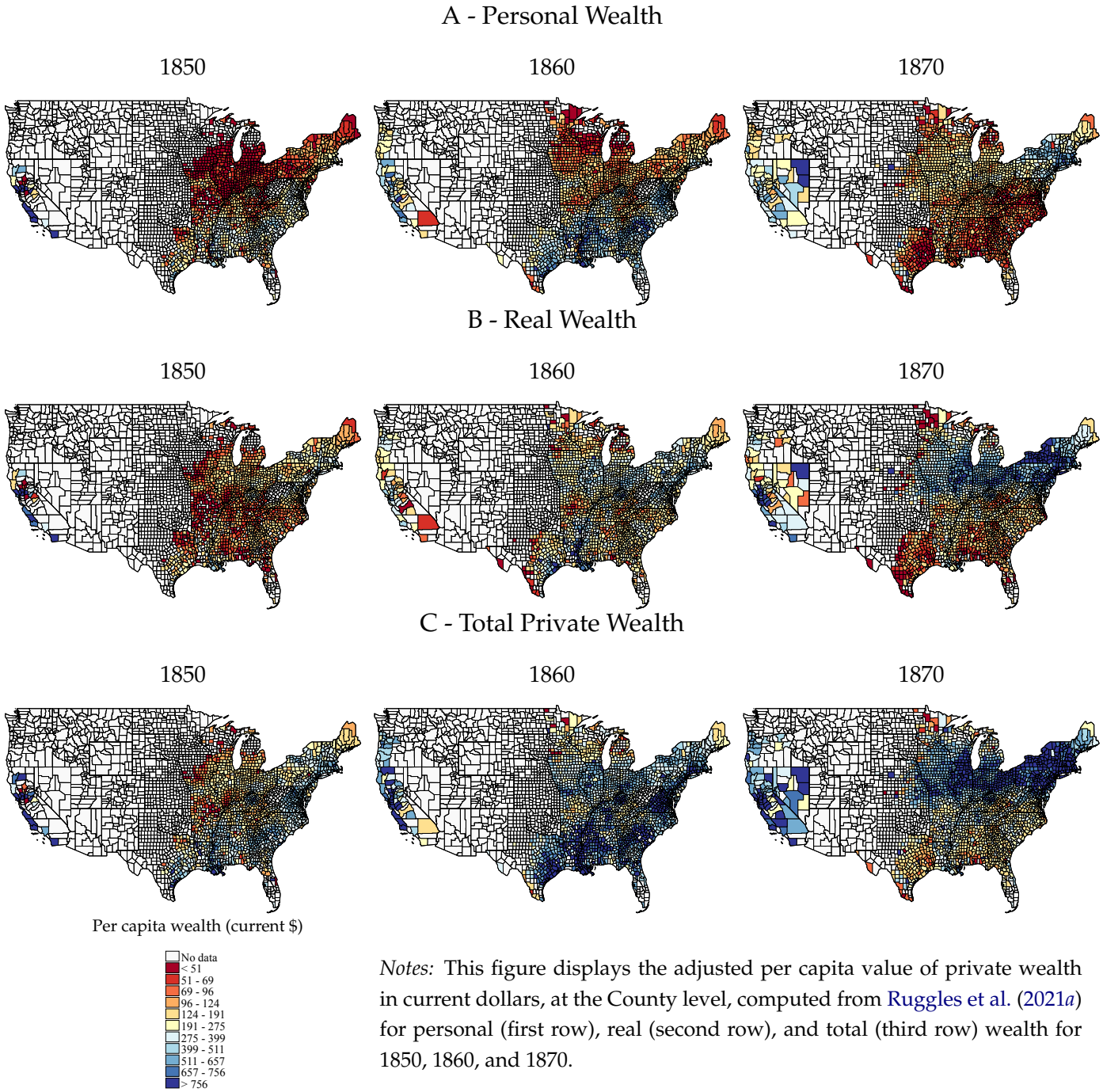
Figure A49 shows private wealth from the IPUMS USA Full Count raw data series at the state level and Figure A50 shows private wealth at the county level between 1850 and 1870.

Figure A49: Private Wealth at the State Level 1850-1870 based on IPUMS USA Full Count



Notes: This figure displays the per capita value of private wealth in current U.S. dollars, at the State level, computed from Ruggles et al. (2021*a*) for personal (first row), real (second row) and total (third row) wealth for 1850, 1860, and 1870.

Figure A50: Private Wealth at the County Level 1850-1870 based on IPUMS USA Full Count



Notes: This figure displays the adjusted per capita value of private wealth in current dollars, at the County level, computed from Ruggles et al. (2021*a*) for personal (first row), real (second row), and total (third row) wealth for 1850, 1860, and 1870.

At the state level, Figure A13 shows that, for many states, the ratio of our property-tax based measure and the IPUMS USA Full Count measure is between 80% and 120% for all years. In 1850, this is the case for 18 out of 30 states; in 1860 24 out of 33 states, and in 1870 22 out of 37 states. There are some states with large discrepancies between the tax-based and IPUMS USA Full Count data in 1850: Texas and Michigan, (where the tax-data significantly underestimates wealth relative to the Census). In 1870, there are some states where the tax data yields higher wealth levels than in the IPUMS USA Full Count. These are Arkansas, Louisiana, South and North Carolina, Florida, New York, Rhode Island and Massachusetts.

At the county level, Figure A14 shows the ratio between tax-based property measures and the IPUMS USA Full Count measures in 1870 (which is the only year in which we can compare these data sources at the county level). Our tax-based measures are quite aligned with the Census ones for this overlapping year.

III.8. Comparison with Other Sources

In this section, we compare our database on wealth to the other historical sources described in Section III.6.

III.8.1. Comparison with the Census of Agriculture Data at the State Level

In Figure 8A, we compare our measure of taxable land and improvements, for states that separately reported this, to the average value of farmland and buildings in the Census of Agriculture, as compiled by Haines, Fishback and Rhode (2014). We compile data on thirteen states (Alabama, Arkansas, Florida, Georgia, Indiana, Kansas, Kentucky, Minnesota, North and South Carolina, Tennessee, Texas and Wisconsin) between years 1860 and 1910.

III.8.2. Piketty and Zucman (2014)

Piketty and Zucman (2014) constructed a harmonized series of ratios of private wealth / national income approximately every decade for 1850-1910 as well as for 1770 and 1810, and annual ratios for the period 1870-1940.

Below are data sources and adjustments for each estimates of private wealth for the Piketty and Zucman (2014) harmonized series :

- **1770**: Estimates of private wealth from probate records in 1774 from Jones (1970) after (i) converting current pounds into current dollars (1 pound sterling = 4.44 U.S.

dollar) (ii) converting "per free capita" into "per capita" assuming that enslaved people made up about 20% of the total population of the Thirteen Colonies in 1774 (iii) upgrading 1770 per capita national income by 5% to take into account real and nominal growth between 1770 and 1774.

- **1810**: Estimate of private wealth from Blodget (1806) based on the compilation of national statistics on the value of real and personal wealth.
- **1850**: Estimates from Goldsmith (1952) inflated by 20%.
- **1860**: Estimates from Hoenack (1964).
- **1870**: Estimates from Goldsmith (1952) inflated by 20%.
- **1880**: Estimates from Hoenack (1964).
- **1900**: Estimates from Goldsmith (1952).
- **1912**: Estimates from Goldsmith (1952).
- **1870-1916 (annual estimates)**: Annual estimates of private wealth using decade-level estimates above, private saving flows from Kutznets (1961), and assuming a constant annual rate of real capital gains of 1.8% for 1870-1880, 1.0% for 1880-1900, 0.7% for 1900-1912, and 1.0% for 1912-1916.
- **1916-1945 (annual estimates)**: Mid-year household wealth estimates from Kopczuk and Saez (2004), based on balance sheets of Goldsmith (1952) and Wolff and Marley (1989). Piketty and Zucman (2014) make two adjustments: (i) they exclude consumer durables[25] (ii) they upgrade household net wealth by 7% for consistency with their post-1945 data. Kopczuk and Saez (2004) estimates also exclude non-transmissible wealth.

III.8.3. Gallman and Rhode (2019)

The Gallman and Rhode (2019) wealth estimates for 1850-1900 are based on Gallman's capital stock measures by two-digit industrial sector estimated from national accounts, and a measure of the value of land. The series used here for comparison comes from Rhode's completion and compilation of these estimates into a consistent national wealth series presented in Gallman and Rhode (2019), Table 2.4. For comparison, we use the

[25] They use series from the BEA for 1925-1945, linear interpolation based on Goldsmith (1952) estimates for 1901, 1913 and 1923, then assume a constant fraction of durables before 1901 (33%, the 1901 value).

series on domestic wealth, measured as the sum of capital stock and the value of land. As detailed in Gallman and Rhode (2019), this wealth concept excludes paper claims, consumer durables, and human capital.

III.9. Data on Property Tax Revenues and Tax Rates

We also collect property tax revenue data from multiple sources.
Figure 1 plots the ratio of the revenues (levies) from the general property tax raised at different levels of government and the GDP of the states in the Union in any given year. This data comes from the following sources:

- For the period 1993 to 2020, we use the Annual Surveys of State and Local Government Finances produced by the U.S. Census Bureau: (U.S. Census Bureau (1993-2020)).
- For the period 1900 to 1992, we rely on several sources:
  - The annual Statistical abstracts of the United States prepared by the chief of the Bureau of Statistics of the Treasury Department, providing data on recent years, especially at the county and the local levels: (U.S. Census Bureau (1942-1992)).
  - The two major censuses: the 1967 Census of government (U.S. Department of Commerce (1967)) and the 1982 Census of Governments (U.S. Department of Commerce (1982)) that provide historical data for past years.
  - The Census 1922: Historical Censuses of Wealth (U.S. Census Bureau (1922)) for several years between 1900 and 1922
- For the period 1850 to 1900, we use the decennial Report on Valuation, Taxation, and Public Indebtedness in the United States by the U.S. Census Bureau for the years 1850 (U.S. Census Bureau (1854)), 1870 (U.S. Census Bureau (1870)), 1880 (U.S. Census Bureau (1880)), 1890 (U.S. Census Bureau (1890)) and the report Historical Censuses of Wealth of 1902 by the U.S. Census Bureau (U.S. Census Bureau (1902)).

For the denominator (i.e the GDP), we are using the GDP series for Johnston and Williamson (2020).
Because the names of the different levels of government can vary from one period to another, we decided to collect consistent series on state, county and "lower levels" of government decomposition, instead of trying to go to finer local levels. From the sources just described, we recover four main variables: the *total levy*, the *state levy*, the *local levy*, and the *county levy*. The *other local levy* describing municipal and lower levels of government is obtained by subtracting the county levy from the local levy.

Table A11: Data Coverage for Property Tax Revenues

Year	Total	State	Local	County	Year	Total	State	Local	County	Year	Total	State	Local	County
1850	X	X	X	X	1908					1965	X	X	X	
1851					1909					1966	X	X	X	
1852					1910					1967	X	X	X	X
1853					1911					1968	X	X	X	
1854					1912	X				1969	X	X	X	
1855					1913	X	X	X		1970	X	X	X	
1856					1914					1971	X	X	X	
1857					1915					1972	X	X	X	X
1858					1916					1973	X	X	X	X
1859					1917		X			1974	X	X	X	X
1860	X				1918					1975	X	X	X	X
1861					1919					1976	X	X	X	
1862					1920					1977	X	X	X	X
1863					1921					1978	X	X	X	X
1864					1922	X	X	X	X	1979	X	X	X	X
1865					1923		X			1980	X	X	X	X
1866					1924		X			1981	X	X	X	X
1867					1925		X			1982	X	X	X	X
1868					1926		X			1983	X	X	X	X
1869					1927	X	X	X		1984	X	X	X	X
1870	X	X	X	X	1928		X			1985	X	X	X	X
1871					1929		X			1986	X	X	X	X
1872					1930		X			1987	X	X	X	X
1873					1931		X			1988	X	X	X	X
1874					1932	X	X	X	X	1989				
1875					1933					1990	X	X	X	X
1876					1934	X	X	X		1991	X	X	X	X
1877					1935					1992	X	X	X	X
1878					1936	X	X	X		1993	X	X	X	
1879					1937					1994	X	X	X	
1880	X	X	X	X	1938	X	X	X		1995	X	X	X	
1881					1939		X			1996	X	X	X	
1882					1940	X	X	X		1997	X	X	X	
1883					1941	X	X	X		1998	X	X	X	
1884					1942	X	X	X	X	1999	X	X	X	
1885					1943					2000	X	X	X	
1886					1944	X				2001	X	X	X	X
1887					1945	X	X	X		2002	X	X	X	X
1888					1946	X	X	X		2003	X	X	X	X
1889					1947	X	X	X		2004	X	X	X	
1890	X	X	X	X	1948	X	X	X		2005	X	X	X	
1891					1949	X	X	X		2006	X	X	X	
1892					1950	X	X	X		2007	X	X	X	X
1893					1951	X	X	X		2008	X	X	X	
1894					1952	X	X	X	X	2009	X	X	X	
1895					1953	X	X	X		2010	X	X	X	
1896					1954	X	X	X	X	2011	X	X	X	
1897					1955	X	X	X		2012	X	X	X	X
1898					1956	X	X	X	X	2013	X	X	X	
1899					1957	X	X	X	X	2014	X	X	X	
1900					1958	X	X	X		2015	X	X	X	
1901					1959	X	X	X		2016	X	X	X	
1902	X	X	X	X	1960	X	X	X		2017	X	X	X	X
1903					1961	X	X	X		2018	X	X	X	
1904					1962	X	X	X	X	2019	X	X	X	
1905					1963	X	X	X		2020	X	X	X	
1906					1964	X				2021				
1907														

For the year 1850, the data is available for only some of the states. The 1850 decennial report estimates a $43,000,000 total levy using the data they had available. In order to check whether this estimate is plausible, we make use of the 1860 total levy by state. We compute the shares of each state in the 1860 total (national) levy. We then use these shares to compute what would be the missing state levies in 1850 if their shares of the total levy were identical to 1860 and if the total national levy was indeed $43,000,000. Summing these estimations, we are getting a total estimation close to $43,000,000. Therefore, we decided to go with the estimation provided by the 1850 Decennial report.

In order to recover the levies for all the levels of government in 1850, we assume that the shares of each level of government for the pool of states available is a good representative for the shares for all states and apply them to the Census estimate of the national levy ($43,000,000).
In Figure 2, the numerator is the levies such as computed for Figure 1. The denominator is the property valuation. For Panel D of Figure 12, the sources are similar to those just described but we use total revenues by state.

III.10. Additional Variables: Geography, Weather, Occupations, and Demographic Characteristics

III.10.1. County Level

All county-level data is based on the boundaries of counties on the year of observation. We did not choose to rely on time-constant definition of counties.

Total population
The total population variable stems from Haines, university Consortium for Political and Research (2010). This variable encompasses both free and enslaved people. When missing, total population is retrieved from Historical Censuses of Wealth (90 missing observations are replaced in this way). Finally, we replace total population by the IPUMS population value (Ruggles et al. (2021*a*)) for one outlying observation (county Lincoln, Nebraska in 1870).

Geography
Most of the geographical variables used were obtained from Allen and Donaldson (2020). The authors divided the U.S. into 570 sub-county spatial grid cells, each approximately

125km by 125km and attributed to them several geographical characteristics, whose sources and units of measurement are listed below.

- Average Minimum January Temperature
  - Unit: Celsius Degrees
  - Source: https://worldclim.org/
- Average Maximum July Temperature
  - Unit: Celsius Degrees
  - Source: https://worldclim.org/
- Average January Precipitation
  - Unit: millimeters
  - Source: https://worldclim.org/
- Average July Precipitation
  - Unit: millimeters
  - Source: https://worldclim.org/
- Average Soil Net Primary Productivity
  - Unit: Original Index: -1.0 grams of carbon per square meter per day (tan) to 6.5 grams per square meter per day
  - Source: http://neo.sci.gsfc.nasa.gov/view.php?datasetId=MOD17A2_M_PSN
- Average Elevation
  - Unit: meters
  - Source: http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/
- Average Ruggedness
  - Unit: Terrain Ruggedness Index, in milimetres
  - Source: http://diegopuga.org/data/rugged/

Starting from the grid elaborated by the authors we used QGIS to map spatial units to counties. In particular, geographic characteristics were averaged within each county's borders and across time, so as to have time-constant variables.

Furthermore, we complemented such a subset of variables with the following:

- Distance to the coast: time-constant variable computed directly on QGIS using the minimum distance from a county to the shoreline (National Oceanic and Atmospheric Administration (2021)) (Source: here).
- Canal crossing: time-varying indicator variable coming from Bazzi, Fiszbein and Gebresilasse (2020) that takes value 1 is a canal crossed the county.
- Steamboat-navigated river crossing: time-constant indicator variable obtained through QGIS from Atack (2015) taking value 1 if a steamboat-navigated river crossed the county.

Demographics

Demographic variables were obtained from Ruggles et al. (2021*b*) and consist of fraction of foreigners living in a county, fraction of males living in a county, fraction of white people living in a county, and fraction of the county population that is literate.

Occupation Shares

Occupation shares were obtained from Ruggles et al. (2021*b*) and were combined as follows:

- Agriculture (code 100)
- Mining (code 200)
- Manufacturing (code 300), and Non-durable production (code 400, not shown in the figures).
- Commerce: sum of Transportation (500), Retail/Trade (code 600), Finance (code 700), and Business (code 800)
- Public Administration (code 900)

For each of these economic sectors we created an indicator variable taking value 1 if a county in a specific year belongs to the top quartile in the fraction of the population working in such a sector and zero otherwise.

Top 10% Wealth Share

We construct the share of wealth owned by the 10% richest individuals at the county level using the IPUMS Census individual data (Ruggles et al. (2021*a*)).

III.10.2. State Level

All geography variables are from Allen and Donaldson (2020) and averaged at the state level. For distance to the coast, we used the minimum distance between the coast and any county in the state. Demographics and Occupation shares are as described for the county level.

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