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Wealth and Property Taxation in the United States*

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Abstract

We study the history and geography of wealth accumulation in the US, using newly collected historical property tax records since the early 1800s. The US General Property Tax was a comprehensive tax on all types of property (real, personal, and financial), making it one of the first "wealth taxes." Drawing on many historical records, we construct long-run, consistent, high-frequency wealth series at the county, state, and national levels. We first document the long-term evolution of household wealth in the US since the early 1800s. The US experienced extraordinary wealth accumulation after the Civil war and until the Great Depression. Second, we reveal that spatial inequality in the US has been large and highly persistent since the mid-1800s, driven mainly by Southern states, whose long-run divergence from the rest of the US predated the Civil War. Before the Civil war, enslaved people were assessed as personal property of the enslavers, representing almost one-half of total taxable property in Southern states. This system is morally abhorrent and implies wrongly counting forced labor income as capital. The regional distribution of wealth and the effects of the Civil war appear very different if enslaved people are not included in the property measure. Third, we investigate the determinants of long-term wealth growth and capital accumulation. Among others, we find that counties with a higher share of enslaved property before the Civil War or higher levels of wealth inequality experienced lower subsequent long-run growth in property.

Keywords: taxation, wealth tax, wealth, inequality, convergence, property tax
JEL Codes: E01, H20, H71, N31, R12, J15

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1 Introduction

At the turn of the 19th century, a comprehensive and sophisticated wealth taxation system emerged in the United States. At the time, it was unique and different from tax systems in European countries. While property taxes have existed since Antiquity, as documented for Egypt (McGregor (1956)), Greece (Seligman (1890) and Walker (1984)), and Rome (Walker (1984)), they were typically based on land.[1] The Danegeld was the first system of land taxation in Europe after the fall of the Roman empire. Initially meant to pay off Viking invaders, it eventually became a nationwide tax. England's Land Tax was a major financing tool for its government in the 18th and 19th centuries, which the British colonies in North America also adopted. The key US innovation was applying a tax to all types of property, not just land. The US General Property Tax (GPT) was a comprehensive tax on all property, including personal and financial wealth, in addition to real estate and real assets. This feature essentially made it one of the first "wealth" taxes.

For 90 years, the GPT remained a central tenet of the US political and economic system, representing a substantial share of all state and local governments' revenues. The GPT was characterized by its very local nature, with multiple jurisdictions potentially competing for the same tax base and relatively uniform and high effective tax rates on all property. As a result, compared to European countries, the US relied heavily on the local taxation of wealth to fund its government expenditures, investments, and public goods. Only after the 1930s did the importance of the property tax decline, and newer forms of taxation and sources of revenues replaced it. Over time, the property tax base shrank to eventually become the current US property tax, which is no longer "general" and falls only on (a fraction of) real estate wealth.

The administration of such a comprehensive tax left detailed and valuable paper trails over a long period. We collected, digitized, and organized many different historical sources, reports, and records of counties and states. We thus provide a new historical dataset on US property and wealth over the long run and at a granular geographical level. Specifically, we constructed wealth series at the national, state, and county levels over a long period: 1800-1935 at the national level, 1850 or earlier (depending on the state) to 1935 at the state level, and 1850 to 1930 at the county level. While historical national wealth estimates exist, as reviewed below, our data based on the GTP offers a coherent, higher-frequency, and long-run source. Furthermore, to our knowledge, there are no existing comprehensive and long-run subnational property measures.

We use this new data to answer the following core questions: How did aggregate

[1] One exception is the Swiss wealth tax during the Helvetic period (1798-1803). However, this was rapidly abandoned and only progressively re-introduced by cantons between 1840 and 1970 (Krenek and Schratzenstaller (2018); Aebi and Eckert (2020))

wealth evolve in this crucial period of US development? Second, how was property distributed across space, and how did spatial inequality change over time? Third, what factors shaped local capital accumulation and growth?

We start by showing that the US experienced exceptionally rapid growth in national wealth after the Civil War and that wealth growth was much faster than income growth.

Thanks to the high frequency of our data, we can also study the changes in wealth around major events, such as the Civil War, and highlight the role of enslavement in shaping long-run wealth accumulation in the South. Wealth per capita in the Northeast, Midwest, and Southern regions was relatively similar before the Civil War. However, while other regions took off and grew rapidly after the war, the South appeared to stagnate at lower wealth levels. We show that the evolution of regional wealth and the effects of the Civil War critically hinge on enslavement. Before the abolition of enslavement, enslaved people were considered the personal property of the enslavers and assessed as such for tax purposes. This treatment is morally abhorrent and means forced labor income flows were counted as "capital" or wealth. We, therefore, also construct property series excluding the value of enslaved people from the property measure.

This analysis reveals how wealth-poor Southern states and counties were pre-Civil War. For instance, Georgia, Florida, and Alabama, had more than 50% of their property in enslaved people, and their property per capita declined by more than 25% between 1860 and 1870, above and beyond excluding enslaved people from the wealth measure. The wealth of white residents in Southern states appeared much higher than in Non-Southern states before Emancipation only and entirely because of enslavement; after the Civil War, it grew at a much slower rate than in other states. Within Southern states, counties with the highest shares of enslaved property experienced much slower long-run growth over 60 years between 1870 and 1930, even conditional on a wide array of controls for geographic, demographic, economic, and inequality characteristics.

We then study spatial inequality after the Civil War. Despite powerful equalizing forces such as internal migration and the deeper integration of the US national market, the level of spatial inequality was high and persistent until 1930 and beyond. More specifically, we show that there was no "sigma-convergence" (a decline in dispersion) in wealth across counties or states, that the share of national wealth held by the top 10% wealthiest counties increased, and that there was remarkable persistence in the wealth ranking of counties and states over time. Furthermore, the US exhibited much slower spatial convergence in wealth per capita over time ("beta-convergence") than would appear from historical income data. Southern states primarily drove the slow convergence.

The persistence of spatial inequality and the relatively slow convergence make it even more important to understand why some places were richer than others after the Civil War and why some grew more rapidly. In other words, we want to identify the correlates of initial wealth levels and which factors drive capital accumulation, conditional on initial wealth. We study the determinants of long-term wealth growth and capital accumulation at the county level– the most granular level for which we have comprehensive data over a long period.

We find that geographical characteristics, such as climate (temperatures and precipitations) and topography, matter substantially for initial wealth and, to a lesser extent, for subsequent growth. Soil productivity and proximity to the coast are significantly positively associated with long-run growth. A key predictor of both initial wealth and subsequent growth is the literacy rate – a measure of local human capital. There seem to be positive agglomeration effects since counties with a higher population in 1870 are wealthier and continue to grow faster. At the same time, migration appears to operate as a convergence force since places with higher recent population growth experience lower wealth growth over the subsequent decade.

We can also show that the structural transformation of the local economy throughout its development looks similar to that documented at the country level by earlier research. More specifically, places with a higher property per capita have lower shares of the population in agriculture and a higher share in commerce (e.g., retail and finance). Manufacturing follows an inverted U-shape, first increasing and then decreasing as counties become richer.

Finally, inequality in wealth, as captured by the share of wealth held by the top 10% wealthiest people in a county, exhibits a robust negative correlation with growth in property over the next 60 years, even if we control for a range of geographic, demographic, and economic factors. This latter finding at the very local level – thus holding institutional and cultural factors fixed – is particularly interesting in light of the extensive literature on the link between inequality and growth, which typically builds on cross-country evidence. One key mediating factor appears to be human capital: places with higher inequality had lower increases in literacy rates.

Our paper contributes to three strands of the literature studying (i) wealth estimates over the long run in the US and other countries; (ii) development and spatial inequality in the US; (iii) the economic consequences of the Civil War and enslavement. Furthermore, our data allows us to provide new quantitative facts to illustrate the history of the property tax. We review the history of the property tax and the literature studying it in Sections 2 and 3.

Wealth estimates over the long run. There exist several historical estimates of US national wealth based on different sources of data (Piketty and Zucman, 2014; Goldsmith, 1952; Gallman, 1986; Gallman and Rhode, 2019). We describe these alternative sources in Section 4 and Appendix III.6 and compare them to our national-level estimates. Kopczuk and Saez (2004) compute top wealth shares in the US since 1916 using estate tax returns and the estate multiplier method. For a more recent period, Saez and Zucman (2016) construct wealth distributions for the US, relying on a combination of tax data, national accounts balance sheets data, and the capitalization method. For surveys of this strand of the literature, see Kopczuk (2015) and Roine and Waldenström (2015). Kuhn, Schularick and Steins (2020) construct new long-run data on income and wealth between 1949 and 2016 using the Survey of Consumer Finances. Derenoncourt et al. (2022) estimate the racial wealth gap between 1860 and 2020 to show that convergence has been very slow and, if anything, the racial wealth gap has widened again since the 1980s.

Our measures of national wealth based on property tax data offer one of the most comprehensive and consistent (i.e., based on the same source over time) series over the long run. Relative to the literature using the estate multiplier (Kopczuk and Saez, 2004) or the capitalization method (Piketty and Zucman, 2014), our approach requires fewer assumptions because property is directly estimated. Importantly, no systematic wealth estimates at the sub-national level over the long run exist. We can provide measures at the city, county, and state levels.[2]

A body of work has constructed wealth estimates for other countries for more recent periods (typically starting in the 70s or later): Acciari, Alvaredo and Morelli (2021) for Italy; Piketty and Yang (2022) for Hong-Kong; Charalampidis (2018) for Greece; Alvaredo, Assouad and Piketty (2019) for the Middle-East; and Piketty, Yang and Zucman (2019) for China. Longer-run estimates include Katic and Leigh (2016) for Australia 1915-2012; Novokmet, Piketty and Zucman (2018) for Russia 1905-2016; Toussaint, de Vicq and Moatsos (2022) for the Netherlands 1854-2019; Albers, Bartels and Schularick (2022) for Germany 1895-2018; and Blanco, Bauluz and Martínez-Toledano (2021) for Spain 1900-2017.

Studying the history of public finances, Sylla, Legler and Wallis (1993) build a dataset on revenues and spending of state and local governments from 1790 to 1915, later harmonized by Hindman (2010) to include Southern States from Holt (1977), which we use to impute the property tax revenue for some of the early years before 1850, as described in Section 3. Legler, Sylla and Wallis (1988) assemble data on the revenues and expenditures of many cities by decade from 1850 and 1902. We expand their data

[2]Earlier historical wealth estimates are typically found for short periods or a few states at a time (Garmon Jr, 2014; Jones, 1970; Soltow, 1984) as described in Appendix III.6.

collection for tax revenues, tax rates, and tax administration-related variables.

Economic development and spatial inequality. We also contribute to the literature on economic development and spatial inequality in the US by providing a new, fine-grained, consistent measure of economic activity: property. Our measures can be useful complements to existing measures of economic activity such as income (derived indirectly from occupational scores and available at low frequency).[3] Wealth and income are far from perfectly correlated across time and space, as can be seen in Appendix Figure A1.[4]

We can also highlight some key correlates of property and capital accumulation at the city, county, and state levels, adding to the literature that has studied the determinants of economic activity as measured by different indicators. Among others, Donaldson and Hornbeck (2016) examine the historical impact of railroads on US economic activity, precisely agricultural output; Hornbeck (2012*a*) studies the effects of the American Dust Bowl on agricultural land values and revenues; Arthi (2018) considers its effects on human capital. Hornbeck (2012*b*) also emphasizes the role of the environment's influence on agricultural output and development. Fiszbein (2022) establish the vital role of agriculture for the subsequent development of places in the US. Consistent with the study of Atack, Haines and Margo (2011), we find that land values sharply rose between 1850 and 1860, as the land was converted into farmland rapidly. Kim and Margo (2004) analyze the historical patterns of economic activity in the US at the city and regional level since colonial times.

We also study domestic and international migration, which is one channel through which wealth accumulation changes across space. Historical migration and its impacts on local economic outcomes are explored in Abramitzky, Boustan and Eriksson (2012), Abramitzky, Boustan and Eriksson (2014), Collins and Wanamaker (2014), Sequeira, Nunn and Qian (2020), and Zimran (2022).

Southern wealth, enslavement, and the Civil war. Our data allows us to quantitatively illustrate some of the history of the US South, the blight of enslavement, and the effects of the Civil. Ager, Boustan and Eriksson (2021) find that white Southerner households who owned more enslaved people in 1860 lost substantially more wealth during the Civil war; we find a similar result at the county level, including a negative effect on long-run growth. The negative association between enslavement and

[3]Occupational scores are typically derived from the cross-over between occupations and income in the 1950 Census.

[4]The correlation between income and wealth at the state-year level is around 0.72, and a regression of wealth on income yields an R^2 of 0.53.

subsequent economic performance is also highlighted in Wright (2022), Hornbeck and Naidu (2014), and Engerman and Margo (2011). We can measure the property loss after the Civil War directly, complementing work by (Hutchinson and Margo, 2004) and Feigenbaum, Lee and Mezzanotti (2022), as well as work studying the wage gap between the North and the South before and after the Civil War (Margo, 2004; Goldin and Margo, 1992).

The rest of the paper is organized as follows. Section 2 provides a brief historical and institutional overview of the General Property Tax in the United States. Section 3 describes our newly collected data. Section 4 analyzes the evolution of wealth accumulation and spatial inequality in the US. Section 5 considers the determinants of capital accumulation. Section 6 concludes.

2 A Brief History

This section provides a brief overview of the history and system of property taxation in the United States, building on a large literature. We contribute newly constructed data to concretely illustrate the importance and features of the property tax.

2.1 From Colonial Taxation to the General Property Tax

The General Property Tax was a major component of the US tax system from its inception. Property taxes were already recorded in Antiquity and the 10th century (under the name of *danegeld*), primarily as taxes on land (Benson et al., 1965). The key US "innovation" was applying a tax on all property classes, not only land.[5] In the American colonies, this translated into a complex system of property taxation on enumerated items with different tax schedules on classes of property such as land and improvement, livestock, merchant's equipment, or enslaved people (Jensen (1931) p.20, Fisher (1999) p. 91).[6] The General Property Tax was progressively established when these disparate taxes on enumerated items of property were merged into a uniform tax on (almost) all property classes.

2.2 The Principles of the General Property Tax

The main principles and characteristics of the General Property Tax were common to all states.

[5] Fisher (1996) p206.

[6] The colonial tax system also included poll taxes and a faculty tax on specific occupations Benson et al. (1965); Fisher (1999)

First, the **universality** principle, often embedded in state constitutions, required that all property classes be subject to the property tax. Exemptions were limited and clearly defined (see Section 2.6).

Second, property taxation is **ad valorem**, i.e., taxation is based on value. This fundamental concept allowed for the same tax *schedule* to apply to different classes of property instead of having tax schedules depend on the kind of property. It made the valuation of property a critical feature of the tax administration.

Third, the **uniformity** principle, written into many state constitutions, required that all property be subject to the same tax rate in proportion to its value. This clause ensured the application of a unique property tax rate, regardless of the property class or its owner's wealth. It also meant that property taxes were not aimed at progressivity.

Fourth, property taxes were **local**. Local assessors – usually elected and often residents-listed and valued property and collected property taxes. This local characteristic of the property tax created a close link between the sources of revenues and government spending. The property tax thus provided valuable benefits to local taxpayers in exchange for their tax payments, making it politically and economically sustainable in the face of mobility of factors and people.[7]

We now provide a brief history of how different levels of government (local, state, and national) financed themselves between the early 1800s to the 1930s to illustrate the crucial importance of the property tax in state and local governments' budgets.

2.3 The early 1800s

In the 1790s and 1800s, states relied heavily on property tax financing, and revenues from the property tax comprised more than 60% of all state revenues (Sylla and Wallis, 1998, pp. 281-282). Over 1800-1830, states progressively decreased their reliance on taxes and instead started to rely on asset finance, i.e., massive investments in banks, canals, railroads, and other transportation improvements.

From the 1830s onwards, the property tax regained its role as the most important source of state tax revenue. A deep and prolonged economic depression began in 1839, and by 1842, eight states and the territory of Florida were in default because of their large state investments in canals and banks. Many states adopted as the result of this episode constitutional provisions limiting or altogether preventing the use of public funds to invest in private corporations and restricting public debt. Furthermore, many new or revised state constitutions included uniformity and universality

[7]Some property taxes were directly targeted at financing specific activities, such as taxes on school and road districts. In addition, some states created specific state property taxes for each spending category, such as the state tax for the road or school funds.

clauses that established the major characteristics of the general property tax discussed above.[8]

2.4 The Property Tax 1842-1933

Our core study period, 1842-1933, is the "Era of property tax finance and local government" (Wallis, 2000). As property tax financing increased, state government activity slowed considerably. The activity shifted to local governments, who took over investments in water, sanitation, transportation, public works, and schools. By 1902, local revenues were roughly the same as state and national revenues combined (Wallis (2001)).

We use our newly constructed data to shed light on the importance of the property tax for the US over this period. Figure 1 shows the total revenue from the property tax as a share of GDP in the US at different levels of government: state, county, municipal and lower levels. In 1850, total property tax revenues were somewhat below 2% of GDP. They more than doubled to 5% of GDP in the 1920s.

2.5 The Demise of the General Property Tax after the 1930s

Criticisms and Reforms At the Turn of the 20th Century. Criticisms of the property tax – often spearheaded by economists– became pronounced at the turn of the century. They focused on three issues: i) its local administration in light of property that became increasingly intangible and mobile (e.g., stocks, bonds, and other financial assets); ii) the quality of assessments, as the economy grew more complex than before, and ownership and control or wealth became more challenging to establish and assets harder to value; iii) inequities in assessment and the increase in wage earnings meant that property value became a less suitable measure of ability to pay (Benson et al., 1965; Fisher, 2002).

As criticisms over the unfairness of the tax system grew, several reforms took place. Tax commissions set up by states were in charge of centralizing and regulating assessment. States also pushed for the professionalization of the assessment functions by training assessors and using rigorous, scientific valuation methods. Second, a classification movement occurred, replacing the uniformity clause and allowing for lower tax rates on intangible property.[9]

[8] Table A1 shows the dates at which these clauses first appear in the State constitution and the dates at which these practices were first observed (many as early as 1793 as in Maryland). There is, thus, historical evidence that the aspirations towards uniformity and universality predated formal inclusion in the constitutions.

[9] For an exposition of the need for classification, see Bullock (1908). See, for instance, Foote (1910) for

The Demise of the GPT After the Great Depression. The 1930s marked the era of income tax financing and the more active federal government (Wallis, 2000, pp. 72-73). Historians still debate the reasons for the demise of the General Property Tax (Hindman, 2010), but three interrelated changes likely drove it.

First, after the Great Depression, the federal government's role expanded. Large programs such as the New Deal and Social Security, welfare services, agricultural price supports, military spending, and public works implied an increase in the share of revenues collected by the federal government, which were then administered by states through a system of intergovernmental grants.

Second, new sources of financing for states appeared, making the property tax less necessary, such as automobile licenses, fees, motor fuel taxes, general sales, and income taxes. Total property tax revenue as a share of total government revenue fell from 38.8% to 25.2% between 1927 and 1938, then to 8.1% in 1946 (Benson et al. (1965)).

At the same time, the fall in property value and rise in property tax delinquencies during the Great Depression meant that states started providing more extensive exemptions to property tax (Fisher (1997)). Finally, after WWII, homestead exemptions given to owner-occupied residences and limits on property tax rates put a nail in the coffin of the General Property Tax (Fisher, 2002; Jensen, 1936).

Figure 1 illustrates the decline in the importance of the Property tax after the 1930s: as a share of GDP, property tax revenues plummeted from 5% at the eve of the Great Depression to around 2.5–3% in the 1950s and beyond. The figure also shows that while property tax revenues at the state level became minimal, the property tax has remained significant for public finances at the county and municipal levels since the 1950s.

2.6 Institutional Features of the General Property Tax

We now describe some key institutional features of the property tax that are important to understand the available data and how it can be used to get consistent property measures across time and space. Appendix II provides more details.

Types of property. The General Property Tax was conceived as a tax on the value of all property – real and personal– owned by households. Real property consisted of land, buildings, and improvements. Personal property was less clearly defined and essentially included most other forms of property, such as tangible property – furniture, livestock, merchandise, and valuables – and intangible property – such as

a description of the experience in Ohio.

money and bank deposits, mortgages, debts and credits, stocks, and bonds. Before the abolition of enslavement, enslaved people were considered to be the personal property of the enslavers. We come back to this issue below.

Figure 2 shows a breakdown of private property in Connecticut – a state for which we have detailed information on property composition– between 1865 and 1885. The figure highlights how extensive the property tax base used to be and provides some information on its composition. The bulk of assets consisted of dwellings, houses, and land, followed by mills and stores, mechanical and manufacturing investments, money, stocks, livestock, and various household goods.

The GPT applied to corporate assets too. Different states adopted different methods of taxing corporate assets –some states taxed property owned by corporations, and others taxed individuals who owned shares of stock and bonds issued by corporations. However, no state taxed *both* corporate assets and household-owned shares, implying that there was no within-state double taxation. Issues of double taxation could nevertheless arise across states: if a corporation was held by shareholders from state a, but had its physical capital in state b and state a taxed stocks and bonds of corporations on the household side, while state b taxed corporate assets directly on the corporate side and there were no provisions for double taxation. In practice, this situation was likely not that common, and several states (Utah, Massachusetts, Montana, Vermont) had explicit provisions for out-of-state corporations (Jensen (1931) pp. 121-124).

Double-counting and exemptions. Specific provisions allowed the deduction of debt and mortgages from the property tax base so that the assets they financed were not double-counted. There were some exemptions from the property tax, which varied by state. Most exemptions were related to public property (land and public buildings), religious property (e.g., churches, cemeteries, religious societies), charities, hospitals, schools, and libraries, not to private wealth. Nevertheless, there may be specific, non-systematic private property exemptions that we cannot account for. 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 (U.S. Census Bureau, 1902).

A layered tax. The property tax was a layered tax. Property was assessed once, locally, and then taxed by all residing jurisdictions: city, county, state, and special districts.[10]

[10]Special districts include school districts, road districts, fire districts, or drainage districts, which allowed for targeting of funds for special projects. There was no equivalent federal property tax. Congress temporarily imposed a progressive property tax in 1798 and 1812, modeled on the *Impot progressif* from the French revolution, but this was unpopular discontinued. Fisher (1997)

The broad parameters of the property tax were defined at the state level in the State constitutions and by the State legislator in specific laws (e.g., revenue laws). State tax commissions supervised the assessment and collection of property taxes. 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. The property tax was levied on a specific day of the year based on the value of the property that day.

Thanks to our data, we can compute effective property tax rates at different levels of jurisdiction (for details of the construction, see Appendix III.8).[11] Panel A of Figure 3 shows that property tax rates in municipalities and lower levels of jurisdictions increased from 0.3% in 1850 to 1% in 1930 while county and state tax rates remained relatively stable at around 0.3% combined. As a result, total effective property tax rates were around 0.6% in 1850 and 1.35% in 1930. There was, however, substantial geographical variation in these tax rates. Panel B of Figure 3 shows that property tax rates ranged from around 0.5% in low-tax areas to more than 3% in higher-tax ones in 1920. In that year, the average effective tax rate was 1.4%; the average city tax rate was 1%; the average county tax rate 0.24%; and the average state tax rate 0.16%.

3 Data Sources and Construction

This section describes the data sources we collected and used to construct private property series at the city, county, state, and national levels. Appendix III provides extensive further information. We then discuss some important conceptual issues when measuring property and wealth.

3.1 Data Sources on the property tax and assessed property values

We now discuss our data sources at the state, county, city, and national levels. We had to digitize all the records on tax rates, assessed wealth, and assessment ratios at the city, county, and state levels to input them into a usable database. We further had to make the data consistent over time and space using the assessment ratios described below. At the state level, we also digitized the complete primary sources, which contain abundant additional data, and created an exhaustive catalog of resources for each state. Because these primary sources change names over time and are available in different collections and libraries, such a catalog can be helpful for future research.

[11] These effective tax rates are computed as the ratio between property tax revenues and our estimates of the value of property at each level of jurisdiction. This allows us to provide consistent effective tax rates for a long period of time. However, for the more restricted period for which we have data for statutory tax rates, the effective tax rates align very well with statutory tax rates adjusted by the assessment ratio (see Figure A3).

3.1.1 State-level data

Assessed property. We collected data from various sources on the valuation (assessment) of private property. Our primary sources are official State reports, which were the chief financial documents of states and contained detailed information about sources of spending and revenues raised, particularly regarding property taxation. The format and name of these reports varied from state to state. However, they were usually called an Auditor', Treasurer's, or Comptroller's report and were produced annually or every two years. We compiled a list of all state reports available on the *HathiTrust* digital library from 1790 until 1940. We also collected data from the State Tax Commission and the Board of Equalization in charge of supervising the assessment of property subject to taxation. Starting in 1915, the U.S. Census compiled and harmonized data from State reports in the series *"Financial Statistics of the States"* (U.S. Census Bureau, 1915). Where available, we also relied on special studies by the U.S. Census Bureau or U.S. Department of Commerce providing a time series of property taxes and valuation for all states (U.S. Census Bureau, 1941; U.S. Department of Commerce, 1967, 1982).[12] Table A10 lists the sources used to construct state-level wealth series from state reports for each of the 52 states and territories.

Figure 4 illustrates the coverage of our state property series by showing the total value of private property for each state as a share of US GDP. We observe the property value for most states since their admission to the Union and, for some, since the early 1800s. The data is naturally much sparser before 1850, so we focus our state-level analysis on the period starting in 1850. As shown in Figure 5, the share of the contemporaneous US population living in states where we have wealth data reaches 50% in 1820, then progressively increases to 100% by 1865.

Wealth from enslaved people. Before the abolition of enslavement, enslaved people were assessed as property in property tax records. The organization of Southern economies meant that some people could be considered the property of others. This is morally abject. In addition, in such a system, the income flows from the labor of enslaved people accrued to others. This made forced labor income flows appear like wealth and property, which is inaccurate. We, therefore, also provide wealth series excluding enslaved people from the property variable, in addition to the series of wealth, as defined at that time, which included enslaved people.

There is evidence that tax assessors underestimated the price of enslaved people. Therefore, we use the number of enslaved people by county from the Census, and the historical series on the price of enslaved people from Ransom and Sutch (1988)

[12] Where multiple sources are available, we rely on the most recently published series.

and Einhorn (2001). Our procedure is described in detail in Appendix III.2, together with a discussion of alternative price estimates.

Property tax revenues. We also collect data on property tax revenues, as described in Appendix III.8. Among others, we use these data to compute effective tax rates.

3.1.2 County-level data

We collected data on county-level wealth from statistics compiled every decade from property tax lists by the Census in their *Wealth, Debt and Taxation* publications between 1870-1930 (U.S. Census Bureau, 1880, 1890, 1902, 1912, 1922). These statistics provided information on total, real, and personal property value and the property tax rates for all counties. We supplement these statistics with real and personal property value data from IPUMS full count data (Ruggles et al., 2021*a*) , based on questions asked directly to individuals in 1850 and 1860. The Census only asked about real property values in 1850. We describe how we use the Census individual-level data to impute wealth in Appendix III.1.

3.1.3 National wealth

We construct national wealth by aggregating our state-level wealth estimates described in Section 3.1.1. For the period starting in 1850, this aggregation is immediate. Before 1850, the data is scarcer. We, therefore, interpolate wealth in-between years where we have data points for each state. Furthermore, to account for the fact that in some years, we only observe some but not all states, we rescale the wealth aggregate for these years before 1850 by the share of national wealth held by these states in 1850. Appendix III.5 describes these procedures in detail and presents multiple sensitivity checks (see Appendix Figure A8). Alternative assumptions do not substantially change our wealth series at the national level, except for the very early period 1800-1820, where data is much scarcer, and the estimates are, hence, more sensitive to omitting particular states or to the weighting. We also compare our estimates to existing ones in Figure 12.

3.2 General Issues: From Reported Statistics to Measures of Private Property and Wealth

We now discuss some important measurement issues when using property tax data for inferring private wealth. Wealth is always difficult to measure, even in modern-day data. The historical setting we study poses some of the same challenges researchers

may face in contemporary settings but also offers some key advantages. First, because few countries today tax wealth directly, wealth often has to be inferred from self-reported survey data or imputed from capital income. The existence of the general property tax and the records that were created because of it provide us with high-quality direct measures of wealth. Second, many assets are hard to value, e.g., private businesses, real estate in areas with few market transactions, etc. During the General Property Tax era, substantial and serious efforts were put into carefully valuing property, as described in Section 2 and further discussed below.

3.2.1 From assessed value to market value.

First and foremost, we need to account that the assessed value of a property reported by tax assessors may systematically differ from its actual market value. Ultimately, the information on the value of property comes from state and city assessors charged with enumerating and valuing property for the purpose of property taxation. Assessors might deviate from the requirement of assessing at "market value" ("true," "full," or "just" valuation in the words of state constitutions) (U.S. Census Bureau (1902) pp. 3-5). Typically, the assessed values of property were significantly lower than the actual market value.

In other words, we observe for jurisdiction i in year t the property tax revenues R_{it}, the nominal tax rate on assessed value of property τ_{it}, and the total assessed value of property measured by assessors $\tilde{W}_{it}$.

$$\begin{aligned} R_{it} &= \tau_{it} \cdot \tilde{W}_{it} \\ &= \tau_{it} \cdot \gamma_{it} \cdot W_{it} \end{aligned} \tag{1}$$

To reconstruct private property, we need the true market value W_{it}, which requires knowing the ratio of assessed to true value, or the so-called "assessment ratio" $\gamma_{it} = \frac{\tilde{W}_{it}}{W_{it}}$. Legally, $\gamma = 1$ in most states, but in practice, $\gamma < 1$

Data on assessment ratios. To measure assessment ratios, we compiled rich information on assessment practices from several main sources. At the state level, we use State reports and the Census analysis from the *"Wealth, Debt, and Taxation"* series, conducted decennially from 1870 to 1920. Substantial efforts were devoted by State tax commissions and the Census to compare assessed to true valuations and document these gaps. Second, 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); Jensen (1931); Lutz (1921); Blakey and Blakey. (1927); Board (1923,

1925)) that documented the ratio of assessment to market values of property. Third, we supplement this with information on assessment ratios from the series *"Financial Statistics of the States"* (U.S. Census Bureau, 1915). In the latter publication, the assessment ratios are self-reported by assessors, so we only use them to detect directional changes but not to infer levels of assessment ratios.

We assign each county the assessment ratio of the state.[13] City-level assessment ratios were provided annually in the *Financial Statistics of Cities*. Because they are based on self-reported estimates by assessors and city officials and were not subject to a critical investigation by the Census, we rescale them so that the population-weighted average city assessment ratio corresponds to the average state-level ratio.[14]

Constructing market values. Appendix III.3 describes the construction of assessment ratios for each state and depicts the time series of assessment ratios, assessed wealth, and the market value of wealth. These state-by-state time series illustrate why information on assessment ratios is so critical. Take the example of Ohio, reproduced in Figure 7. In 1910, assessed wealth exhibited a sharp and sudden jump. Such discontinuities may cast doubt on the benefits of assessed property tax data for economic analysis. However, our detailed data collection shows that, in 1910, Ohio experienced a clear increase in the assessment ratio because of the creation of the Ohio Tax Commission, which was responsible for equalization. When we apply this change in the assessment ratio to the assessed wealth series according to formula (1), we obtain a perfectly smooth series of the market value of private wealth.

Evolution of assessment ratios. Figure 6 depicts the evolution of assessment ratios across states over time. Over the long run, assessment ratios decreased in most states. The average assessment ratio fell from around 82% in 1850 to 43% in 1922 (see also Appendix Figure A6 showing the evolution of the average assessment ratio over time). Although there is no conclusive explanation for why this decline occurred, one possibility is that personal property became a larger share of private wealth and was more likely to be undervalued (Jensen (1931), p. 282).

[13] For 1870, the *"Wealth, Debt, and Taxation"* publications directly provide county-level assessment ratios, which we can use to cross-check the validity of the state-level estimates. Appendix Figure A7 shows that our use of the state-level assessment ratio is well-justified. The average population-weighted county assessment ratio is very close to the state-level assessment ratio for all states.

[14] The Census considered these self-reported ratios "only approximately correct" (U.S. Census Bureau (1919) p. 101). It appears indeed that self-assessed ratios are overestimates of the actual assessment ratios. Nevertheless, they offer some useful additional information regarding heterogeneity in practice across local assessors, which we use.

3.2.2 Cross-border ownership of assets.

An important dimension of the GPT is that assets were assessed and taxed at their location rather than in their owner's location. In some cases, these locations could differ. Individuals could, for instance, own assets (a house, some livestock, etc.) in a different county than the one where they had their primary residence. Strictly speaking, our county and state-level measures are measures of local property rather than local wealth. Local property is an interesting measure per se since it captures local economic activity.

Nevertheless, these measures will deviate from measures of local wealth. Our estimates of local private property will tend to underestimate true household wealth in jurisdictions where residents own substantial amounts of property in other jurisdictions and overestimate true local household wealth in jurisdictions where non-residents own significant property. Our data only provides limited consistent information relative to cross-border patterns of asset ownership. However, we do have some suggestive and noisy information about cross-state ownership in 1880, based on work by the Census (U.S. Census Bureau, 1880). These are depicted in Figure 8. The methodology the Census used to get at these numbers is unclear, so we should use them as suggestive evidence. We can see that most states have a net cross-state position between -10% and +20% (with New York being by far the state whose residents hold the most wealth in other states). This data also shows us for which states we may need to be particularly careful when considering local property as a measure of wealth, namely Western states excluding the West Coast, such as Wyoming, Idaho, Nevada, or Arizona. In these states, residents of other states hold a significant share of local assets. However, for most states in the Northeast, the Midwest, the South, and on the West Coast, the local property is highly correlated with local wealth.

A final important note is that the distinction between property and wealth vanishes as we move to higher levels of geographical aggregation. Thus, at the national level, our aggregated measure of national property truly measures private domestic wealth, except for net foreign assets, which at the time were very limited in the US.

3.2.3 Cross-validation

We validate the quality of our data on assessed property and assessment ratios using three other sources.

First, we can use external information on the market value of specific property types. The Census of Agriculture conducted a thorough and independent assessment of the market value of farmland for certain states and years. Haines (2014) compiles this

information. Our data contains estimates of the market value of taxable land and improvements (as a separate category) for select states and years.[15] Figure 9 compares these estimates and the value of farmland land and buildings from the Census of Agriculture. Farmland and improvements are a subset of all taxable land and improvements, which explains the small, non-zero intercept in the log-log relationship depicted. Reassuringly, the best linear fit line lies very close and is parallel to the 45-degree line, with an estimated slope of essentially 1. This cross-validation suggests that our assessment ratios offer a reliable estimate of the difference between property values reported in the tax data and their true market values.

Second, we compare our property estimates to the wealth measures from the IPUMS Full Count data at the county level (for 1870) and the state level (for 1850, 1860, and 1870). These comparisons, shown in Appendix Figures A11 and A12, show that for many states, the pictures are quite consistent between these two data sources, although there are differences across space and time. At least three factors can explain these differences. First, the IPUMS data measures local wealth, while our estimates measure local property. Second, our property estimates are based on assessments by tax authorities, while the IPUMS data is self-reported. Third, the IPUMS data is censored from below and top-coded.

Third, in Section 4, we compare our national-level estimates to existing ones for overlapping years.

4 Wealth Growth and Spatial Inequality in the US

Based on the comprehensive property tax data collected and described in the previous section, we can provide new evidence on the evolution of wealth and spatial inequality in the US since the early 19th century.

4.1 The Growth in US Wealth 1800-1935

A rapid wealth accumulation since the early 1800s. The first important descriptive fact is that the US was relatively wealth-poor at the start of the 19th century but experienced a dramatic wealth accumulation from 1800 to 1935. Panel A of Figure 10 shows our estimates of US private wealth as a share of GDP over the period 1800-1935.[16] The US started at relatively low wealth-to-GDP ratios of around 300% in the

[15] Notably, we compiled data on thirteen states (Alabama, Arkansas, Florida, Georgia, Indiana, Kansas, Kentucky, Minnesota, North and South Carolina, Tennessee, Texas, and Wisconsin) between 1860 and 1910.

[16] The GDP series come from Johnston and Williamson (2020) for the period pre-1929 and from the Bureau of Economic Analysis for the post-1929 period https://www.bea.gov/resources/

early 19th century. Between 1850 and 1860, the wealth-to-GDP ratio increased to 400% before plummeting to 200% during the Civil war. After the Civil war, a growth spur increased the wealth-to-GDP ratio to almost 500%. World War I led to a steep decline in wealth-to-GDP ratios to 300%. The wealth-to-GDP ratio then rose to almost 600% on the Eve of the Great Depression before crashing back to around 300%.

Is the evolution of the US wealth-to-GDP ratio driven by its numerator or denominator? Panel B of Figure 10 separately depicts the numerator (US wealth per capita, expressed in 2012 prices) and the denominator (GDP per capita in 2012 prices) and shows that wealth per capita drives the ratio. Wealth per capita started from a low level and grew slowly until the Civil war but took off drastically starting in 1870 and grew much more rapidly than income per capita until the crash induced by the first World War.

The US experience in wealth accumulation seems quite unique compared to other countries where wealth data exists. Cross-country comparisons are difficult, given the uncertainty around measures of historical GDP, price deflators, and exchange rates. However, we can compare wealth-to-GDP ratios, indicating wealth accumulation relative to the country's income. Figure A9 depicts the wealth-to-GDP ratios in the US to those in France and the UK. The US appeared relatively wealth-poor compared to the European countries over the 19th century and until the end of WWI.

The composition of US wealth Our data allows us to explore the composition of US wealth in terms of three broad categories: real property, property from enslaved people (which we discuss at length below), and all other personal property.[17] Figure 11 shows that real property – land, buildings, and improvements – was the largest category of wealth throughout the whole period. Enslaved people represented 15% of total US wealth in 1860.

For some states, we also have the value of taxable land as a separate category (as used in Figure 9). For these states, we can see that the importance of land in real property declines over time. Early in the 19th century, the primary source of wealth was land, which was abundant and cheap in the US compared to European countries. Policies were explicitly put in place to maintain a low price of land and allow people to buy it and settle in the US.[18] The figure also highlights that all real property in the US represented less than 200% of GDP in the US before the Civil war, while land

learning-center/what-to-know-gdp. The estimates for the pre-1929 period build on McCusker (2000) (for 1793), Weiss (1992) (for 1799, 1809, 1819, and 1929), and Gallman (1966) (for 1839, 1849, and 1859). Because there are uncertainties surrounding GDP measures, Figure A10 plots the wealth-to-GDP ratio using two additional sources for GDP series.

[17] For the construction of enslaved property, see Appendix Section III.2.

[18] These include the "Act to Graduate and Reduce the Price of the Public Lands to Actual Settlers and Cultivators" (1854), which "reduced the purchase or preemption price of lands opened for settlement

alone represented 300% of national income in the UK (Piketty and Zucman, 2014). Immigrants and settlers arriving in the US were usually not bringing large amounts of physical property or capital. Throughout the period 1840 to 1940, the US accumulated wealth at a fast rate in the form of non-land capital.

Comparison with existing national wealth estimates. Figure 12 compares our wealth series to existing ones from Gallman and Rhode (2019), Goldsmith (1952), and Piketty and Zucman (2014), based on different data sources. We describe these alternative sources in detail in Appendix III.7.

In brief, the "Goldsmith-Piketty-Zucman" series (Piketty and Zucman, 2014) is based on a combination of Census IPUMS data, national accounts, and balance sheet data and builds on Goldsmith (1952) (as well Jones (1977), Hoenack (1964), and ultimately U.S. Census Bureau (1870)). The "Gallman-Rhode" series (Gallman and Rhode, 2019) uses capital stock estimates from national accounts and land values from the Census to compute national wealth. These series are significantly sparser and of lower frequency (typically decadal) than ours from 1800 to 1870. This finer granularity allows us to, for instance, measure the big dip in wealth-to-GDP during the Civil war, which decadal data misses.

Our series is quite well-aligned with these existing estimates for the overlapping years. For 1885-1890 and 1893-1910, our series are somewhat below the Goldsmith-Piketty-Zucman series. On the contrary, we find higher wealth in 1880 (and, to a lesser extent, in 1890 and 1900) than Gallman-Rhode.

Regional wealth evolution We can also compute wealth series by region in the US. Panel A of Figure 13 shows the wealth per capita in each of the four major regions – Northeast, South, Midwest, and West – normalized by the US GDP per capita. This measure captures a given region's wealth relative to the average national GDP per capita. The South, Midwest, and Northeast were similarly wealthy until the Civil war, although the Northeast experienced the most considerable fluctuations over time. After the Civil war, the South diverged from the other three regions and remained poorer in wealth until 1940. The West quickly became the region with the highest per capita wealth and remained so until WWI.

that remained unsold for long periods" (Chused, 1984, p. 53); the Bounty Act of 1847 (Lebergott, 1985, p. 194); and the Homestead Act of 1862 (1862) which "lowered the price of surveyed tracts of 160 acres or less to zero, contingent on a $10 entry fee, and five years of continuous residence on the property. " (Allen, 1991, p. 8).

4.2 The Civil War and Southern Wealth

An abundant literature, referenced in the introduction, studies Southern economies and the legacy of enslavement. We can shed more light on Southern states thanks to the wealth data, particularly around the Civil War. Figure 14 presents some key statistics about the South.

Panel A shows the composition of property in Southern states. Enslaved people accounted for over 40% of the total property. Panel B shows the variation across states in the value of enslaved people as a share of the total property in 1860. In states such as Georgia, Alabama, and Florida, enslaved people represented more than 50% of the total property.[19] After the Civil War and with the restructuring of the economy, the value of land decreased, and other property increased in importance.

Going back to Figure 13, we can compare the evolution of private property across the four US regions, excluding wealth from enslaved people (the line "South, excl. wealth from enslaved"). The South now appears poorer than the other regions and not accumulating wealth at the rate witnessed in the other regions even before the Civil war. While other regions' wealth-to-income ratios grew post-Civil war, the South' stagnated. This pattern is also apparent at the state and county levels, as we show next.

Figure 15 shows the evolution of state-level property around the Civil war. Panel A depicts the rank of states in 1860 and 1870 (on the vertical axis) against their rank in 1850 (on the horizontal axis). The left figure shows this relationship for all property, including property from enslaved people; the right figure excludes property from the enslaved. The difference between the two figures is striking. If we do not count enslaved people as part of personal property, there was a strong persistence in the rank of states even after the Civil war. The rank-rank correlation is 0.73 between 1850 and 1860 and 0.57 between 1850 and 1870. Including enslaved people in the measure of property reduces the rank-rank correlation to 0.04.

Panel B depicts the decline in property per capita during the Civil War for Southern States against the share of property from enslaved people in 1860. The numbers represent the additional decline in property value, above and beyond that generated by the freeing of enslaved people, 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. A zero value means that a state had the same property in 1870 as in 1860, excluding property from enslaved. For instance, in Texas, where enslaved people represented 35% of total property, property values declined by the full amount of the share of enslaved property and an additional 51%. In Mississippi, where property

[19] See Appendix Figure A13 for robustness checks and shares at the county level.

from enslaved people was 44% in 1860, property in 1870 was another 53% lower than wealth in 1860 excluding enslaved property. Although the relation depicted is noisy, it is increasing. States with the highest share of enslaved, such as Alabama or Mississippi, witnessed some of the most significant shortfalls in per capita property between 1860 and 1870. We show the results for all states, including non-Southern ones, in Appendix Figure A14. For comparison, property per capita in Philadelphia more than doubled over this decade.

Panel C displays the evolution of property per capita for white and Black residents in Southern and Non-Southern states, normalized by the average GDP per capita in the US. Black residents had significantly higher property per capita in Non-Southern states than Southern states. However, even in Non-Southern states, their property was drastically lower than that of white residents. For white residents, we provide two series: one excluding enslaved property and one including it. Including enslaved property, white residents in Southern states appeared more than twice as rich as those Non-Southern states and saw their property per capita plummet by 75% during the Civil War. If enslaved property is excluded, white residents had similar levels of property per capita in Southern and non-Southern states before the Civil War. There is a clear divergence after the Civil war, with white residents in Southern states experiencing much slower growth in their property per capita.

We can also shed some light on the public finances of the Civil War and the Reconstruction Era. Panel D shows the effective property tax rates (constructed as explained above for Panel A of Figure 3) in Southern and Northern states. Effective tax rates in Northern states were twice as high as in Southern states before the Civil War, reflecting significantly lower investments in public goods and infrastructure in the South. However, the Civil War and the Reconstruction Era drastically changed the picture of public finances in the South (Foner, 1988). Confronted with a decline in the property tax base and with significant needs to invest in public goods like public schools, newly elected Republican legislators in the South pushed for significantly higher property tax rates during Reconstruction.[20] Our data allows us to grasp the historical nature of this public finance shock: in Southern states, effective rates almost tripled in about five years, reaching a peak of 1.2% in 1870. This sudden increase in property taxes was met by a major backlash, triggering political violence, especially against black politicians (Logan, 2019). As Democrats regained control of the South, ending the Reconstruction Era's political experiment and enabling the institution of the Jim Crow regime, tax rates quickly reverted to around 0.6%, a much lower level than in Northern states.

[20]On the history of public education and the racial gaps in education in the South, see also Goldin (1999), Margo (1990), and Tyack and Lowe (1986).

4.3 The persistence of spatial inequality 1870-1930

The third set of facts revealed in the new data pertains to the remarkably high level of persistence of spatial inequality in the US. Despite potential equalizing forces, such as internal migration and the deepening of the US internal goods and capital markets, spatial inequality did not decline after the Civil war.

We start with Figure 16, which shows property per capita as a fraction of US GDP per capita at the state level for each decade between 1850 and 1930. Figure 17 shows the equivalent statistics at the county level. The figures highlight that spatial inequality seems to be high and persistent. For instance, Southern counties and states remained persistently poorer than those in the Northeast, Midwest, or West. Furthermore, Figure 18 shows that the persistence has remained remarkably strong even until today. We compare the spatial distribution of property per capita in the 1920s (Panel A), at the fine-grained county level, to that of household income today from the Opportunity Atlas Data (Panel B). Panel C shows that the rank-rank correlation between these two variables is 0.6.

To document spatial persistence formally, we perform four additional analyses.

Dispersion of wealth across space. First, we consider the change over time in the dispersion of wealth across space, the so-called "σ-convergence". Figure 19 plots the yearly standard deviation of log property per capita across states. The dispersion of property remains roughly constant. Appendix Figure A16 shows a similar pattern for the evolution of wealth dispersion across counties. Second, Figure A17 focuses on a different metric: the share of total national wealth held by the top 10% of richest counties. It shows that property was highly spatially concentrated in the US and that this concentration increased significantly from 1860 to 1930. By the end of the period, the top 10% of richest counties accounted for about 70% of total US property.[21]

Rank-rank correlations at the county and state levels. Third, Panel A of Figure 20 depicts the rank-rank correlations of property per capita at the county level between 1870 and subsequent decades (1880 to 1930). The rank-rank correlation is 0.78 over ten years and remains high (0.67) even over the entire 60-year period. We see high rank-rank persistence at the state level, too (Panel A of Figure A15). These results indicate that spatial inequality was not only high, but that places that started poorer remained poorer.

[21] Young, Higgins and Levy (2008) show that, if anything, there has been sigma divergence in income across US counties since the 1970s, a result echoed by Gaubert et al. (2021) who also show that states have been diverging since the 1990s.

Speed of β-convergence. Finally, we study the speed of convergence between poor and rich counties and states over time. We present the analysis at the county level here, whereas the state-level analysis is in the Appendix. We regress the change in private property per capita in county i between 1870 and 1930 on the initial property per capita (in 1870), a constant, and a detailed set of controls measured in 1870. We infer the speed of so-called "β-convergence" from Barro et al. (1991), i.e., the correlation between initial levels and growth, from the relation:

$$\log\left(\frac{W_{i,1930}}{W_{i,1870}}\right) = \alpha - (1 - \exp(-\beta \cdot 60)) \cdot \log(W_{i,1870}) + \mathbb{X}'_{i,1870}\gamma + u_i \tag{2}$$

where $\mathbb{X}_{i,1970}$ is a vector of county-level controls measured in 1870, based on three groups of variables: i) *Geography* variables taken from Allen and Donaldson (2020), Bazzi, Fiszbein and Gebresilasse (2020), Atack (2015), Atack (2017), National Oceanic and Atmospheric Administration (2021) capture the geographical characteristics of a county such as the climate, soil properties, topography, and distance to waterways; ii) *Demographics* variables from Ruggles et al. (2021*b*) and Haines et al. (2010) include total population, population growth, the literacy rate, the share of foreigners, gender composition, and the share of white residents; iii) *Occupational shares* in public administration, manufacturing, mining, commerce (which comprises retail, finance, business, and transportation), and agriculture from Ruggles et al. (2021*b*). Appendix III.10 provides more details on the sources and construction of these three groups of variables.

Panel B of Figure 20 shows a scatter plot of county long-term, 60-year growth rates against initial property in 1870 and reports the estimated β from a regression without controls and including the complete set of controls. Without any controls, the speed of convergence is $\beta = 0.011$. Southern counties, represented in red on the scatter plot, stagnate at lower wealth levels and growth rates: the β excluding Southern counties is 0.028. Thus, regional factors have strong explanatory power, and convergence is relatively fast except for Southern counties, which start and remain poorer. Furthermore, by adding controls, β increases to 0.025 and R^2 to 0.61. Panel B of Appendix Figure A15 replicates this same analysis at the state level and yields an even smaller $\beta = 0.007$ over 1870-1930.

The literature usually studies convergence in terms of income per capita. Table 1 shows our estimates of convergence (column "Property") at the county and state levels as compared to the estimates using income data from IPUMS, as well as to the estimates from Barro et al. (1991) at the state level. We restrict to the period 1880-1920 for comparison with these alternative sources. Without controls, β estimates are 2-2.5 times higher using income data; with controls, they are 1.5 times higher. Thus, income

data conveys a picture of higher convergence than wealth data. The estimates from Barro et al. (1991) are somewhat lower than those from the IPUMS data but still show faster convergence unless controls are included.

Our results indicate that despite the shock of the Civil War, the US experienced limited spatial convergence from 1870 to 1930. This slow convergence was largely driven by the Southern states and led to persistent inequality in terms of property per capita across places that still reflects in the spatial inequality of income today.

5 The Correlates of Capital Accumulation

The previous analysis showed that the US experienced relatively limited spatial convergence after the Civil War and until 1930. Using our rich and granular data, we now explore the reasons for such slow spatial convergence. We want to study the characteristics of poorer and richer places after the Civil War and why some places grew faster than others, given their initial conditions. We perform this analysis at the county level– the most granular level for which we have comprehensive data over a long period.

Linking back to our previous convergence analysis in Figure 20, there is slow convergence conditional on initial property $W_{i,1870}$, but convergence is faster when controlling for additional characteristics. Therefore, we ask two questions:

1. Which characteristics are correlated with property levels in 1870 (i.e., with initial conditions)? To answer this question, we run a regression of the following form:

$$\log W_{i,1870} = \mathbb{X}'_{i,1870}\gamma_0 + u_i \tag{3}$$

   We include in $\mathbb{X}$ the same set of (standardized) variables related to *Geography*, *Demographics*, and *Occupational Shares* as described in Section 4.3, as well as two measures of inequality (the share of enslaved property in 1860 and the share of wealth held by the top 10% wealth holders). Panel A of Figure 21 shows the estimated coefficients.

2. Which characteristics in $\mathbb{X}$ correlate with the growth in property per capita from 1870 to 1930, conditional on initial property in 1870? To this effect, we plot the estimated coefficients γ from specification (2) in Panel B of Figure 21.[22]

[22] Tables A2-A3 show more detailed regression results at the county level, including for wealth growth over ten years and adding state fixed effects. These estimates reveal similar patterns regarding the role of geography, demography, and occupational structure.

In addition to the regression results, we also compute the contribution of each group of variables to the total variance in property per capita in 1870 (Panel A) and 60-year growth in property (Panel B).[23] The share of variance explained by each group of variables is reported next to the header. We confirm these simple linear model results using a more sophisticated prediction model– a random forest model that allows for more flexible interactions between all variables in the model. Figure A19 reports the most important variables, ranked by predictive power.

5.1 Geography, demography, and economic structure.

Geography. Figure 21 shows that characteristics related to *Geography* are strongly correlated with initial wealth in 1870 but less so with subsequent growth (controlling for initial wealth). Geographical characteristics explain 21% of initial property per capita and 9% of subsequent conditional growth. Climate – temperatures and precipitations– is an important predictor of initial wealth. For instance, one standard deviation higher temperature in July – characteristic of Southern counties– is associated with a 25% lower initial wealth. More abundant winter precipitations –indicating harsher winter conditions– are associated with significantly lower initial wealth as well as slightly lower growth. As captured by elevation and ruggedness, topography is negatively related to wealth in 1870 but not significantly correlated with growth in wealth over the long run. Better soil productivity and a lower distance to the coat are significantly positively correlated with long-run growth.

Overall, these results suggest that counties significantly differ in terms of environmental advantages or disadvantages. These differences affected wealth levels in 1870 but are less predictive of the subsequent local growth path.[24]

Demography. *Demographic* variables strongly correlate with initial property stock in 1870 and subsequent long-run growth. Together they explain 20% of the variance in property in 1870 and 4% of the variance in conditional growth. Among them, the literacy rate – a proxy for education levels and the local stock of human capital– exhibits the highest correlation and explains 10% of the variance in initial property. Agglomeration effects also seem to matter. Counties with a higher population in 1870 were wealthier and grew faster over the long run. These results are consistent with the scale

[23] More precisely, we add each variable sequentially in the linear regressions described in the text. For each new variable entering the model, we compute its partial adjusted R^2. Because the order in which the variables are added can affect the R^2, we randomly draw sequences in which the variables are introduced, and, for each variable, we average the partial adjusted R^2 over all draws.

[24] These findings align with the results in Hornbeck (2012*b*), who finds that, for a subset of counties in the Plains for 1920-2002, environmental characteristics had a constant relative influence on agricultural land values.

effects in innovation and growth documented in Jones (1995, 2002, 2022). Conditional on population size, a higher share of foreigners is also significantly positively associated with higher long-run growth.

At the same time, migration seems to operate as a force that reduces spatial inequality. Indeed, counties that experienced a higher ten-year population growth and had a higher share of foreigners (a proxy for migration) had lower property in 1870. Appendix Table A2 shows that systematically, over the whole period, lagged higher population growth is associated with lower wealth growth over each next decade. This is suggestive that migration flows foster some convergence: richer places see inflows of migrants moving in (Allen and Donaldson (2020)), but on average, these newcomers have lower wealth and dilute the wealth per capita over the next decade.[25]

Economic structure. Another important potential determinant of long-term accumulation highlighted in the "structural transformation" literature is the structure of the local economy (Herrendorf, Rogerson and Valentinyi, 2014), which we capture using *occupational shares*. For each occupation j, we rank all counties by the share of their population employed in occupation j and create an indicator variable equal to one if the county belongs to the top decile. Occupational shares explain 12% of the variance in initial property per capita and 3% of the variance in long-run growth.

Figure 21 shows that counties with a higher level of specialization in public administration, mining, and commerce were significantly richer in 1870. More agricultural counties, on the contrary, were significantly poorer and also tended to accumulate property at a significantly slower rate between 1870 and 1930.

Furthermore, we can shed some light on the economic transformation at the local level over the course of development and compare it to the one at the country level (explored, among others, by Herrendorf, Rogerson and Valentinyi (2014)). Appendix Figure A18 reveals that the structure of occupations at the county level follows the same evolution as the one found at the aggregate country level. The fraction of people employed in agriculture declines steadily, and the fraction in services increases as a county's property per capita increases. The fraction employed in manufacturing follows a characteristic hump shape, first increasing and then decreasing as counties grow richer.[26] This evidence suggests that "structural transformation" away from agriculture is a relevant pattern of development even at the local labor market level.

[25] Collins and Zimran (Forthcoming) show that between 1850 and 1940, the assimilation of European immigrants was U-shaped, with earlier cohorts assimilating more quickly. The comparative performance of immigrants and natives is explored in Ferrie (1996) and Ferrie (1997).

[26] This non-monotone pattern for employment in manufacturing also explains why the linear regressions from Figure 21 do not detect a precise effect.

5.2 The blight of enslavement.

Section 4.3 highlighted that the experience of Southern economies is key to understanding the lack of spatial convergence in the US after the Civil War. This prompts us to explore the role of enslavement and the unequal distribution of wealth.

Nunn (2007) and Mitchener and McLean (2003) have documented a significant negative correlation between the share of enslaved and economic outcomes today. We first highlight how the reliance on enslavement at the county level, captured by the fraction of enslaved property in total property, correlates with wealth accumulation in the decades following the abolition of enslavement. We then explore the mechanisms through which this occurred using a mediation analysis.

Results in Figure 21 show that counties in which enslaved people represented a larger share of total property in 1860 were significantly poorer in 1870 (panel A) and, importantly, also accumulated property at a significantly lower rate in the sixty subsequent years, even conditional on the full set of other observables in $\mathbb{X}$ (Panel B). The magnitude of the correlation is large: a 10 percentage point (p.p.) increase in the share of enslaved property in total property, conditional on initial property level in 1870, reduces the growth rate of property in the next 60 years by 5 percent.

We next focus exclusively on Southern counties to check whether this negative correlation is driven by non-Southern counties, for which the fraction of enslaved wealth was zero and which grew fast after 1870. Figure 22 shows that there is still a strong negative association between the fraction of enslaved property in total property and long-run development after the Civil War in Southern counties only. Although the magnitude is smaller than when we include non-Southern counties, these results suggest that the "intensity" of reliance on enslaved property also mattered for long-run growth. In addition, this association is robust to introducing our extensive set of county-level geographic, demographic, and occupational characteristics.

Engermann and Sokoloff (2000) formulated the argument that, after its abolition, enslavement remained detrimental for long-run development because it increased initial economic inequality. To test this hypothesis, we follow Nunn (2007) and check whether the association between enslavement and subsequent growth remains significant when introducing direct controls for the level of initial inequality after the Civil War. Consistent with the argument in Engermann and Sokoloff (2000), the fraction of enslaved property is indeed positively correlated with higher initial wealth inequality (Appendix Figure A20). Nevertheless, a strong negative and significant correlation between enslavement and growth remains, even when controlling for initial inequality.[27] Appendix Table A4 shows that the estimated correlation between the fraction of

[27] Nunn (2007) uses data on land inequality in 1860 and also finds no support for the hypothesis in

enslaved wealth in 1860 and future growth is not strongly affected by the introduction of controls for county-level inequality: at most, inequality mediates one-sixth of the effect of slavery. The impact of enslavement on the slow convergence of the US South was not only through high levels of wealth inequality after the Civil War. Instead, systemic policies and the Jim Crow regime played critical roles.

5.3 The shadow of inequality

Despite inequality not being the main reason for the lasting consequences of enslavement for capital accumulation in the South, there nevertheless is a significant negative correlation between initial inequality levels, measured by the top 10% wealth share in 1870, and local long-run capital accumulation, even conditional on the full array of controls, including enslaved shares (panel B of Figure 21).

A vast literature on the link between growth and inequality mainly relies on cross-country correlations (see, among others, Perotti (1996), Alesina and Rodrik (1994), Acemoglu et al. (2007), Banerjee and Duflo (2000), Barro (2000), and Baselgia and Foellmi (2022) for a recent survey). Our key advantage is that we can measure the relationship between inequality and long-term growth across places at a granular level within the same country and state. This granularity allows us to keep fixed many characteristics, such as institutional or cultural factors.

We explore the relationship between local (county-level) inequality and long-term growth in Figure 23. The figure plots the long-term growth of counties in 25 equally-sized bins by top 10% wealth shares, with and without conditioning on the full array of local controls in $\mathbb{X}$ (i.e., geography, demographic, occupational shares, and enslaved property share. For full results see also Table A5). Highly unequal counties, with top 10% shares close to 100% in 1870, such as Baton Rouge, LA or Charleston, SC, had almost 70 percent lower growth of property per capita over the next 60 years than counties such as Douglas, NE or Larimer, CO, where the initial top 10% wealth share was about 75%. This strong relationship remains highly significant, even after adding controls: a 10 p.p. increase in a county's top 10% wealth share is associated with 20 percent lower property growth over the subsequent 60 years.

To understand the potential mechanisms underlying this strong negative correlation, we perform a mediation analysis by running specifications of the following form:

Engermann and Sokoloff (2000) that the legacy of slavery on future development was mediated by initial inequality.

$$\log\left(\frac{W_{i,1930}}{W_{i,1870}}\right) = \alpha - (1 - \exp(-\beta \cdot 60)) \cdot \log(W_{i,1870}) + \mathbb{X}'_{i,1870}\gamma + \Lambda \text{Top Wealth Share}_{i,1870} + \mathbb{Z}'_{i,1870-1930}\gamma_z + u_i$$

where the vector $\mathbb{Z}$ includes changes in the composition of the population, in its level of education, or in the occupational structure of the local economy between 1870 and 1930. We are interested in how the addition of these mediators affects the estimated correlation Λ between inequality and growth.[28]

The results in Appendix Tables A5 and A6 indicate that the most important mediator is the pace of human capital accumulation as captured by the change in the literacy rate of the local population. Lower growth of literacy rates in areas with higher inequality alone account for 20% of the association between higher inequality and lower long-run growth. Earlier work (e.g., Ramcharan (2006) or Acemoglu et al. (2007)) had already suggested a negative correlation between inequality in land ownership in 1860 and school enrollment or education expenditures. Our results confirm that a lower rate of human capital accumulation is a strong mediator of the inequality-growth link.

6 Conclusion

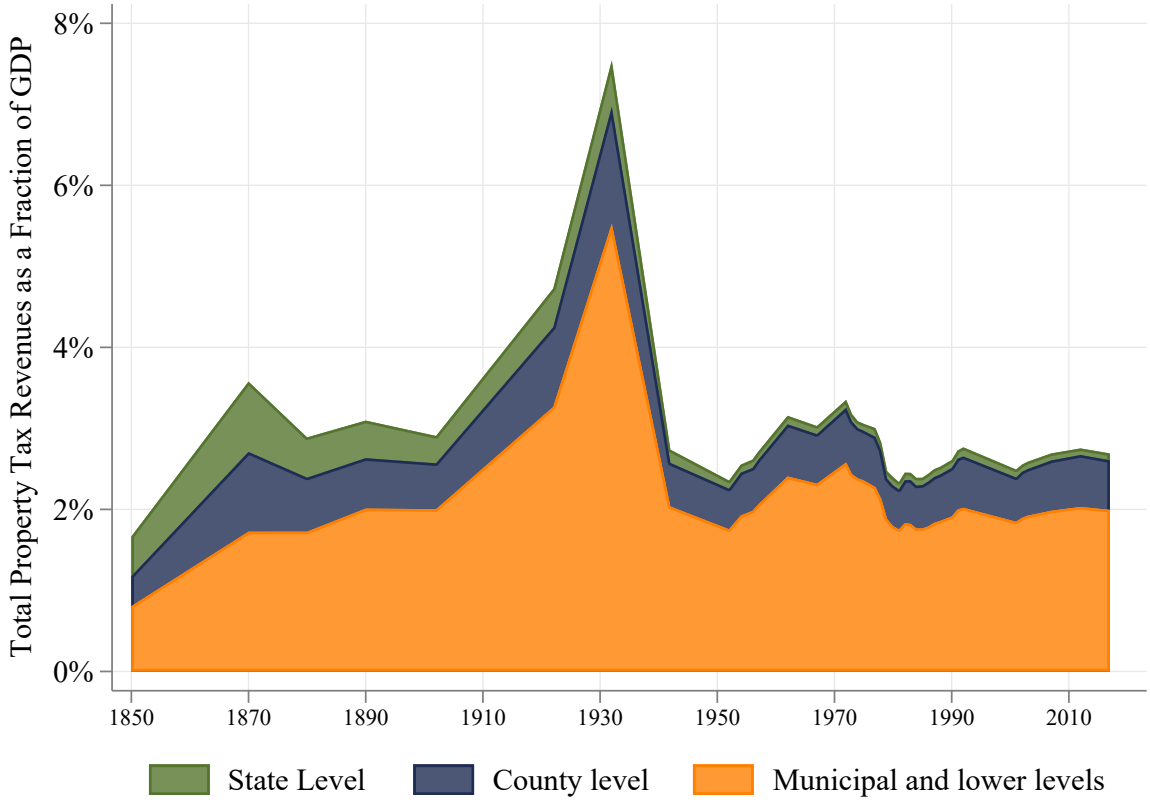
The US General Property Tax was one of the first wealth taxes. It was a comprehensive tax that applied mostly uniformly to many kinds of property, such as real estate, personal property, and financial wealth. Thanks to the paper trails left by the administration of this tax, we can construct new fine-grained and high-frequency wealth series of household property in the US. This data allows us to document the evolution of wealth and spatial inequality over time. At the national level, US wealth grew extraordinarily rapidly after the Civil war. At the same time, spatial inequality was large and highly persistent. Southern economies, which relied heavily on exploiting enslaved people, remained stagnant and poor even over the long run. We document a strong link between inequality and growth, even at a granular geographic level: Places that were more unequal in 1870 had significantly lower subsequent 60-year growth, among others, because they accumulated human capital at a slower rate.

Future work can leverage the exhaustive wealth and property data to compare and

[28] 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.

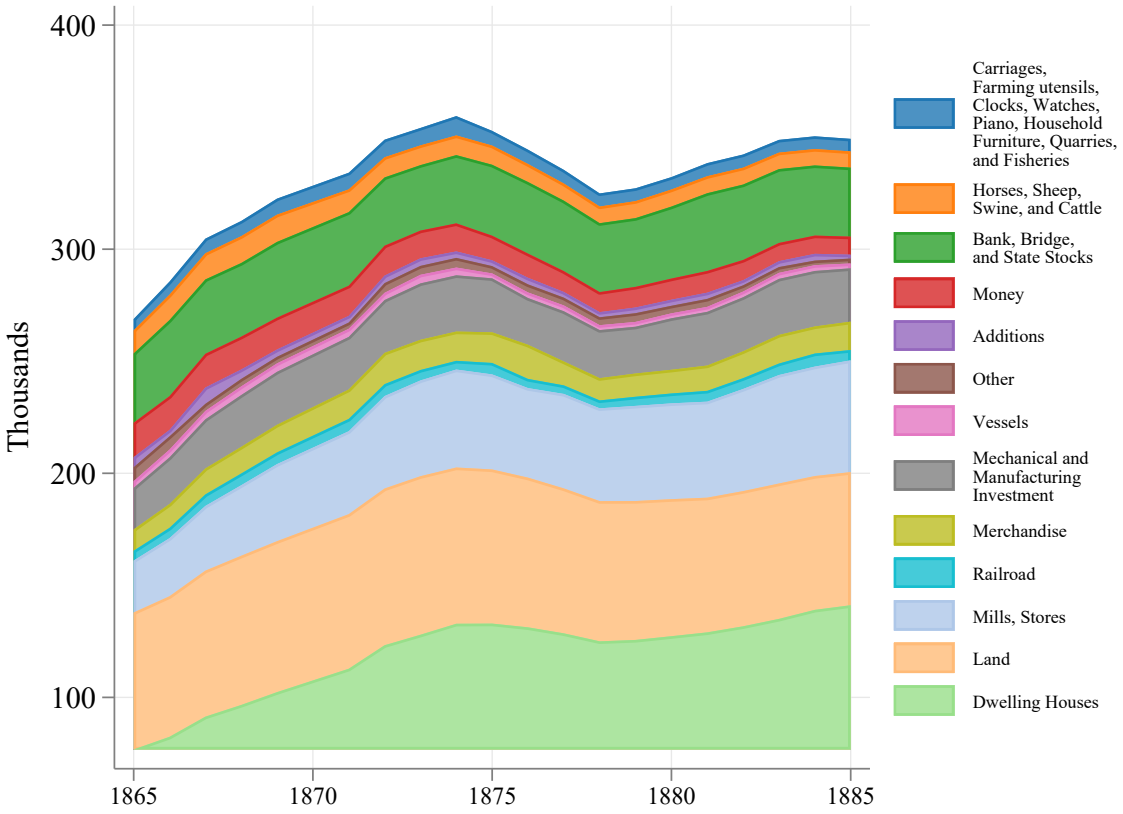
contrast with the results from earlier work on the determinants of economic activity using income data. Along these lines, we showed that the speed of convergence in wealth is very different from that of income. It would also be interesting to consider the effects of local wealth on other economic outcomes, such as innovation or education. Finally, it may be interesting to perform a finer analysis of different types of wealth, leveraging the additional information in the data trail left by the administration of the General Property Tax.

Figure 1: Total Property Tax Revenues as a Share of GDP 1850-2020



Notes: This figure shows total property tax revenues as a share of GDP for the United States. It includes all states in the Union for a given year. Property tax revenues are broken down by i) State-level, ii) County-level, and iii) Municipal-level and lower levels (which would include districts as listed in the text). For the data sources and construction, see Appendix III.8. The GDP data comes from the series by Johnston and Williamson (2020).

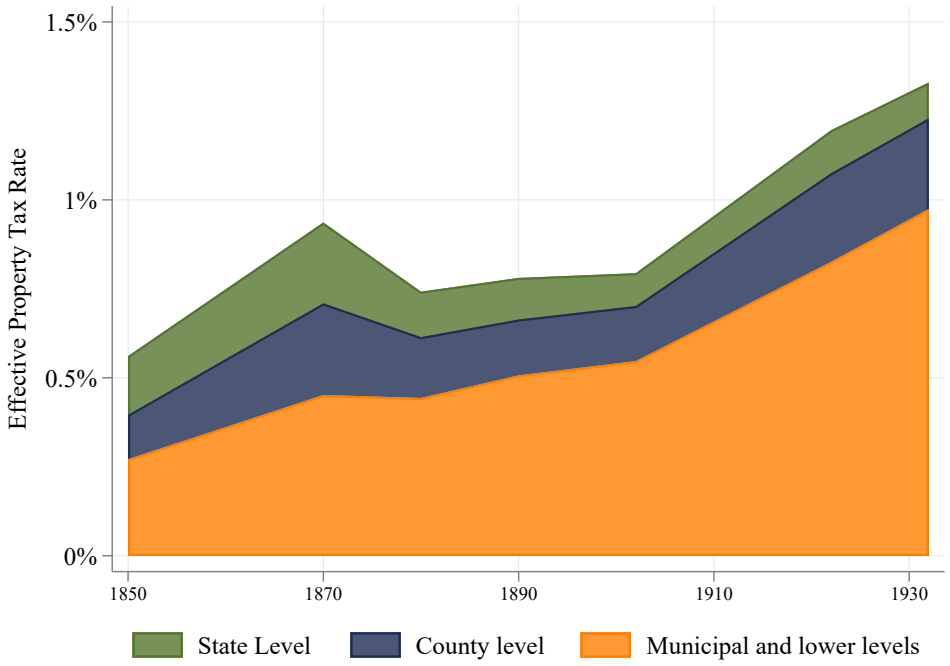
Figure 2: Composition of Private Property in Connecticut



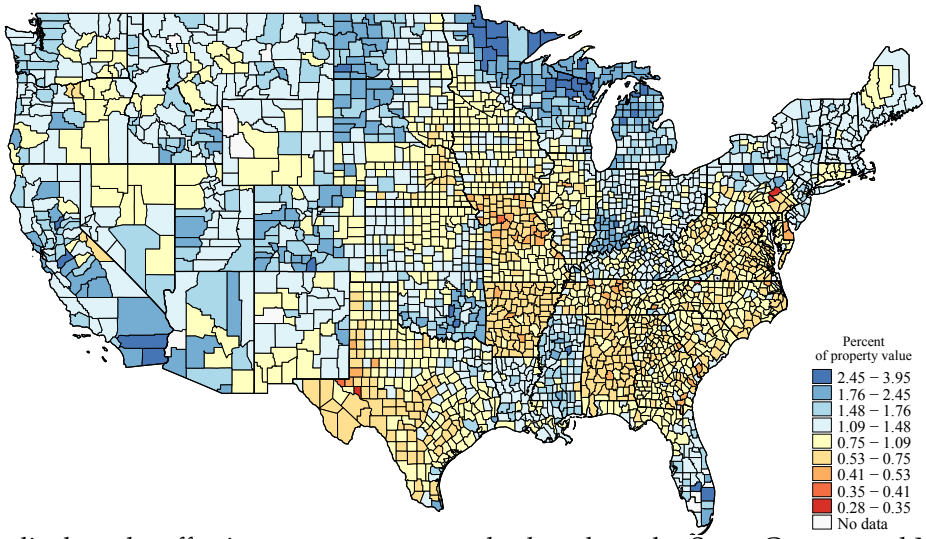
Notes: This figure shows the decomposition of private property subject to the general property tax in Connecticut. The data comes from the *Grand List of Connecticut* as presented by Ely (1888) (pp. 503-506).

Figure 3: Effective Tax Rates

A. Effective Tax Rates by Level of Government

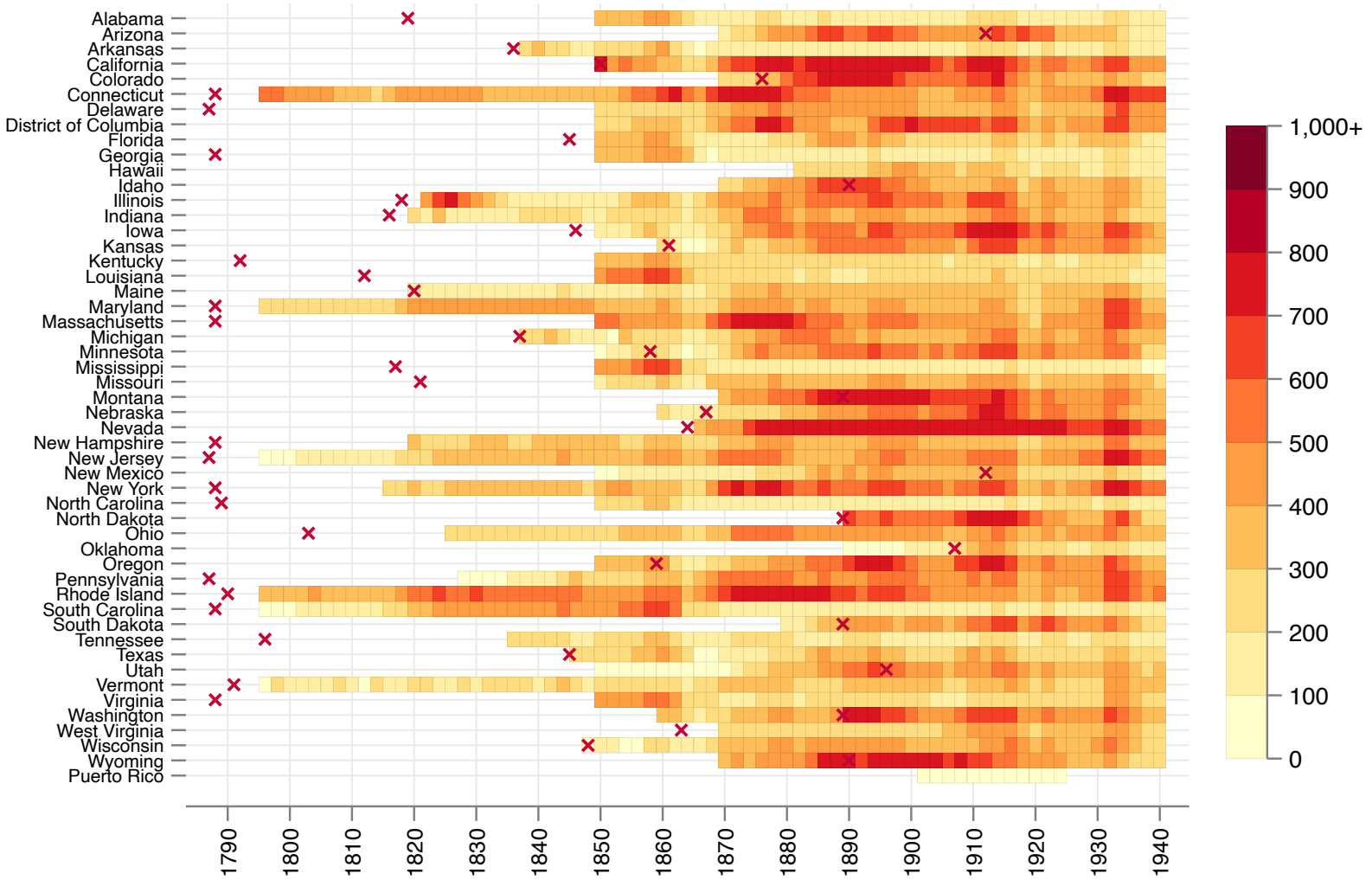


B. Total Effective Property Tax Rate - 1920



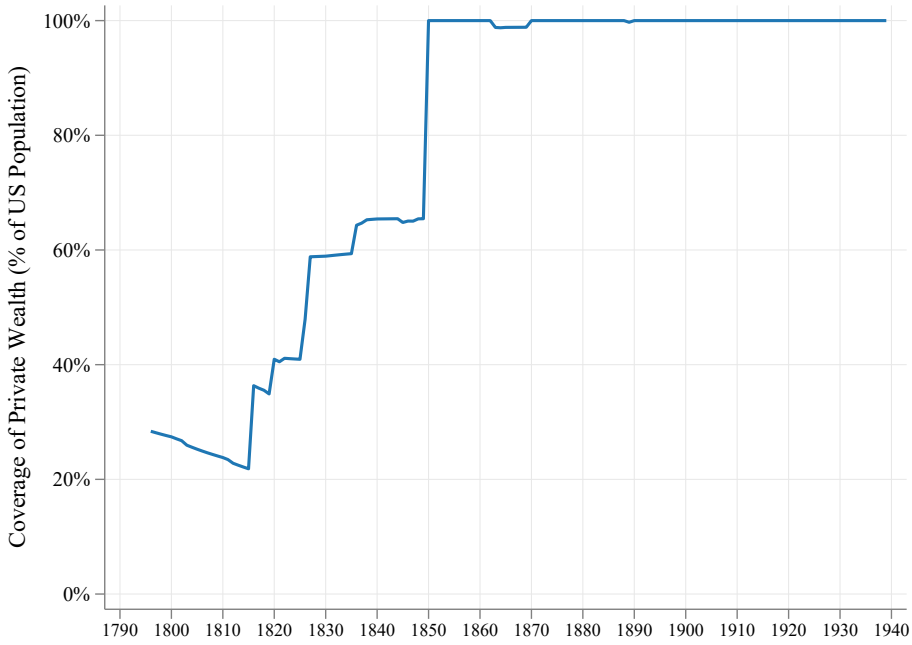
Notes: Panel A displays the effective property tax rates broken down by State, County, and Municipal and lower levels of jurisdiction. We compute effective tax rates as the ratio between the tax revenues and the total value of property. For the data sources and construction, see Appendix III.8. Panel B shows the effective property tax rate at the county level. It includes all property taxes (district, city, county and state levels).

Figure 4: Private Property by State as a Share of National GDP (%)



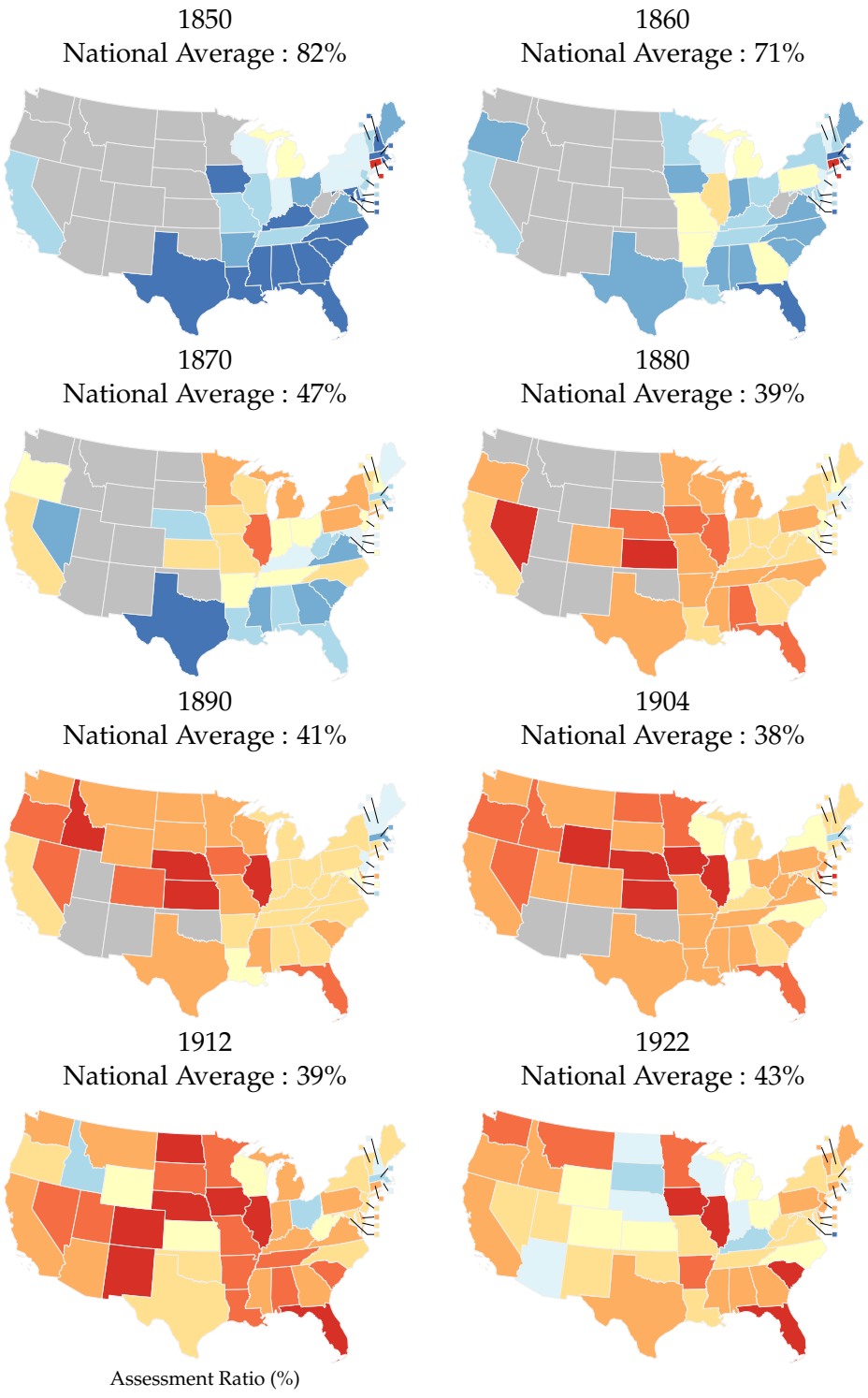
Notes: This figure shows the coverage and trends in property share for all 50 states, the District of Columbia and Puerto Rico. Property shares are measured as the ratio of private property per capita in the state over national GDP per capita. Red crosses indicate the year of the admission of the state to the Union. Property values are linearly interpolated for missing years. For coverage without interpolation, see Panel C of Figure A4.

Figure 5: Share of the Population Covered in the Property Data



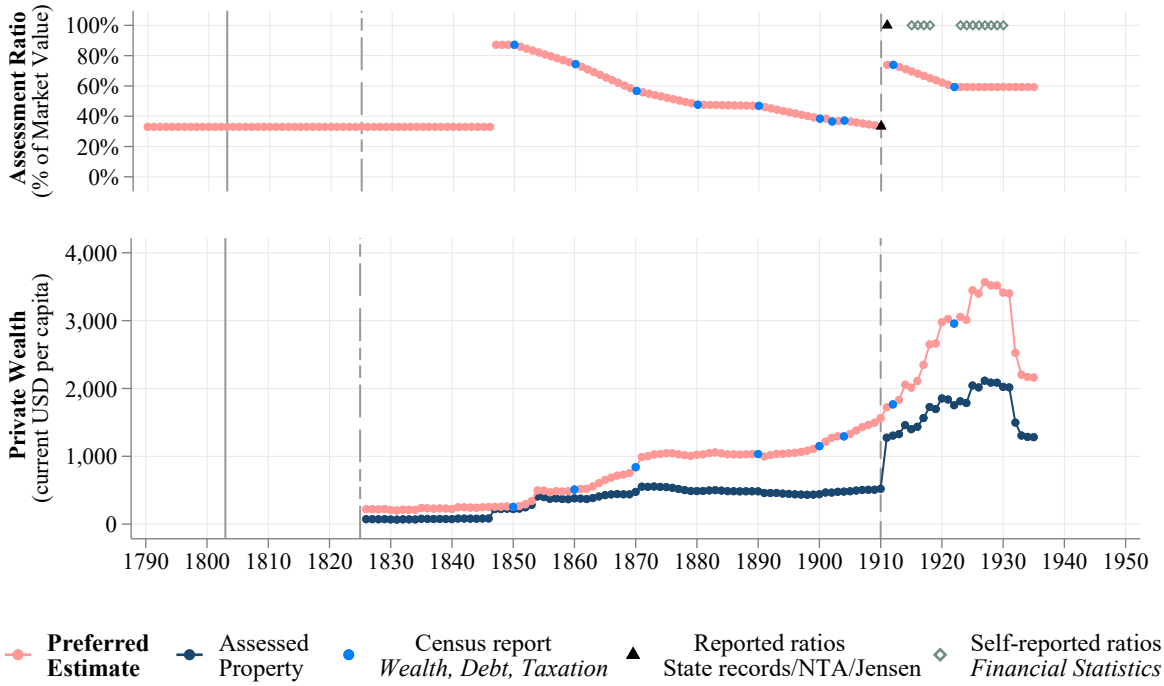
Notes: This figure shows the fraction of the national population for which data on private property is available in any given year.

Figure 6: Assessment Ratios at the State Level over Time



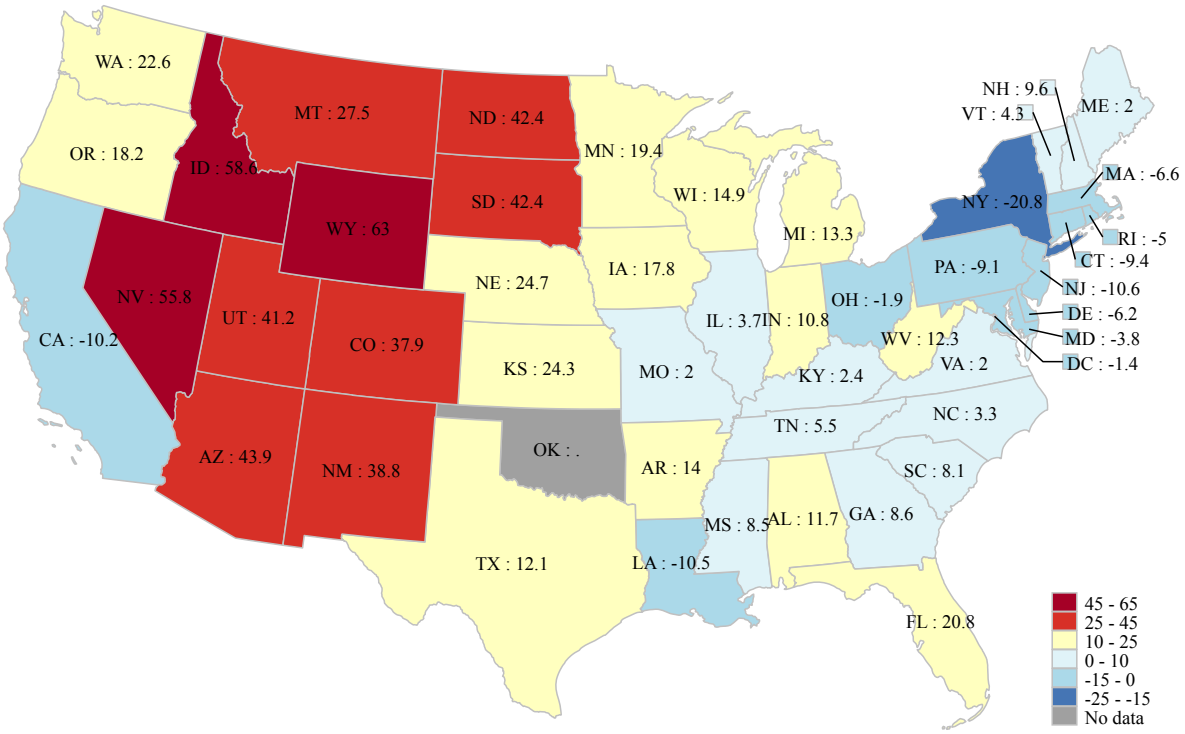
Notes: This figure displays the average assessment ratio of assessed to true value of all property for each state. Assessment ratios for US territories prior to admission in the Union are not displayed.

Figure 7: Example: Assessment Ratio and Property Estimates in Ohio



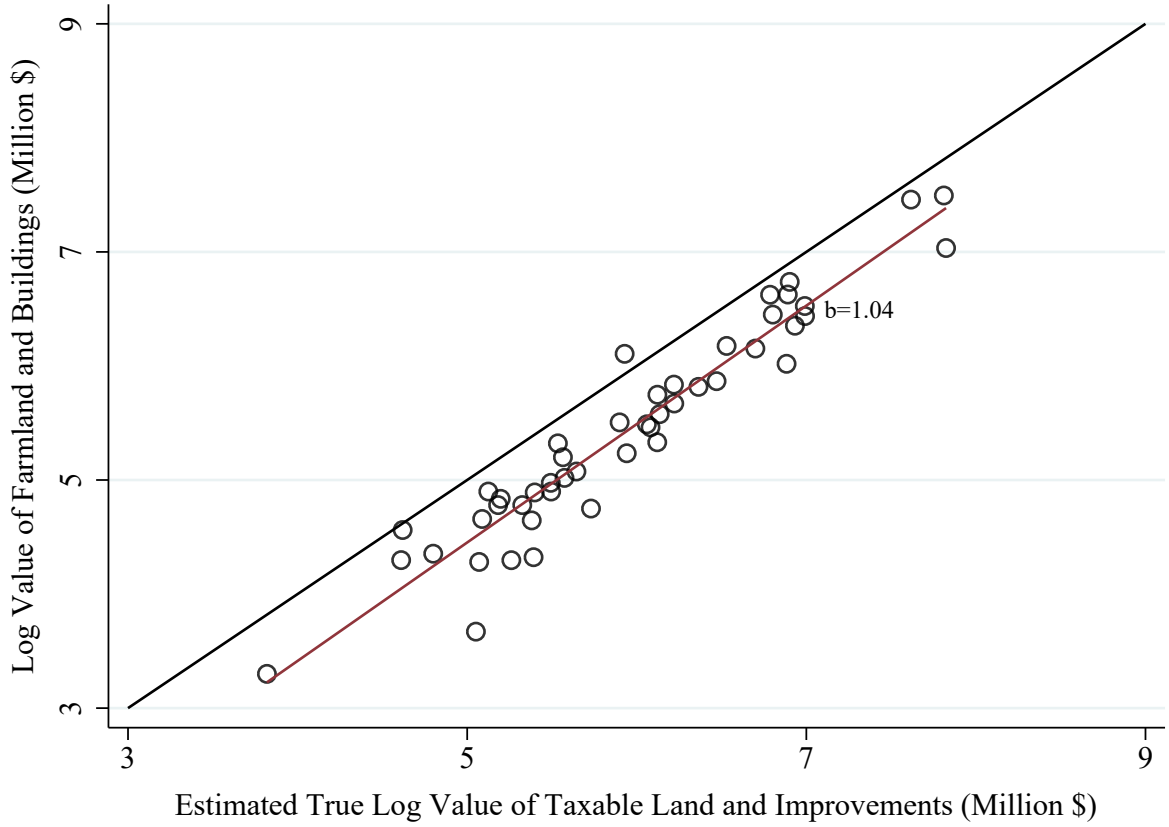
Notes: The top chart depicts the data sources for and values of assessment ratios for Ohio. The bottom chart compares the assessed property values as collected from primary sources with the market value of property obtained by rescaling assessed values using the assessment ratio.

Figure 8: Net Cross-State Asset Positions in 1880



Notes: The Figure shows the net cross-state position of each state for year 1880, in percentage of their total private property. A positive value means that non-residents own part of the property of the state; a negative value means that residents of that state own property in other states. The data comes from U.S. Census Bureau (1880).

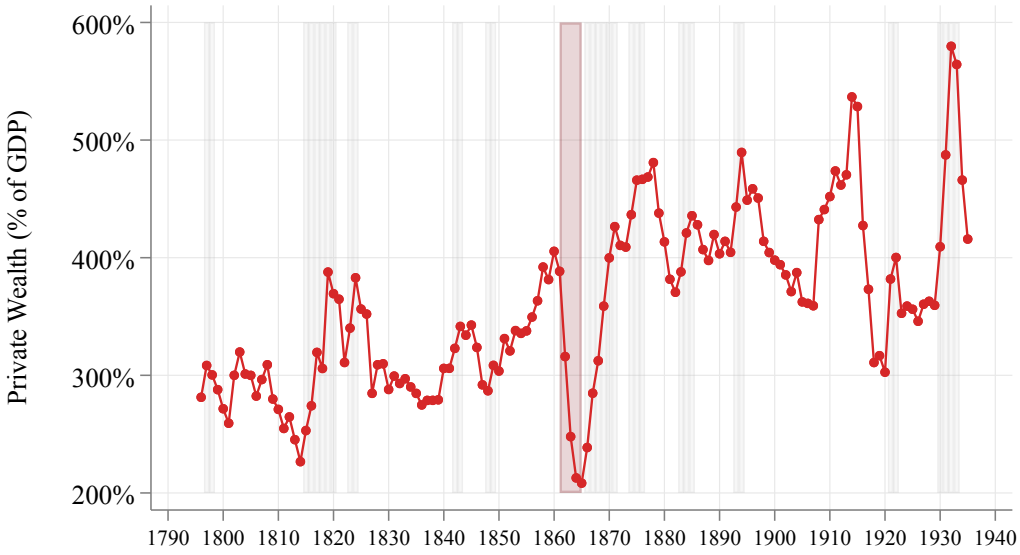
Figure 9: Cross-Validation: Comparison of the Estimated Value of Taxable Land from Property Tax Records and Values from the Census of Agriculture (1860-1910)



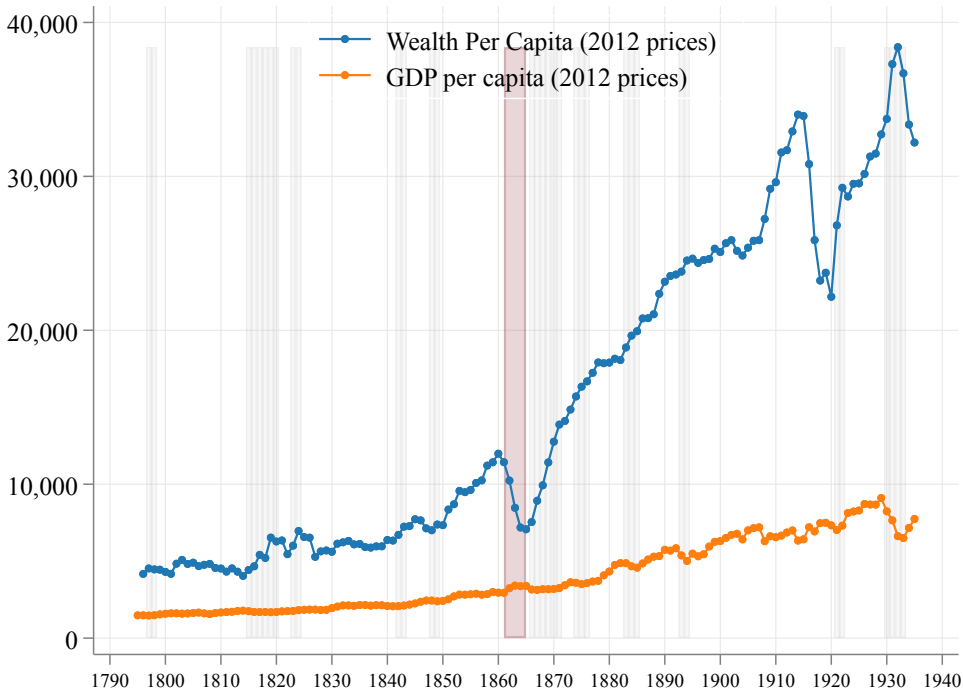
Notes: This figure compares the estimated value of taxable land in our property tax data to the estimated value of agricultural land from the Census of Agriculture. Data from the Census of Agriculture is derived from Haines (2014). The value of taxable land is a sub-category of real property and is reported separately for 13 states from 1860 to 1910: Alabama, Arkansas, Florida, Georgia, Indiana, Kansas, Kentucky, Minnesota, North and South Carolina, Tennessee, Texas, and Wisconsin. Note that the agricultural land is a subset of all taxable land; therefore we expect that levels not to match. However, the correlation is almost 1.

Figure 10: US National Wealth Series 1795-1935

A. Private Wealth-to-GDP Ratio

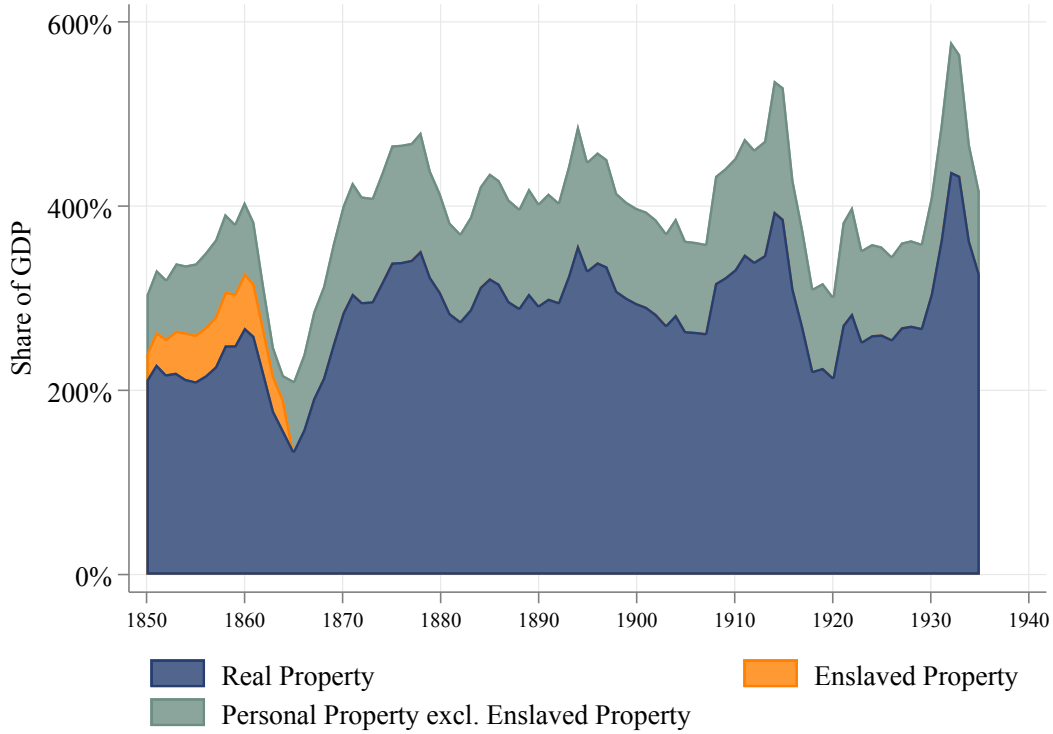


B. Private Wealth & GDP Per Capita: US (1795-1935)



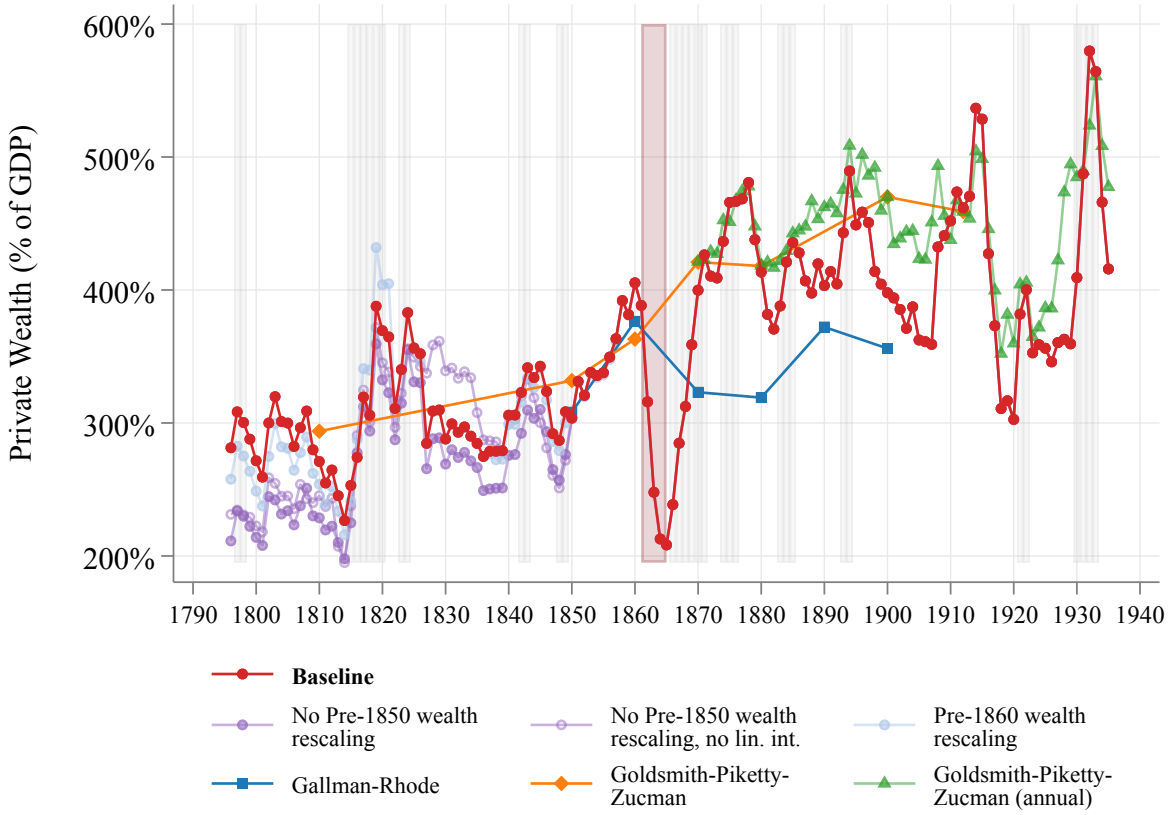
Notes: Panel A displays total US wealth as a fraction of GDP, using our benchmark assumptions. Panel B displays both Wealth per capita (the numerator) and GDP per capita (the denominator) over the same period. Grey areas indicate recessions; the red shaded area indicates the Civil War.

Figure 11: The Composition of US Wealth 1850-1935



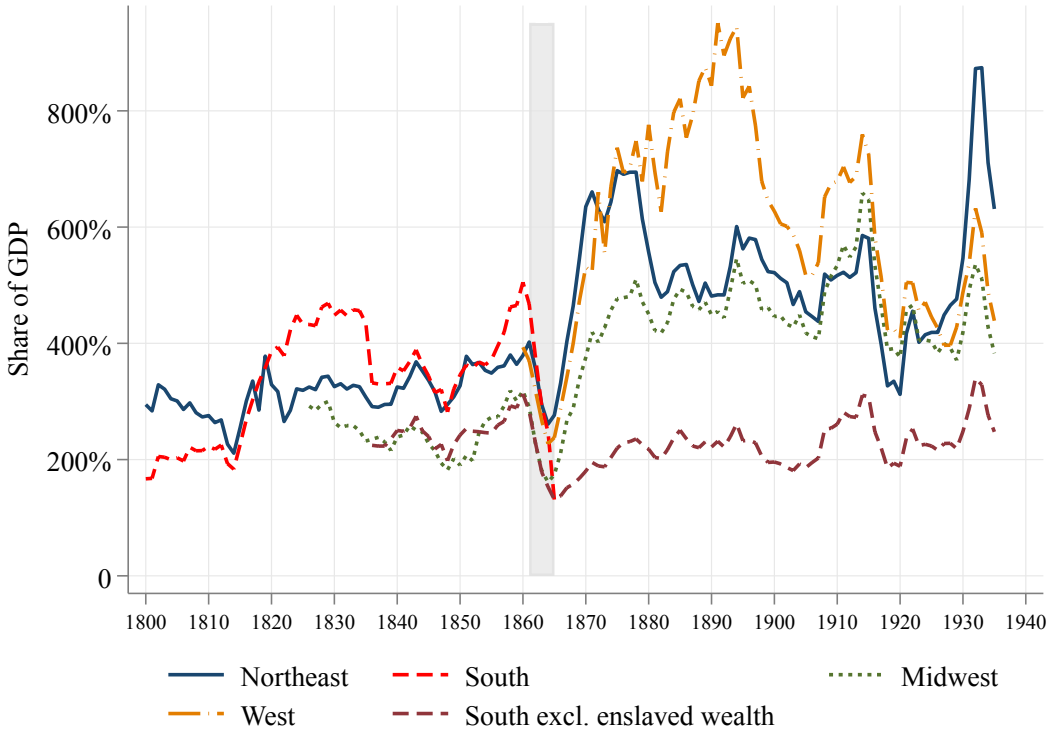
Notes: The figure shows the decomposition of wealth per capita in the US into three categories: real property; personal property excluding enslaved wealth, and the value of enslaved wealth. For the construction of enslaved wealth series see Appendix Section III.2.

Figure 12: Comparison with Other Estimates and Sensitivity Analysis



Notes: This figure compares our baseline wealth estimate with other estimates (see Appendix III.6 for a description of these alternative estimates). The main text and Appendix III.5 provide all details for the construction of our "Baseline" series and of the sensitivity series plotted on this graph. The series "No Pre-1850 wealth rescaling." does not reweigh states before 1850; the series "No Pre-1850 wealth rescaling, no lin. int." in addition does not use linear interpolation for years in which state-level wealth is missing; the line "Pre-1860 wealth rescaling" uses 1860 as the benchmark year to re-weigh states. Grey areas indicate recessions; the red shaded area indicates the Civil War.

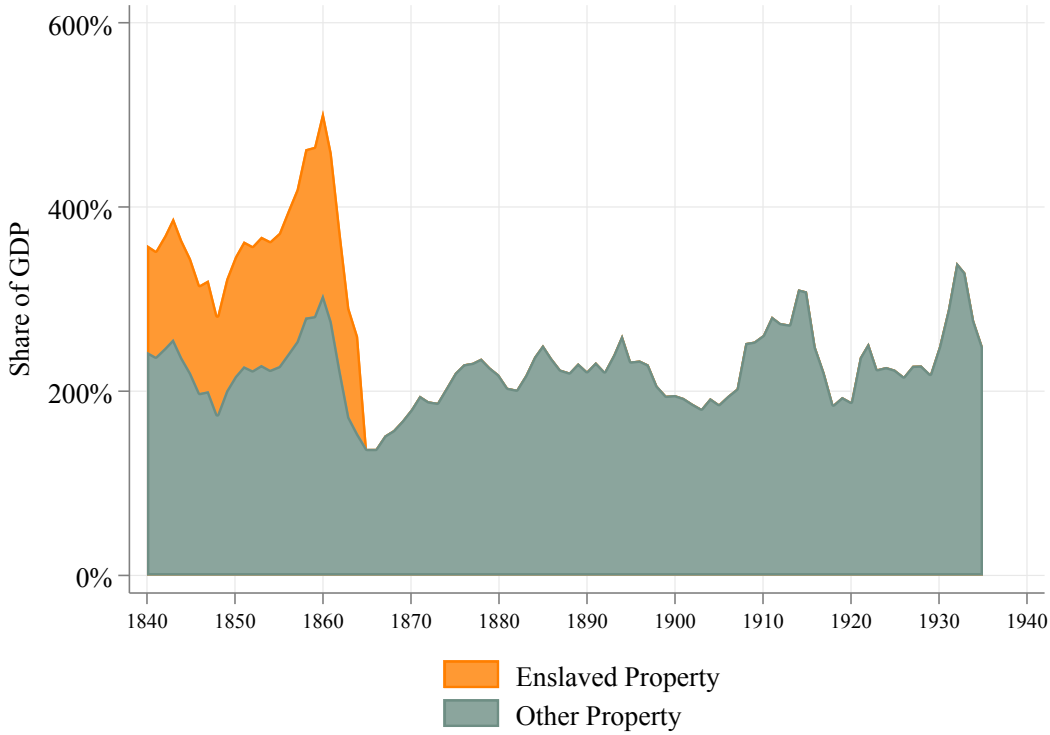
Figure 13: Property per Capita by Region, as a Share of National GDP per Capita



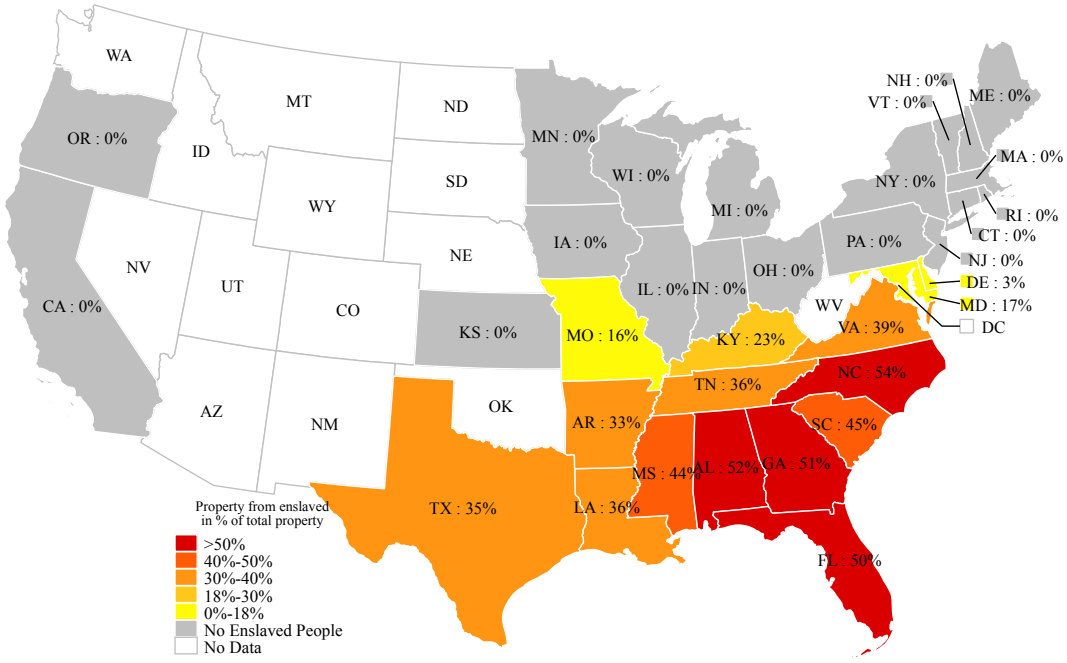
Notes: The figure shows the average ratio of property per capita in four US regions over the national (US) GDP per capita.

Figure 14: Enslaved People in Property in Southern States 1840-1935

A. Composition of Property as share of GDP



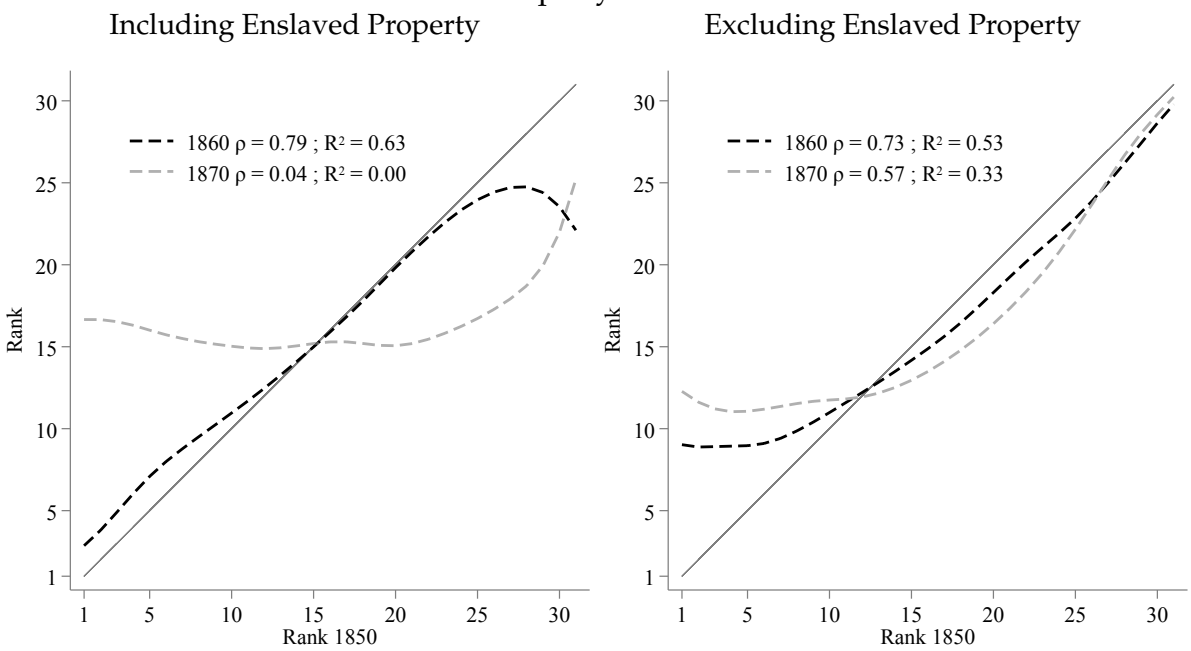
B. Share of Enslaved Property in 1860



Notes: Panel A shows the decomposition of property per capita for Southern states into two categories: enslaved property and all other property. For the construction of this series see Appendix Section III.2. Panel B shows the share of enslaved property in total property by state in 1860.

Figure 15: The Civil War and Enslaved Property

A - Persistence of Property Pre- and Post Civil War



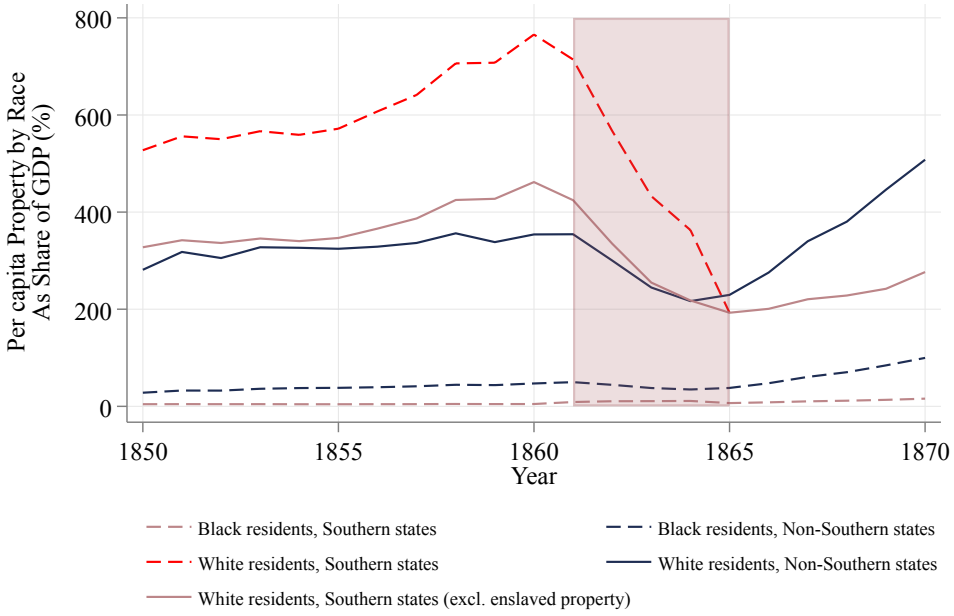
B - Decline in Property per Capita during Civil War beyond Enslaved Property by Share of Enslaved Property

Notes: Panel A displays the persistence of state per capita property rank between 1850, 1860, and 1870. The left plot includes enslaved property; the right plot excludes it. Panel B displays the percent decline in per capita property beyond the disappearance of the enslaved property between 1860 and 1870. 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 included in population counts).

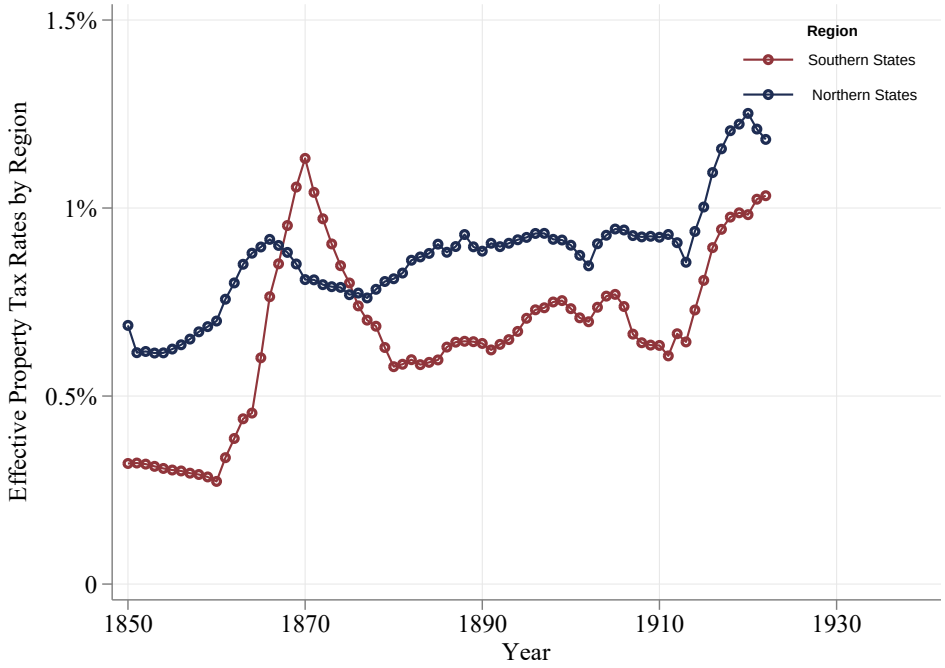
Continued on the next page

Figure 15: The Civil War and Enslaved Property (continued)

C - Evolution of Property by Race, in Southern and non-Southern States

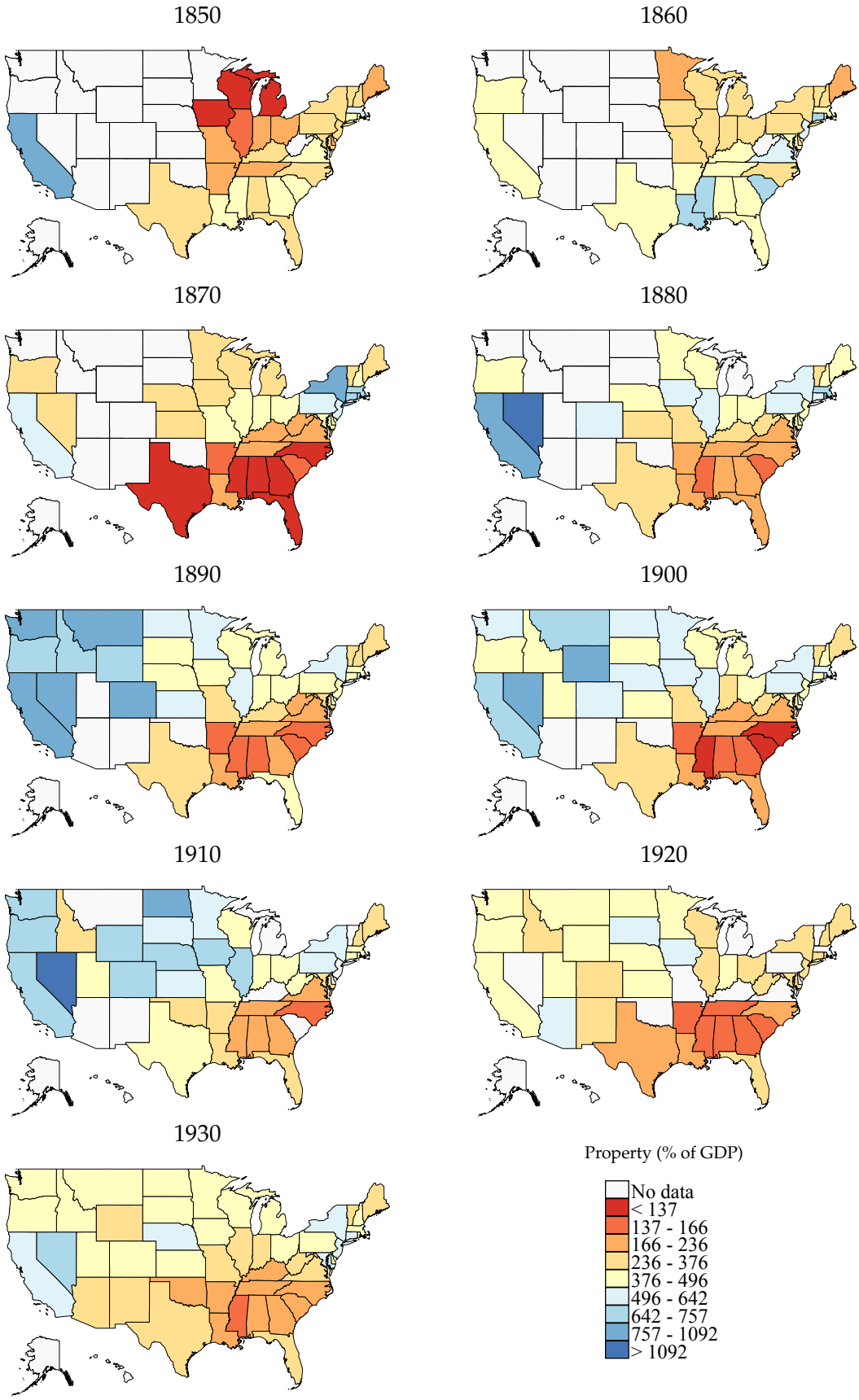


D - Effective Tax Rates by Region



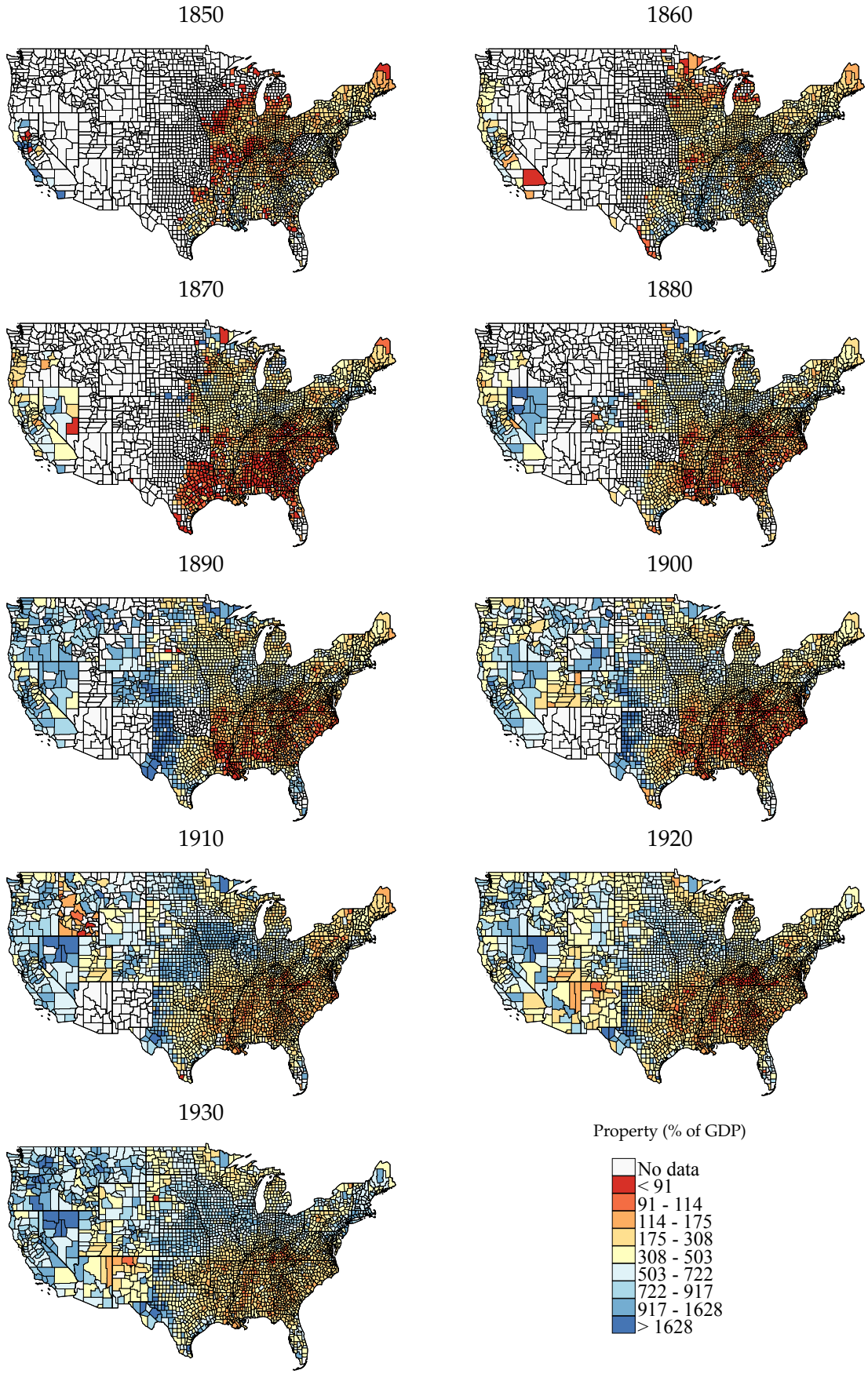
Notes: Panel C displays the evolution of the average value of property per capita for Black and white residents in Southern and Non-Southern states, as a share of US GDP. Panel D displays the effective property tax rates for Southern and Northern States. For the data sources and construction, see Appendix III.8.

Figure 16: 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 US territories prior to admission in the Union are not displayed.

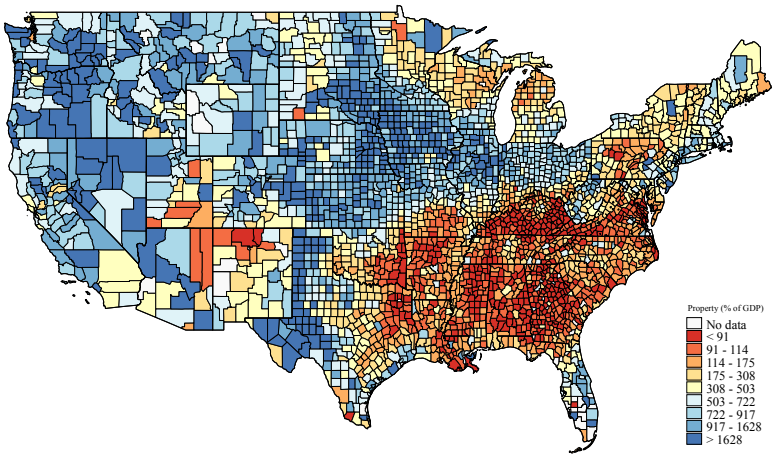
Figure 17: Property Per Capita by County As a Share of National GDP Per Capita



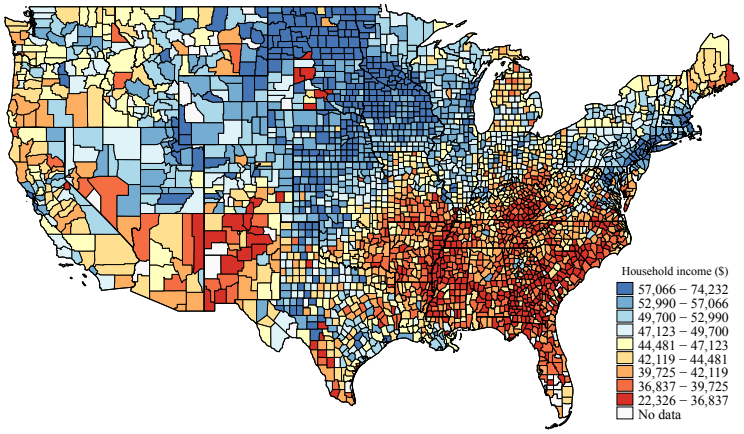
Notes: The figure shows the value of property per capita by county normalized by the national GDP per capita for each decade between 1850 and 1930. Data for counties in US territories prior to admission in the Union are not displayed.

Figure 18: County Level Property in 1920 and Income in 2014 (Opportunity Atlas Data)

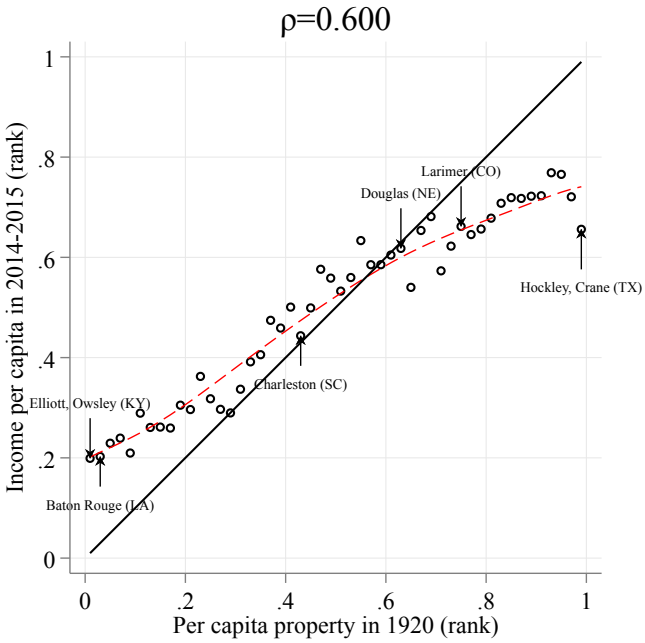
A. Property per Capita in 1920



B. Income in 2014 (Opportunity Atlas Data)

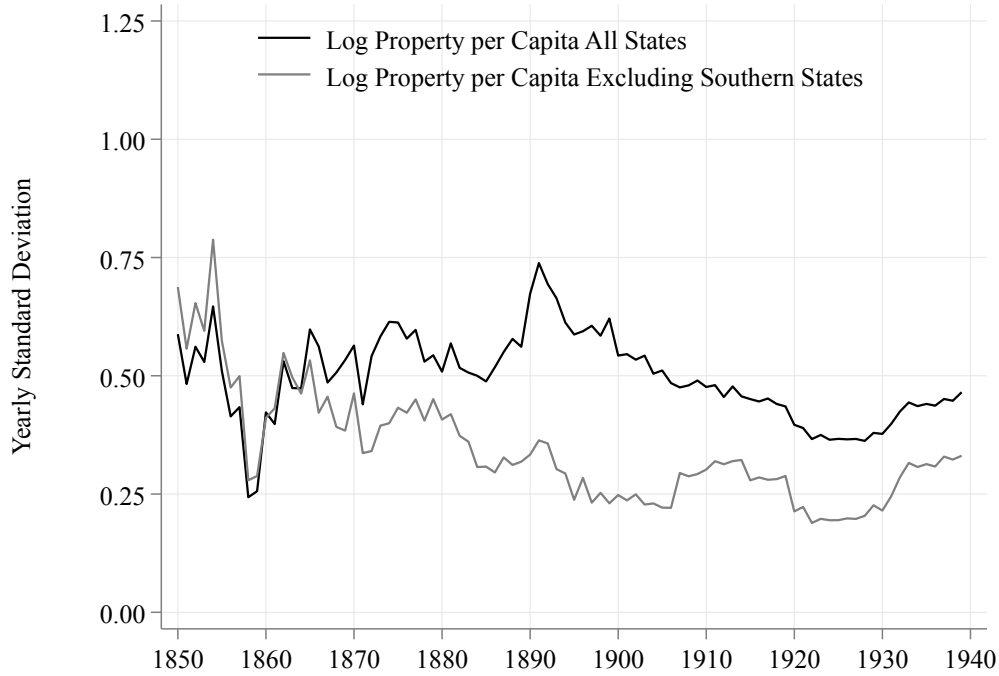


C. Persistence of Property and Income



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.

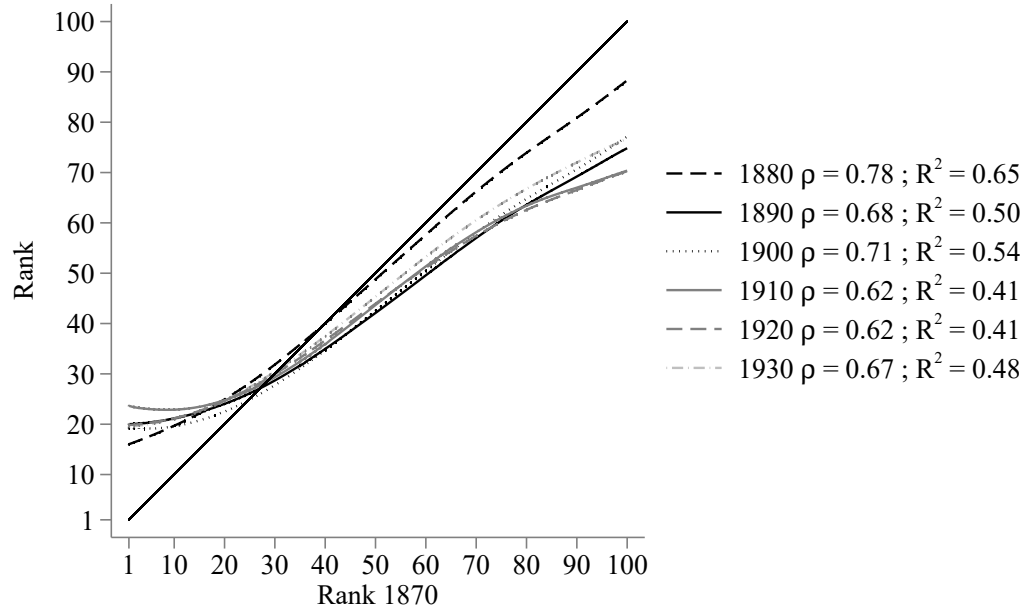
Figure 19: Dispersion in Property per Capita across States over Time



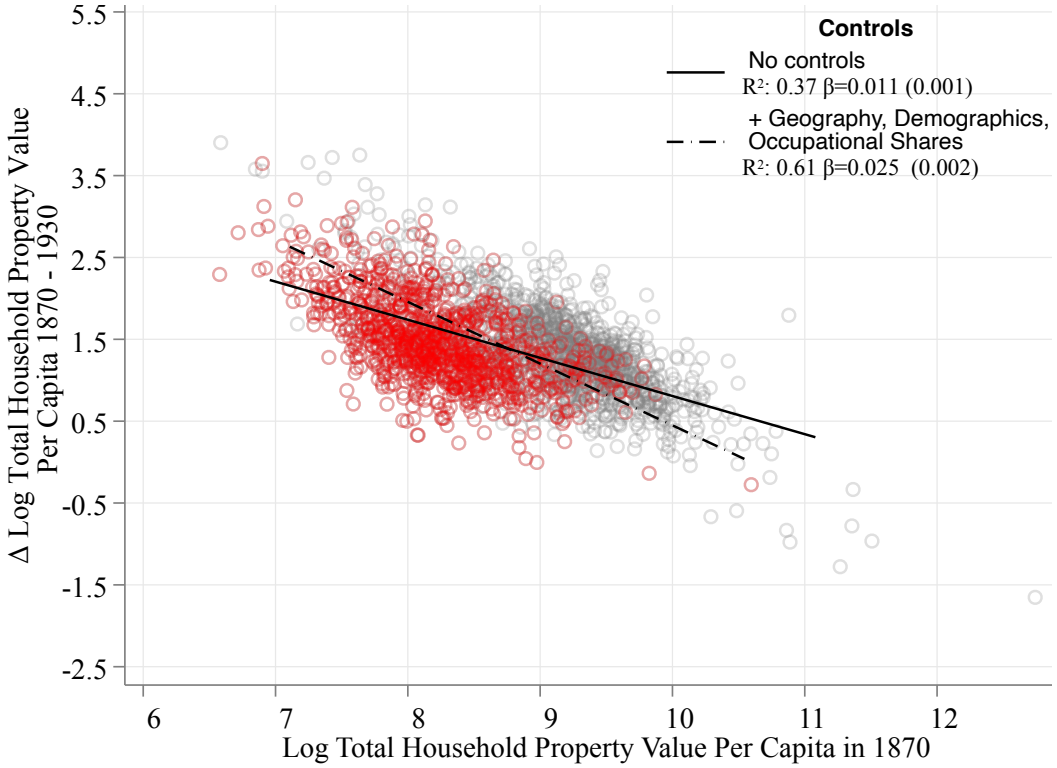
Notes: The figure plots the yearly standard deviation of property per capita across states for all states (solid black line) and excluding Southern states (grey line).

Figure 20: County-level Persistence and Convergence

A. Rank-Rank Correlation Across Time of County-Level Property Per Capita



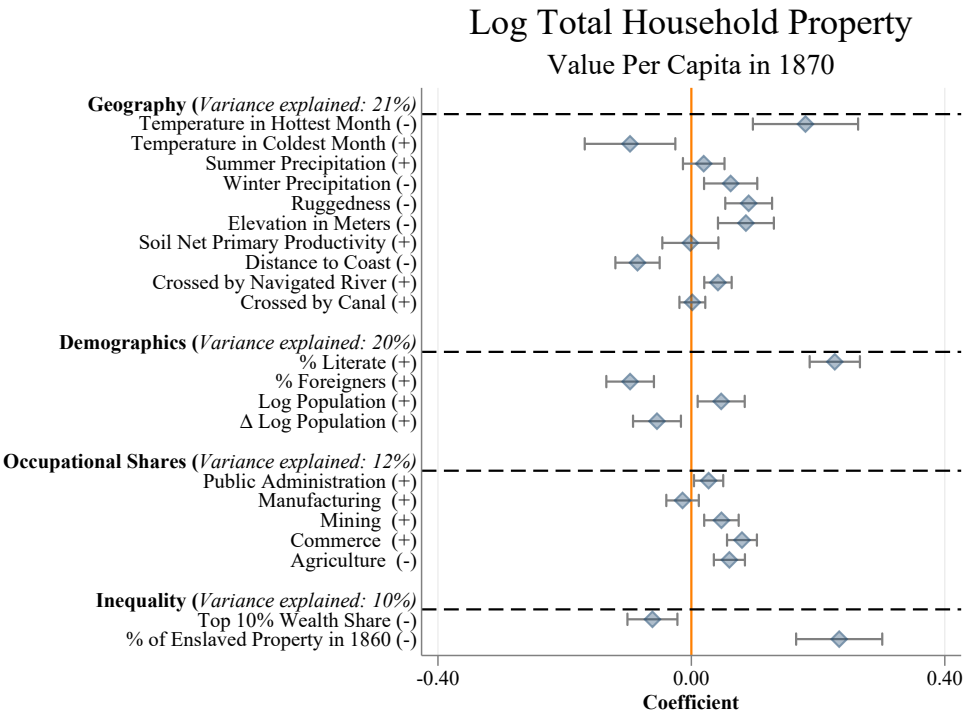
B. β-Convergence at the County Level



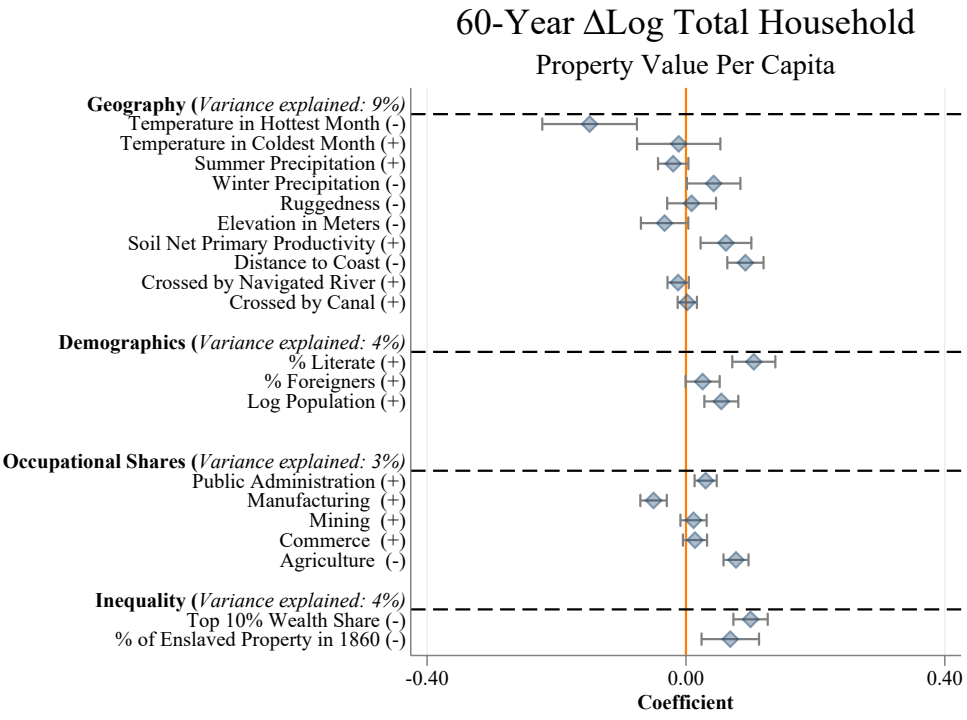
Notes: Panel A shows the rank-rank correlation of county-level property per capita for different years (ρ) and the R^2 for each year t of a simple regression of county-level property capita in year t on county-level property per capita in 1870. Panel B shows the relationship between the growth rate of county-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 structure (dashed line). Southern counties are represented in red.

Figure 21: Correlates of Property at the County Level 1870-1930

A. Log Total Property per Capita in 1870

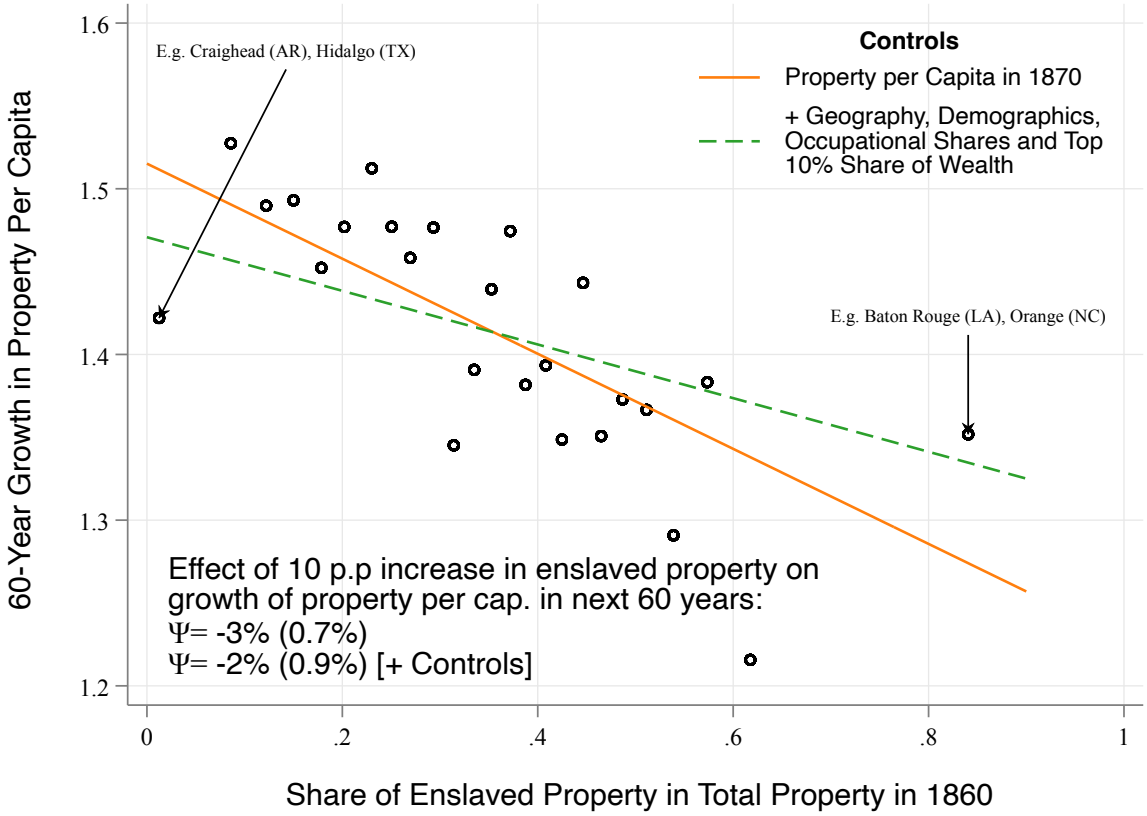


B. 60-Year Δ log Total Property per Capita



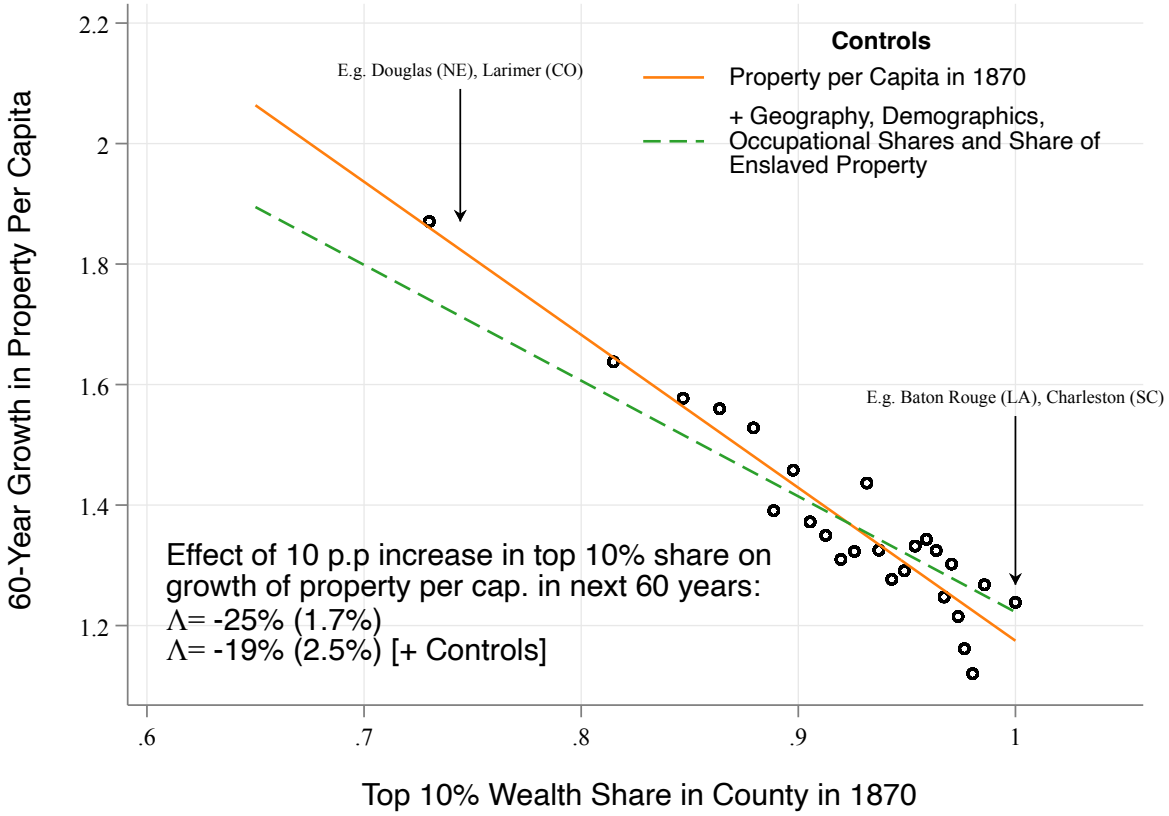
Notes: Panel A presents coefficients from the regression of log property in 1870 on inequality measures, and geographic, demographic, and economic characteristics from equation (3) . Panel B presents coefficients from the regression of the change in log property between 1870 and 1930 on the same controls, from equation (2). The controls included are described in Section 4.3 and Appendix III.10 and are standardized. Commerce includes retail, finance, transportation and business. We also include but do not show year fixed effects, % of white, and % of male individuals. 90% confidence interval are depicted. A minus sign next to the variable name indicates that the variable was included with a minus sign for expositional ease.

Figure 22: The Legacy of Enslavement on Growth: County-Level Correlations



Notes: The figure displays a binscatter 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. Counties are grouped into 25 equally-sized bins by their share of property from enslaved people. The correlation is residualized on controls for geography, demographics, occupational shares controls, and the share of wealth held by the top 10% as described in Section 5. The controls are the same as in Figure 21. See Appendix III.10 for the sources and construction of these variables.

Figure 23: Inequality and Growth: County-Level Correlations



Notes: The figure displays a binscatter 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. Counties are grouped into 25 equally-sized bins by their share of wealth held by the top 10%. The correlation is residualized on controls for geography, demographics, occupational shares controls, and the share of enslaved people in total property as described in Section 5. The controls are the same as in Figure 21. See Appendix III.10 for the sources and construction of these variables.

Table 1: Convergence at the county and state level

(a) County convergence 1880-1920

Without controls			With controls for regions		
Income (IPUMS)	Property	Barro & Sala-i-Martin	Income (IPUMS)	Property	Barro & Sala-i-Martin
.026	.010	-	.036	.020	-

(b) State convergence 1880-1920

Without controls			With controls for regions		
Income (IPUMS)	Property	Barro & Sala-i-Martin	Income (IPUMS)	Property	Barro & Sala-i-Martin
.021	.011	.016	.034	.021	.019

Notes: Panel A and B display the estimated rate of convergence at the county and state level respectively. Computations are made using Barro and Sala-i Martin (1992) methodology. In Panel B, we use Easterlin (1957) data to compute the values for Barro and Sala-i Martin (1992).

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ONLINE APPENDIX

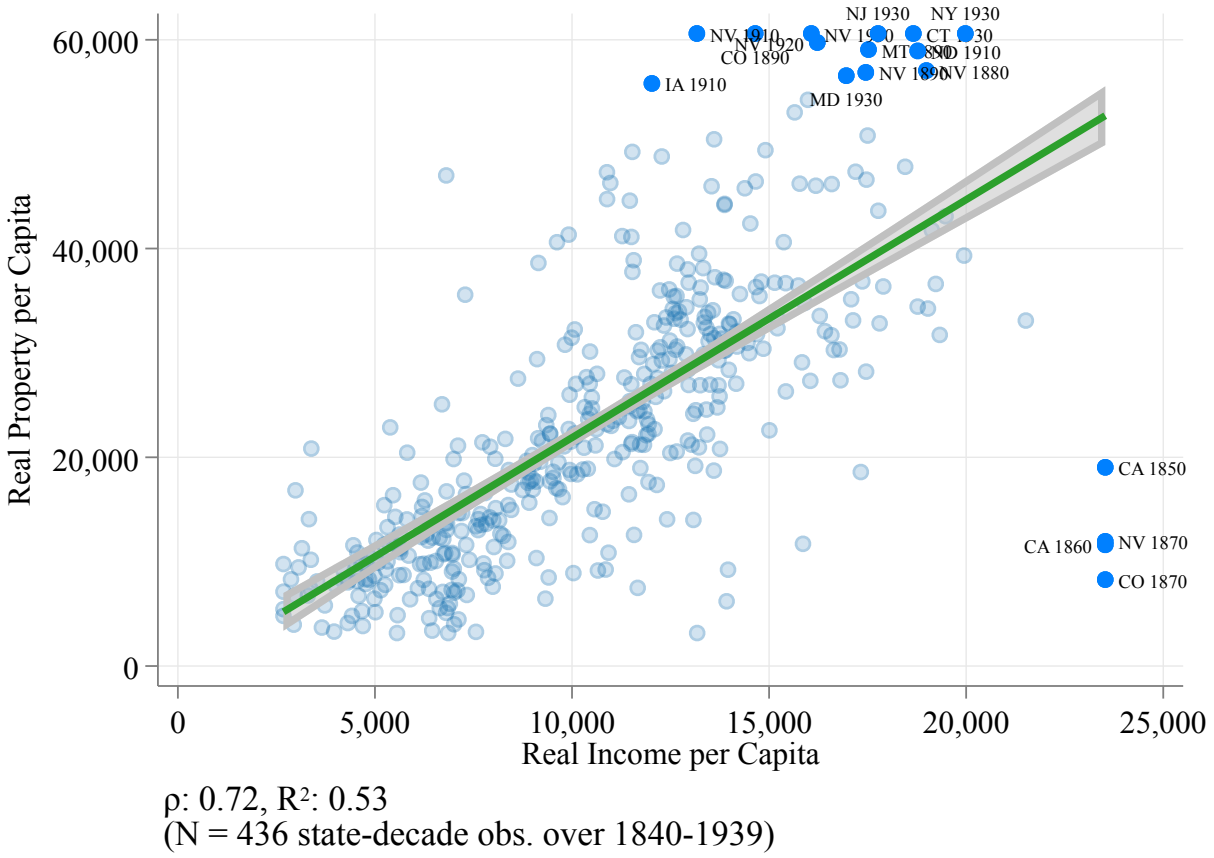
for "Wealth and Property Taxation in the United States"

by Sacha Dray, Camille Landais, and Stefanie Stantcheva

Contents

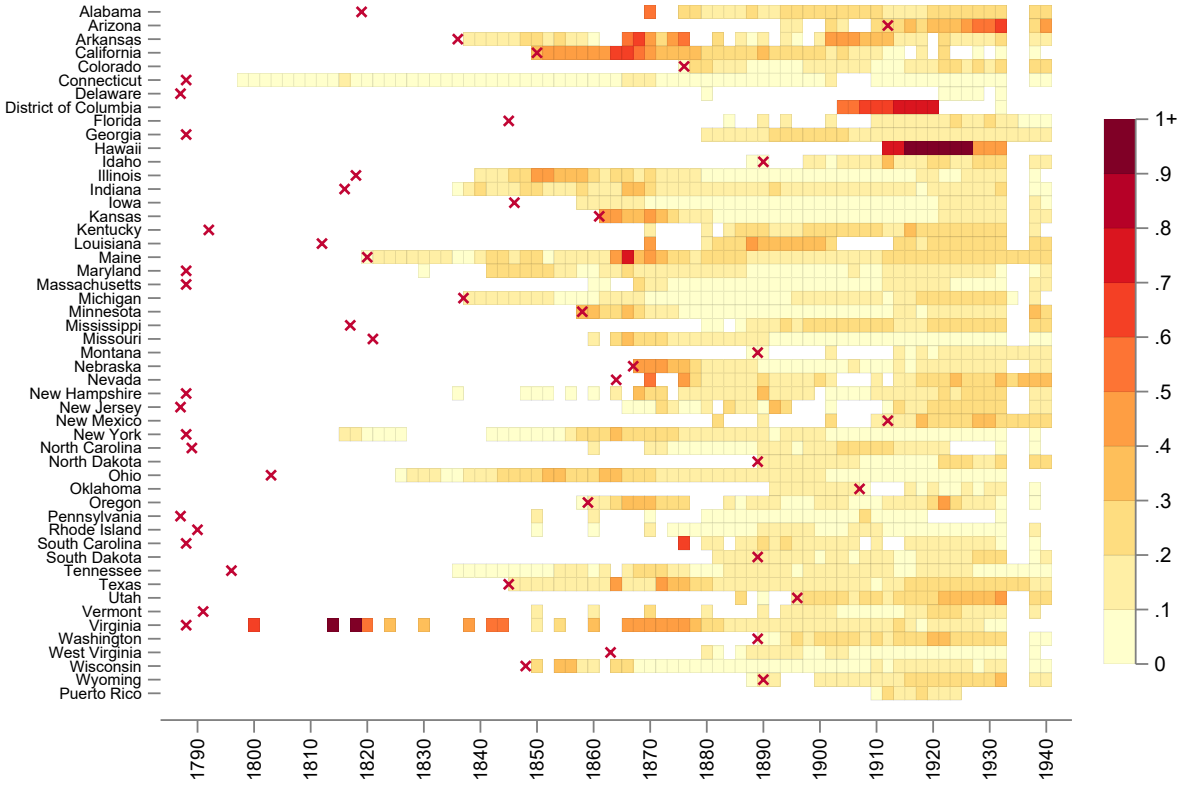
I. Additional Tables and Figures

Figure A1: Property and Income Per Capita



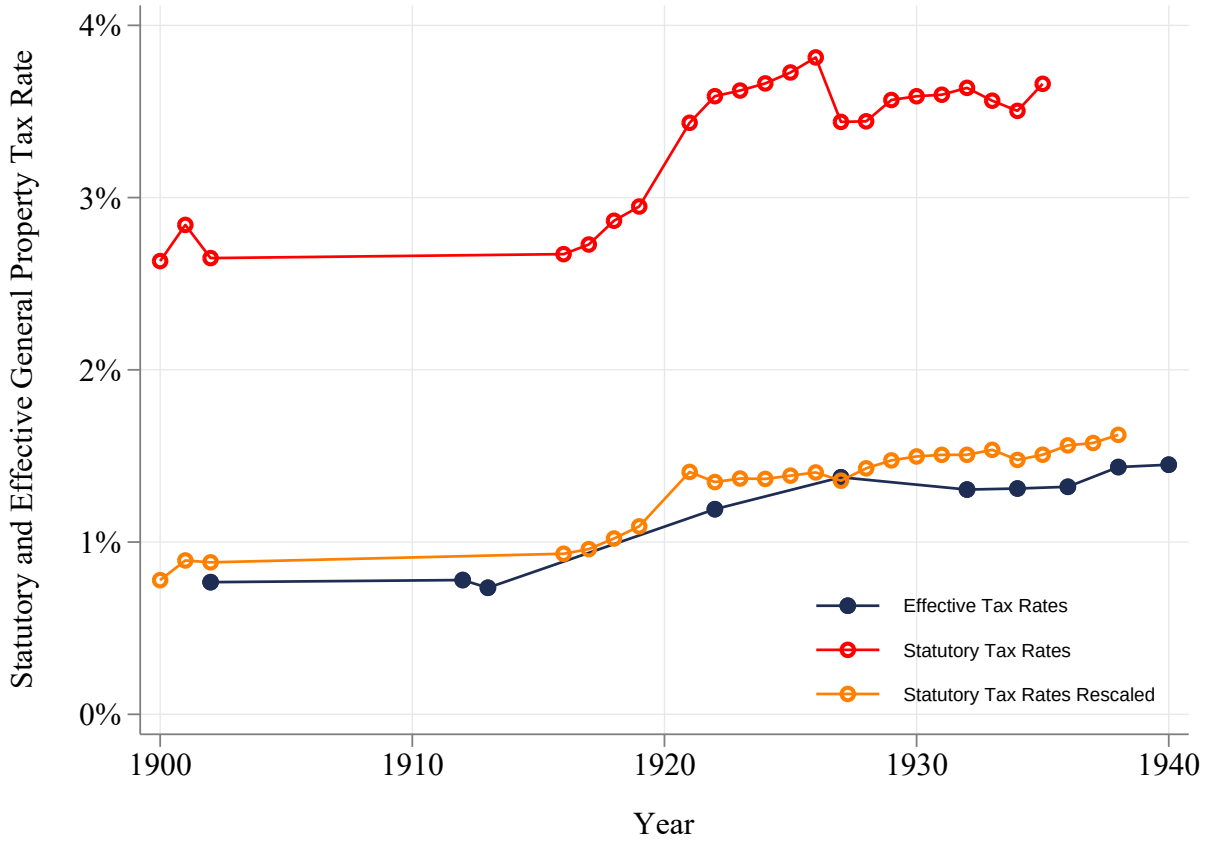
Notes: This graph plots the relationship between real property per capita and real income per capita between 1840 and 1939 at the state level. The values are winsorized at 1% and 99%.

Figure A2: State Property Tax Rates



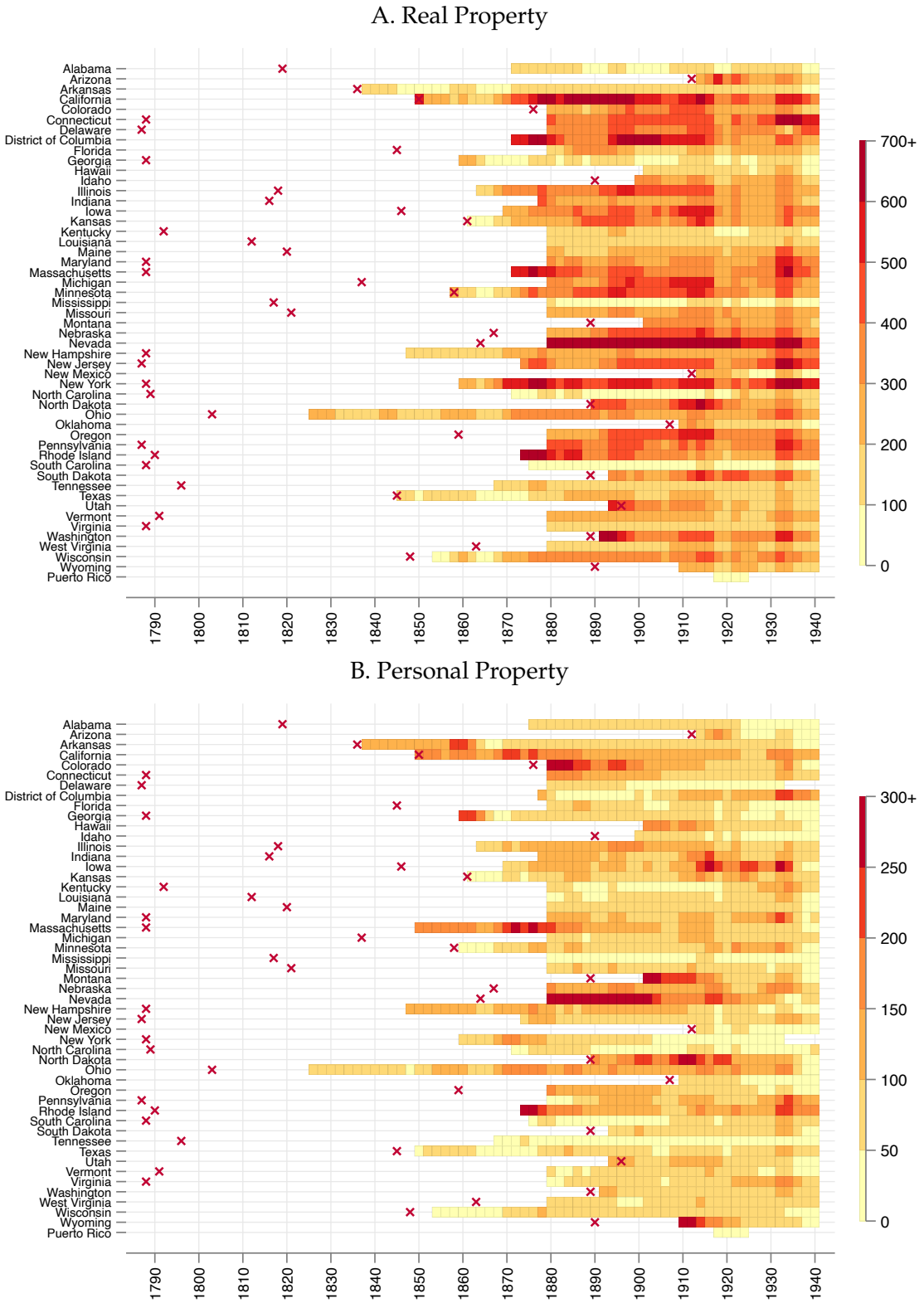
Notes: This figure shows the effective state property tax rates for all states, the District of Columbia and Puerto Rico. Values are interpolated every year at the state level and winsorized for 5th and 95th percentile. Red crosses indicate the year of the admission of the state to the Union.

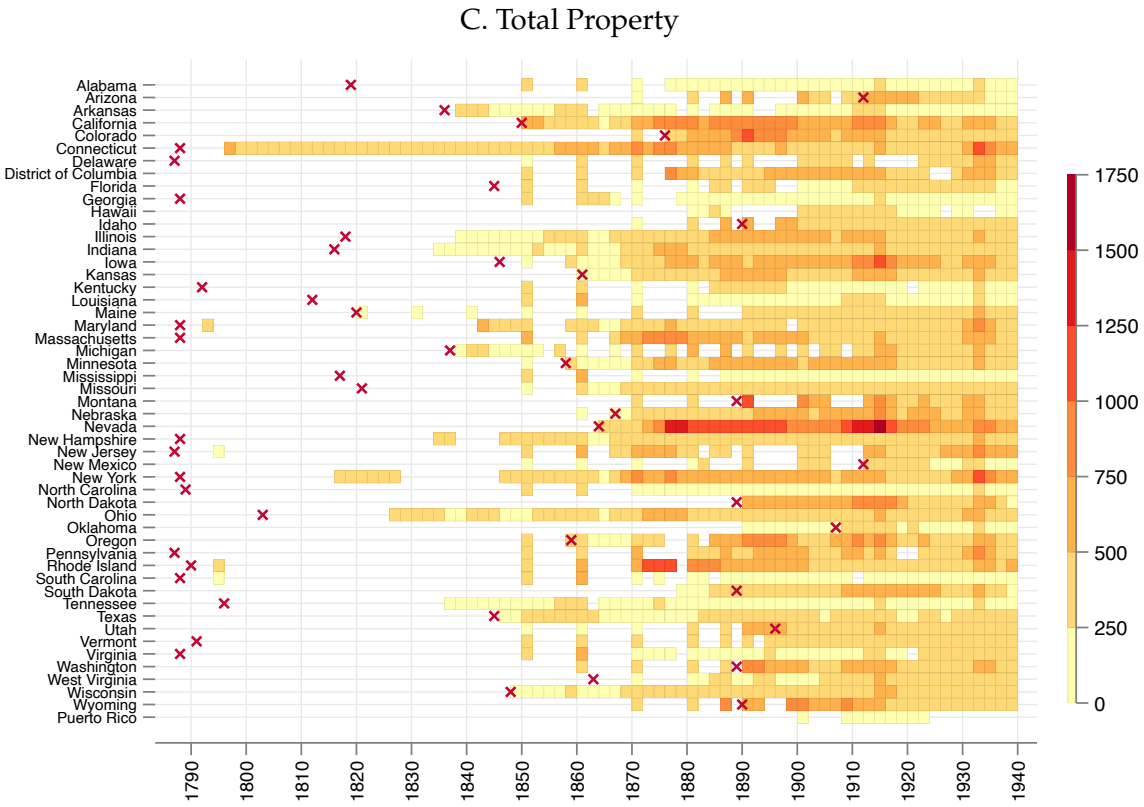
Figure A3: Total Statutory and Effective Tax Rates (%)



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.8.

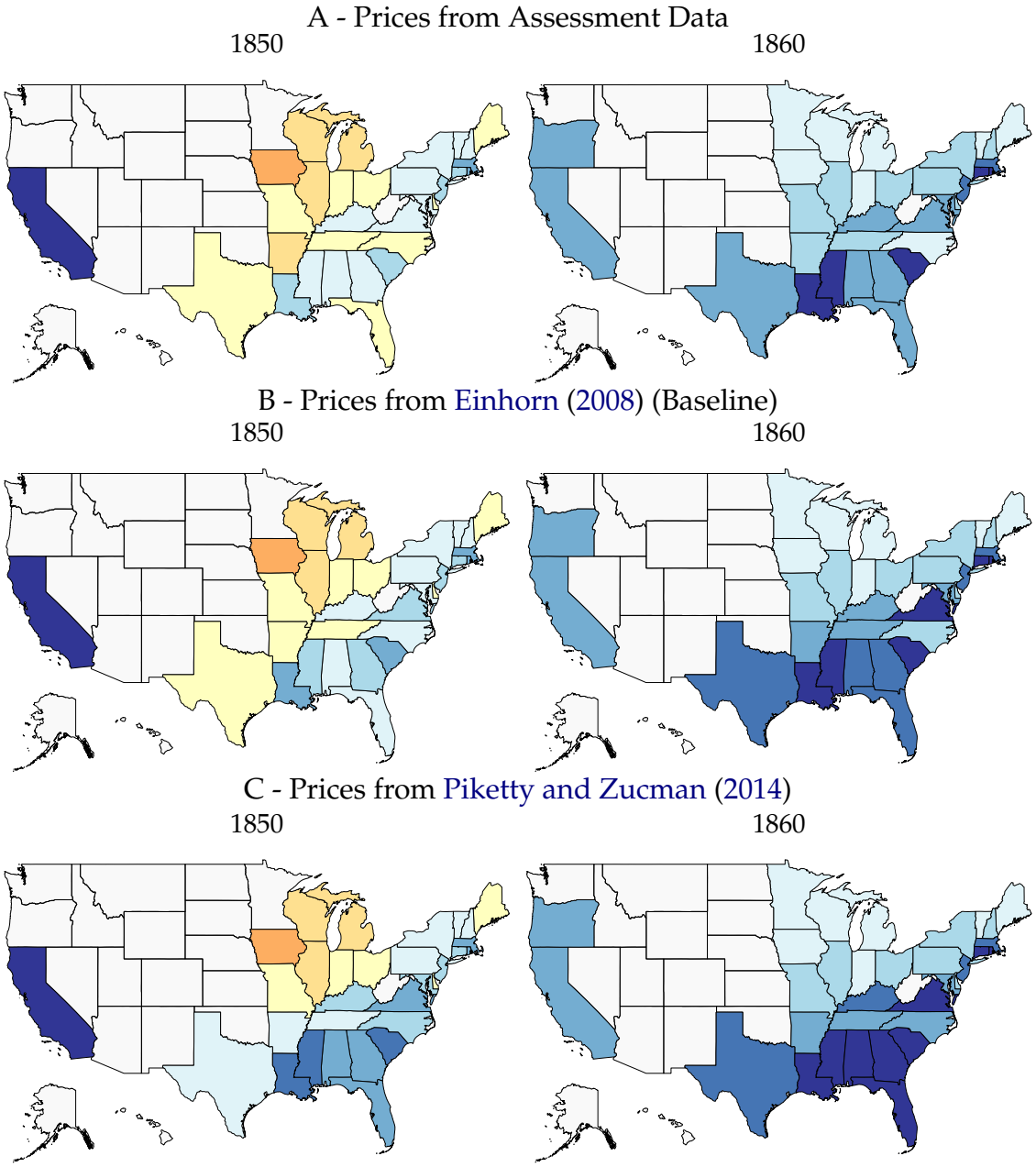
Figure A4: Real, Personal, and Total Property per Capita at the State Level as a Share of US GDP (%)





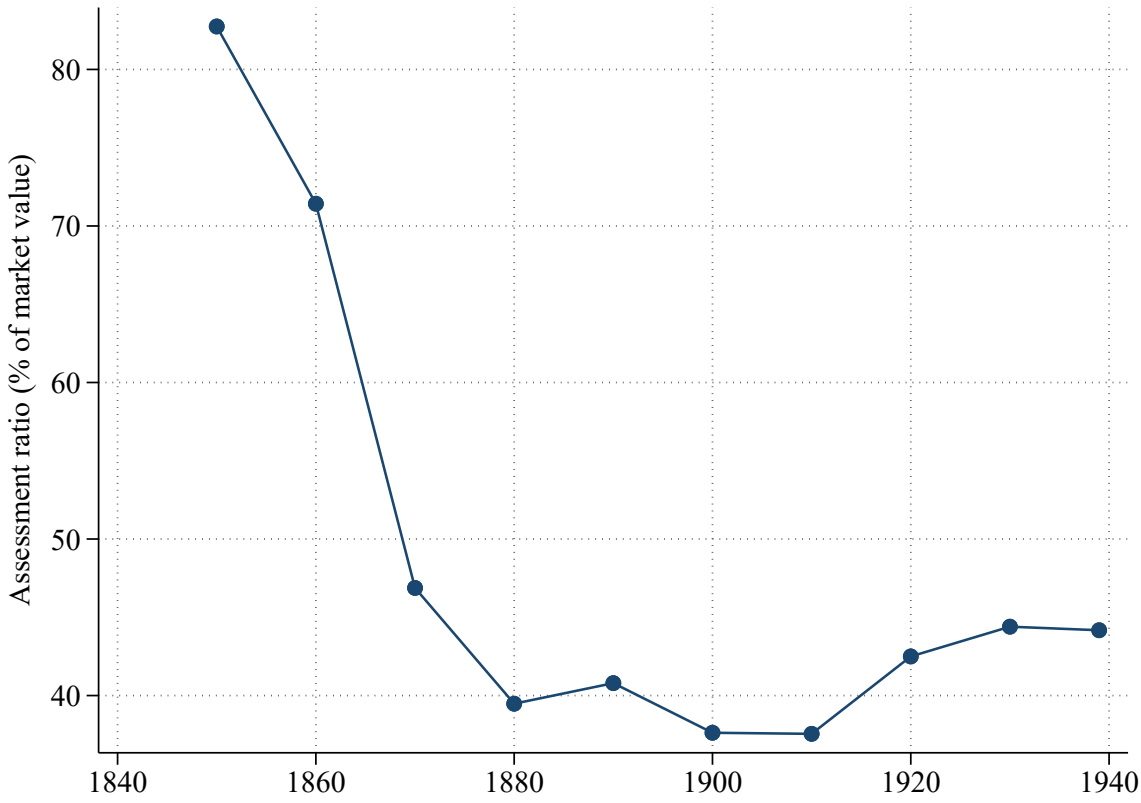
Notes: The figure shows the coverage for two major subcomponents of property: real property (in Panel A) and personal property (Panel B) for all 50 states, the District of Columbia and Puerto Rico. Panel C shows total property per capita. Real, personal, and total property are expressed as a share of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



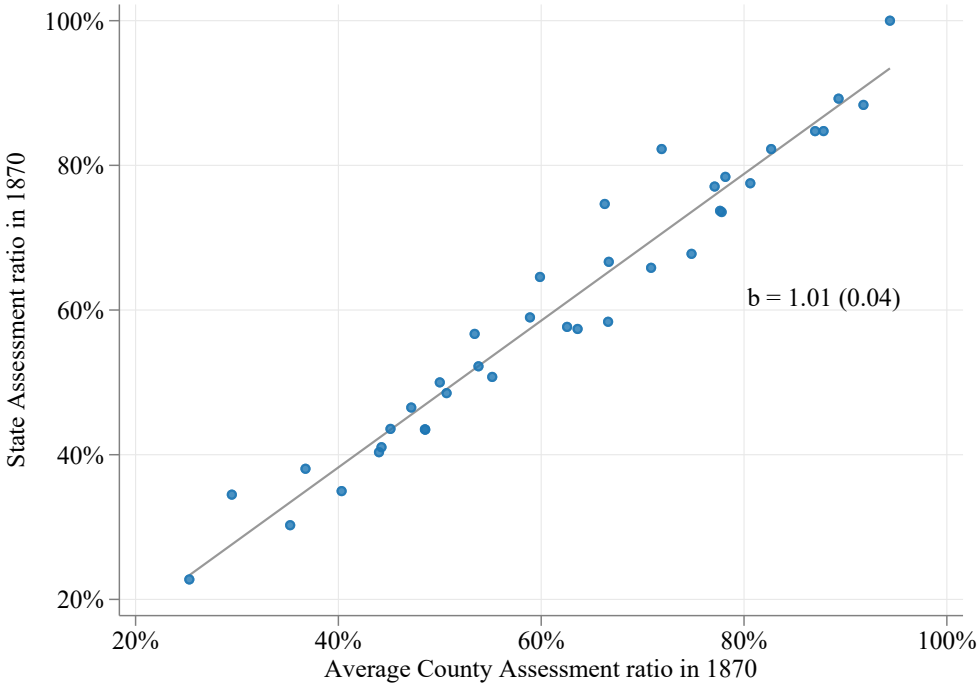
Notes: This figure displays the value of property per capita at the state level, using different prices for enslaved people. Panel A uses the implied prices from property assessments ($250 in 1850 and $430 in 1860). Panel B uses prices from Einhorn (2008) ($401 in 1850 and $774 in 1860, which constitutes 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).

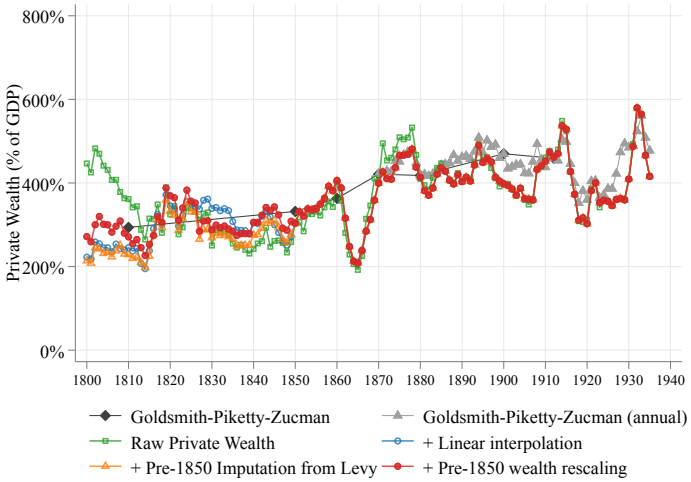
Figure A7: Comparison of State and Counties Assessment Ratios in 1870



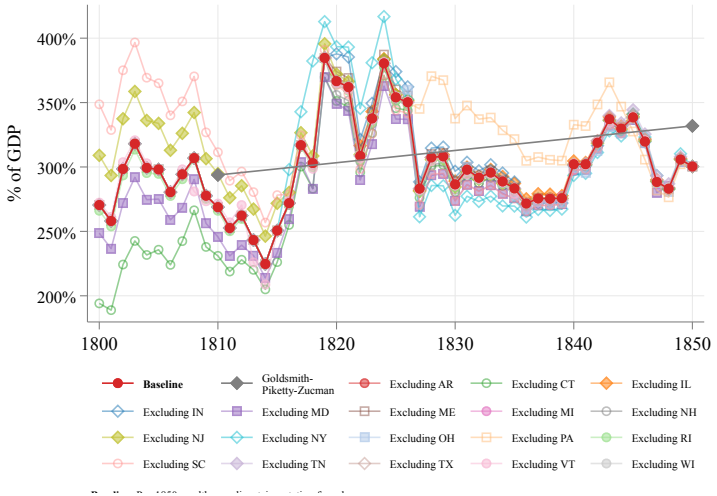
Notes: The figure compares the state assessment ratios (on the vertical axis) to the average, population-weighted assessment ratios across counties in the state. The correlation is 1.01.

Figure A8: Sensitivity of National Wealth Estimates

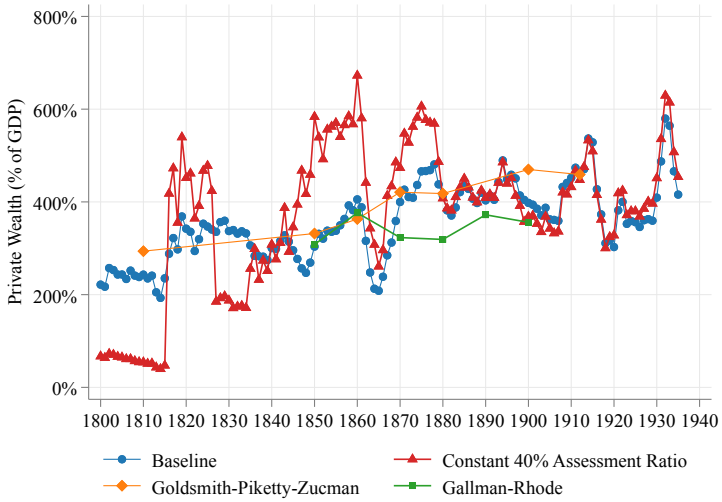
A. Comparison of Private Wealth Estimates



B. Robustness of US Wealth Estimates

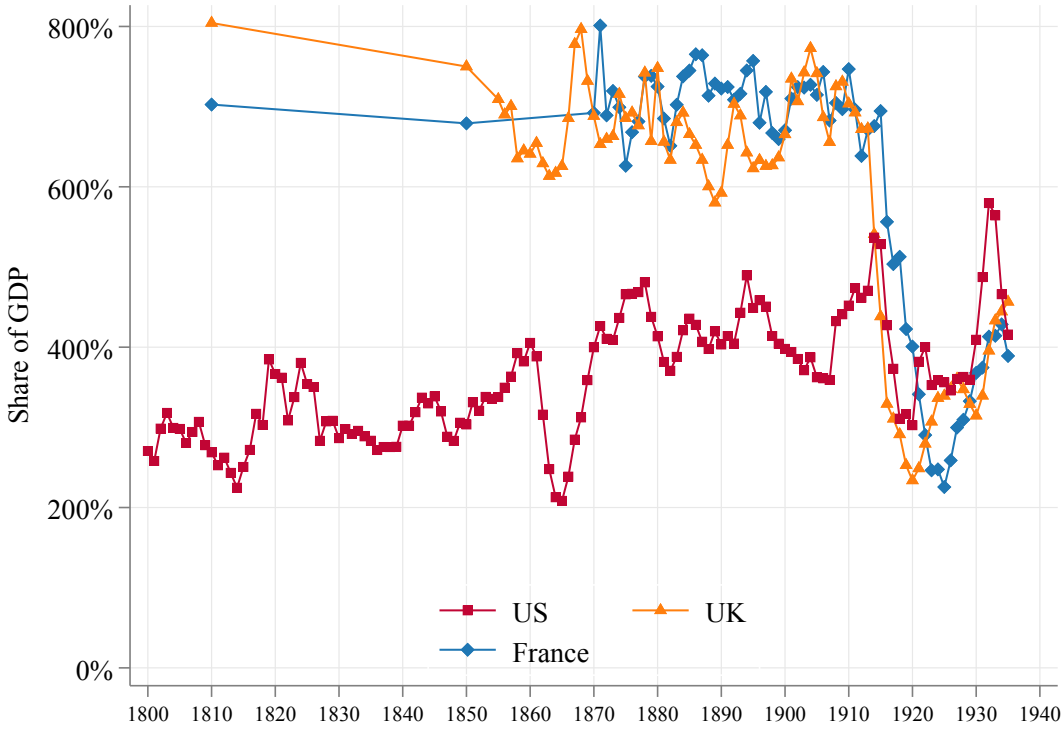


C. Sensitivity to Assessment Ratio



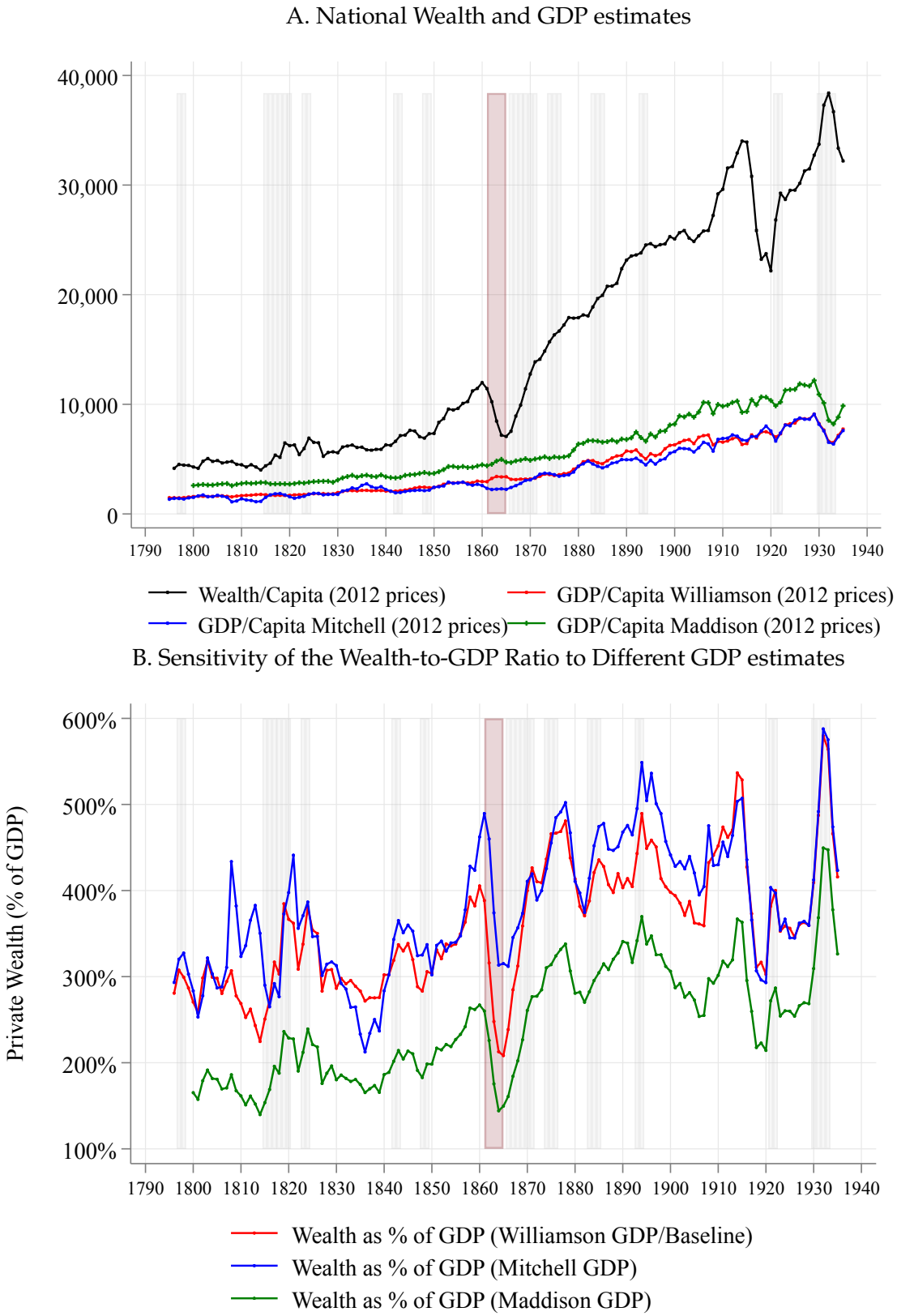
Notes: The figure performs the sensitivity analyses described in Appendix III.5. Panel A compares different core wealth estimates. Panel B compares the estimates' sensitivity to excluding specific states. Panel C compares our wealth estimate and those from Goldsmith (1951) and Piketty and Zucman (2014) 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



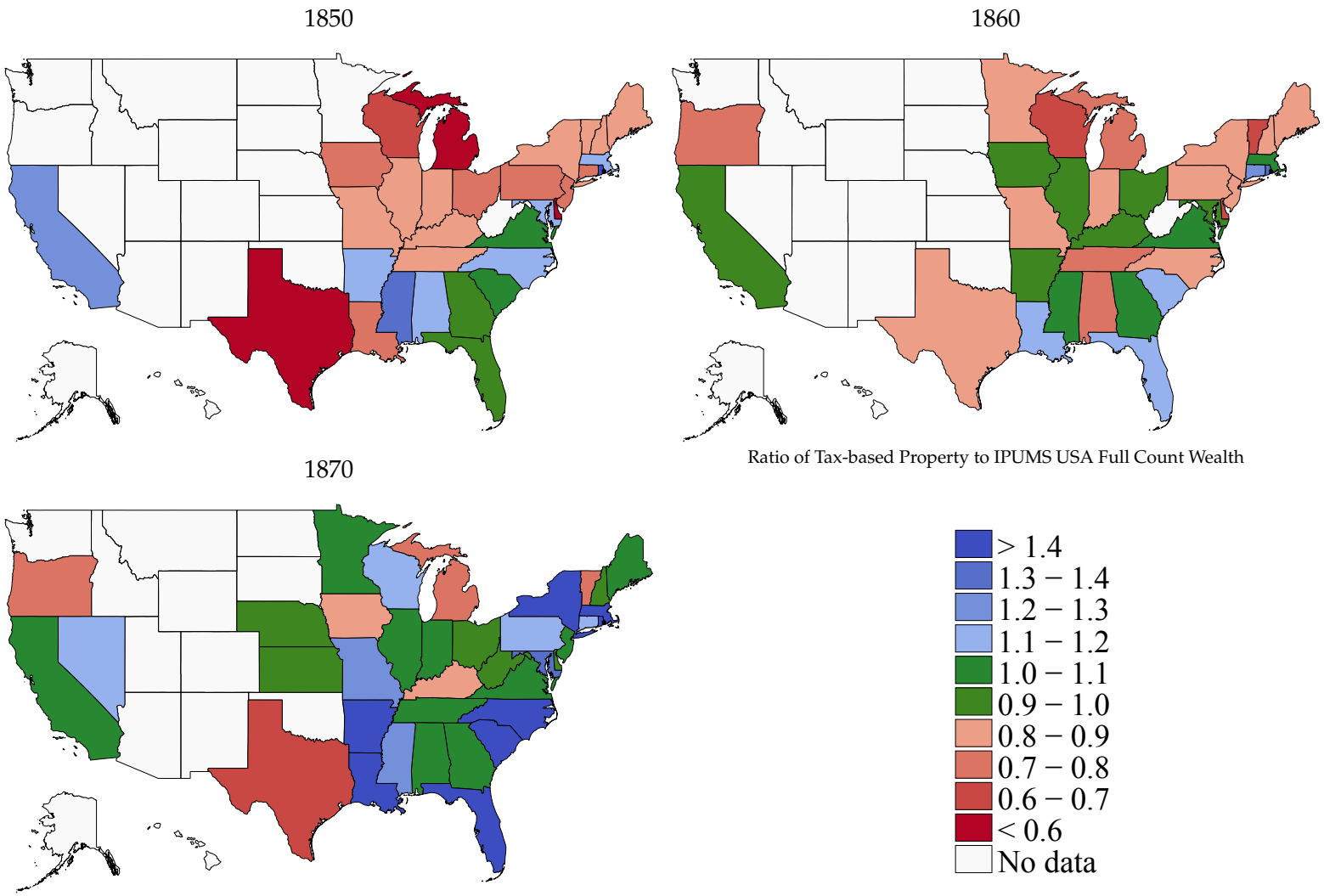
Notes: The figure shows the evolution of the private wealth-to-GDP ratio for the United States, France, and the United Kingdom. Data for the United Kingdom and France come from the World Inequality Database and Piketty (2014).

Figure A10: Sensitivity to Alternative GDP Series



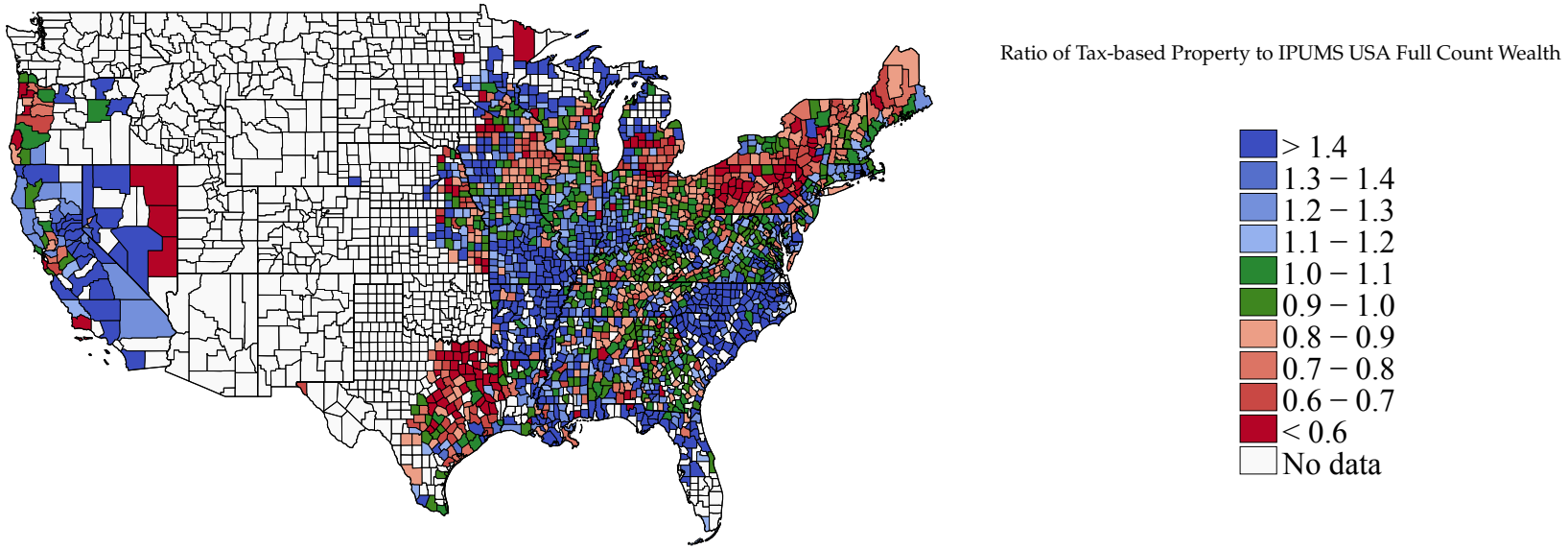
Notes: The figure explores different existing GDP estimates. Panel A shows our wealth estimate and compares it to different GDP estimates from Johnston and Williamson (2020) (in red), Mitchell (2007) (in blue), and Bolt and Van Zanden (2020) (in green). Panel B displays our estimated national wealth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

Figure A11: 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



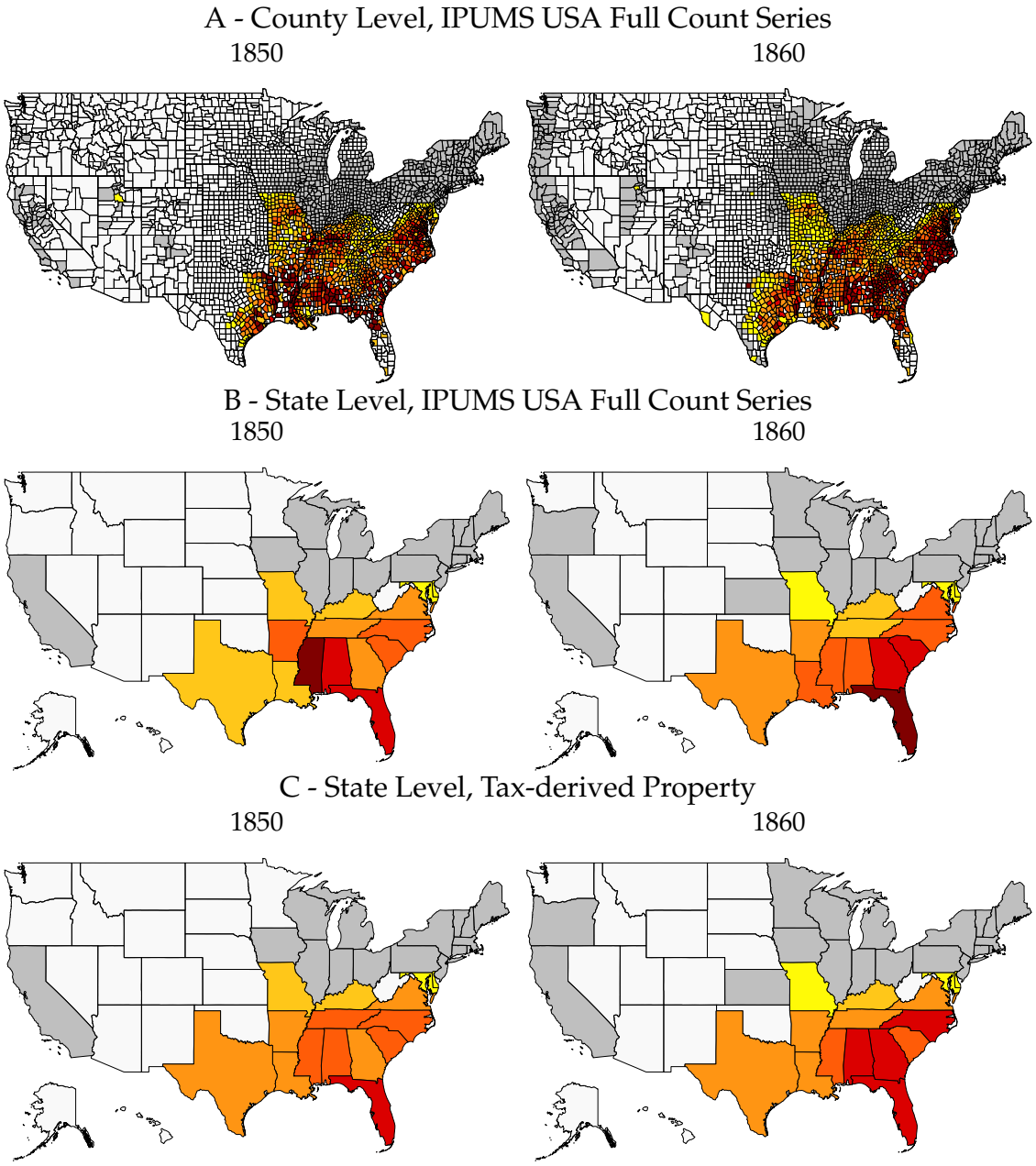
Notes: The figure shows the ratio of the tax-based property measure to the IPUMS USA Full Count wealth measure at the state level, for 1850, 1860, and 1870. Data for states in US territories prior to admission in the Union are not displayed.

Figure A12: 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



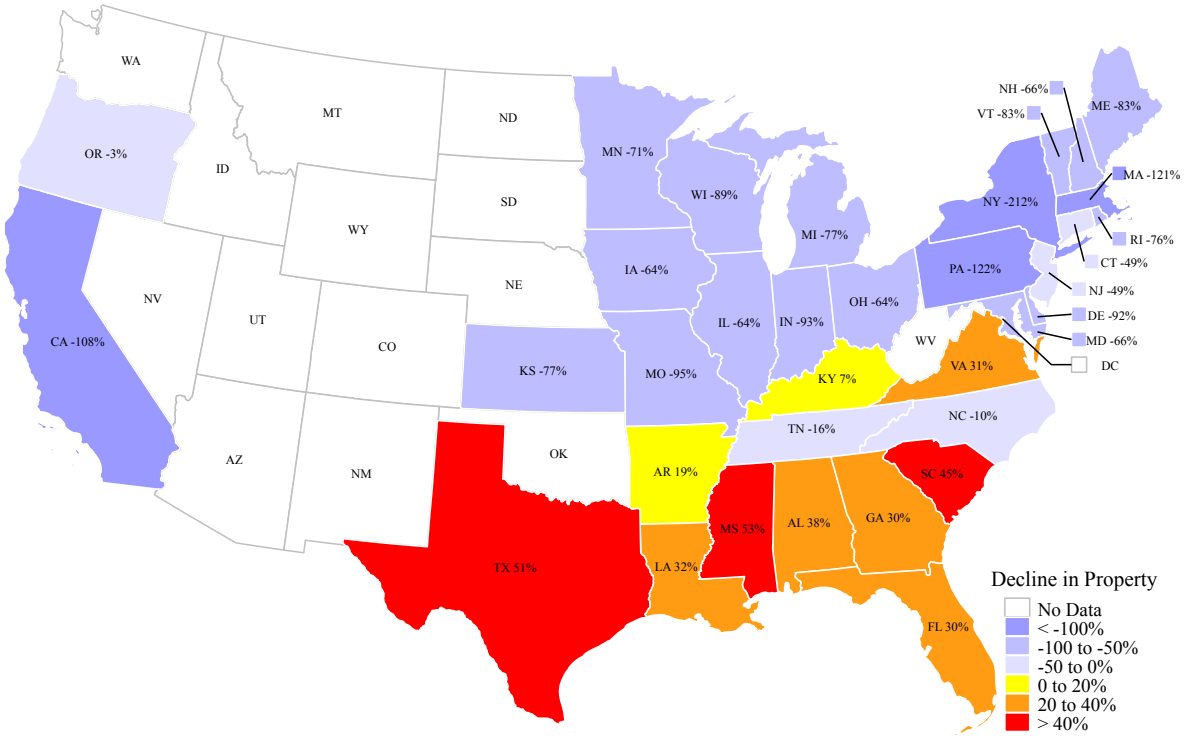
Notes: The figure shows the ratio of the tax-based to the IPUMS USA Full Count wealth measure at the county level in 1870.

Figure A13: 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.2. Data for states in US territories prior to admission in the Union are not displayed.

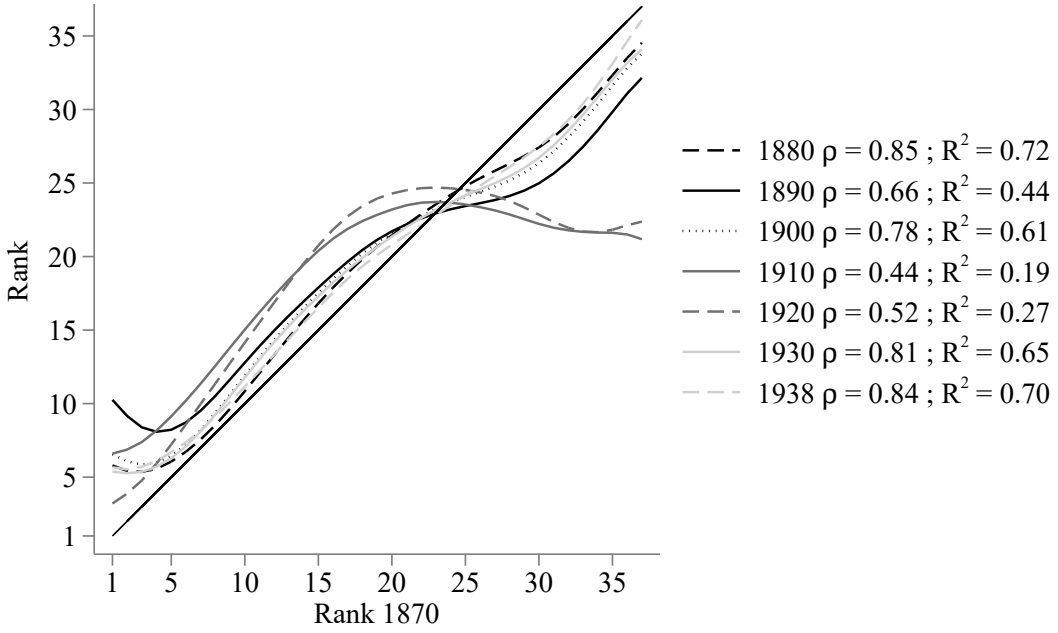
Figure A14: Decline in Property per Capita from 1860 to 1870 beyond Enslaved Property



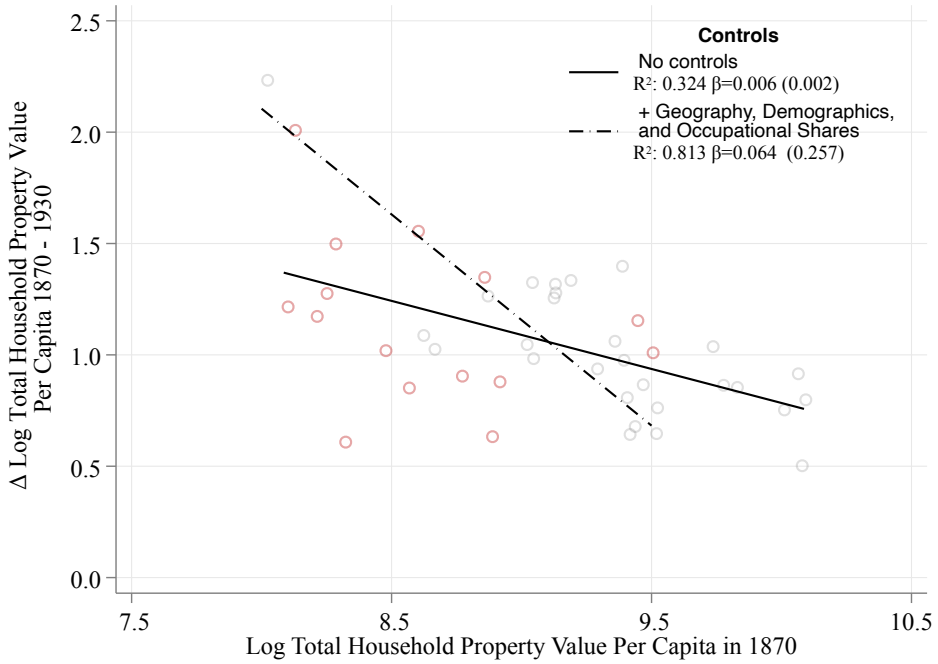
Notes: The figure displays the percent decline in per capita property above and beyond the one following the freeing of the enslaved property. A value of 0 means the property per capita in 1870 is equal to the property per capita in 1860 excluding enslaved property, i.e., $1 - \frac{W_{i,1870}}{(1-S_{i,1860})W_{i,1860}}$, 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 A15: State Persistence and Convergence

A. State Persistence

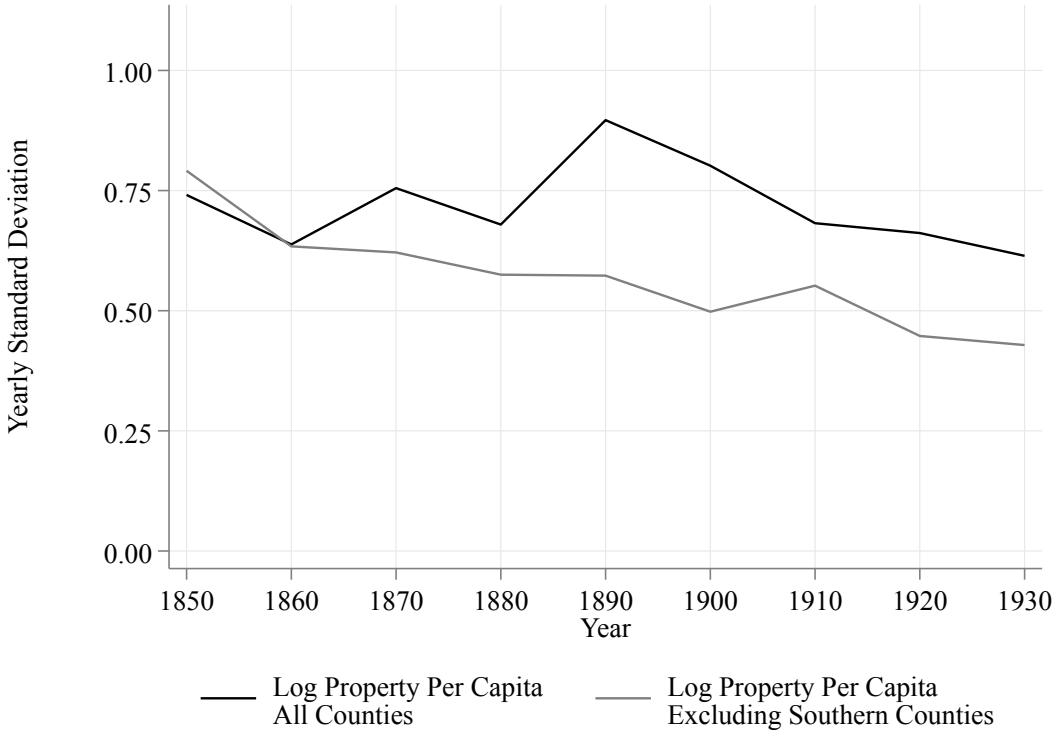


B. β - Convergence - Property per Capita from 1870



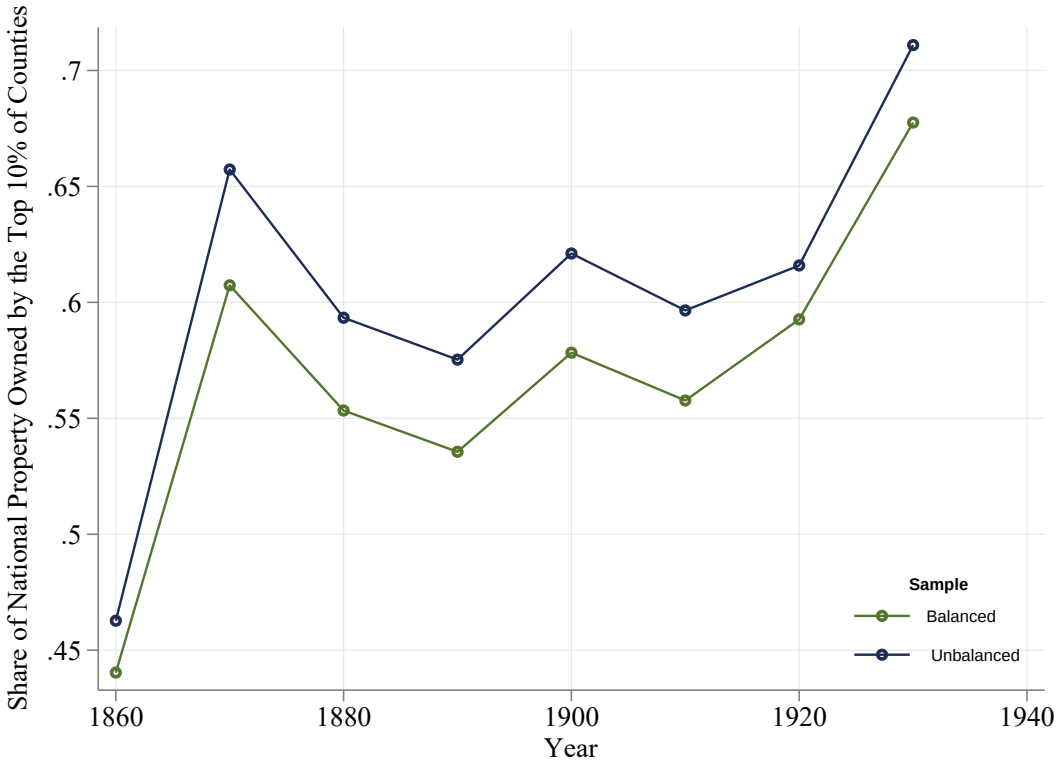
Notes: Panel A shows the rank-rank correlation of state-level property per capita for different years (ρ) and the R^2 for each year t of a simple regression of state-level property capita in year t on state level property per capita in 1870. Panel B shows the relationship between the growth rate of state 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 A16: Dispersion in Property across Counties over Time



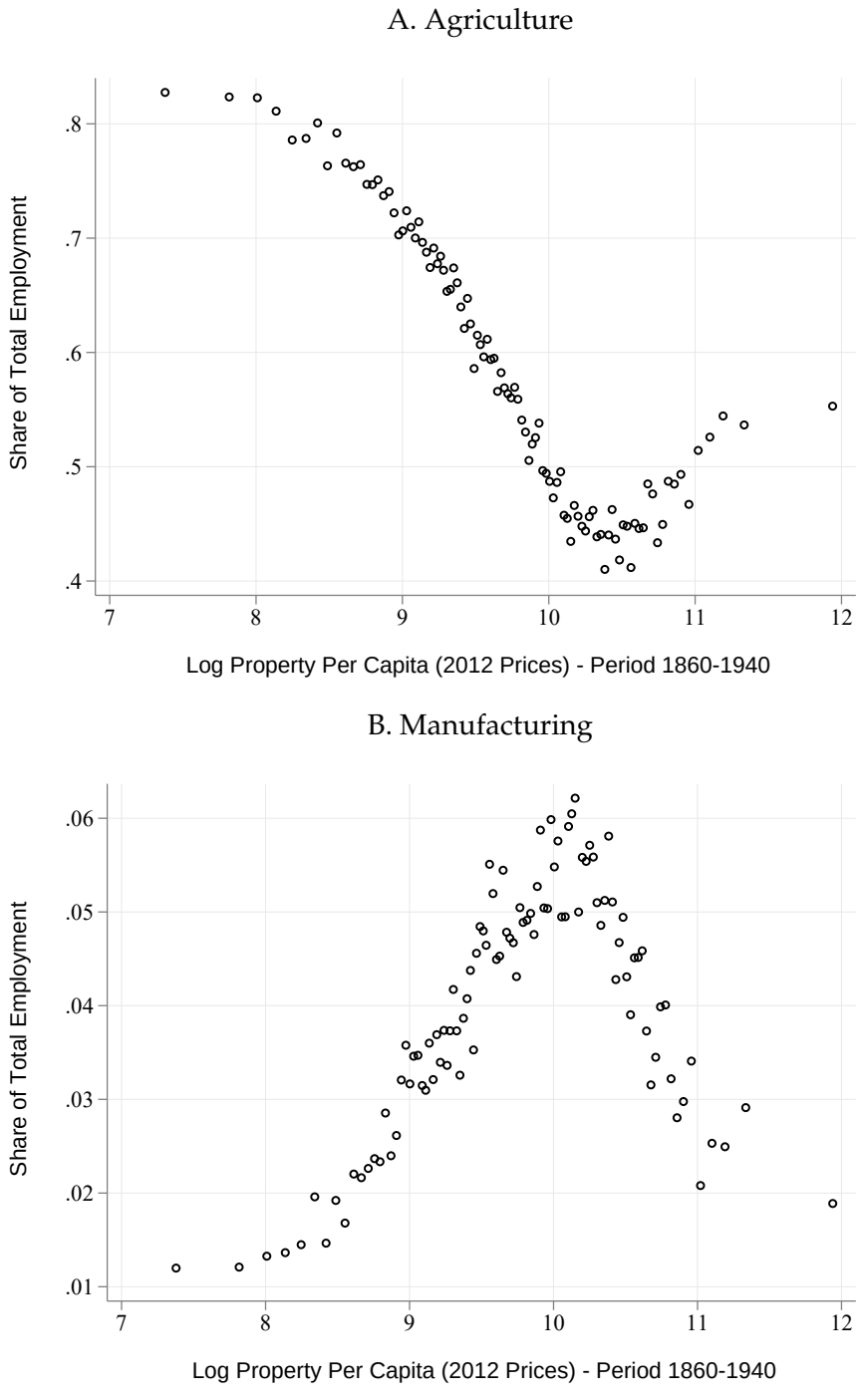
Notes: The figure displays the yearly standard deviation of property per capita across counties for all counties (solid black line) and excluding Southern counties (grey line).

Figure A17: Evolution of Spatial Inequality across Counties Based on Share of National Property Owned by the Top 10%



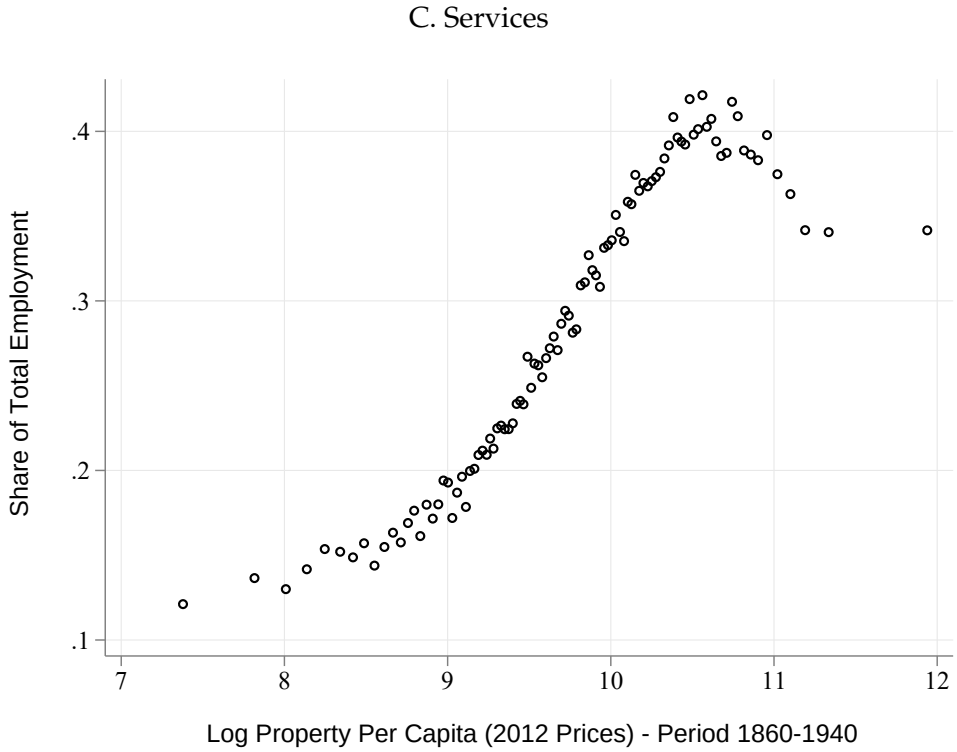
Notes: The figure displays the evolution of the share of national property owned by the top 10% wealthiest counties between 1860 and 1930. The balanced panel only keeps counties for which we have values for all decades between 1860 and 1930. The unbalanced panel keeps all counties.

Figure A18: 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 US 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 US dollars. Counties are ranked by this measure of log of property per capita in 100 bins pooling all years.

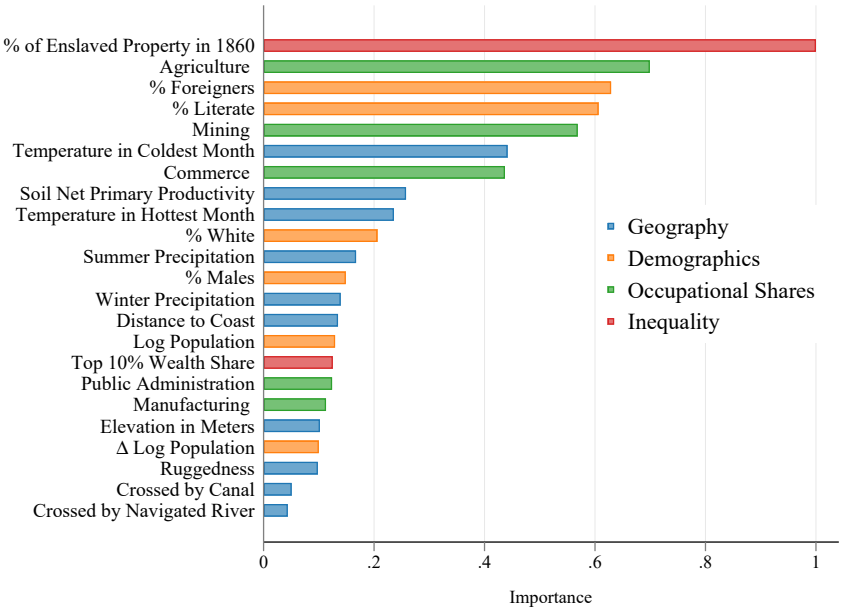
Figure A18: Structural Transformation Over the Course of Development: Occupational Shares in Total Employment and Log Property Per Capita by County



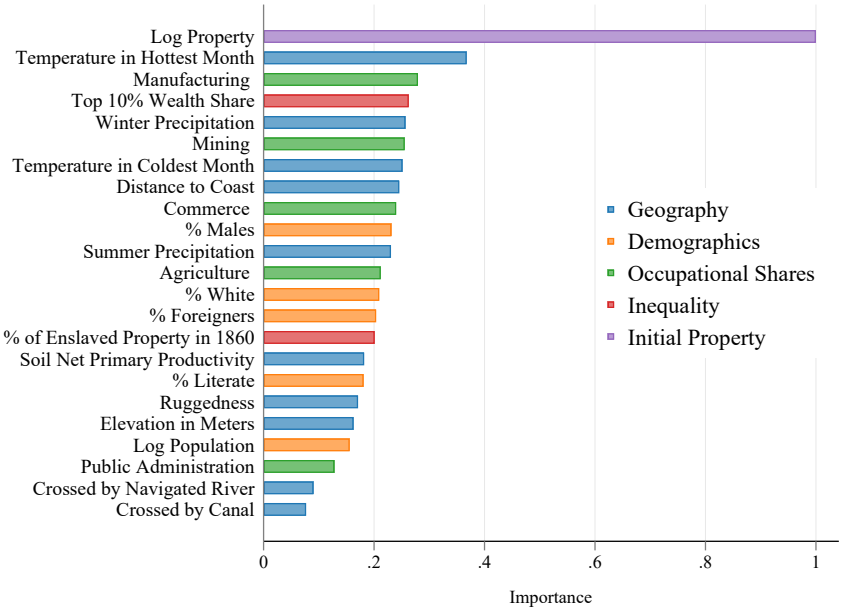
Notes: Panel C presents the relationship between the share of services in the total employment in the county and the log of the county property per capita expressed in 2012 US dollars for the period between 1860 and 1940. The service sector is built by adding the fraction of people working in business, 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 A19: 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 A20: 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.

Table A1: 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.

Table A2: 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 Total Household Property Value Per Capita	-0.217***	-0.327***	-0.395***	-0.414***	-0.732***	
	(0.008)	(0.011)	(0.013)	(0.012)	(0.024)	
A. Geography						
Temperature in Hottest Month		-0.035**	-0.008	-0.004	0.159***	-0.170***
		(0.014)	(0.015)	(0.015)	(0.048)	(0.055)
Temperature in Coldest Month		0.007	0.061***	0.048***	-0.002	-0.131***
		(0.012)	(0.013)	(0.013)	(0.038)	(0.041)
Summer Precipitation		-0.078***	-0.024***	-0.026***	-0.036**	0.026
		(0.006)	(0.006)	(0.006)	(0.016)	(0.021)
Winter Precipitation		-0.056***	-0.047***	-0.036***	-0.016	-0.035
		(0.010)	(0.011)	(0.010)	(0.025)	(0.026)
Ruggedness		-0.027***	-0.015*	-0.016**	-0.037*	-0.098***
		(0.007)	(0.008)	(0.008)	(0.020)	(0.023)
Elevation in meters		0.007	-0.004	-0.008	0.152***	-0.192***
		(0.011)	(0.011)	(0.011)	(0.040)	(0.049)
Soil Net Primary Productivity		0.029***	-0.000	-0.005	0.075***	0.005
		(0.007)	(0.008)	(0.008)	(0.023)	(0.027)
Distance to Coast		-0.006	0.019***	0.018**	-0.107***	0.065**
		(0.007)	(0.007)	(0.007)	(0.023)	(0.028)
Crossed by Navigated River		0.007	0.006	0.004	-0.004	0.097***
		(0.008)	(0.008)	(0.008)	(0.020)	(0.025)
Crossed by Canal		0.006	-0.006	0.007	0.020	-0.004
		(0.014)	(0.015)	(0.015)	(0.030)	(0.040)
B. Demographics						
% Literate			0.172***	0.156***	0.101***	0.203***
			(0.011)	(0.011)	(0.019)	(0.022)
% Foreigners			0.066***	0.060***	0.037***	-0.111***
			(0.008)	(0.007)	(0.013)	(0.018)
Log Population			-0.030***	-0.043***	0.037**	0.101***
			(0.007)	(0.007)	(0.016)	(0.021)
Δ Log Population			-0.236***	-0.234***		0.238***
			(0.024)	(0.023)		(0.065)
% Males			0.036***	0.030***	0.066***	0.211***
			(0.012)	(0.009)	(0.025)	(0.042)
% White			-0.008	-0.003	-0.059***	-0.102***
			(0.006)	(0.006)	(0.019)	(0.024)
C. Occupational shares:						
Public Administration				0.031***	0.027**	0.032**
				(0.004)	(0.011)	(0.014)
Manufacturing				-0.023***	-0.046***	-0.019
				(0.004)	(0.012)	(0.015)
Mining				-0.005	0.015	0.033**
				(0.004)	(0.012)	(0.016)
Commerce				0.006*	0.015	0.065***
				(0.004)	(0.010)	(0.013)
Agriculture				-0.045***	-0.087***	-0.069***
				(0.004)	(0.012)	(0.015)
D. Inequality						
Top 10% Wealth Share					-0.169***	0.133***
					(0.024)	(0.034)
% of Enslaved Property in 1860					-0.071***	-0.232***
					(0.027)	(0.041)
Observations	16,121	13,369	11,084	11,072	1,617	1,619
Number of units	3,067	2,518	2,517	2,517	1,617	1,619
Period Dep. Variable	1870-1920	1870-1920	1870-1920	1870-1920	1870-1930	1870
Adjusted R^2	0.33	0.38	0.45	0.46	0.58	0.62
Implied Convergence	0.025	0.040	0.050	0.053	0.022	

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 A3: 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 Total Household Property Value Per Capita	-0.405***	-0.434***	-0.461***	-0.479***	-0.734***	
	(0.010)	(0.011)	(0.013)	(0.012)	(0.025)	
A. Geography						
Temperature in Hottest Month		0.022	0.025	0.025	0.080	0.100
		(0.019)	(0.020)	(0.020)	(0.061)	(0.070)
Temperature in Coldest Month		-0.021	-0.010	-0.026	-0.059	-0.049
		(0.016)	(0.017)	(0.017)	(0.054)	(0.060)
Summer Precipitation		-0.004	0.003	-0.000	-0.004	0.006
		(0.010)	(0.010)	(0.010)	(0.028)	(0.032)
Winter Precipitation		-0.052***	-0.053***	-0.046***	-0.056*	-0.049*
		(0.009)	(0.011)	(0.010)	(0.029)	(0.029)
Ruggedness		-0.037***	-0.025***	-0.025***	-0.029	-0.072***
		(0.008)	(0.008)	(0.008)	(0.025)	(0.024)
Elevation in meters		0.055***	0.028	0.022	0.108*	0.061
		(0.016)	(0.018)	(0.018)	(0.057)	(0.059)
Soil Net Primary Productivity		0.030***	0.023**	0.016	0.046*	0.038
		(0.010)	(0.010)	(0.010)	(0.026)	(0.030)
Distance to Coast		-0.073***	-0.047***	-0.042***	-0.232***	-0.071**
		(0.011)	(0.011)	(0.011)	(0.030)	(0.035)
Crossed by Navigated River		0.017**	0.014*	0.011	-0.011	0.043**
		(0.008)	(0.008)	(0.008)	(0.018)	(0.021)
Crossed by Canal		0.041**	0.027*	0.031*	0.049	0.019
		(0.016)	(0.016)	(0.016)	(0.032)	(0.040)
B. Demographics						
% Literate			0.136***	0.121***	0.044**	0.177***
			(0.011)	(0.011)	(0.018)	(0.022)
% Foreigners			0.048***	0.042***	0.028*	-0.063***
			(0.009)	(0.008)	(0.015)	(0.020)
Log Population			-0.016**	-0.033***	0.073***	0.019
			(0.008)	(0.008)	(0.016)	(0.025)
Δ Log Population			-0.224***	-0.228***		0.384***
			(0.022)	(0.021)		(0.066)
% Males			0.038***	0.032***	0.057*	0.048
			(0.012)	(0.009)	(0.030)	(0.048)
% White			-0.015**	-0.012*	-0.038*	-0.196***
			(0.007)	(0.007)	(0.021)	(0.026)
C. Occupational shares:						
Public Administration				0.026***	0.011	0.044***
				(0.004)	(0.010)	(0.013)
Manufacturing				-0.012***	-0.029***	-0.006
				(0.004)	(0.011)	(0.014)
Mining				-0.001	-0.003	0.018
				(0.004)	(0.011)	(0.015)
Commerce				0.012***	0.015	0.061***
				(0.004)	(0.009)	(0.012)
Agriculture				-0.040***	-0.069***	-0.067***
				(0.004)	(0.011)	(0.013)
D. Inequality						
Top 10% Wealth Share					-0.095***	0.107***
					(0.023)	(0.031)
% of Enslaved Property in 1860					-0.061**	-0.182***
					(0.029)	(0.043)
Observations	16,121	13,369	11,084	11,072	1,617	1,619
Number of units	3,067	2,518	2,517	2,517	1,617	1,619
Period Dep. Variable	1870-1920	1870-1920	1870-1920	1870-1920	1870-1930	1870
Adjusted R^2	0.45	0.46	0.51	0.52	0.68	0.73
Implied Convergence	0.052	0.057	0.062	0.065	0.022	

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 A4: 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	**Occupational Shares**	Top 10% Share
Enslaved Property (Ψ)	-0.260 (0.072)	-0.189 (0.077)	-0.187 (0.090)	**-0.188** **(0.089)**	-0.158 (0.091)
Property in 1870	-0.515 (0.023)	-0.570 (0.025)	-0.639 (0.028)	**-0.672** **(0.029)**	-0.669 (0.029)
Controls:					
Geography		X	X	**X**	X
Demographics			X	**X**	X
Occupational Shares				**X**	X
Top 10% Share					X
Observations	862	862	862	862	862

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 A5: 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)	-2.539	-1.793	-1.619	**-1.861**	-1.934
	(0.166)	(0.185)	(0.196)	**(0.195)**	(0.253)
Property in 1870	-0.508	-0.659	-0.755	**-0.778**	-0.735
	(0.014)	(0.016)	(0.017)	**(0.017)**	(0.020)
Controls:					
Geography		X	X	**X**	X
Demographics			X	**X**	X
Occupational Shares				**X**	X
Enslaved Property					X
Observations	1797	1797	1797	1797	1568

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 A6: Mediation of the Effect of Top 10% Share of Property in 1870 on 60-Year Property Growth

	Estimated Λ from specification (4): -1.861
Mediators	Change in Estimated Λ when adding mediator to specification (4)	Fraction of Λ explained by mediator
Demographics:		
Δ % Literate	.456	18%
Δ % Foreigners	.073	3%
Δ Log(Population)	.003	0%
Δ Males	.007	0%
Δ White	.005	0%
Δ ***Occupational Shares***:		
Public Administration	.017	1%
Production	-.007	0%
Mining	-.025	-1%
Commerce	-.005	0%
Agriculture	.112	4%

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 A5 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. History

Property taxes in history There is evidence on land taxation in Egypt by already 3000BC which were levied in kind (i.e., agricultural product) rather than in cash (McGregor (1956) p.265) and in Greece as early as around 600BC (Seligman (1890) and Walker (1984) p.265). The Roman Empire seems to have attempted a general property tax without much success, reverting to land taxes (Walker (1984) p.265). The Danegeld was the first system of land taxation since the fall of the Roman Empire. First levied by King Aethelred of England to pay off viking invaders, it had by 1014 become "a nationwide tax, collected on the systemic basis for the maintenance of a foreign fleet." (Cohen (2018) p.20). In 18th and 19th century England, the Land Tax was a major financing tool for government. In Colonial America, in addition to property taxes on land and enumerated items existed four other kinds of taxes (i) a poll tax on male adults; (ii) a faculty tax on high-earning occupations; (iii) tarifs; and (iv) an excise tax on consumption goods, in particular alcohol.

The early 1800s As a result of the 1842 recession, many states adopted constitutional provisions limiting or altogether prevent the use of public funds to invest in private corporations, and restricting public debt. See for instance the "Stop and Tax" policy in New York to ban state borrowing for internal improvement and preventing the state from investing in corporations following the economic collapse of 1837 (Einhorn (2008) p. 221. See Fisher (1996) pp. 51-56 for case studies of Ohio and Illinois after 1840. Lamoreaux and Wallis (2017) describe how this crisis in public finance led to the idea that laws should be general, contrary to the system of special laws prevailing until then.

Criticisms of the property tax in the early 1900s. Economists led the charge and were at the forefront of proposals for reforms to the GPT (see Seligman (1890); McPherson (1907) for a summary of criticism, and Ely (1888); Jensen (1931); Bullock (1916*b*); Lutz (1921) for reviews and reform proposals. Another popular proposal was a single tax on land championed by George (1882). Another criticism levied against the property tax was that the size of the administrative districts were small, which facilitated tax sheltering and rendered the valuation of property crossing jurisdictions (such as shares in the rail-

roads) difficult. In Boston, the inclusion of Roxbury and Dorchester in 1868 and 1870 led nonetheless to the migration of wealthy elites as tax rates were increased, and Boston was derided by contemporaries as "the heaviest taxed city in civilization." See also the debate over classification in Boston between David A. Wells (in favor of taxing real estate only) and Thomas Hill, described in Maggor (2017), in particular pp. 74-95.

II.2. Tax base.

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).

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) p. 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).

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.

II.3. Tax administration

In U.S. Census Bureau (1902) (p. 617) it is stated that "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." 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. Taxes were collected on a tax day. The property tax was levied at the place and at the value it has on a specific day of the year. 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.

II.4. Assessment ratios

The **Census Bureau** conducted decennial investigations to precisely estimate the 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 by the Census.

In 1850, 1860, and 1870, US 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, and referred precisely to that assessment ratio described above. 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 properties. For real property, they separately appraised the value of real property used for farming and manufacturing purposes. Regarding residential real property, sought to recover the ratio of assessed to true value of real property by a fairly sophisticated process that is based on a variety of 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.[1]

(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).

(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.[2]

Regarding personal property, a measure of true value was appraised by census enumerators directly for livestock,[3] farm equipment, manufacturing machinery,[4] gold and silver.[5] The true value of other classes of property, such as railroads, street railways, or canals, was also separately ascertained by the Census.

A similar approach 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.

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

[2]A sixth test is employed to verify the assessment ratio obtained through indirect methods 2-5, but only applies to counties.

[3]Using values from the Department of Agriculture.

[4]using values from the Census of manufactures.

[5]Using values from the Director of the Mint.

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 as explicit objective 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.

III. Data Appendix

III.1. Census (IPUMS USA Full Count) Data at the County and State Level

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. 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 1850, we consider the ratio between personal and real wealth:

$$\rho_{c,1860} = \frac{W^{pers}_{c,1860}}{W^{real}_{c,1860}} \ , \ \rho_{c,1850} = \frac{W^{pers}_{c,1850}}{W^{real}_{c,1850}} \tag{1}$$

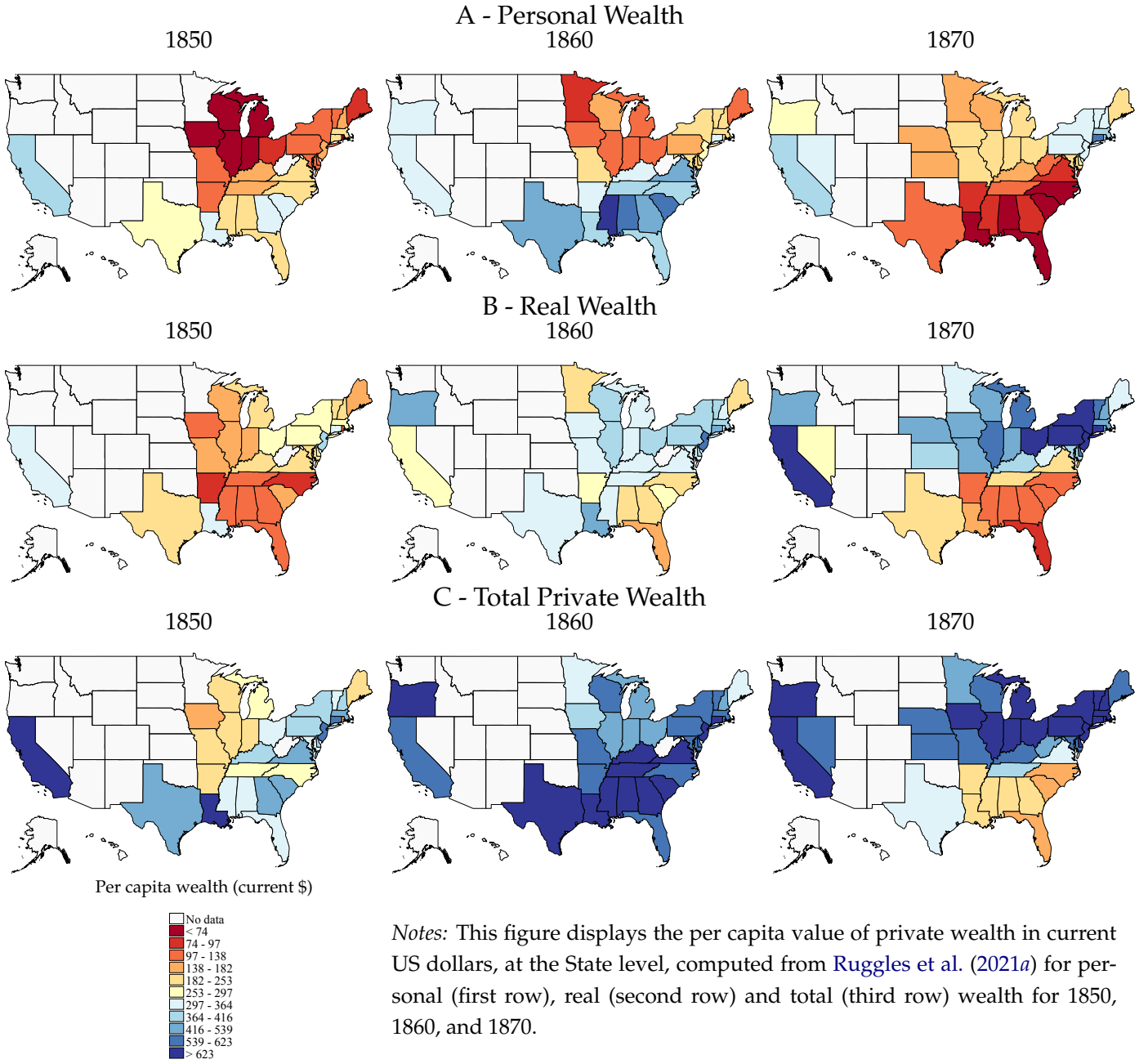
We consider that this ratio is constant over time : $\rho_c = \rho_{c,1860} = \rho_{c,1850}$. With available IPUMS USA full count data, we are able to compute $\rho_c = \rho_{c,1860}$, and then to retrieve:

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

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.

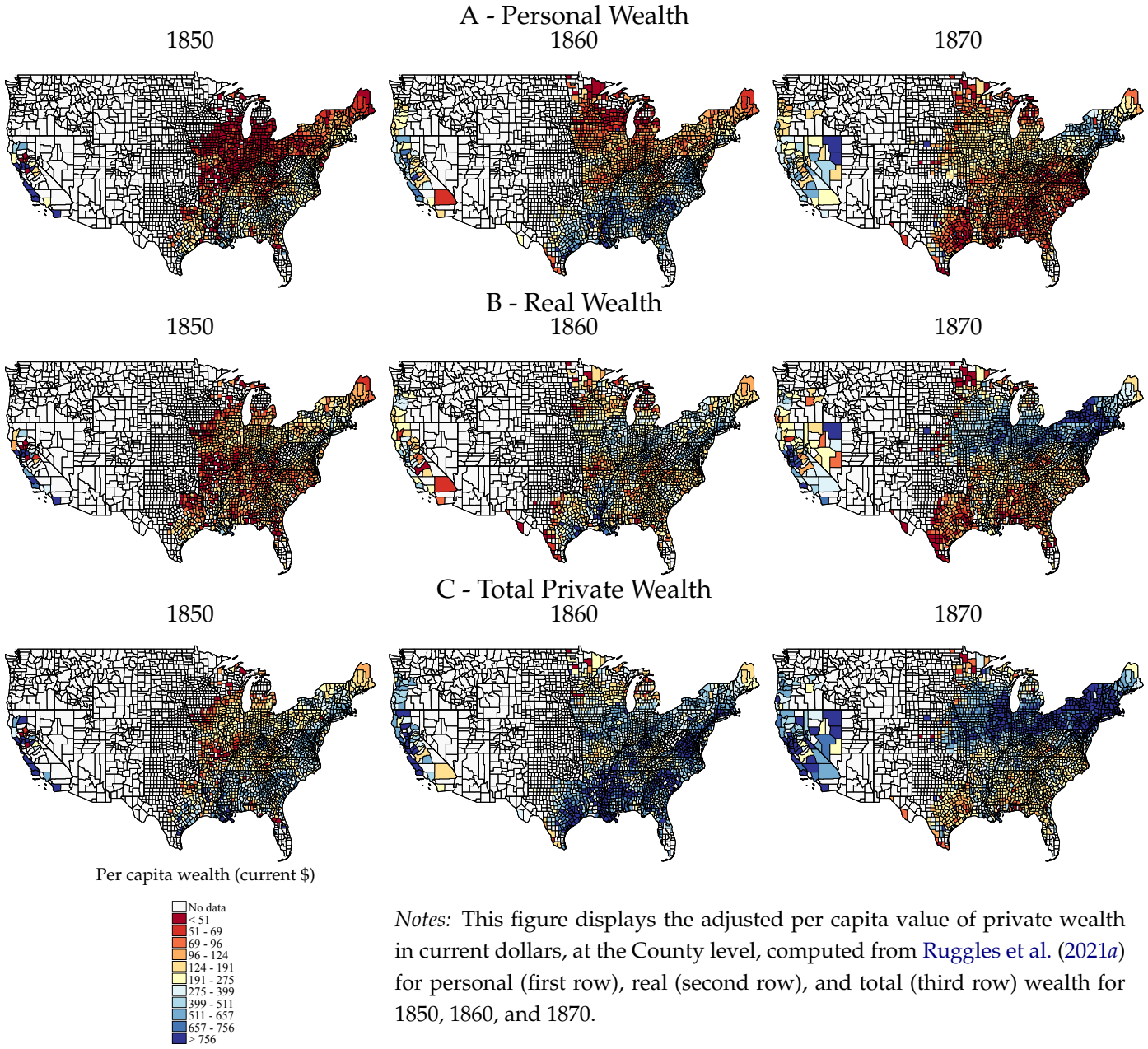
Figure A21 shows private wealth from the IPUMS USA Full Count raw data series at the state level and Figure A22 shows private wealth at the county level between 1850 and 1870.

Figure A21: 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 US 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 A22: 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.

III.2. 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 A7. Piketty and Zucman (2014) use prices of $800 for 1850 and $1000 for 1860. For these same years, Einhorn (2008) 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) (Nota Bene p. 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), an issue we return to in Appendix III.3.

Table A7: Prices Estimates of Enslaved Persons 1810-1860

Series	U.S. Census Bureau (1870)	Piketty and Zucman (2014)	Einhorn (2008)	Ransom and Sutch (1988)
1810	-	500	265	277
1850	250	800	401	377
1860	420	1000	774	778

Notes: Column 3 (Einhorn, 2008) corresponds to a 3-year average of Ransom and Sutch (1988).

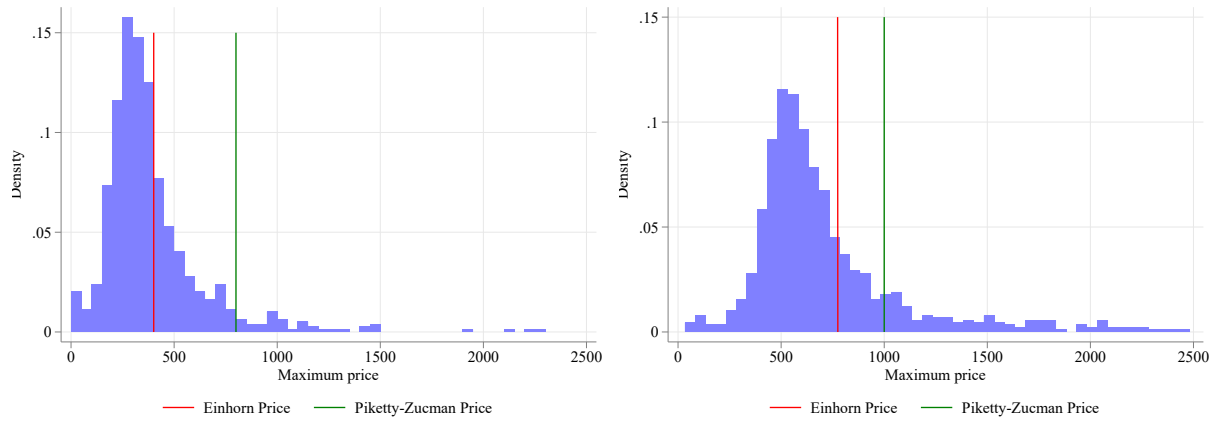
States do not typically separately report their property from enslaved people in their annual state reports. The exceptions are Georgia (from 1860 to 1864) and Texas (from 1846 to 1861 and in 1864). Those property values imply an enslaved person price of $306 and $584 in Texas in 1850 and 1860, and $655 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 (2008).

To get a sense of possible bounds on the price of enslaved people, Figure A23 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 (2008) 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.

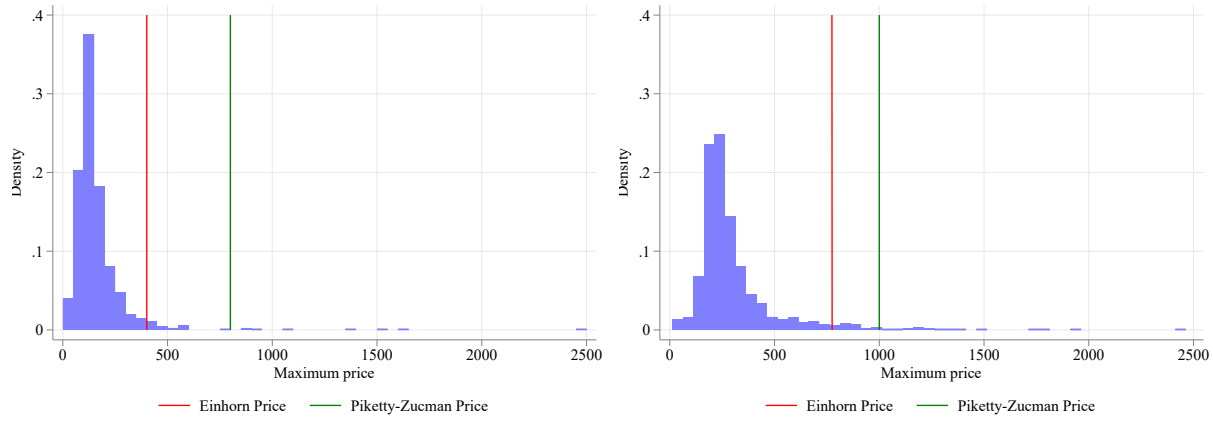
Figure A23: Distribution of the Upper Bounds on Prices of Enslaved People

A - Wealth from Enslaved People = 100% of Personal Wealth

B - Wealth from Enslaved People = 50% of Personal Wealth



C - Wealth from Enslaved People = 20% of Personal Wealth



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 (2008) 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 et al. (2010) and Gibson and Jung (2002) and multiply it by a given price for each year. We call this variable *Val. Enslaved*. Our benchmark case uses the prices from Einhorn (2008), available for each decade from 1810 to 1860, which we linearly interpolate.

Figure A13 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.

III.3. State Level property data

III.3.1. General approach for the construction of assessment ratios and market value of wealth

Assessed value of property. For each state, we start from a harmonized series measuring the total assessed value of property compiled from State reports (mainly reports from the Auditor, the Board of Equalization, or the State Tax Commission), the Census *Wealth, Debt, Taxation* publications, and *Financial Statistics of States* series. Table A10 provides a list of the sources for the assessed property measures for each state. We reconstructed a measure of total assessed property value typically since around after statehood to 1930. When multiple sources were available, we prioritized assessed values reported in the Financial Statistics of States and State reports.

In very few cases (128 observations out of 3,409), when no other information was available, we estimated the assessed value of property using 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. 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).

Next, we estimate the total 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.

Assessment ratios. We systematically collected information on the assessment ratio using (i) the assessment ratio calculations done by the Census Bureau over the period 1850 - 1922 in the *Wealth, Debt, Taxation* reports; (ii) State reports; (iii) secondary sources (especially Jensen (1931)) and the proceedings of the National Tax Association conferences from 1907 to 1925). We also collected information on assessment ratios given by state tax officials between 1915-1930, but given their self-reported nature and the Census characterization of these ratios as being "only approximately correct" (Census 1921, p. 21), we only use them in special cases to validate our estimates from other sources, as detailed for each state in Section III.3.2.

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

1. Start from the Census ratios available for approximately one year per decade from 1850 to 1920, and linearly interpolate in between them.[6]

2. Add information on assessment ratios used in practice provided by State reports, in the legislation, and secondary sources, which are due to changes in the assessment basis used by assessors. This information helps us better identify the timing of changes in assessment ratios. For instance, suppose that for state s, the Census provides an assessment ratio of value a_1^s in 1890 and of value a_2^s in 1900. We check the legislation and secondary sources for state s and find out that there was a legislation related to property tax enforcement in 1986. We will thus be able to infer that the value of the assessment ratio changed from a_1^s to a_2^s in 1896 (rather than assuming that this change happened in 1900, the first year in which we see the new assessment ratio). Many times, we can validate the timing by noting that there are sharp breaks in the assessed values of property exactly in the same year as the legislation.

3. If there are remaining breaks in the time series of assessed property per capita for which we cannot find any explanation in State reports, legislations and secondary sources used in (2), we adopt the following procedure. Suppose the assessment ratios constructed by the Census are different in t and $t+1$ (i.e., in the decadal

[6]For 1880 and 1902, the Census 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.3.2.

publications) and equal to $a_t = a_1$ and $a_{t+10} = a_2$ respectively. If we see a break in the series of assessed property in $t + x$ where $x \leq 10$, we assume that the change in assessment ratio from a_1 to a_2 happened in year $t + x$, so that we set $a_n = a_1$ for $t \leq n < t + x$ and $a_n = a_2$ for $t + x \leq n \leq t + 10$.

4. For the remaining breaks in the assessed values, when we observe a break in the assessed property series, but find no other information, we apply state-by-state adjustments based on information from self-reported assessment ratios by tax assessors in the Census *Financial Statistics of States*. However, given the self-reported nature of this information, we only use it to infer changes in assessment ratio trends, but do not trust the levels reported.

Computing wealth from enslaved people and correcting for the under-valuation of wealth from enslaved people at the state level. As explained in Appendix III.2, 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 using actual market prices. We use the prices from Einhorn (2008) to multiply the number of enslaved people at the state level, as explained in Appendix III.2, which gives us the variable *Val. Enslaved*.

We also need to first subtract the (underestimated) value of wealth from enslaved people from the 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. We then add *Val. Enslaved* to the value of property at the state level.

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.2, Table A7, which we can use for robustness instead of the prices in Einhorn (2008). Figure A5 shows the state-level wealth using these alternative prices. The picture remains similar in terms of the spatial distribution and time trends.

Computing property series excluding enslaved property. To obtain the series of private wealth at the county and state levels excluding wealth from enslaved people, we simply subtract *Val. Enslaved* from the (corrected) total property series.

III.3.2. 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 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, and 1904 - 1912
- Use 1880 Census ratio for 1871 - 1886
- Use 1890 Census ratio for 1887 - 1893
- Use 1900 Census ratio for 1894 - 1900
- Use 1912 Census ratio for 1912 - 1919
- Use 1922 Census ratio for years 1920 and later

Alaska

- Use 60% assessment ratio indicator in State records (Survey of Taxation 1938, page 31)

Arizona

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, and 1890 - 1900
- Use 1900 Census ratio for 1900
- Use average of 1900 and 1904 Census ratio for 1901 - 1903
- Use 1904 Census ratio for 1904
- Use 25% assessment ratio for 1905 - 1911
- Use 1912 Census ratio for 1912

- Use 1922 Census ratio for 1913 - 1922
- 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 - 1902, 1902 - 1904, and 1904 - 1912
- Use 1912 Census ratio for 1912 - 1921
- Use 1922 Census ratio for years 1922 and later

California

- Use 1860 Census ratio for years 1860 and earlier.[7]
- Linearly interpolate between Census ratios for 1860 - 1870, 1880 - 1890, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1870 Census ratio for 1870 - 1871
- Use higher assessment basis from the 1860 Census ratio in 1872 to account for changes in assessment methods following the creation of the Board of Equalization as noted in the reports of the Board of Equalization in 1873 (pp. 4-5) and 1880 (p. 10).
- Linearly interpolate between 1872 and 1880 Census ratio
- Use 1922 Census ratio for years 1922 and later

Colorado

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios between 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, 1890 - 1900, 1902 - 1904, and 1904 - 1912
- Use 1900 Census ratio for 1900 - 1901
- Use 1922 Census ratio for 1913 - 1922
- Use 1922 Census ratio for years 1922 and later

[7] We rely on the 1860 Census ratios instead of 1850 as the wealths estimates of 1850 underestimated the value of wealth in California compared to the assessed valuation.

Connecticut

- Use 6% assessment ratio used in 1808 to report full assessed values in the tax list[8] for year 1790 - 1820.
- Use 4.4% assessment ratio for 1821 - 1827, Use 4% for 1828 - 1844, and 3.6% for 1845[9]
- Use 1850 Census ratio for 1850 and linearly interpolate assessment ratio between 1846 and 1850
- Linearly interpolate between 1850 and 1861 using 1850 and 1860 Census ratios, and following the same trend for 1861
- Use 1870 census ratio for 1862 - 1870, following change to the legal basis of assessment (reporting of full value of property in the grand list in 1862)
- Linearly interpolate between Census ratios for 1870 - 1880, 1880 - 1890, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1922 Census ratio for years 1922 and later

Delaware

- 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, 1904 - 1912[10], and 1912 - 1922
- Use 1904 Census ratio for 1901 - 1911
- Use 1922 Census ratio for years 1922 and later

[8]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).

[9]We chose these ratios to account for (i) discontinuous drops in aggregate valuation of property in the grand list at these threshold years, (ii) the decline in assessment ratios between 1808 (6% as indicated by State records) and 1850 (3% as estimated in Census reports).

[10]We ignore the 1902 Census ratio as it is inferred from tax rates therefore less precisely estimated, and its value is widely different from the 1904 Census ratio

District of Columbia

- 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

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, 1904 - 1912, and 1912 - 1922
- Use 1900 Census ratio for 1900 - 1901, 1902 Census ratio for 1902, and 1904 Census ratio for 1903 - 1904
- Use 1922 Census ratio for years 1922 and later

Georgia

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1880 - 1890, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1860 Census ratio for 1860 - 1864
- Use 1870 Census ratio for 1865 - 1874
- Use 1880 Census ratio for 1875 - 1880
- Use 1921 ratio in the Financial Statistics of States for 1921
- Use 1922 Census ratio for years 1922 and later

Hawaii

- Use 1930 ratio in the Financial Statistics of States throughout (the Census Wealth, Debt, Taxation reports did not estimate the property of Hawaii)

Iowa

- 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 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1922 Census ratio for 1922 - 1932, and 40% ratio for years 1933 - 1940

Idaho

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, and 1912 - 1922
- Use 1890 Census ratio for 1890 - 1898
- Use 1900 Census ratio for 1899 - 1900
- Use 1904 Census ratio for 1901 - 1906
- Use 30% assessment ratio for 1907 - 1910
- Use 1912 Census ratio for 1911 and 1912
- 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 - 1902, and 1902 - 1904
- Use 1870 Census ratio for 1870 - 1872
- Use 50% assessment ratio in 1873 and a linear interpolation with the 1880 Census ratio for 1874 - 1880 (to match the sudden jump in assessed valuation in 1873)
- Use 1904 Census ratio for 1904 - 1908
- Use 1912 Census ratio for 1909 - 1919
- Use 22% assessment ratio for 1920 - 1921

- Use 1922 Census ratio for 1922 - 1927
- Use 40 % assessment ratio for 1928 - 1921, and 33% for 1932 - 1940

Indiana

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, 1900 - 1902, 1902 - 1904, and 1904 - 1912
- Use 1900 Census ratio for 1891 - 1900
- Use 1912 Census ratio for 1912
- Use 25% ratio in 1918 based on State reports[11] and linear interpolation between 1912 and 1918
- Use 1922 census ratio for 1919 - 1922
- Use 1922 Census ratio for years 1922 and later

Kansas

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, and 1890 - 1900
- Use 1900 Census ratio for 1900, 1902 Census ratio for 1901 - 1902, and 1904 Census ratio for 1903 - 1904
- Use 16.5% ratio for 1905 - 1907[12] and 80% assessment ratio for 1908[13]
- Use 1922 Census ratio for 1922 - 1932, and 40% ratio for years 1933 - 1940

[11]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 estimat eof 25%. See for reference the discussion pp. 122-123.

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

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

Kentucky

- Use 1850 Census ratio for years 1850 and earlier
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1904 - 1912
- Use 1880 Census ratio for 1880 - 1886
- Use 1890 Census ratio for 1887 - 1899
- Use 1900 Census ratio for 1900 -1901, 1902 Census ratio for 1902, and 1904 Census ratio for 1903 - 1904
- Use 1912 Census ratio for 1912 - 1914, 55% for 1915 - 1917, and 66% for 1918
- Use 1922 Census ratio for 1912 - 1922 and later years

Louisiana

- 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 - 1902, 1902 - 1904, 1904 - 1912
- Use 1912 Census ratio for 1912 - 1919
- use 50% ratio for 1920 - 1921 (in line with Financial Statistics of States)
- Use 1922 Census ratio for 1922 and later years

Maine

- 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 - 1902, 1902 - 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 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1922 Census ratio for 1922 and later years

Massachusetts

- 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, 1904 - 1912, and 1912 - 1922
- Use 1922 Census ratio for 1922 and later years

Michigan

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1860 - 1870, 1870 - 1880, 1880 - 1890, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912
- Use 1850 Census ratio for 1850 - 1852
- Use 1860 Census ratio for 1853 - 1860
- Use 1912 Census ratio for 1912 - 1916
- Use 1922 Census ratio for 1917 - 1922
- Use 1922 Census ratio for 1922 and later years

Minnesota

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1860 - 1870, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912
- Continue 1860 - 1870 trend in assessment ratio for years 1870-1872

- Use 1890 Census ratio for 1874 - 1890
- Use 1900 Census ratio for 1900 -1901
- Use 1912 Census ratio for 1912 - 1920
- Use 1922 Census ratio for 1921 and later years

Mississippi

- 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 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 25% assessment ratio for 1915 - 1916 (Financial Statistics ratio for 1915)
- Linearly interpolate between 1912 - 1915
- Use 1922 Census ratio for 1917 - 1922
- Use 1922 Census ratio for 1922 and later years

Missouri

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1870 - 1880, 1880 - 1890, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912
- Use 1870 Census ratio for 1861 - 1870
- Use 1912 Census ratio for 1912 - 1920, 33.6% ratio for 1921 (Financial Statistics 1918), and 1922 Census ratio for 1922
- Use 1922 Census ratio for 1922 and later years

Montana

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, 1890 - 1912
- Use 1922 Census ratio for 1920 - 1922
- Use 1922 Census ratio for 1922 and later years

Nebraska

- Use 1860 Census ratio for 1860 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, 1890 - 1900, 1904 - 1912
- Use 1900 Census ratio for 1900 - 1903
- use 1912 census ratio for 1912 - 1919
- Use 16% ratio in 1920
- 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
- Use 1922 Census ratio for 1921 - 1922
- Use 1922 Census ratio for 1922 and later years

New Hampshire

- 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 1912 - 1922
- Use 1904 Census ratio for 1901 - 1911
- Use 1922 Census ratio for 1922 and later years

New Jersey

- 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 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1922 Census ratio for 1922 and later years

New Mexico

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1890 - 1900, 1904 - 1912
- Use 1880 Census ratio for 1880
- Use 1870 Census ratio for 1870 - 1879 and 1881 - 1882
- Use 1890 Census ratio for 1883 - 1890
- Use 1904 Census ratio for 1901 - 1904
- Use 1912 Census ratio for 1912 - 1915 and 55% for 1916 - 1921
- 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, 1900 - 1902, 1904 - 1912, and 1912 - 1922
- Use 1902 Census ratio for 1902 - 1902
- Use 1922 Census ratio for 1922 and later years

North Carolina

- 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 - 1902
- Use 1904 Census ratio for 1903 - 1904
- Linearly interpolate between 1904 - 1912, and continue trend until 1919, use 80% ratio in 1920 instead of full value basis in State reports.
- Use 1922 Census ratio for 1920 - 1922
- Use 1922 Census ratio for 1922 and later years

North Dakota

- Use 1890 Census ratio for 1890 or earlier years
- Linearly interpolate between Census ratios fro 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912
- Use 1912 Census ratio for 1912 - 1919
- Use 1922 Census ratio for 1920 - 1922
- Use 50 % ratio for 1923 or later years (ratio estimated by the Board of Equalization in 1932, page 95)

Ohio

- Use 1850 Census ratio for 1847 - 1849, and 33% ratio for 1846 or earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, 1890 - 1900, 1902 - 1904, 1904 - 1910[14], and 1912 - 1922
- Use 1900 Census ratio for 1901
- Use 1912 Census ratio for 1911
- Use 1922 Census ratio for 1922 and later years

Oklahoma

- Use 1890 Census ratio for 1890 and earlier years
- Linearly interpolate between Census ratios for 1890 - 1900, 1900 - 1904
- Continue trend of decline in assessment between 1890 - 1900 during 1905 - 1907: 17% in 1905, 14.5% in 1906, 11% in 1907
- Continue trend of decline in assessment between 1890 - 1900 during 1908 - 1912 after reform towards use full cash basis for assessment: 51.5% in 1908, 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

[14]One-third valuation basis cf WDT 1912 Assessed Valuation 1860 - 1912.pdf p. 28.

Oregon

- 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 40% ratio for 1905 - 1908
- Use 1912 Census ratio for 1909 - 1912
- Use 1922 Census ratio for 1922 and later years

Pennsylvania

- 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 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1922 Census ratio for 1922 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 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1880 - 1890, 1890 - 1900, 1900 - 1904, and 1912 - 1922
- Use 1880 Census ratio for 1871 - 1880
- Use 1912 Census ratio for 1909 - 1912 and 60% ratio for 1905 - 1908
- Use 1922 Census ratio for 1922 and later years

South Carolina

- 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 - 1902, 1902 - 1904, 1904 - 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
- 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 - 1902, 1902 - 1904, 1904 - 1912
- uUse 1860 Census ratio for 1860 - 1864
- Use 1870 Census ratio for 1865 - 1870
- Extrapolate declining trend 1904 - 1912 for 1913 - 1919
- Use 60% ratio in 1920 - 1921 (Tax Commission 1922, p. 28 about Legislation of 1919)
- 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 - 1902, 1902 - 1904

- Use 1904 Census ratio for 1904 - 1907
- Use 1912 Census ratio for 1908 - 1921
- 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
- Use 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 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912, and 1912 - 1922
- Use 1870 Census ratio for 1870 - 1889
- Use 1890 Census ratio for 1890
- Use 1922 Census ratio for 1922 and later years

Virginia

- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1880 - 1890, 1890 - 1900, 1904 - 1912, and 1912 - 1922
- Use 1870 Census ratio for 1870 - 1877
- Use 1880 Census ratio for 1878 - 1880
- Use average of 1900 and 1904 Census ratios for 1901 - 1903
- 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 - 1902, 1902 - 1904, and 1912 - 1922
- Use 1900 Census ratio for 1891 - 1900
- Use 1904 Census ratio for 1904 - 1905
- Use 1912 Census ratio for 1906 - 1912
- Use 1922 Census ratio for 1922 and later years

West Virginia

- Use 1870 Census ratio for 1870 and earlier years
- 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

- Linearly interpolate between 1905 (60% following creation of a Tax Commission[15]) and 1912 Census ratio
- Use 1912 Census ratio for 1912 - 1917
- Use 1922 Census ratio for 1918 and later years

Wisconsin

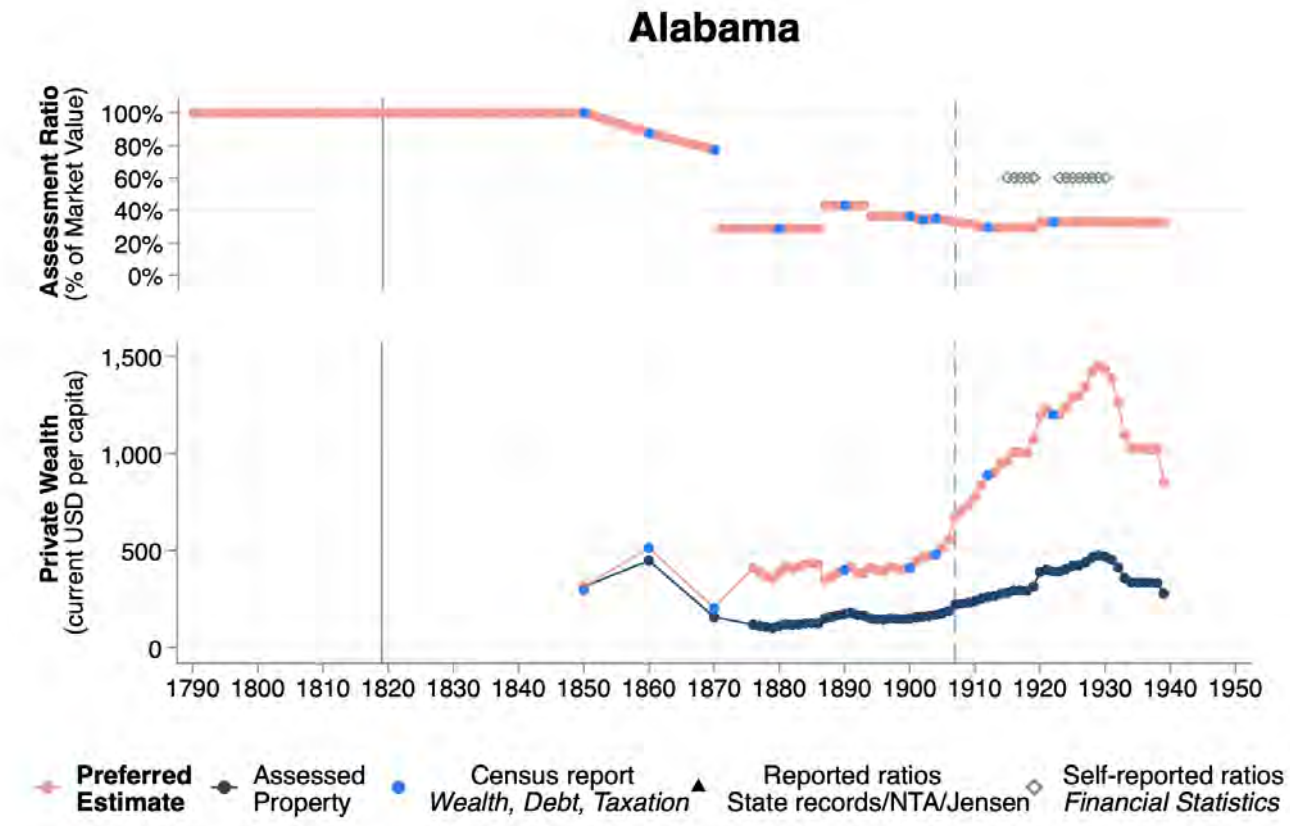
- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, and 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912
- Use 55% ratio for 1913-1921 and 1922 Census ratio for 1916 - 1922
- Use 1922 Census ratio for 1922 and later years

Wyoming

- Use 1870 Census ratio for 1870 and earlier years
- Linearly interpolate between Census ratios for 1890 - 1900
- Use 1870 Census ratio for 1870 - 1880
- Use 1890 Census ratio for 1881 - 1890
- Use 1900 Census ratio for 1900 - 1904
- Use 1904 Census ratio for 1905 - 1908
- Use 1912 Census ratio for 1909 - 1913
- Use 1922 Census ratio for 1914 - 1919 and 1922
- Use 60% ratio for 1920 - 1921 and 70% ratio for 1923 - 1940 (Financial Statistics of States for 1921 and 1923 - 1930 respectively)

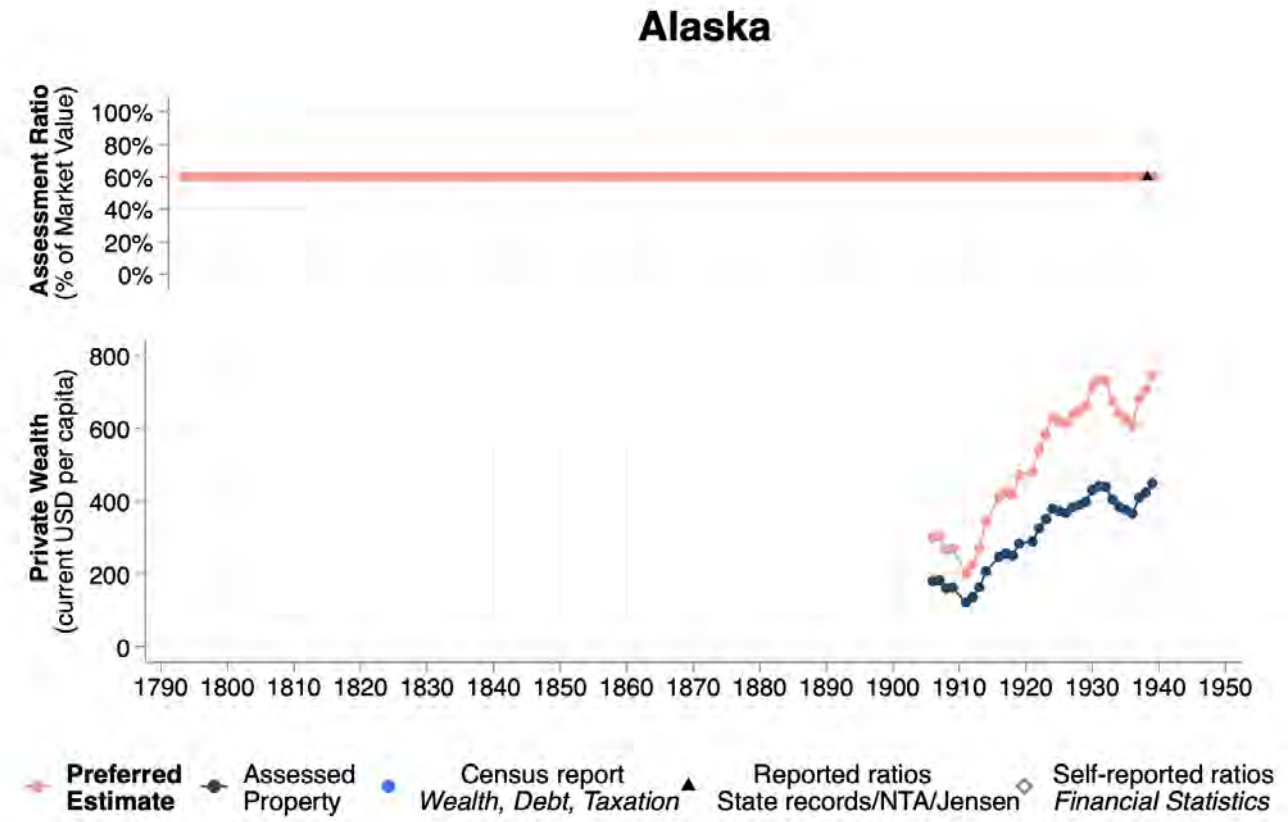
[15] Digest NTA p. 17

Assessed Property Value, Assessment Ratio and Private Wealth
Alabama



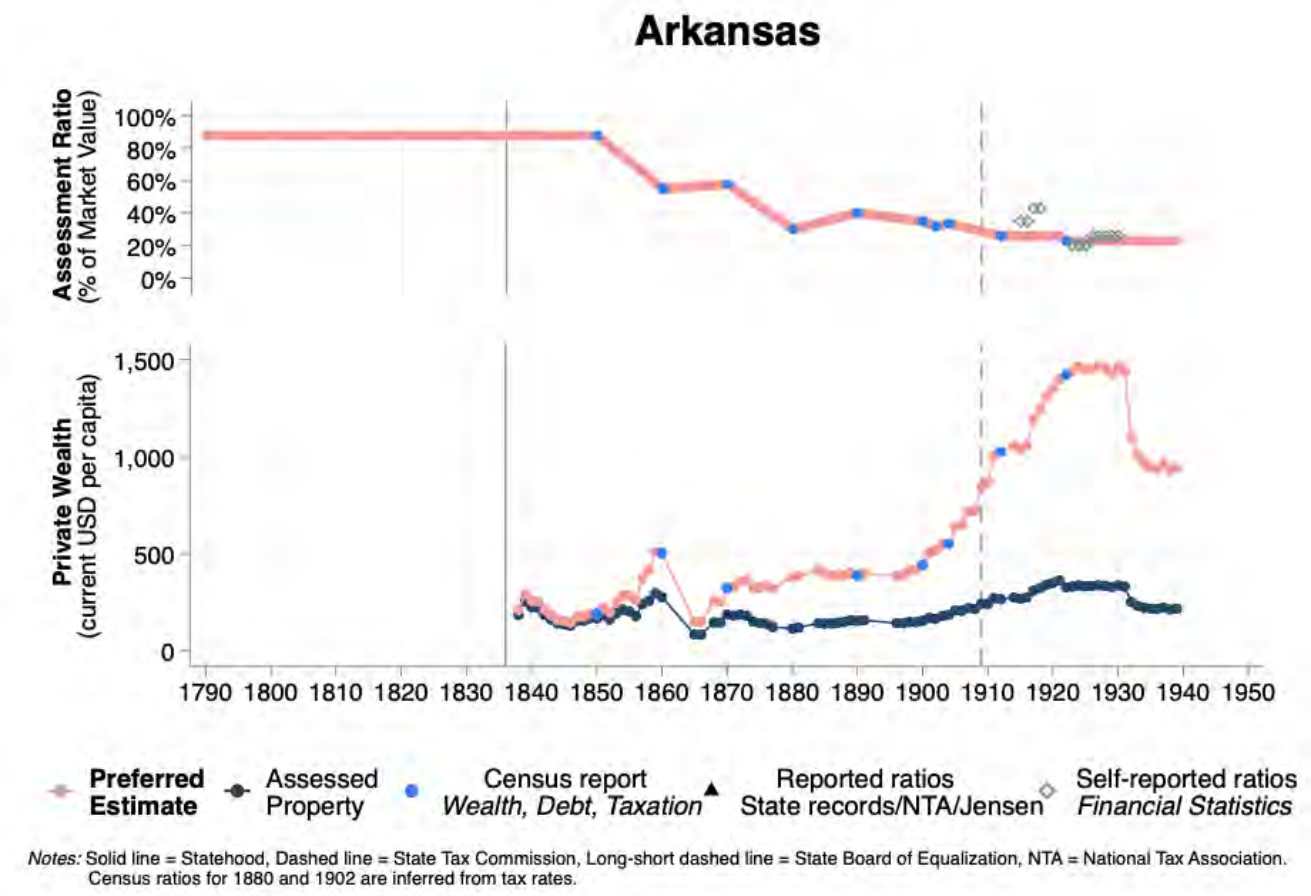
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Alaska



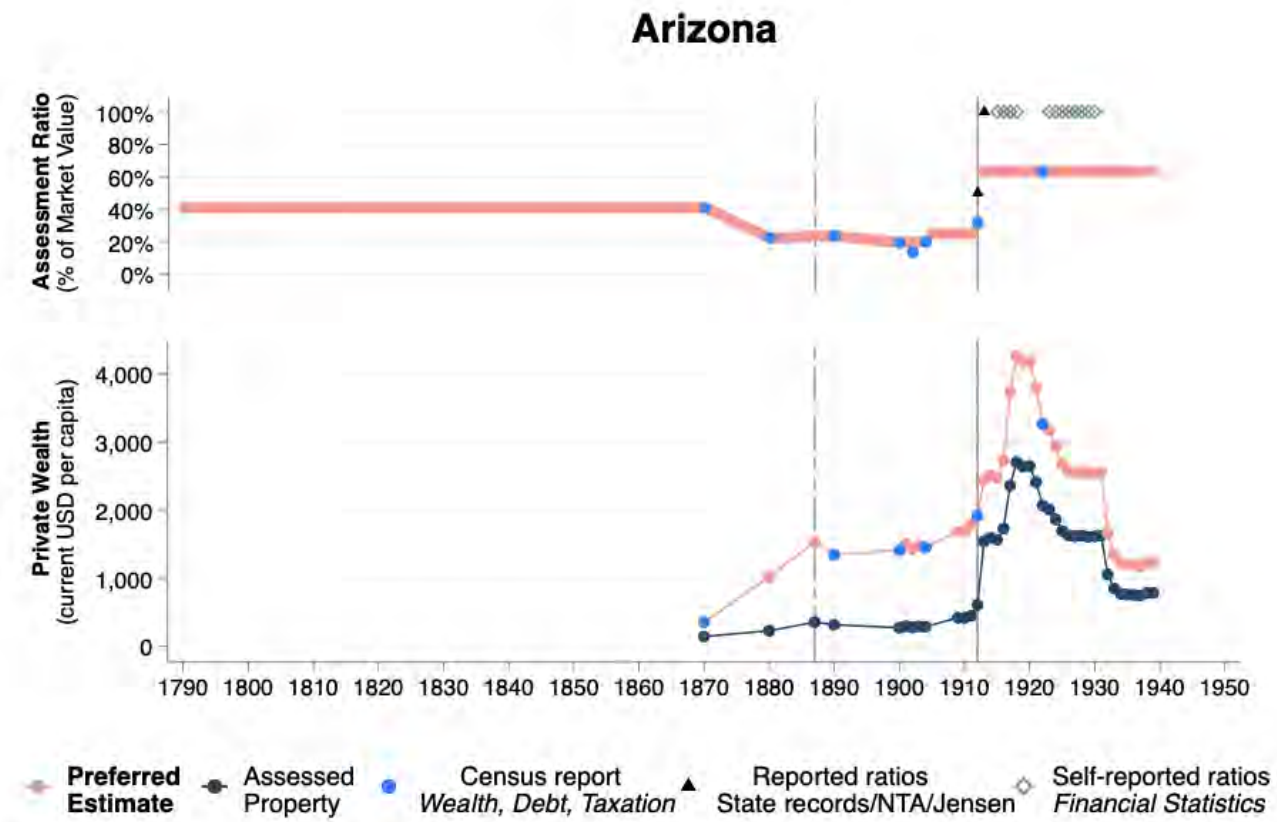
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Arkansas



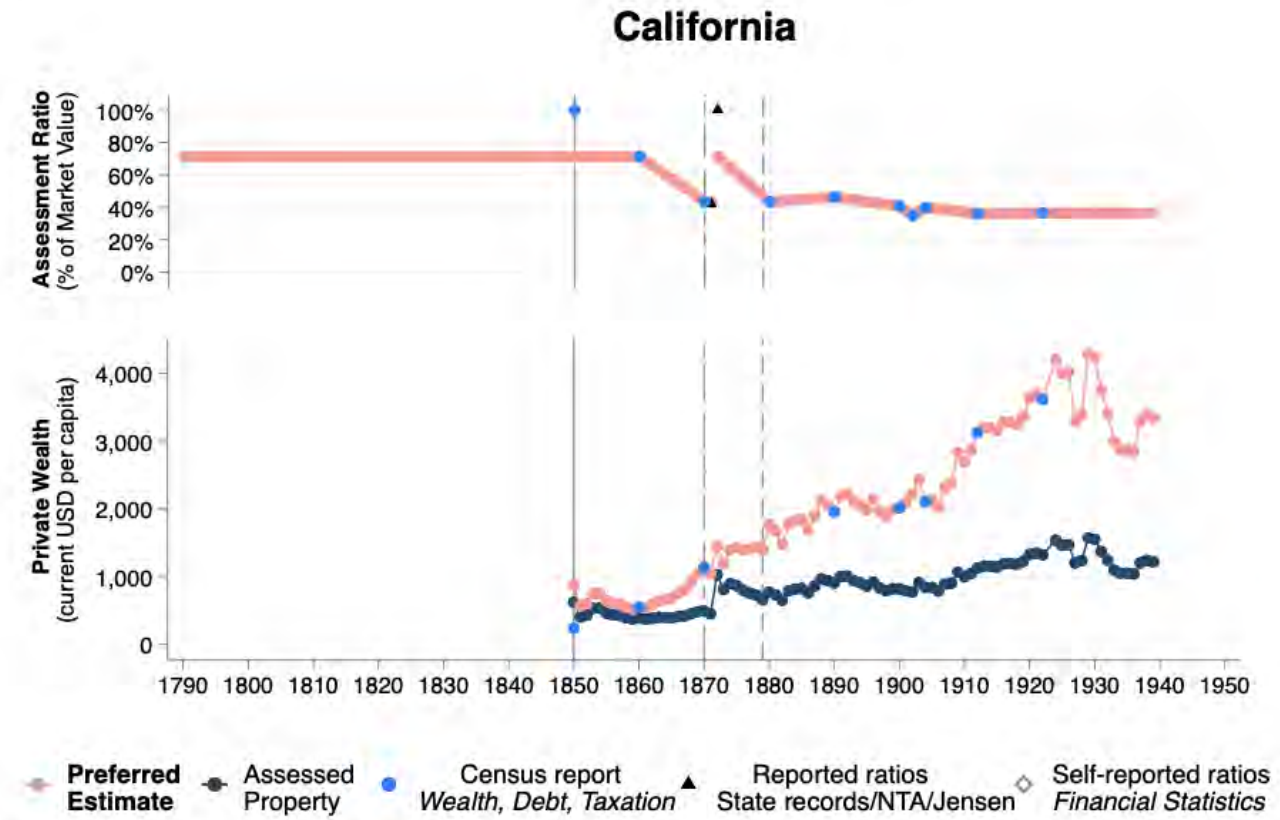
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Arizona



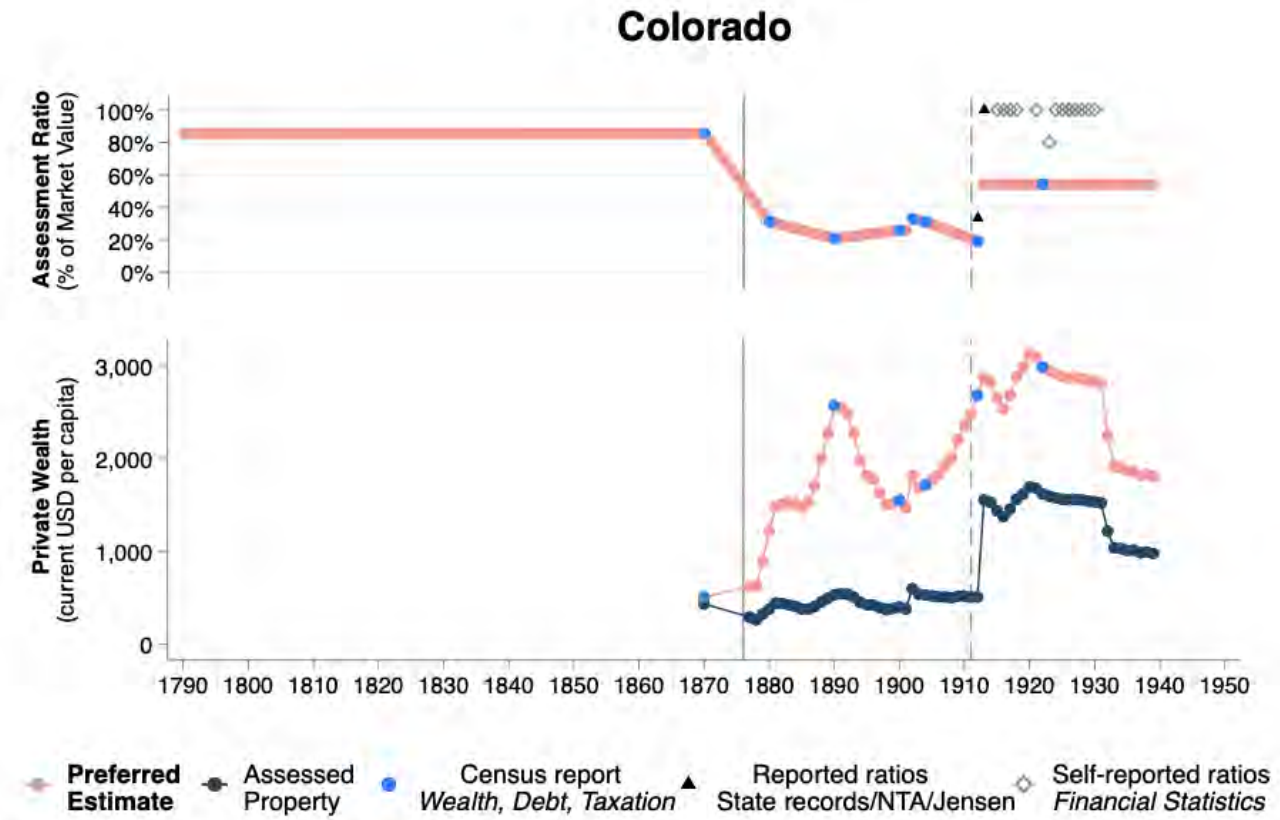
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

California



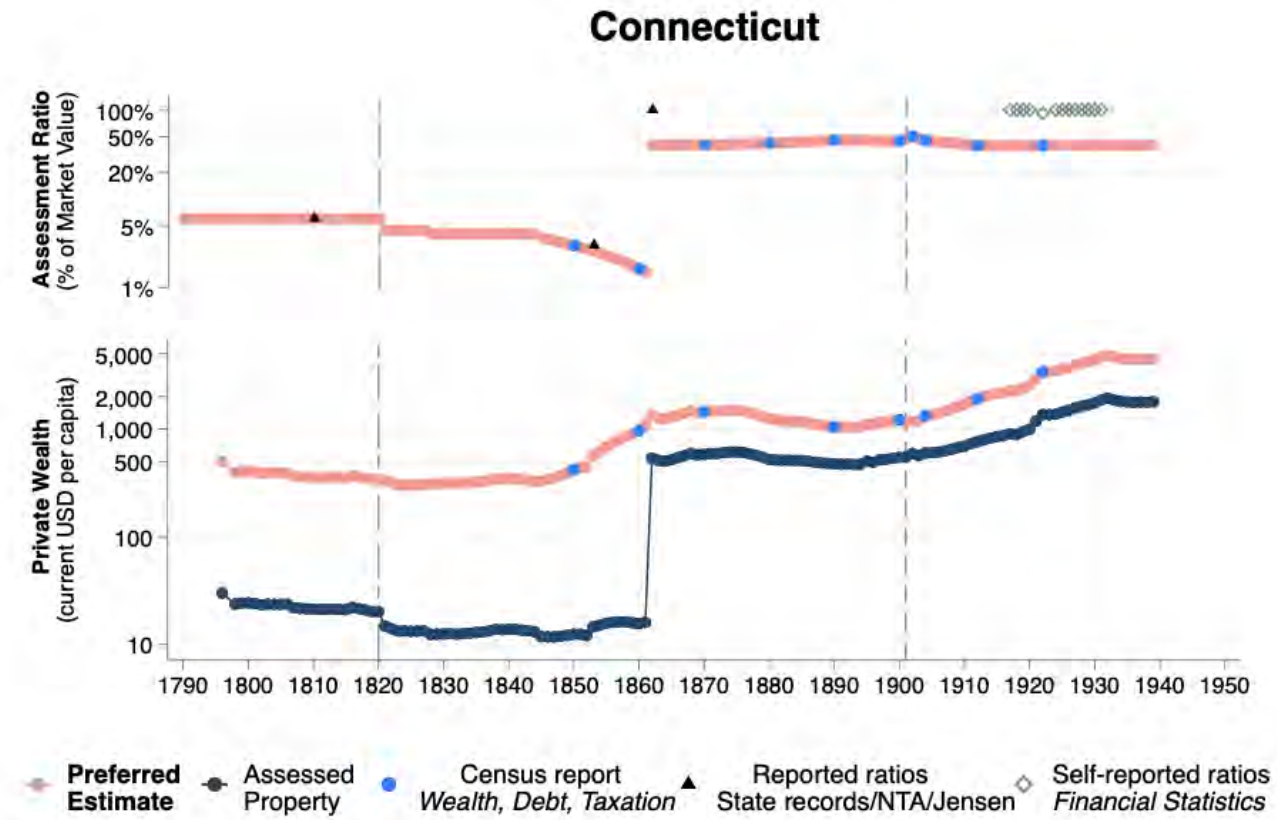
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Colorado



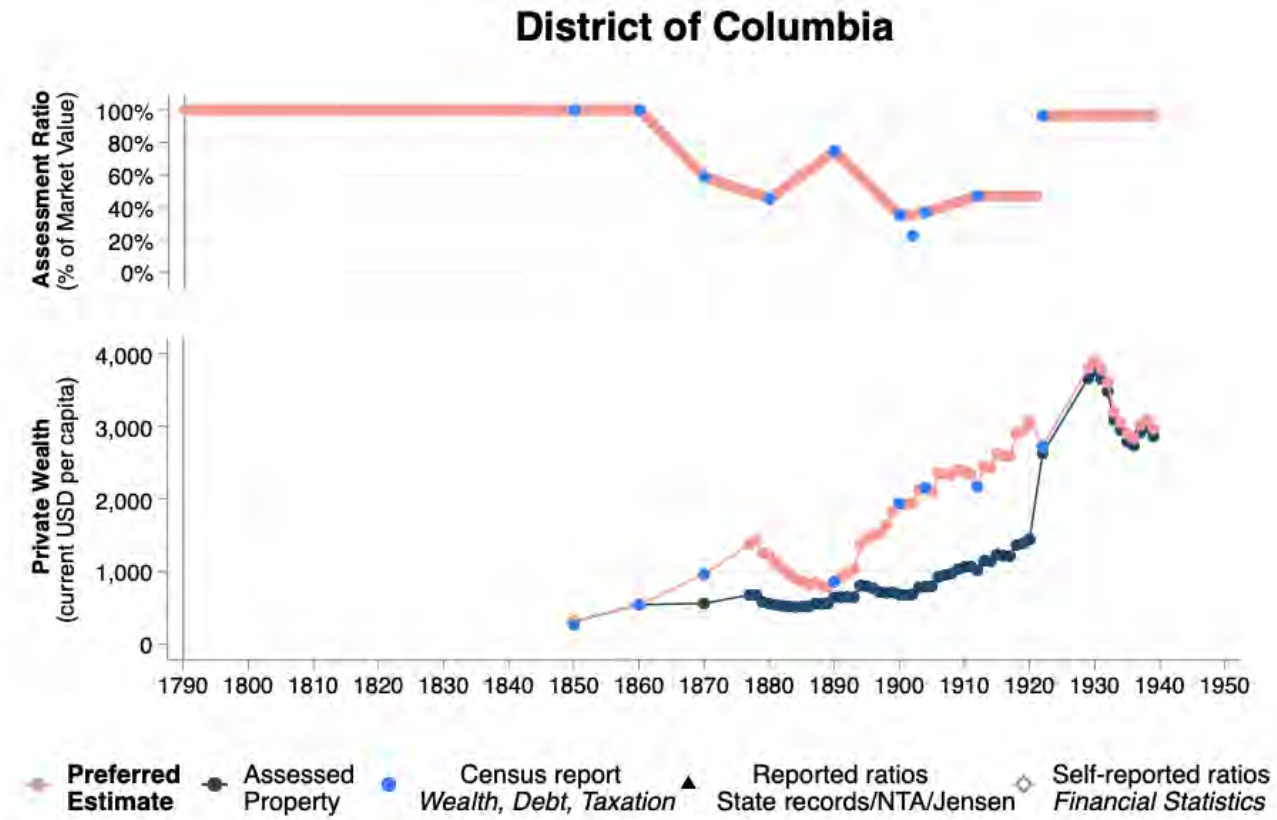
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Connecticut



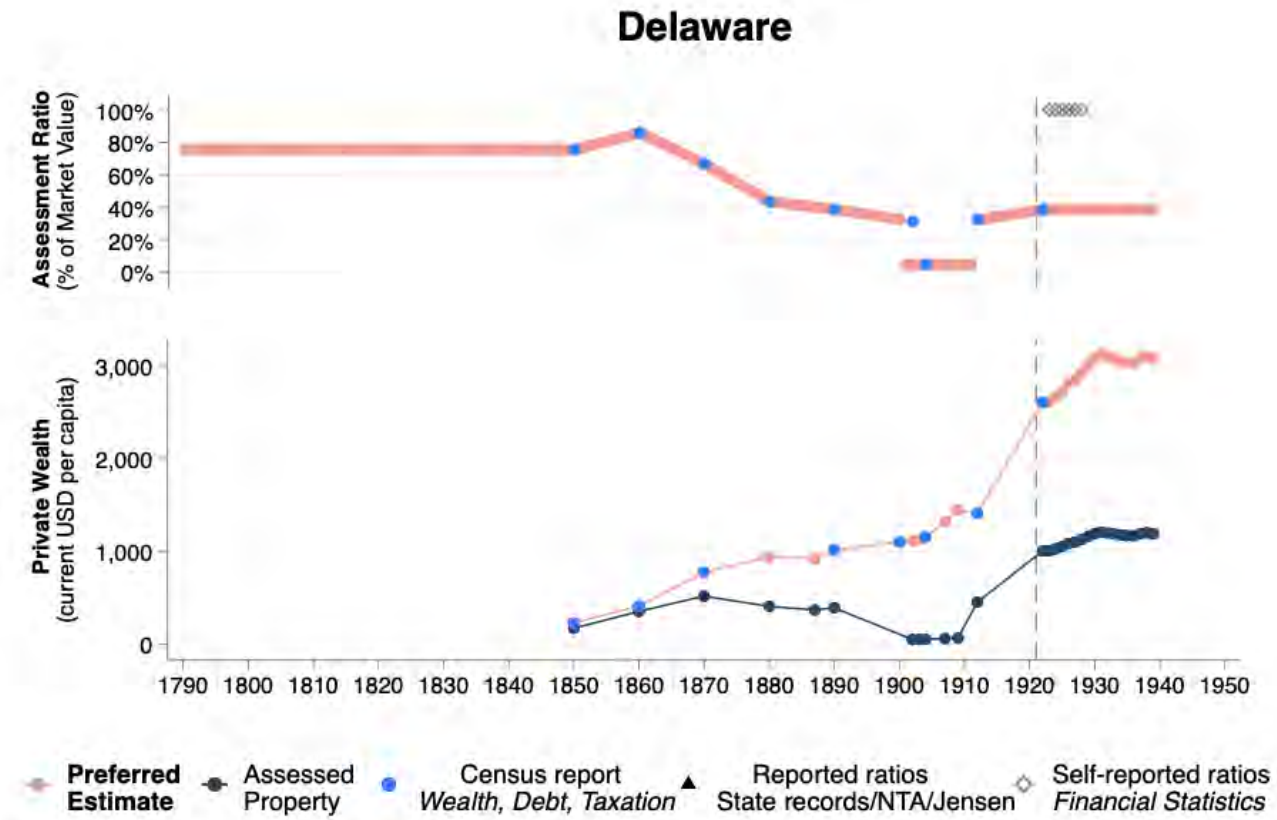
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

District of Columbia



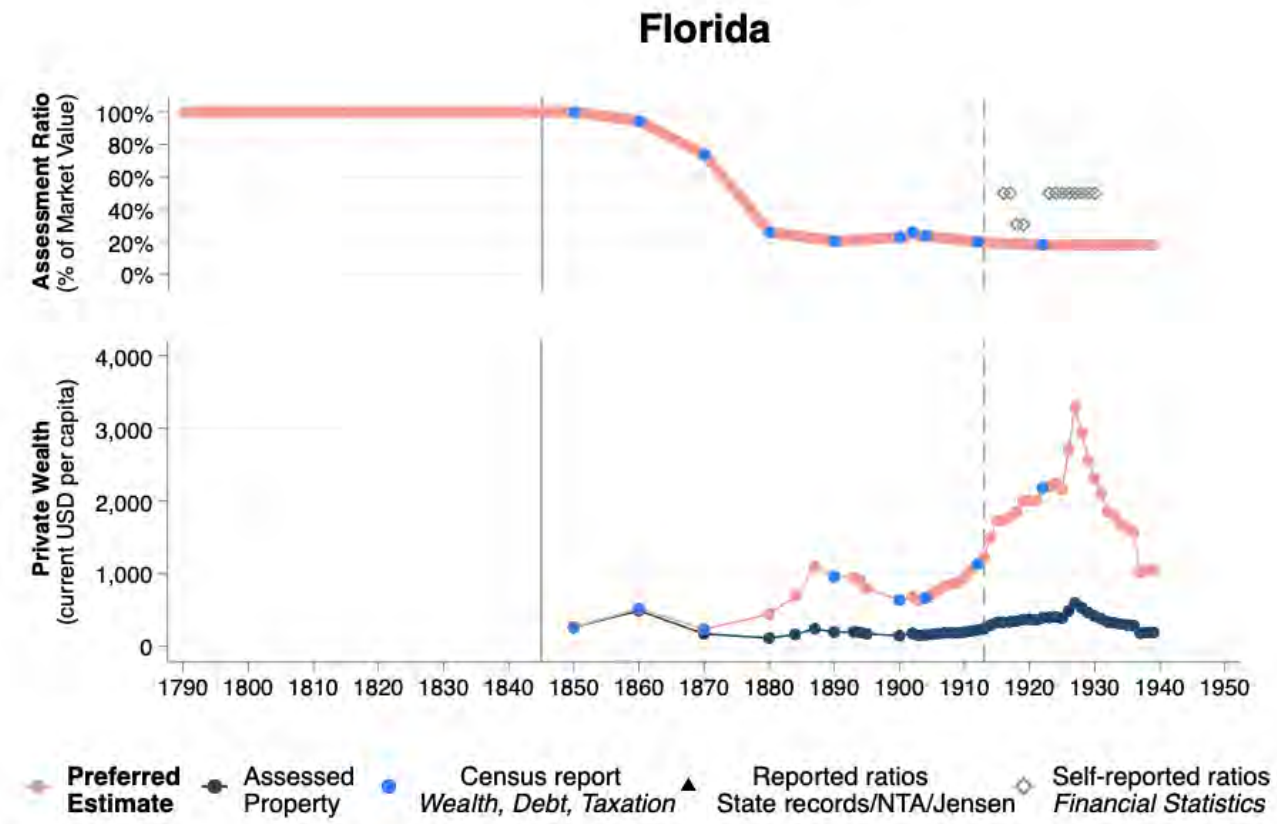
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Delaware



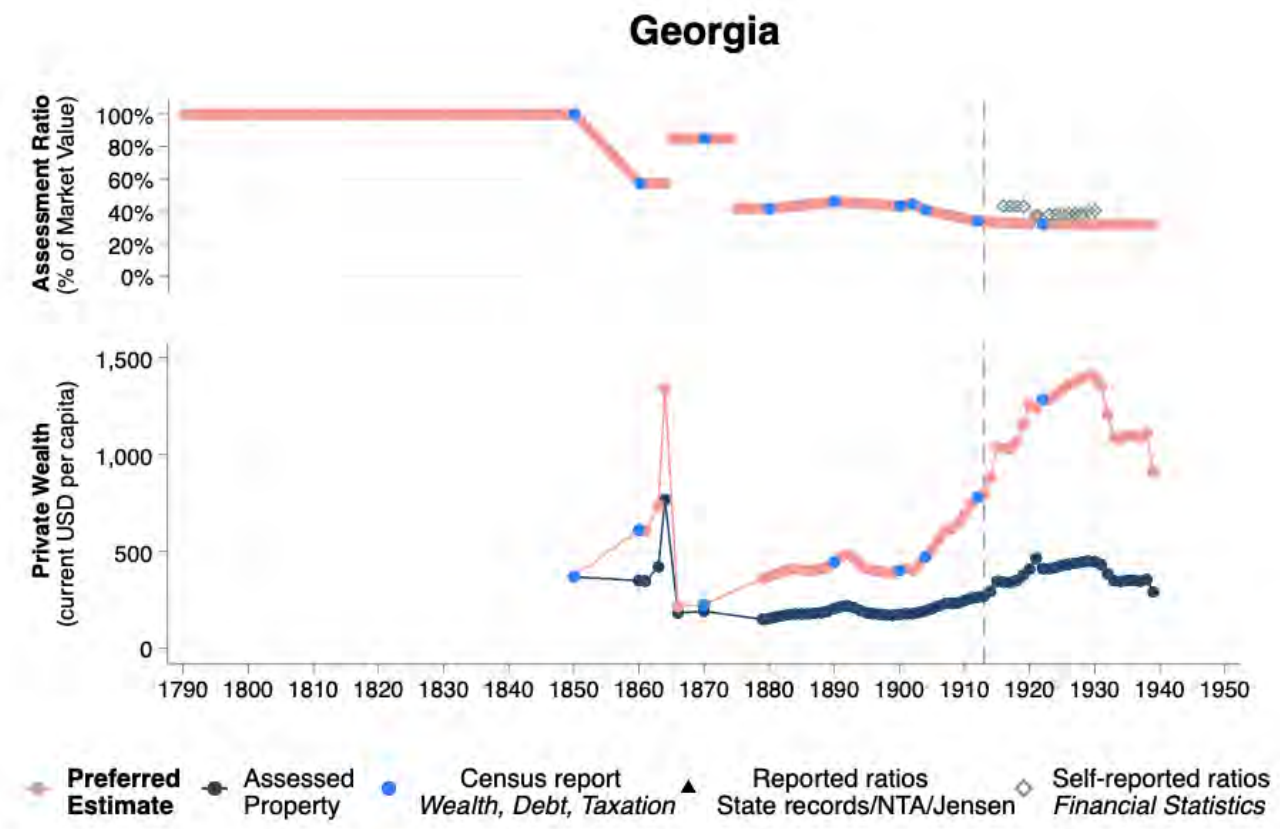
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Florida



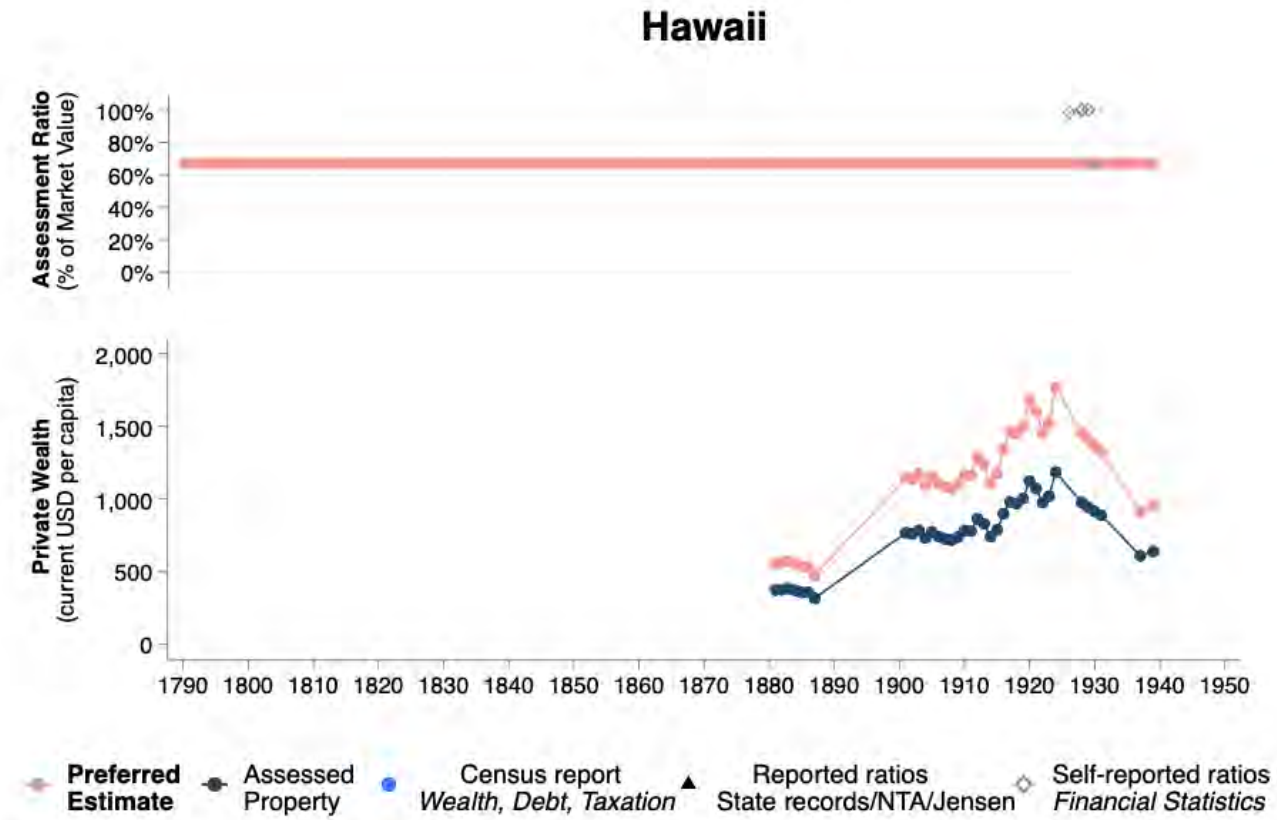
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Georgia



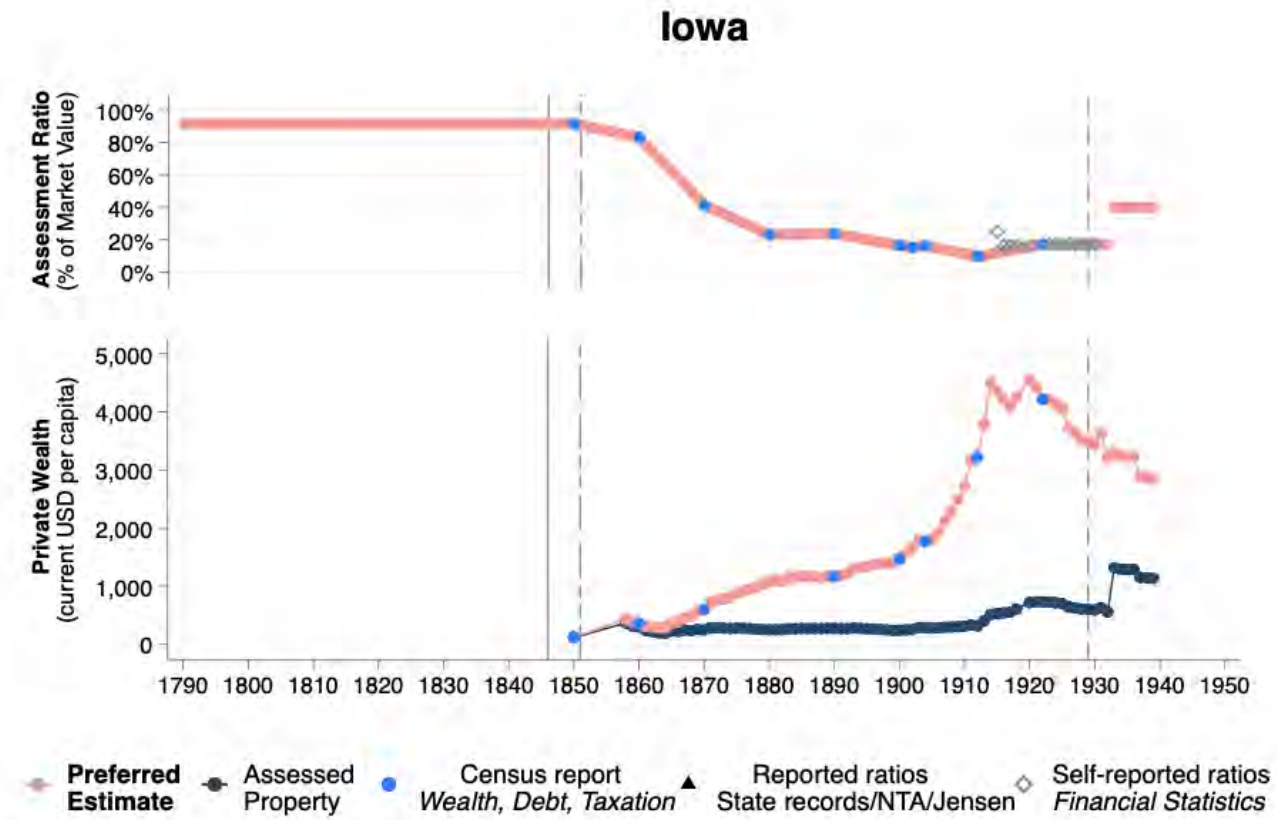
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Hawaii



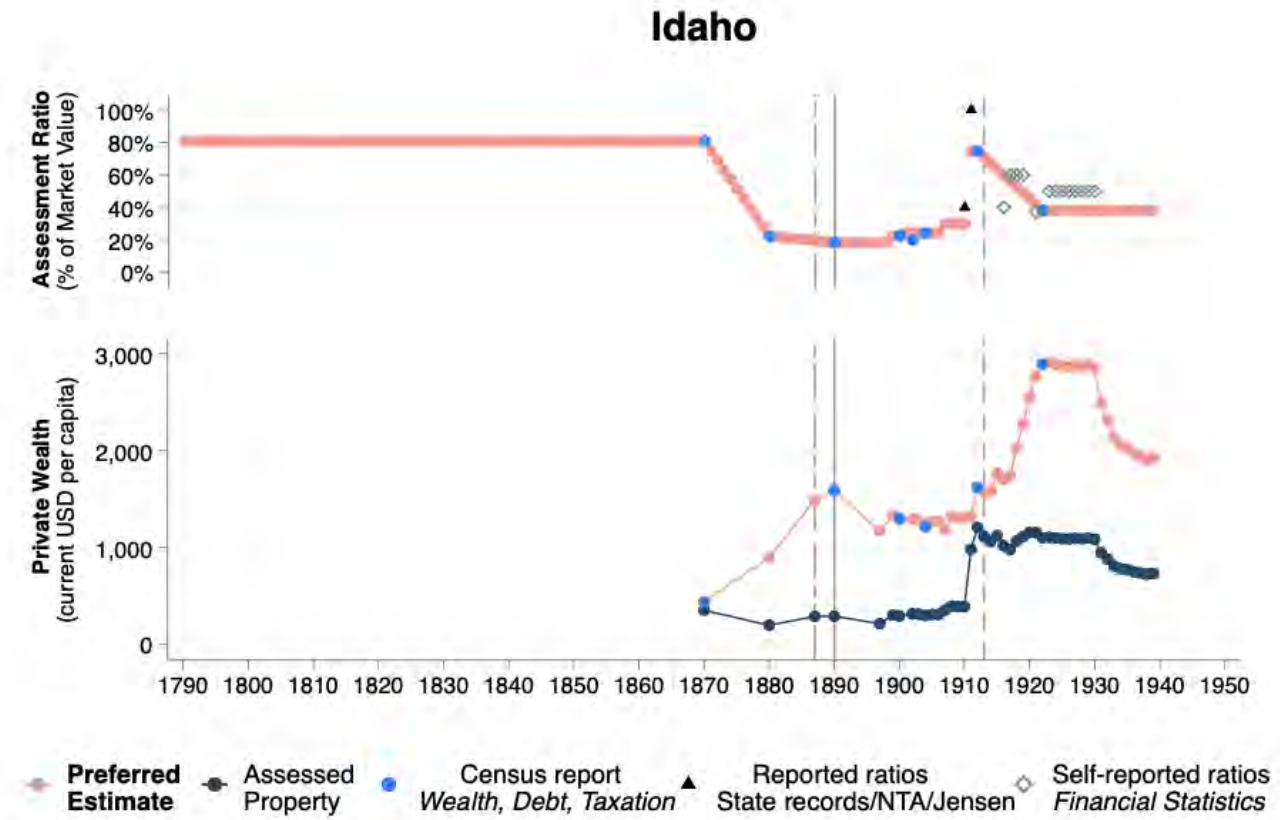
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Iowa



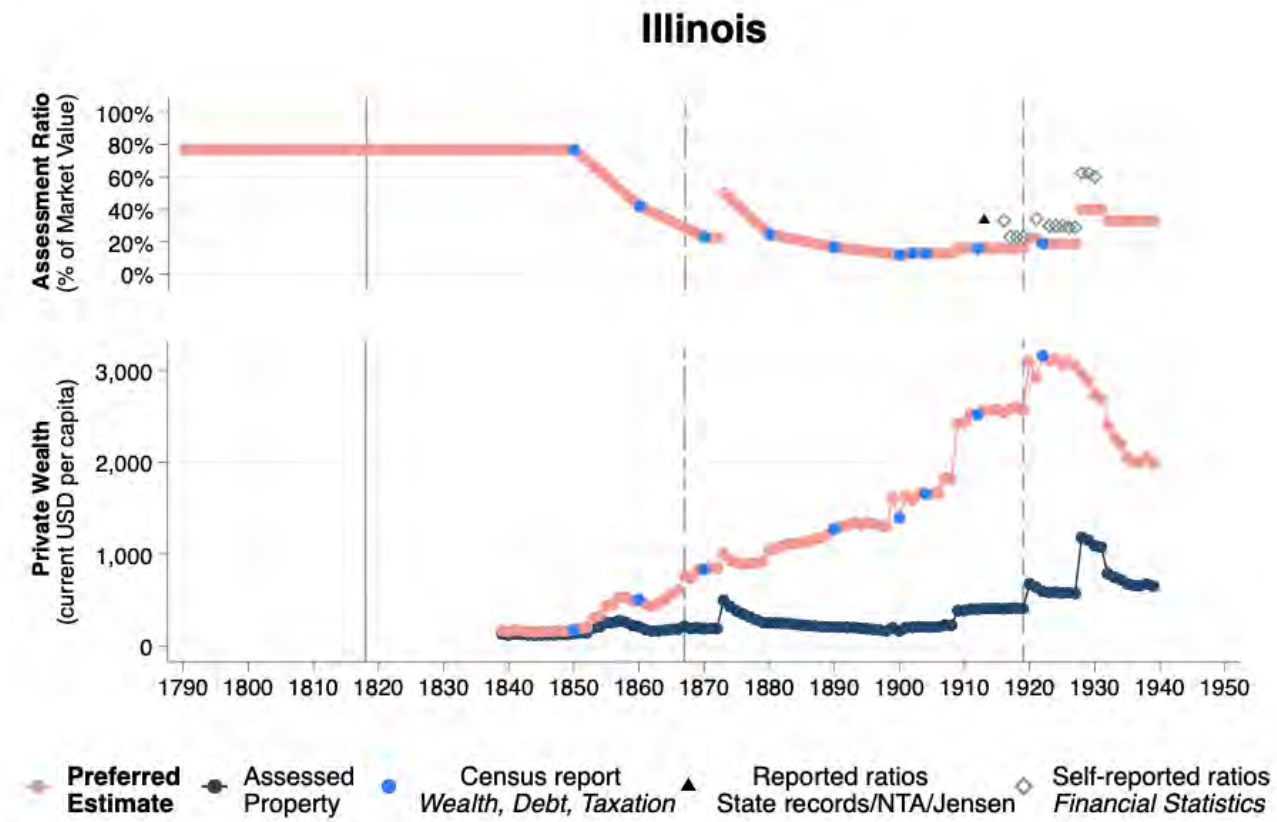
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Idaho



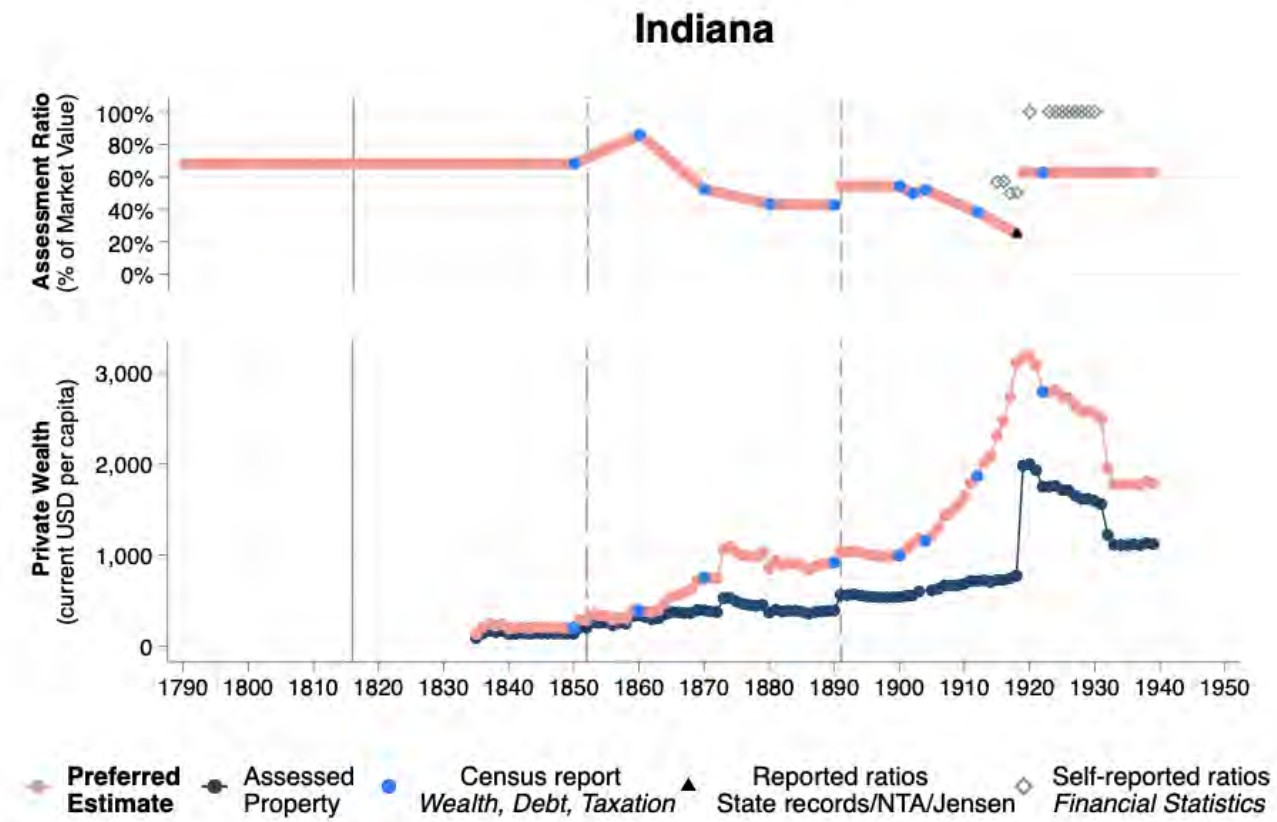
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Illinois



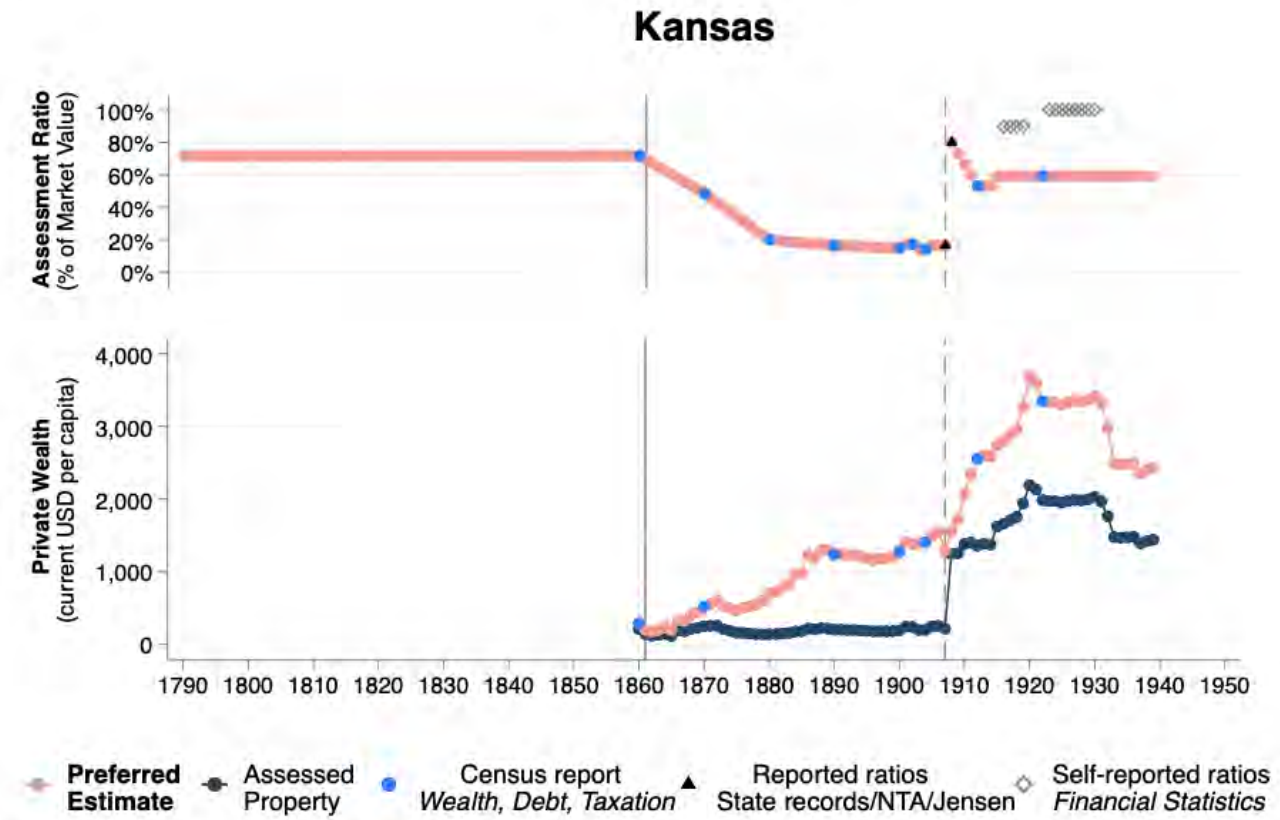
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Indiana



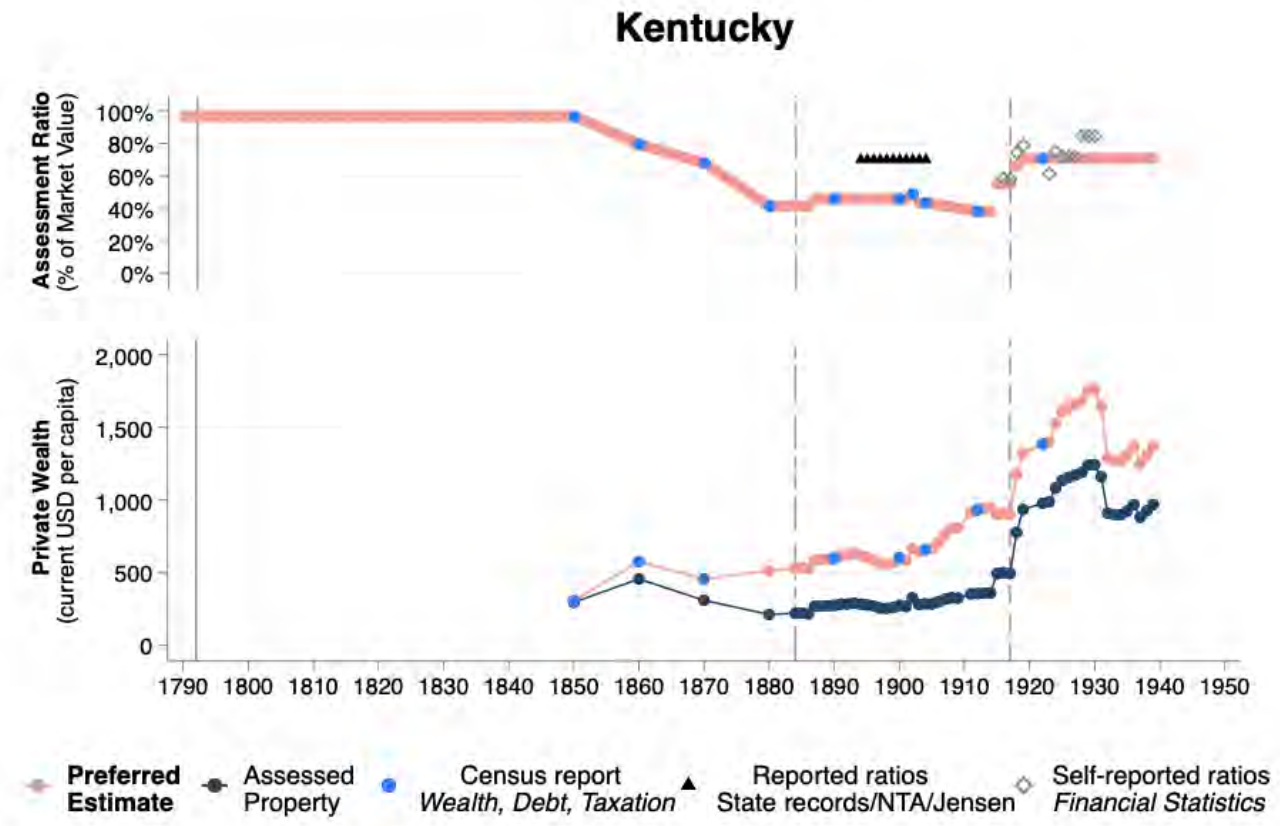
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Kansas



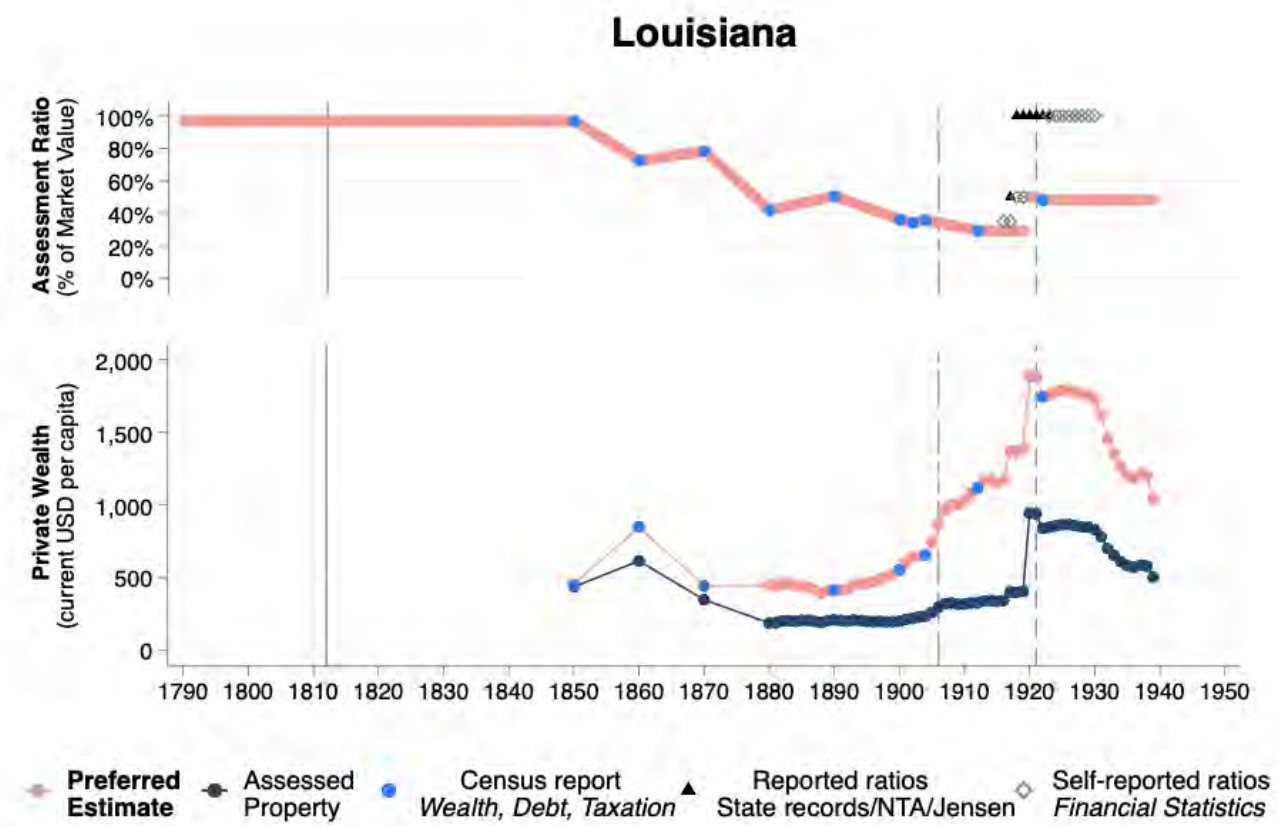
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Kentucky



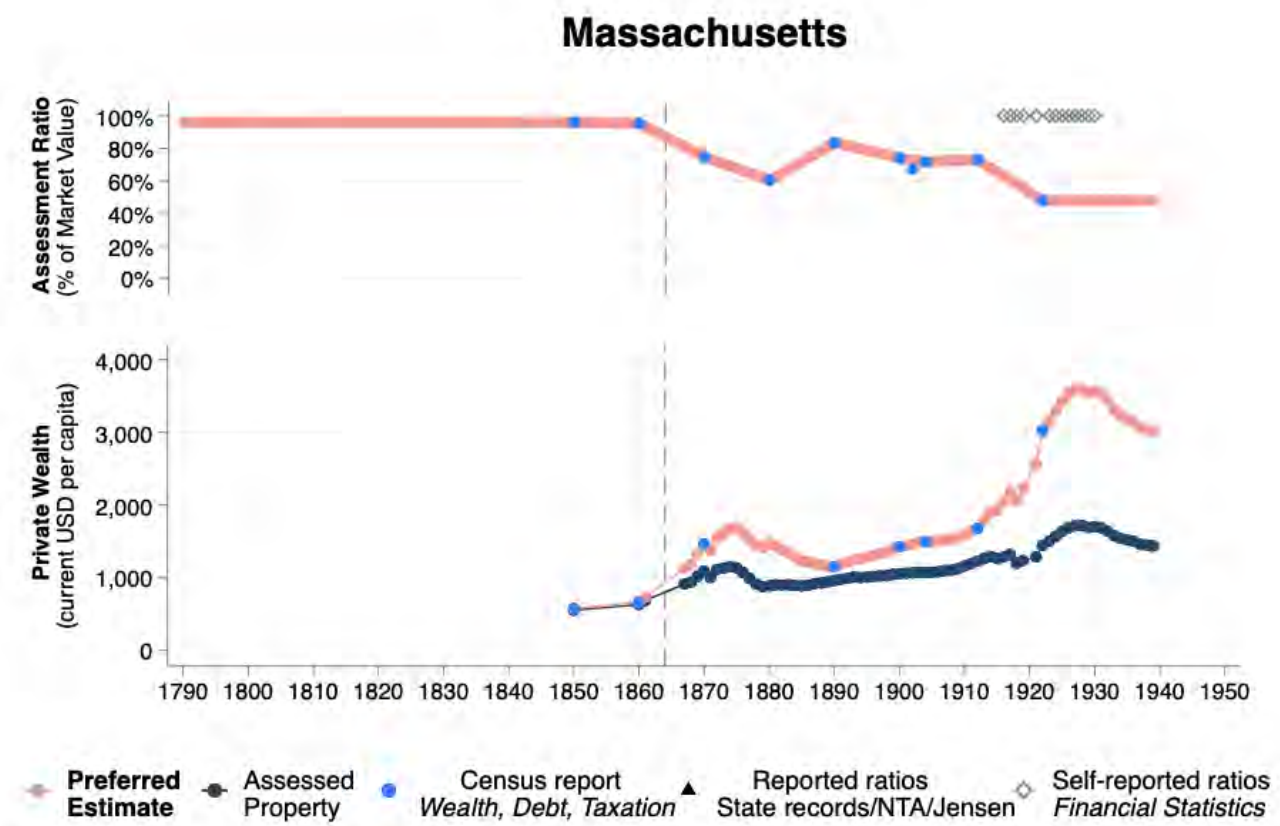
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Louisiana



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.

Massachusetts



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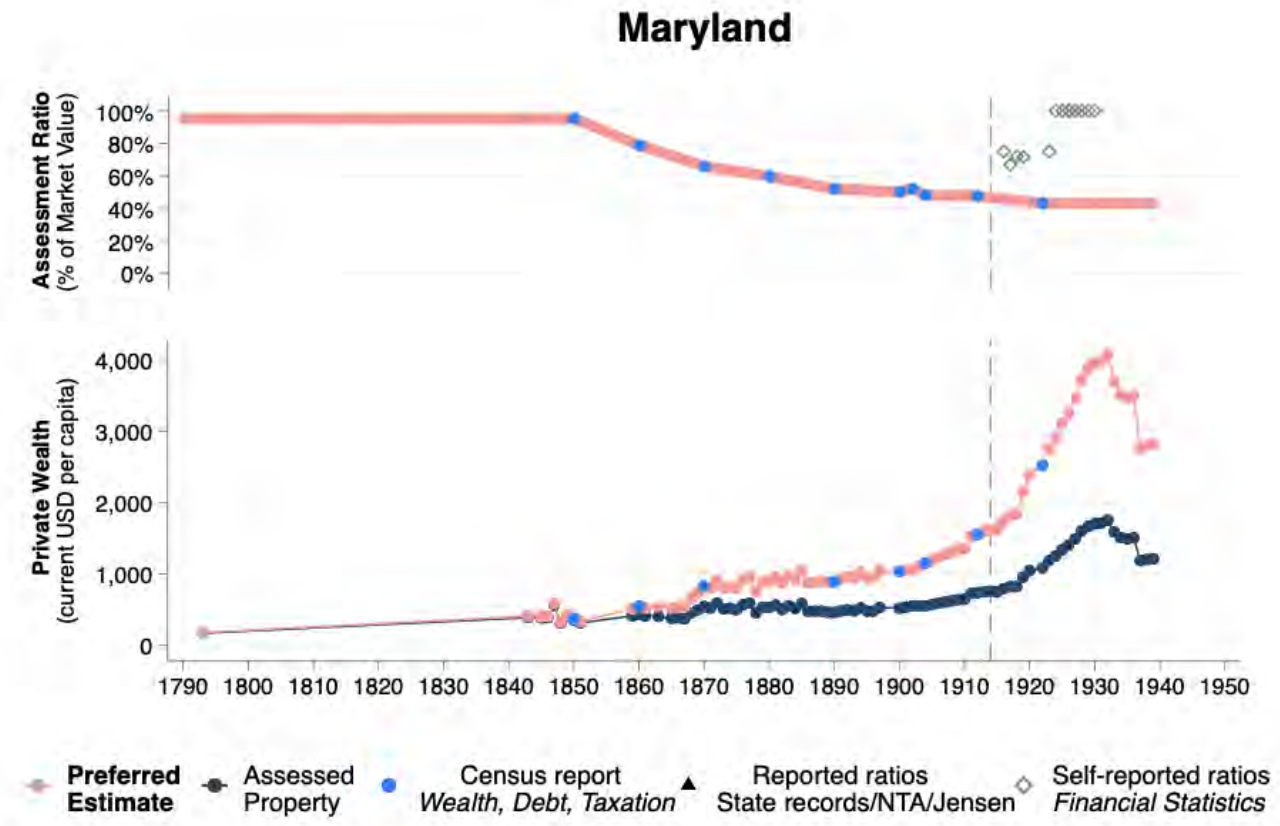
Maryland



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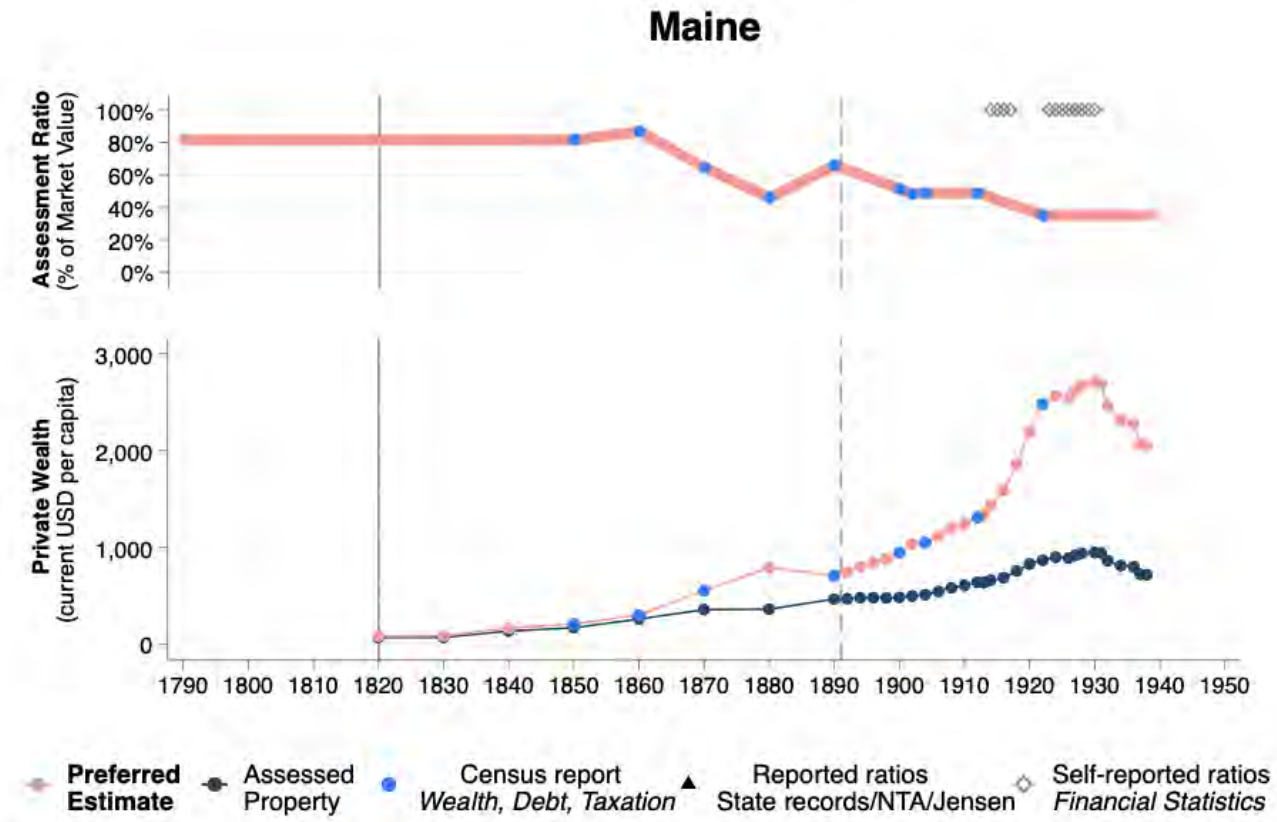
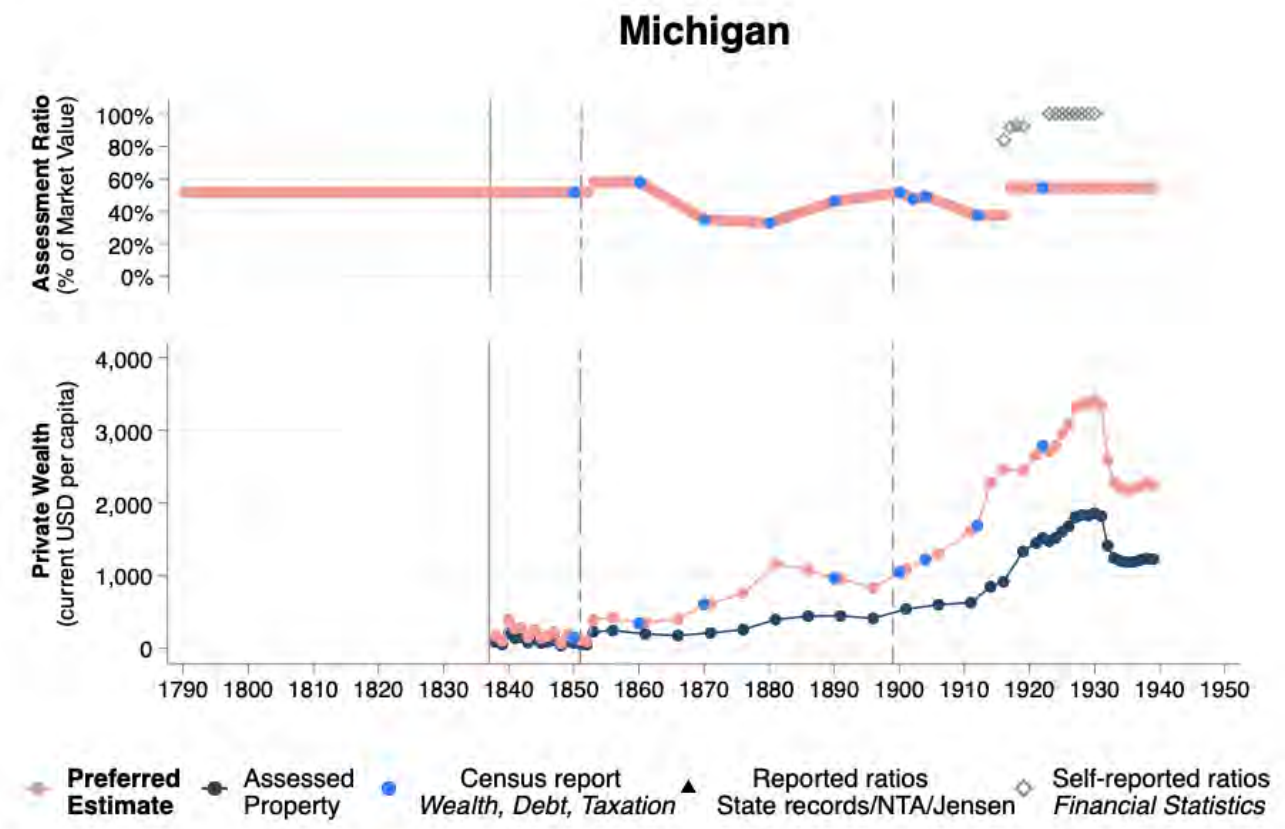
Maine



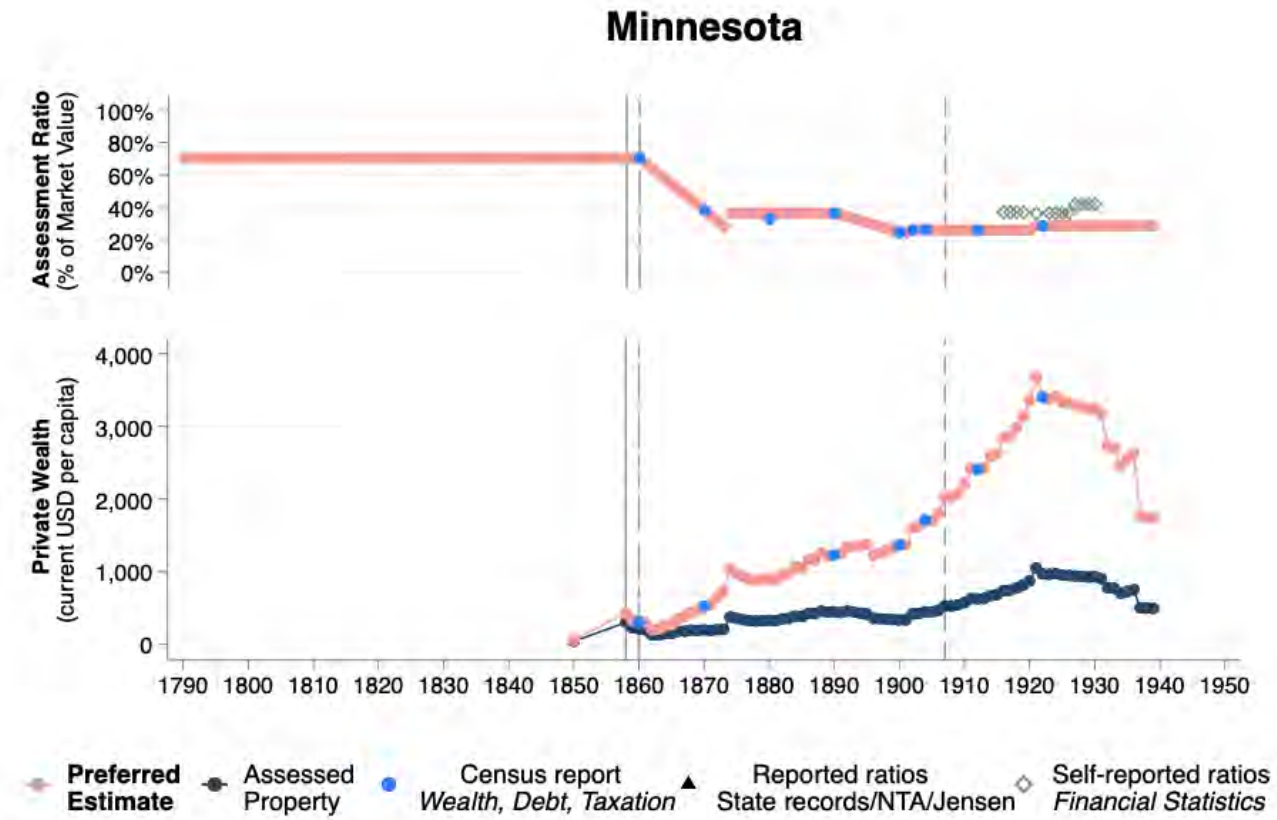
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Michigan



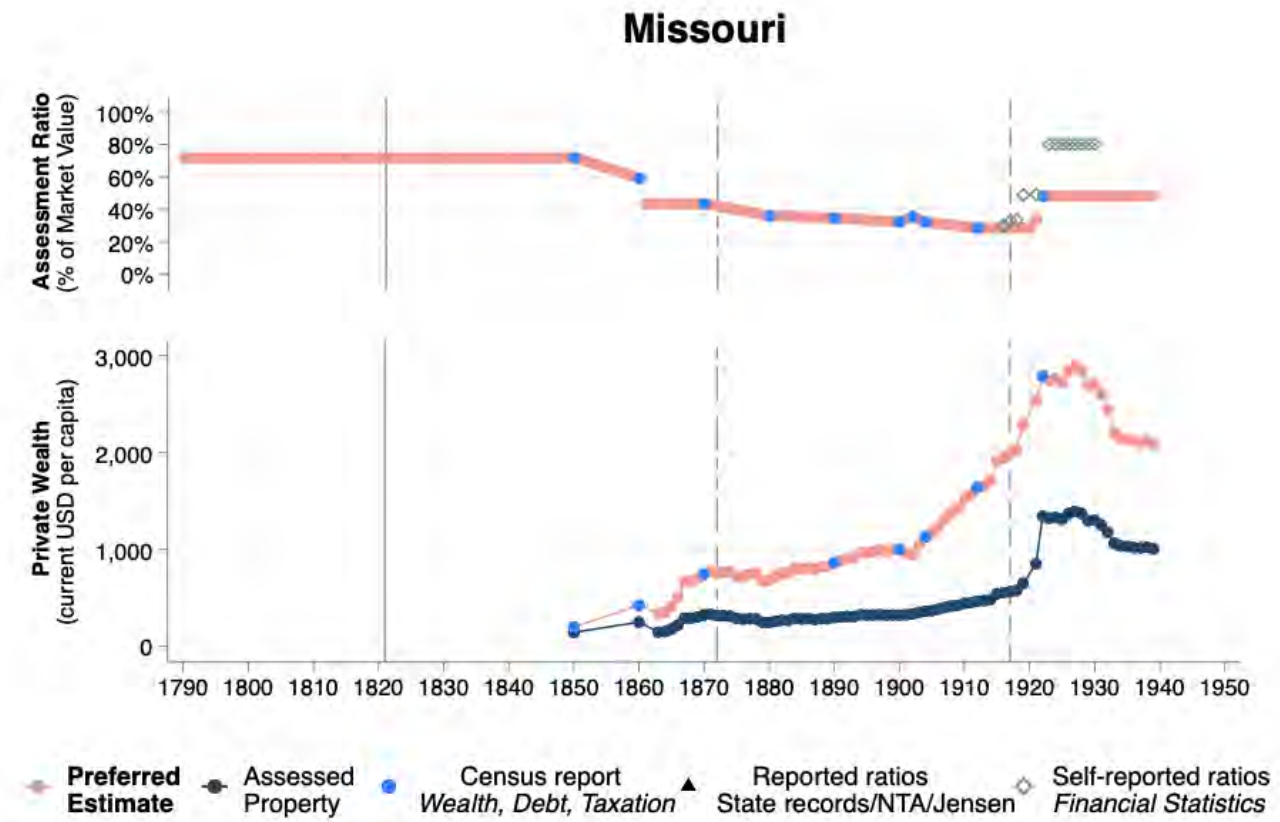
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Minnesota



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.

Missouri



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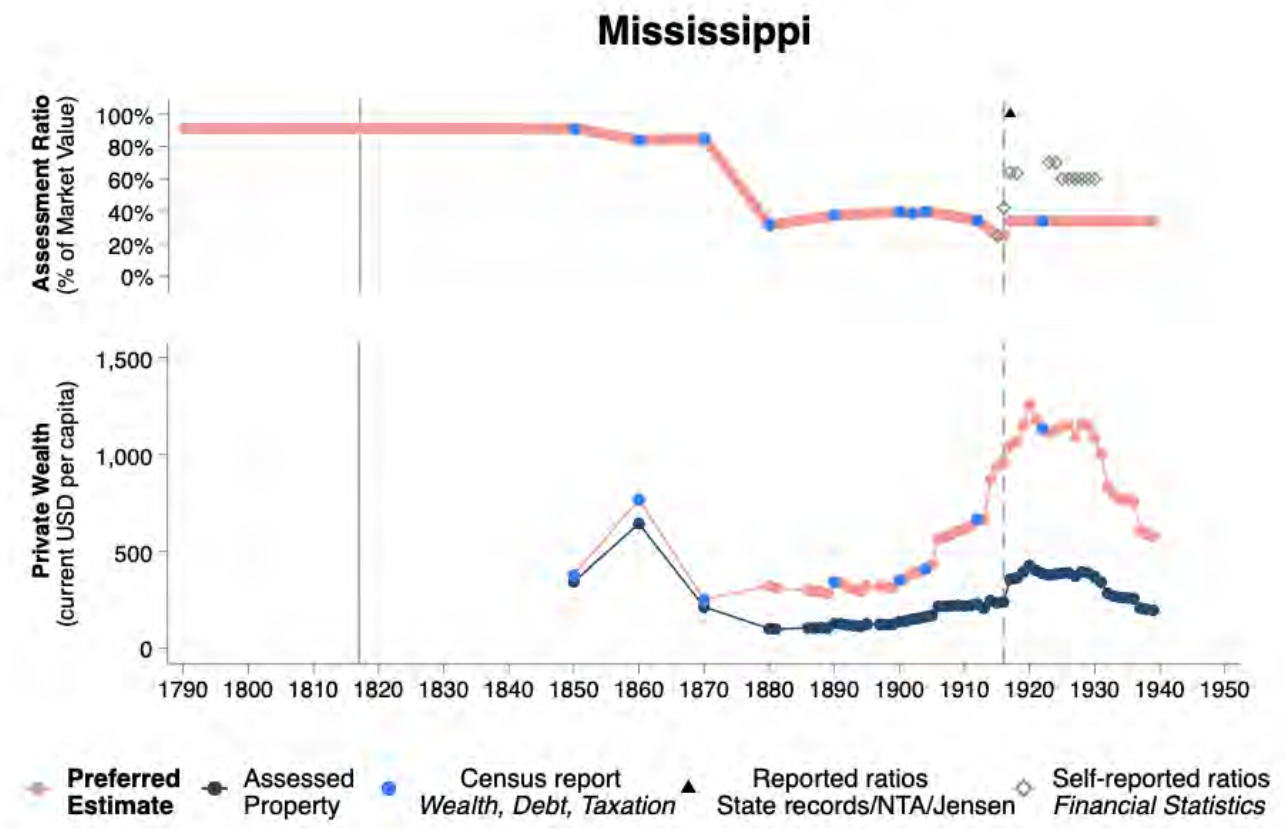
Mississippi



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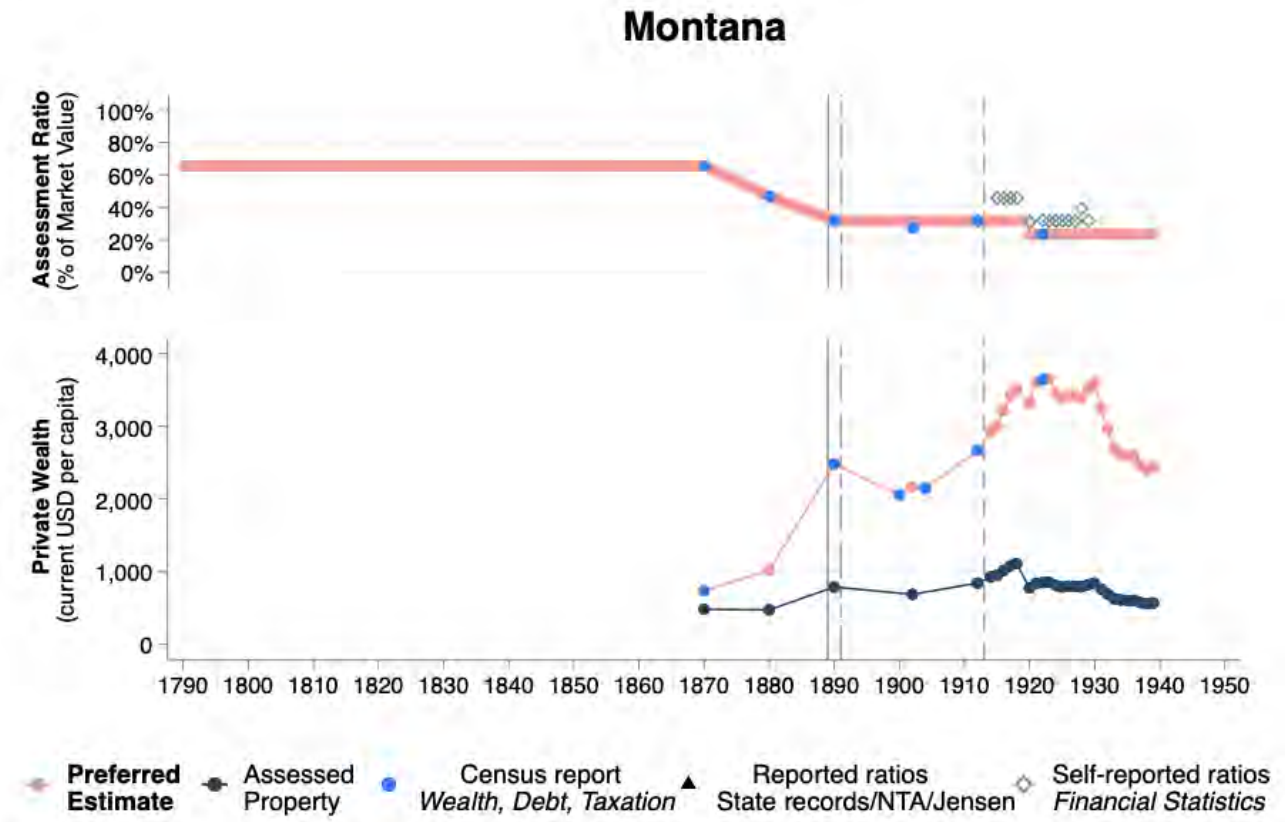
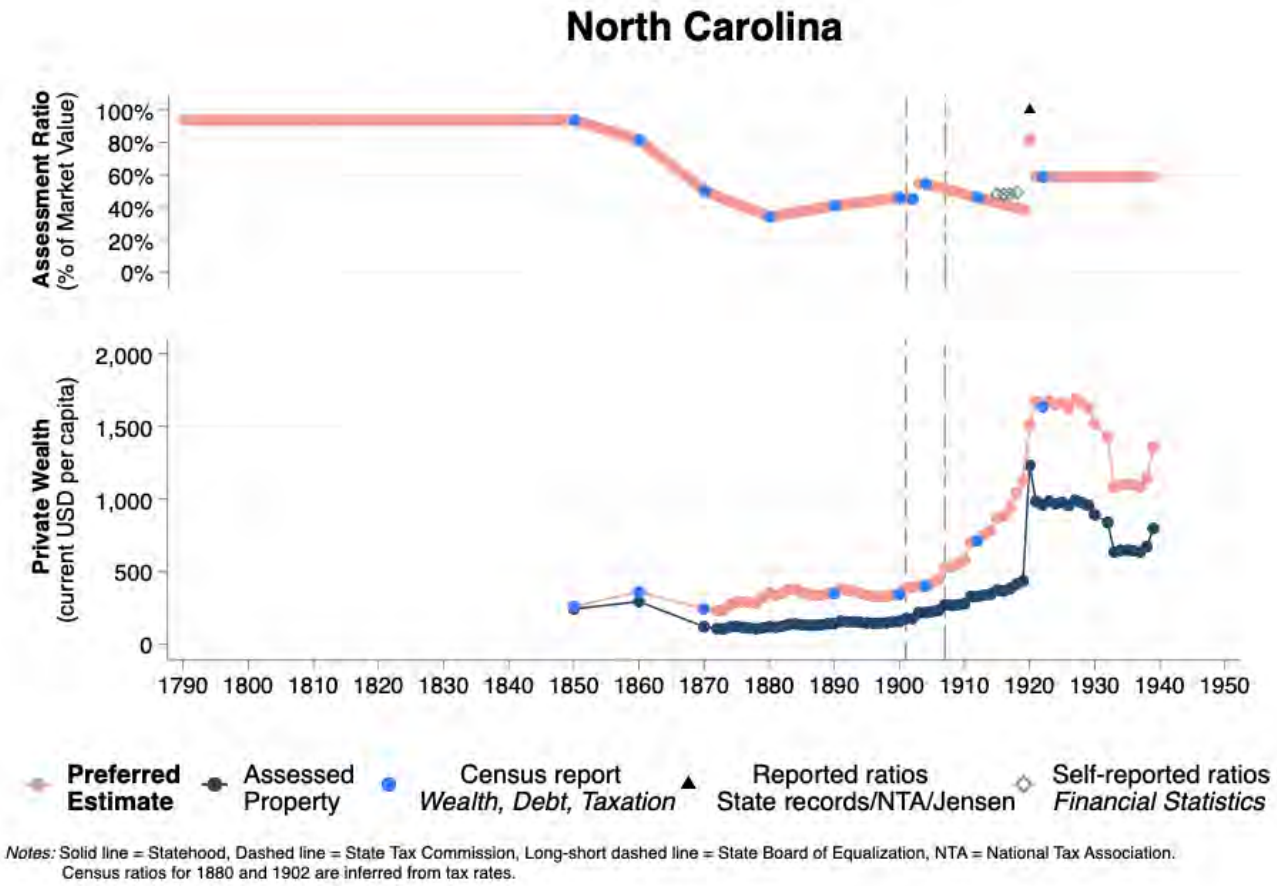
Montana



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.

North Carolina



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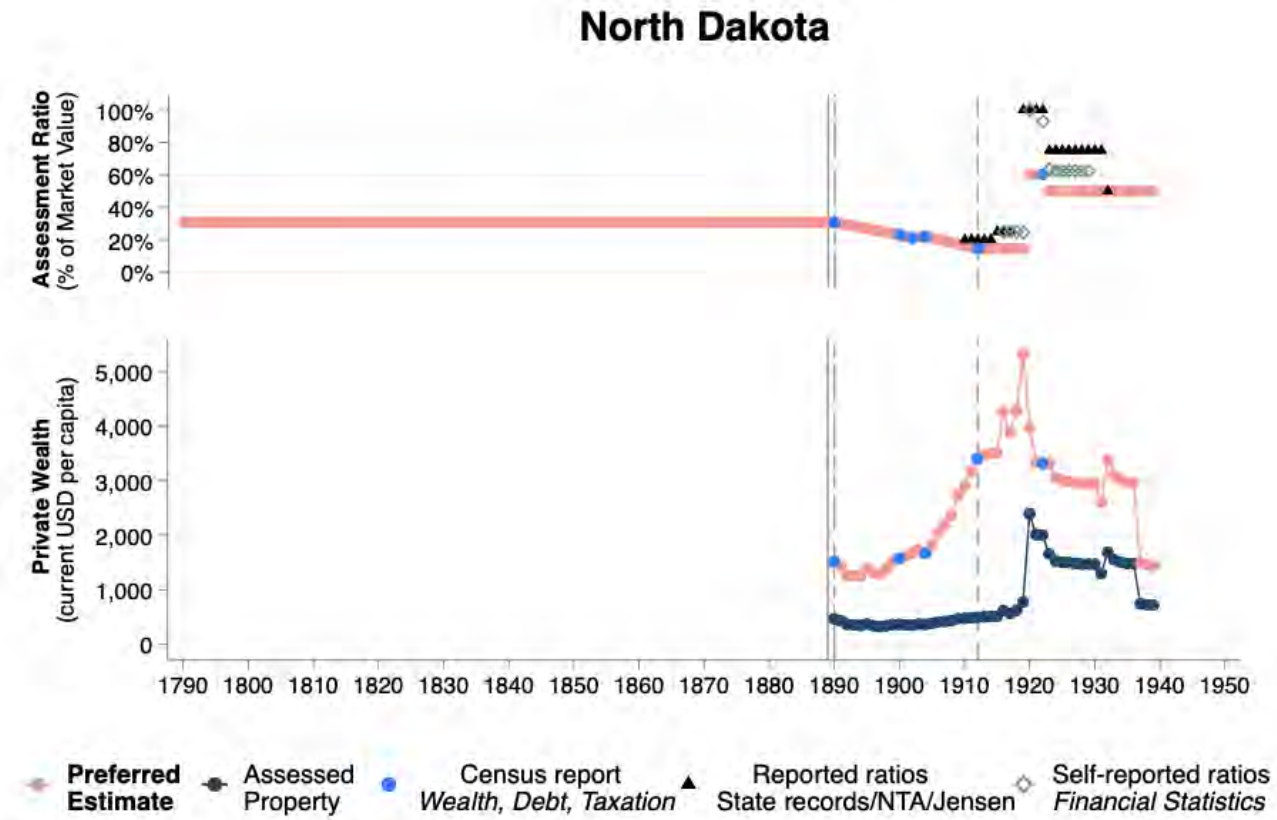
North Dakota



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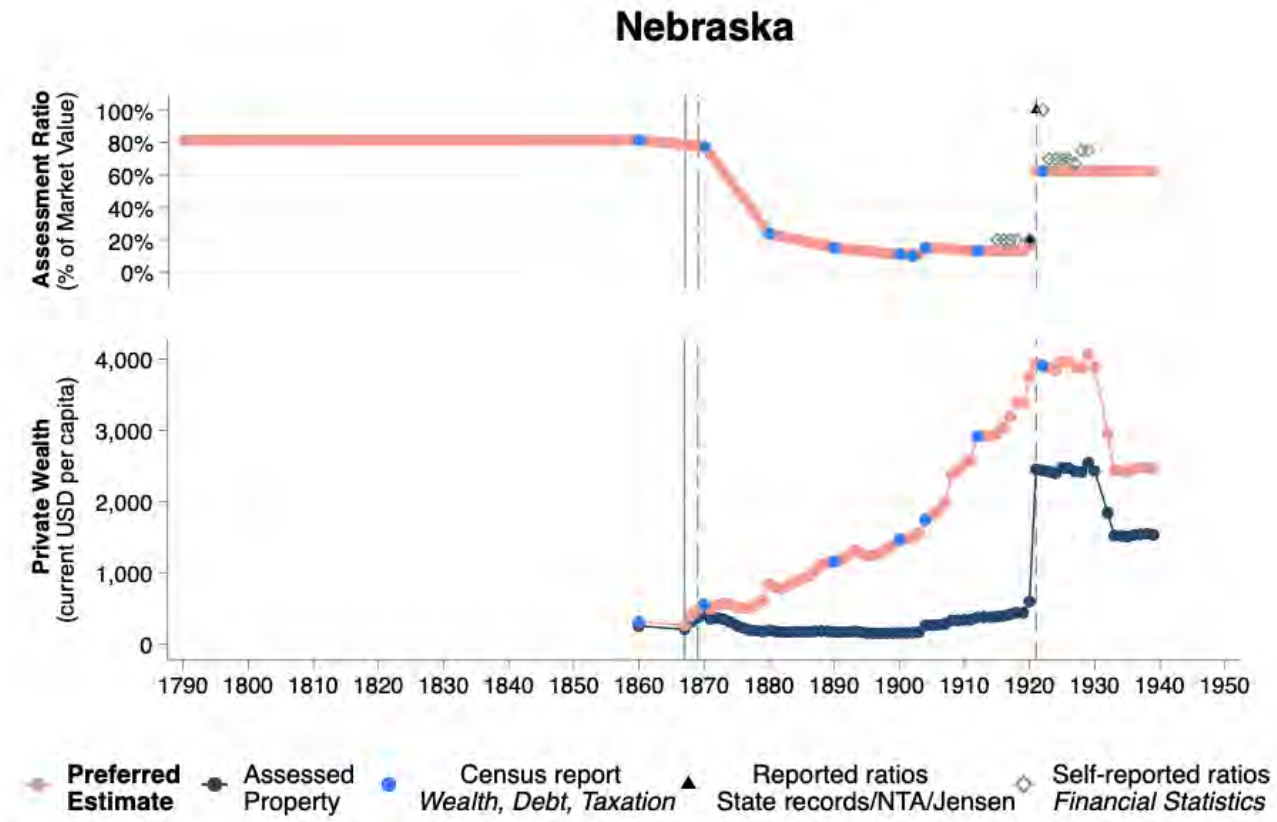
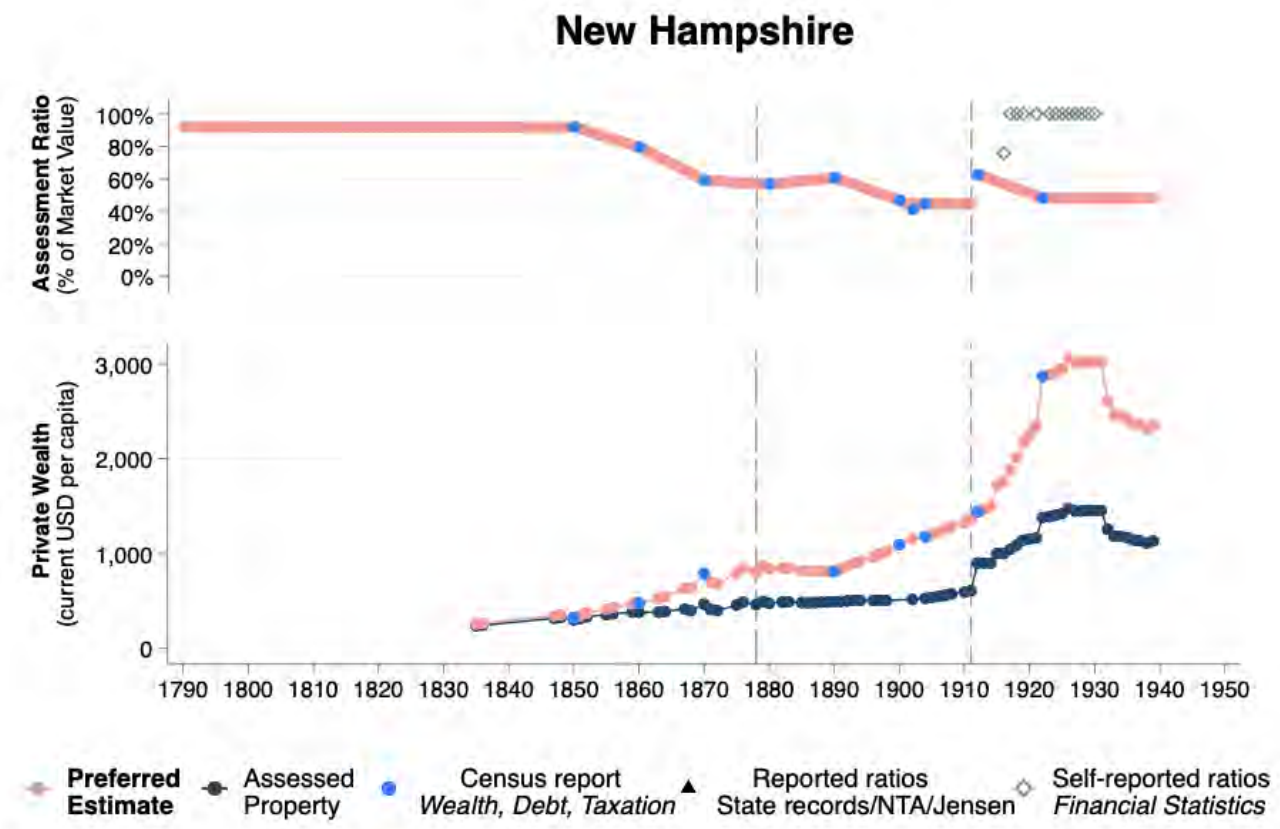
Nebraska



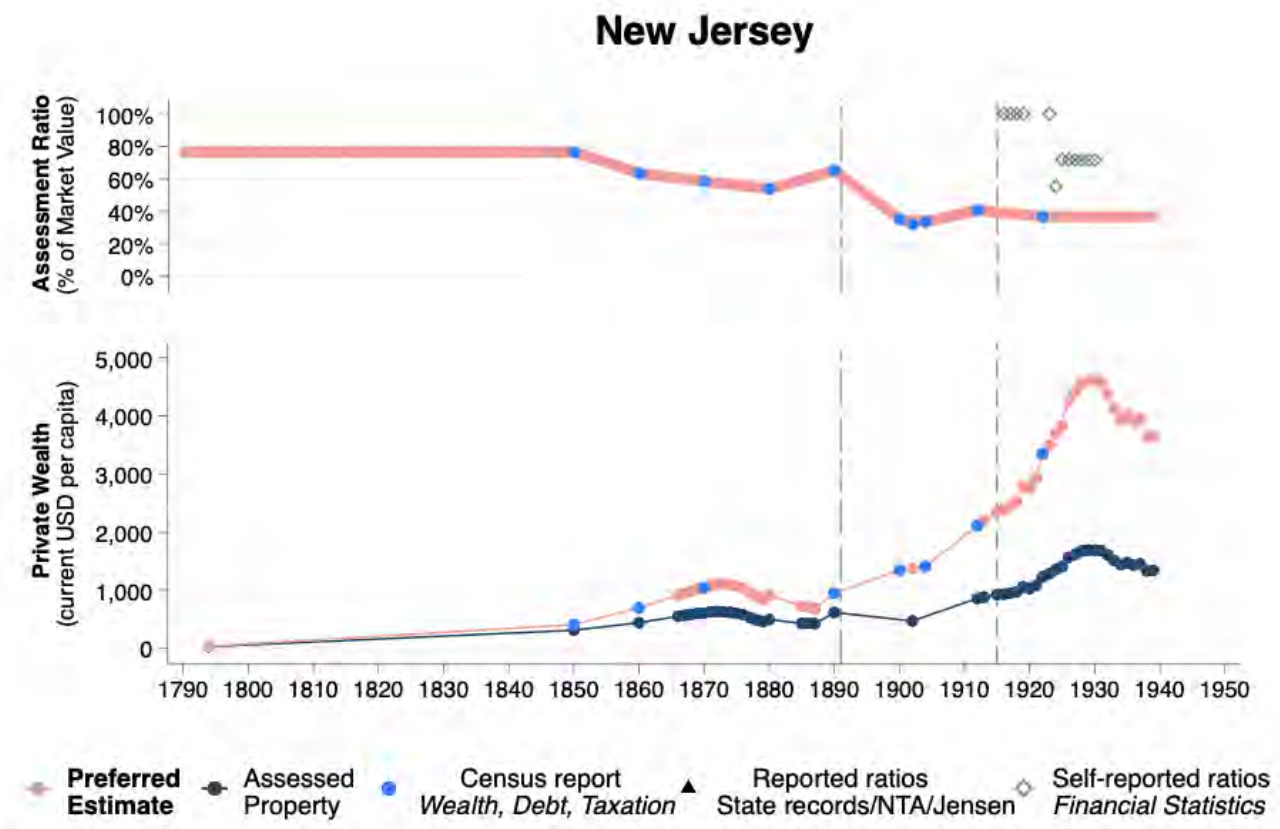
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

New Hampshire



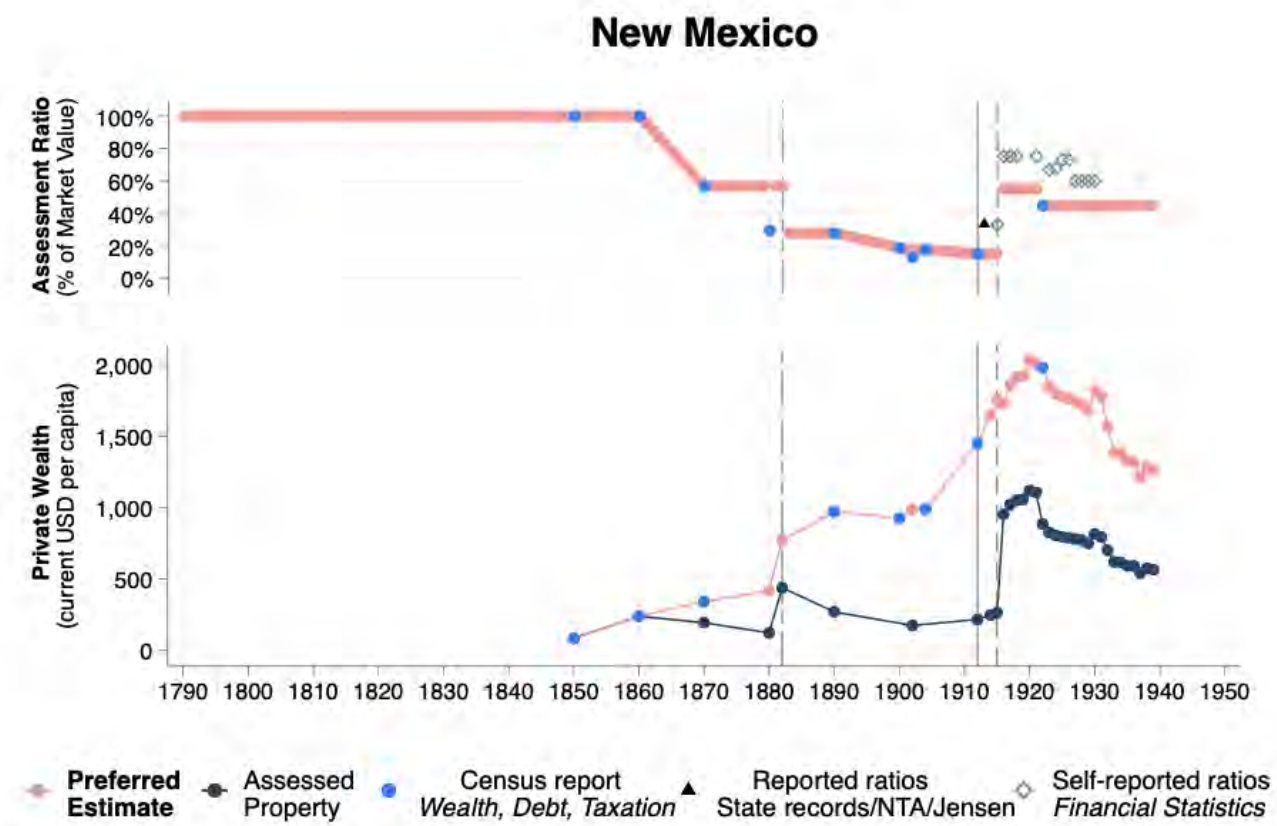
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

New Jersey



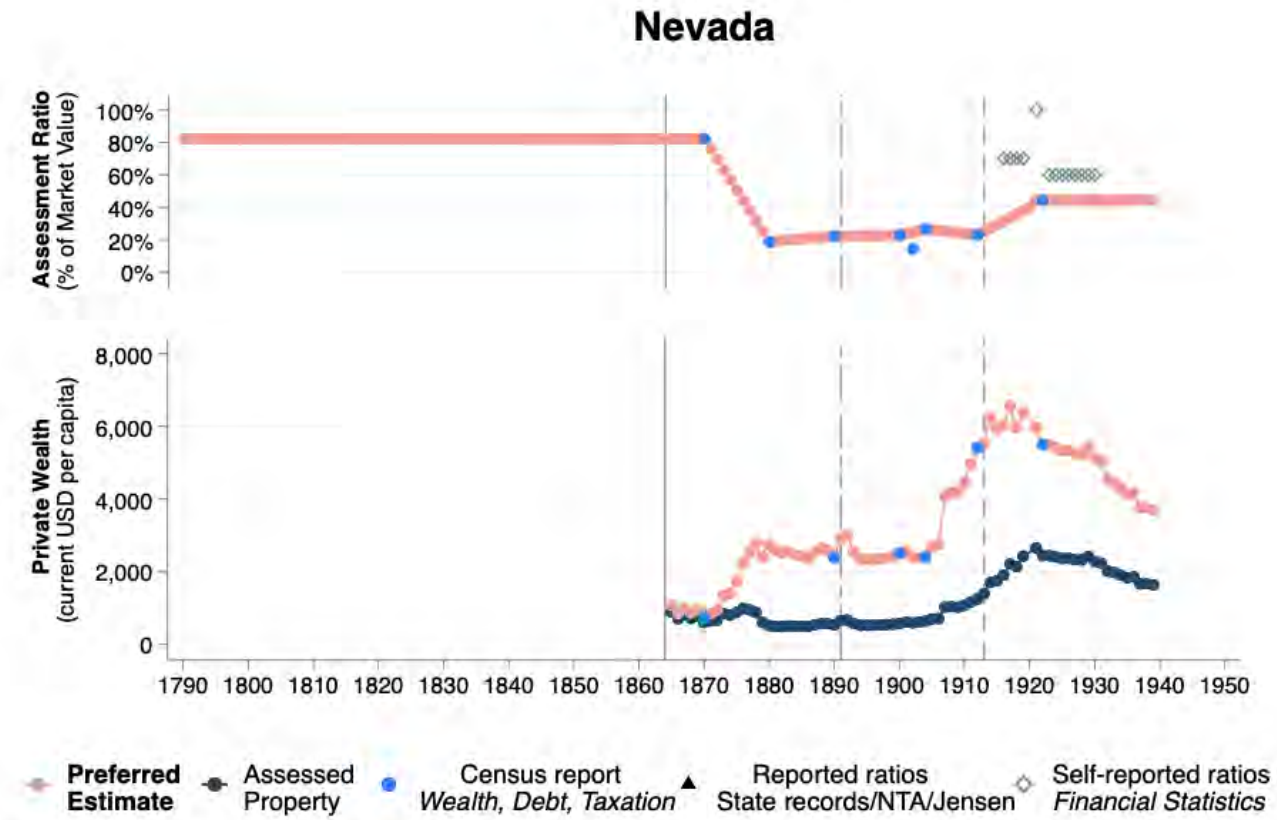
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

New Mexico



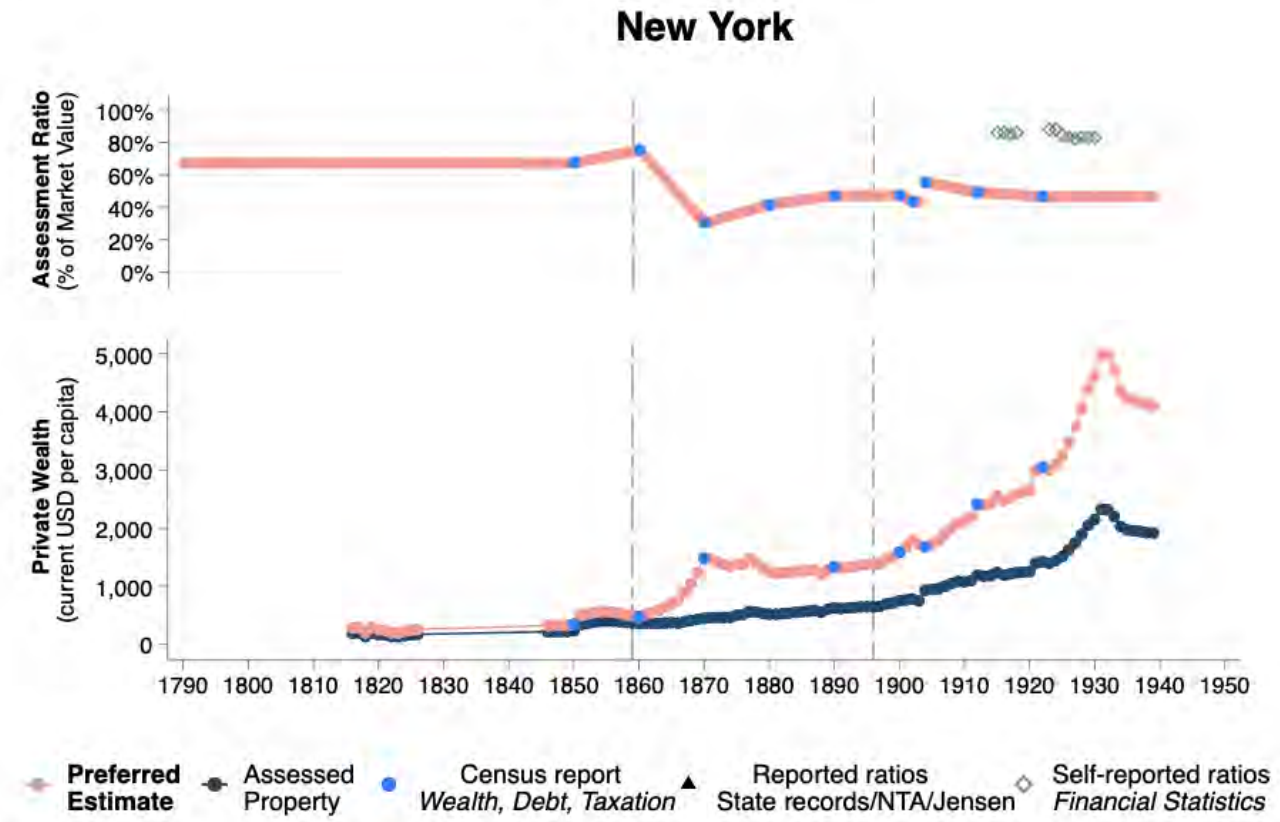
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Nevada



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.

New York



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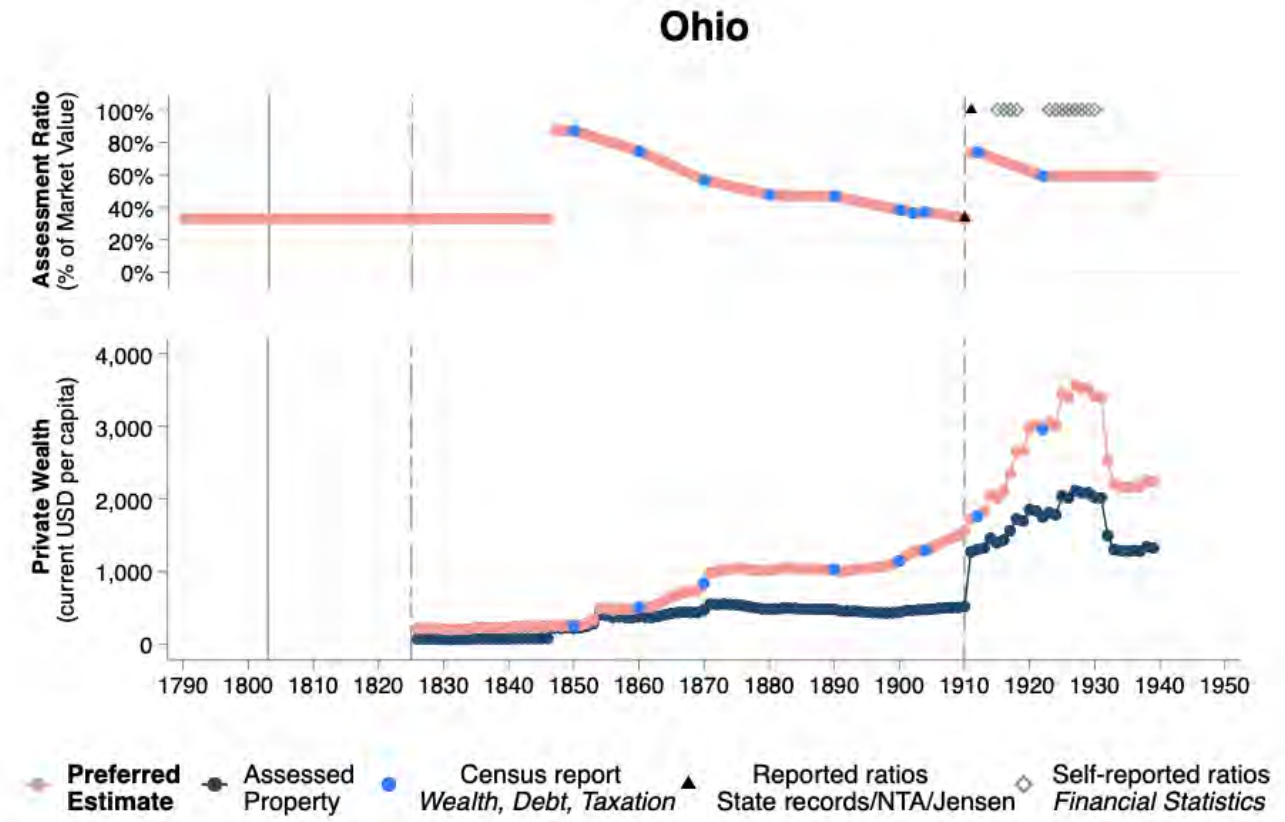
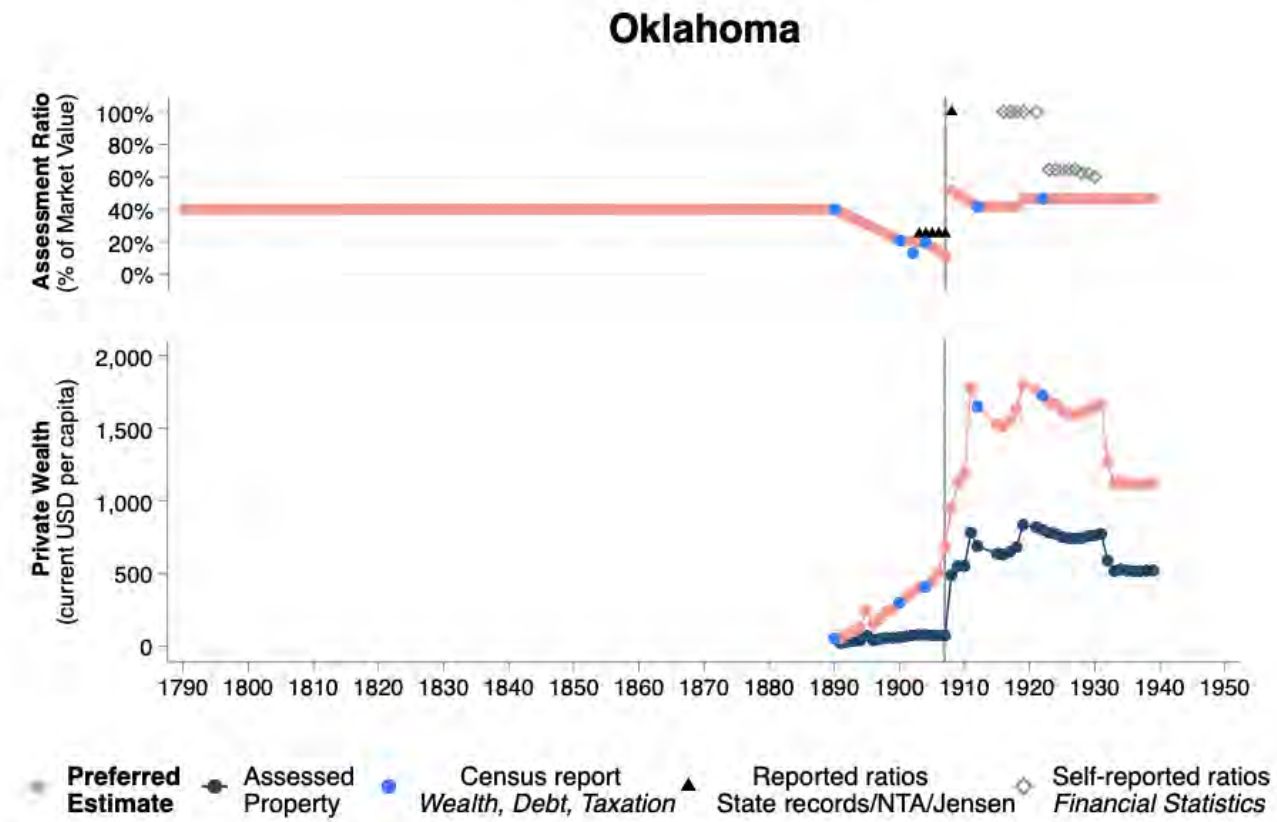
Ohio



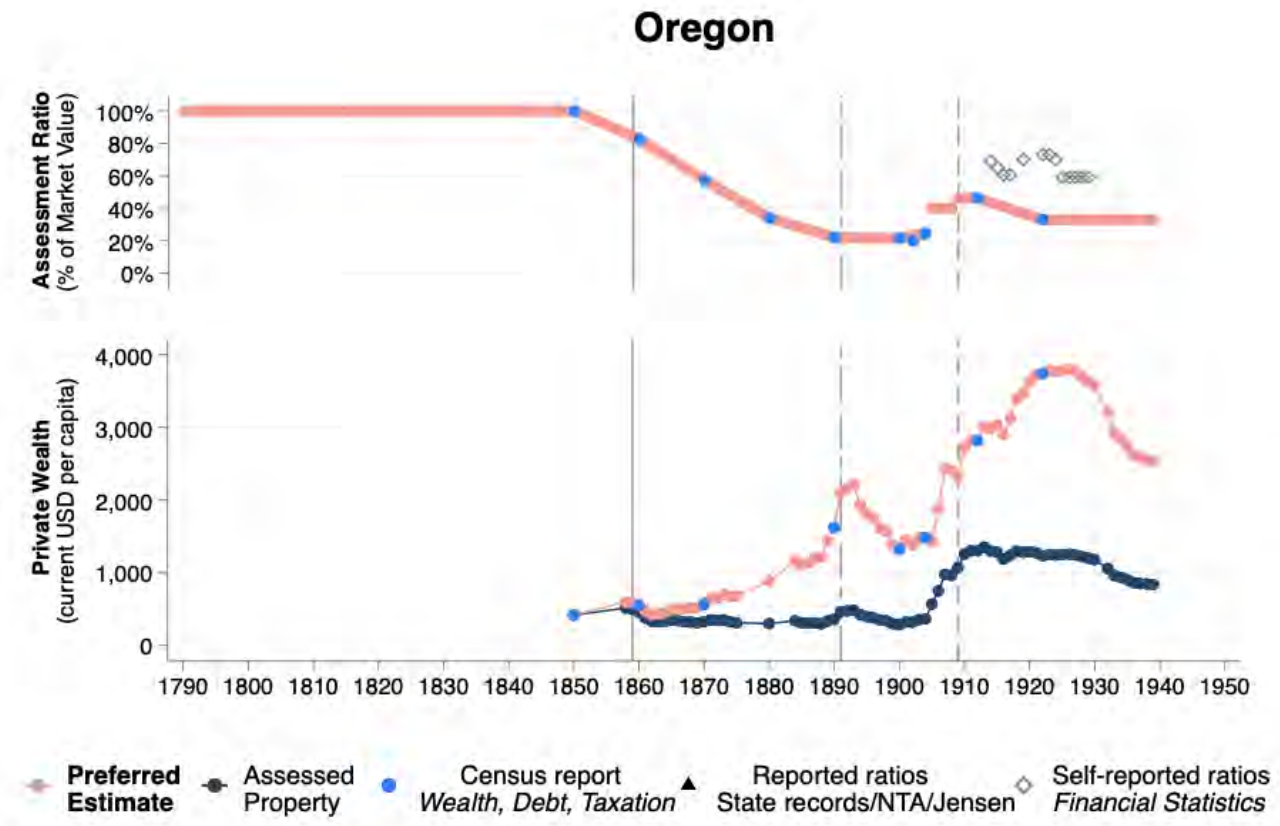
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Oklahoma



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.

Oregon



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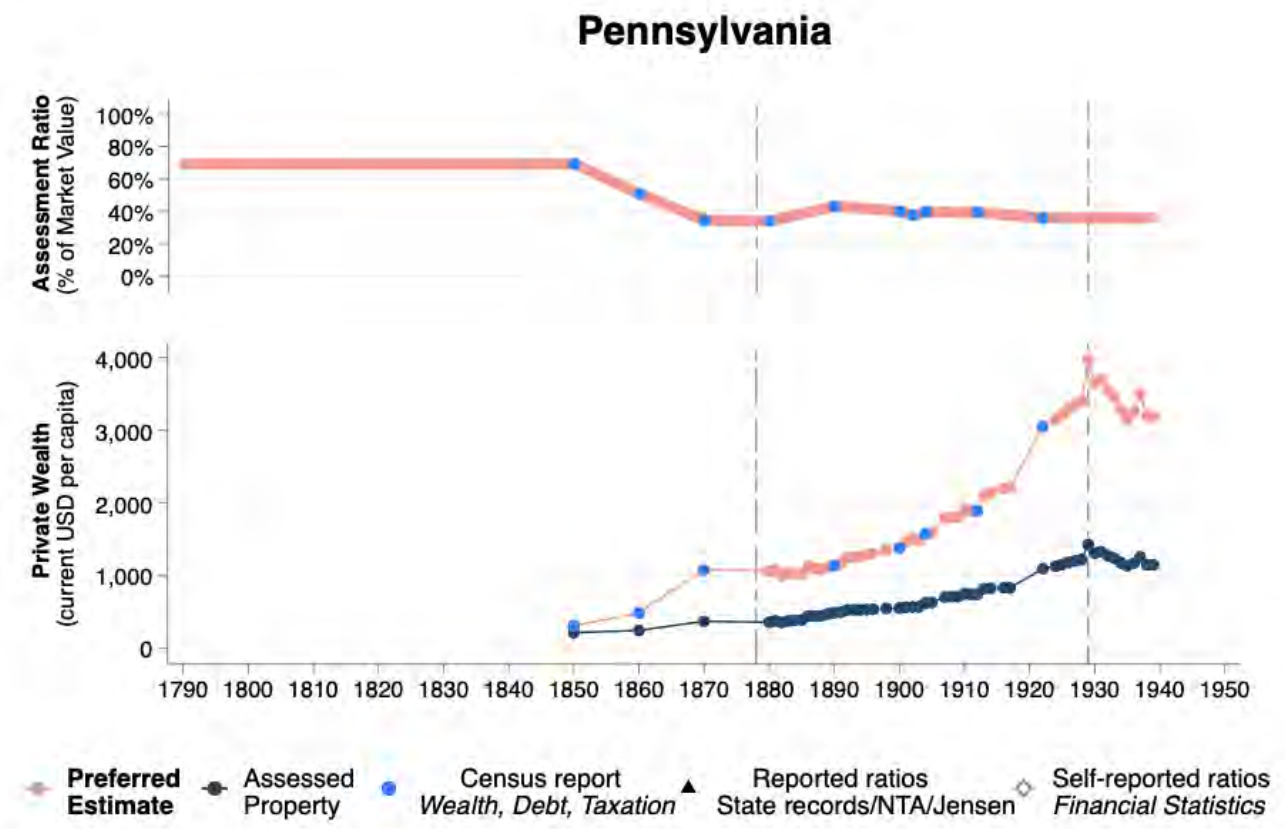
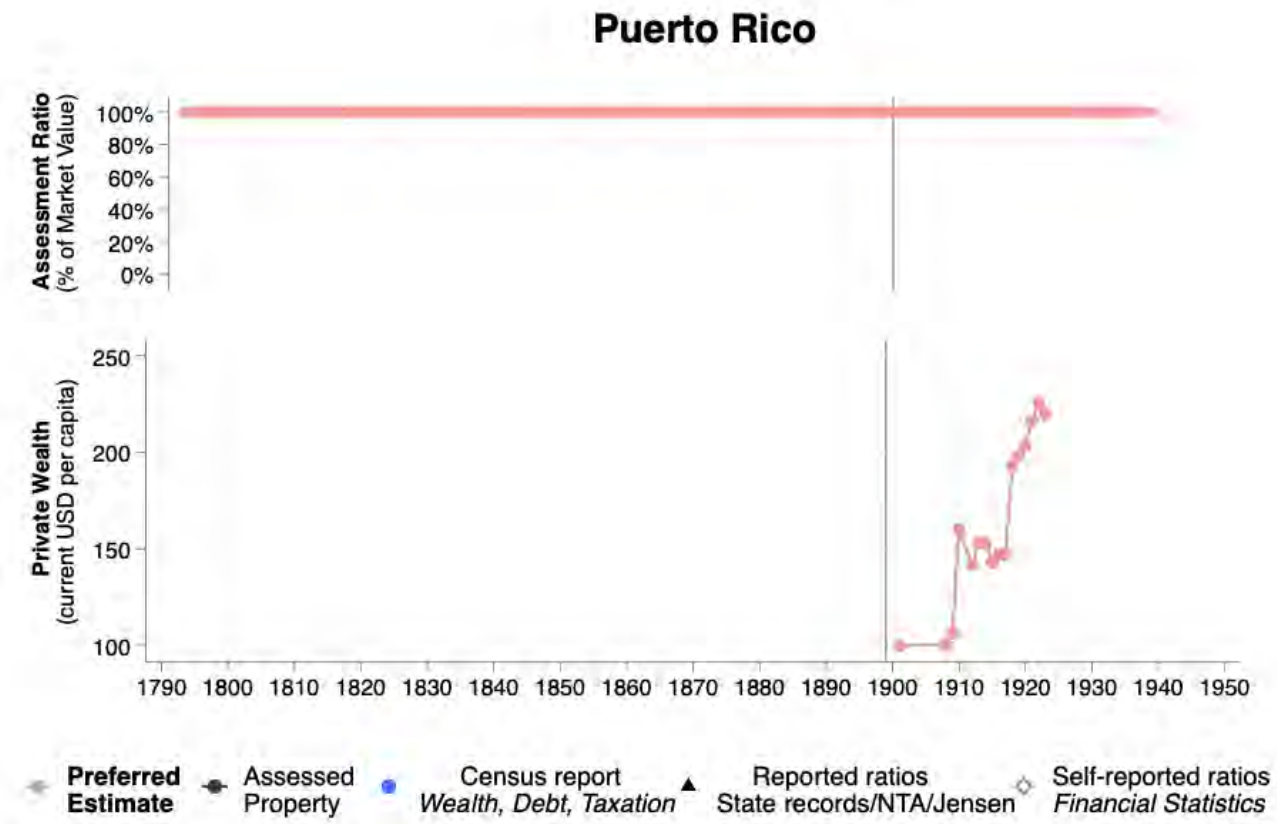
Pennsylvania



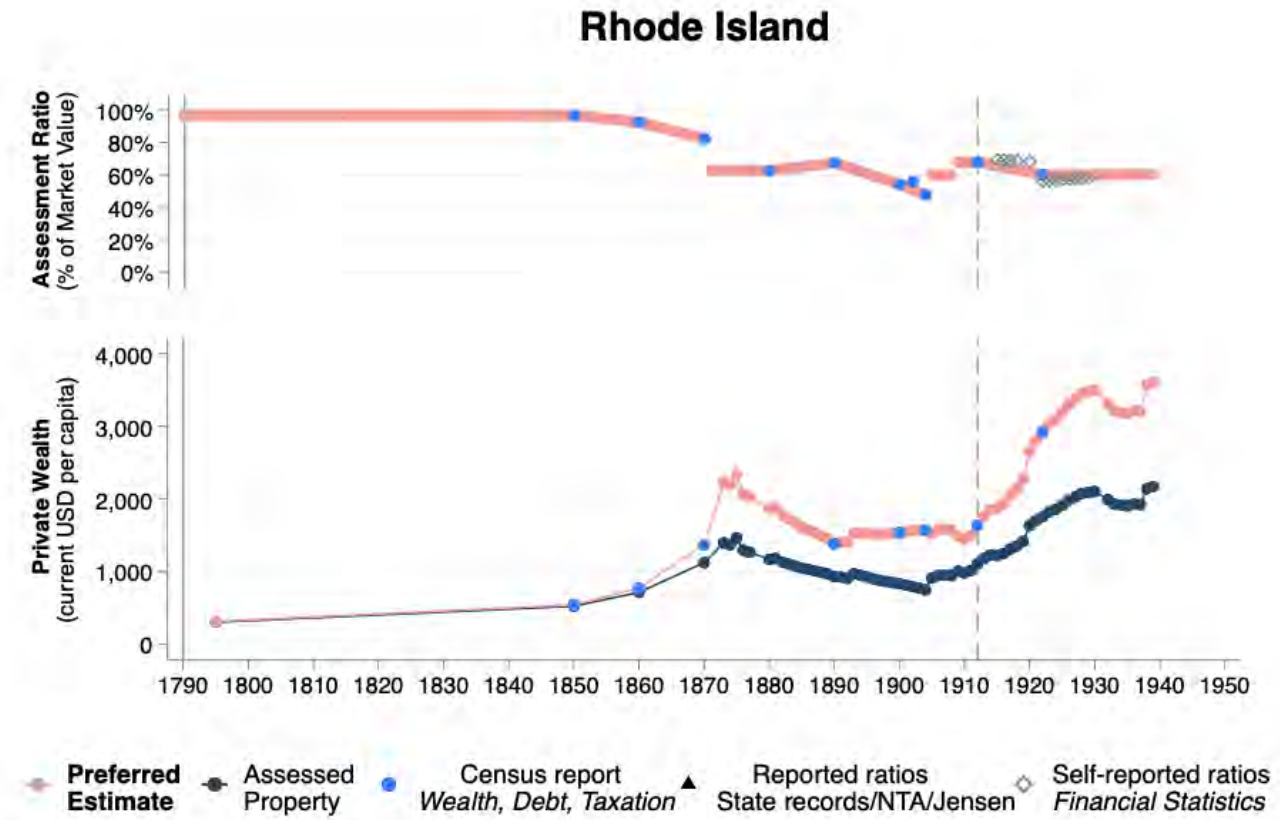
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Puerto Rico



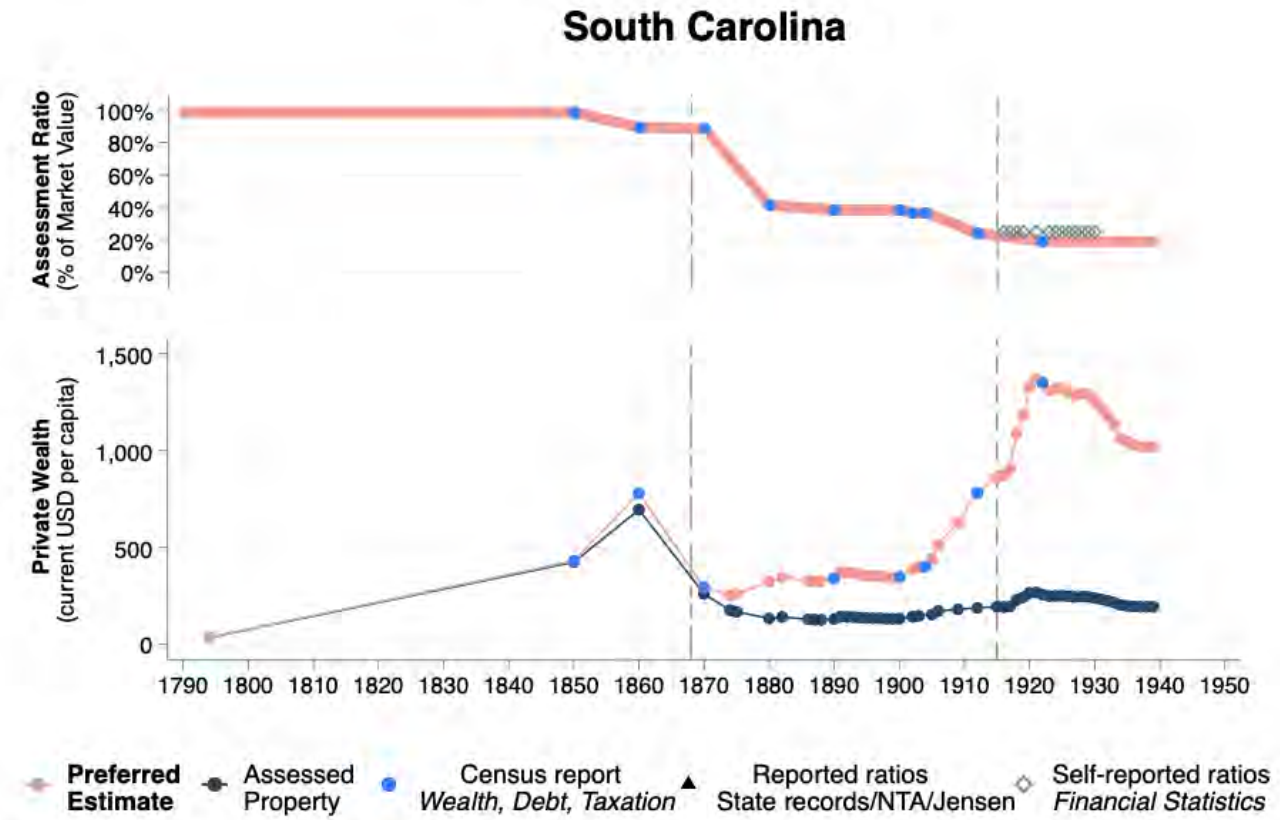
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Rhode Island



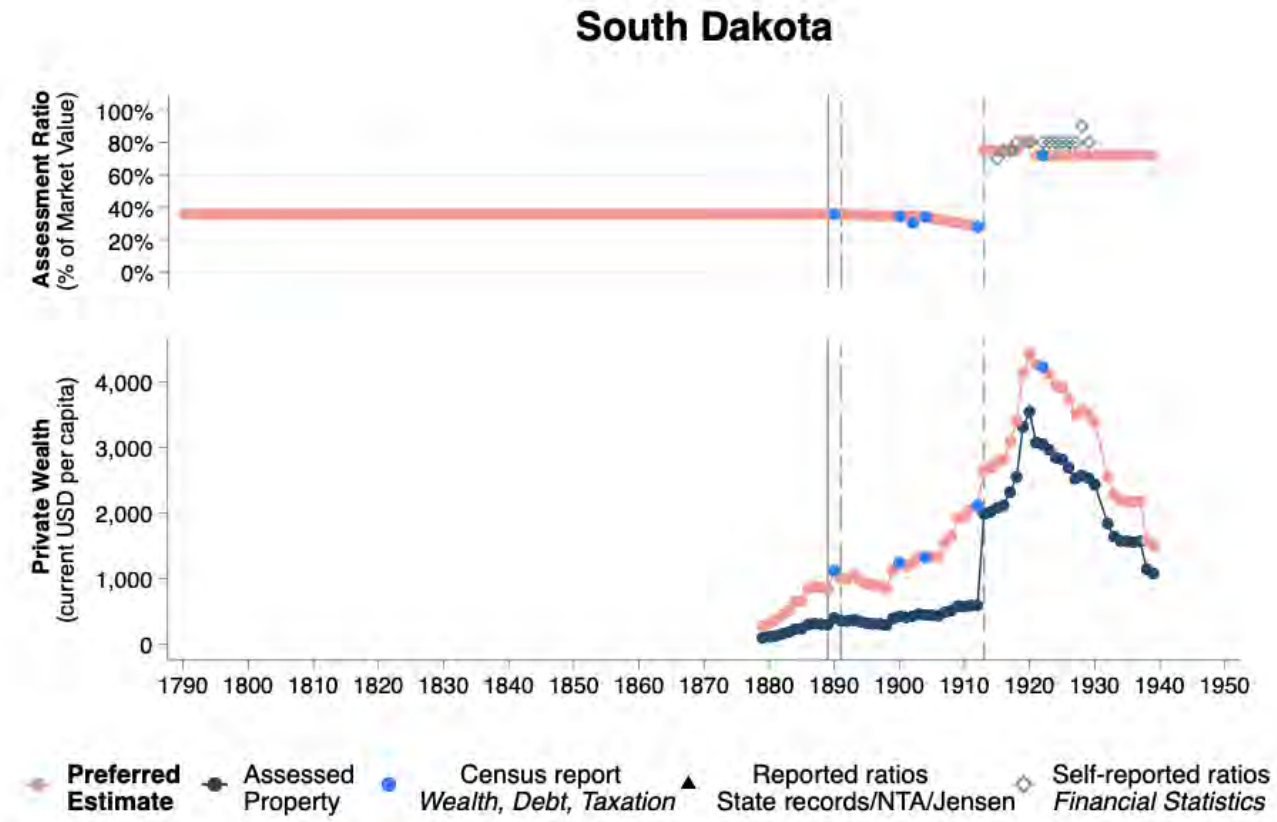
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

South Carolina



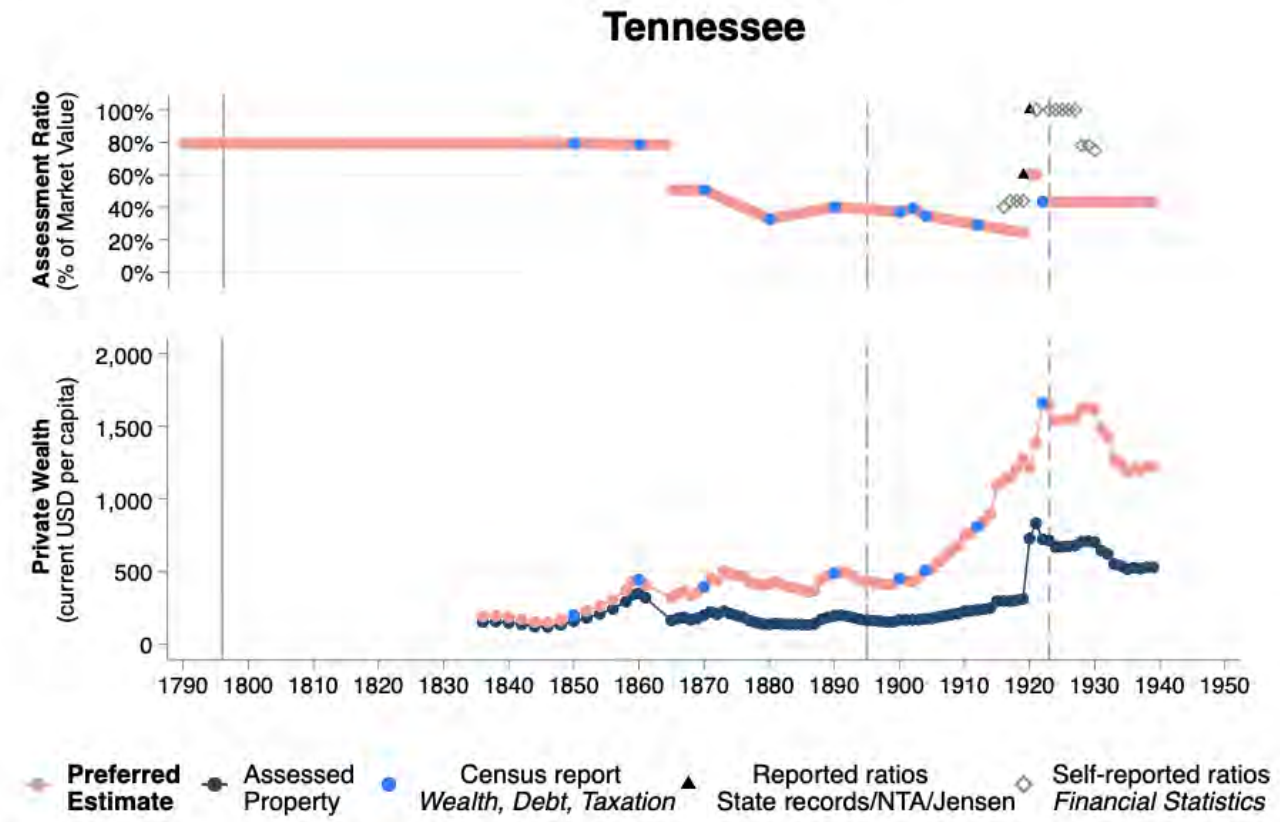
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

South Dakota



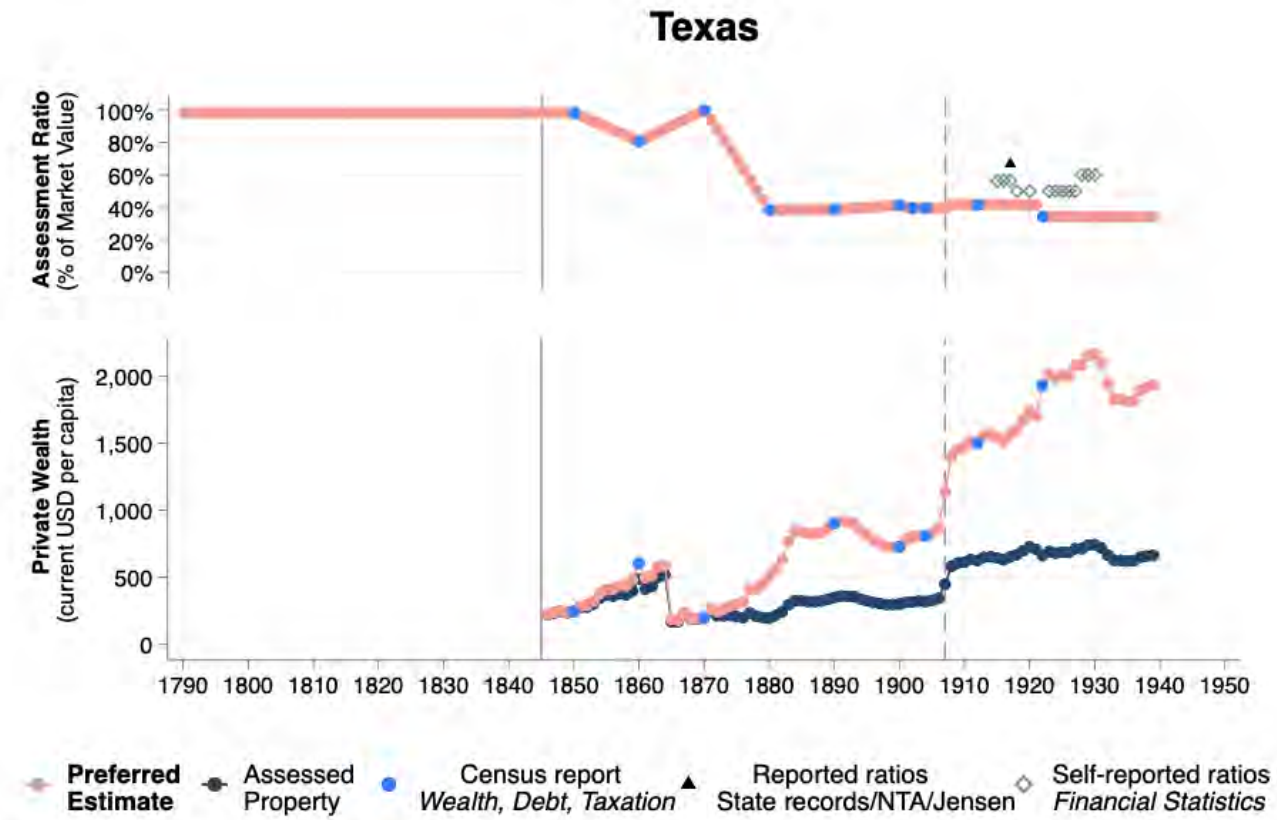
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Tennessee



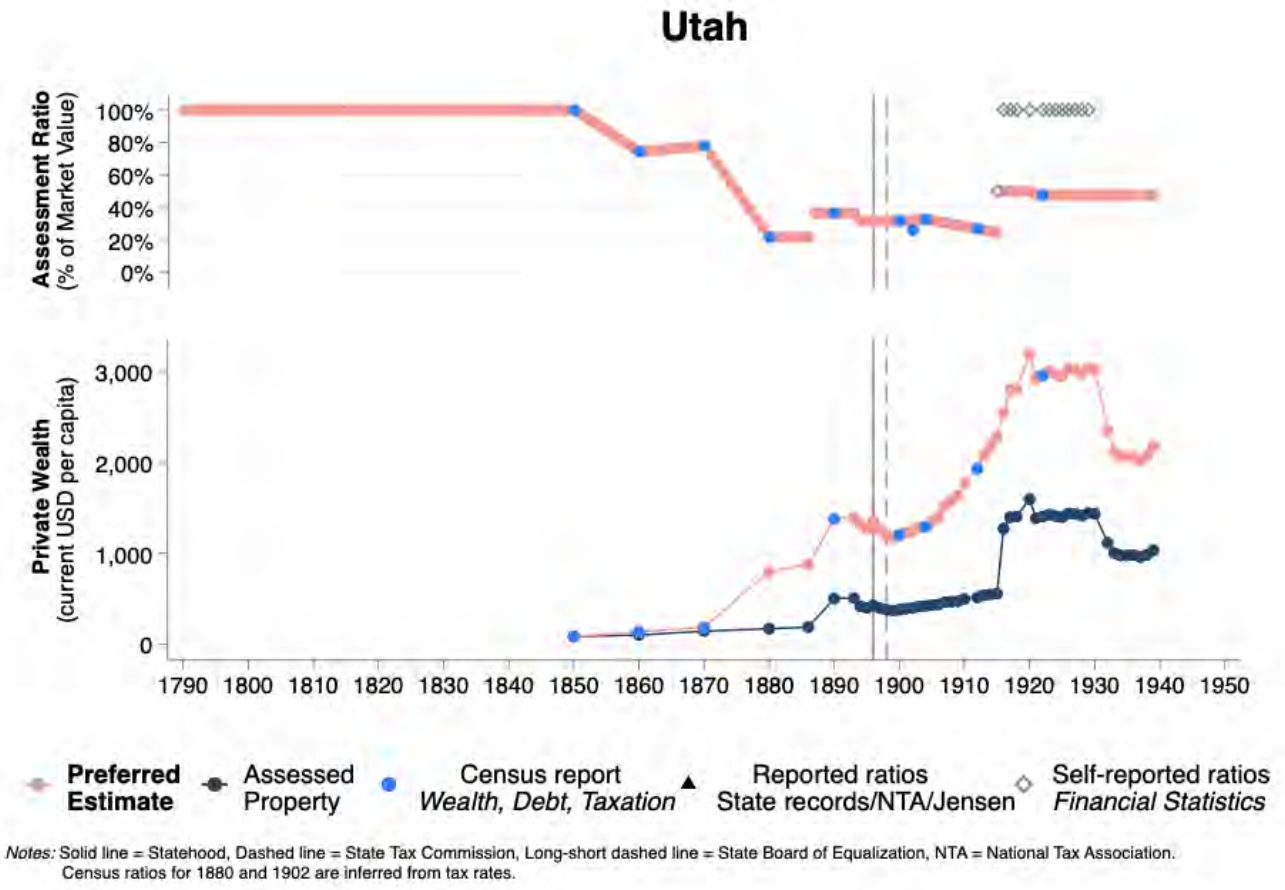
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Texas



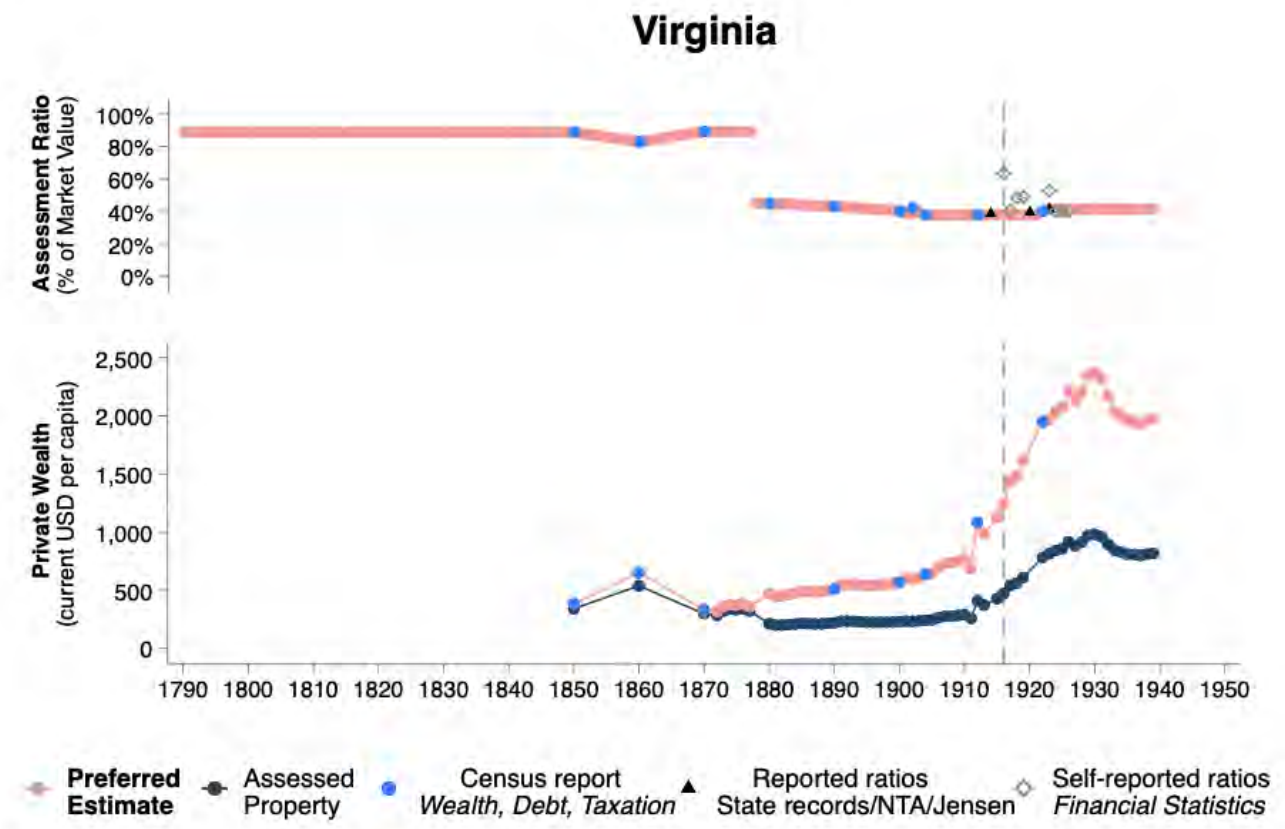
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Utah



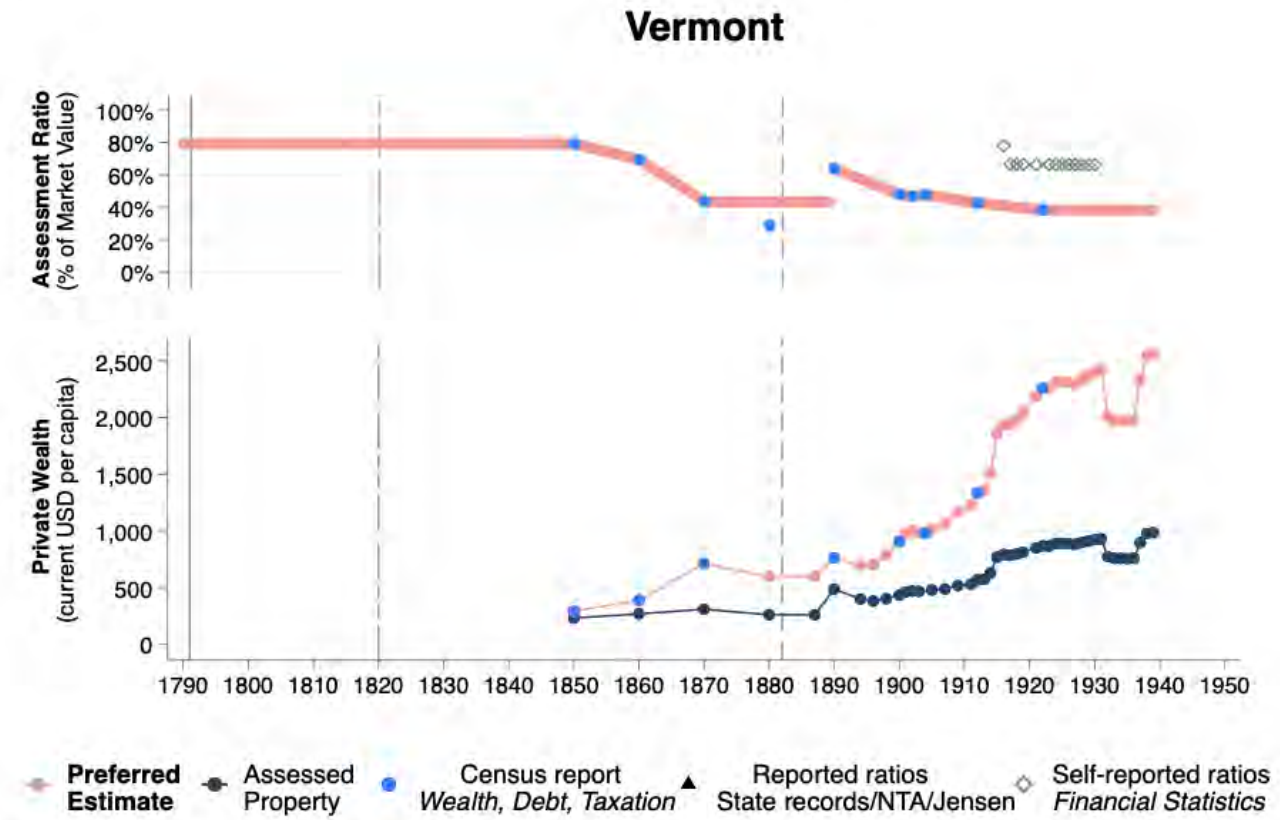
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Virginia



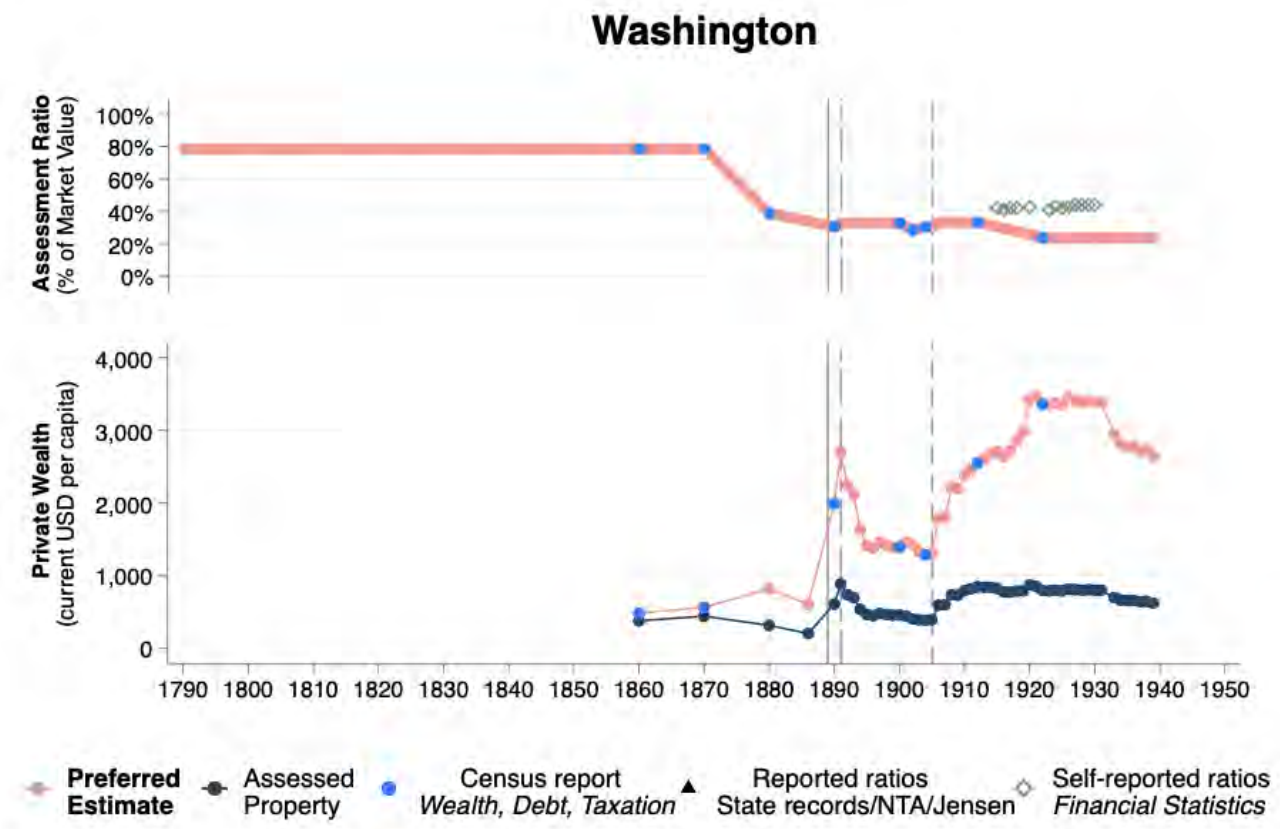
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Vermont



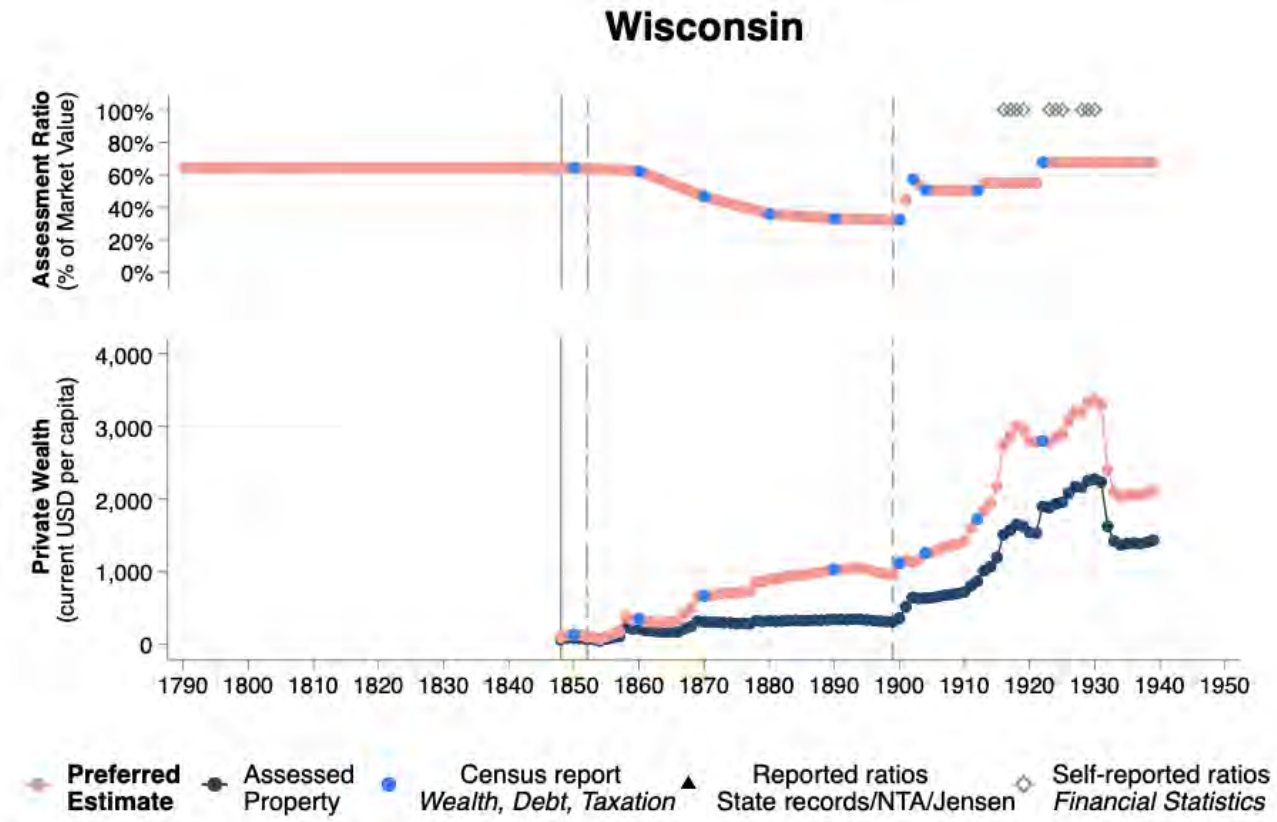
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Washington



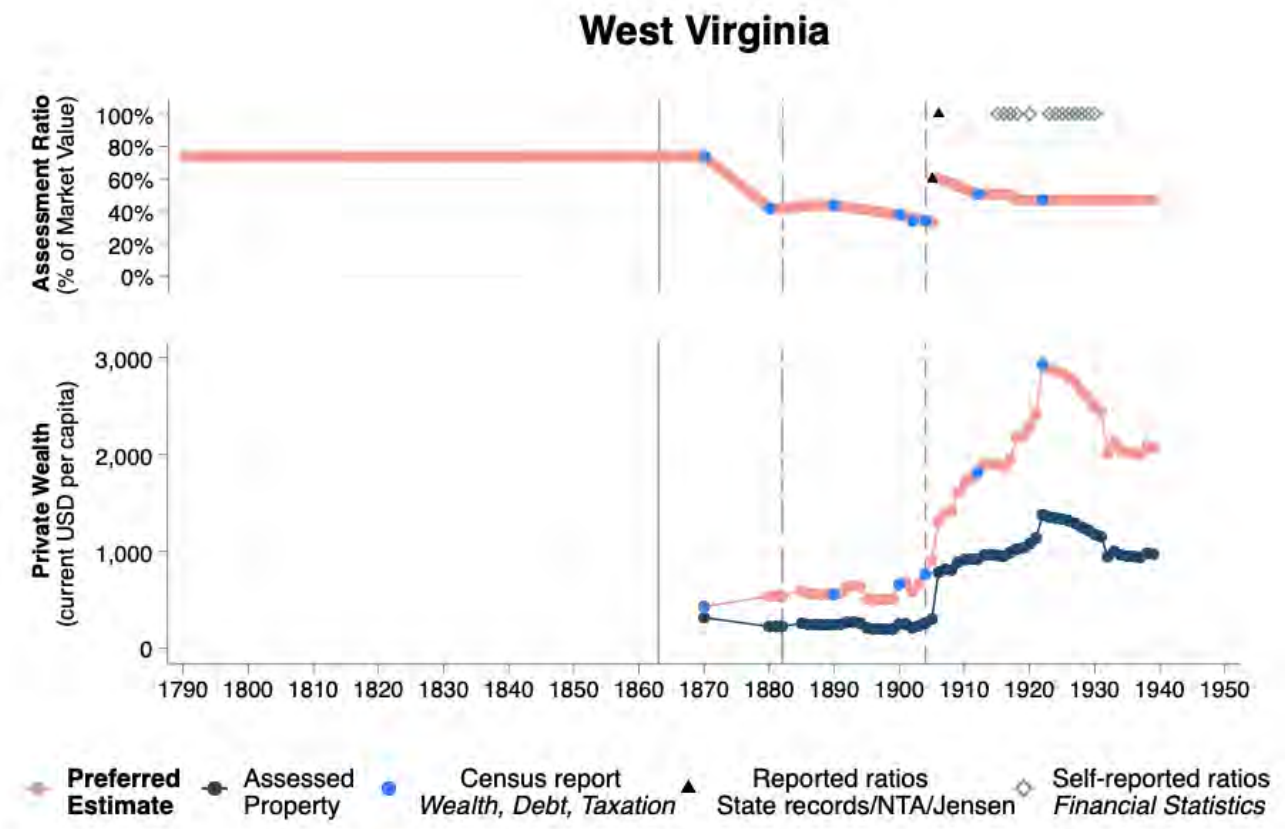
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Wisconsin



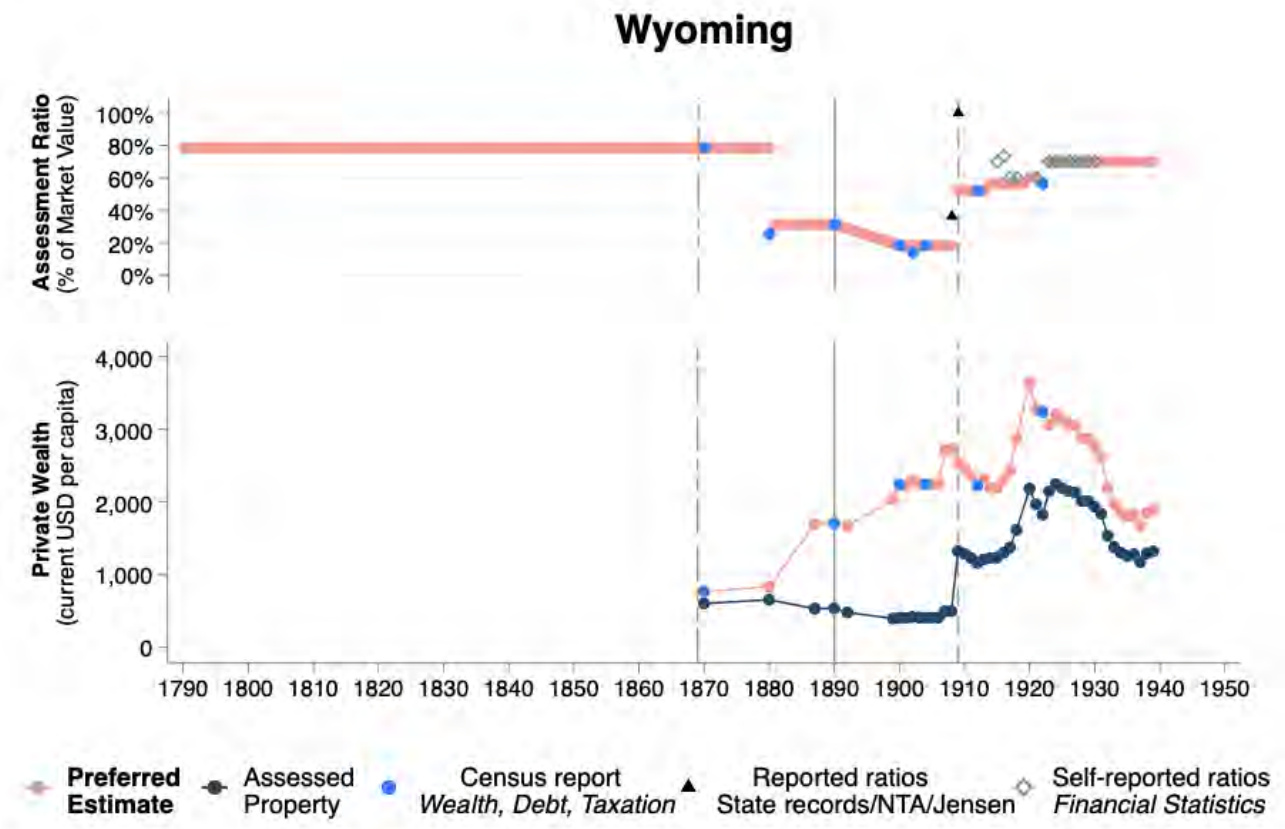
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

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.

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.

III.4. County Level property data

1870-1930 decadal data. We construct county-level property using assessed property for property tax purposes compiled in the Census Wealth Debt Taxation 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.3. For 1870, we have county-level assessment ratios from the Census report on Wealth, Debt, and Taxation[16]. We can thus compare the state assessment ratios described in Section III.3 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.

[16]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.

1850 and 1860 wealth estimation based on Census data. For 1850 and 1860, we obtain county-level wealth data from the Census, as described in Section III.1. 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

$$\rho_{s,t} = \frac{W_{s,t}}{\sum_{c \in s} w_{c,t}} \tag{2}$$

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

$$\widetilde{w_{c,t}} = \rho_{s,t} * w_{c,t} \tag{3}$$

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.

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.2.

III.5. National wealth series

Our national wealth series are based on the aggregation of state-level wealth series (from Appendix III.3). It is worth distinguishing the method used before and after 1850.

Post-1850 We measure the national wealth per capita as the population-weighted average of wealth per capita in each state, where state-level property is constructed as explained in Section III.3.

Pre-1850 Prior to 1850, we lack systematic information on wealth per capita for all states in the Union. The coverage of our data in terms of population can be seen in Figure 4. Figure A24 shows data coverage in terms of states, where the line "States with raw

property valuation (no imputation or interpolation)" shows the coverage of the raw data before any interpolation or imputation.

Therefore, 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:

$$\tilde{W}_{it} = \frac{R_{it}}{\tilde{\tau}_{it_{first}}} \tag{4}$$

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 A24.

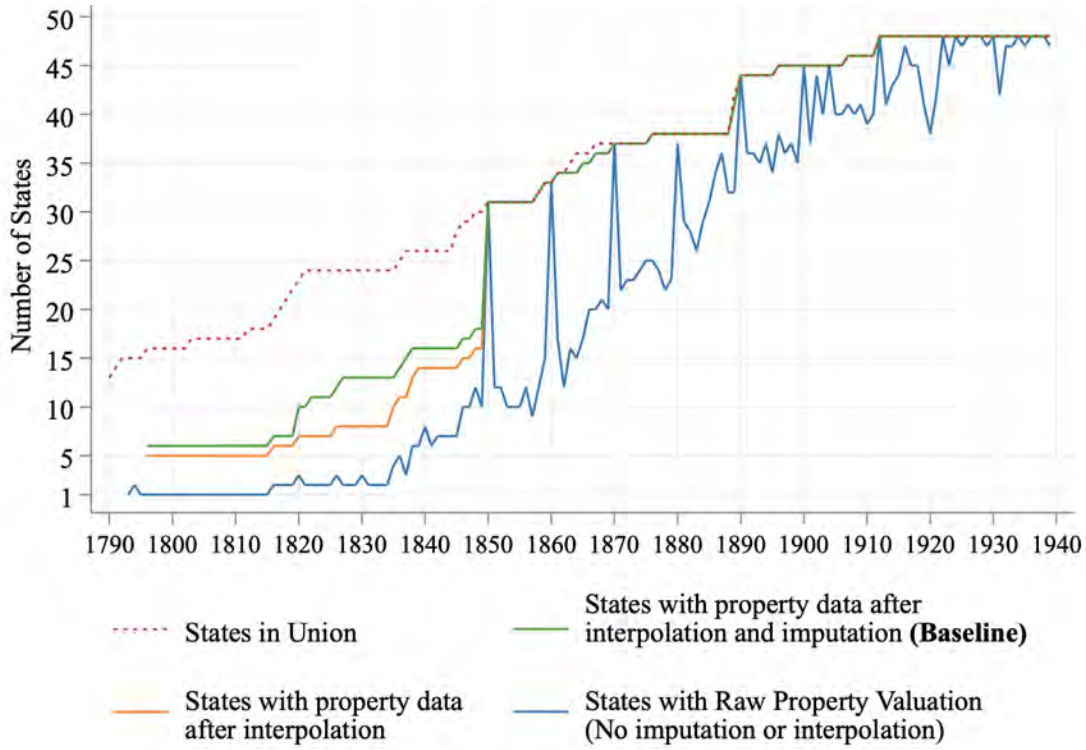
(2) We obtain a national wealth estimate for each year by rescaling the sum of total wealth from states with observed wealth in that year (either directly, or through the imputation in equation (4) by the share of national wealth from these states in 1850 (1850 is the first year when wealth is observed 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

$$W_t^{nat} = \sum_{i \in I_t} W_{it} \cdot \frac{W_{1850}^{nat}}{\sum_{i \in I_t} W_{i,1850)}} \tag{5}$$

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 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 (4) (line "Pre-1850 Imputation from Levy"). In the final series, we also rescale pre-1850 national wealth series using formula (5) (line "Pre-1850 wealth rescaling"). As we can see

Figure A24: Data Coverage at the State Level



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.

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 (5) 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.3, 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 6).

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.7:

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.1. 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.7.

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.7.

3. **Measures of wealth based on national balance sheets data from national accounts.** Such information only becomes available in 1916 for the US, 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 Other Sources

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

III.7.1. Comparison with the Census of Agriculture Data at the state level

In Figure 9, 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 (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.7.2. Comparison with the IPUMS USA Full Count

At the state level, Figure A11 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 A12 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.7.3. 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 US 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 (1898). Piketty and Zucman (2014) make two adjustments: (i) they exclude consumer durables[17] (ii) they upgrade household net wealth by 7% for consistency

[17] 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).

with their post-1945 data. Kopczuk and Saez (2004) estimates also exclude non-transmissible wealth.

III.7.4. 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 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.8. 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 US 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: Wealth, Debt and Taxation (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 US 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 Wealth, Debt and Taxation of 1902 by the US 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 A8: 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 3, the numerator is the levies such as computed for Figure 1. The denominator is the property valuation. For Panel D of Figure 15, the sources are similar to those just described but we use total revenues by state.

III.9. Data Appendix Tables

Table A9: Overview of wealth data series constructed

Variable	Unit	Period	Frequency	Sample	Sources	Note
Total Private Property	County	1860-1930	Decennial	All counties	Census (1860-1870) *Wealth, Debt, Taxation* (1870-1930)	$N = 18,242, n = 3,159, \bar{T} = 5.8$
	State	1793-1940	Annual	All States + Alaska, Washington DC and Puerto Rico	State reports, Ely (1888), Census (1941) *Financial Statistics of States* (1915-1939)	$N = 4,583, n = 52, \bar{T} = 88.1$
Real Property	County	1860, 1870, 1910, 1920, 1930	Decennial	All counties	Census (1860-1870) *Wealth, Debt, Taxation* (1870-1930)	$N = 10,200, n = 3,089, \bar{T} = 3.3$
	State	1826-1940	Annual	All States + Washington DC and Puerto Rico	State reports, Ely (1888), Census (1941) *Financial Statistics of States* (1915-1939)	$N = 2,227, n = 51, \bar{T} = 43.7$
Personal Property	County	1860, 1870, 1910, 1920, 1930	Decennial	All counties	Census (1860-1870) *Wealth, Debt, Taxation* (1870-1930)	$N = 10,160, n = 3,092, \bar{T} = 3.3$
	State	1826-1940	Annual	All States + Washington DC and Puerto Rico	State reports, Ely (1888), Census (1941) *Financial Statistics of States* (1915-1939)	$N = 2,161, n = 51, \bar{T} = 42.4$
Property tax rate	County	1870-1930	Decennial	All counties	*Wealth, Debt, Taxation* (1870-1930)	$N = 16,243, n = 3,204, \bar{T} = 5.1$
	State	1816-1940	Annual	All States + Washington DC and Puerto Rico	State reports, Ely (1888) Financial Statistics of States (1915-1939)	$N = 2,753, n = 51, \bar{T} = 54$
Assessment ratio	County	1860-1930	Decennial	All counties	State reports *Wealth, Debt, Taxation*	$N = 23,071, n = 3,368, \bar{T} = 6.7$
	State	1798-1940	Annual	All States + Washington DC and Puerto Rico	State reports *Wealth, Debt, Taxation*	$N = 5,289, n = 52, \bar{T} = 101.7$

Table A10: 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 A10 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 A10 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

Table A10 continued from previous page

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*a*)
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 A10 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 A10 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

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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 A10 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.10. Additional variables: geography, weather, occupations, and demographic characteristics

III.10.1. County level

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: WorldClim.org
- Average Maximum July Temperature
  - Unit: Celsius Degrees
  - Source: WorldClim.org
- Average January Precipitation
  - Unit: millimeters
  - Source: WorldClim.org
- Average July Precipitation
  - Unit: millimeters
  - Source: 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 population, 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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