

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, and high-frequency wealth series at the city, 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 show that spatial inequality in the US was large and highly persistent since the mid-1800s, in large part driven by Southern states. Before the Civil war, enslaved people were assessed as personal property of the enslavers, which is both 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. Finally, we highlight the importance of local public policies, notably spending on education and property taxes, for long-term capital accumulation. Using variation in property tax rates for more than 300 municipalities, we also find significant elasticities of the local capital stock, driven by extensive (migration) margin response and capitalization of property taxes into the value of local assets.

Keywords: taxation, wealth tax, wealth, inequality, convergence, property tax

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1 Introduction

At the turn of the 19th century, a system of comprehensive and sophisticated wealth taxation 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 \(1984\)](#) p.265), they were typically based on land.¹ The Danelgeld was the first system of land taxation in Europe after the fall of the Roman empire, initially meant to pay off Viking invaders and eventually becoming a nationwide tax. England's Land Tax was a major financing tool for its government in the 18th and 19th century that was also adopted in the British colonies in North America. The key US innovation was to apply a tax to all types of property, not only land. The General Property Tax (GPT) in the US was a comprehensive tax on all property, including personal and financial wealth, in addition to real estate and real assets. This essentially made it one of the first "wealth" taxes.

For a period of 90 years, the GPT remained a central tenet of the political and economic system of the US, 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, as it was replaced by newer forms of taxation and sources of revenues. 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 of time. We collected, digitized, and organized many different historical sources, reports, and records of cities, counties, and states. This allows us to 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, county, and city level over a long time period: 1800-1935 at the national level, 1850 or earlier (depending on the state) to 1935 at the county and state levels, and 1899 to 1938 at the city level. While there exist historical national wealth estimates, 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, long-run subnational measures of property.

¹One 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 ([Krennek and Schratzenstaller \(2018\)](#); [Aebi and Eckert \(2020\)](#))

We use this new data to answer the following core questions: First, how did aggregate 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 show that the US experienced exceptionally rapid growth in wealth after the Civil War and that growth in wealth was much faster than growth in income. The US had larger GDP per capita than France or the UK since the late 1870s but a significantly lower wealth-to-GDP ratio over the whole 19th century. Wealth-to-GDP ratios in the US only caught up with Europe after World War I.

Thanks to the high frequency of our data, we can study the changes in wealth around major events, such as the Civil War, and highlight the role played by 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 appears 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 personal property of the enslavers and assessed as such for tax purposes. This is morally abhorrent and means that 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 actually were pre-Civil War. For instance, Georgia, North Carolina, or Alabama, had more than 50% of their property in enslaved people and their property per capita declined by more than 30% between 1860 and 1870, above and beyond excluding enslaved people from the wealth measure. 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, and economic characteristics.

We then turn to studying spatial inequality after the Civil War. We show that the level of spatial inequality was high and persistent until 1930 and beyond despite powerful equalizing forces such as internal migration and the deeper integration of the US national market. The US exhibited much slower spatial convergence in wealth per capita over time than would appear from historical income data and the slow convergence is driven largely by Southern states.

The relatively slow convergence makes 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 what drives capital accumulation above and beyond convergence, conditional on

initial conditions. We start at the county-level– the most granular level for which we have comprehensive data over a long period of time– to study the determinants of long-term wealth growth and capital accumulation.

We find that geographical characteristics, such as climate (temperatures and precipitations) and topography, matter substantially for initial wealth but less so for subsequent growth. Some exceptions include soil productivity and proximity to the coast, which are significantly positively associated with long-run growth. A key predictor of both initial wealth and subsequent growth is the share of the population that is literate – a measure of local human capital. There seem to be positive agglomeration effects since counties with higher population in 1870 are wealthier and continue to grow faster. At the same time, migration appears to operate as a force that reduces spatial inequality, since places with higher population growth in a given decade experience lower wealth growth in the subsequent decade.

We can also show that structural transformation of the local economy over the course of development looks similar to that documented at the country level. More specifically, places with 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%, shows 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 large literature on the link between inequality and growth, which typically builds on cross-country evidence.

Finally, we turn to the municipality level to specifically explore the role of local public policies and property taxation. Municipalities are the jurisdictions that levy the bulk of property taxes and provide most of the public goods at the time and we can leverage our long-run, annual data on municipal taxes and expenditures for a large number of cities. We start by showing that public policies in general and property taxation more specifically can explain a substantial share of the variation in property per capita at the city level.

We then use the tax variation within cities over time to estimate the responses of local capital accumulation to tax rates. We find significant elasticities of capital income at the ten-year horizon of around 0.6. If we decompose this effect into an intensive and extensive margin, we find that 40% is due to migration effects (extensive margin) and the remaining 60% is due to the per capita property responses (intensive margin). Within the latter responses, we find that capitalization of property tax rates changes into the value of local real assets plays an important role, with a capitalization rate of

around .7. We also provide some direct evidence for tax competition between cities. For instance, smaller cities have much larger migration elasticities than larger cities and a city's property per capita is negatively associated with neighboring's cities' net-of-tax rates. Furthermore, tax rates among geographically proximate cities tend to be positively correlated.

Our paper contributes to four 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; and (iv) the impact of taxation on wealth accumulation. 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.8 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 and 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, there are no systematic estimates of wealth at the subnational level over the long-run and 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;

²Earlier historical wealth estimates are typically found for short periods of time and/or for a few states at a time ([Garmon Jr, 2014](#); [Jones, 1970](#); [Soltow, 1984](#)) as described in Appendix III.8.

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; Tous-saint, 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 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 of and spatial inequality in the US by providing a new, fine-grained, and consistent measure of economic activity, namely wealth and property. Our measures can be useful complements to existing measures of economic activity such as income (which is 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 of the key correlates of property and capital accumulation at the city, county, and state levels, adding to a 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, specifically agricultural output; Hornbeck (2012a) studies the effects of the American Dust Bowl on agricultural land values and revenues; Arthi (2018) considers its effects on human capital. Hornbeck (2012b) also emphasizes the role of the environment's influence on agricultural output and development. Fiszbein (2022) establish the important 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 land was converted into farmland at a rapid pace. Kim and Margo (2004) analyze the historical patterns of economic activity in the US at the city and regional level since colonial times.

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

⁴The correlation between income and wealth at the state-year level is around 0.6 and a regression of wealth on income yields an R^2 of 0.4.

We also study migration – domestic and international – which is one of the channels 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 subsequent economic performance is also highlighted in [Wright \(2022\)](#), [Hornbeck and Naidu \(2014\)](#), and [Engerman and Margo \(2011\)](#). We can measure the loss in property after the Civil War directly, complementing work by [\(Hutchinson and Margo, 2004\)](#) and [Feigenbaum, Lee and Mezzanotti \(2022\)](#). We thus complement work studying the wage gap between the North and the South before and after the Civil War ([Margo, 2004](#); [Goldin and Margo, 1992](#)) with new data on wealth and property.

Impact of taxation on wealth accumulation. Because the US property tax was historically a comprehensive tax on most property, it resembles a wealth tax much more than it resembles today’s property tax, which applies only to real estate. Thus, our paper sheds light on the effects of wealth taxes on wealth accumulation, an area for which the evidence is growing, but still relatively scarce.

In Sweden, [Seim \(2017\)](#) assesses the effects of the annual wealth tax and finds sizable elasticities, including a significant role for under-reporting. [Jakobsen et al. \(2020\)](#) also find large elasticities for Denmark. In Switzerland, canton-level variation in wealth taxes is leveraged by [Brülhart et al. \(2022\)](#) to estimate substantial wealth effects, driven in part by taxpayer mobility and house price capitalization. They argue that savings play only a small role, in light of the lack of third-party reporting. On the estate tax, [Kopczuk and Slemrod \(2000\)](#) consider the effects of the estate tax on wealth accumulation and avoidance behavior from 1916 to 1996 (see also [Joulfaian \(2006\)](#)). In France, [Goupille-Lebret and Infante \(2018\)](#) show that the inheritance tax exhibits small effects on wealth.

There has also been a resurgence of interest in modern property taxation and its distributional impacts ([Wong \(2020\)](#); [Avenancio-León and Howard \(2022\)](#); [Brockmeyer et al. \(2021\)](#); [Löffler and Siegloch \(2021\)](#)).

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 in the 10th century (under the name of *danegeld*), primarily as taxes on land (Benson et al., 1965). The key US “innovation” was to apply a tax on all classes of property and 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 tax 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.

First, the **universality** principle, often embedded in state constitutions, required that all classes of property be the 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 on the basis of value. This key concept allowed for the same tax *schedule* to apply to different classes of property,

⁵Fisher (1996) p206.

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

instead of having tax schedules depend on the kind of property being taxed and made the valuation of property a critical feature of the tax administration.

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

Fourth, property taxes were **local**. Local assessors – usually elected and often local residents themselves – listed and valued property and collected property taxes. This local characteristic of the property tax meant that sources of revenues were tightly linked to government spending. The property tax thus provided valuable benefits to local taxpayers in exchange of their tax payments, which made it sustainable – politically and economically– 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 made up more than 60% of all state revenues (Sylla and Wallis, 1998, pp. 281-282). Over the period 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.

Starting in the 1830s, 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 clauses that established the major characteristics of the general property tax discussed above.⁸

⁷Some property taxes were directly targeted at financing specific activities, such as taxes on school districts 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.

⁸Table 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 the formal inclusion in the constitutions.

2.4 The Property Tax 1842-1933

Our core period of study, 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, and 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. At the local level, our data shows that property taxes represented on average 64% of all city revenues in 1930 (see Appendix Figure A5).

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 more 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, and ownership and control or wealth became more difficult 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 movement of classification occurred, replacing the uniformity clause, and allowing for lower tax rates on intangible property.⁹

The Demise of the GPT After the Great Depression. The 1930s marked the era of income tax financing and more active federal government (Wallis, 2000, pp. 72-73).

⁹For an exposition of the need for classification, see Bullock (1908). See for instance Foote (1910) for a description of the experience in Ohio.

The reasons for the demise of the General Property Tax are still debated ([Hindman, 2010](#)), but it was likely driven by three interrelated changes.

First, after the Great Depression, the role of the federal government 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, which made the property tax less necessary, such as automobile license, fees, and motor fuel taxes, as well as 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 larger exemptions to property tax ([Fisher \(1997\)](#)). Finally, after WWII, homestead exemptions given to owner-occupied residence 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 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 continued to play a stable and significant role 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 data available, and how it can be used to get consistent measures of property across time and space. More details are provided in [Appendix II](#).

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 money and bank deposits, mortgages, debts and credits, stocks, and bonds. Before the

abolition of enslavement, enslaved people were considered to be 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 the composition of property– between 1865 and 1885. The figure highlights how extensive the tax base of the property tax used to be and provides some information on its composition. The bulk of assets consisted of dwelling, 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, other taxed individuals who owned shares of stock and bonds issued by corporations. But 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 finance were not double counted. There were some exemptions from the property tax, which varied by state. Most exemptions 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 which we cannot account for. Some examples include Treasury bonds, abatements for individuals (e.g., one \$25 watch in Vermont), or specific sectors (e.g., 10 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

¹⁰Special 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 *Impôt 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.10).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

In this section, we first describe 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 in order to input them into a usable database. We further had to make the data consistent over time and space by using assessment ratios as described below. At the state level, we also digitized the full primary sources, which contain an abundance of additional data, and created an exhaustive catalog of resources for each state. Because these primary sources change names over time and

¹¹These 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 A6).

are available in different collections and libraries, such a catalog can be useful for future research.

3.1.1 State-level data

Assessed property. We collected data from a variety of 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, in particular as relates to property taxation. The format and name of these reports varied from state to state, but were usually either called an Auditor's, 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 A11 gives the list of 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 as share of GDP for each of the states. We observe the value of property for most states since their admission to the Union and, for some, since the early 1800s. The data is naturally much sparser before 1850, which is why we focus our state-level analysis to the period starting in 1850. As shown in Figure 5, the share of the contemporaneous US population living in states for which we have wealth data reaches 50% in 1820, then progressively increases to 80% 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 in addition to being morally repugnant. We therefore also provide wealth series excluding enslaved people from the property

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

variable, in addition to the series of wealth, as defined at that time, which included enslaved people.

There is evidence that the price of enslaved people was underestimated by tax assessors. We therefore 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 \(1988\)](#) 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.10](#). Among others, we use these data to compute effective tax rates.

3.1.2 County-level data

We collected data on county-level wealths 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, as well as the property tax rates for all counties. We supplement these statistics with data on real and personal property value from IPUMS full count data ([Ruggles et al., 2021a](#)), 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 make use of the Census individual-level data to impute wealth in Appendix [III.1](#).

3.1.3 City-level data

Our city-level data is extracted from the series *Financial Statistics of Cities* from 1899 to 1938. Following an act of Congress, this series was initially compiled by the Bureau of Labor Statistics from 1899 to 1938, and then continued by the U.S. Census Bureau until 1938. These publications aggregated information on municipal finance from the book of accounts of city governments ([U.S. Census Bureau, 1948; Bureau, 2006](#)). They contain detailed annual statistics on property taxes, including rates, revenues, property valuation, and assessment ratios for all cities with a population higher than 30,000 people for the period 1899 to 1931 (311 cities overall) and 100,000 people for the period 1932 to 1938 (95 cities). We also have a snapshot of similar data for 259 smaller cities with population between 8,000 and 25,000 in 1903. The data are harmonized for all municipal governments so that they are comparable across cities ([U.S. Census Bureau, 1899-1931, 1932-1938](#)). We also use these data sources to extract many variables related to government spending in various categories and tax enforcement (described in Section [5.2](#) and Appendix [III.5](#)).

3.1.4 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.7 describes these procedures in detail and presents multiple sensitivity checks (see Appendix Figure A12). 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 11.

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 as researchers may face in contemporaneous 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 era of the General Property Tax, 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 for the fact that the assessed value of a property reported by tax assessors may systematically differ from its true 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 for the purpose of property taxation 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 the rich information on assessment practices coming 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 it 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 individual state and depicts the time series of assessment ratios,

¹³For 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 A11 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.

¹⁴The Census considered these self-reported to be 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 make use of.

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 exhibits a sharp and sudden jump. These sorts of discontinuities may cast doubts upon 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 and, thus, in the US as a whole from around 82% in 1850 to 43% in 1922 (see also Appendix Figure A10 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).

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 the location of their owner. 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 in which they had their main residence. Strictly speaking, our measures at the county and state levels are measures of local property, rather than local wealth. Local property is an interesting measure per se since it captures local economic activity.

But 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 important amounts of property in other jurisdictions, and overestimate true local household wealth in jurisdictions where a lot of property is owned by non-residents. Our data unfortunately provides limited consistent information relative to cross-border patterns of asset ownership. But 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 the vast majority of states have a net cross-state position between -10% and +20% (with New York being by far the state whose residents hold

most wealth, namely 20%, 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, a significant share of local assets are held by residents of other states. However, for the bulk of states on the East Coast, the midwest, the South, and West Coast, local property is highly correlated with local wealth.

A final important note is that the distinction between property and wealth is attenuated 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, modulo net foreign assets, which at the time were very limited in the US.

3.2.3 Cross-validation

To validate the quality of our data on assessment ratios, we can use external sources of information on the market value of specific property. The Census of Agriculture conducted for certain states and years a thorough and independent assessment of the market value of farmland. This information was compiled by [Haines \(2014\)](#). Figure 9 compares our estimates of the market value of taxable land and improvements (for select states where this property category is reported separately) and the value of farmland land and buildings from the Census of Agriculture.¹⁵ Note that the definition of farmland and improvements is more restrictive than taxable land and improvements that we observe in the property tax data, as not all land is farmland. This explains the presence of a small, non-zero intercept in the log-log relationship depicted. Reassuringly, we find that the best linear fit line lies very close and is parallel to the 45-degree line, with an estimated slope of 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.

We can also 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 [A15](#) and [A16](#), show that for many states, the pictures are quite consistent between these two data sources, although there are differences across space and time. These differences can be explained by at least three factors. First, the IPUMS data is a measure of local wealth, while our estimates are measures of 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.

¹⁵Notably, 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.

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 of 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 19-th century, but experienced a dramatic accumulation of wealth over the period 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. The US started out at relatively low wealth-to-GDP ratios of around 300% in the early part of the 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 spur of growth led the wealth-to-GDP ratio to increase to almost 500%. World War I led to a steep decline of the wealth-to-GDP ratios to 300%. The wealth-to-GDP ratio then rose to almost 600% at 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.¹⁶ 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.

Comparison with existing national wealth estimates. Figure 11 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.9.

In brief, the “Goldsmith-Piketty-Zucman” series (Piketty and Zucman, 2014), are 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

¹⁶The GDP series come from Johnston and Williamson (2020) for the period pre 1929 and from the Bureau of Economic Analysis for post 1929 <https://www.bea.gov/resources/learning-center/what-to-know-gdp>. Precisely, those first estimates build upon the work of McCusker (2000) (for year 1793), Weiss (1992) (for years 1799, 1809, 1819, and 1929) and Gallman (1966) (for years 1839, 1849, and 1859).

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 over the period 1800 to 1870. This finer granularity allows us to, for instance, measure the big dip in wealth-to-GDP during the Civil war, which is missed by decadal data.

For the overlapping years, we can see that our series are quite well-aligned with these existing estimates. 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.

The US versus Europe. The US experience in wealth accumulation seems quite unique when compared to other countries for which wealth data exists. Cross-country comparisons are difficult given the uncertainty around measures of historical price deflators and exchange rates. However, we can compare wealth-to-GDP ratios, which indicate the wealth accumulation relative to the country’s income. Figure 12 depicts the wealth-to-GDP ratios in the US to those in France and the UK. While data from Bolt and Van Zanden (2020) shows that the US overtook Europe in the 19th century already in terms of GDP per capita, the US appears much poorer in wealth relative to the European countries over the whole course of the 19th century and until the end of WWI. The convergence in wealth per capita occurs when European countries’ wealth per capita drops sharply following WWI.

The different experience of wealth accumulation in the US is driven by both quantity and price effects, both peculiar due to its history. This history is better understood when looking at the the composition of wealth in the US which we reconstructed in Figure 13. Our data allows us to decompose US wealth in terms of four broad categories: real property, land, personal property, and property from enslaved people (which we discuss at length below).¹⁷ Early in the 19th century, the main source of wealth was land, which was abundant and cheap in the US compared to European countries. In fact, policies were specifically put in place to maintain a low price of land and allow people to buy it and settle in the US.¹⁸ This explains that the value of land as a share of GDP was significantly smaller in the US than in the UK or France: it

¹⁷For the construction of these graphs, particularly the enslaved wealth and the value of land, see Appendix III.2 and III.6

¹⁸These 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 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).

represented around 150% of GDP in the US compared to more than 300% in the UK. Furthermore, immigrants and settlers arriving in the US were usually not bringing large amounts of physical property or capital. This in turn explains why the amount of domestic capital beyond land and housing was also relatively small in the US in the middle of the 19th century. But, throughout the period 1840 to 1940, the US accumulated wealth at a fast rate, in the form of housing and other domestic capital, whose share in GDP increased significantly despite the rapid growth in GDP experienced by the country at the same time.

Regional wealth evolution We can also compute wealth series by region in the US. Panel A of Figure 14 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 how wealthy a given region is 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 largest 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 wealth per capita to US GDP per capita ratio and remained so until WWI.

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 some more light on Southern states thanks to the wealth data, particularly around the Civil War. Figure 15 presents some key statistics about the South.

Panel A shows the composition of property in Southern states. Enslaved people accounted for almost one half of total property. Panel B shows the variation across states in the value of enslaved people as a share of total property in 1860. In states such as Georgia, Alabama or Florida, enslaved people represented more than 50% of total property.¹⁹ After the Civil War, the value of land decreases and real property excluding land starts to gain importance as the economy was restructured.

Going back to Figure 14, we can compare the evolution of private property across the four US regions but 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’

¹⁹See Appendix Figure A17 for robustness checks and for shares at the county level.

stagnated. This pattern is also apparent at the state and county levels as well, as we show next.

Figure A19 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 wealth, including wealth from enslaved people; the right figure excludes wealth 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 0.54 between 1860 and 1870. Including enslaved people in the measure of property reduces the rank-rank correlation to -0.26.²⁰

Panel B depicts the decline in property per capita during the Civil War for all US states. The numbers represent the additional decline in property value, above and beyond the “mechanical” disappearance of wealth from 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 value of zero would therefore mean that a state has the same wealth in 1870 as its wealth in 1860, excluding wealth from enslaved. For instance, in Texas, where enslaved people represented 35% of total wealth (see Panel B of Figure 15), property values declined by the full amount of the share of enslaved wealth and an additional 57%. In Mississippi, where wealth from enslaved people was 44% in 1860, wealth in 1870 was another 53% lower than 56% of the wealth in 1860. By contrast, in Philadelphia, property per capita grew by 122% over that same decade. Panel C plots this shortfall in wealth for Southern states against the share of property from enslaved people in 1860. Although the relationship is noisy, it is clearly increasing. States with the highest share of enslaved such as Alabama or Mississippi witnessed some of the largest shortfalls in per capita property between 1860 and 1870. Two outliers are North Carolina and Tennessee, where the shortfalls are smaller than would be predicted based on their share of property from enslaved in 1860.

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 states and Northern states. In Northern states, effective tax rates were twice as high than in Southern states before the Civil War, reflecting significantly lower investments in public goods and infrastructure in the South. But the Civil War and the Reconstruction Era drastically changed the pic-

²⁰Appendix Figure A19 illustrates the difference between the evolution of wealth (from the IPUMS USA Full Count) and property (from our tax data). The property and wealth measures tell a consistent story around the Civil War.

ture 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.²¹ Our data allows 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, putting an end to the political experiment of the Reconstruction Era, and enabling the institution of the Jim Crow regime, tax rates quickly reverted back to around .6%, a much lower level than in Northern states.

4.3 The persistence of spatial inequality 1870-1930

The third set of descriptive facts that our data reveals pertains to the remarkably high level of persistence of spatial inequality in the US.

We start with Figure 17, 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 18 shows the equivalent statistics at the county level. The figures highlight that spatial inequality was high and persistent. For instance, Southern counties and states remained persistently poorer than those in the Northeast, Midwest, or West.

In Figure 19, we show that the persistence remained remarkably strong 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 this persistence formally, we perform several 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 20 plots the yearly standard deviation of log property per capita across states. The dispersion of property remains roughly constant. Appendix Figure A22 shows a similar pattern for the evolution of wealth dispersion across counties. Appendix Figure A23 focuses on a different metric: the share of total national wealth held by the top 10% of richest counties. It shows that property is quite highly spatially concentrated in the US, and that this concentration increased significantly over the period 1860 to 1930. By the

²¹On the history of public education and the racial gaps in education in the South, see also Goldin (1999), Margo (1990), and citettyack1986constitutional.

end of the period, the top 10% of richest counties accounted for about 70% of total US property.

Overall, there is therefore little evidence that spatial inequality in the US declined after the Civil war and until the Great Depression, despite the presence of several equalizing forces, such as internal migration and the deepening of the US internal goods and capital markets.

Rank-rank correlations at the county and state levels. Second, Panel A of Figure 21 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 a ten-year period and remains high (0.66) even over the full 60-year period. We see high rank-rank persistence at the state-level too (see Panel A of Appendix Figure A19). This indicates that, on top of the level of spatial inequality being high, “spatial mobility” was also limited: places that started poorer remained poorer. In other words, spatial inequality has been quite persistent.

Speed of β -convergence. Finally, we study the speed of convergence between poor and rich counties (resp. states) over time. For this, we first construct 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 or state, in terms of climate, soil, topography, and distance to waterways; ii) *Demographics* variables from Ruggles et al. (2021b) and Haines et al. (2010) that measure the population, change in population, literacy rate, share of foreigners, gender composition, and the share of white residents; iii) *Occupational shares* in public administration, production, mining, commerce, and agriculture from Ruggles et al. (2021b). These variables and their sources are defined more precisely in Appendix III.12.

To estimate the speed of convergence, we regress the change in private property per capita in county i between 1870 and 1930 on initial property per capita (in 1870), a constant, and a growing number 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:

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

Panel B of Figure 21 reports the estimated β for different sets of controls: i) no controls; and adding ii) *Geography*, *Demographics*, and *Occupational shares* controls. The

persistence we find without any controls corresponds to $\beta = 0.011$. Note that the scatter plot represents Southern counties in red. It is clear that these counties stagnate at overall lower wealth levels and lower growth rates: the β excluding Southern counties is 0.028. Furthermore, by adding controls, β increases to 0.025 and R^2 to 0.61. Thus, regional and geographical factors have strong explanatory power and convergence is relatively fast except for Southern counties which start and remain poorer in terms of property. Panel B of Appendix Figure [A21](#) replicates this same analysis at the state level, and yields an even smaller $\beta = 0.007$ over the period 1870-1930.

Convergence has usually been studied 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 the 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.

Taken together, our results indicate that despite the shock of the Civil War, the US experienced limited spatial convergence over the period 1870 to 1930. This slow convergence was in large part driven by the Southern states and led to persistent inequality in terms of property per capita across places that still reflects on the spatial inequality of income today.

5 The Correlates of Capital Accumulation

The previous analysis shows that the US experienced relatively limited spatial convergence after the Civil War and until 1930. We now turn to exploring the reasons for such slow spatial convergence using our rich and granular data. We want to document the characteristics of places that were poorer than others after the Civil War (“initial conditions”) and why some places fared better than others, conditional on their initial conditions.

The section proceeds in two steps. We start at the county-level– the most granular level for which we have comprehensive data over a long period of time– to study the determinants of wealth and capital accumulation. We then turn to the municipality level to specifically explore the role of local public policies and property taxation. The municipal level is the most natural level to study public policies for two reasons. First the municipalities are the jurisdictions that levy the bulk of property taxes (and impose

the largest tax rate, as shown in Panel A of Figure 3) and fund and provide most of the public goods over this period (see Section 2). Second, we have annual data on municipal taxes and expenditures for a large number of municipalities over a long time period.

5.1 Correlates of initial property per capita and of capital accumulation

We start our analysis at the county level. Linking back to our previous convergence analysis in Figure 21, there is slow convergence conditional on initial property $W_{i,1870}$, but convergence is faster when controlling for additional characteristics. We therefore ask two questions:

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

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

We include in $\mathbb{X}$ the same set of (standardized) variables related to *Geography* (which are time-invariant at the county-level), *Demographics*, and *Occupational Shares* as described in Section 4.3. The estimated coefficients in γ_0 are shown in Panel A of Figure 22.

2. Which characteristics in $\mathbb{X}$ are correlated with the growth in property per capita over the period 1870 to 1930? To this effect, we plot the estimated coefficients γ from specification (2) in Panel B of Figure 22.²²

5.1.1 Geography, demography, and economic structure.

Geography. Figure 22 shows that characteristics related to *Geography* are strongly correlated with initial wealth in 1870 but much less so with subsequent growth (controlling for initial wealth). Climate is an important predictor of initial wealth. For instance, a one standard deviation higher temperature in July – characteristic of Southern counties – is associated with a 25% lower initial wealth, but has no correlation with subsequent growth. More abundant winter precipitations – indicating harsher winter conditions – are associated with significantly lower initial wealth as well as with

²²Tables A2-A3 show more detailed regression results at the county level, including for wealth growth over 10 years and adding state fixed effects. For completeness, we also show in Appendix Figure A24 and Appendix Table A4 the results from similar regressions, at the state level. These estimates reveal similar patterns in terms of the role of geography, demography and occupational structure.

slightly lower growth. Topography— as captured by elevation and ruggedness — is negatively related to wealth in 1870, but not significantly correlated with growth in wealth over the long run. Soil productivity appears like an exception since it is not associated with significantly higher initial wealth but correlates positively with long-run growth.

Overall, these results suggest that counties significantly differ in terms of environmental advantages or disadvantages, and that these differences affected wealth levels in 1870 but did not seem to affect the subsequent local growth path. Thus, environmental advantages appear broadly neutral in terms of convergence.²³

Demography. *Demographic* variables are strongly correlated with both initial property stock in 1870 and subsequent long-run growth. Among them, proxies for education levels and the local stock of human capital, such as literacy rates, exhibit the highest correlation. Agglomeration effects also seem to matter. In 1870, wealthier counties had somewhat higher population levels, and initial population levels in 1870 are positively associated with growth over the long-run. These results are consistent with the scale 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. While initial population size and composition matter for growth, migration seems to operate as a force that reduces spatial inequality. 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.²⁴

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. Figure 22 shows that counties with a higher level

²³These findings are in line with the results in Hornbeck (2012b) who finds that, for a subset of Plains counties for the period 1920-2002, environmental characteristics had a constant relative influence on agricultural land values.

²⁴Collins 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).

of specialization in manufacturing, mining, or in commercial occupations were significantly richer in 1870. More agricultural counties, to 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 \(2014\)](#)). Interestingly, Appendix Figure [A25](#) reveals that the structure of occupations at the county level follows the same evolution as the one found at the aggregate country level. The figure displays binscatters of the share of the county population employed in agriculture, manufacturing, and services as a function of county log property per capita. The fraction employed in agriculture declines steadily and the fraction in services increases as county's property per capita increases. The fraction employed in manufacturing follows a characteristic hump shape, first increasing then decreasing as counties grow richer. This evidence suggests that “structural transformation” away from agriculture is a relevant pattern of development even at the local labor market level.

5.1.2 The blight of enslavement.

Section [4.3](#) demonstrated that the experience of Southern economies is key to understanding the lack of spatial convergence in the US after the Civil War: the speed of both σ -convergence and β -convergence is significantly faster when omitting Southern counties. 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 document 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 [22](#) show that counties in which enslaved property 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 almost 10 p.p.

We can also 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 23 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 also 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 the introduction of our large 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 explicit controls for the level of initial inequality after the Civil War. We use the IPUMS Census data (Ruggles et al., 2021a) to create county-specific measures of the local concentration of wealth, such as the share of total wealth in the county held by the top 10% of richest households. 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 A26). Nevertheless, we find that a strong negative and significant correlation between enslavement and growth remains, even when controlling for initial inequality.²⁵ Appendix Table A5 shows that the estimated correlation between the fraction of 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 therefore not only through high levels of wealth inequality after the Civil War. Indeed, systemic policies and the Jim Crow regime played an important role, by preventing wealth accumulation by Black Americans in the South. Conditional on initial wealth, Black Americans got significantly lower returns and saving flows, affecting the speed of convergence (Derenoncourt et al., 2022).

5.1.3 The shadow of inequality

Although we found, like Nunn (2007) that inequality was not the main reason for the lasting legacy of enslavement on capital accumulation in the South, we nevertheless reveal a large negative correlation between initial inequality levels, measured by the

²⁵This confirms results from Nunn (2007). who, using cruder data on land inequality in 1860, also finds no support for the hypothesis in Engermann and Sokoloff (2000) that the legacy of slavery on future development was mediated by initial inequality.

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 22).

There is a vast literature on the link between growth and inequality, which mostly 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 and, importantly, in the same country and even state. This allows us to keep fixed many factors, including e.g. institutions or cultural factors.

We explore the relationship between local (county-level) inequality and long-term growth in Figure 24. 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 $\mathbb{X}_i$ (i.e., geography, demographic, occupational shares, and enslaved property share). Very 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 the top 10% wealth share of a county is associated with 20 percent lower growth of property over the subsequent 60 years.

To understand the potential mechanisms underlying this strong negative correlation, we explore, in a mediation analysis, the roles played by the evolution of various other characteristics of the local economy. We run specifications of the following form:

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

where the vector $\mathbb{Z}$ includes changes in the composition of the population, its level of education, or 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.²⁶ The results in Appendix Tables A6 and A7 indicate that the most important mediator is the pace of human capital accumulation

²⁶The algorithm is as follows. Pick one of the mediating variables, Z_j . We select the mediator variables from the vector $\mathbb{Z} = \{Z_1, Z_2, \dots, Z_n\}$ 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.

as captured by the change in the literacy rate of the local population. In itself, lower literacy rates in areas with higher inequality 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.

5.2 The role of public policies and taxation

The preceding results suggest that wealth accumulation differed markedly across space in the US over the period 1870 to 1930, and that local demography, the economic and social structure, enslavement, and the initial allocation of wealth all contributed significantly to explaining the spatial variation in the growth rate of local property. We now turn to the role of public policy, specifically taxation. We study their effects at the municipality level for the two reasons outlined at the start of Section 5.

5.2.1 Which factors are correlated with higher local property per capita?

To gauge the importance of public policies and property taxation in explaining local capital accumulation, we start with a variance decomposition exercise. We try to explain the variance in property value per capita at the municipal level in 1931 using the same set of regressors $\mathbb{X}$ (geography, demography, economic structure), as in section 5.1, now also adding to the model 19 variables related to public policy (see Appendix III.5 for a detailed description of the definition and sources). We group these additional variables into four categories. First, we include *Government Expenditures*, which comprises the average yearly total municipal government expenditures, as well as average expenditures in nine categories (Health, Sanitation, Highways, Public Assistance, Education, Recreation, Public Order, General Government, and a residual category), and the average interest rate on municipal bonds over the period 1920 to 1930. Second, we use *Tax Enforcement* variables, which are indicator variables for the existence of a State tax commission, the presence of tax ferrets, and property tax classification.²⁷ Finally, we capture the local history of the property tax using *Assessment Ratios* and *Tax Rates*.

²⁷State tax commissions were set up in many states to harmonize assessments across municipalities and improve the quality of enforcement of the GPT. Tax ferrets were private tax investigators, employed by state and local tax officials to facilitate the collection of general property taxes, and compensated using a bounty system. Tax classification, which appeared in the 1910s and 1920s, allowed states to tax different types of property in a non-uniform manner, which presumably led to variations in the quality of assessment of different classes of property.

The latter contain ten-year averages of the log effective net-of-tax rate on property between 1900 and 1930. We focus on the 153 municipalities for which we have consistent and continuous data for all these variables for the period 1900 to 1931.

We start with a simple linear model estimated using OLS to compute the contribution of each group of variables to the total variance in municipal property per capita.²⁸ Panel A of Figure 25, which reports the results, shows the important role played by geography, demography, and the occupational structure of the economy, as was the case at the county level. Together, these variables explain around a quarter of the total variance in per capita municipal property. But the graph also suggests that public policy variables are key determinants of the spatial allocation of per capita property and account for about 25% of the total variance. In particular, the sequence of past property tax rates from 1900 to 1930 explains around one-tenth of the variance across municipalities in 1931, around as much as the share explained by total municipal government expenditures and spending in various categories.

We confirm that local public finances matter for the spatial allocation of property using a more sophisticated prediction model. In panel B of Figure 25, we report a “variable importance” plot from a random forest model that allows for more flexible interactions between all variables in the model.²⁹ The figure plots the “importance” of the ten most important variables in the model, relative to the variable with the strongest importance, which, in our model, happens to be the fraction of government expenditures on education. While geography and the structure of government expenditures matter, average past tax rates (for the last two decades) appear among the ten most important variables of the model as well. Overall this evidence confirms that local public policies, and in particular education policies, are important determinants of local wealth accumulation. It also suggests that the past dynamics of property taxes may be an important determinant of the spatial dispersion of wealth across US cities.

²⁸More precisely, we add each variable sequentially in the linear model. 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.

²⁹To obtain this plot, 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 observation 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 recoded and attributed to the variable that is used for the split. At the end, we sum up, for each variable, all the improvements in RMSE within a tree and across all trees attributable to this variable. Hence, each variable contributes in total to a certain amount of RMSE improvement. For each variable, we then normalize the contribution to RMSE improvement to that of the variable with the highest contribution.

5.2.2 Elasticity of the Local Capital Stock

To better understand the relationship between property taxes and the long-run evolution of per capita property at the beginning of the twentieth century, we use the rich within-municipality variation in property tax rates over time.

Empirical strategy. We estimate a distributed leads and lags model with two-way fixed effects. The conditional expectation of outcome Y in municipality i in year t is:

$$Y_{it} = \sum_{k=-10}^{k=5} \gamma_k \tau_{i,t+k} + \mathbb{X}'_{it} \gamma + \eta_i + \zeta_t \quad (4)$$

where $\tau_{i,t}$ is the effective property tax rate in municipality i in year t . We allow for five leads of the tax rates (to identify potential pre-trends) and ten lags to measure the longer-run dynamic effects. The vector of controls $\mathbb{X}$ includes the same set of demographic and occupational covariates as before, transformed into ten-year rolling-averages (from $t - 10$ to $t - 1$), as well as state $\times$ year fixed effects.³⁰ We also control for the key policy variables described above. Thus, we include leads and lags of total local government expenditures to account for the fact that changes in tax rates may be endogenous to local public expenditure needs, which may themselves be correlated with the evolution of local property values. Hence, we identify the effect of property taxation conditional on local amenities, or equivalently of shifting the burden of financing local expenditures towards property. We also include all tax enforcement variables and leads and lags of local assessment ratios in order to focus only on the variation in effective tax rates that come from effective decisions of the local authorities rather than on the discretionary behavior of local assessors.

Tax variation. To get a sense of the underlying variation in effective tax rates that contributes to our identification, Panel A of Appendix Figure A27 shows the distribution of tax rates across cities. In panel B, we residualize effective tax rates on the vector of controls $\mathbb{X}$ as well as the time and municipality fixed effects, and display the distribution of the first-difference of these residualized effective tax rates across cities over time. More than 20% of residualised tax changes are larger than .13 p.p., which is large relative to an average effective tax rate of around .9% in our estimation sample of municipalities. In Appendix Figure A28, we further show that residualised tax changes exhibit very little serial correlation. This implies that the variations in effec-

³⁰Note that we drop the variables related to geography in the vector of controls $\mathbb{X}$ because they are time-invariant and absorbed in the city fixed-effects.

tive tax rates that we are exploiting are independent of the past evolution of tax rates, and that they translate into extremely persistent changes in effective tax rates.

Dynamic elasticity estimates. The dynamic impact of the effective property tax rate on the local stock of property can be seen in Figure 26. The graph plots the cumulative responses to a tax rate change in $t = 0$ accounting for potential anticipation up to 5 years before, as estimated from specification (4), using the log of total property value as an outcome. For each year j relative to the tax change, we plot the estimated coefficient $\hat{\alpha}_j = \sum_{k=-j}^5 \hat{\gamma}_k$, which corresponds to the cumulated estimated effect of the tax change up to year j . The results show that a tax increase event triggers a significant decline in total property values, which stabilizes after about three to four years. To get a sense of the magnitude of the effect, we can express the response as an elasticity of the total stock of property with respect to the net-of-average tax rate. Because the average tax rate τ is small, $d \ln W / d \ln(1 - \tau) \approx -d \ln W / d \tau$, this elasticity can also be interpreted as the impact of a 1 p.p. increase in the effective tax rate on property. As can be immediately read off the graph, the elasticity is large at around 20: increasing the tax rate on the local stock of property by 1 p.p. reduces the value of the stock of property by 20% after ten years. This elasticity is twice as small as the estimates from Brülhart et al. (2022) in Switzerland, but very close to the estimates from Jakobsen et al. (2020) in Denmark.

However, the elasticity of the stock of wealth with respect to the net of tax rate on wealth is bound to be large and may be hard to interpret. Instead, we can express the result in terms of the implied elasticity of the *flow* of capital income $r \cdot W$ (in short “capital income”) with respect to the net-of-tax rate on capital income $t = \tau / r$ where τ is the average effective tax rate on property, and r is the interest rate. This makes the result easily comparable to elasticities of taxable income estimated in the public finance literature. In Table 2, we focus on this long-term implied elasticity of capital income flow by reporting estimates from the following specification:

$$Y_{it} = \varepsilon \ln(1 - \bar{\tau}_{i,t-10,t} / \bar{r}) + \sum_{k=1}^{k=5} \gamma_k \ln(1 - \tau_{i,t+k} / \bar{r}) + \mathbb{X}_{it}' \gamma + \eta_i + \zeta_t \quad (5)$$

This specification differs from (4) because we replace the tax rate by the log of implied net-of-tax rate on capital income $\ln(1 - \tau_{i,t} / \bar{r})$, where $\bar{r}$ is the average risk free interest rate. We use $\bar{r}=2.5\%$, corresponding to the average 1-year US Treasury bond yields over this period (Siegel (1992), NBER (2023a) and NBER (2023b)). We also use the moving ten-year average of the net-of-tax rate in city i (from $t - 10$ to t), denoted $\bar{\tau}_{i,t-10,t}$, so that the coefficient ε measures the average elasticity over a ten year period following a tax change.

Our estimated elasticity of the implied capital income flow reported in Panel A of Table 2 is equal to .56. In panel B and C, we further decompose the effect in terms of extensive and intensive margin responses. Panel B shows the elasticity of the population size (extensive margin) and reveals a significant increase in population in response to an increase in the implied net-of-tax rate on capital income. The implied elasticity of the population stock with respect to the net-of-tax rate on capital income is $\varepsilon_N = .20(.07)$, which is in line with estimates in the migration literature (see a summary of these estimates in Figure A29). Thus, a significant part (around 40%) of the response of local property is driven by migration. This occurs in a context where property taxation is highly local so that we may expect migration responses to be strong.

Panel C shows the response of log property per capita, the intensive margin. The graph confirms the presence of a significant response along the intensive margin as well, with an implied elasticity of per capita capital income with respect to the net-of-tax rate on income equal to .36 (.12).

Capitalization of tax rates in local asset prices. We now investigate the extent to which the substantial response of local property per capita is driven by the capitalization of tax variations into the prices of local assets. If property taxes are fully capitalized into lower prices, current owners bear the full incidence of the property tax. If, on the contrary, there is no capitalization, current owners are able to shift the incidence of property taxes to future buyers.

In panel D of Table 2, we estimate the evolution of per capita real property, and find a strong response, with an implied elasticity of the flow value of real property of around 0.35. Furthermore, the dynamics of the response of real property values, displayed in Appendix Figure A30, suggests that the bulk of the effect happens immediately after the tax change. This large and immediate response in the stock cannot be driven so quickly by changes in savings flows or investments in real estate and assets. It is *prima facie* evidence of significant capitalization of local property taxes into prices of local real assets.

Following the large literature on capitalization (e.g. Oates (1969), Reinhard (1981), John et al. (1990)), we can, assuming a specific discount rate, estimate the rate of capitalization of municipal property taxes into local real property prices. Using our measure of risk-free interest rates $\bar{r}=2.5\%$ as a discount rate, we find a capitalization rate of .72(.23). This large level of capitalization of property taxes in real property values is in line with the evidence on capitalization available for the modern-day United States.³¹

³¹The early literature on capitalization, relying on cross-sectional data, found mixed results, some findings supporting full capitalization (Oates (1969), Reinhard (1981) and Gallagher, Kurban and Persky (2013)), others supporting close to zero (Pollakowski (1973) and Wales and Wiens (1974)). The most

The role of local tax competition The presence of large mobility responses and of strong capitalization of tax changes into local asset prices like real property suggests that the institutional environment of the general property tax was especially conducive to tax competition. Can we indeed identify the existence of significant tax competition across municipalities?

First, we find that, as typically predicted by tax competition models, smaller jurisdictions face more intense competitive pressure. Panel A of Figure 27 shows that the elasticity ε of total property decreases in city size, i.e., in the initial population size of the city. In panel B, we show that this gradient is almost entirely driven by the gradient in the population size elasticity: municipalities in the bottom quintile of the size distribution of cities are seeing a much stronger percentage reduction in their population size than the largest cities.

Second, to model spillovers and tax competition more directly, we consider the regression:

$$\bar{\tau}_{i,t+1,t+5} = \beta \ln(1 - \bar{\tau}_{i,t-10,t-1}/\bar{r}) + \rho \ln(1 - \bar{\tau}_{-i,t-10,t-1}/\bar{r}) + \mathbb{X}'_{it}\gamma + \eta_i + \zeta_t \quad (6)$$

where $\bar{\tau}_{i,t+1,t+5}$ is the average log effective net-of-tax rate in city i from $t + 1$ to $t + 5$, $\bar{\tau}_{-i,t-10,t-1}$ is the average effective tax rate in all neighboring cities of city i , defined as being within a given distance in miles in planar measure, between years $t - 10$ and $t - 1$. For our benchmark use, we consider cities within 100 miles. Table 3 shows that a city's own average net-of-tax rate in years $t + 1$ to $t + 5$ is significantly positively correlated with the average effective net-of-tax rate in neighboring cities over the past ten years. This positive association is robust to including our wide array of controls, including government expenditures of the city and of its neighbors.³²

Overall, these patterns are suggestive of the presence of significant tax competition in line with the highly local nature of the general property tax. In the absence of local tax coordination, neighboring cities directly competed for the same population tax base. And therefore jurisdictions quite strongly reacted to the tax setting behavior of their neighbors. But this in turn did put constraints on the use of public funds, towards expenditures that were valued by the local population. In the end, the reliance on relatively high tax rates on property at that time in US history did not translate in a high elasticity of the capital stock, that would have hampered the speed of capital accumulation. The reason is that property tax revenues were used to fund valuable

recent literature, using quasi-experimental variation in property taxes generally supports partial but significant capitalization (see e.g. Rosen (1982), John et al. (1990) or Giertz, Ramezani and Beron (2021)).

³²A city's own tax rate is also significantly positively correlated with its own tax rate but the correlation becomes small and insignificant once we control for demographic covariates. Given we control for city fixed-effects, this reflects the point, mentioned above, that effective tax rate variations within city do not exhibit much serial correlation.

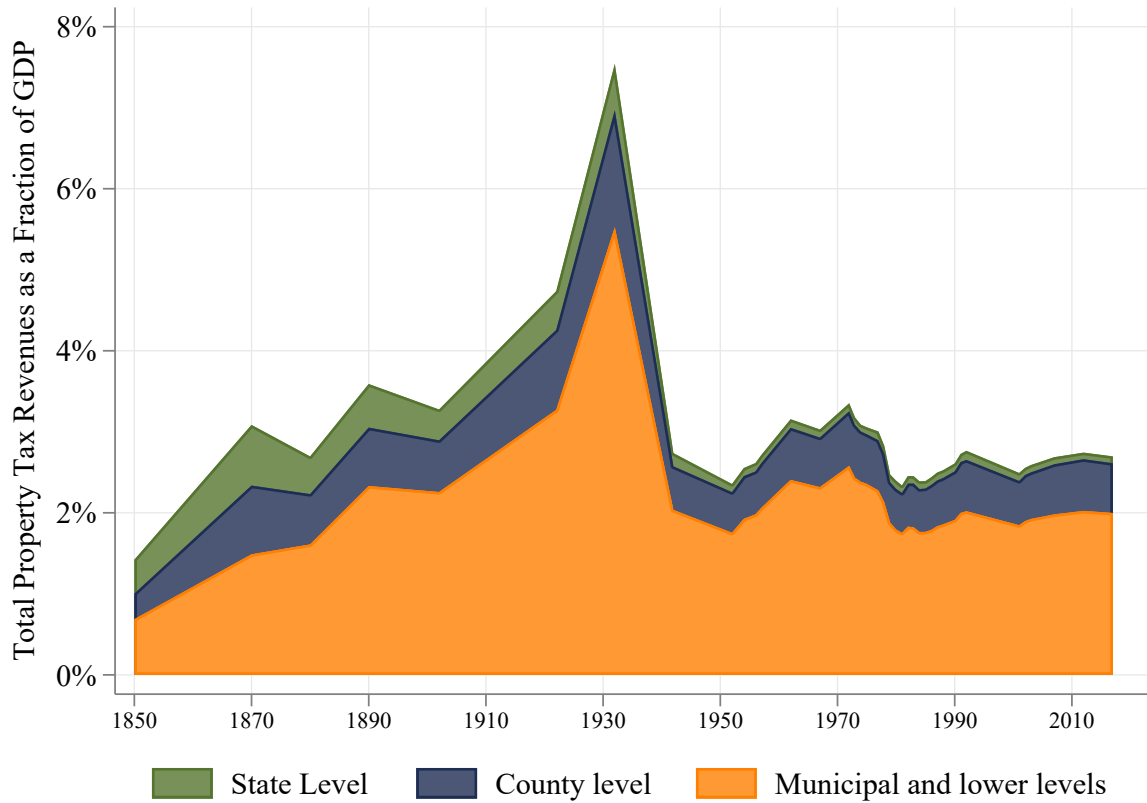
local public goods, like education, that were highly complementary to local wealth accumulation.

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 new data allows us document the evolution of wealth and spatial inequality over time. At the national level, US wealth grew extraordinarily rapidly after the Civil war. From 1800 to 1930, the US multiplied its wealth per capita by a factor of 8 and its wealth-to-GDP ratio by 2. Spatial inequality is highly persistent and strongly correlated with factors related to geography, demographics, and inequality. We also study the impacts of the property tax on wealth accumulation, using the abundant variation of tax rates across municipalities over a long period of time. We find that, given the very localized nature of the tax, the implied elasticities of capital income are relatively large at around 0.6. Around 40% of it is accounted for by migration responses (extensive margins) which represents a spillover to neighboring jurisdictions. Another 60% are driven by responses of per capita wealth (intensive margin). We also show evidence for tax competition across jurisdictions. For instance, migration elasticities are significantly higher in smaller jurisdictions and a city's tax rates are positively correlated with the tax rates of its neighbors.

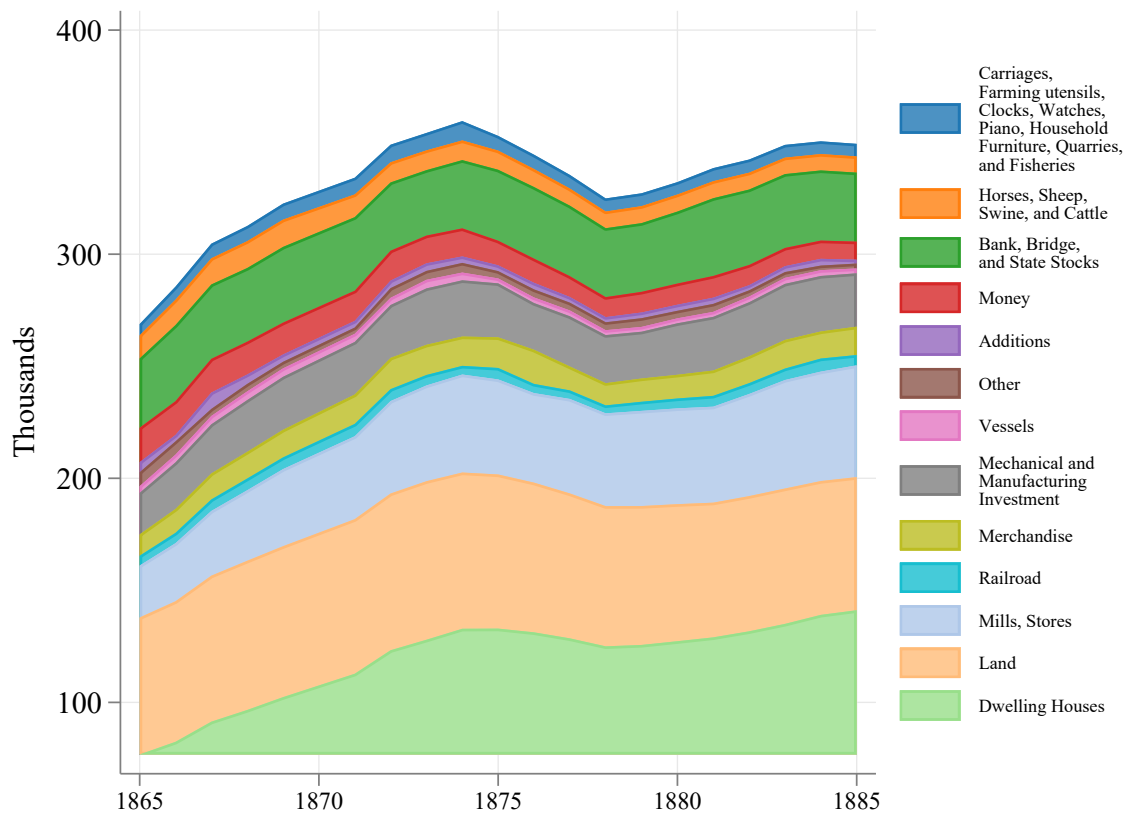
Future work can leverage the exhaustive wealth and property data to compare and contrast to the results from earlier work on the determinants of economic activity that uses income data. We showed that results on convergence for instance look very different in terms of wealth and income. It would also be interesting to consider the effects of local wealth on an array of other economic outcomes, such as innovation or education. Finally, it may be interesting to perform a finer analysis by different types of wealth, leveraging the additional information in the data.

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.10. The GDP data comes from the series by [Lindert, Peter and Williamson, Jeffrey \(2011\)](#), [Lindert, Peter and Williamson, Jeffrey \(2012\)](#), [Lindert, Peter and Williamson, Jeffrey \(2016\)](#), [Dincecco, Mark and Prado, Mauricio \(2013\)](#) and [U.S. Census Bureau \(2022\)](#).

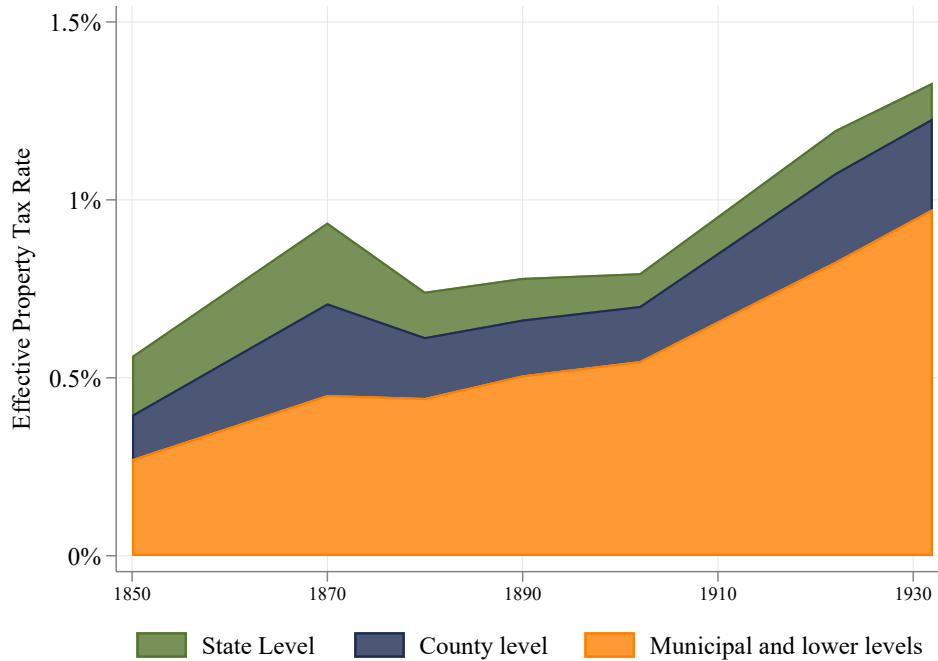
Figure 2: Composition of Private Property in Connecticut



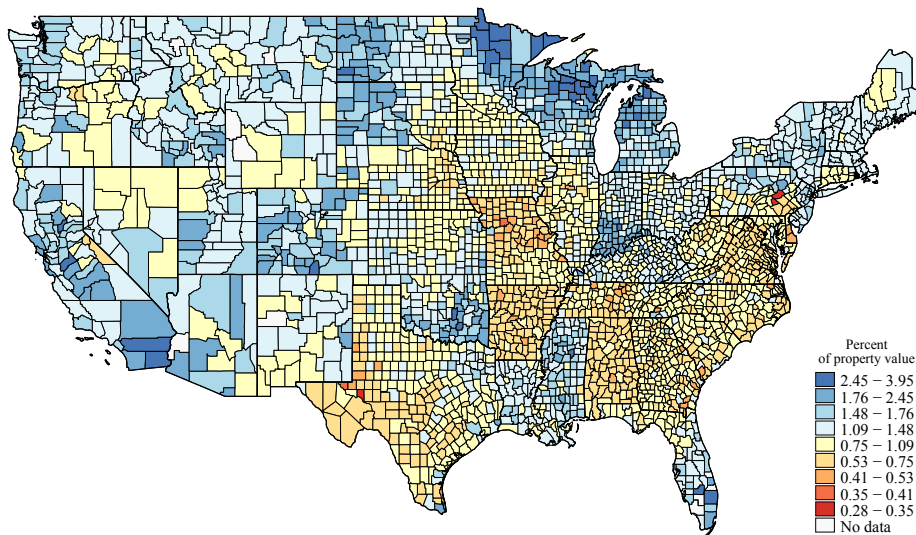
Notes: This figure shows the decomposition of private property subject to the general property tax in Connecticut. The data comes from the *Grand List of Connecticut* as presented by Ely (1888) (pp. 503-506).

Figure 3: Effective Tax Rates

A. Effective Tax Rates by Level of Government

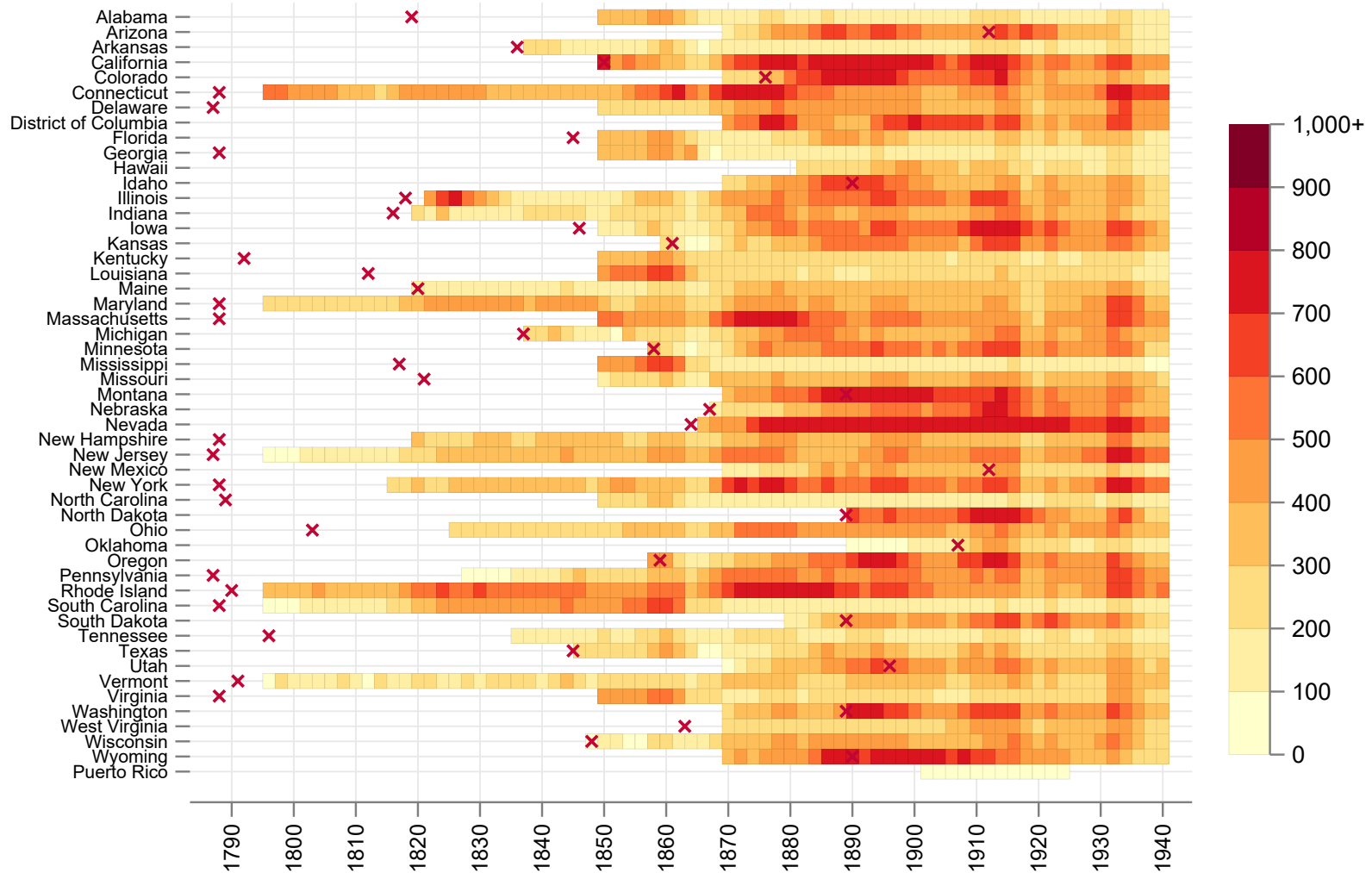


B. Total Effective Property Tax Rate - 1920



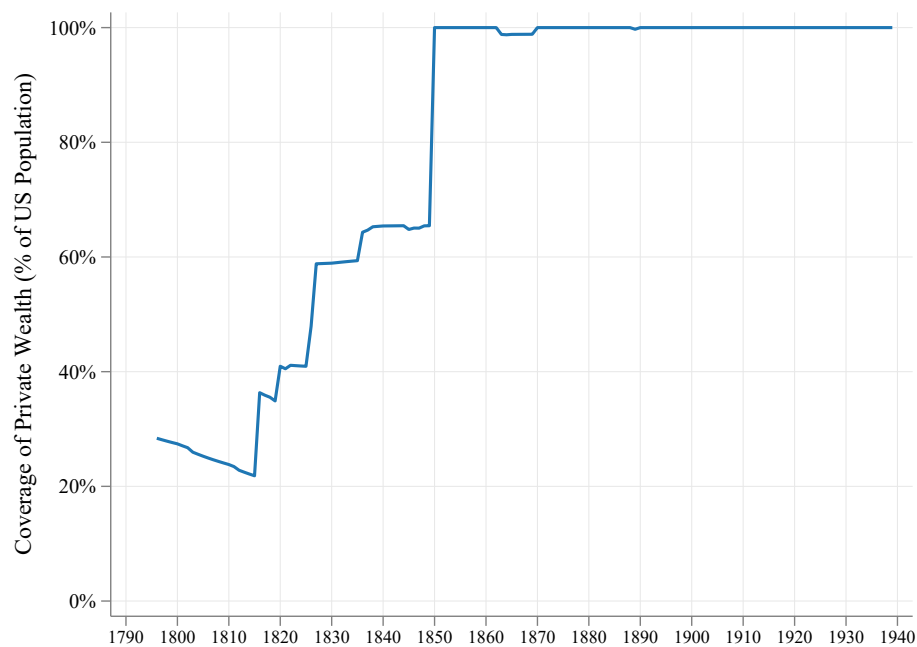
Notes: Panel A displays the effective property tax rates broken down by State, County, and Municipal and lower levels of jurisdiction. We compute effective tax rates as the ratio between the tax revenues and the total value of property. For the data sources and construction, see Appendix III.10. Panel 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 A8.

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

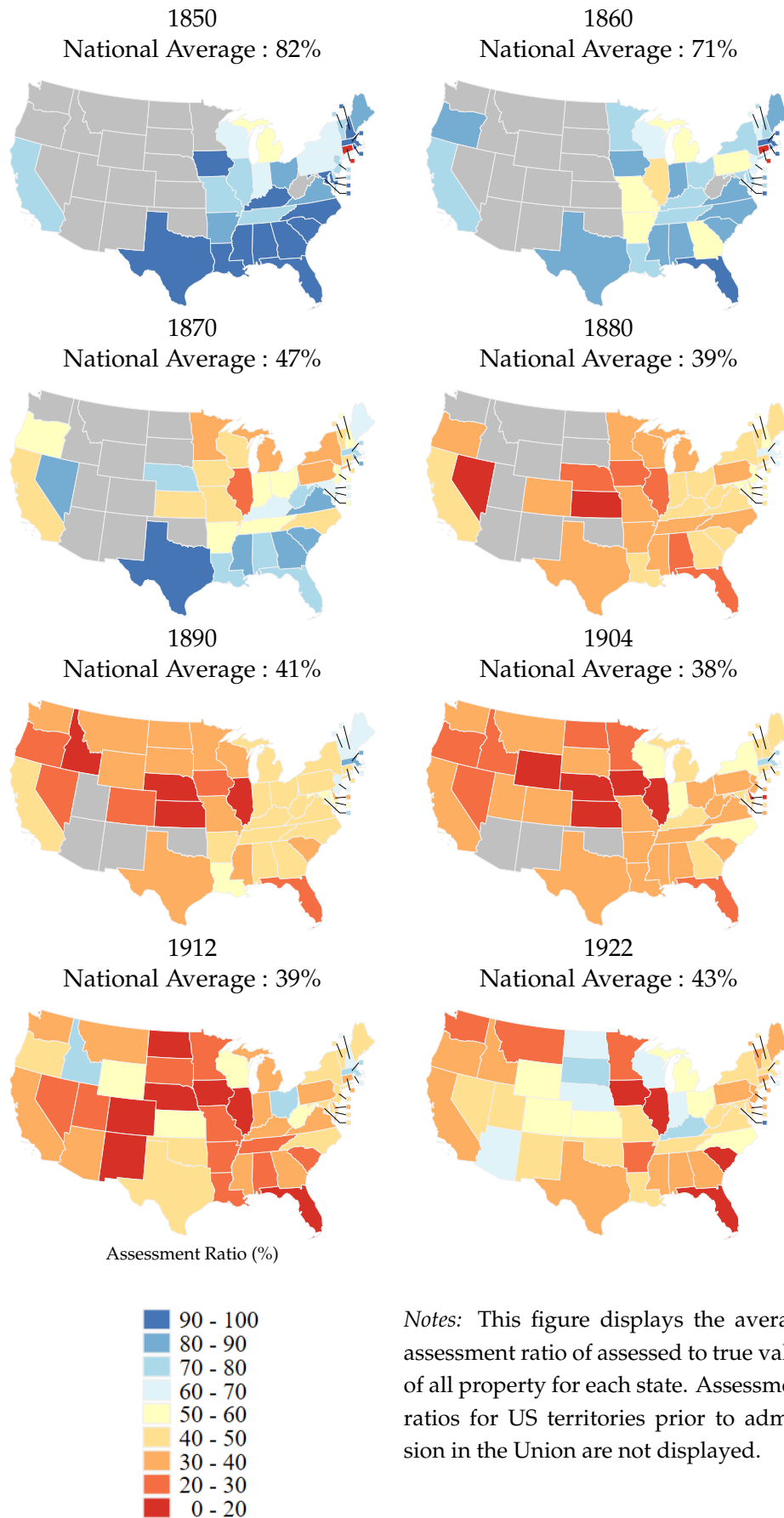
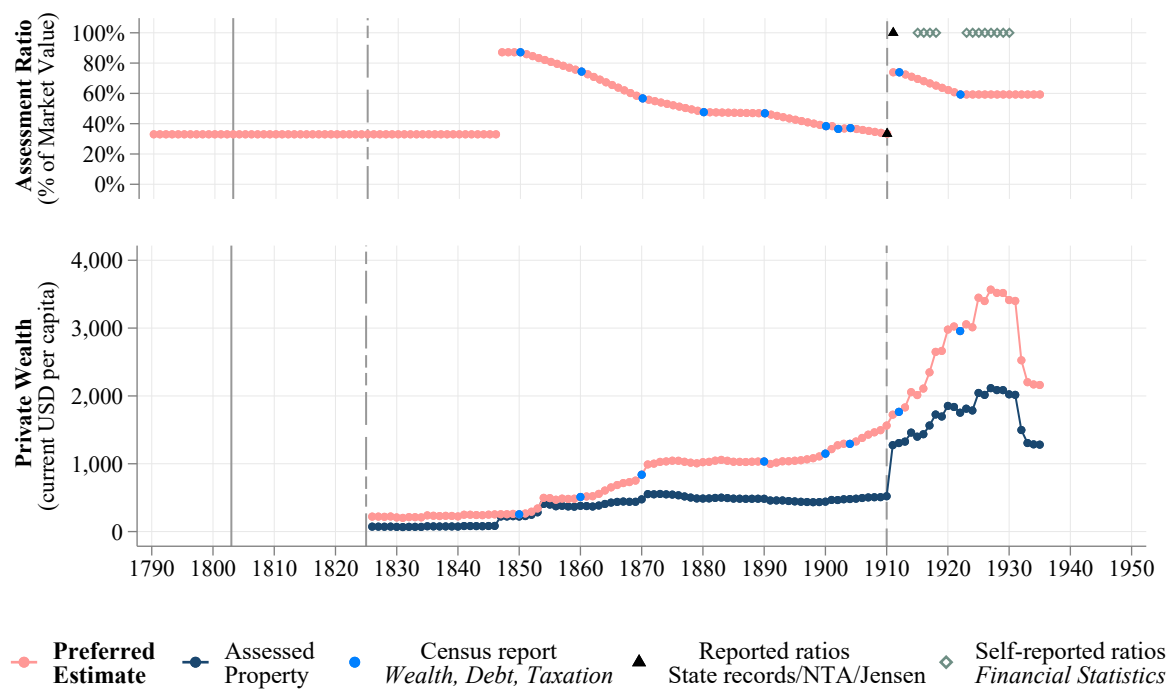
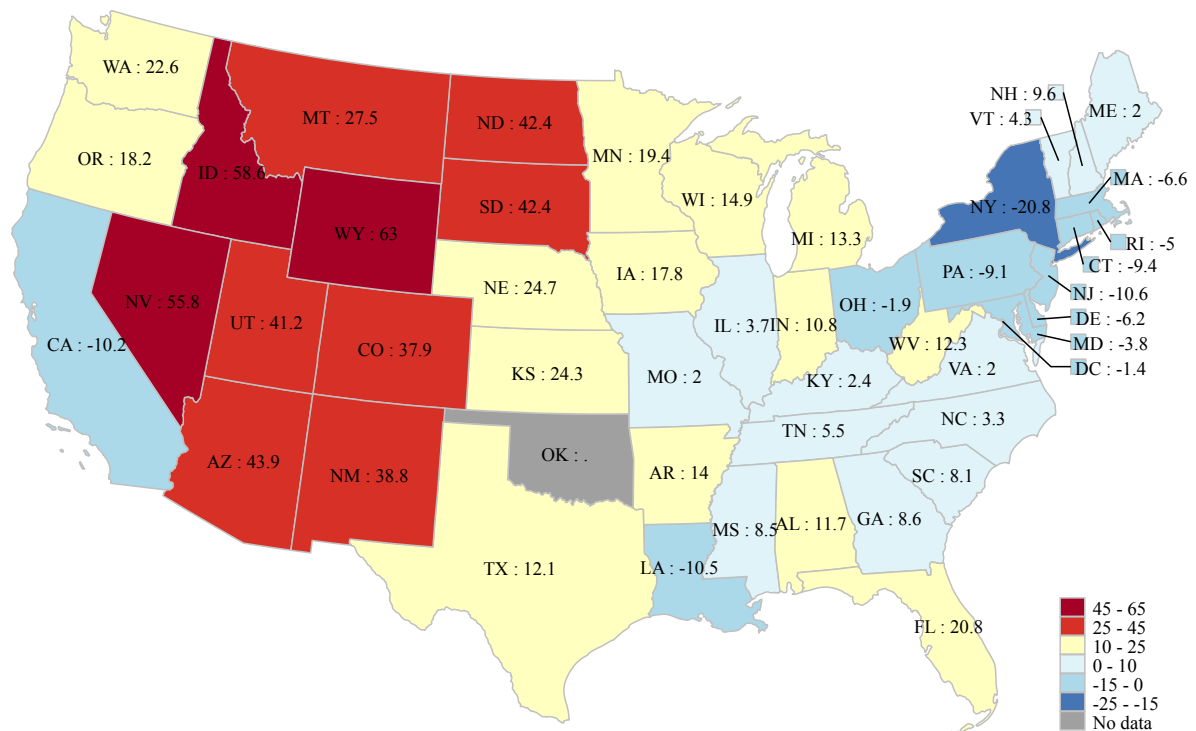


Figure 7: Example: Assessment Ratio and Property Estimates in Ohio



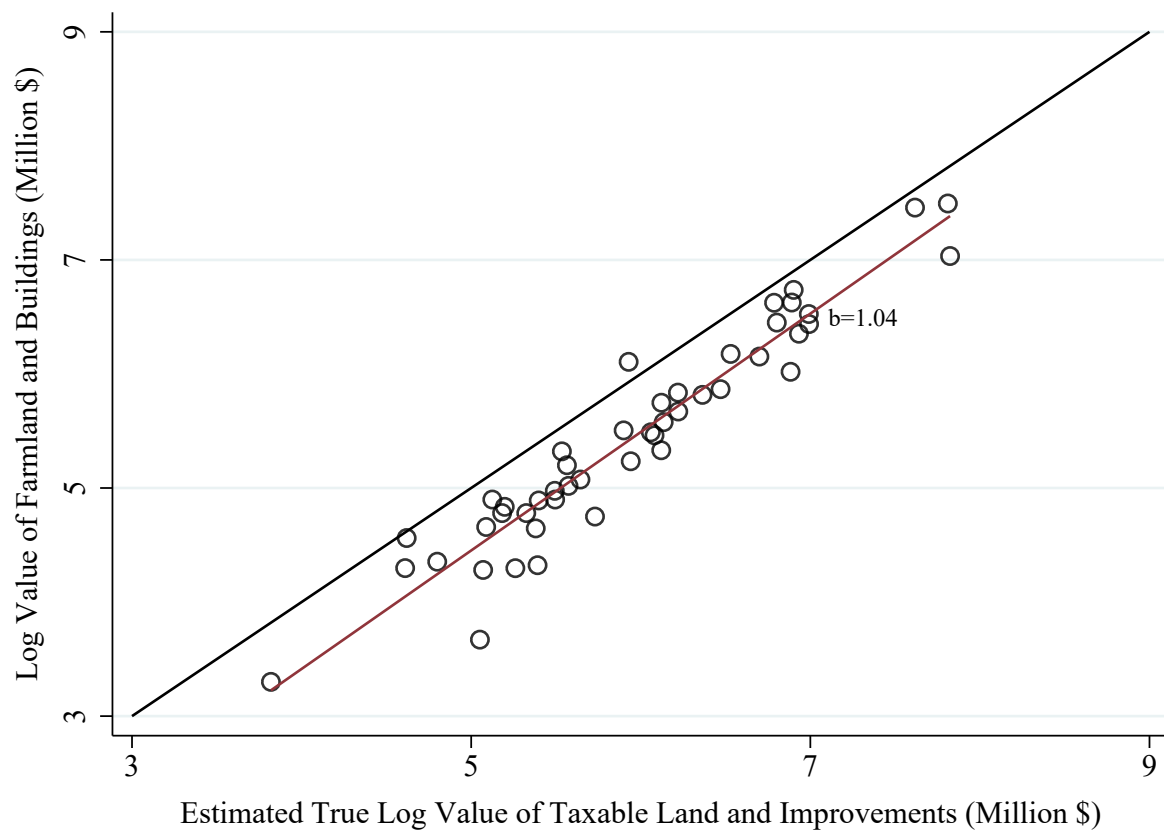
Notes: Top chart represents the construction of assessment ratios for Ohio. Bottom chart compares the assessed property value with the preferred estimate of property value. Census ratios for 1880 and 1902 are estimated from tax rates.

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 \(1880\)](#).

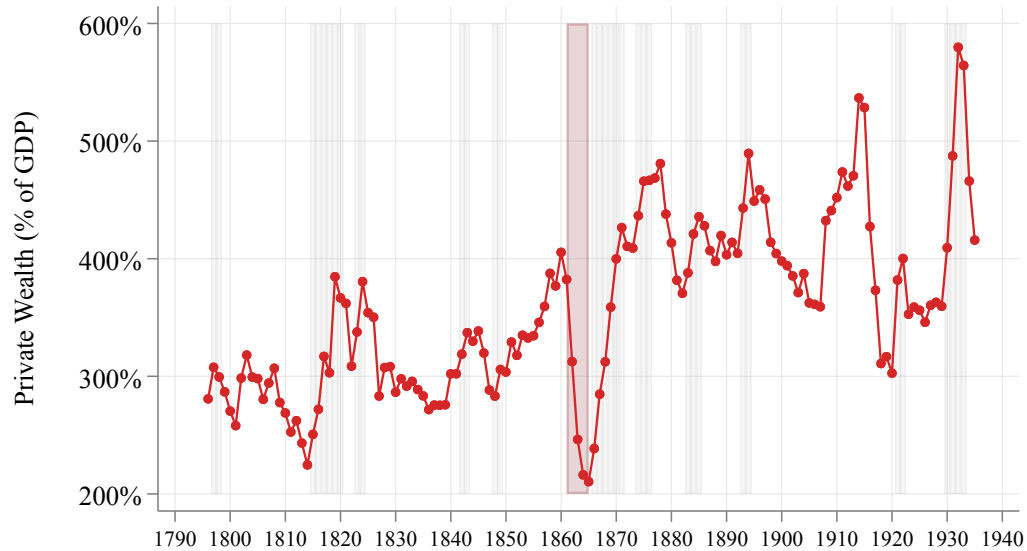
Figure 9: Cross-Validation: Comparison of the Estimated Value of Taxable Land from Property Tax Records and Values from the Census of Agriculture (1860-1910)



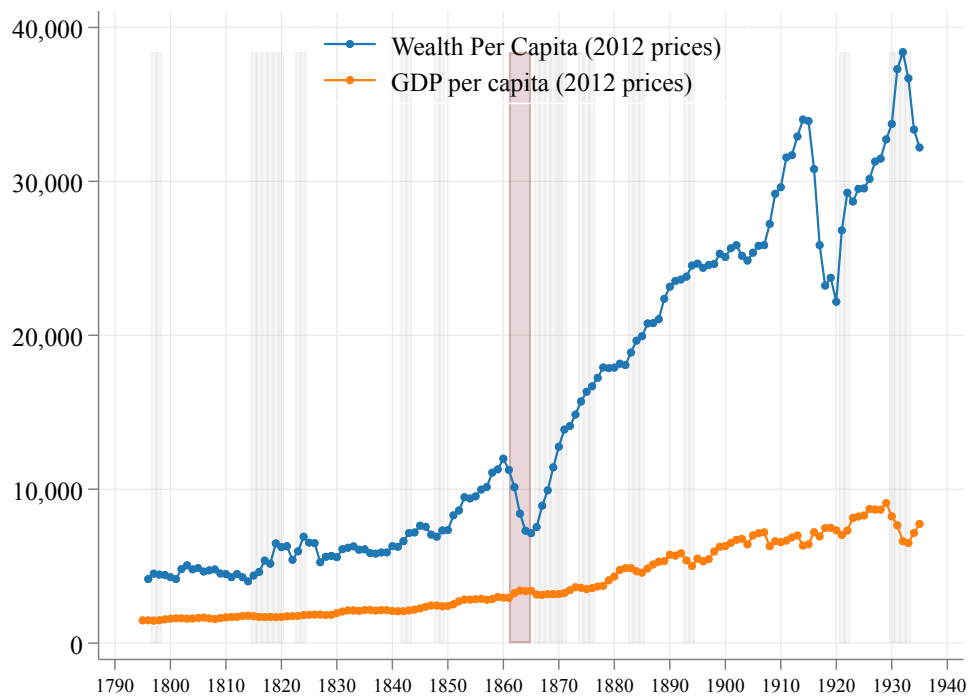
Notes: This figure compares the estimated value of taxable land in our property tax data to the estimated value of agricultural land from the Census of Agriculture. Data from the Census of Agriculture is derived from [Haines \(2014\)](#). The value of taxable land is a sub-category of real property and 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

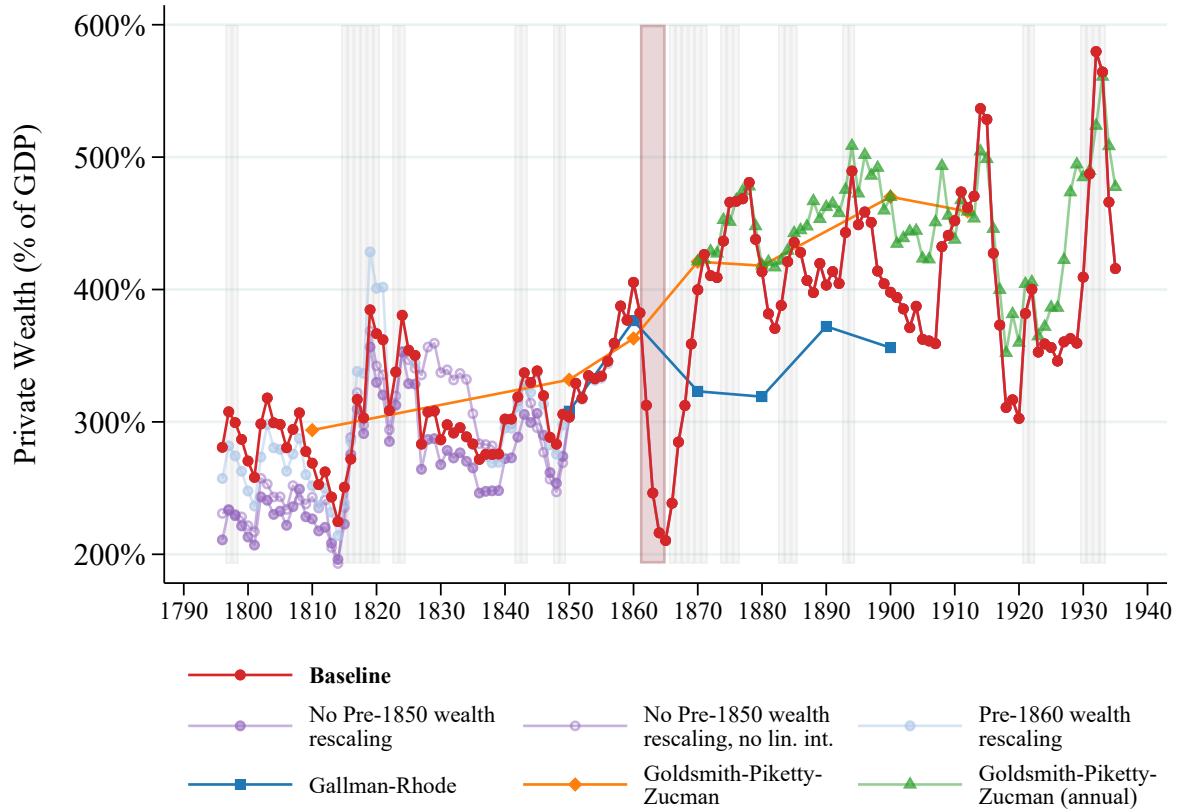


B. Private Wealth & GDP Per Capita: US (1795-1935)



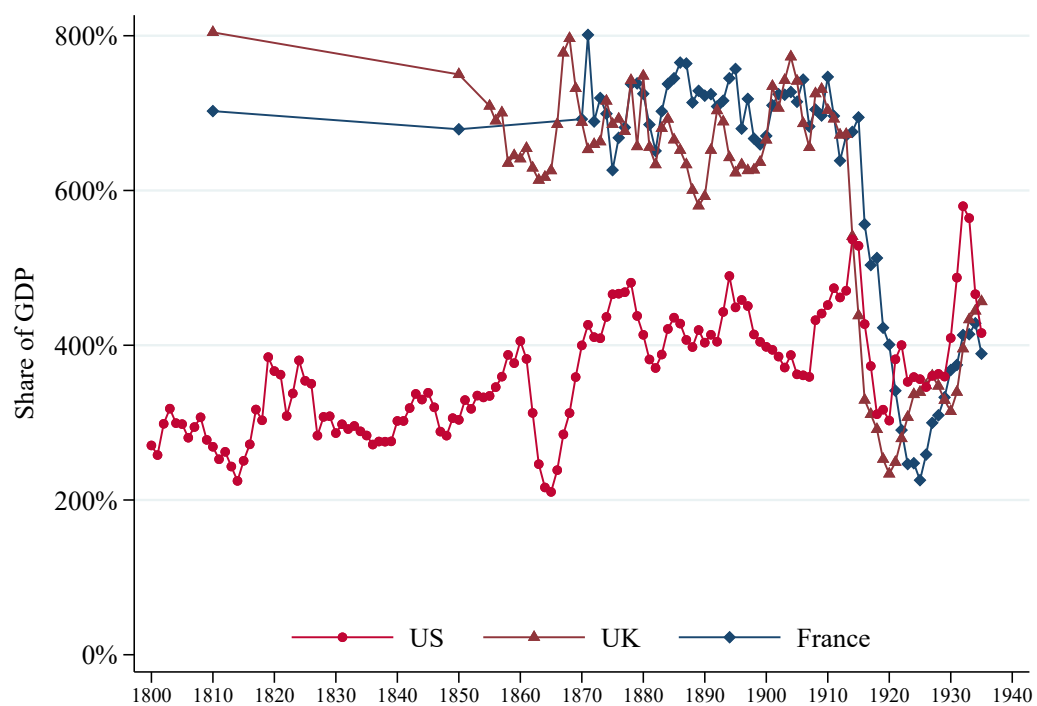
Notes: Panel A displays total US wealth as a fraction of GDP, using our benchmark assumptions. Panel B displays both Wealth per capita (the numerator) and GDP per capita (the denominator) over the same period. Grey areas indicate recessions; the red shaded area indicates the Civil War.

Figure 11: Comparison with Other Estimates and Sensitivity Analysis



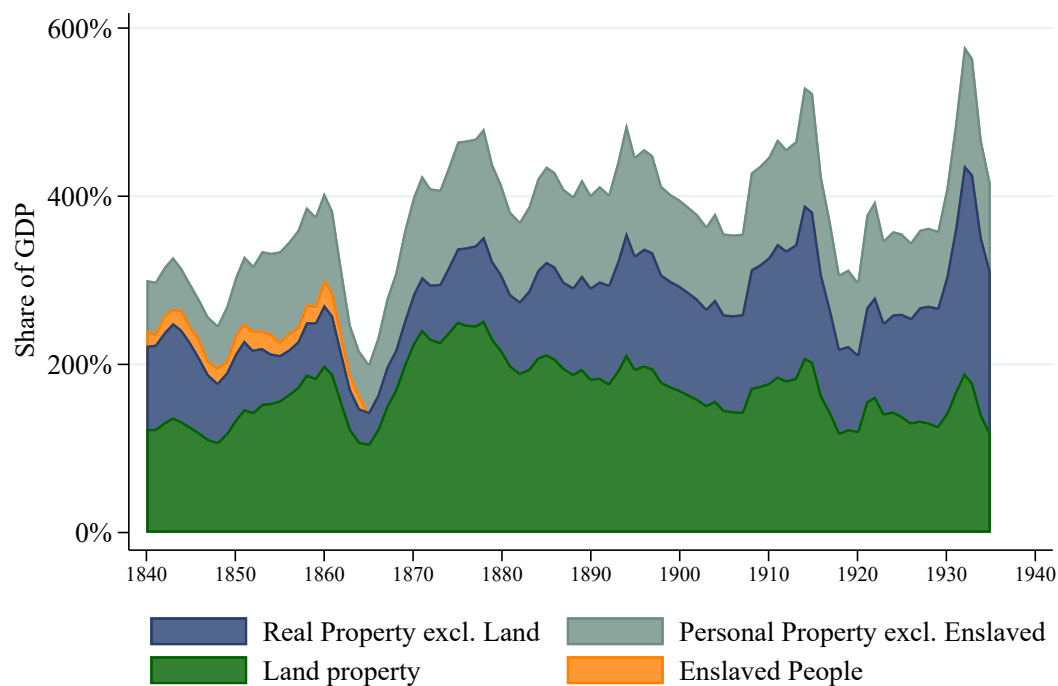
Notes: This figure compares our baseline wealth estimate with other estimates (see Appendix III.8 for a description of these alternative estimates). The main text and Appendix III.7 provide all details for the construction of our “Baseline” series and of the sensitivity series plotted on this graph. 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 12: Wealth-to-GDP Ratios in the United States, France, and United Kingdom



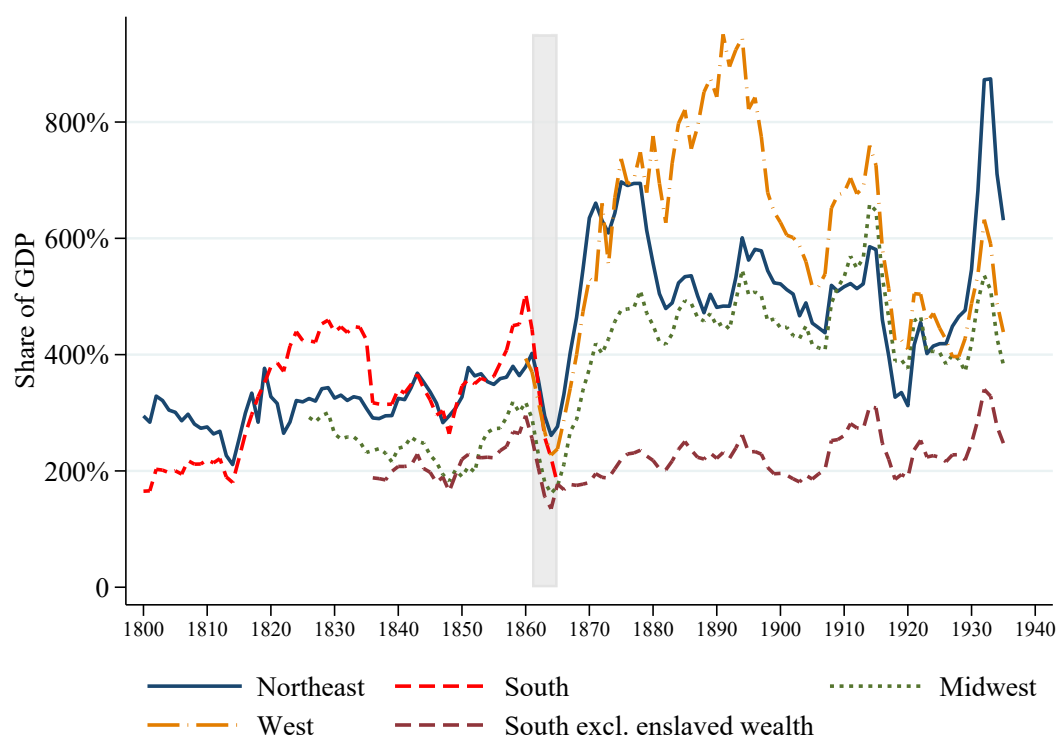
Notes: The figure shows the evolution of the private wealth-to-GDP ratio for the United States, France, and the United Kingdom. Data for the United Kingdom and France come from the World Inequality Database and [Piketty \(2014\)](#).

Figure 13: The Composition of US Wealth 1840-1935



Notes: The figure shows the decomposition of wealth per capita in the US into four categories: real property excluding the value of land; land property; personal property excluding enslaved wealth, and the value of enslaved wealth. Land property is a sub-category of real property. For the construction of these series see Appendix Sections [III.2](#) and [III.6](#). Enslaved people were counted as a sub-category of personal wealth before emancipation.

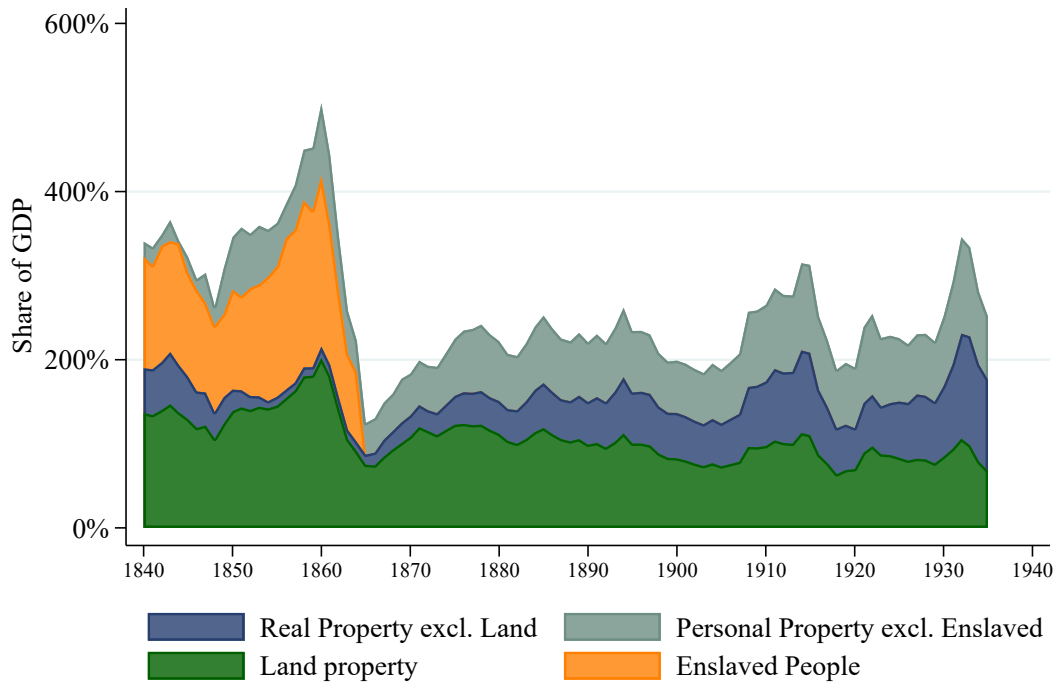
Figure 14: Property per Capita by Region, as a Share of National GDP per Capita



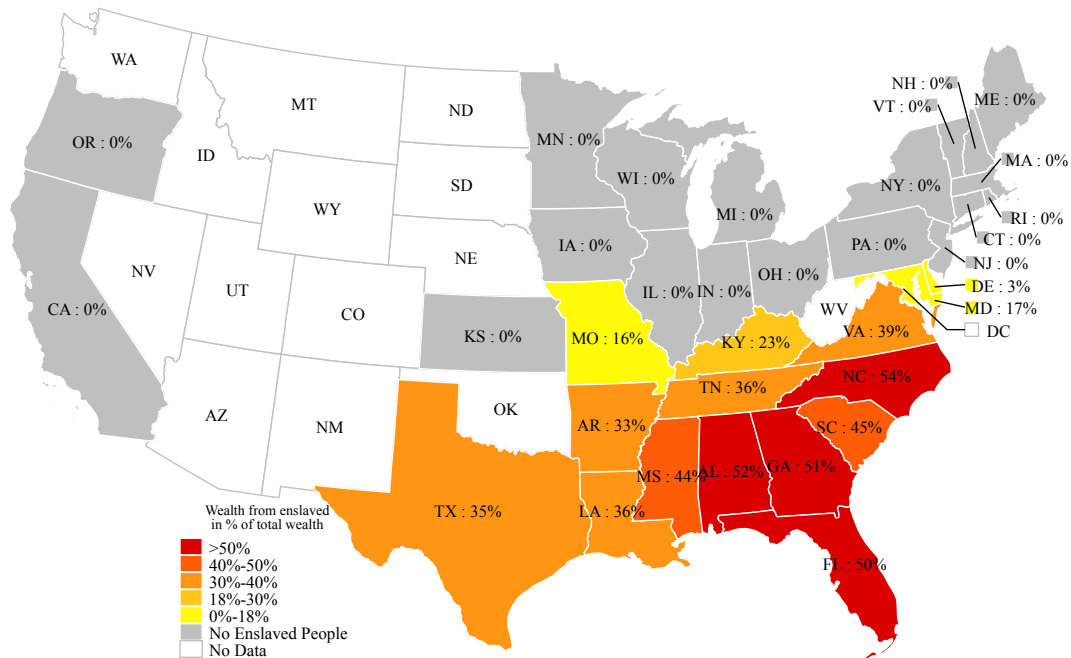
Notes: The figure shows the average ratio of property per capita in four US regions over the national (US) GDP per capita. The values are interpolated, and enslaved property represents ten-year moving averages. For Southern states, we show series including and excluding enslaved wealth. Of course, enslaved people are always counted in the denominator for population.

Figure 15: The Composition of Property in Southern States 1840-1935

A. Composition of Property as share of GDP

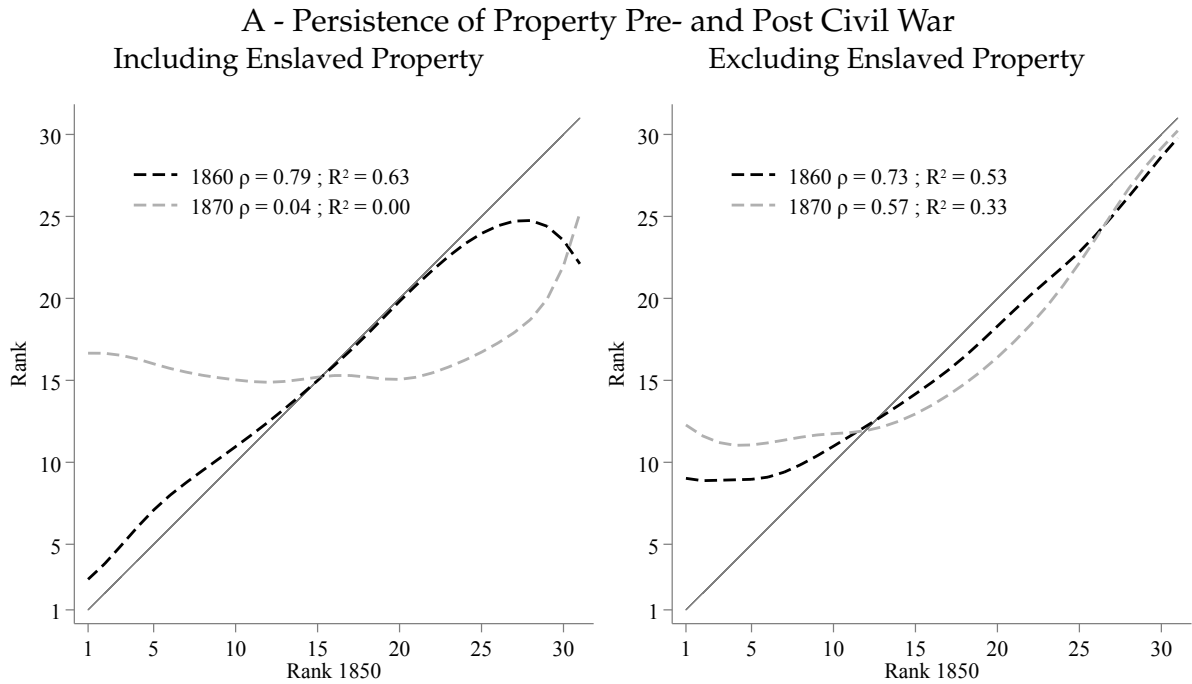


B. Share of Enslaved Property in 1860

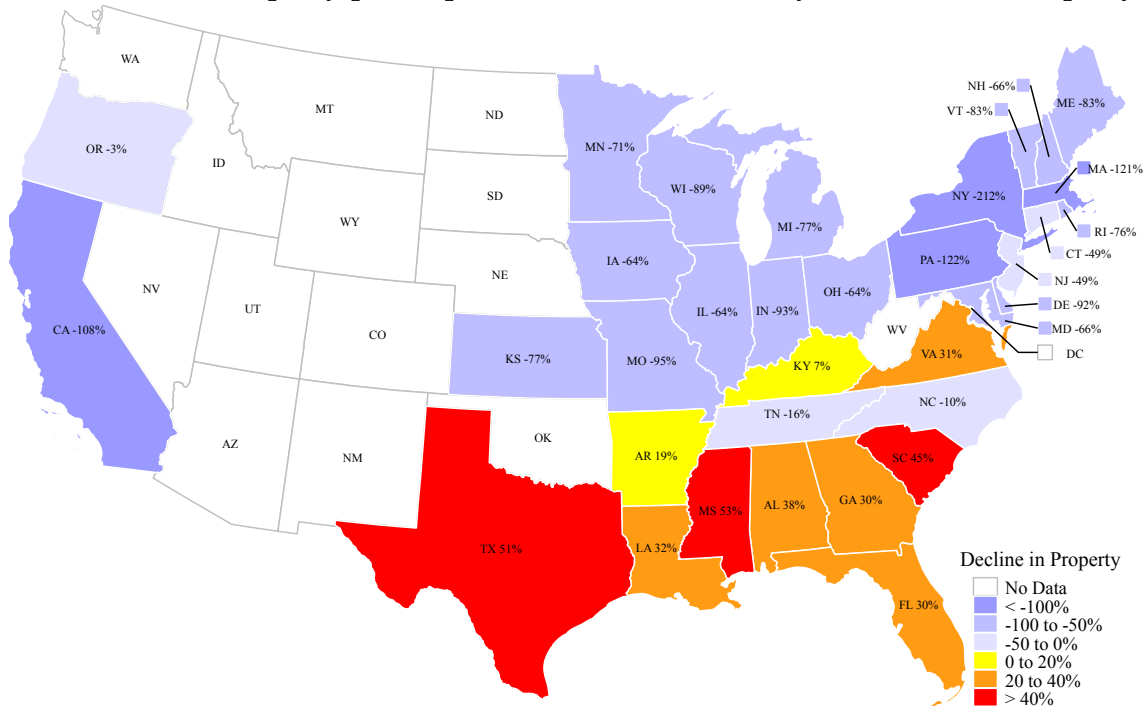


Notes: Panel A shows the decomposition of property per capita for Southern states into four categories: into four categories: real property excluding the value of land; land property; personal property excluding enslaved wealth, and the value of enslaved wealth. For the construction of these series see Appendix Sections III.2 and III.6. Panel B shows the share of enslaved property in total property by state in 1860.

Figure 16: The Civil War and Enslaved Property



B - Decline in Property per Capita from 1860 to 1870 beyond 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. 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 people in total property in 1860. Of course, enslaved people are always counted in the denominator for population.

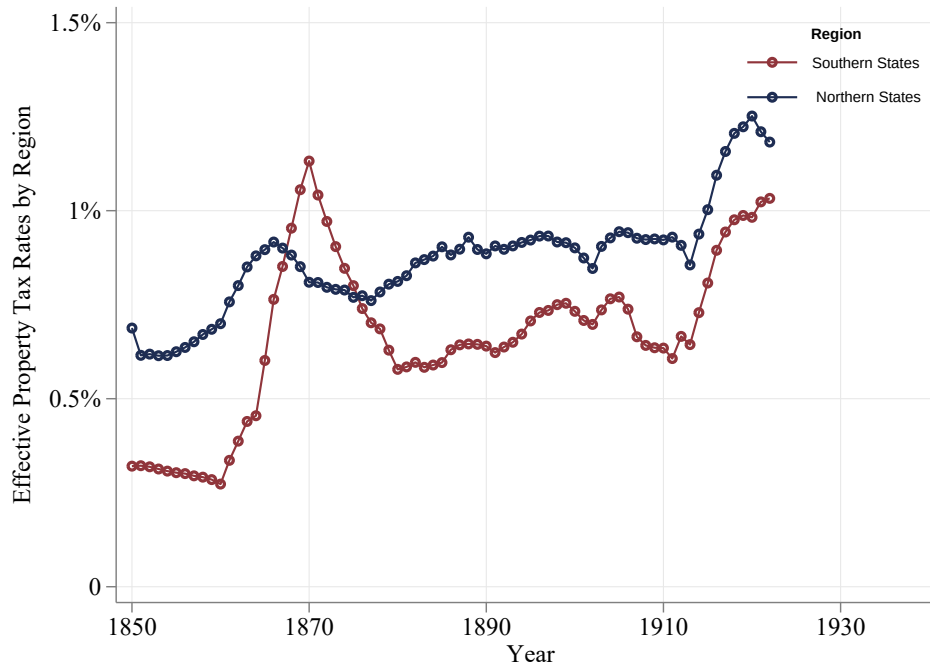
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Figure 16: The Civil War and Enslaved Property (continued)

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

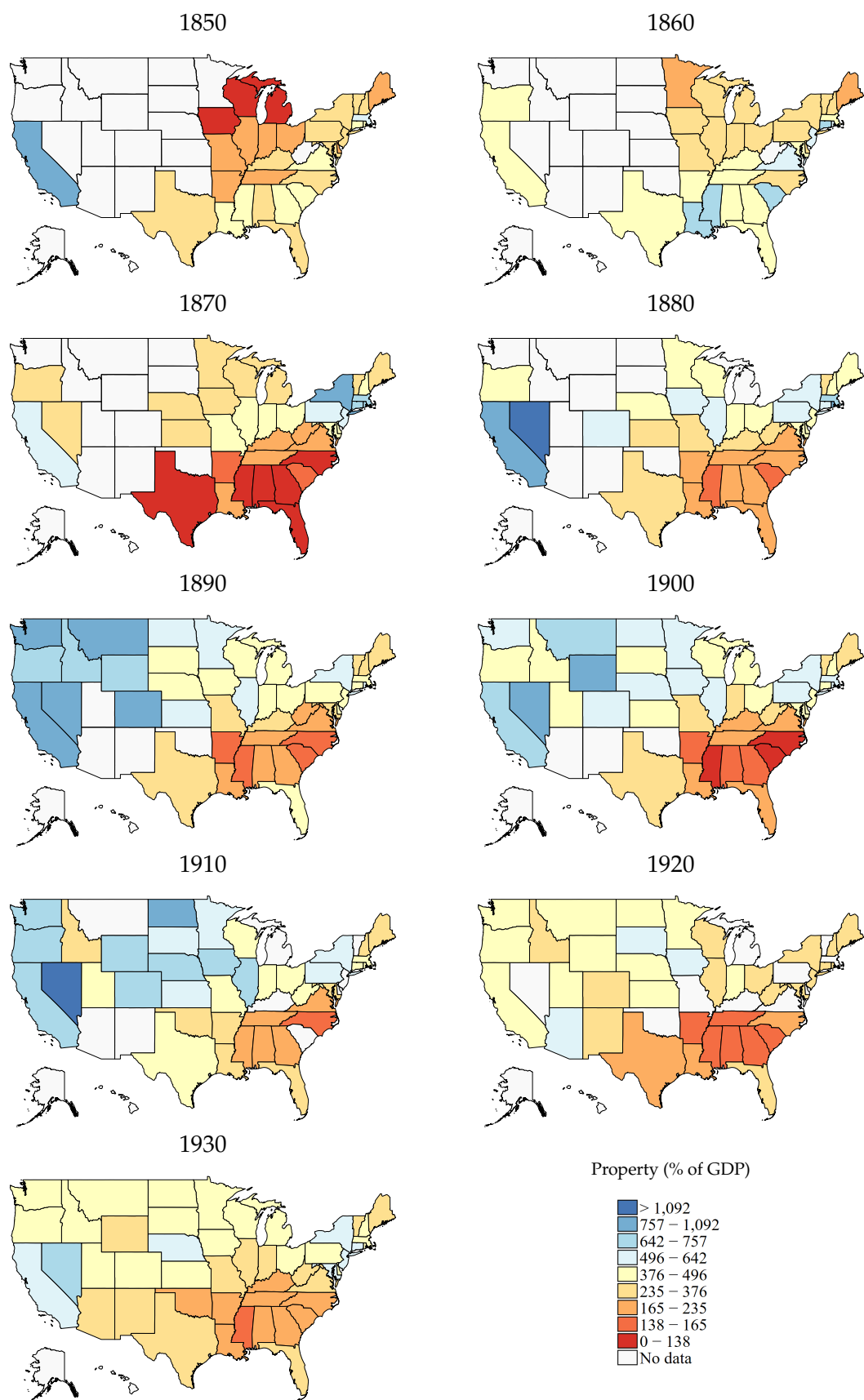


D - Effective Tax Rates by Region



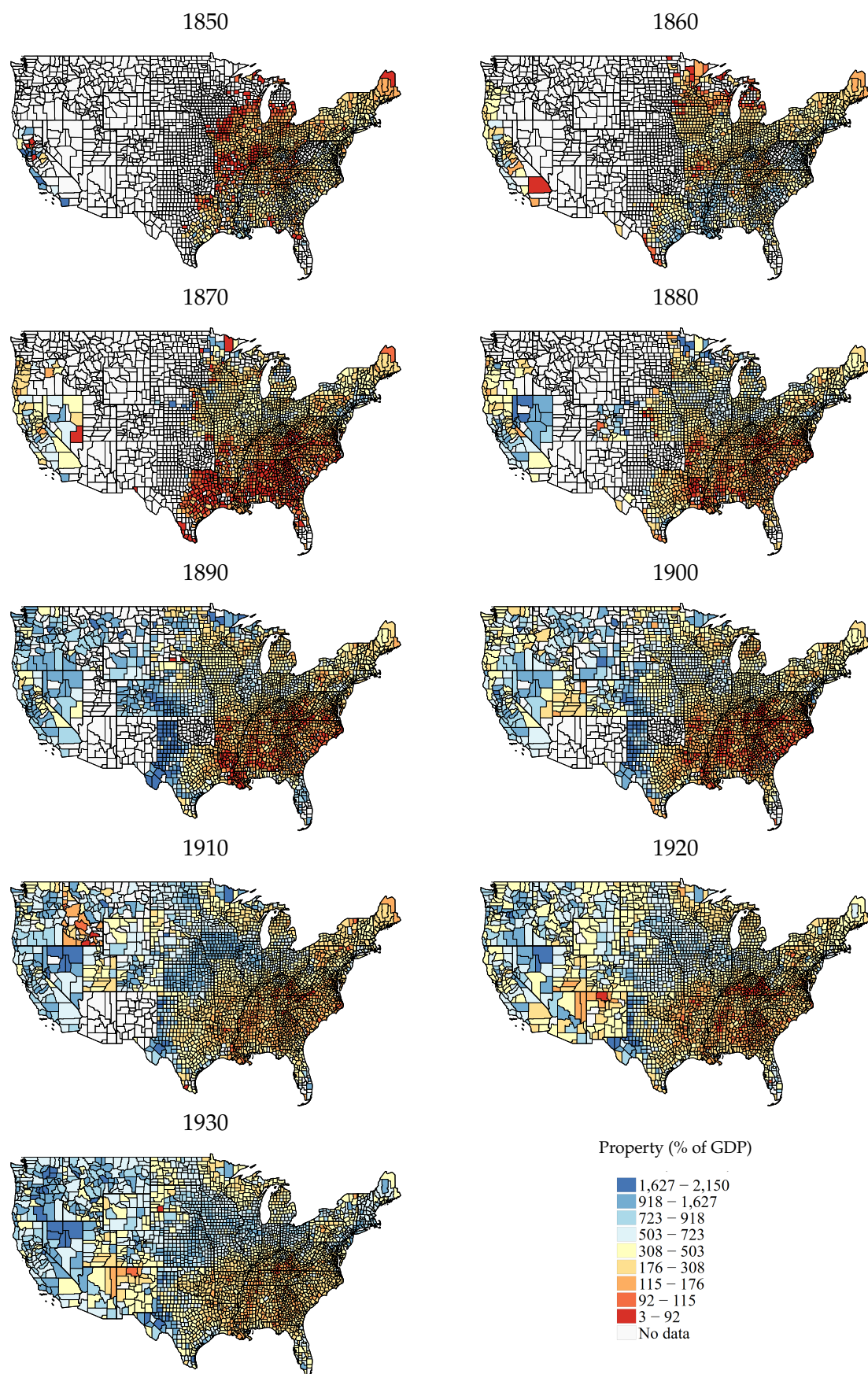
Notes: Panel C displays the decline in property per capita between 1860 and 1870, as defined in Panel B. Panel D displays the effective property tax rates for Southern and Northern States. The values are linearly interpolated when missing. Southern States include Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia. Northern States include Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. For the data sources and construction, see Appendix III.10.

Figure 17: 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.

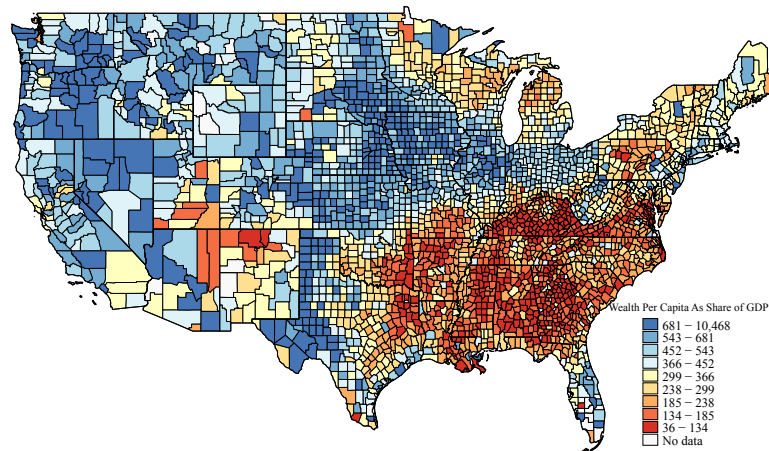
Figure 18: Property Per Capita by County As a Share of National GDP Per Capita



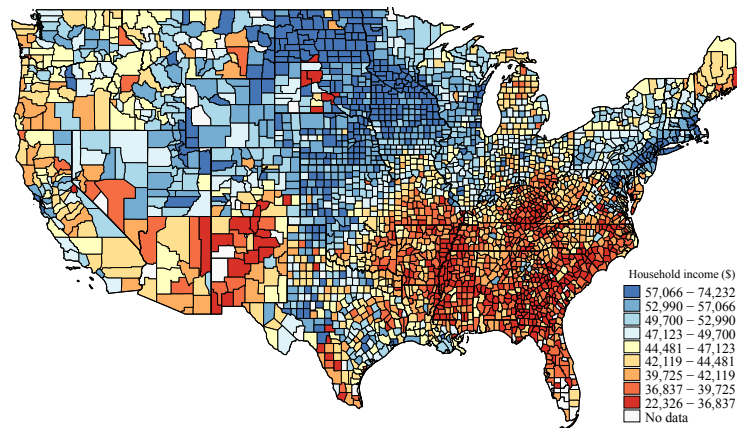
Notes: The figure shows the value of property per capita by county normalized by the national GDP per capita for each decade between 1850 and 1930. Data for counties in US territories prior to admission in the Union are not displayed.

Figure 19: County Level Property in 1920 and Income in 2014 (Opportunity Atlas Data)

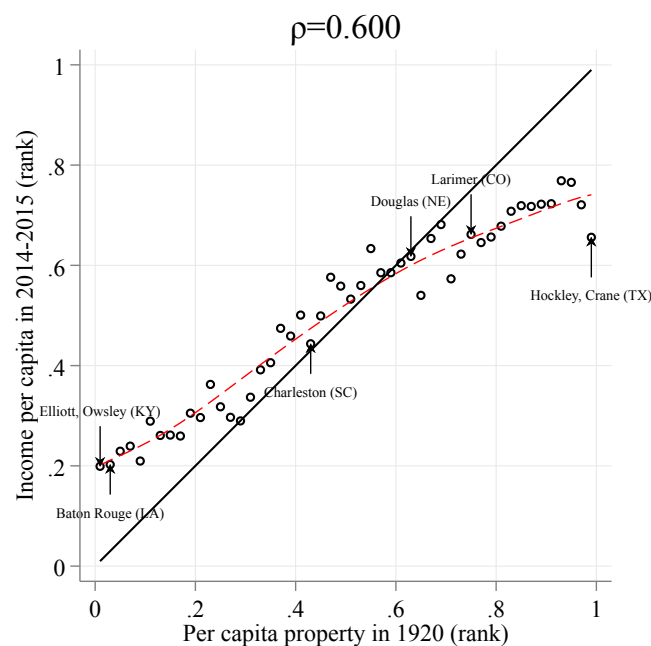
A. Property per Capita in 1920



B. Income in 2014 (Opportunity Atlas Data)

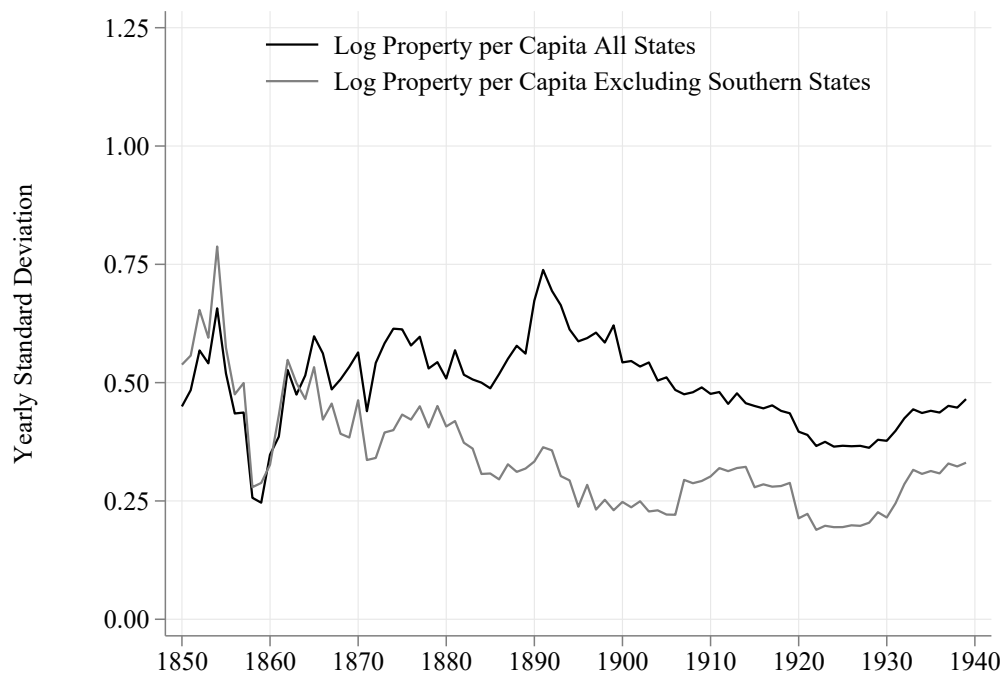


C. Persistence of Property and Income



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.

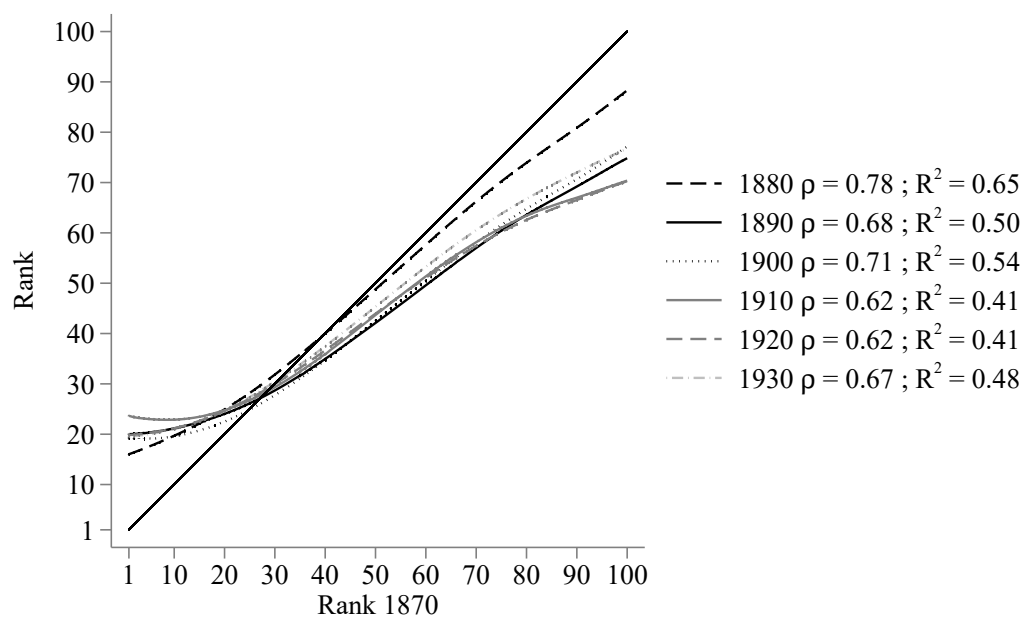
Figure 20: Dispersion in Property per Capita across States over Time



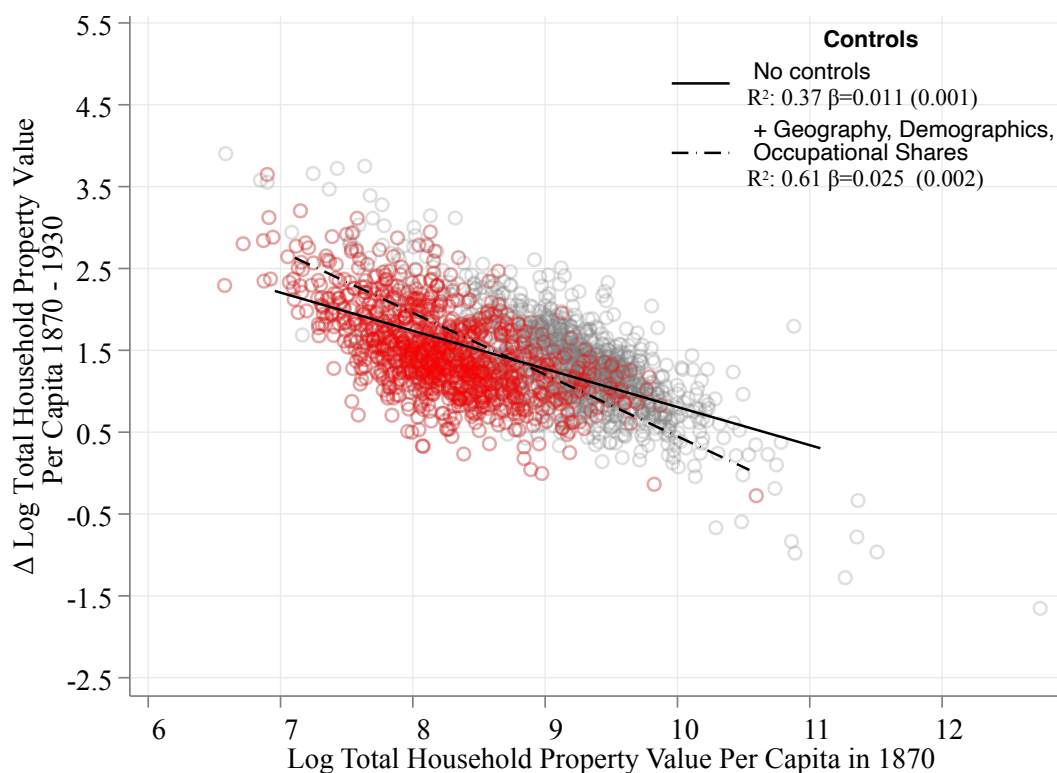
Notes: The figure plots the yearly standard deviation of property per capita across states for all states (solid black line) and excluding Southern states (grey line).

Figure 21: County-level Persistence and Convergence

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



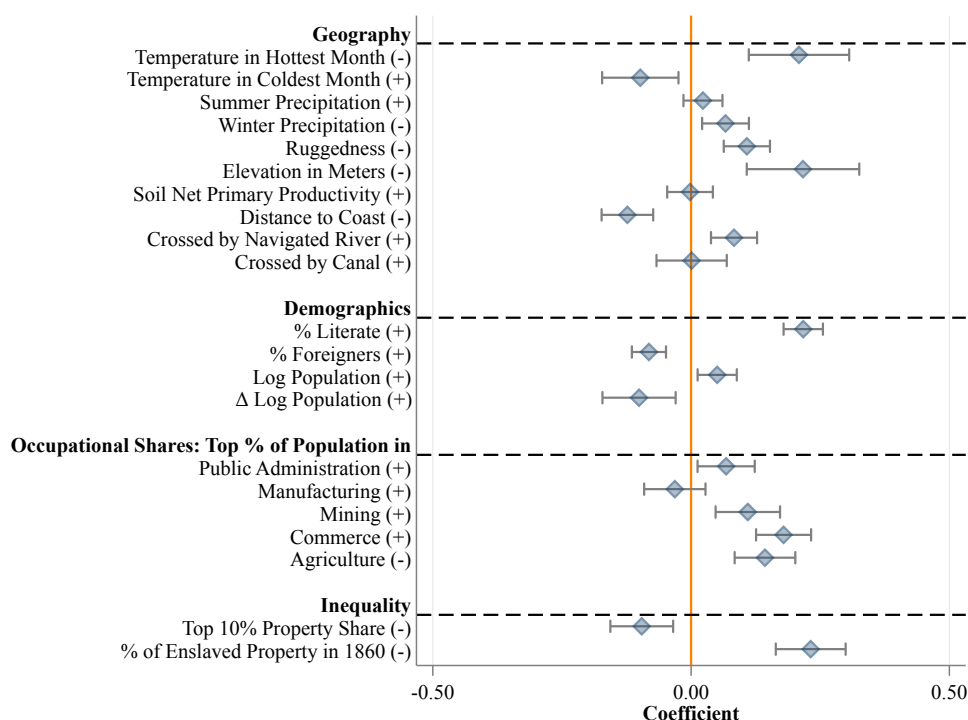
B. β -Convergence at the County Level



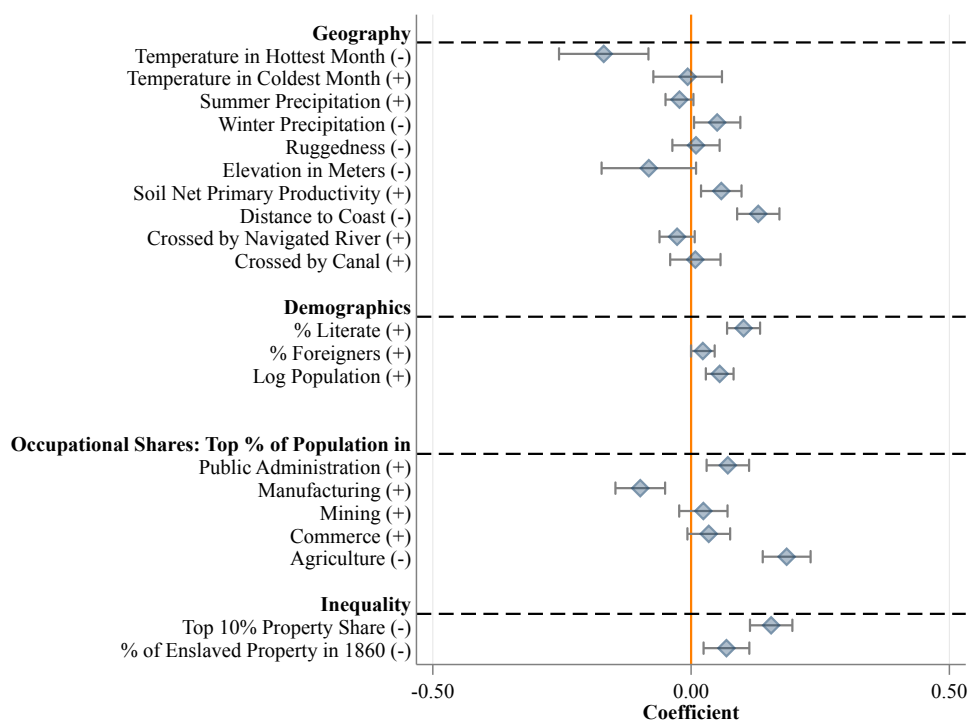
Notes: Panel A shows the rank-rank correlation of county-level property per capita for different years (ρ) and the R^2 for each year t of a simple regression of county-level property per capita in year t on county-level property per capita in 1870. Panel B shows the relationship between the growth rate 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 22: Correlates of Property at the County Level 1870-1930

A. Log Total Property per Capita in 1870

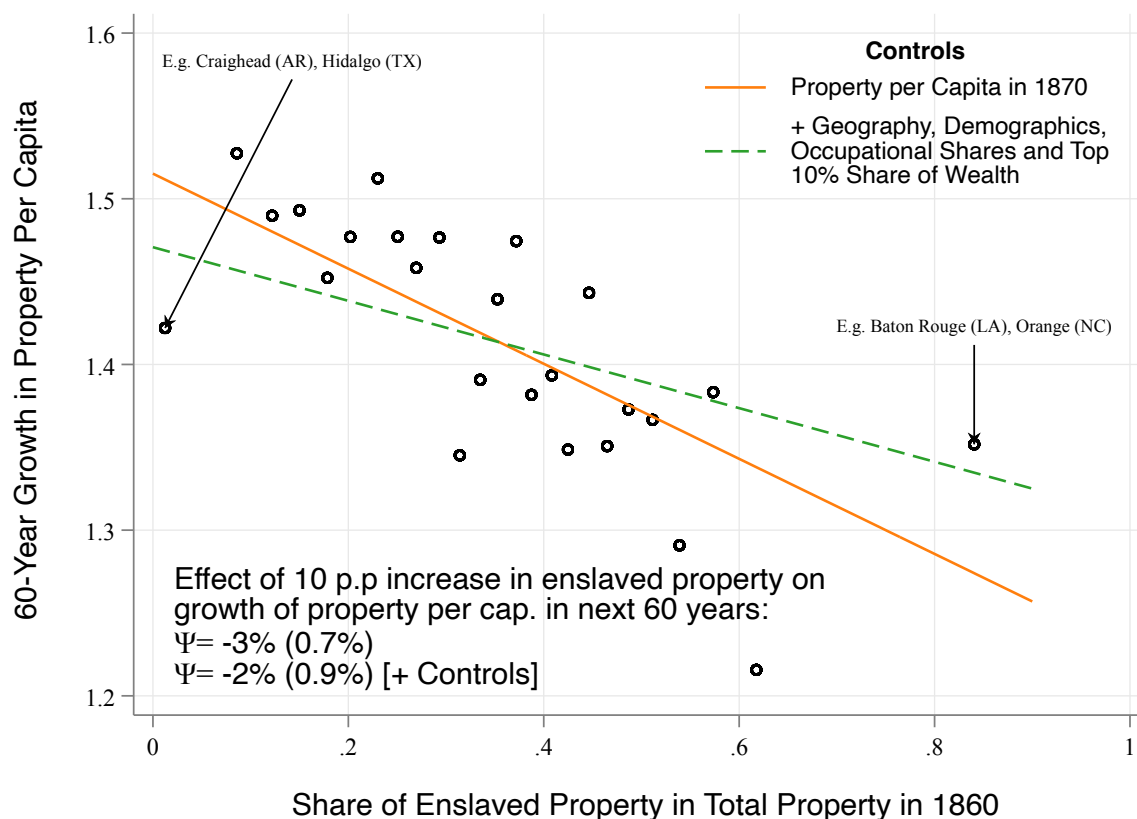


B. 60-Year Δ log Total Property per Capita



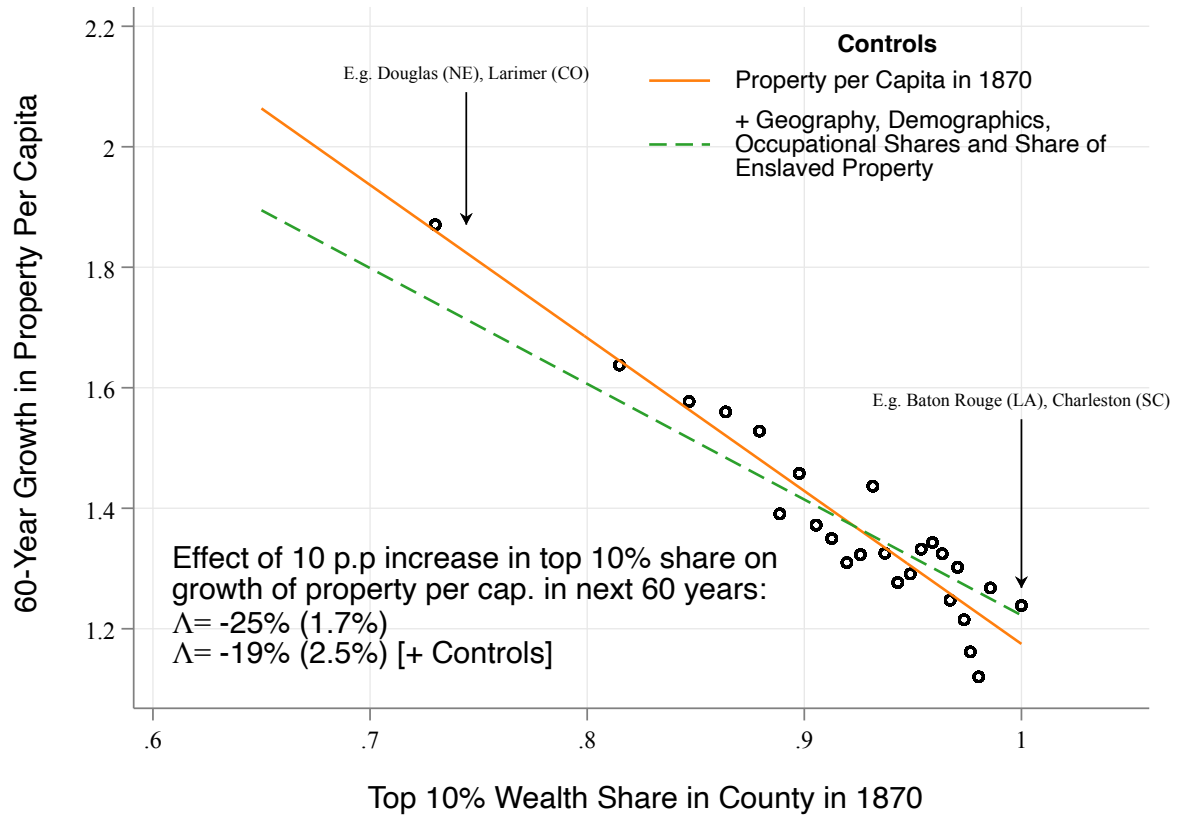
Notes: Panel A presents the set of coefficients coming from the regression of log property in 1870 on 1870's determinants from equation 3. Panel B presents the set of coefficients coming from the regression of the change in log property between 1870 and 1930 on 1870's property and controls from equation 2. The controls included for geography, demographics, and occupational shares are described in Section III.12 and standardized. Commerce includes retail, finance, transportation and business. Production of non-durable goods is not displayed. 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 23: 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 5.1; they are the same controls as in Figure 22. See Appendix III.12 for the sources and construction of these variables.

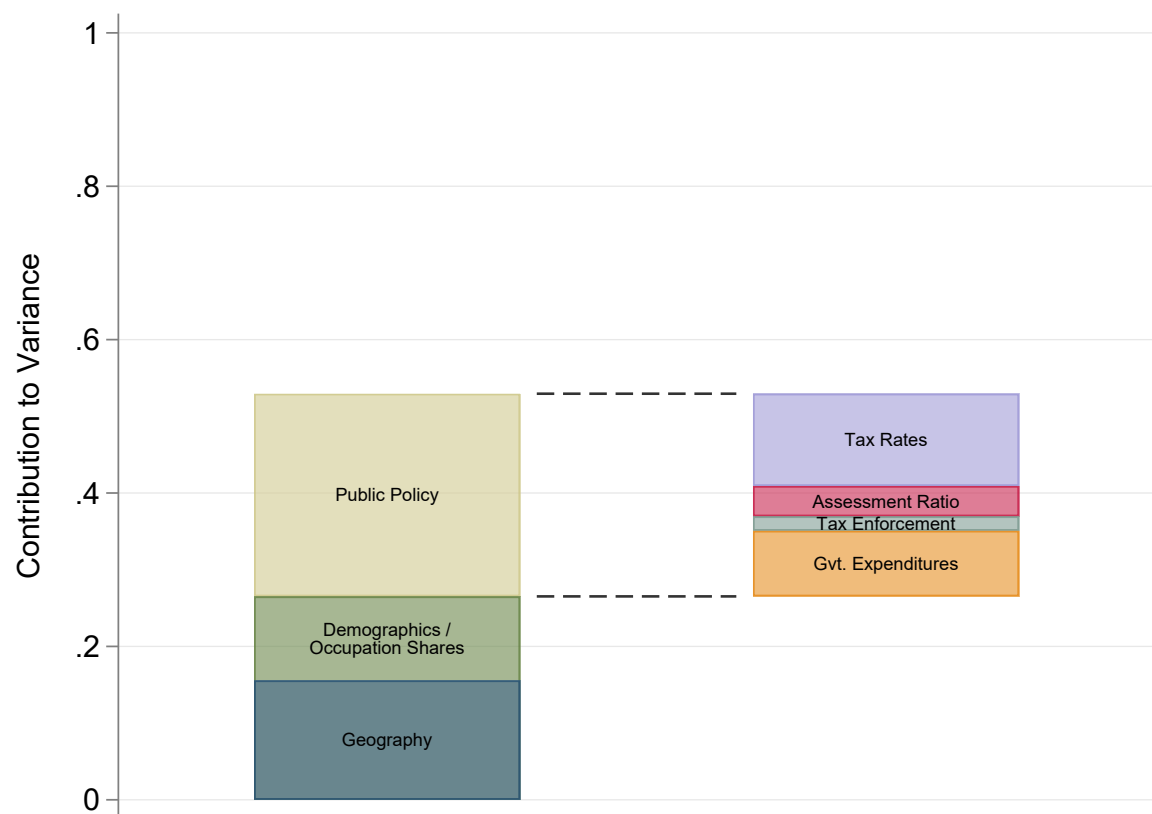
Figure 24: Inequality and Growth: County-Level Correlations



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 5.1; they are the same controls as in Figure 22. These controls are the same as in Figure 22. See Appendix III.12 for the sources and construction of these variables.

Figure 25: Variance Decomposition of Municipal Property Per Capita in 1931

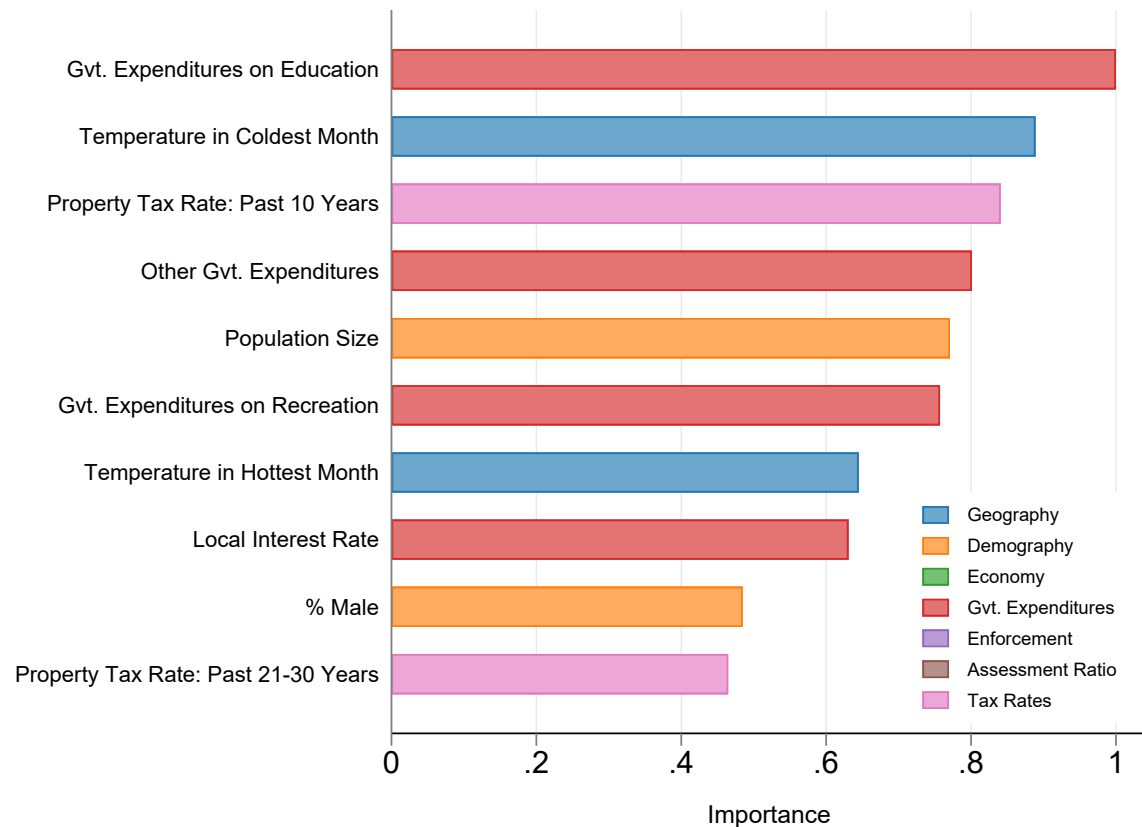
A. Fraction of Total Variance Explained by Each Group of Variables - OLS Model



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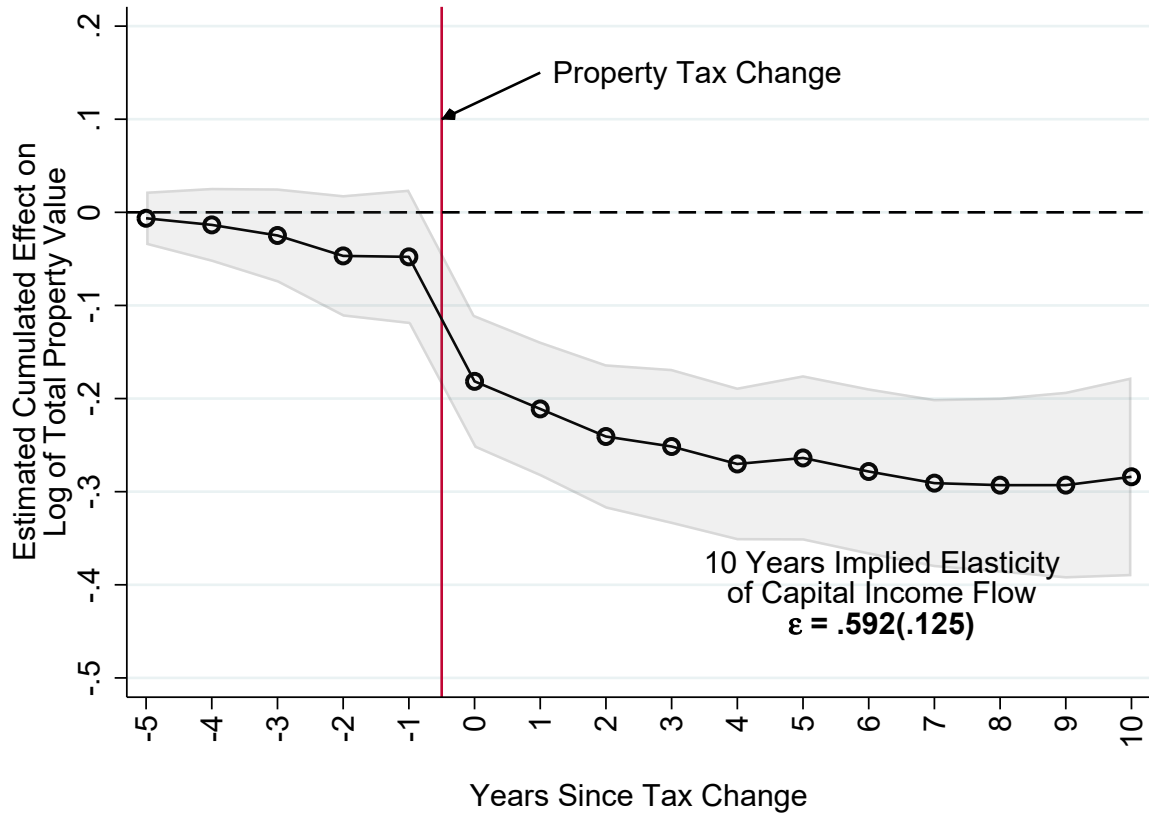
Figure 25: Variance Decomposition of Municipal Property Per Capita in 1931

B. Variable Importance Plot - Random Forest Model



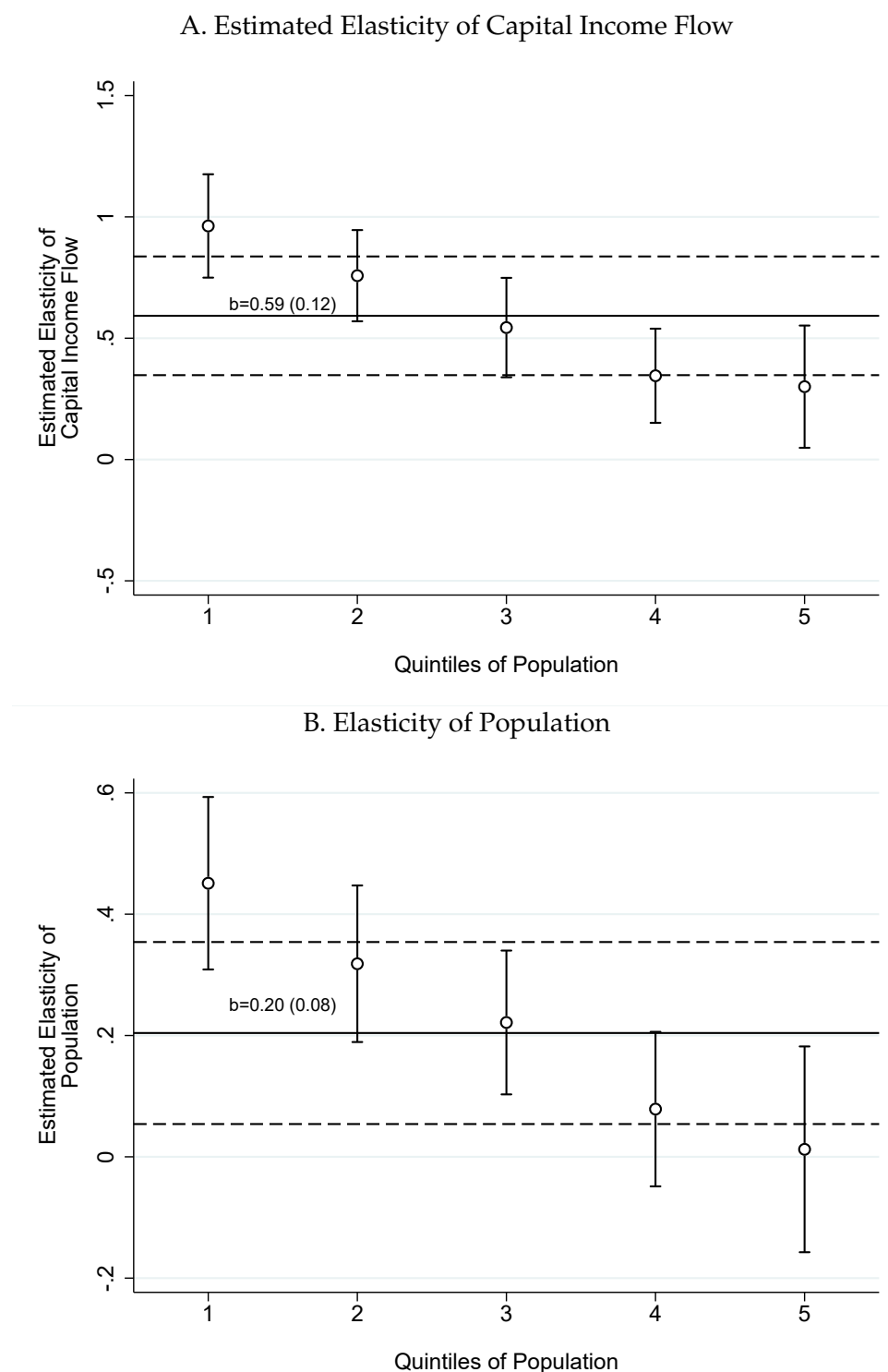
Notes: The figure reports two variance decomposition exercises of total municipal property per capita in 1931. In panel A, we estimate via OLS a linear model of per capita property at the municipal level using the same set of explanatory variables as in Figure 22, to which we add a set of variables capturing the past dynamics of property taxes and local government finances, described in Section 5 and Appendix III.5. We use random draws of the sequential orders in which the variables are introduced in the model. Then, for each variable, we average their partial adjusted R^2 over all models. We finally sum the average partial adjusted R^2 of covariates belonging to the same group of variables. See text for details. In panel B, we predict municipal property in 1931 using random forests and report a variable importance plot.

Figure 26: Elasticity of Total Property at the Municipal Level: Dynamic Leads and Lags Model



Notes: The figure shows the estimated cumulative effect of a tax change in year 0 on the log of total property. The horizontal axis plots the years since the tax change. We estimate equation (4) and plot for each year $t = j$, $\alpha_j = \sum_{k=-j}^5 \hat{\gamma}_k$. The controls are as defined in Sections 4.3 and 5.2. Public policy covariates include 10-year moving average of tax enforcement covariates (the presence of a tax ferret, tax classification, and a state tax commission, as well as the interaction between the presence of a state tax commission and four characteristics of this commission: the power to order reassessment as of 1930, the power to equalize property as of 1930, the power to assess certain corporate property as of 1930 and the power to exercise general supervision as of 1930); the 10-Year moving average of government expenditures and 10 lags, 5 leads and the contemporaneous variable of the assessment ratio. Occupational shares covariates include 10-year moving average of indicators for being in the top quartile of cities by population employed in mining, agriculture, commerce, production, or public administration. Demographics covariates include 10-year moving average of the shares of residents who are male, literate, white, foreigner, or employed. Standard errors are clustered at the city level.

Figure 27: Evidence for Tax Competition: Elasticity of Property and Population by City Size



Notes: The figure reports estimated elasticities of the capital income flow (Panel A) and population (Panel B) by quintiles of city population size. Panel A displays the estimated flow elasticity of capital income with respect to the implied net-of-tax rate on capital income. Panel B shows the estimated population elasticity with respect to the implied net-of-tax rate on capital income. Both panels show heterogeneous elasticity estimates and corresponding 95 percent confidence intervals by population quintiles. The overall estimated elasticity and its corresponding 95 percent confidence interval are shown by the dashed and solid lines. For the covariates definition see the notes to Figure 26 except for the assessment ratio where we include a 10-year moving average instead of leads, contemporaneous and lags. Standard errors are clustered at the city level.

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](#)).

Table 2: Elasticities of Capital along the Intensive and Extensive Margins

	(1)	(2)	(3)	(4)
<i>A. Log of Total Property Value</i>				
Estimated Elast. $\hat{\epsilon}$	0.516*** (0.108)	0.7*** (0.149)	0.713*** (0.13)	0.592*** (0.125)
<i>B. Log of Population</i>				
Estimated Elast. $\hat{\epsilon}$	-0.141 (0.088)	0.111 (0.088)	0.154** (0.078)	0.204*** (0.077)
<i>C. Log Total Property Per Capita</i>				
Estimated Elast. $\hat{\epsilon}$	0.669*** (0.104)	0.593*** (0.141)	0.559*** (0.118)	0.388*** (0.112)
<i>D. Log Real Property Per Capita</i>				
Estimated Elast. $\hat{\epsilon}$	0.71*** (0.117)	0.617*** (0.134)	0.572*** (0.112)	0.353*** (0.108)
<i>E. Log Personal Property Per Capita</i>				
Estimated Elast. $\hat{\epsilon}$	0.498* (0.293)	0.697** (0.293)	0.744*** (0.285)	0.275 (0.255)
5 Leads Net-of-Tax Rate	X	X	X	X
10-Year Moving Avg Net-of-Tax Rate	X	X	X	X
Year + City FE	X	X	X	X
Public Policy Covariates		X	X	X
Occupational Shares			X	X
Demographic Covariates			X	X
State-Year FE				X

Notes: The table shows regression results from specification (5) where the dependent variables are the log of: total property value (Panel A), population (Panel B), total property per capita (Panel C), real property per capita (Panel D), and personal property per capita (Panel E). For the covariates definition see the notes to Figure 26 except for the assessment ratio where we include a 10-year moving average instead of leads, contemporaneous and lags. Standard errors clustered at the city level. The interest rate is assumed to be 2.5%.

Table 3: Tax Competition: Own Tax Rate as function of Past Own Tax Rate and Neighbors' Tax Rates

<i>Dependent variable: Average log of eff. net of tax rate from t+1 to t+5</i>				
	(1)	(2)	(3)	(4)
$\text{Log}(1 - \frac{\bar{\tau}_{i,t-10,t-1}}{\bar{r}})$	0.581*** (0.145)	0.574*** (0.148)	0.476** (0.185)	0.510** (0.231)
$\text{OtherLog}(1 - \frac{\bar{\tau}_{i,t-10,t-1}}{\bar{r}})$	0.321** (0.143)	0.344** (0.148)	0.406** (0.166)	0.447** (0.193)
Observations	6573	6488	4785	4098
Number of cities	273	273	264	220
Adjusted R^2	0.710	0.711	0.715	0.727
Year Fixed Effects	X	X	X	X
City Fixed Effects	X	X	X	X
Tax Enforcement Covariates	X	X	X	X
Occupational Shares		X	X	X
Demographic Covariates			X	X
Assessment Ratio				X
Assessment Ratio (Neighbors)				X
Government Expenditures				X
Government Expenditures (Neighbors)				X

Notes: The table shows regression results from specification (6) where the dependent variable is the average of the log of effective net of tax rate of a municipality in the next five years. For the covariates definition see the notes to Figure 26 except for the assessment ratio where we include a 10-year moving average instead of leads, contemporaneous and lags. “(Neighbors)” signifies that the average covariate for neighboring cities is added as a control. Standard errors are clustered at the city level. The interest rate is assumed to be 2.5%.

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ONLINE APPENDIX

for “Wealth and Property Taxation in the United States”

by Sacha Dray, Camille Landais, and Stefanie Stantcheva

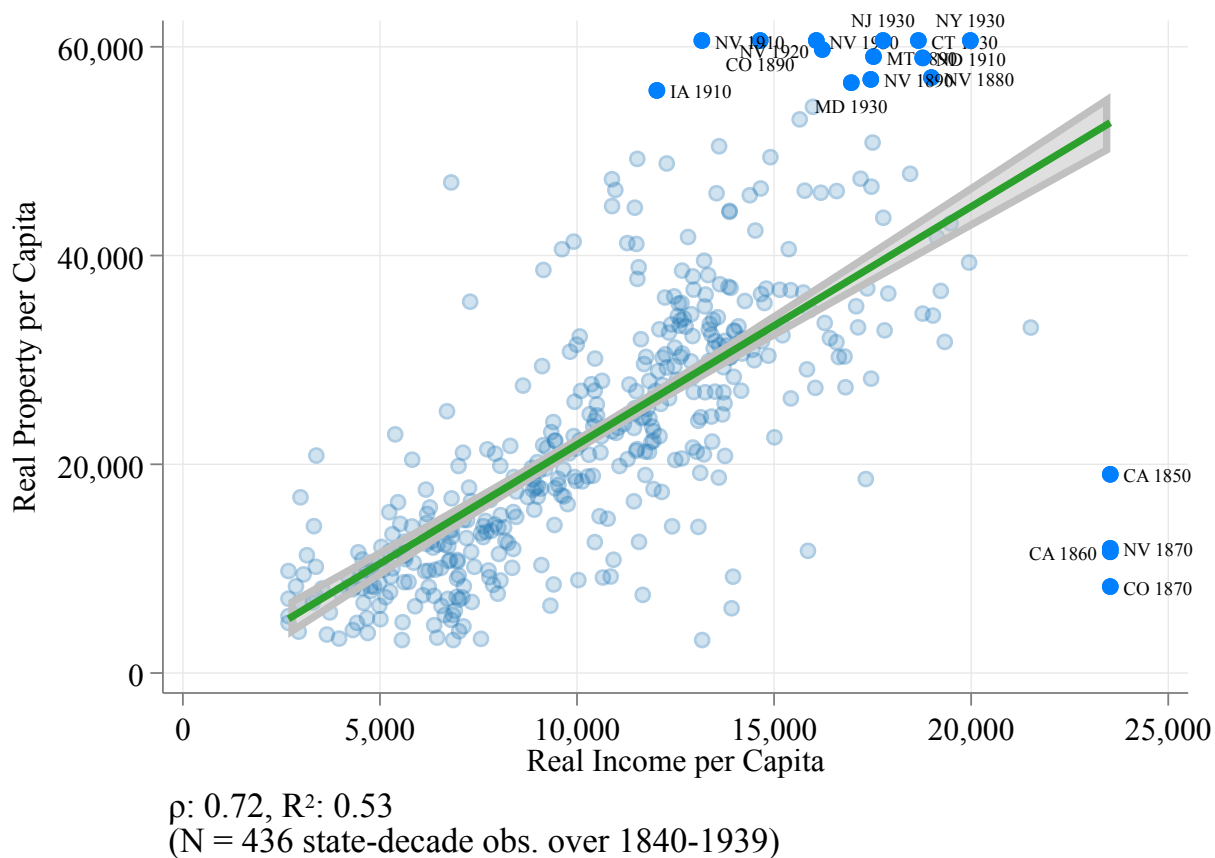
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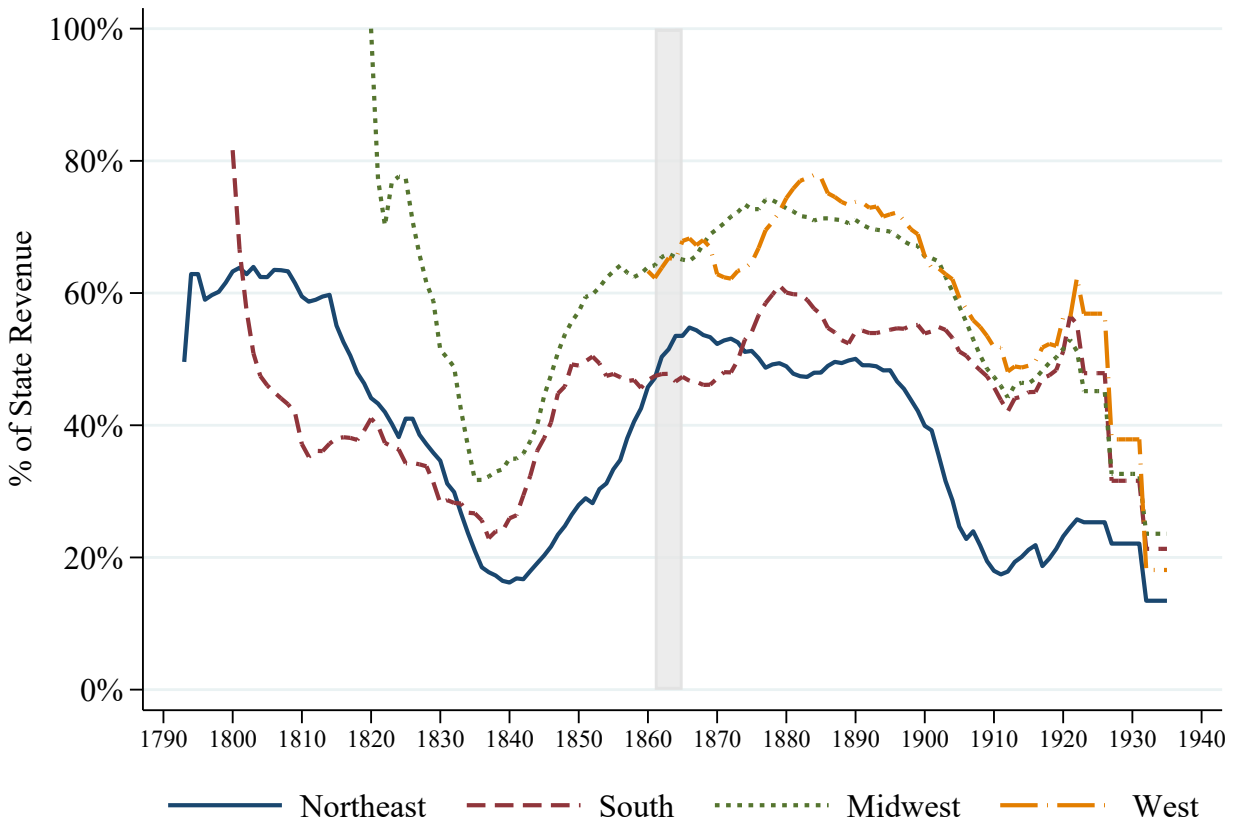
I. Additional Tables and Figures

Figure A1: Property and Income Per Capita



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

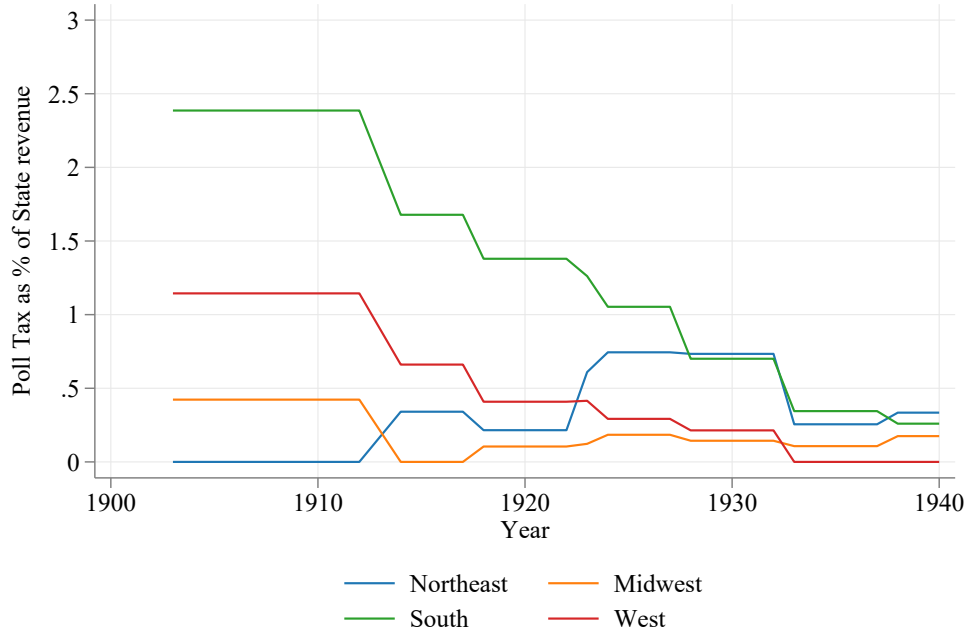
Figure A2: Property Tax Revenue as a Share of State Revenue



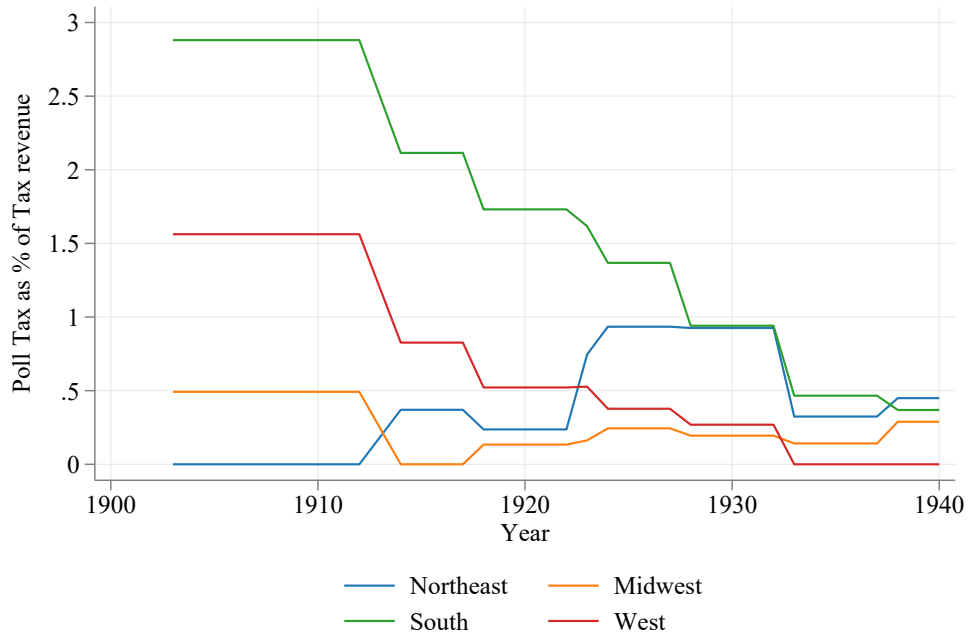
Notes: This figure shows the average share of state revenue (both tax and non-tax revenues) from property tax in four US regions. The values represent ten-year moving averages. For Southern states, we show series including and excluding enslaved wealth.

Figure A3: Revenue from the Poll Tax

A. As a Share of Total State Revenue

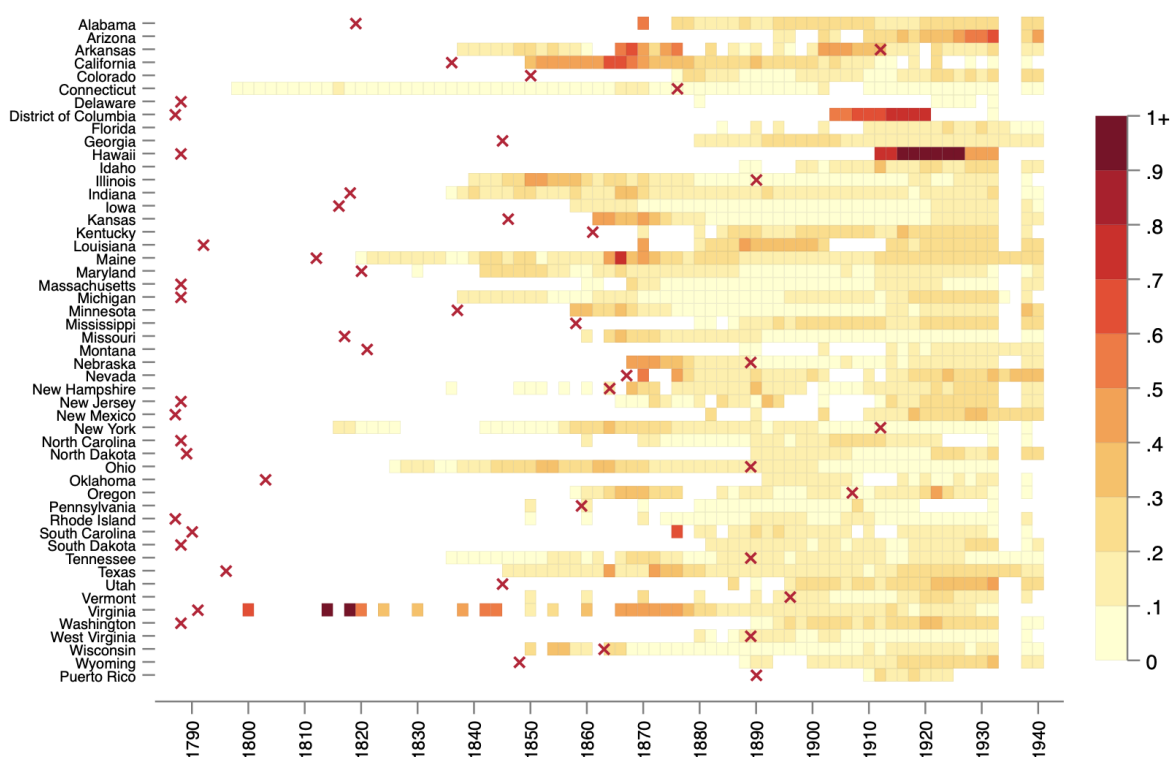


B. As a Share of State Tax Revenue



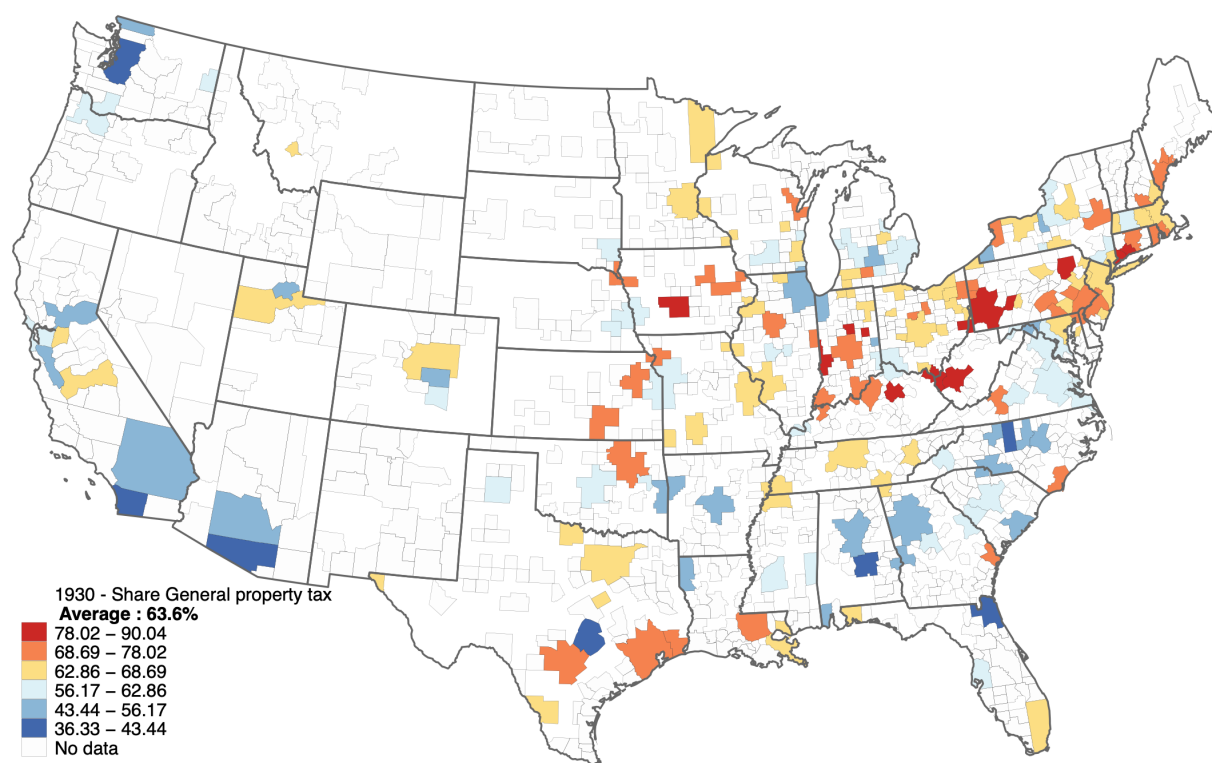
Notes: Panel A shows the average share of state revenue from the poll tax for the four US regions. Panel B shows the average share of state tax revenue from the poll tax by region. The values depicted are 10-year moving averages (because poll tax revenues is not reported every year in most states).

Figure A4: State Rate of Property Tax



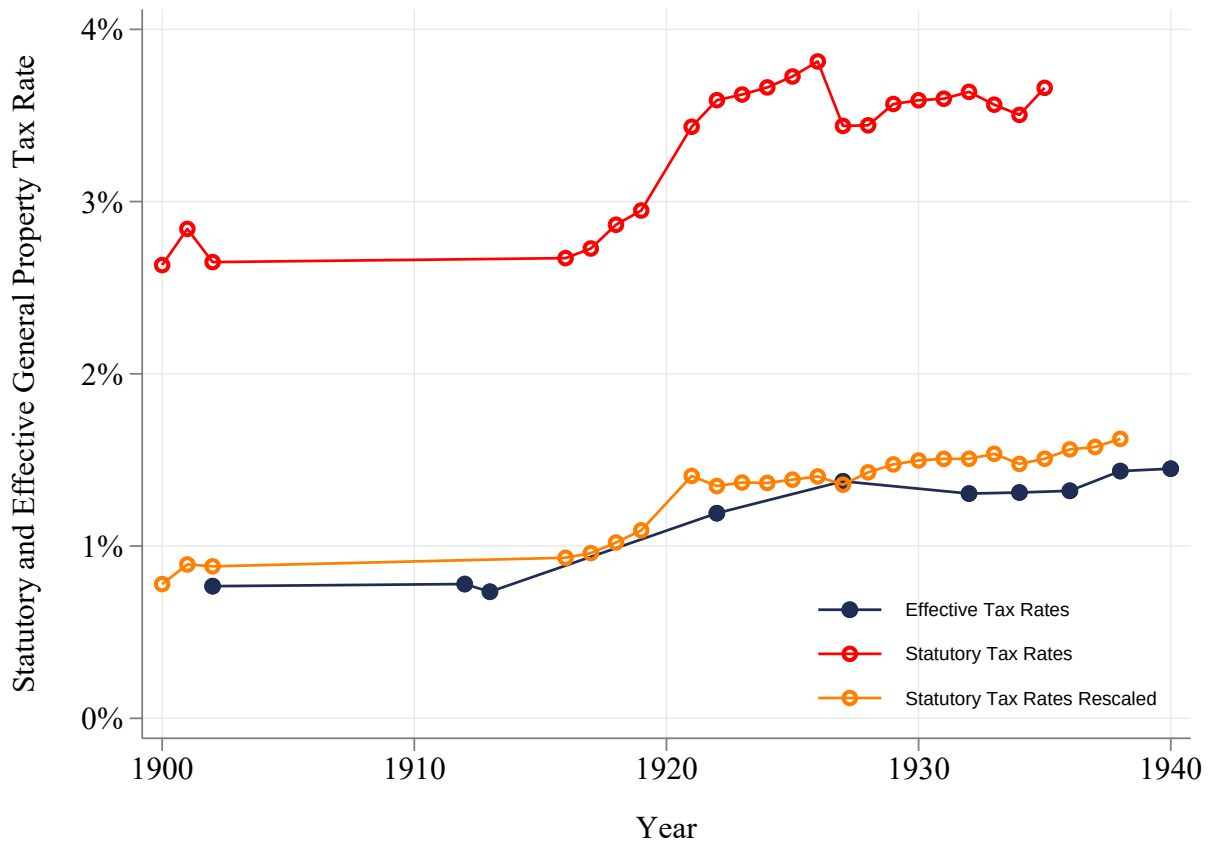
Notes: This figure shows the values of property tax for all 50 states, the District of Columbia and Puerto Rico. Values are interpolated every year at the state level and winsorized for 5th and 95th percentile. . Red crosses indicate the year of the admission of the state to the Union.

Figure A5: The Property Tax as Backbone of City Revenue



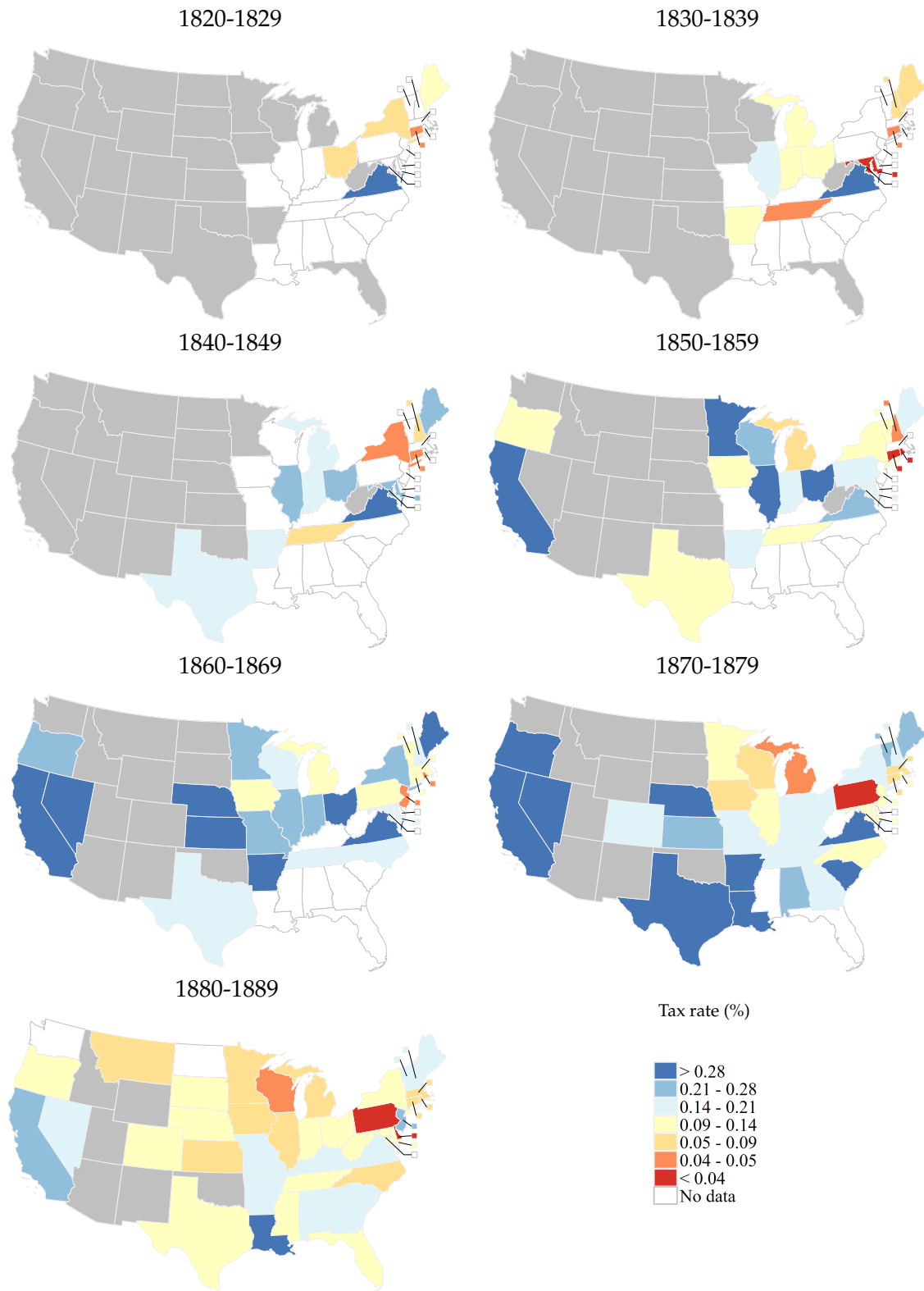
Notes: This figure shows the share of municipal revenue derived from the general property in 1930. The sample of cities are those with a population above 30,000 population. The shares are averaged and displayed on core-based statistical areas for readability.

Figure A6: Statutory and Effective Tax Rates (%)



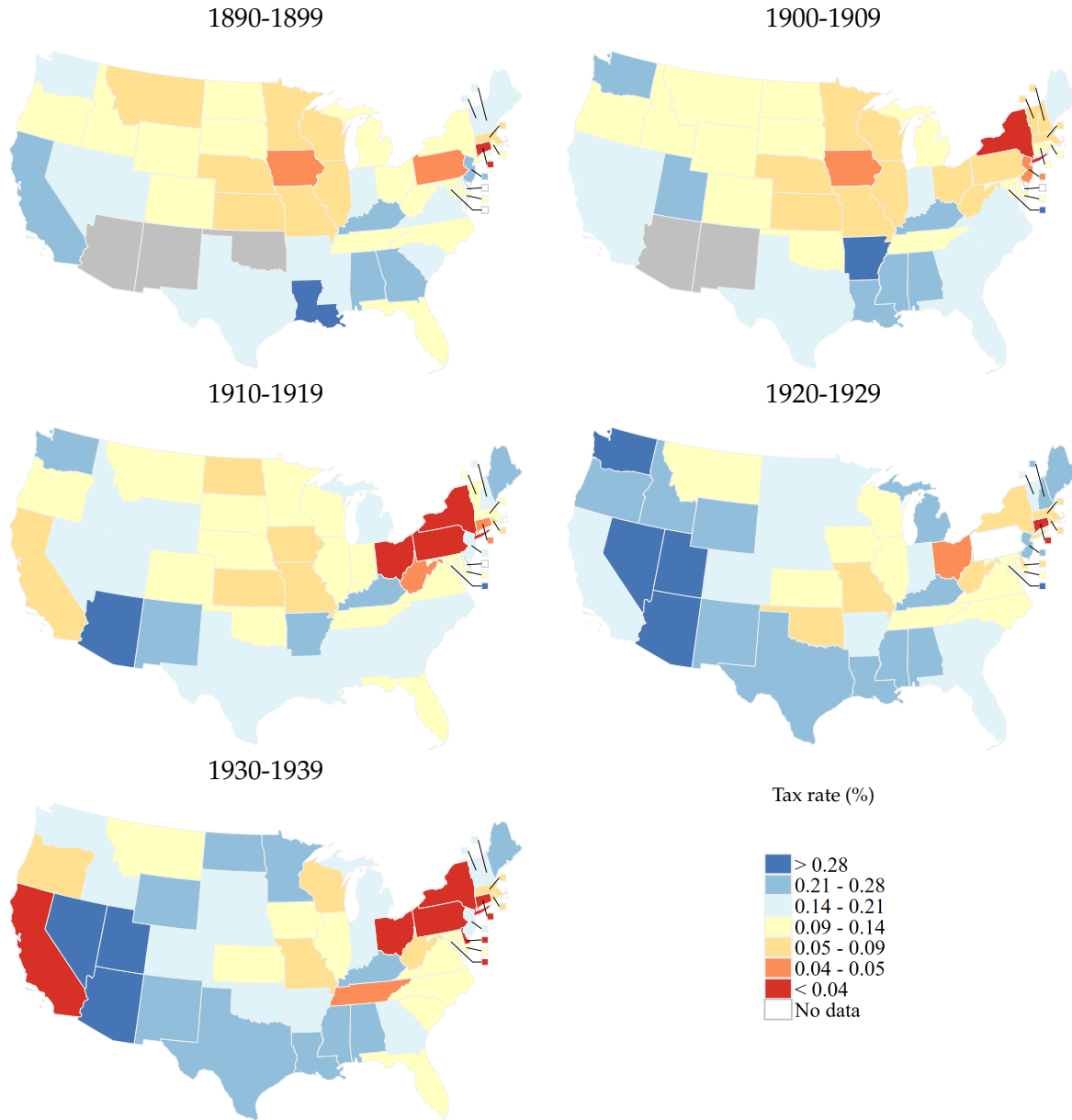
Notes: This graph plots the statutory tax rates on the general property tax, the effective tax rate computed using the tax levies and the true value of property as well as the statutory tax rates rescaled, taking into account the assessment ratios. For the data sources and construction, see Appendix III.10.

Figure A7: State Effective Property Tax Rate: 1820-1940 (%)



Continued to the next page

Figure A7: State Property Tax Rate: 1820-1940 (%)



Notes: This figure displays the average state effective property tax rate by state between 1820-1940. Values are averaged for every decade. The state property tax rate does not include property tax rates from other jurisdictions, such as city and county. The cutoffs for the legend represent the minimum, 5th, 10th, 25th, 50th, 75th, 90th percentile and maximum values across all years. The average tax rate is generally lower than 0.3%.

Figure A8: Private Property as Share of GDP (%)

A. Real Property



B. Personal Property



Notes: This Figure shows the coverage and trends in property share for all 50 states, the District of Columbia and Puerto Rico. Panel A displays Real property shares, and Panel B displays Personal property shares. Property shares are measured as the ratio of private property per capita in the state over national GDP per capita. Property values are linearly interpolated for missing years. Red crosses indicate the year of the admission of the state to the Union.

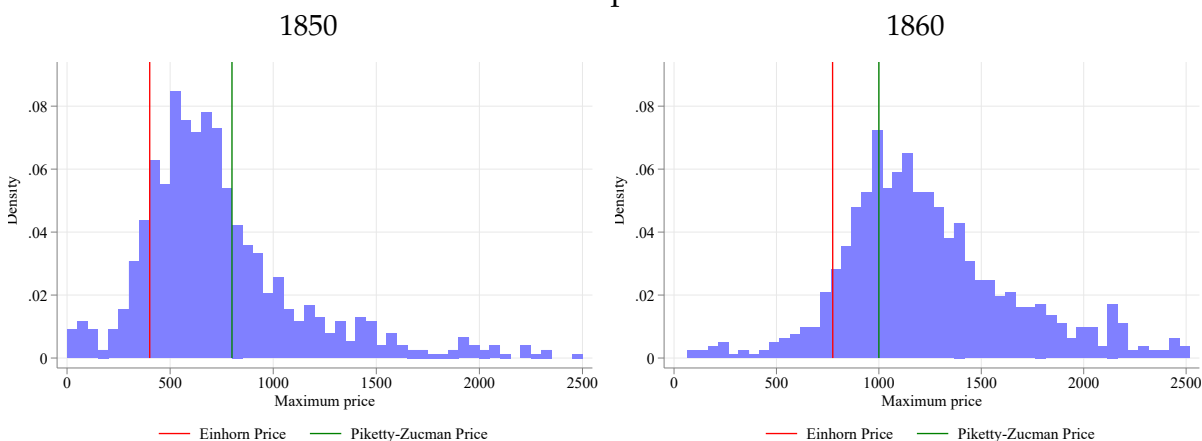
C. Total Property



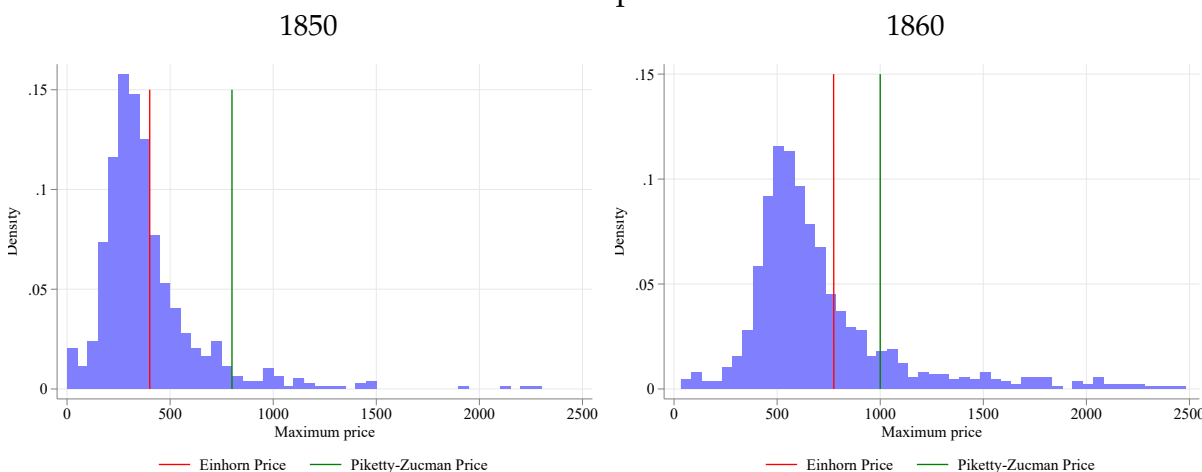
Notes: This Panel shows the coverage and trends in property share for all 50 states, the District of Columbia and Puerto Rico. Property shares are measured as the ratio of private property per capita in the state over national GDP per capita. Red crosses indicate the year of the admission of the state to the Union. For coverage with linear interpolation, see Figure ??.

Figure A9: Distribution of the Upper Bounds on Prices of Enslaved People

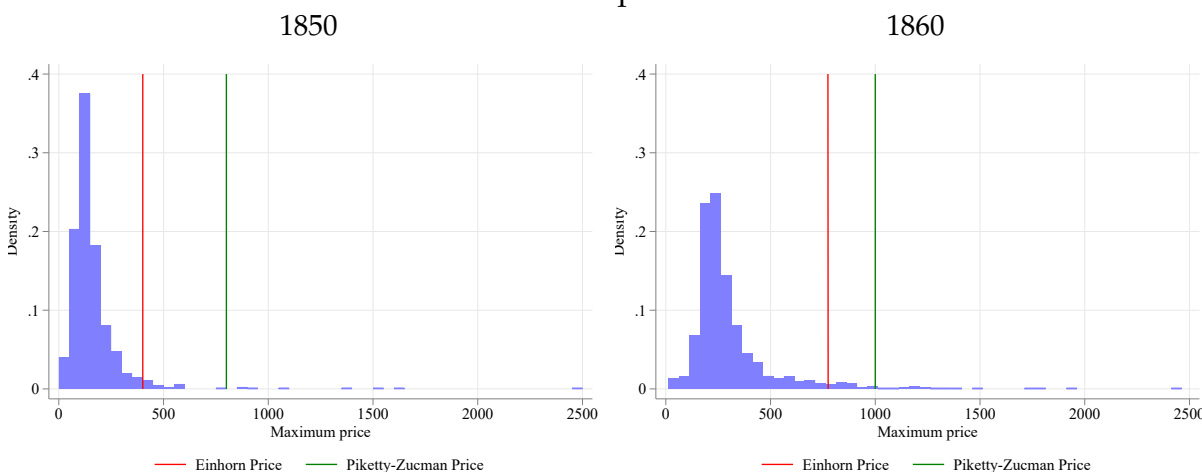
A - Wealth from Enslaved People = 100% of Personal Wealth



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

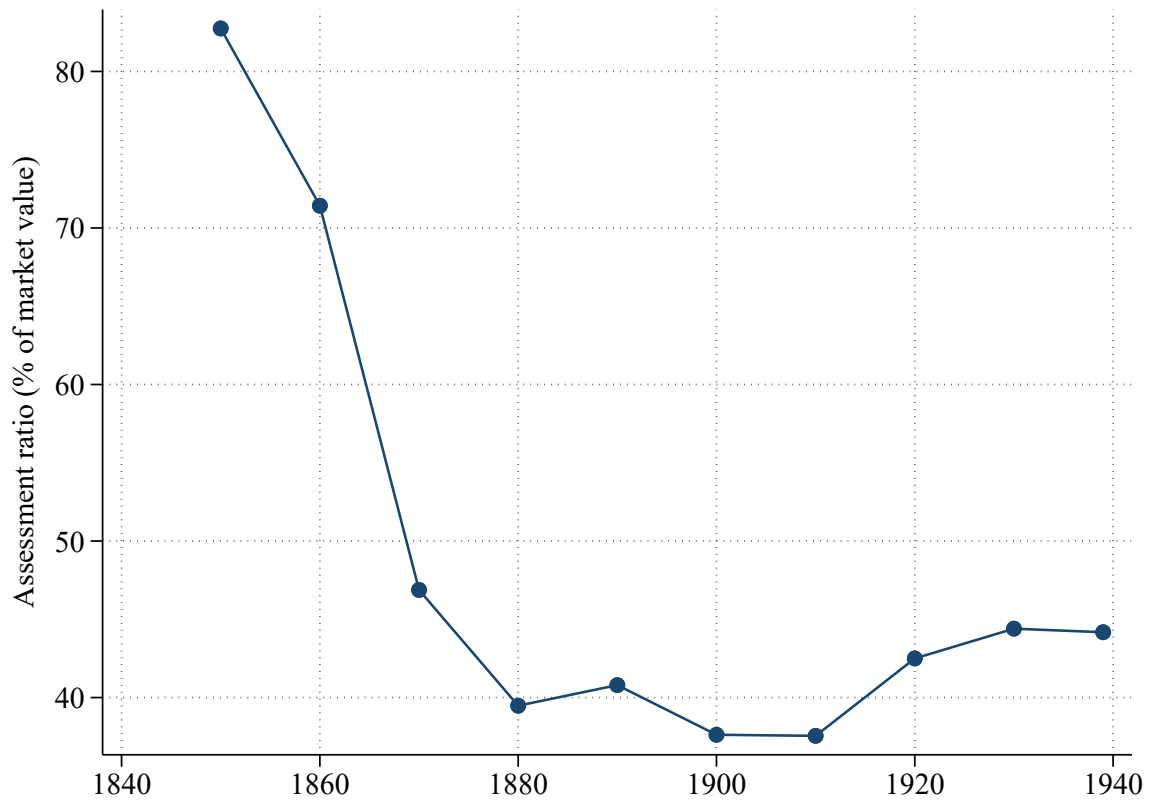


C - Wealth from Enslaved People = 20% of Personal Wealth



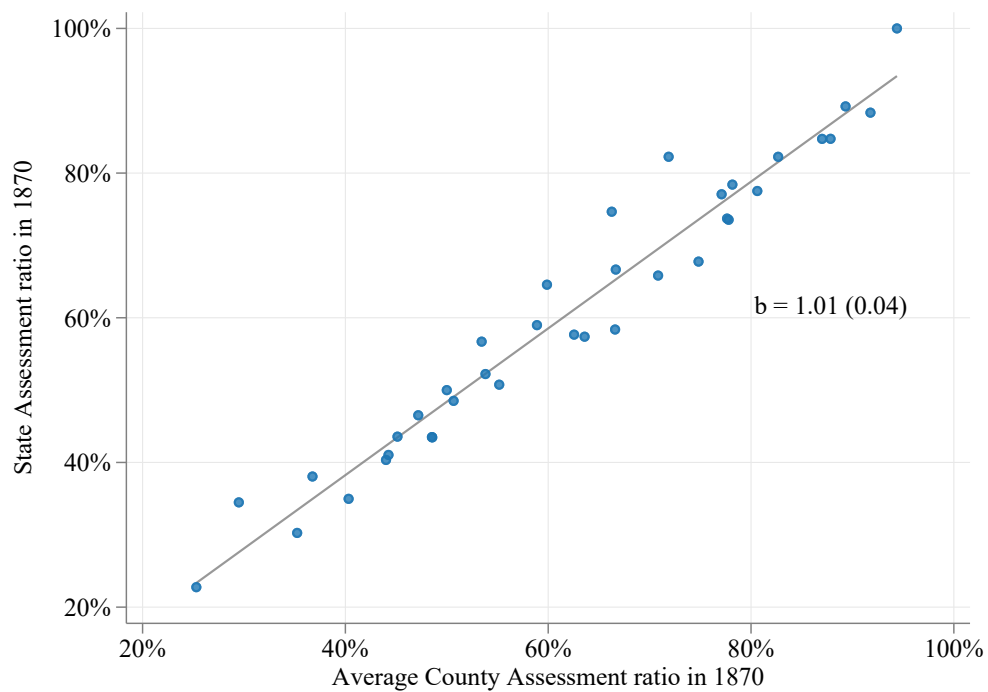
Notes: The figure represents the distribution of the upper bounds on prices of enslaved people by county. The prices are obtained by assuming that wealth from enslaved people represents a share X of Personal Wealth in Southern states in 1850 and 1860 and dividing by the number of enslaved people in the 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 \(2014\)](#).

Figure A10: Assessment Ratio



Notes: The figure shows the average effective ratio of assessed to true value of all property used for state property taxation. Decline in 1850-1880 happens as intangible property gained in importance during the industrialization (share of personal property in tax base is stable), increase from 1910 is due to adoption of state tax commissions and increased enforcement (average year of adoption: 1908).

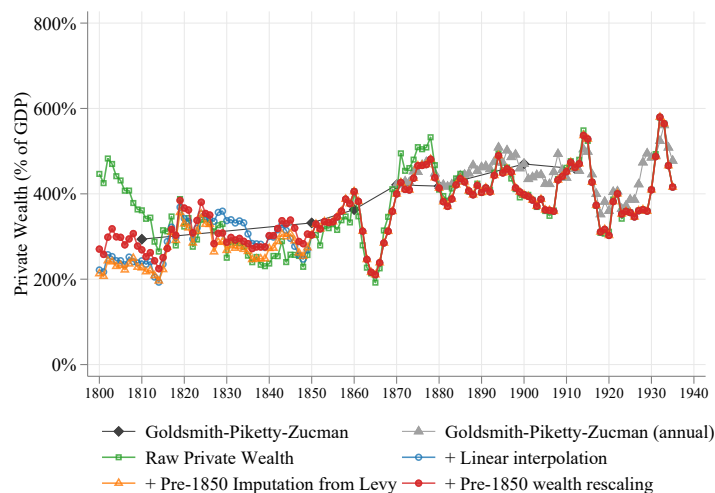
Figure A11: Comparison of State and Counties Assessment Ratios in 1870



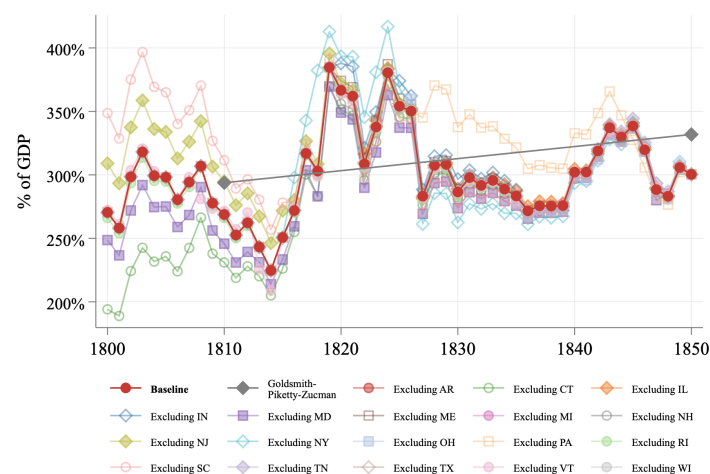
Notes: This figure displays the average assessment ratio of assessed to true value of all property at the state-level in 1870. Each dot plots the ratio in the state compared to the average ratio of each county in that state weighted by county population.

Figure A12: Sensitivity of National Wealth Estimates to Various Assumptions

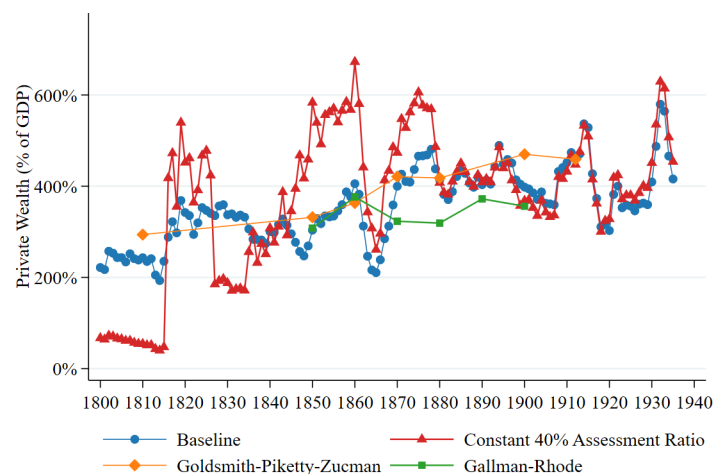
A. Comparison of Private Wealth Estimates



B. Robustness of US Wealth Estimates



C. Sensitivity to Assessment Ratio



Notes: Panel A compares the different Wealth estimates. Panel B compares different Wealth estimates excluding certain states. Baseline is Pre-1850 rescaling and imputation from Levy. Panel C compares the different Wealth Estimates with those of Goldsmith (1951) and Piketty and Zucman (2014).

Figure A13: Private Wealth at the State Level 1850-1870 based on IPUMS USA Full Count

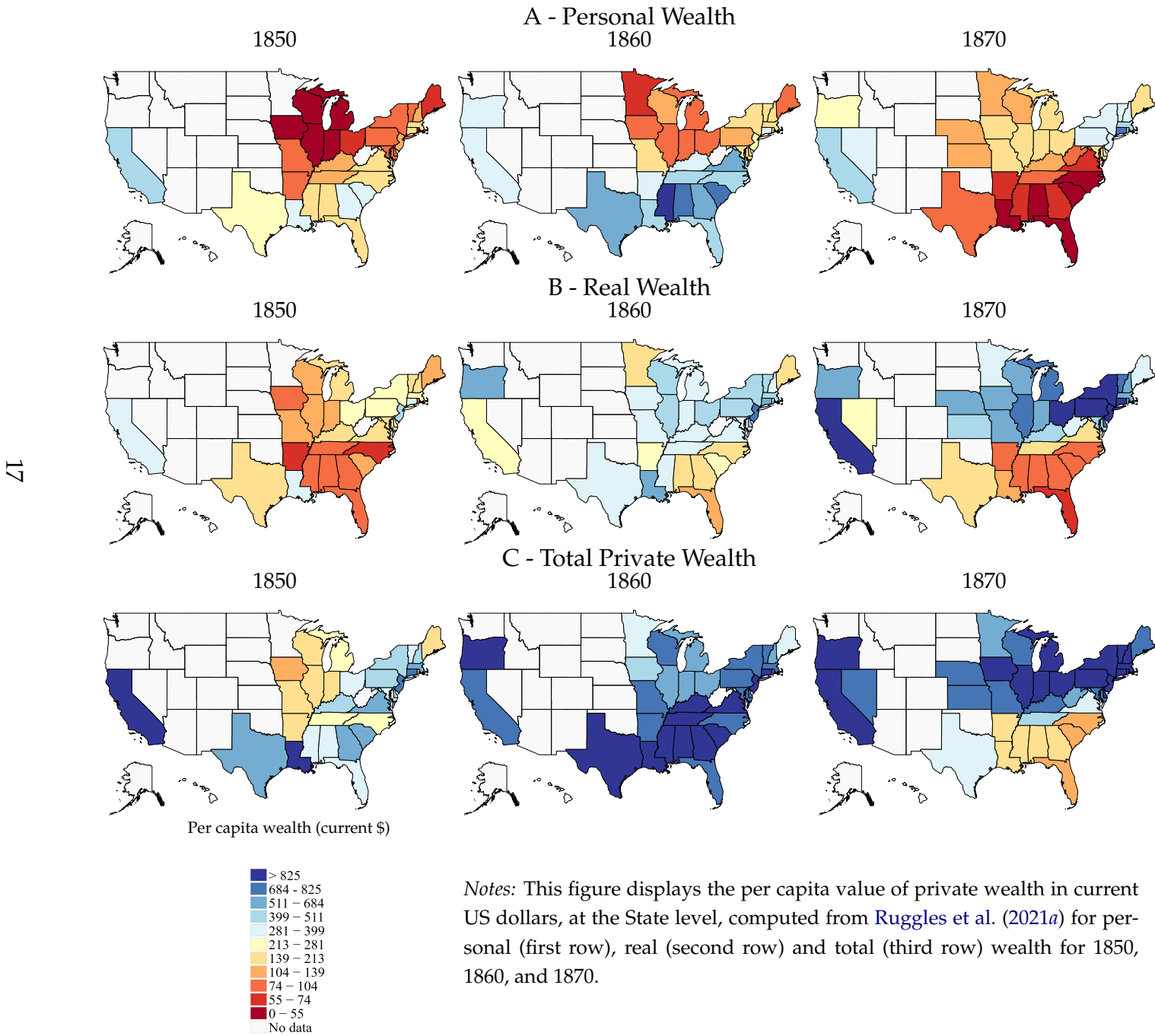


Figure A14: Private Wealth at the County Level 1850-1870 based on IPUMS USA Full Count

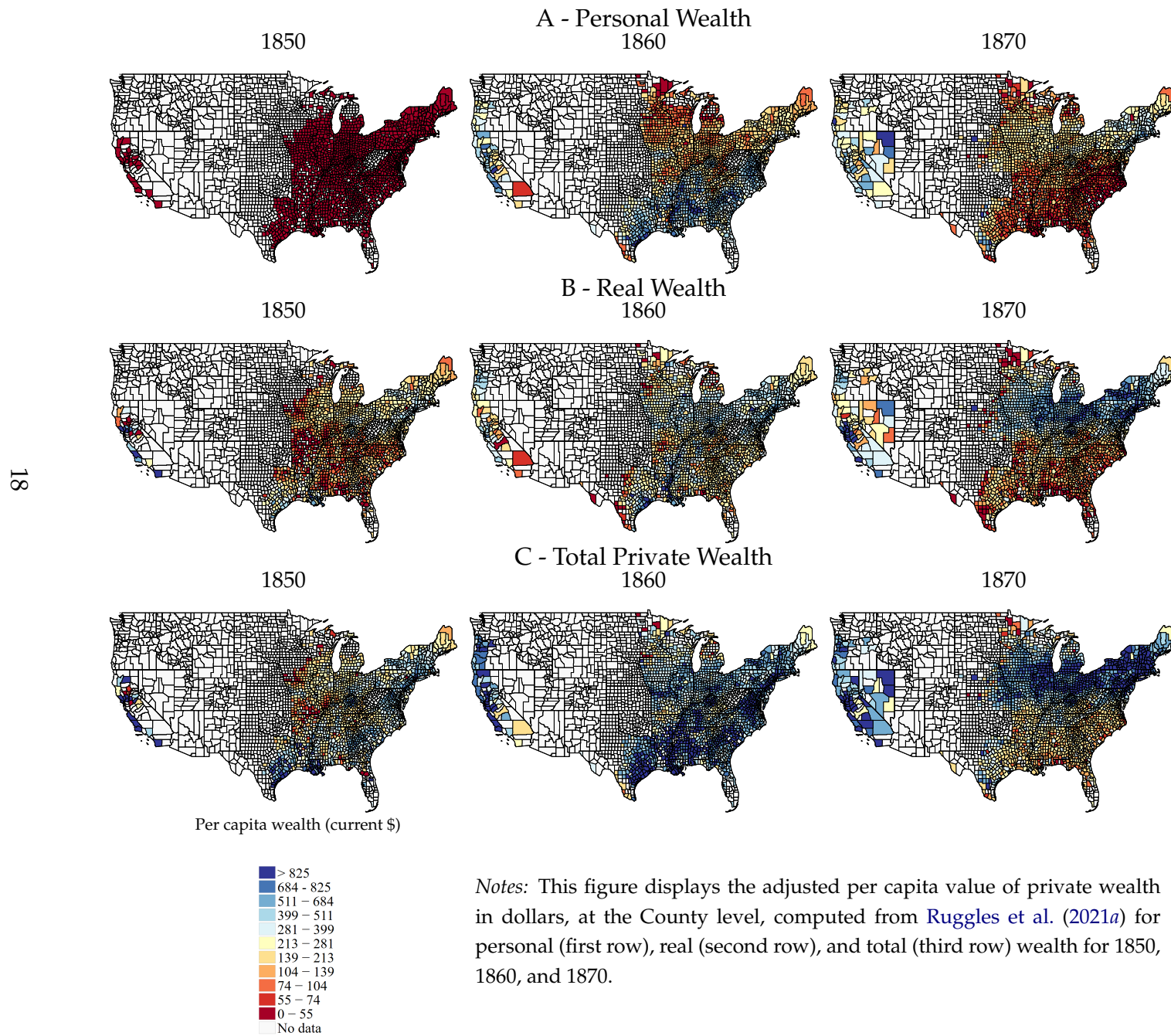
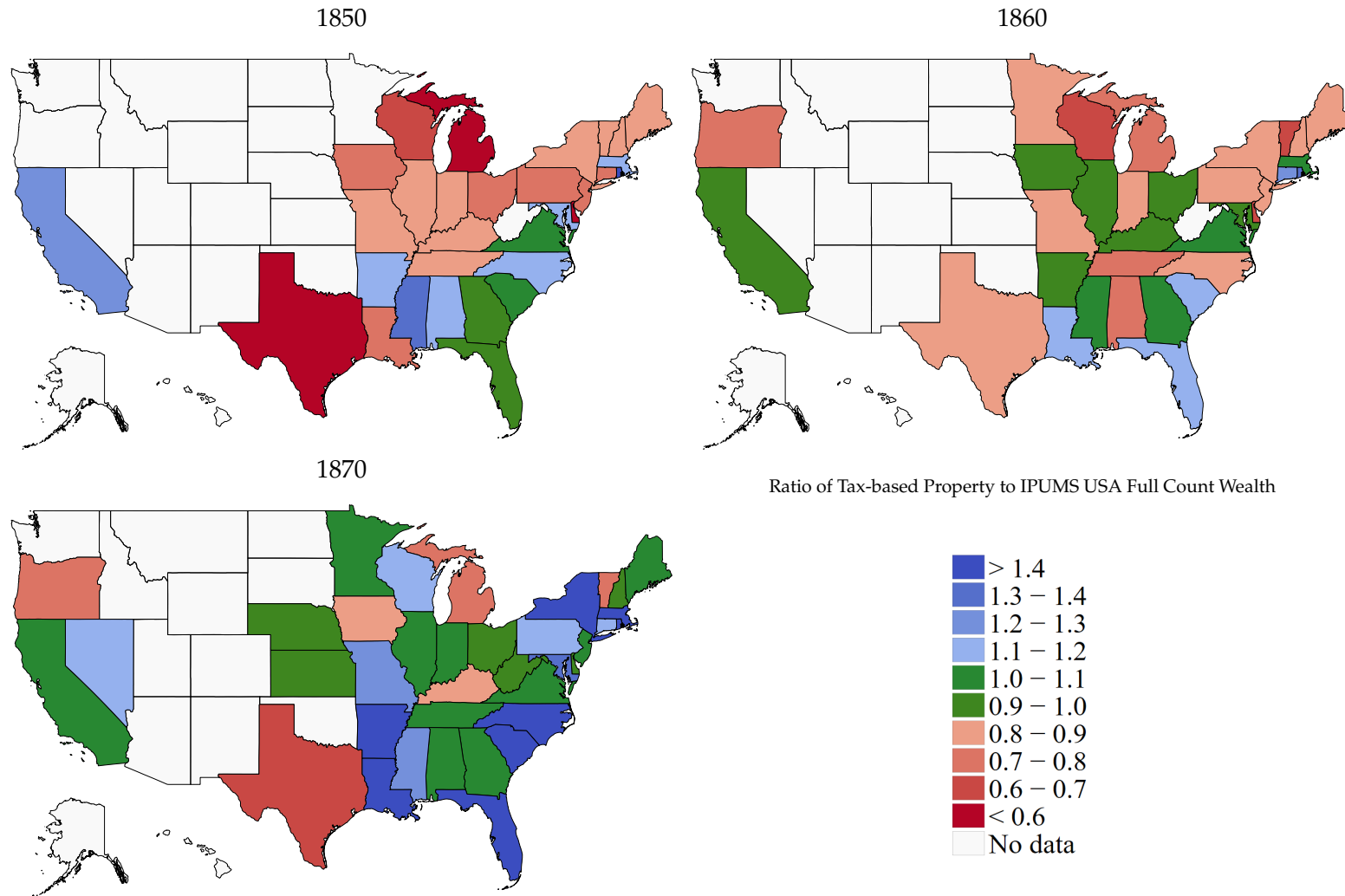
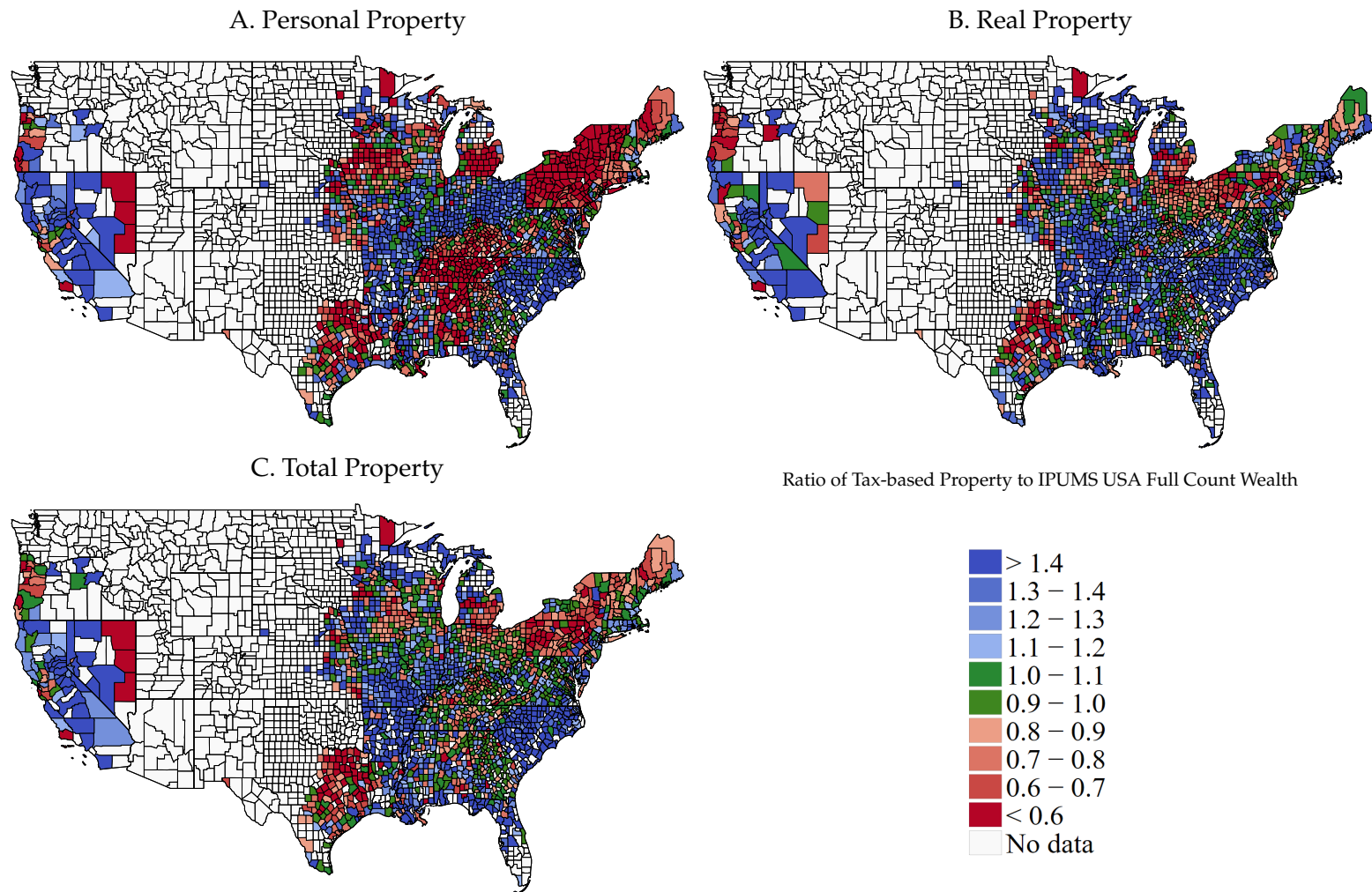


Figure A15: Ratio of Tax-based Property and IPUMS USA Full Count Wealth Measures at the State Level 1850-1870



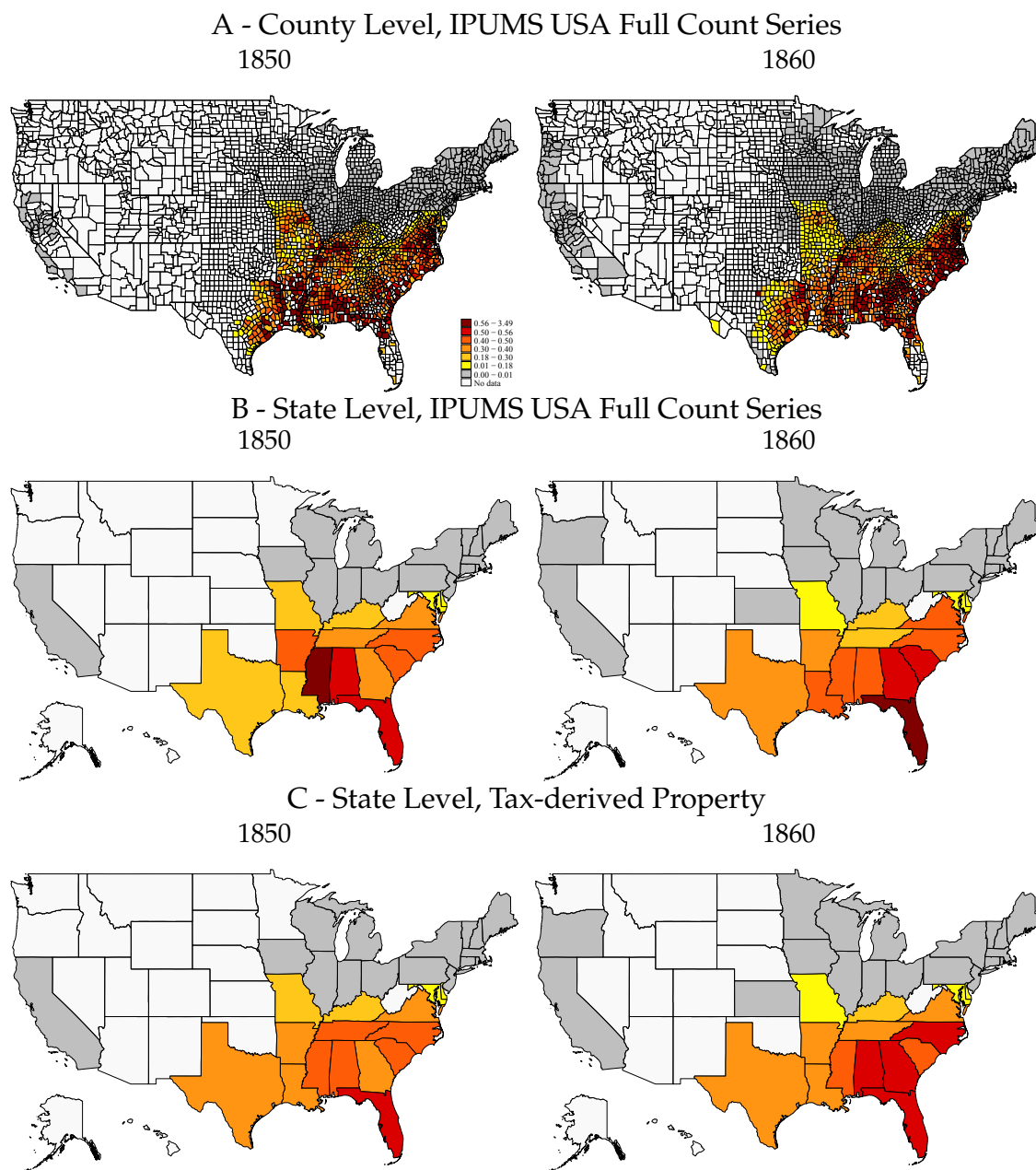
Notes: The figure shows the ratio of the tax-based property measure to the IPUMS USA Full Count wealth measure at the state level, for 1850, 1860, and 1870. Data for states in US territories prior to admission in the Union are not displayed.

Figure A16: Ratio of Tax-based Property and IPUMS USA Full Count Wealth Measures at the County Level in 1870

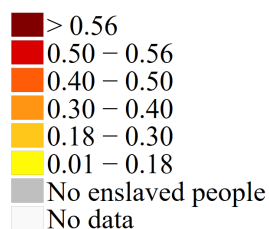


Notes: The panels shows the ratio of the tax-based to the IPUMS USA Full Count wealth measure at the county level in 1870.

Figure A17: Share of Wealth and Property from Enslaved People in Total Wealth

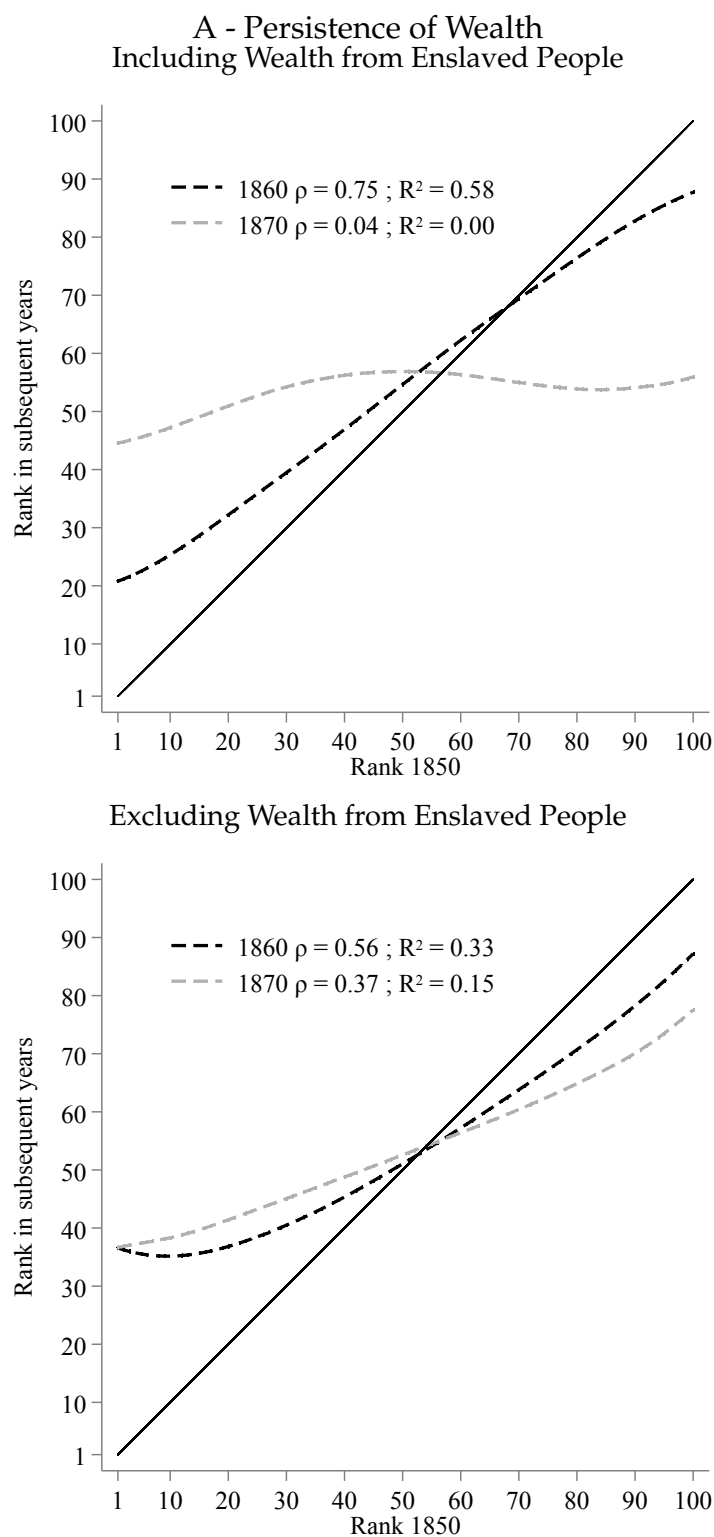


Share of Wealth from Enslaved People in Total Wealth



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 Section III.2. Data for states in US territories prior to admission in the Union are not displayed.

Figure A18: Effects of the War and Role of Enslaved Wealth 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 wealth per capita in year t on county-level wealth per capita in 1850, taking [Ruggles et al. \(2021a\)](#) series. We successively include or exclude wealth from enslaved people using [Einhorn \(2008\)](#) prices. Wealth is compared in current US dollars.

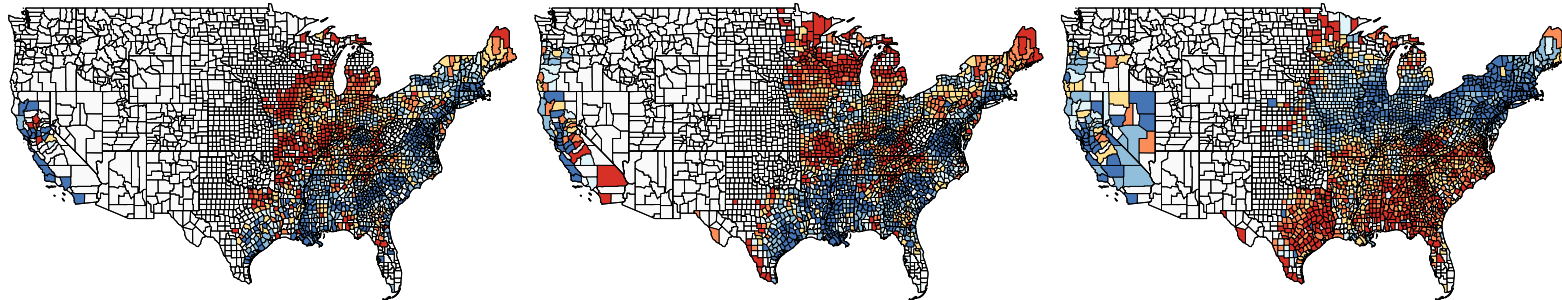
Figure A18: (continued)

B - Per Capita Total Wealth Including Wealth from Enslaved People

1850

1860

1870

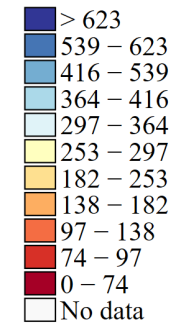
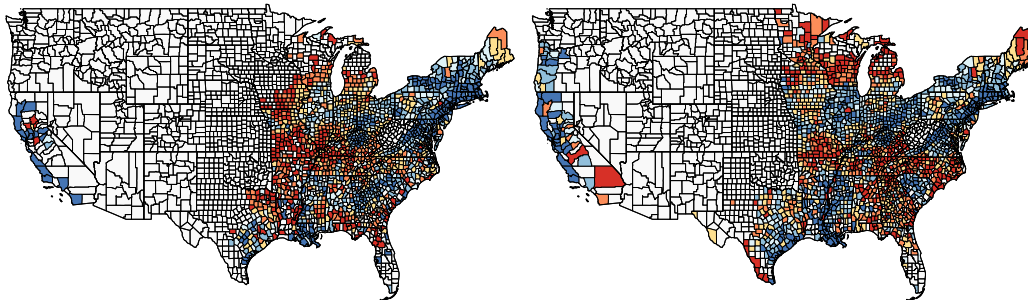


C - Per Capita Total Wealth Excluding Wealth from Enslaved People

1850

1860

Per capita wealth (current \$)

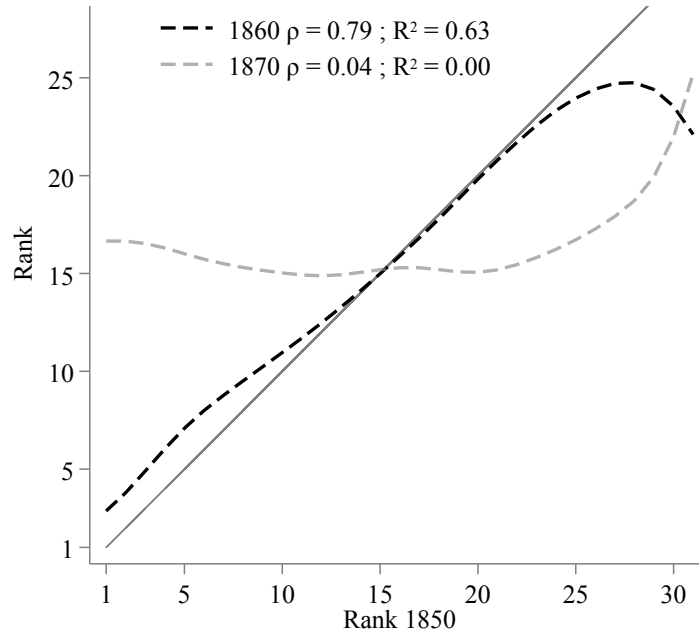


Notes: Panel B displays the value of wealth per capita at the county level from [Ruggles et al. \(2021a\)](#) series, including wealth from enslaved people, in current US dollars. Panel C displays the value of wealth per capita at the county level from [Ruggles et al. \(2021a\)](#) series, excluding wealth from enslaved people, with [Einhorn \(2008\)](#) prices. Panel C year 1870 would be identical to Panel B because there were no enslaved person in 1870. Wealth is compared in current US dollars. Data for counties in US territories prior to admission in the Union are not displayed.

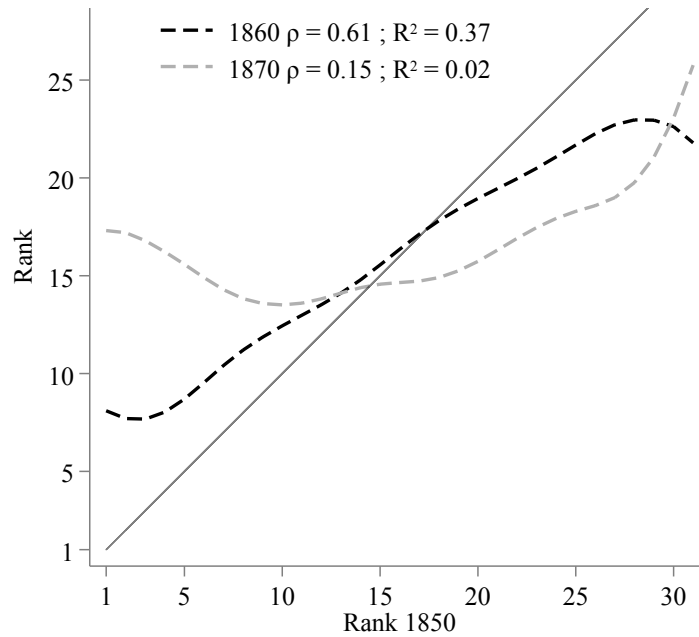
Figure A19: Effects of the War at the State Level : Property and Wealth

A - Persistence of Wealth and Property

Property - Tax-based series



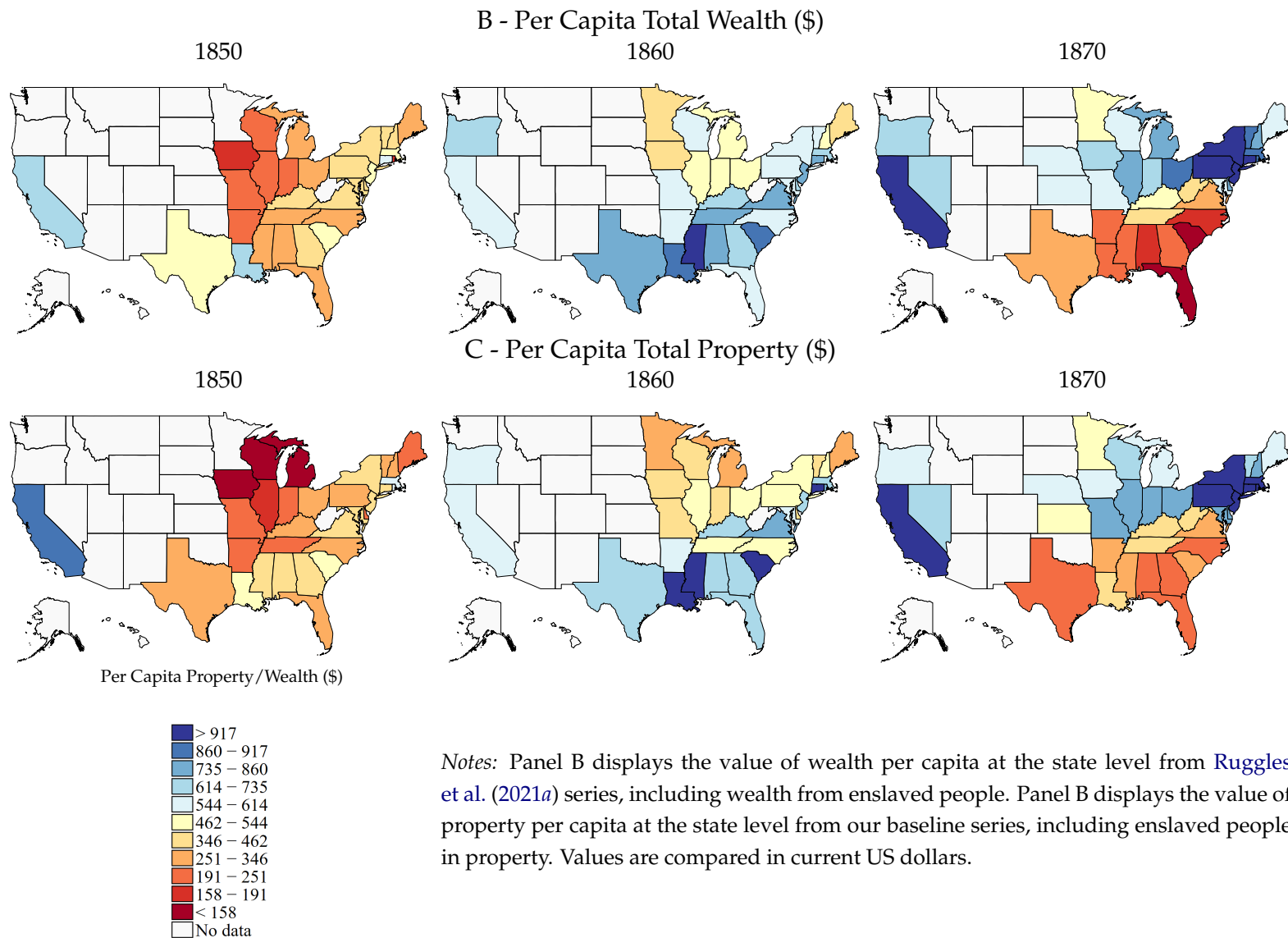
Wealth - [Ruggles et al. \(2021a\)](#) series



Notes: Panel A shows the rank-rank correlation of state-level property per capita for 1860 and 1870 (ρ) and the R^2 for each year t of a simple regression of state-level wealth per capita in year t on county-level wealth per capita in 1850, taking [Ruggles et al. \(2021a\)](#) series for the upper panel and our property data for the bottom panel.

Continued to the next page

Figure A19: Effects of the War at the State Level



Notes: Panel B displays the value of wealth per capita at the state level from [Ruggles et al. \(2021a\)](#) series, including wealth from enslaved people. Panel C displays the value of property per capita at the state level from our baseline series, including enslaved people in property. Values are compared in current US dollars.

Figure A20: Sensitivity Analysis: State-Level Property in 1850 and 1860 using Different Prices for Enslaved People

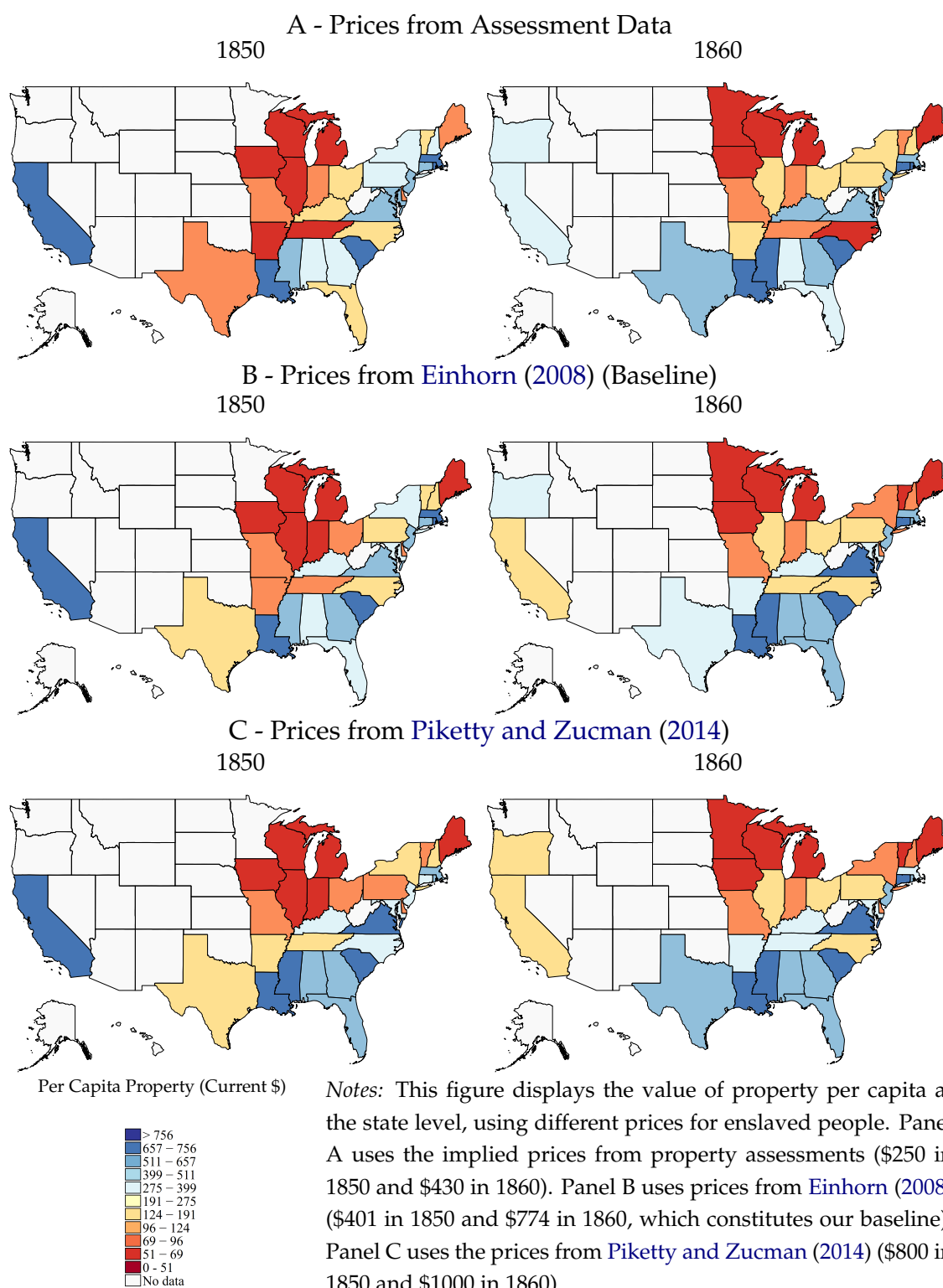
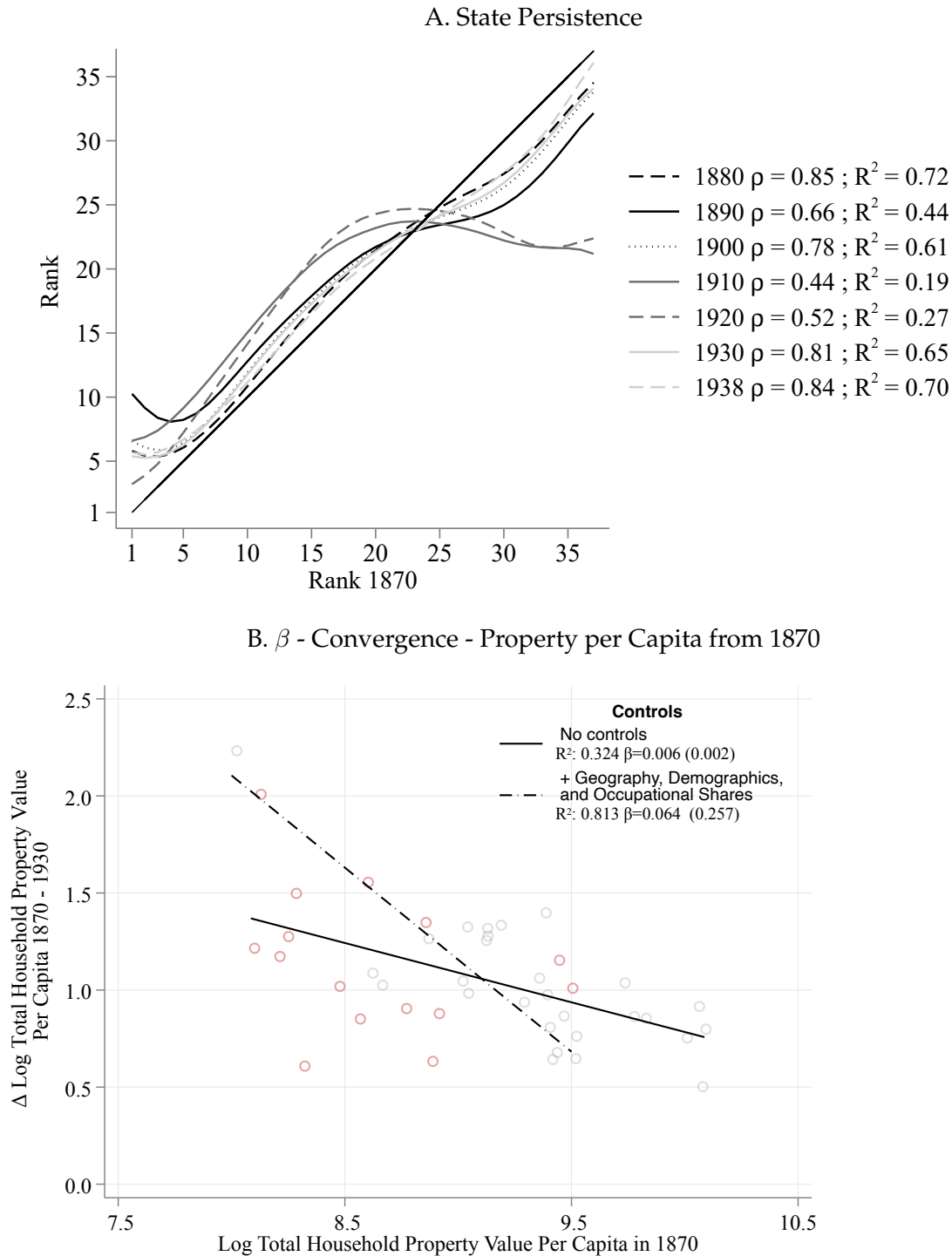
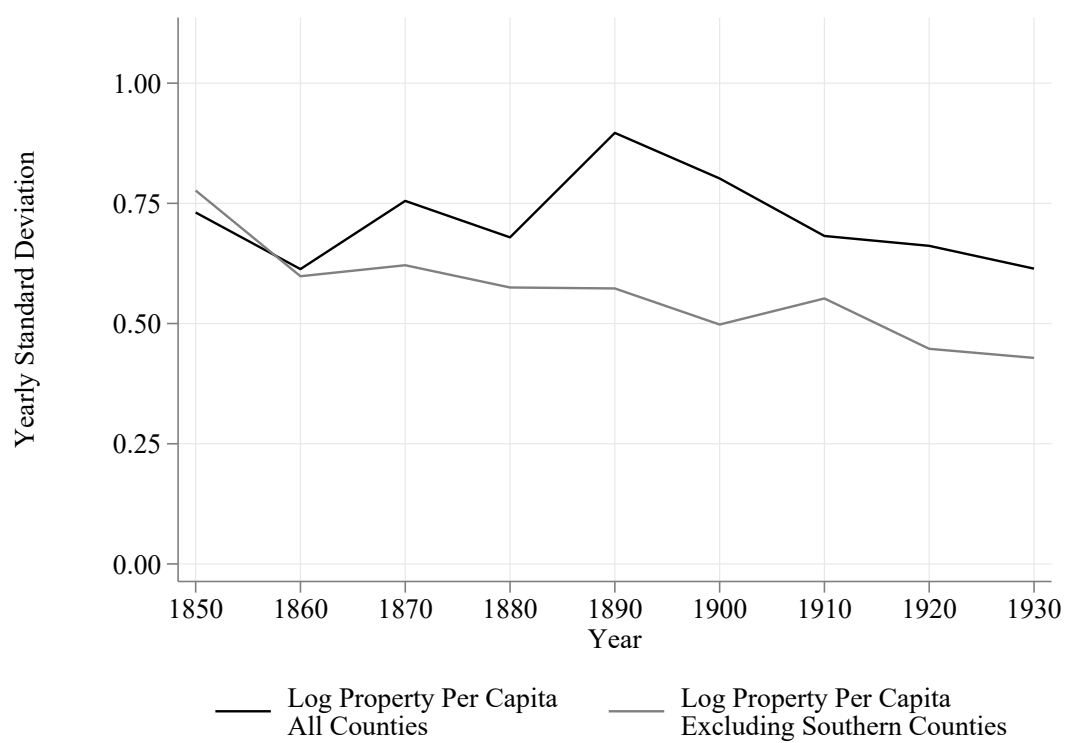


Figure A21: State Persistence and Convergence



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 A22: 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).

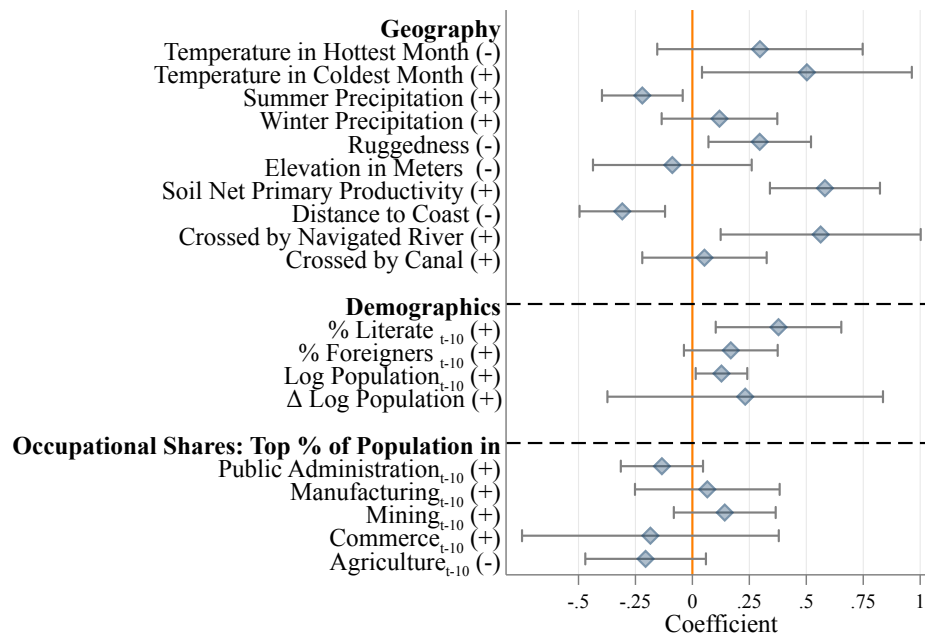
Figure A23: Evolution of Spatial Inequality across Counties Based on Share of National Property Owned by the Top 10%



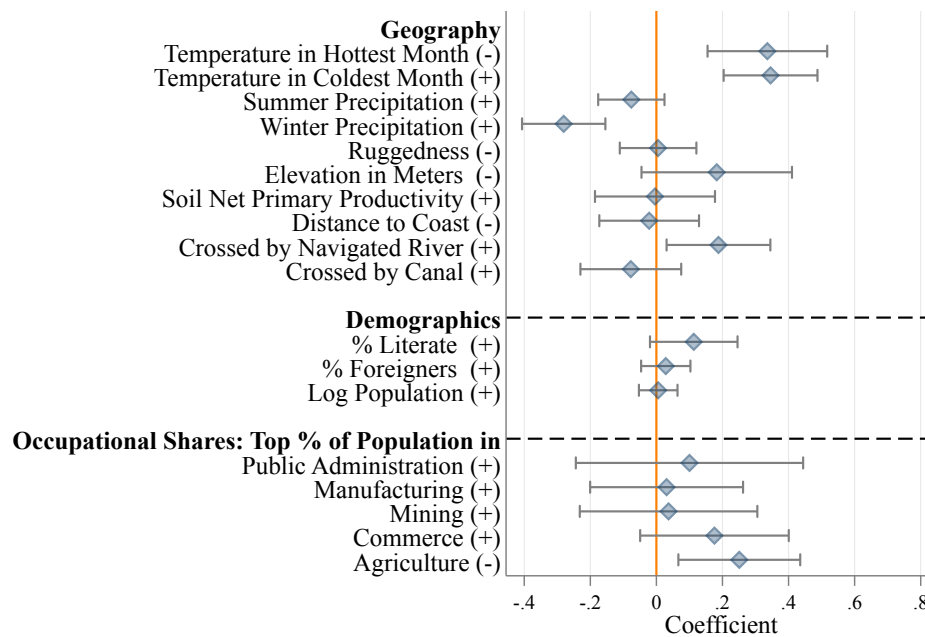
Notes: The figure displays the evolution of the share of national property owned by the top 10% wealthiest counties between 1860 and . The balanced panel only keeps counties for which we have values for all decades between 1860 and 1930. The unbalanced panel keeps all counties.

Figure A24: Correlates of Property Growth - State Level Estimates (1870-1939)

A. Log Total Household Property Value per Capita in 1870

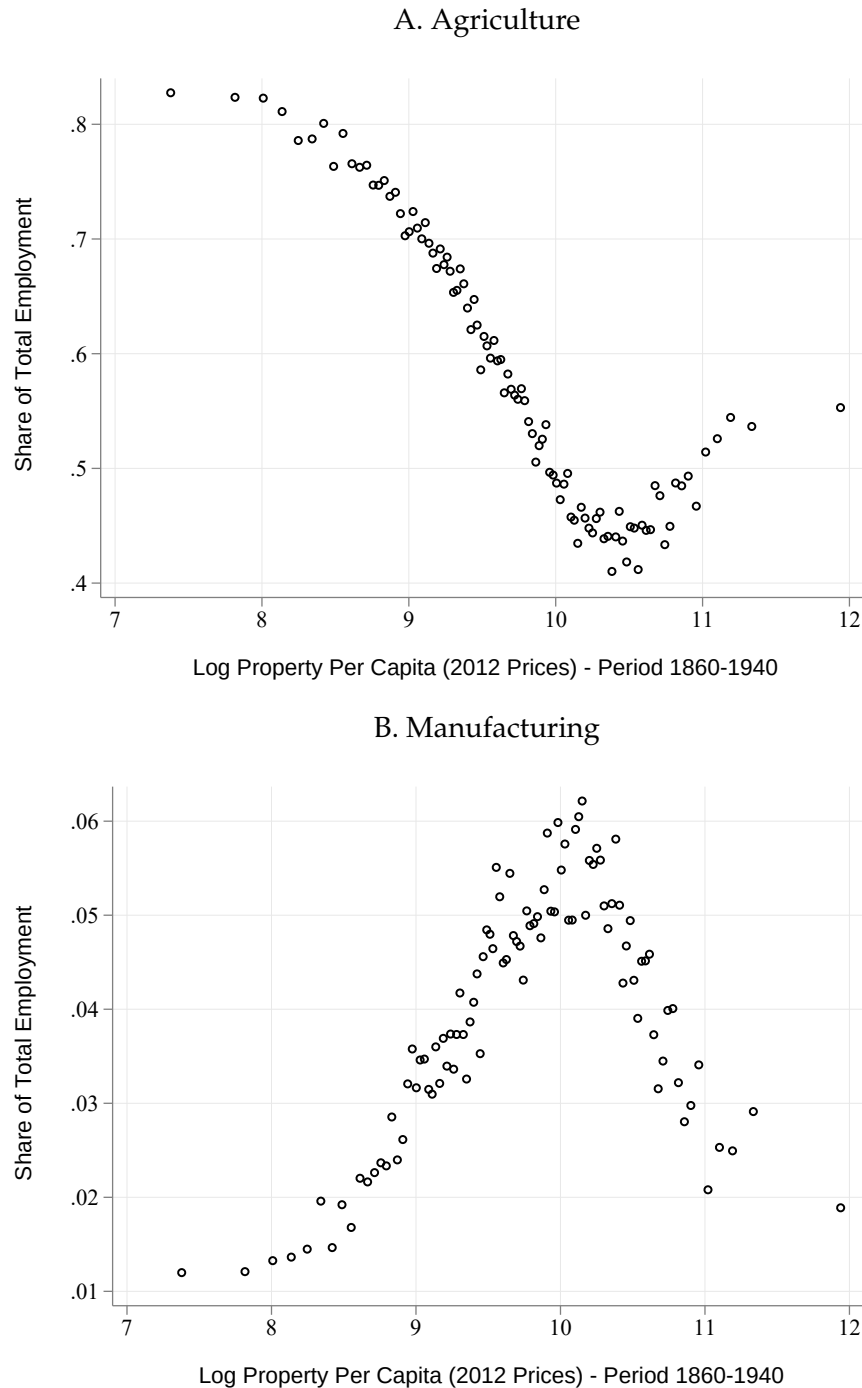


B. 1870-1930 Δ log Total Household Property Value per Capita



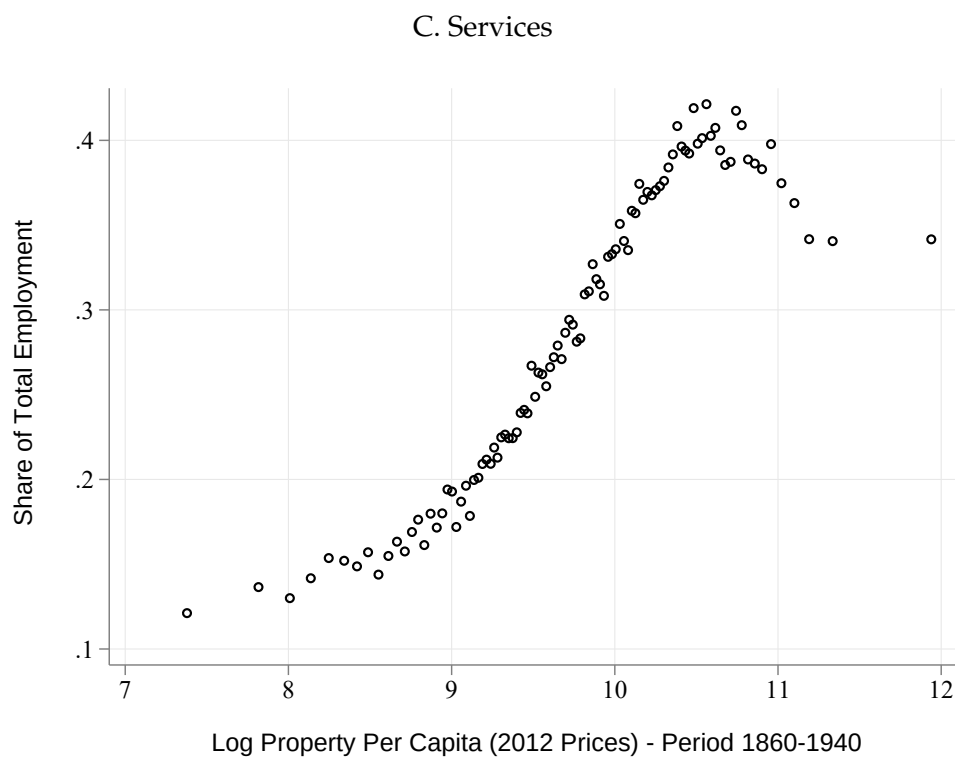
Notes: Panel A presents the set of coefficients coming from the regression of log property in 1870 on 1860's determinants from equation ?? . Panel B presents the set of coefficients coming from the regression of the change in log property between 1870 and 1939 on 1870's property and controls from equation ?? . Geography is time-constant and every coefficient is shown with its 90% confidence interval. Furthermore, the minus sign tells that the sign of the coefficient was switched for graphical purposes. Year fixed effects are included in this specification.

Figure A25: 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



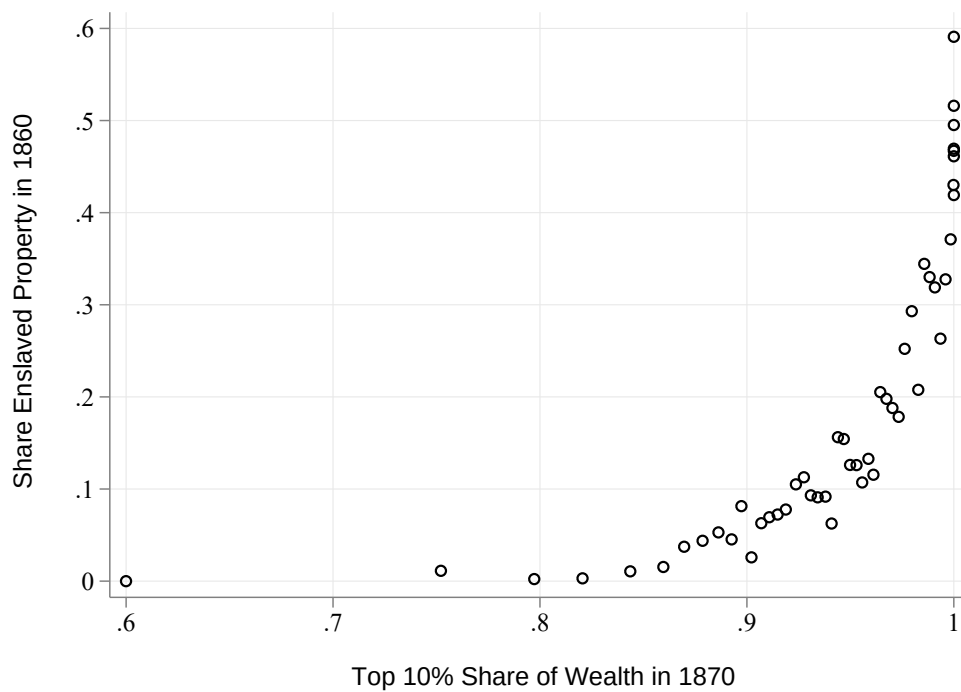
Notes: Panel A displays the relationship between the share of agriculture in the total employment in the county and the log of the county property per capita expressed in 2012 US dollars for the period between 1860 and 1940. Panel B displays the relationship between the share of manufacturing industry 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 A25: 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.

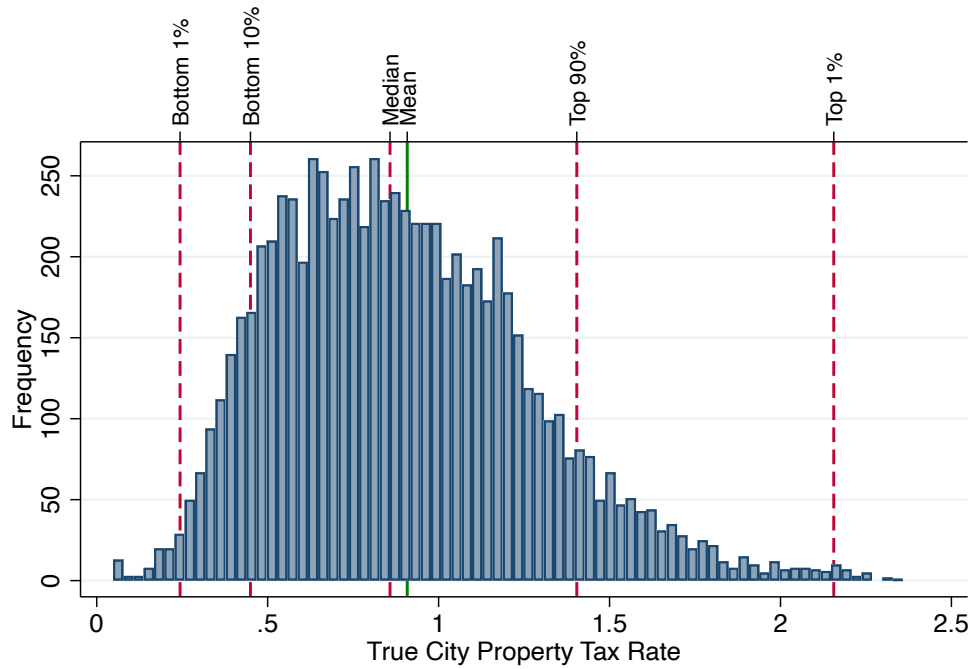
Figure A26: Correlation between Top 10% Wealth Share in 1870 and Share of Enslaved Property in 1860 at the County Level



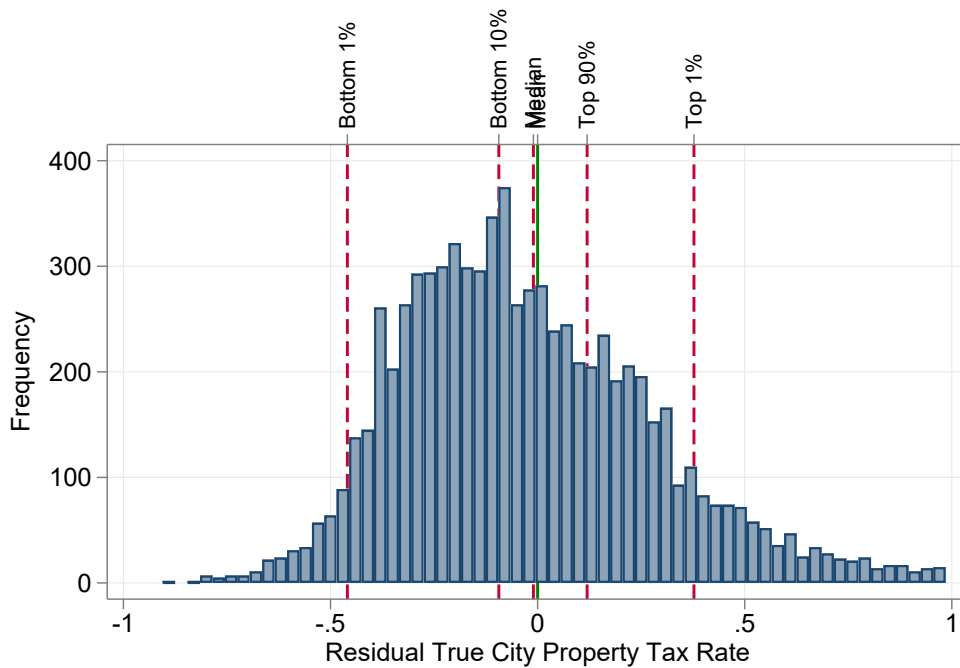
Notes: This figure displays the correlation between the share of enslaved property in 1860 and the top 10% share of total wealth in 1870. Top 10% wealth share measures the fraction of total wealth owned by the top 10% of wealthiest individuals in the county, measured in the Census data. Counties are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

Figure A27: Distribution of Effective Tax Rates Across Municipalities

A. Histogram of Effective Tax Rates



B. Histogram of Residualized Tax Rates Changes



Notes: Panel A plots the distribution of the true city property tax rates. Panel B plots the residualized difference of the true city property tax rate in T and the true city property tax rate in T-1.

Figure A28: Serial Correlation of Residual Tax Rates Changes

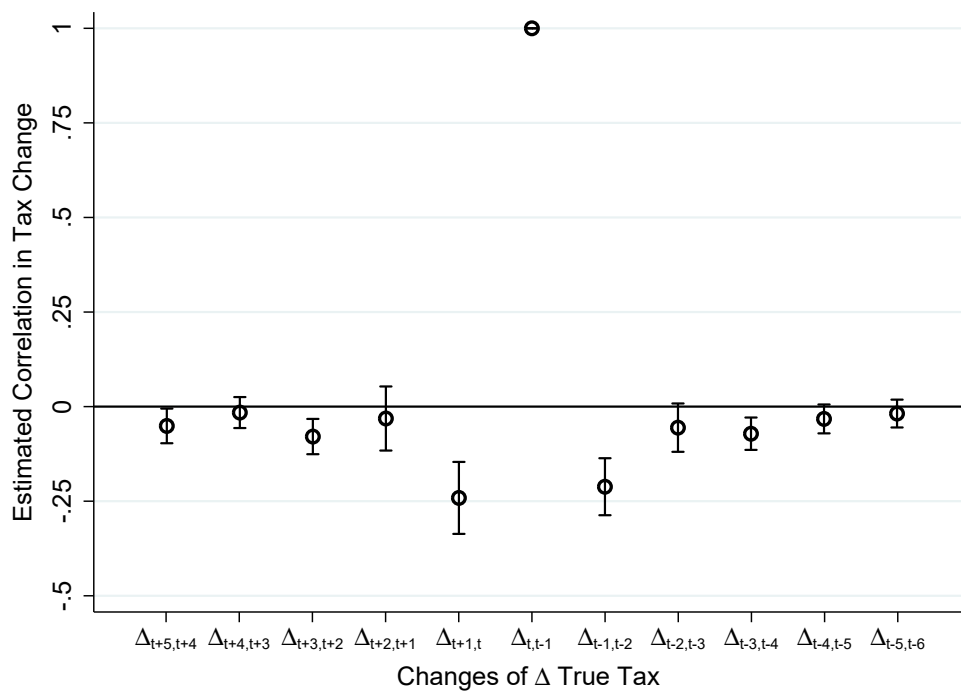


Figure A29: Estimates of Migration Elasticities in Literature

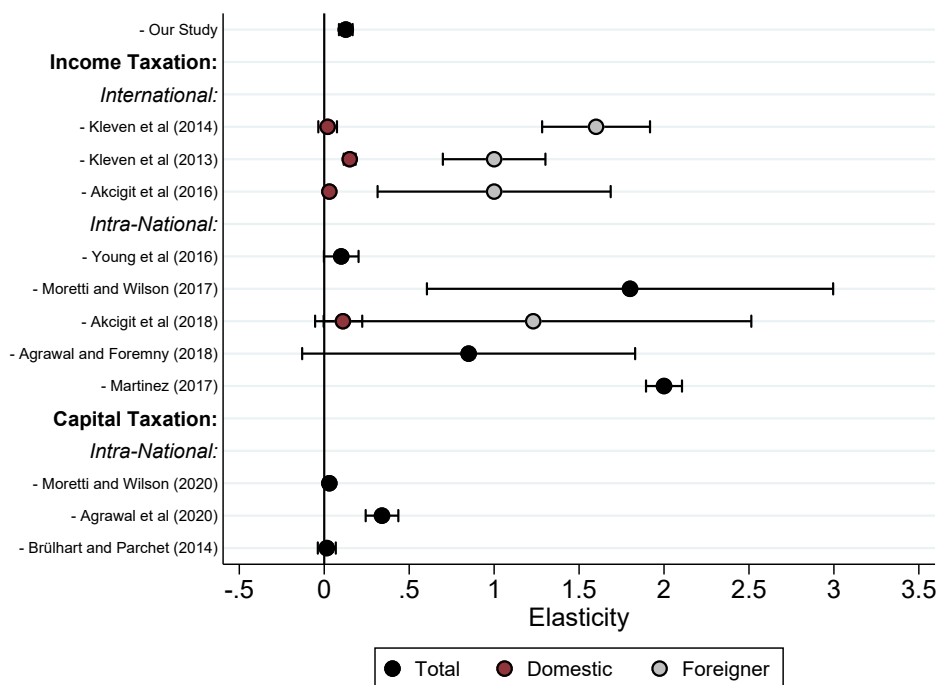


Figure A30: Capitalization Into Value of Real Property: Dynamic Impact of Tax Change on Value of Real Property Per Capita



Notes: The Figure shows the estimated cumulative effect of a tax change on the log of total real property value per capita. The horizontal axis plots the years since the tax change. We estimate equation (??) and plot the coefficients for each year $t = j$, $\alpha_j = \sum_{k=-j}^5 \hat{\gamma}_k$. For the covariates definition see the notes to Figure ??.

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 - 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	-0.261*** (0.008)	-0.410*** (0.011)	-0.503*** (0.013)	-0.520*** (0.012)	-0.718*** (0.025)	
A. Geography						
Temperature in Hottest Month		-0.062*** (0.017)	-0.032* (0.017)	-0.023 (0.017)	0.169*** (0.053)	-0.315*** (0.060)
Temperature in Coldest Month		-0.001 (0.015)	0.038*** (0.014)	0.024* (0.014)	-0.007 (0.040)	0.061 (0.043)
Summer Precipitation		-0.107*** (0.007)	-0.063*** (0.008)	-0.070*** (0.007)	-0.022 (0.016)	0.028 (0.022)
Winter Precipitation		-0.081*** (0.012)	-0.094*** (0.012)	-0.087*** (0.012)	-0.051* (0.027)	-0.148*** (0.030)
Elevation in meters		-0.003 (0.014)	-0.030** (0.013)	-0.037*** (0.013)	0.082 (0.056)	-0.344*** (0.068)
Ruggedness		-0.042*** (0.009)	-0.010 (0.009)	-0.010 (0.009)	-0.009 (0.028)	-0.127*** (0.028)
Soil Net Primary Productivity		0.061*** (0.009)	0.082*** (0.010)	0.074*** (0.010)	0.058** (0.024)	0.031 (0.027)
Distance to Coast		0.007 (0.009)	0.053*** (0.009)	0.058*** (0.008)	-0.130*** (0.025)	0.238*** (0.029)
Crossed by Navigated River		0.014 (0.010)	-0.003 (0.010)	-0.006 (0.010)	-0.027 (0.021)	0.089*** (0.026)
Crossed by Canal		0.069*** (0.018)	0.092*** (0.020)	0.090*** (0.020)	0.008 (0.030)	0.010 (0.038)
B. Demographics						
% Literate			0.197*** (0.011)	0.177*** (0.011)	0.102*** (0.019)	0.377*** (0.038)
% Foreigners			0.061*** (0.008)	0.055*** (0.007)	0.023 (0.014)	-0.069*** (0.018)
Log Population			-0.033*** (0.008)	-0.049*** (0.009)	0.055*** (0.016)	0.082*** (0.024)
Δ Log Population			-0.093*** (0.022)	-0.093*** (0.021)		-0.073 (0.055)
% Males			0.029*** (0.011)	0.023** (0.009)	0.087*** (0.027)	0.087*** (0.033)
% White			-0.097*** (0.008)	-0.094*** (0.008)	-0.048** (0.019)	-0.343*** (0.054)
C. Occupational shares: Top % of Population in:						
Public Administration				0.026*** (0.010)	0.071*** (0.025)	-0.032 (0.033)
Production				0.014 (0.011)	-0.098*** (0.029)	0.118*** (0.032)
Mining				0.008 (0.012)	0.024 (0.028)	0.097*** (0.031)
Commerce				0.023** (0.011)	0.034 (0.025)	0.092*** (0.031)
Agriculture				-0.092*** (0.011)	-0.185*** (0.028)	-0.040 (0.032)
D. Inequality						
Top 10% Property Share					-0.155*** (0.025)	
% of Enslaved Property in 1860					-0.069** (0.027)	-0.257*** (0.034)
Observations	18,128	15,033	12,742	12,730	1,568	1,583
Number of units	3,080	2,519	2,518	2,518	1,568	1,583
Period Dep. Variable	1870-1930	1870-1930	1870-1930	1870-1930	1930	1870
Adjusted R^2	0.37	0.47	0.52	0.53	0.57	0.61
Implied Convergence	0.030	0.053	0.070	0.073	0.021	

Notes: Columns 1-4 report the coefficients obtained by regressing the 10-year change in log property on lagged property, geography variables, demographics, occupational shares and inequality variables. Geography is taken as time-constant. Occupation shares are represented by indicator variables taking value 1 if the county is in the top quartile for such an occupation category. This specification includes year fixed effects. Column 5 reports the set of coefficients coming from the regression of the change in log property between 1870 and 1930 on 1870's property and controls. Geography is time-constant. Column 6 presents the set of coefficients coming from the regression of log property in 1870 on 1860's controls.

Table A3: Correlates of Property - County Level - State FEs

	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	-0.489*** (0.010)	-0.523*** (0.011)	-0.573*** (0.013)	-0.589*** (0.012)	-0.728*** (0.026)	
A. Geography						
Temperature in Hottest Month		0.027 (0.022)	0.033 (0.024)	0.043* (0.024)	0.060 (0.066)	-0.046 (0.080)
Temperature in Coldest Month		-0.018 (0.019)	-0.009 (0.020)	-0.023 (0.020)	-0.037 (0.056)	0.085 (0.062)
Summer Precipitation		-0.005 (0.012)	0.005 (0.013)	-0.003 (0.012)	0.001 (0.029)	0.014 (0.031)
Winter Precipitation		-0.073*** (0.011)	-0.102*** (0.013)	-0.101*** (0.013)	-0.070** (0.032)	-0.196*** (0.034)
Elevation in meters		0.084*** (0.019)	0.050** (0.021)	0.047** (0.021)	0.091 (0.060)	-0.124* (0.072)
Ruggedness		-0.052*** (0.009)	-0.017* (0.009)	-0.016* (0.009)	-0.020 (0.029)	-0.084*** (0.028)
Soil Net Primary Productivity		0.031*** (0.012)	0.052*** (0.013)	0.048*** (0.013)	0.034 (0.026)	0.028 (0.028)
Distance to Coast		-0.053*** (0.013)	-0.001 (0.014)	0.007 (0.014)	-0.228*** (0.030)	0.062 (0.039)
Crossed by Navigated River		0.024** (0.010)	-0.000 (0.010)	-0.005 (0.010)	-0.015 (0.019)	0.065*** (0.024)
Crossed by Canal		0.101*** (0.021)	0.112*** (0.024)	0.106*** (0.024)	0.071* (0.039)	0.017 (0.037)
B. Demographics						
% Literate			0.125*** (0.011)	0.107*** (0.011)	0.055*** (0.018)	0.396*** (0.037)
% Foreigners			0.052*** (0.009)	0.045*** (0.009)	0.028* (0.016)	-0.052*** (0.017)
Log Population			-0.032*** (0.009)	-0.049*** (0.009)	0.077*** (0.016)	-0.012 (0.027)
Δ Log Population			-0.100*** (0.020)	-0.105*** (0.020)		-0.144** (0.057)
% Males			0.014 (0.012)	0.007 (0.010)	0.068** (0.033)	-0.009 (0.036)
% White			-0.115*** (0.008)	-0.113*** (0.008)	-0.043** (0.021)	-0.198*** (0.069)
C. Occupational shares: Top % of Population in:						
Public Administration				0.016* (0.010)	0.032 (0.024)	0.035 (0.030)
Production				0.049*** (0.011)	-0.054** (0.027)	0.164*** (0.029)
Mining				0.003 (0.011)	-0.011 (0.026)	0.081*** (0.027)
Commerce				0.032*** (0.010)	0.033 (0.023)	0.086*** (0.028)
Agriculture				-0.073*** (0.011)	-0.153*** (0.026)	-0.057** (0.027)
D. Inequality						
Top 10% Property Share					-0.103*** (0.024)	
% of Enslaved Property in 1860					-0.061** (0.029)	-0.140*** (0.031)
Observations	18,128	15,033	12,742	12,730	1,568	1,583
Number of units	3,080	2,519	2,518	2,518	1,568	1,583
Period	1870-1930	1870-1930	1870-1930	1870-1930	1930	1870
Adjusted R^2	0.53	0.55	0.59	0.59	0.67	0.71
Implied Convergence	0.067	0.074	0.085	0.089	0.022	

Notes: Columns 1-4 report the coefficients obtained by regressing the 10-year change in log property on lagged property, geography variables, demographics, occupational shares and inequality variables. Geography is taken as time-constant. Occupation shares are represented by indicator variables taking value 1 if the county is in the top quartile for such an occupation category. This specification includes both state and year fixed effects. Column 5 reports the set of coefficients coming from the regression of the change in log property between 1870 and 1930 on 1870's property and controls. Geography is time-constant. Column 6 presents the set of coefficients coming from the regression of log property in 1870 on 1860's controls.

Table A4: Correlates of Property - State 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	69-Year Δ	in 1870
Lagged Log total Household Property Value Per Capita	-0.206*** (0.0380)	-0.420*** (0.0309)	-0.523*** (0.0412)	-0.544*** (0.0410)	-0.902*** (0.207)	
A. Geography						
Temperature in Coldest Month		0.0546 (0.0713)	0.0401 (0.0408)	0.0316 (0.0425)	0.245* (0.125)	0.440* (0.213)
Temperature in Hottest Month		-0.0177 (0.0747)	0.0286 (0.0566)	0.0274 (0.0579)	-0.174 (0.155)	-0.249 (0.251)
Soil Net Primary Productivity		0.172*** (0.0384)	0.116** (0.0441)	0.112** (0.0464)	0.141 (0.131)	0.600*** (0.157)
Elevation in meters		0.110 (0.100)	0.0901 (0.0717)	0.0775 (0.0723)	-0.157 (0.213)	0.135 (0.228)
Ruggedness		-0.0809** (0.0346)	-0.0290 (0.0295)	-0.0283 (0.0300)	0.0992 (0.0970)	-0.300** (0.138)
Winter Precipitation		-0.00890 (0.0551)	-0.0234 (0.0356)	-0.0240 (0.0334)	-0.275*** (0.0943)	0.168 (0.123)
Summer Precipitation		-0.122*** (0.0298)	-0.0368* (0.0198)	-0.0414* (0.0222)	-0.209** (0.0934)	-0.246** (0.111)
Distance to Coast		-0.00932 (0.0425)	0.00875 (0.0336)	0.0110 (0.0333)	0.0365 (0.0981)	0.295** (0.115)
Crossed by Canal		-0.0342 (0.0354)	0.00416 (0.0346)	-0.00241 (0.0354)	-0.0227 (0.111)	0.0713 (0.156)
Crossed by Navigated River		0.207*** (0.0719)	0.150** (0.0600)	0.148** (0.0607)	0.157 (0.169)	0.567* (0.273)
B. Demographics						
Lagged Log Population			0.00348 (0.0147)	-0.000305 (0.0143)	-0.00658 (0.0517)	0.129* (0.0710)
Lagged % Literate			0.162*** (0.0409)	0.138*** (0.0427)	0.199* (0.0971)	0.378** (0.155)
Lagged % Males			0.00530 (0.0440)	0.0179 (0.0457)	-0.153* (0.0741)	-0.0867 (0.0743)
Lagged % White			-0.0529 (0.0345)	-0.0447 (0.0353)	-0.107 (0.0955)	-0.464* (0.262)
Lagged % Foreigners			0.0967*** (0.0300)	0.0861*** (0.0319)	-0.0515 (0.0532)	0.140 (0.106)
Δ Log Population			0.0827 (0.0900)	0.0650 (0.0965)		0.283 (0.321)
C. Occupational shares: Top % of Population in						
Lagged Agriculture				-0.0429 (0.0273)	-0.150 (0.140)	0.194 (0.158)
Lagged Mining				-0.0284 (0.0454)	-0.0334 (0.194)	0.112 (0.112)
Lagged Production				-0.0119 (0.0470)	0.0243 (0.192)	-0.0722 (0.141)
Lagged Commerce				0.0457 (0.0406)	0.306 (0.218)	-0.0663 (0.214)
Lagged Public Administration				0.0144 (0.0389)	0.160 (0.219)	-0.101 (0.103)
Observations	2,722	2,636	2,509	2,509	44	41
Number of units	52	48	48	48	44	41
Period Dep. Variable	1826-1940	1826-1940	1860-1940	1860-1940	1939	1870
Adjusted R^2	0.51	0.61	0.66	0.66	0.62	0.80
Implied Convergence	0.023	0.055	0.074	0.078	0.034	

Notes: Columns 1-4 report the coefficients obtained by regressing the 10-year change in log property on lagged property, geography variables, demographics and occupational shares variables. Geography is taken as time-constant. Occupation shares are represented by indicator variables taking value 1 if the county is in the top quartile for such an occupation category. This specification includes year fixed effects. Column 5 reports the coefficients presents the set of coefficients coming from the regression of the change in log property between 1870 and 1939 on 1870's property and controls. Geography is time-constant. Column 6 presents the set of coefficients coming from the regression of log property in 1870 on 1860's controls.

Table A5: Effect of Enslaved Property in 1870 on 60-Year Property Growth

<i>Dependent variable: 60-year Growth in Property per Capita</i>					
	(1)	(2)	(3)	(4)	(5)
	Baseline	Geography	Demographics	Occupations	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
Occupations				X	X
Top 10% Share					X
Observations	862	862	862	862	862

Notes: This table presents the regression of the 60-Year Property Growth per capita on the share of enslaved property in the county. Column 1 is the baseline specification adding only the initial log of property per capita in 1870 as a control. Column 2 is adding 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 is adding 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 adding the occupational shares controls as top % of population in public administration, production industry, mining, commerce and agriculture sectors. Column 5 is adding the share of the total property owned by the top 10% as a final control.

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

<i>Dependent variable: 60-year Growth in Property per Capita</i>					
	(1)	(2)	(3)	(4)	(5)
	Baseline	Geography	Demographics	Occupations	Enslaved Property
Top 10% Wealth Share (Λ)	-2.539 (0.166)	-1.793 (0.185)	-1.619 (0.196)	-1.861 (0.195)	-1.934 (0.253)
Property in 1870	-0.508 (0.014)	-0.659 (0.016)	-0.755 (0.017)	-0.778 (0.017)	-0.735 (0.020)
<i>Controls:</i>					
Geography		X	X	X	X
Demographics			X	X	X
Occupations				X	X
Enslaved Property					X
Observations	1797	1797	1797	1797	1568

Notes: This table presents the regression of the 60-Year Property Growth per capita on the share of total property owned by the top 10% at the county level. Column 1 is the baseline specification adding only the initial log of property per capita in 1870 as a control. Column 2 is adding 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 is adding 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 adding the occupational shares controls as top % of population in public administration, production industry, mining, commerce and agriculture sectors. Column 5 is adding the share of enslaved property in the county as a final control.

Table A7: Mediation of the Effect of Top 10% Share of Property in 1870 on 60-Year Property Growth

<i>Estimated Λ from specification (4): -1.861</i>		
Mediators	Change in Estimated Λ when adding mediator to specification (4)	Fraction of Λ explained by mediator
Average ETR	.029	1%
<i>Demographics:</i>		
Δ % Literate	.456	18%
Δ % Foreigners	.073	3%
Δ Log(Population)	.003	0%
Δ Males	.007	0%
Δ White	.005	0%
<i>Δ Top 10% of Population in:</i>		
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 Property on 60-Year property growth. We use the baseline specification (4) on the table above that include controls for geography, demographic and occupational shares, we determine the effect of adding several controls for differences in covariates. We sequentially add mediator variables from the vector of differences in covariates $\mathbb{Z} = \{Z_1, Z_2, \dots, Z_n\}$, and repeat this operation x times, taking a random sequence of the variables in the vector $\mathbb{Z}$. For each variable $Z_j \in \mathbb{Z}$, we measure the importance of its mediating effect of 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

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.

Principles. [Jensen \(1931\)](#) pp. 101 writes that “The law may at one time provide that all persons shall pay taxes; at other times, that all property shall be taxed; frequently both provisions occur. It was evidently not always clear whether the general property tax was a tax on all persons according to the value of their property or a tax on all property, regardless of ownership. In fact, it is a combination of both.”

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 \(1916b\)](#); [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.

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 double taxation of corporate assets: 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 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.

Wealth, debt, and taxation.(p. 617), "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."

III. Data Appendix

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

We construct wealth series at the county and state levels using the IPUMS USA Full Count data ([Ruggles et al., 2021a](#)) 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 ersonal 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 $W_{c,1860}^{real}$ is the real wealth in the county in 1860, $W_{c,1860}^{pers}$ is the personal wealth in the county in 1860, we consider the ratio between personal and real wealth:

$$\rho_{c,1860} = \frac{W_{c,1860}^{pers}}{W_{c,1860}^{real}}, \quad \rho_{c,1850} = \frac{W_{c,1850}^{pers}}{W_{c,1850}^{real}} \quad (1)$$

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:

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

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

Appending IPUMS USA Full count data data to the assessed property data at the county level. 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 (see Section ??). 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

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

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

$$\widetilde{w}_{c,t} = \rho_{s,t} * w_{c,t} \quad (3)$$

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 1860.

Figure A13 shows private wealth from the IPUMS USA Full Count raw data series at the state level and Figure A14 shows private wealth at the county level between 1850 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. [Piketty and Zucman \(2014\)](#) use prices of \$800 for 1850 and \$1000 for 1860. [Einhorn \(2008\)](#) estimates the prices to be \$401 in 1850 and \$774 in 1860, 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 \(1870\)](#) gives an average price of \$250 for 1850 and \$420 for 1860. Those values were estimated by [Goldsmith \(1952\)](#), p. 317 and [U.S. Census Bureau \(1870\)](#) (Nota Bene p. 8). There are good reasons to believe that those prior estimations of wealth from enslaved people were under-estimated ([U.S. Census Bureau \(1870\)](#), p. 8, and [Piketty and Zucman \(2014\)](#), p. 63 of Appendix).

Table A8: 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 [A9](#) 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.

Computing wealth from enslaved people. We will generically use the number of enslaved people from [Haines et al. \(2010\)](#) and multiply it by a given price for each year (1850 and 1860). We call this variable *Val. Enslaved*. To obtain the series of private wealth excluding wealth from enslaved people, we do the following for years 1850 and 1860:

1. For the state IPUMS USA Full Count series: we subtract the value of enslaved people at the state level from reported private wealth.
2. For the state tax-based data: we first subtract an estimate of the value of enslaved people as given by tax assessors before adding back the value of enslaved people *Val. Enslaved*.
3. For the county IPUMS USA Full Count series (which are our only data for 1850 and 1860), we subtract *Val. Enslaved*.

In some counties, sometimes, total Personal Wealth is below value of enslaved wealth, if we use the Einhorn prices of enslaved people. In 1860, this occurs in 3.2% of counties, or 6.0% of counties that held enslaved persons. In a total of 4.9% of counties, wealth from enslaved people is more than 90% of Personal Wealth using the Einhorn prices. Those counties are mainly located along the Mississippi river and South Carolina. We cap *Val. Enslaved* at the total value of Personal Wealth in each county. Figure [A17](#) shows the share of wealth from enslaved people at the county and state levels obtained for each of the three series (1-3).

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 A11 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 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. 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).

Assessment ratios. Importantly, we 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 about one year every decade from 1850 to 1920, and linearly interpolate in between them.¹
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 1896. 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 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

¹For 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.

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. There is evidence that the assessments of wealth from enslaved people for property tax purposes were under-estimate([U.S. Census Bureau \(1870\)](#), p. 8, and [Piketty and Zucman \(2014\)](#), p. 63 of Appendix.). Therefore, we want to correct these assessed values using actual market prices. We use the prices from [Einhorn \(2008\)](#) which are \$401 in 1850, \$774 in 1860. We multiply these by the number of enslaved people at the county level from ([Haines et al., 2010](#)) and at the state level from ([Gibson and Jung, 2002](#)). Section [III.1](#) describes these constructions in more detail.

We also need to first subtract the (underestimated) value of wealth from enslaved people from the tax-assessed wealth. To do so, we use an estimate of the implicit price per enslaved person at the Federal level. More precisely, we use the total federal values of enslaved person derived from [Goldsmith \(1952\)](#), p. 317 for 1850 and [U.S. Census Bureau \(1870\)](#), p. 8 for 1860. [Goldsmith \(1952\)](#) provides an estimate of wealth from enslaved people of \$0.8 billion in 1850, which implies an averages price of \$250 per enslaved person, using enslaved people counts from ([Gibson and Jung, 2002](#)). For 1860, the implied price is \$420 in [U.S. Census Bureau \(1870\)](#).

This approach assumes that the price of enslaved people was the same across states in a given year. This is not the case in practice. For Georgia in 1860 and Texas in 1850 and 1860, the tax data contains the wealth from enslaved people separately. If we use the actual number of enslaved people in these two states from the Census, we obtain an implicit price used by tax of \$306 and \$584 in Texas in 1850 and 1860, and \$655 in Georgia in 1860, which is lower than the estimates from Einhorn. Yet, it seems important to correct for the undervaluation of wealth from enslaved people in the tax assessment data.

We also have alternative sources of prices, as described in Appendix Section [III.2](#), especially on Table [A8](#) which we can use for robustness instead of the prices in [Einhorn \(2008\)](#). Figure [A20](#) shows the state-level wealth using these alternative prices. The picture remains similar in terms of the spatial distribution and time trends.

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.²
- 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

²We 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 list³ for year 1790 - 1820.
- Use 4.4% assessment ratio for 1821 - 1827, Use 4% for 1828 - 1844, and 3.6% for 1845⁴
- 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 - 1912⁵, and 1912 - 1922
- Use 1904 Census ratio for 1901 - 1911
- Use 1922 Census ratio for years 1922 and later

³Connecticut 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).

⁴We 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).

⁵We 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 reports⁶ 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 - 1907⁷ and 80% assessment ratio for 1908⁸
- Use 1922 Census ratio for 1922 - 1932, and 40% ratio for years 1933 - 1940

⁶The State Tax Commission of 1918 estimated that the assessment of property varied across the State, but gave plausible estimates ranging from 10%, 25%, and 40% for real property. We use the middle range estimate of 25%. See for reference the discussion pp. 122-123.

⁷cf Proceedings of 1908 National Tax Association conference reported in its digest, p. 225.

⁸Reform 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 for 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 - 1910⁹, 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

⁹One-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 Commission¹⁰) and 1912 Census ratio
- Use 1912 Census ratio for 1912 - 1917
- Use 1922 Census ratio for 1918 and later years

Wisconsin

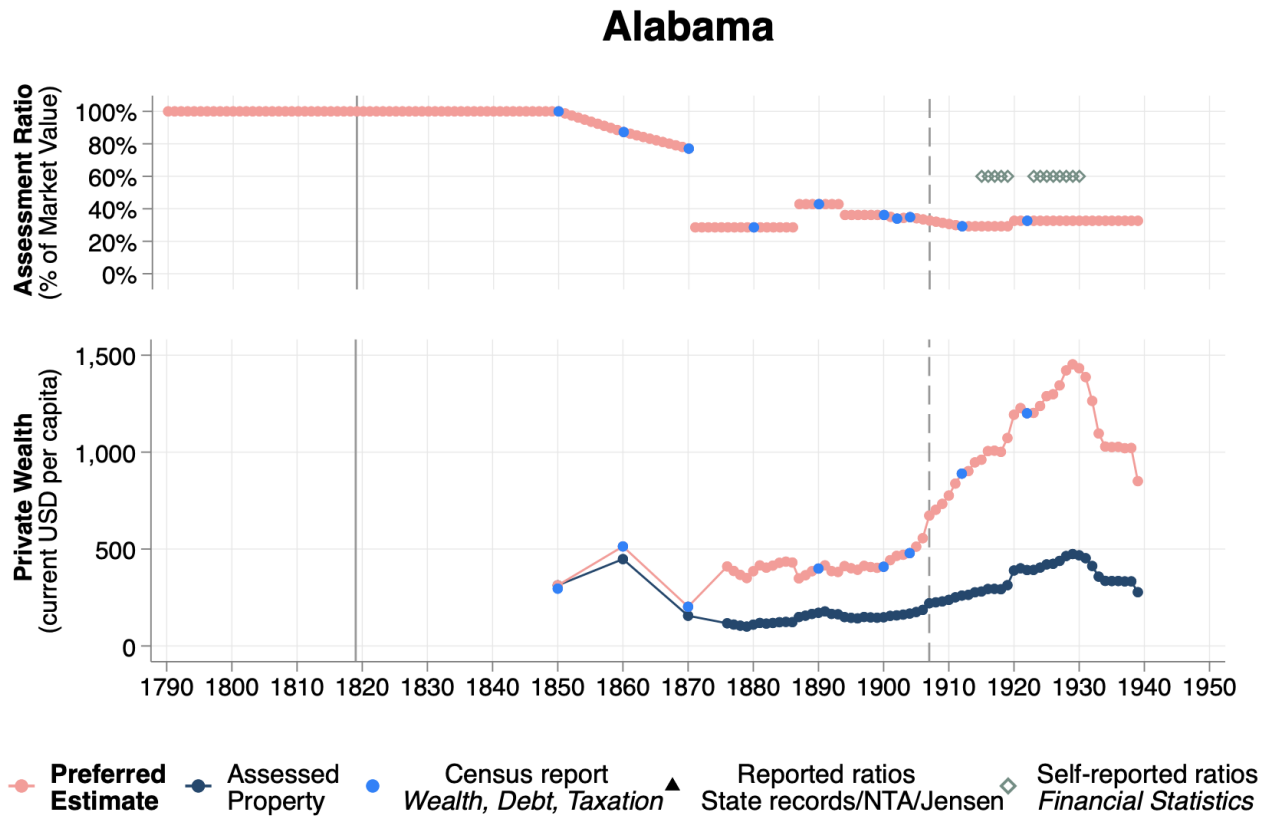
- Use 1850 Census ratio for 1850 and earlier years
- Linearly interpolate between Census ratios for 1850 - 1860, 1860 - 1870, 1870 - 1880, 1880 - 1890, and 1890 - 1900, 1900 - 1902, 1902 - 1904, 1904 - 1912
- Use 55% ratio for 1913-1921 and 1922 Census ratio for 1916 - 1922
- Use 1922 Census ratio for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

¹⁰Digest NTA p. 17

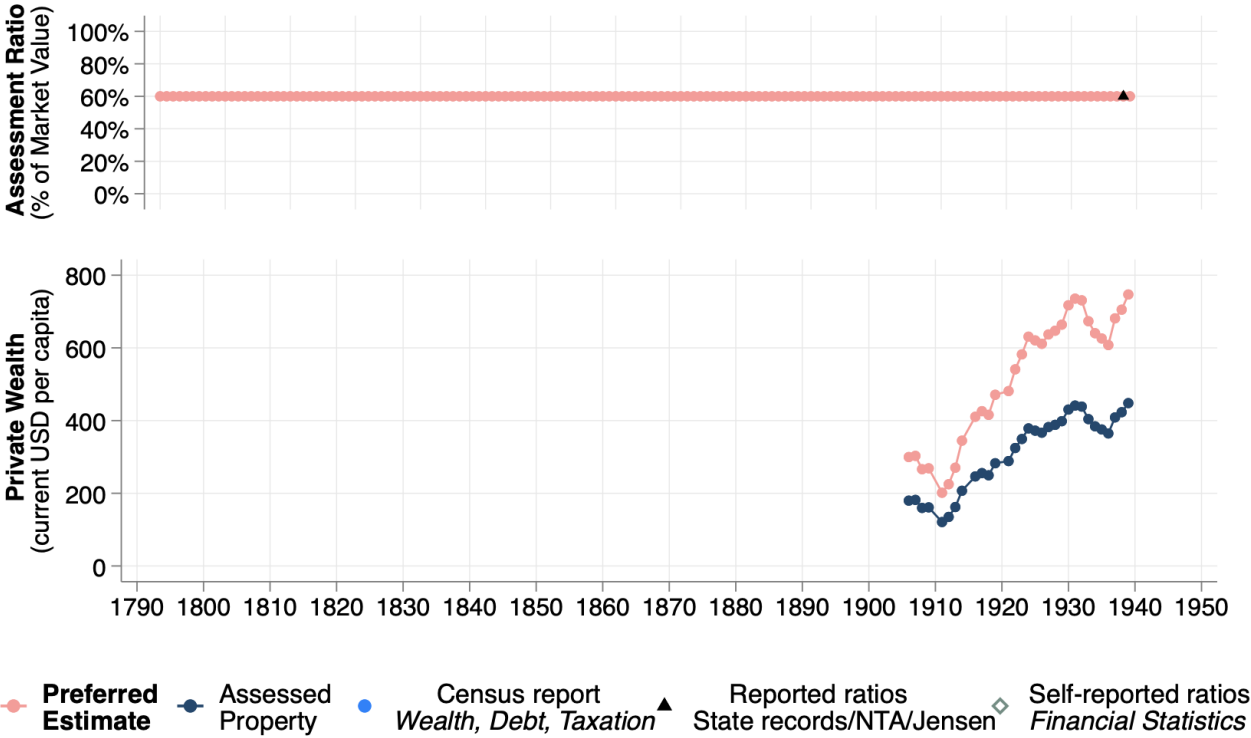
Assessed Property Value, Assessment Ratio and Private Wealth Alabama



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.

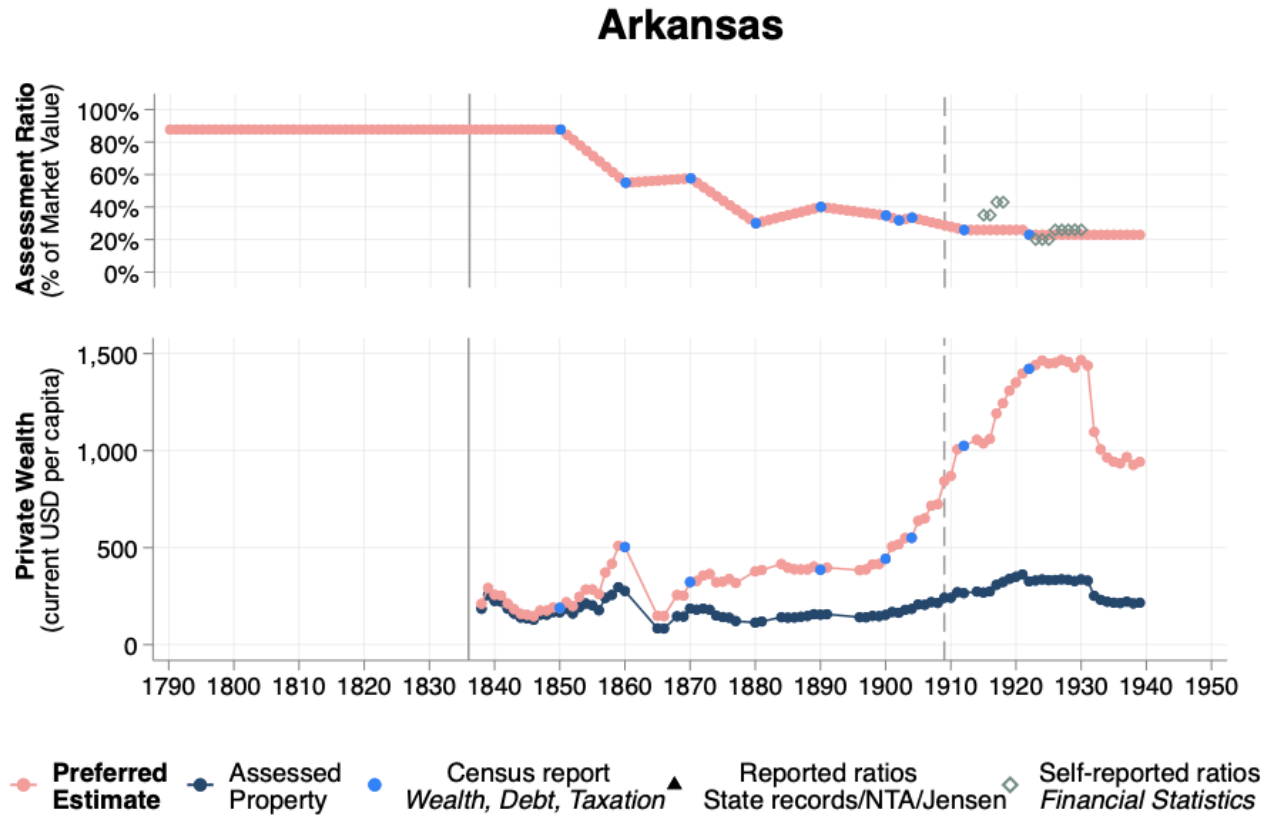
Alaska

Alaska



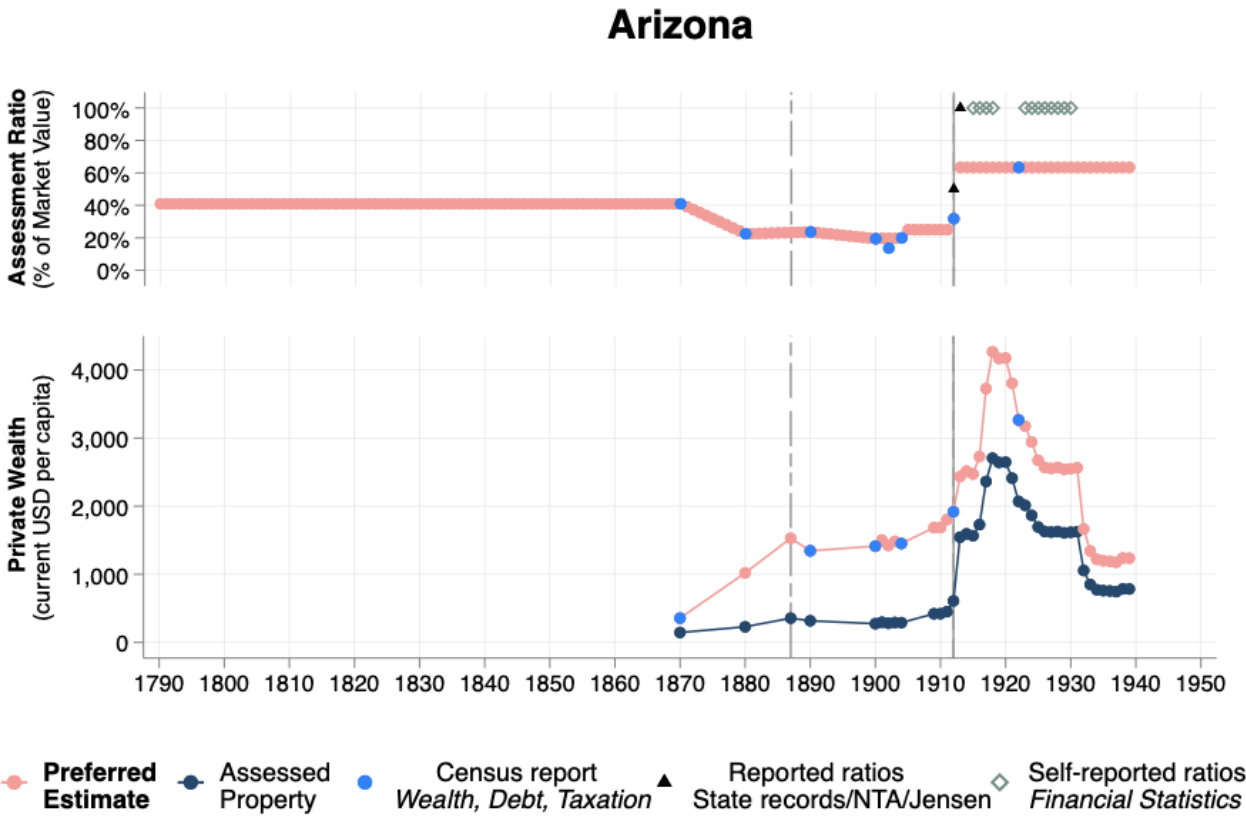
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Arkansas



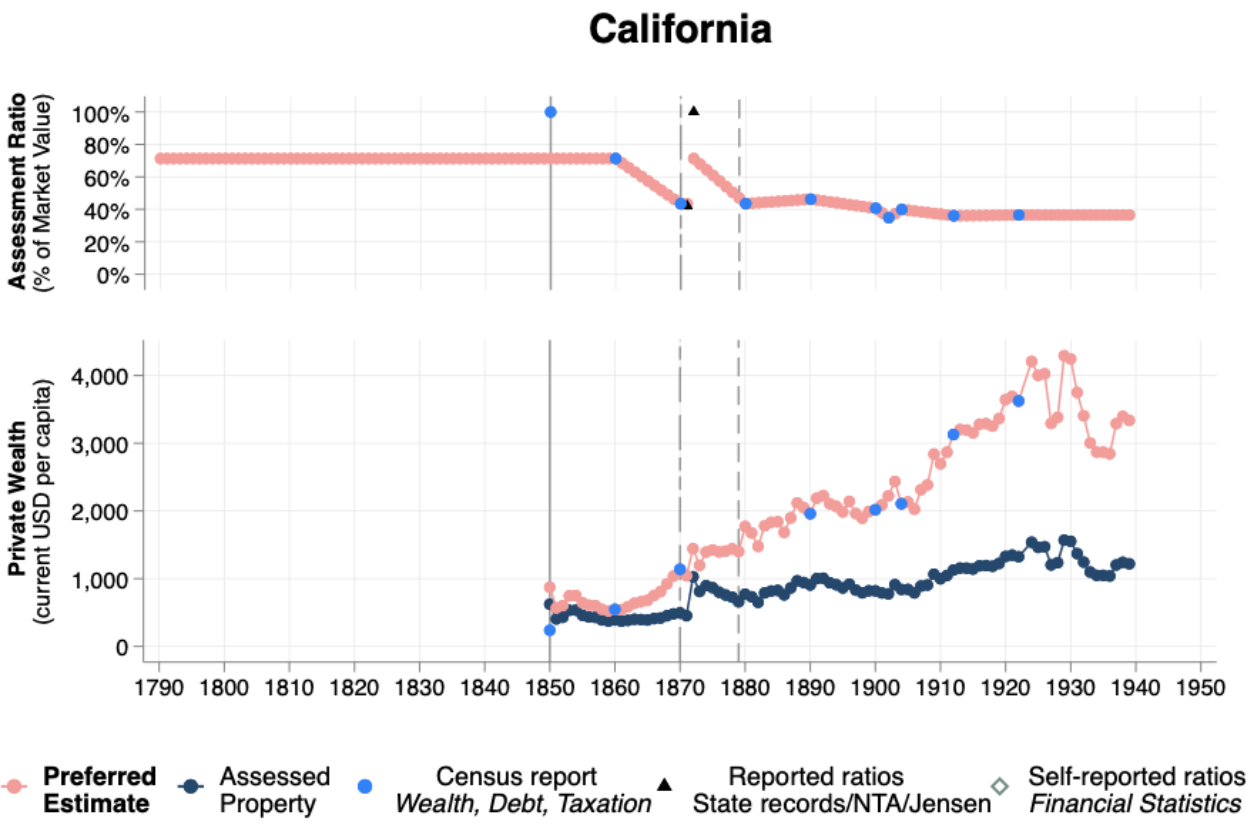
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Arizona



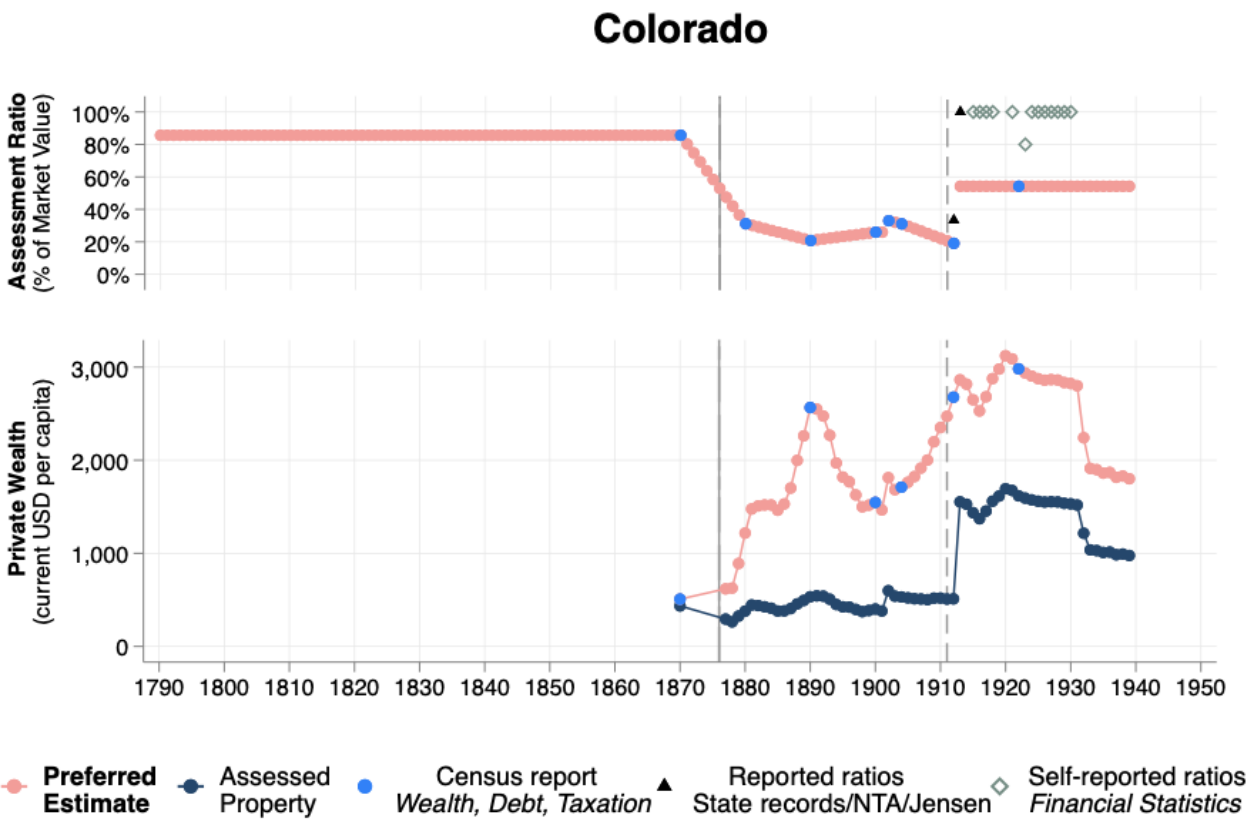
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

California



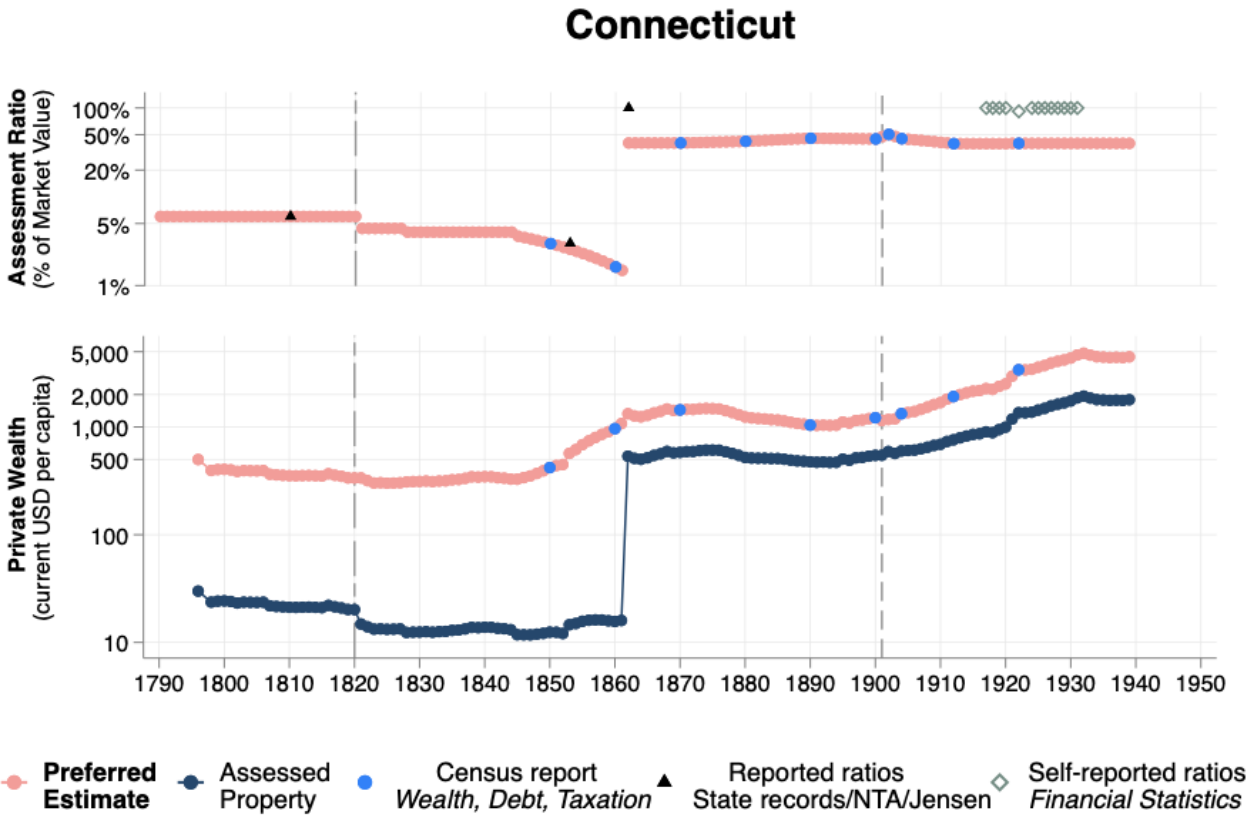
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Colorado



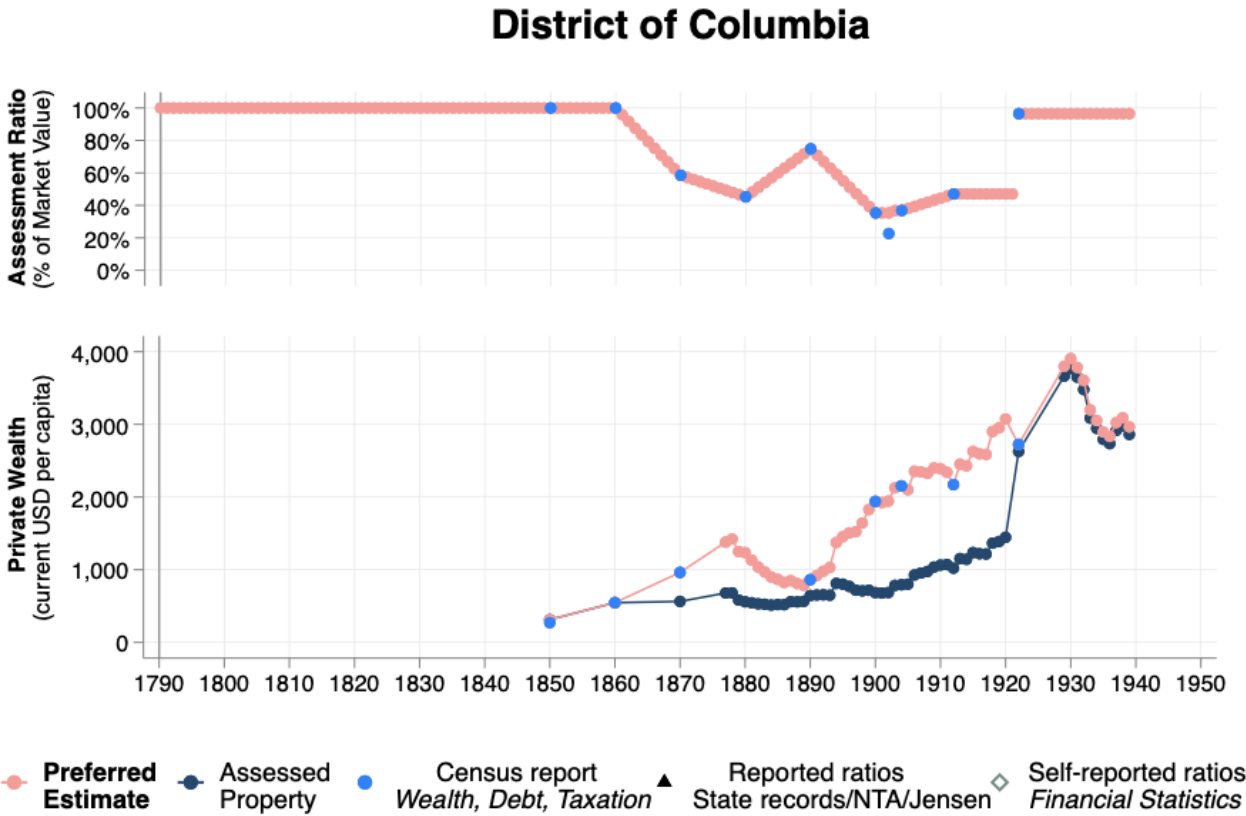
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Connecticut



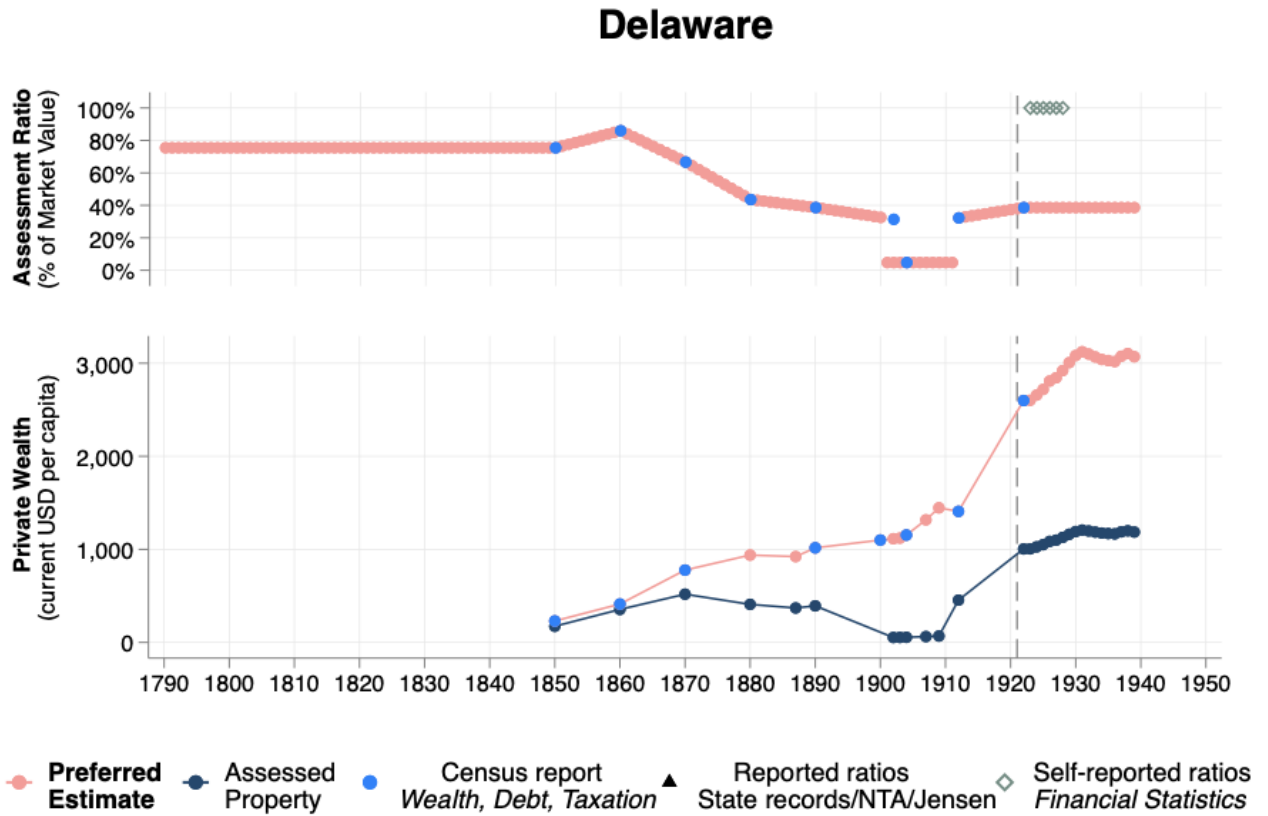
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

District of Columbia



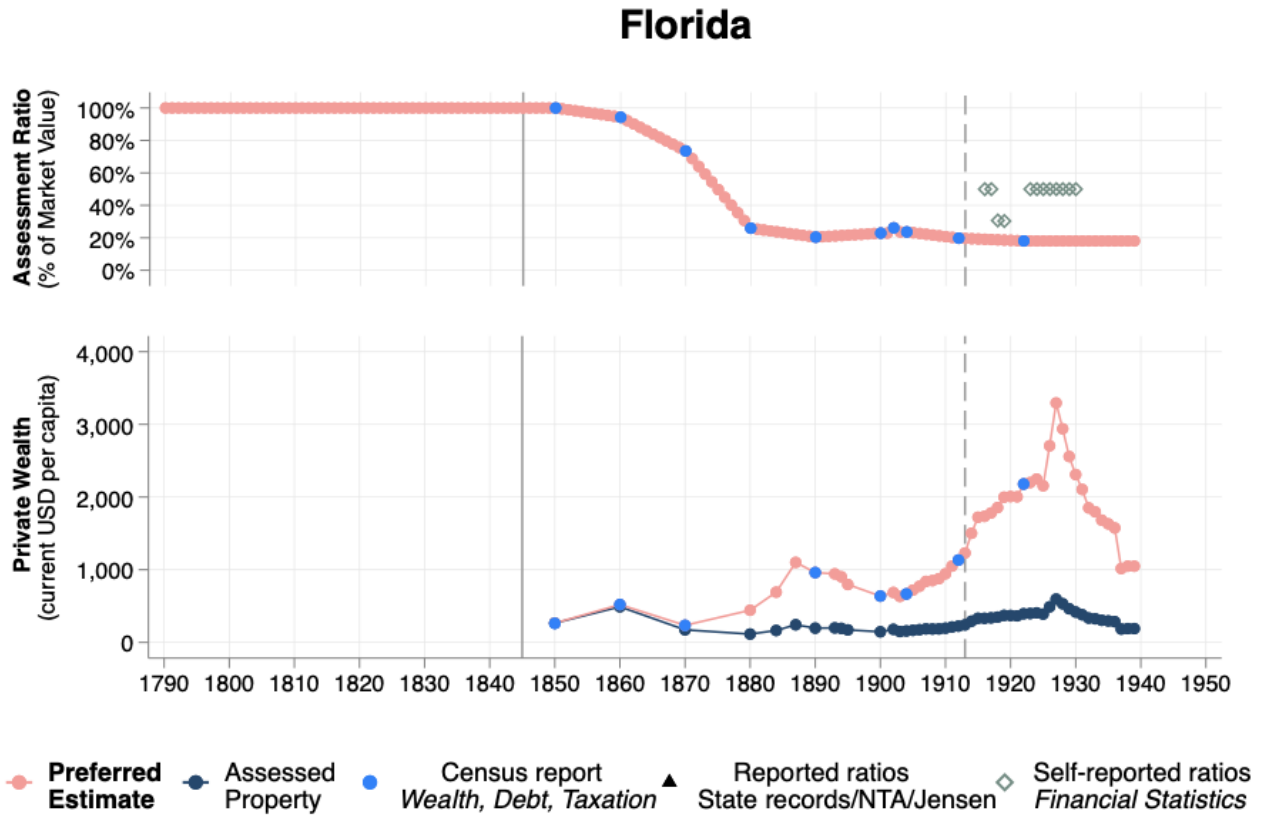
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Delaware



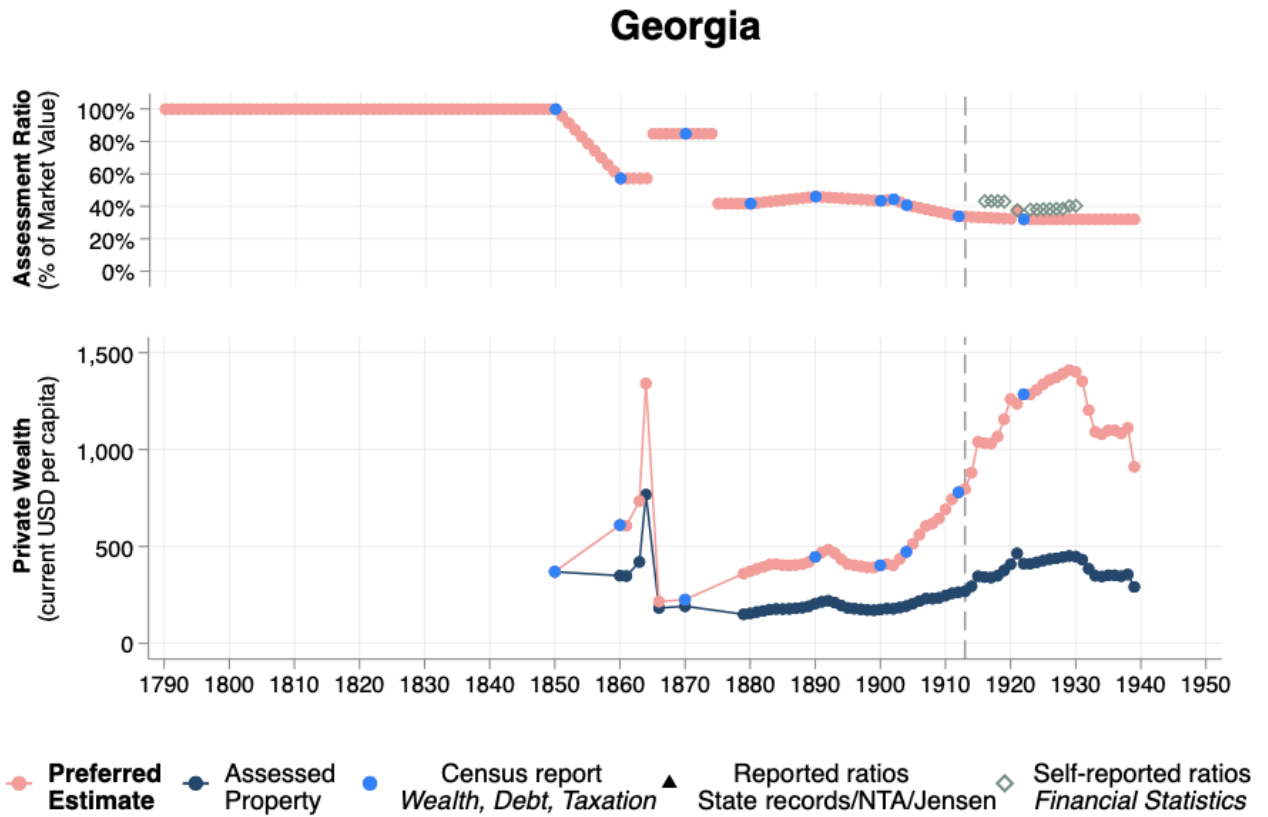
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 Census ratios for 1880 and 1902 are inferred from tax rates.

Florida



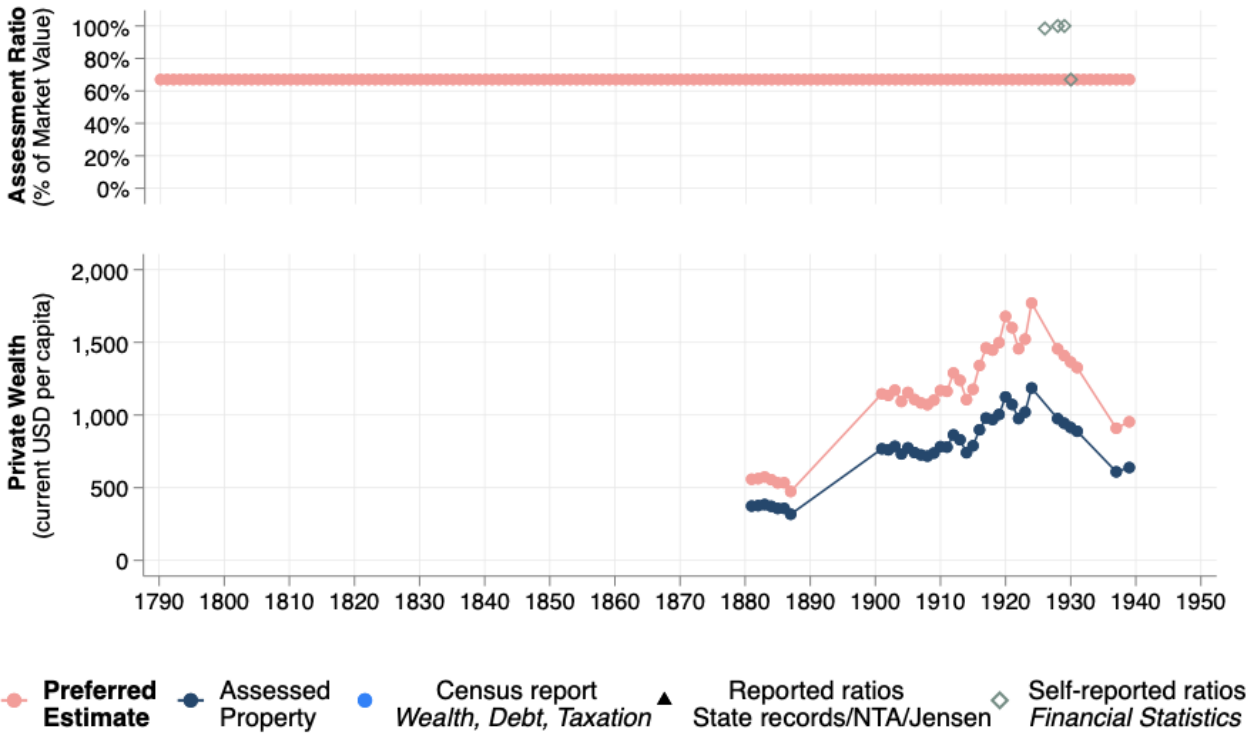
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 Census ratios for 1880 and 1902 are inferred from tax rates.

Georgia



Hawaii

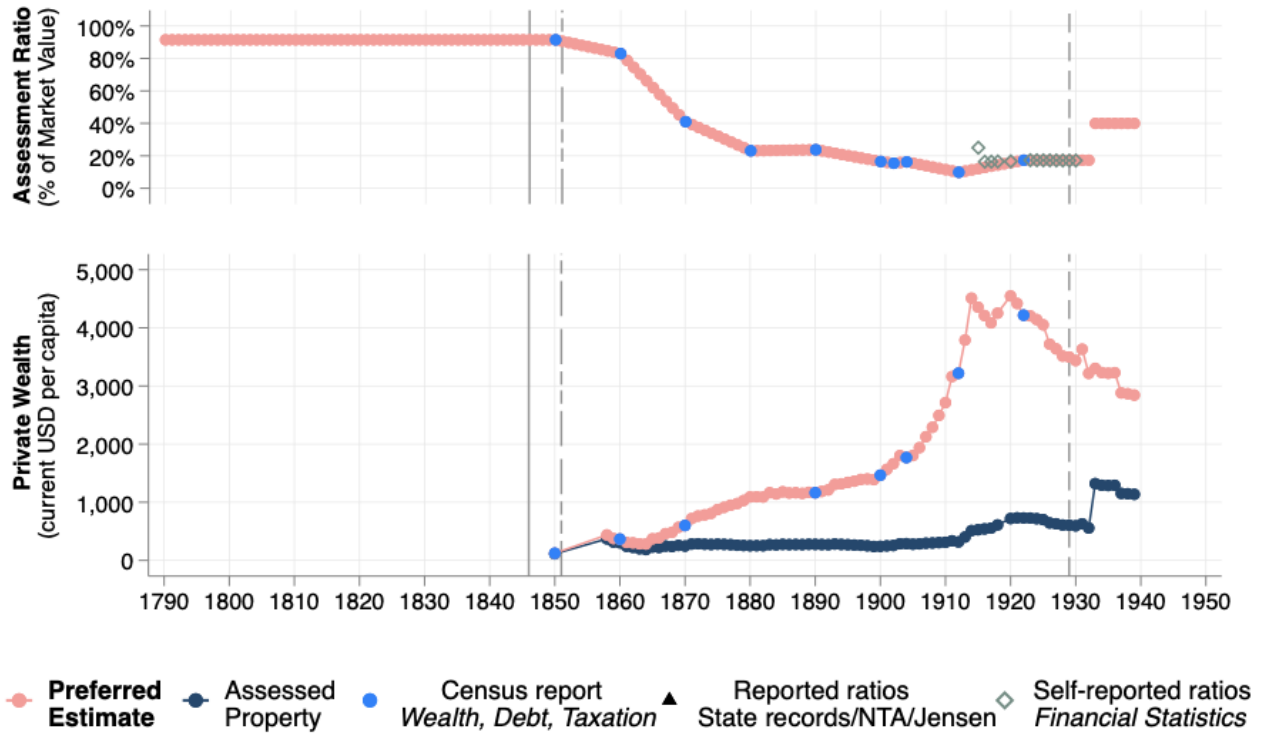
Hawaii



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.

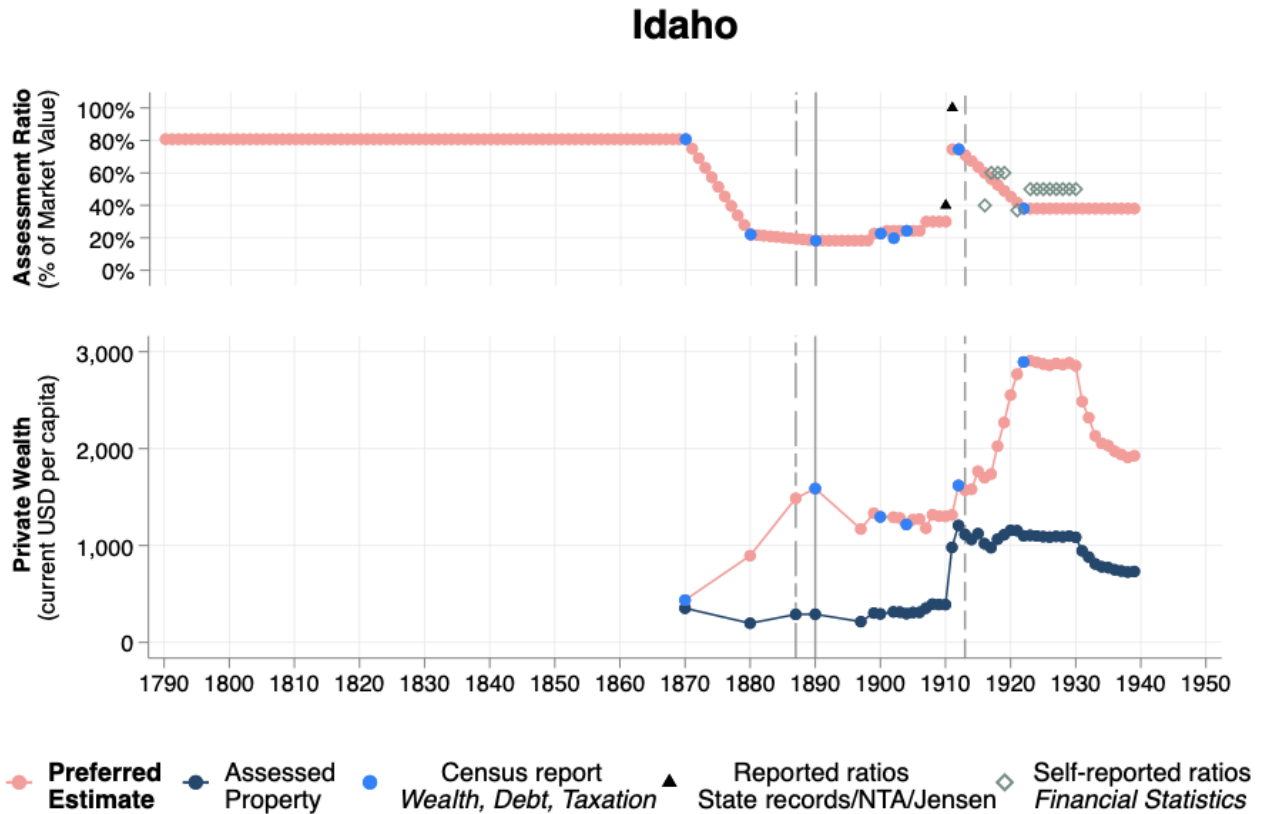
Iowa

Iowa



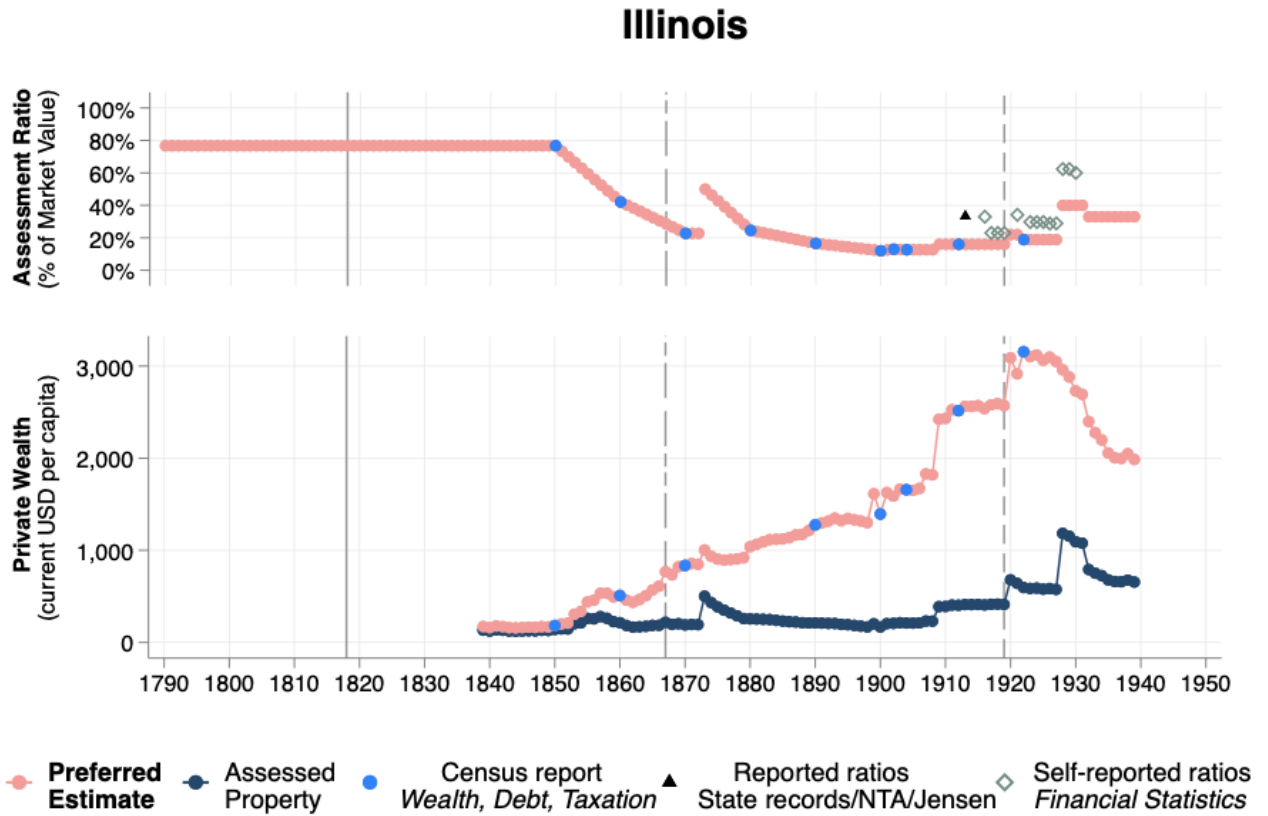
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 Census ratios for 1880 and 1902 are inferred from tax rates.

Idaho



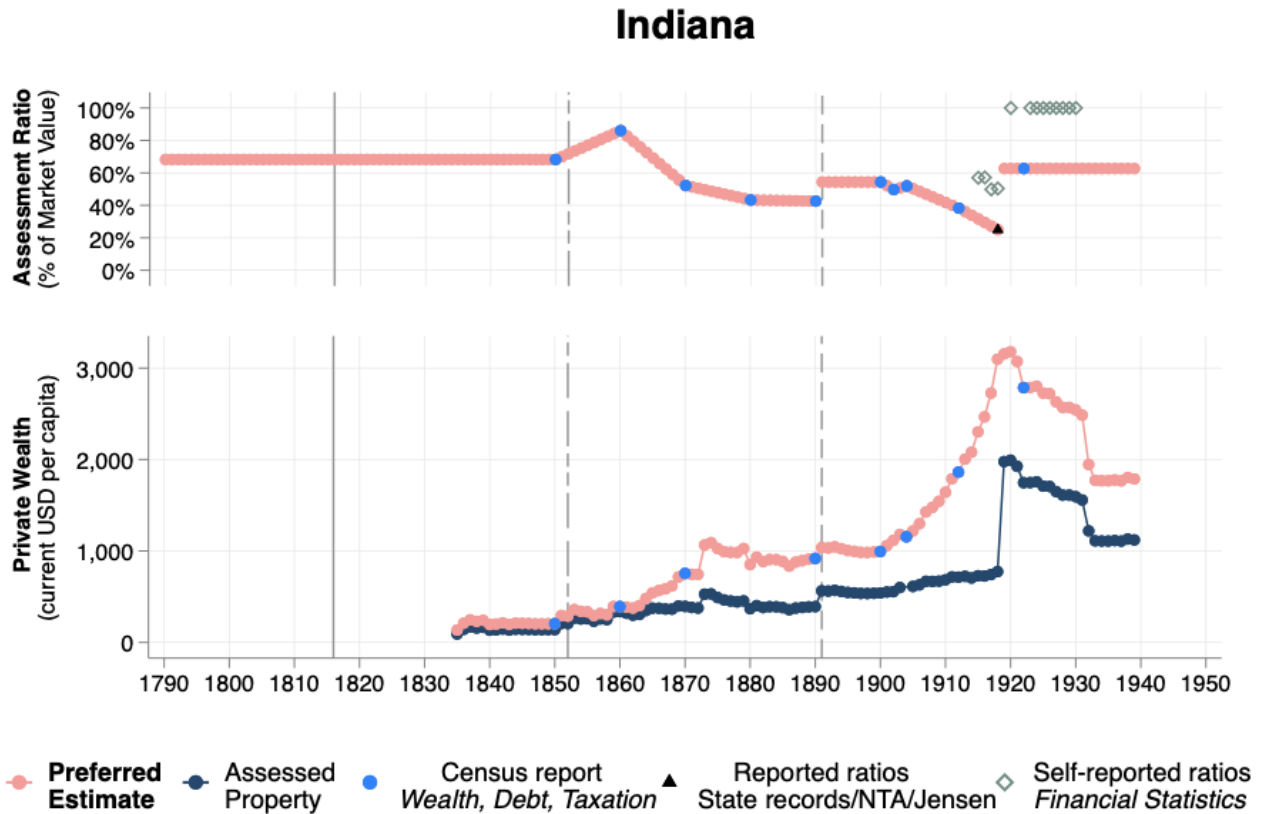
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

Illinois



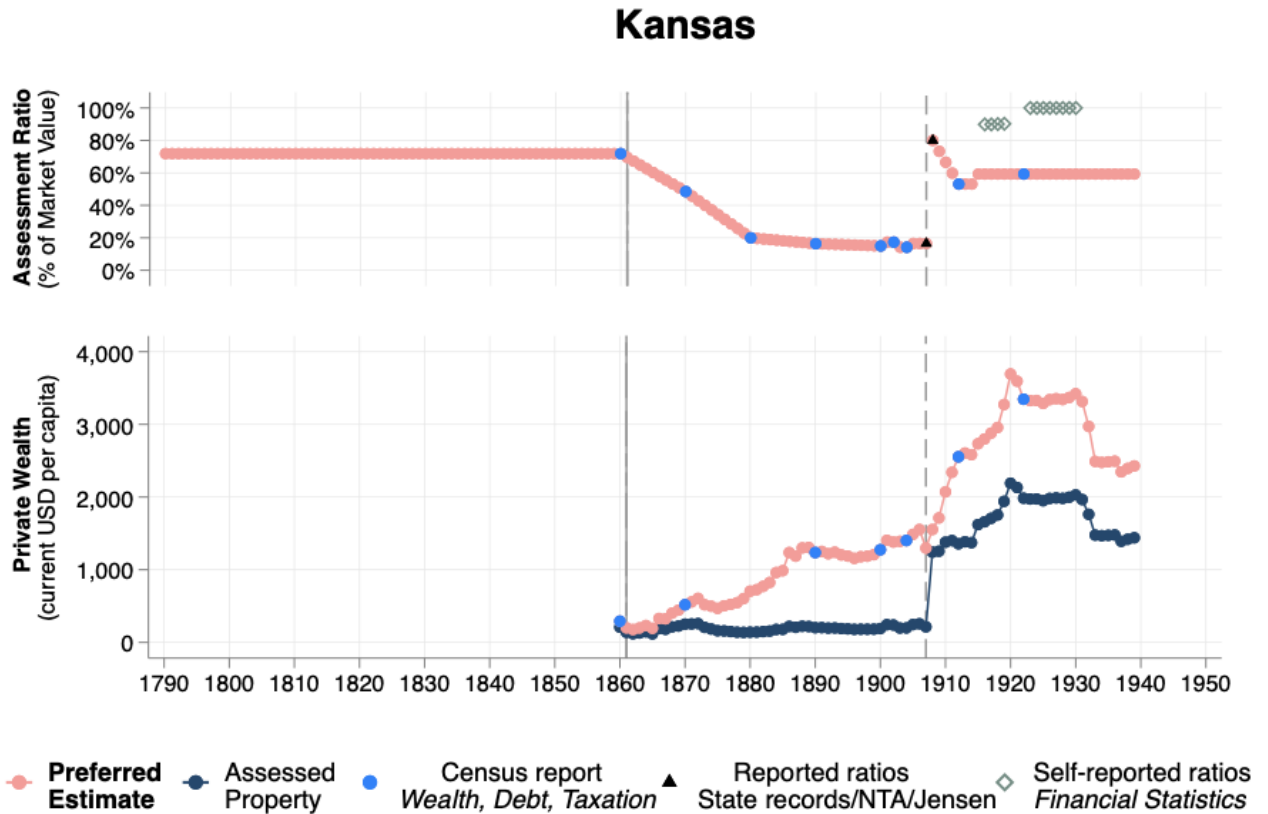
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

Indiana



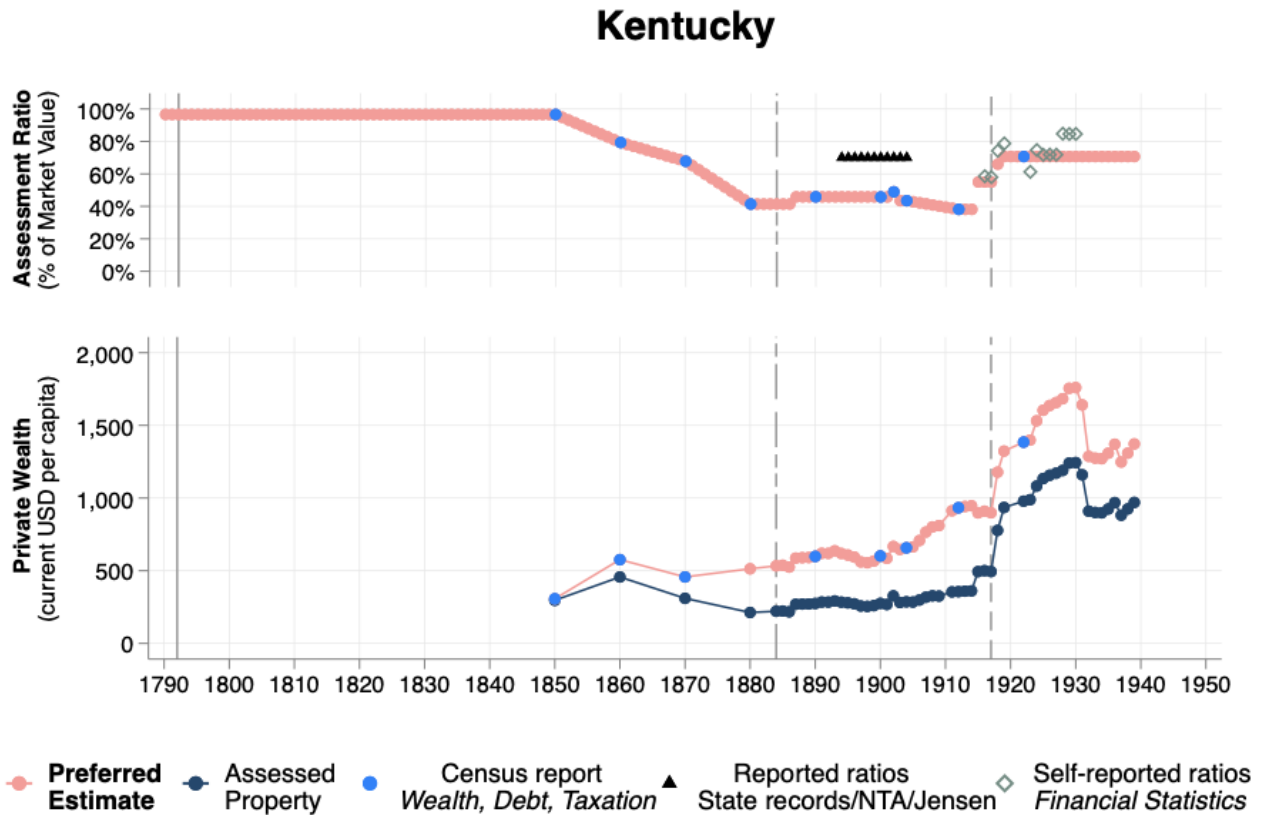
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

Kansas



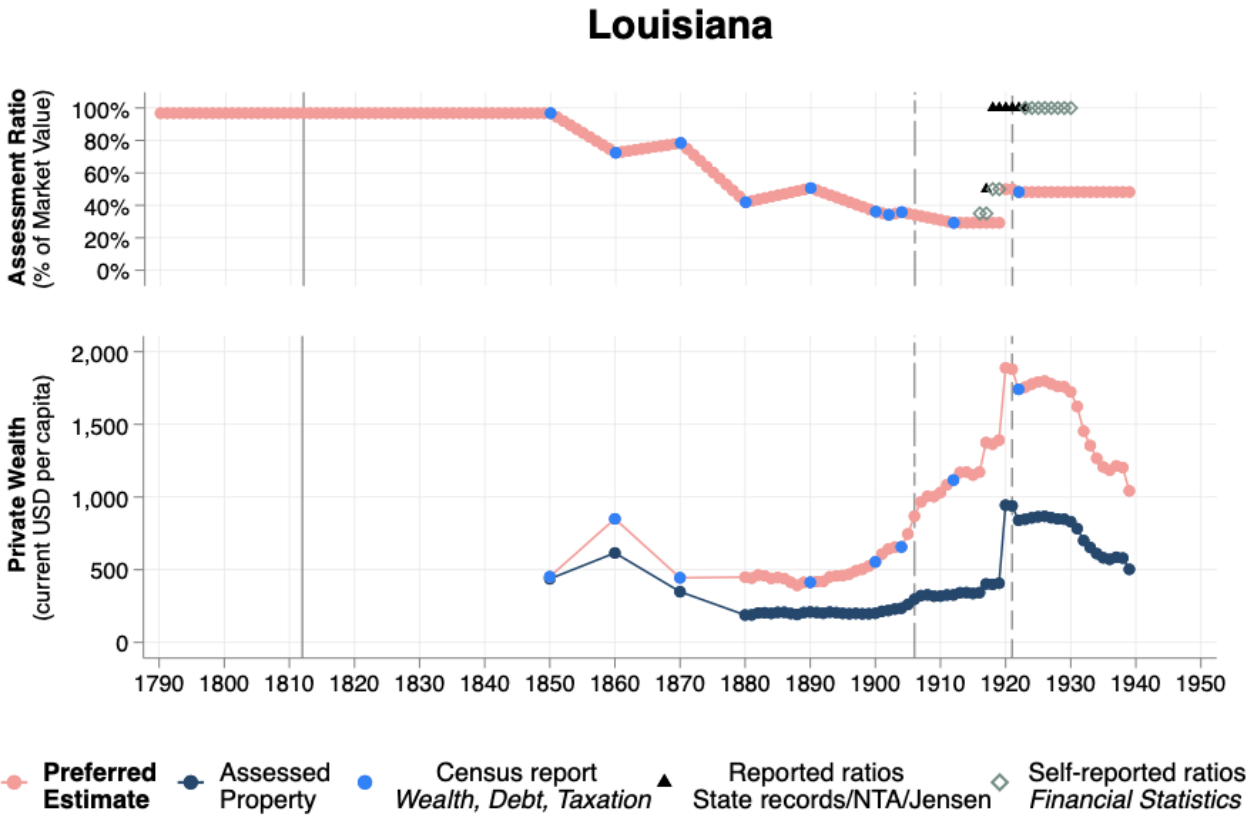
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

Kentucky



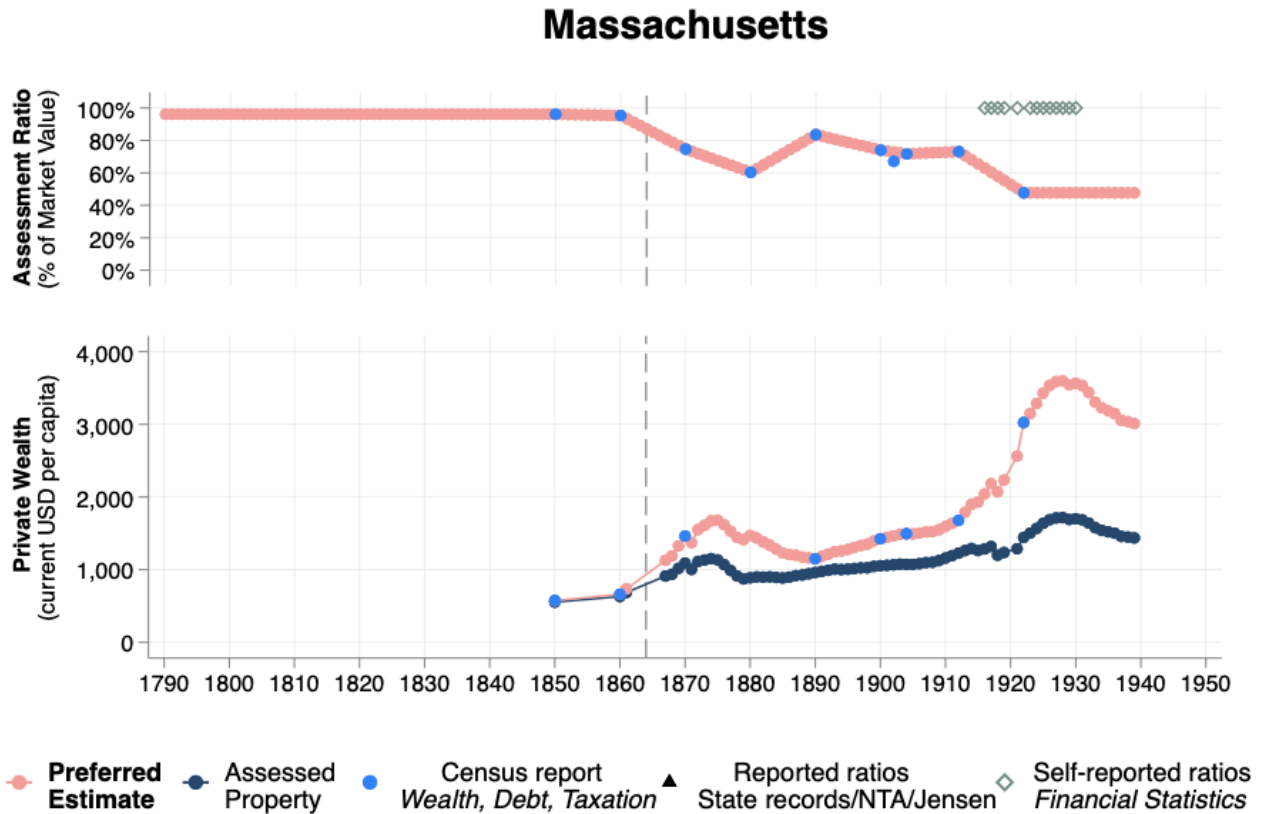
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Louisiana



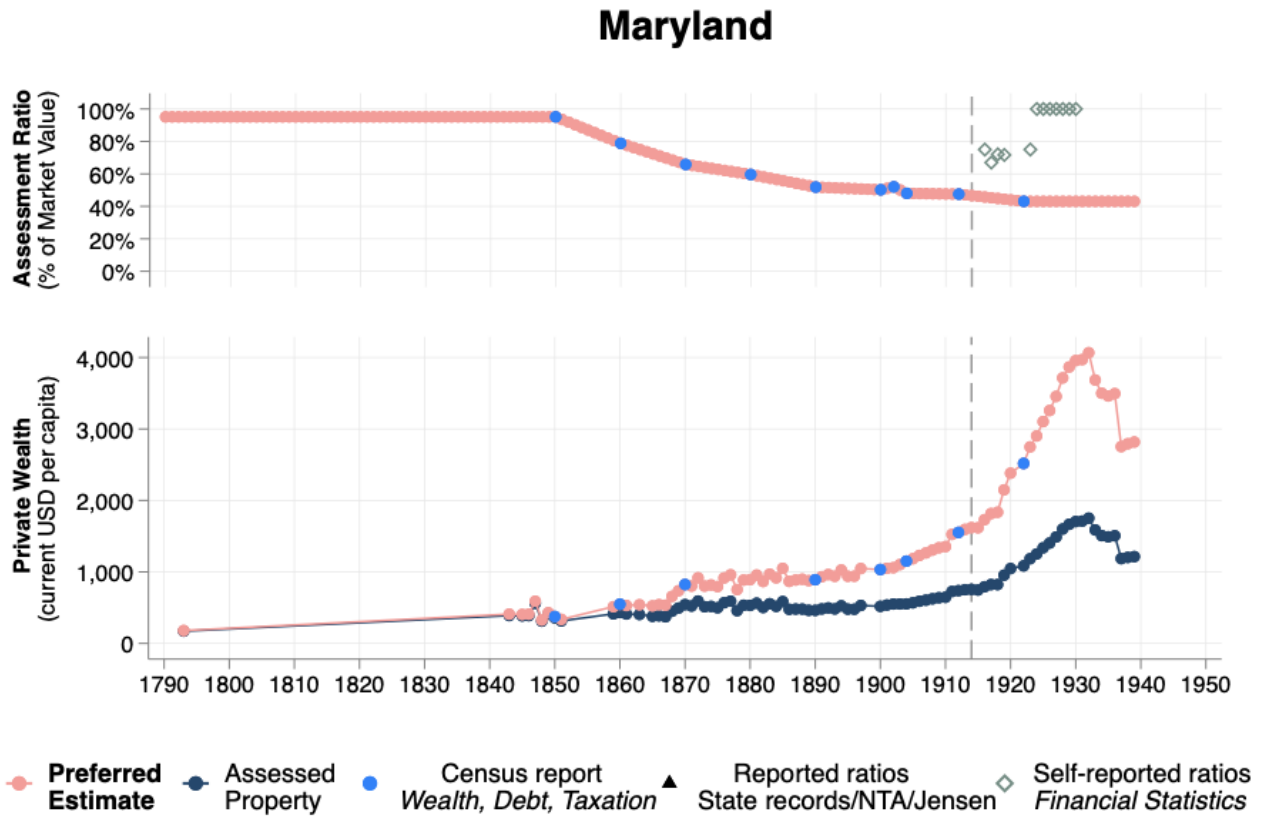
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Census ratios for 1880 and 1902 are inferred from tax rates.

Massachusetts



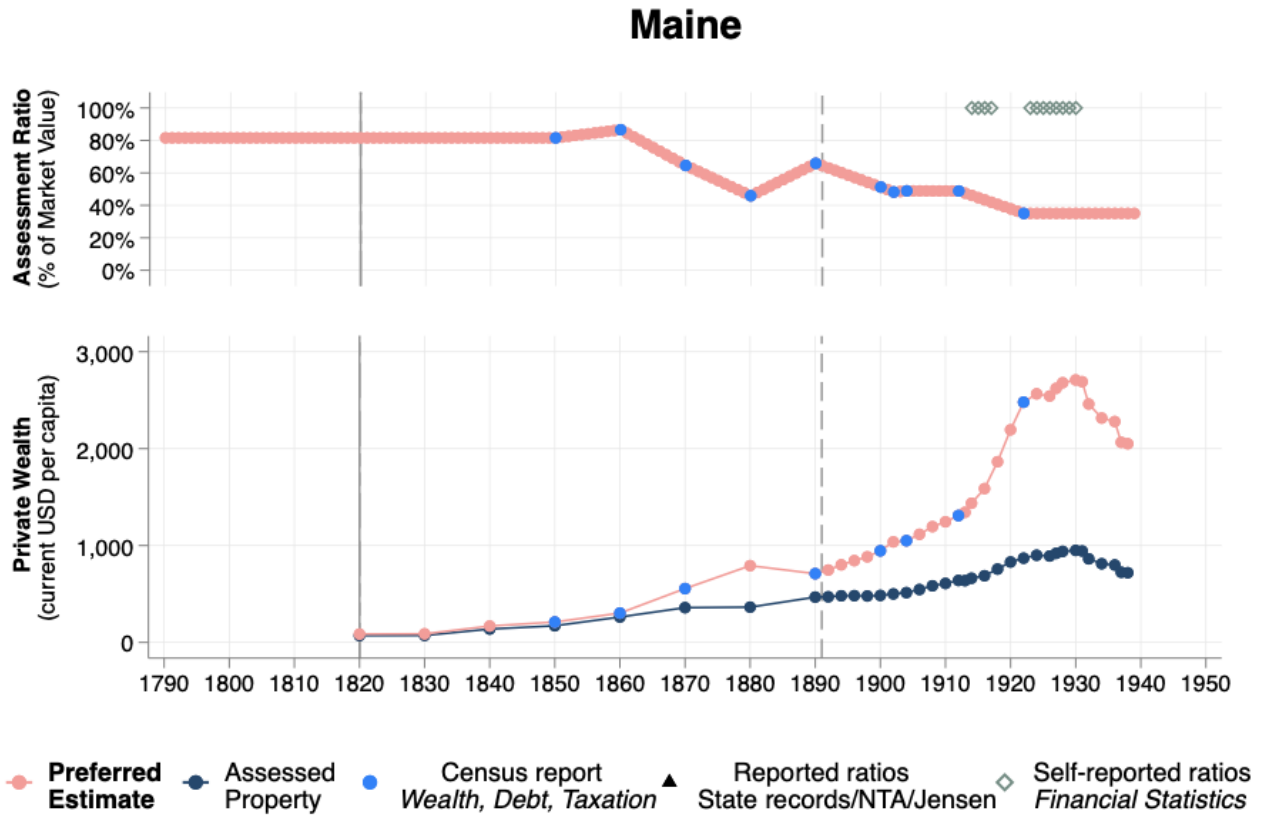
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 Census ratios for 1880 and 1902 are inferred from tax rates.

Maryland



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.

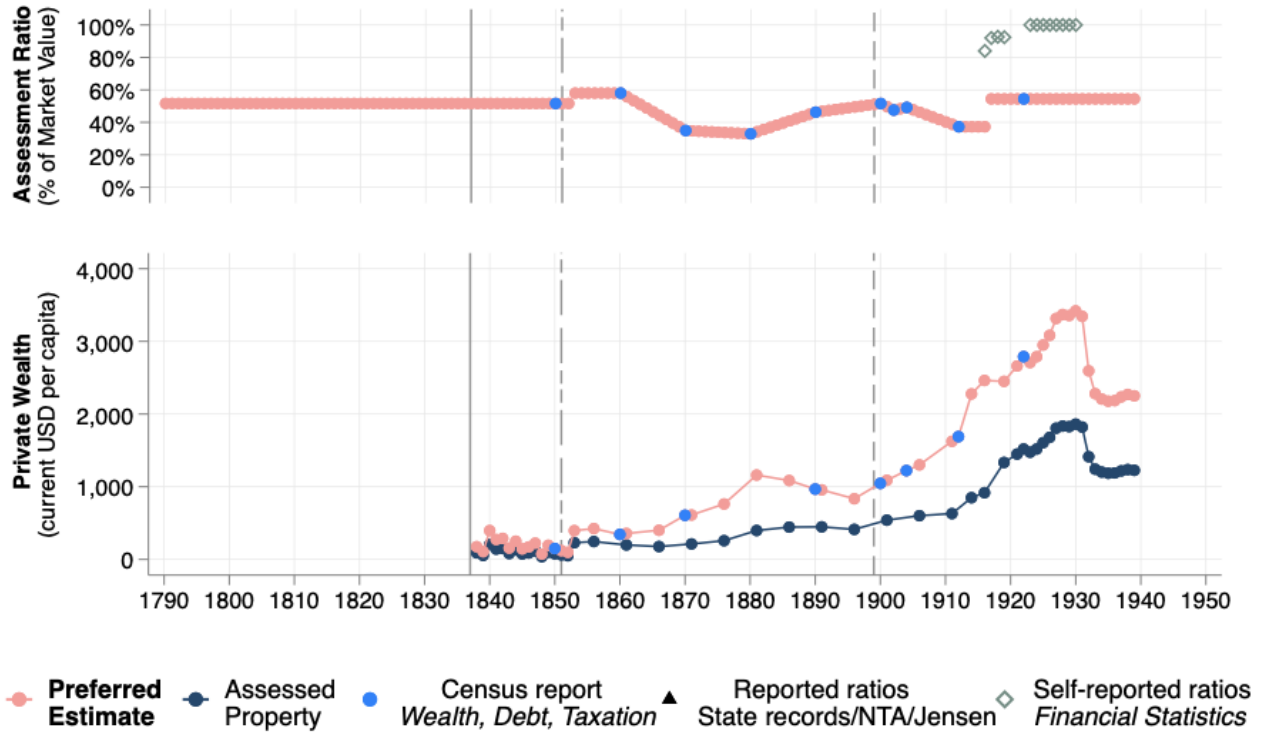
Maine



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

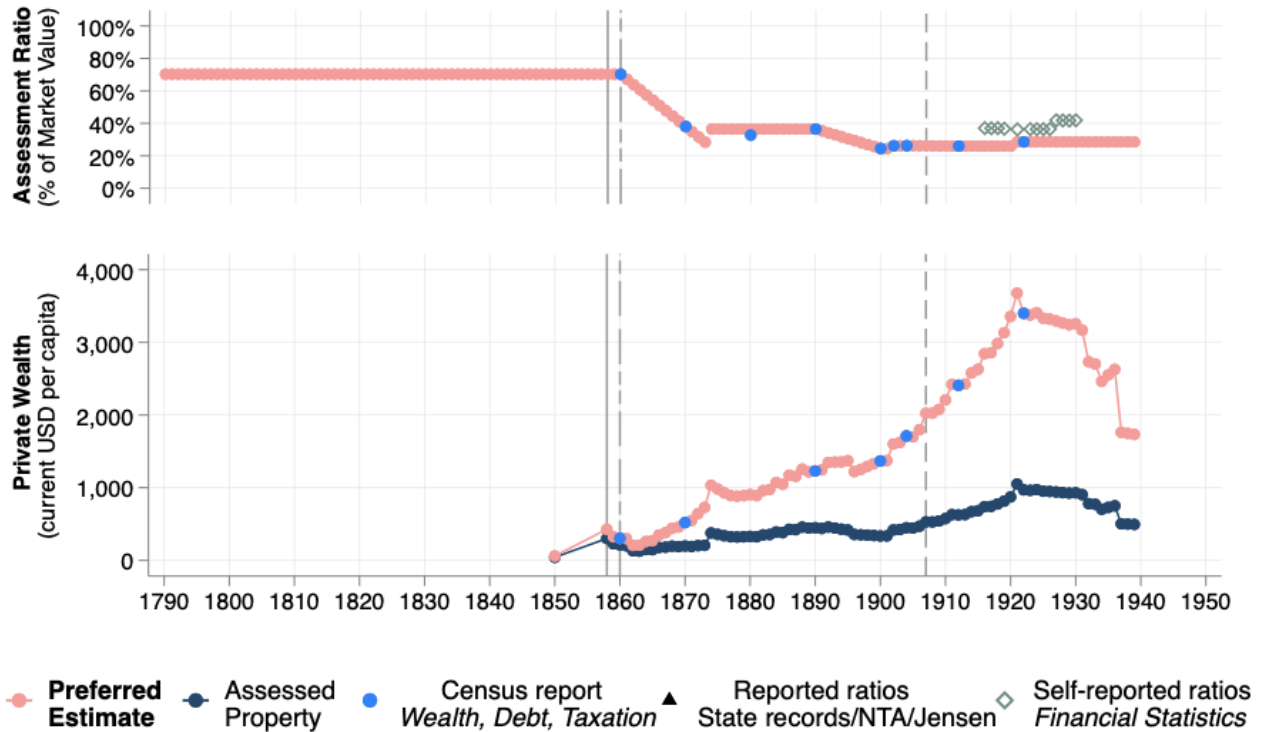
Michigan



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

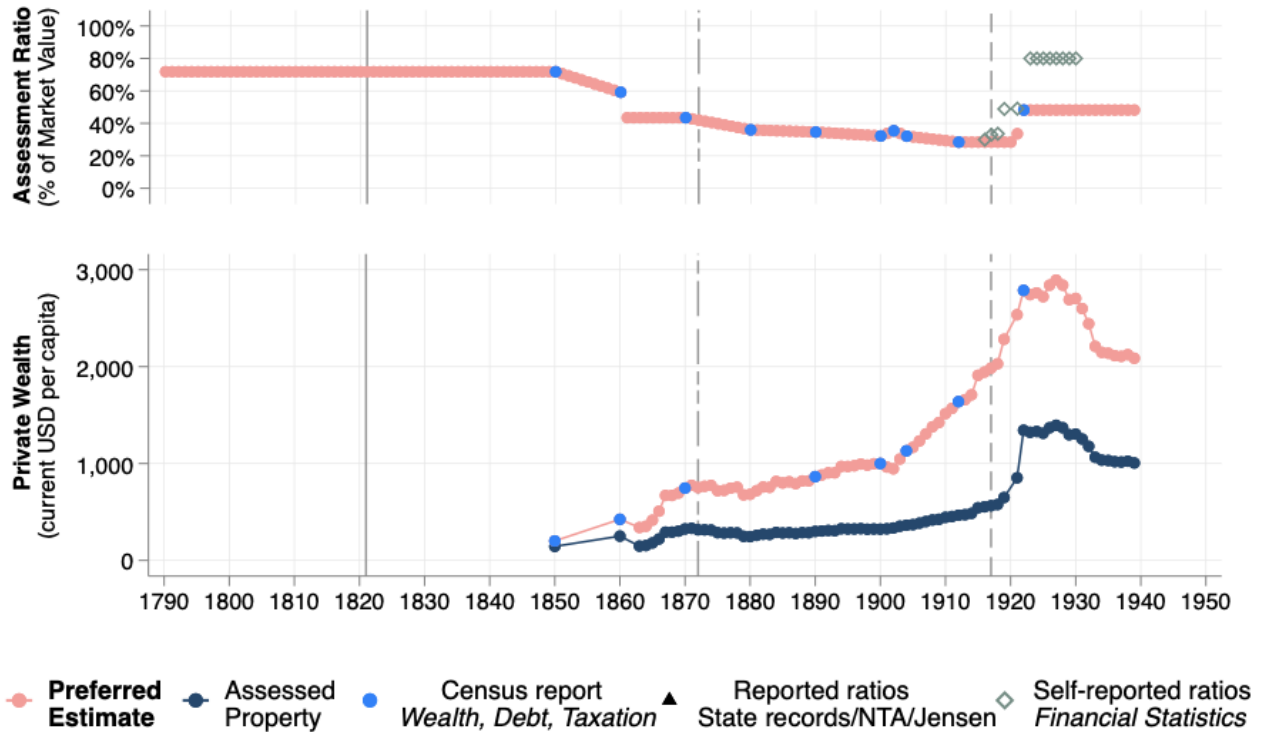
Minnesota



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

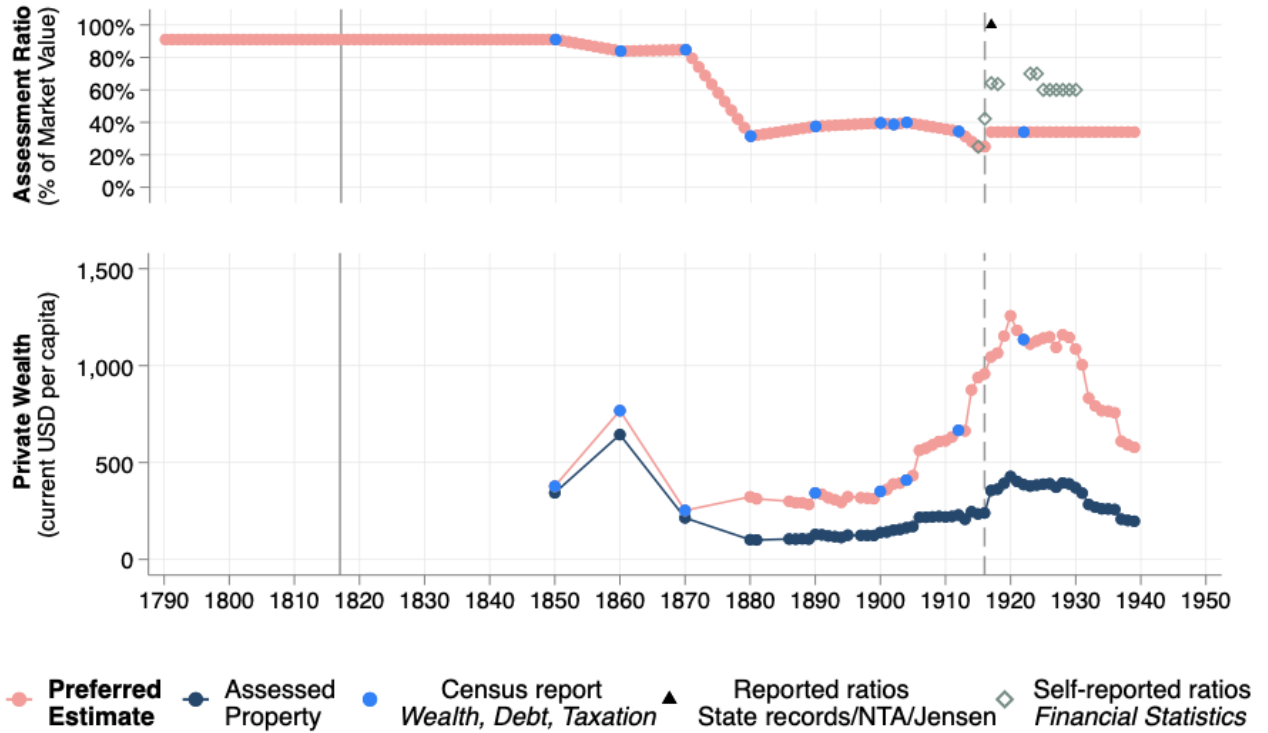
Missouri



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.

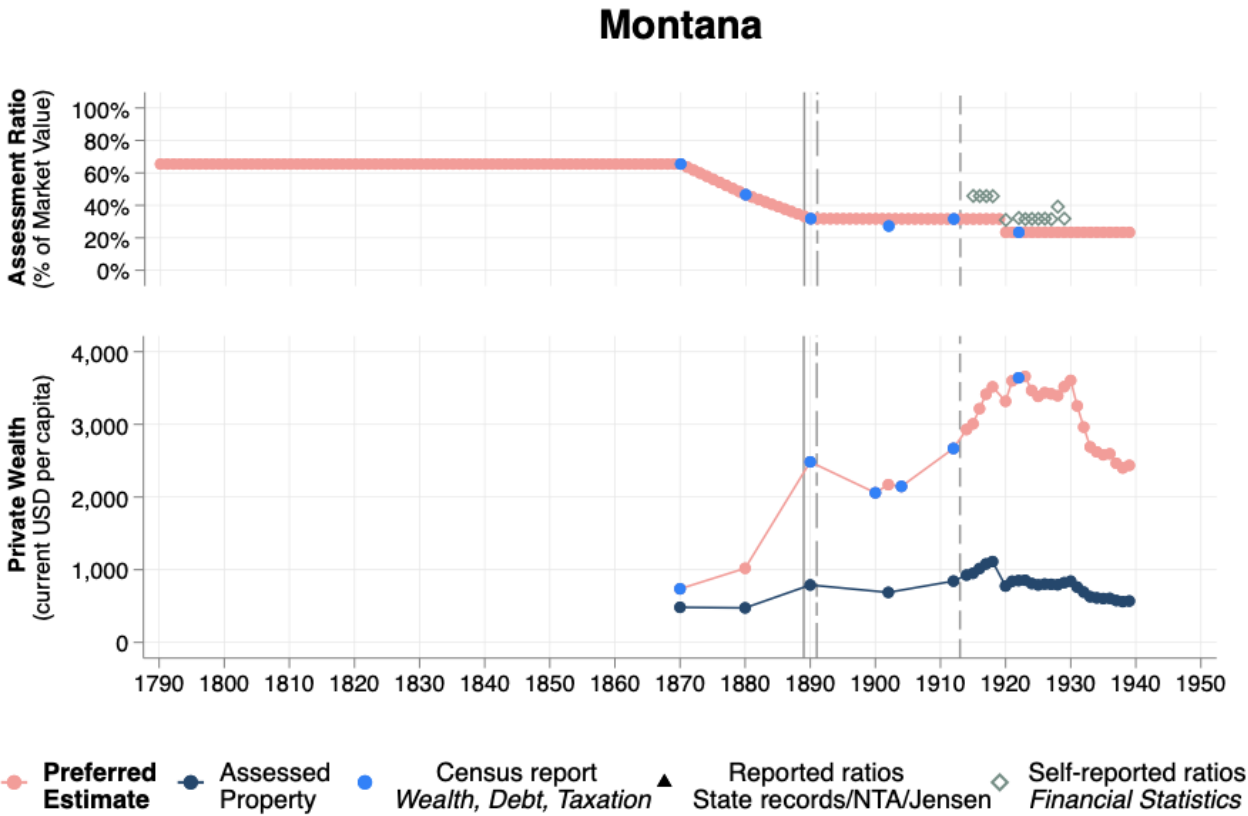
Mississippi

Mississippi



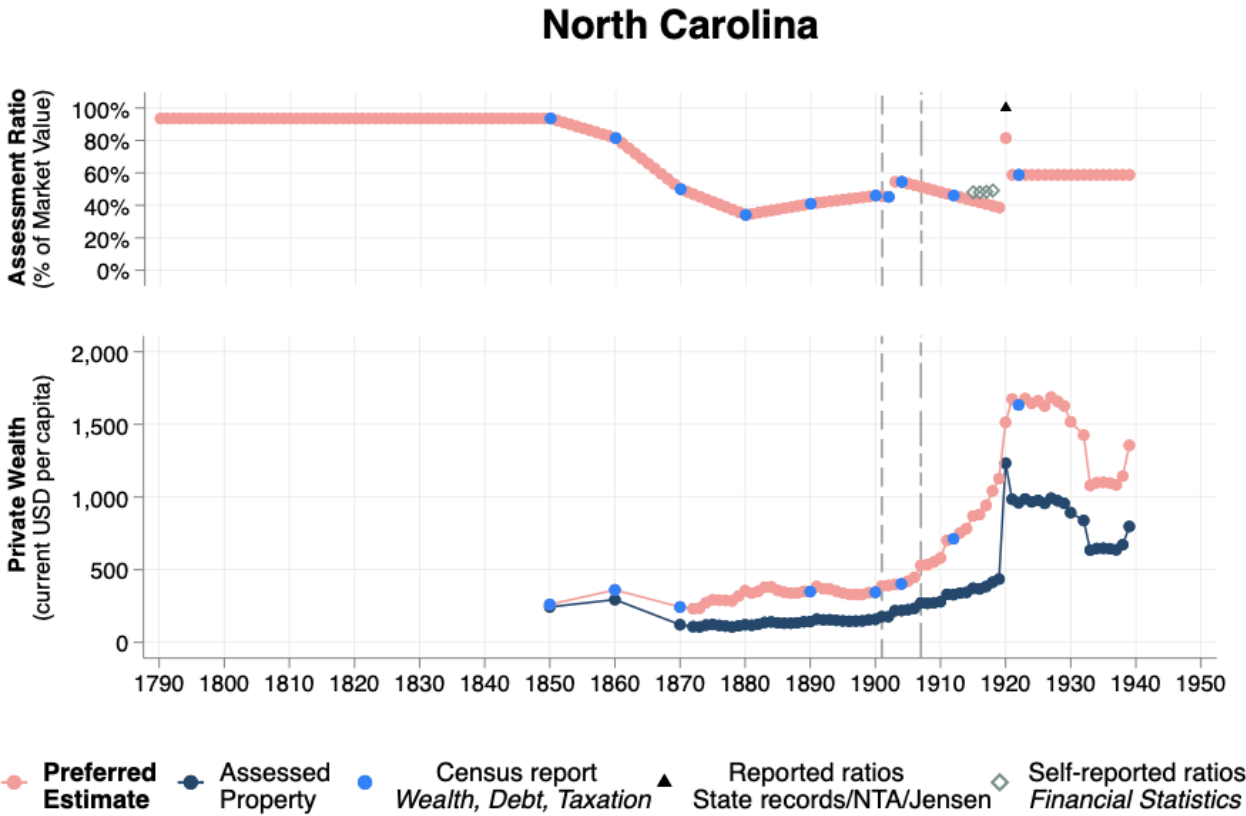
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

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.

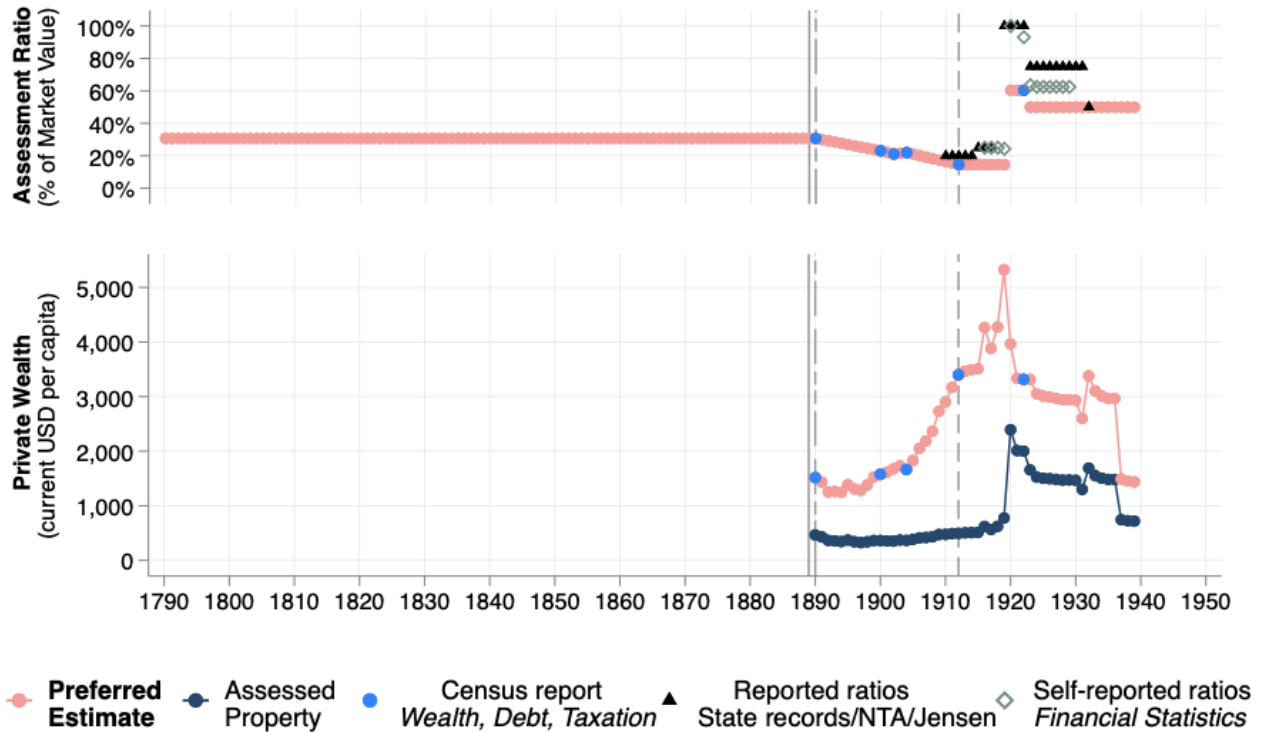
North Carolina



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 Dakota

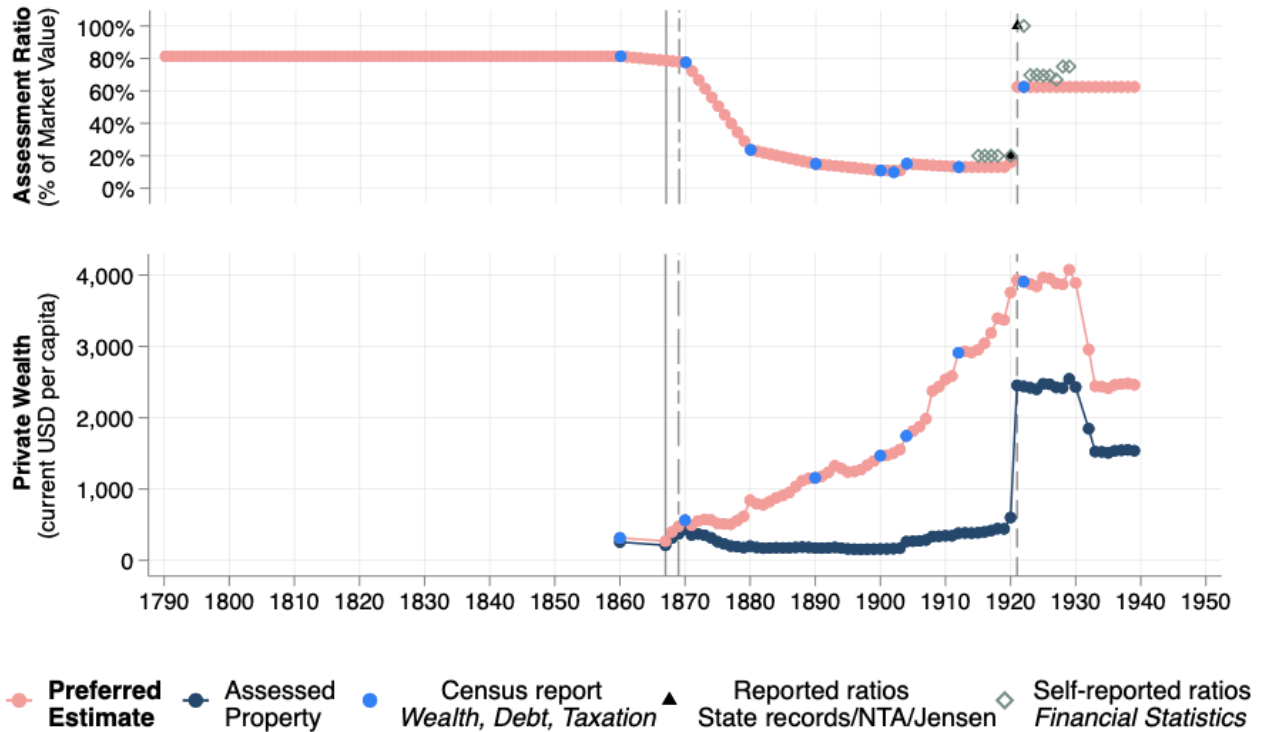
North Dakota



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.

Nebraska

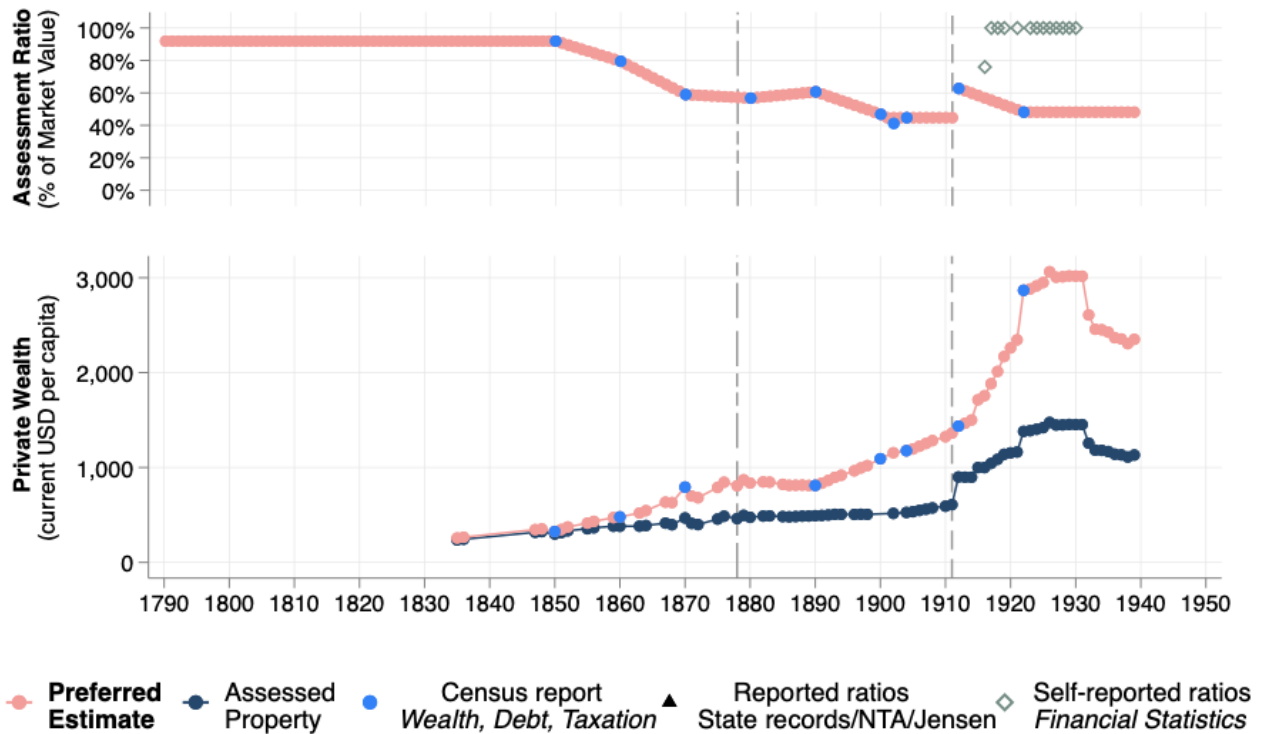
Nebraska



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.

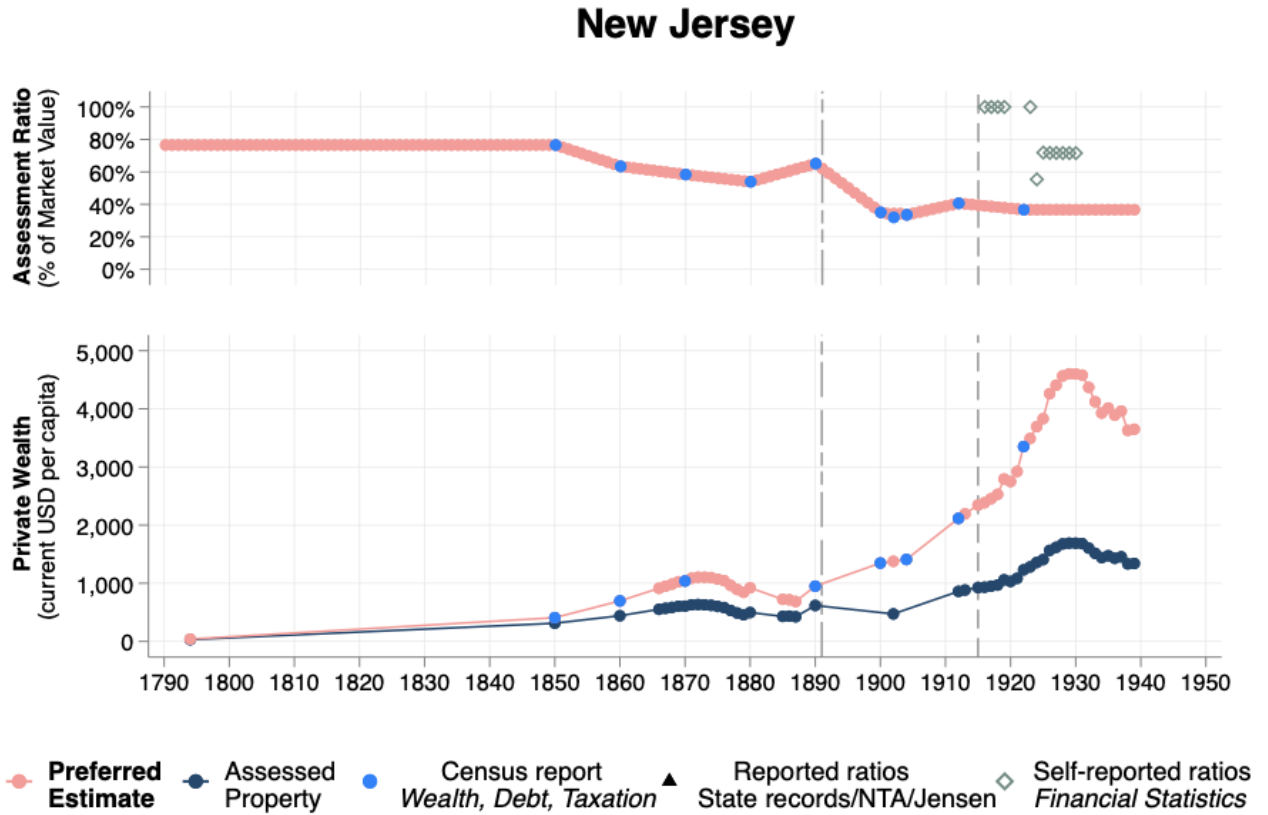
New Hampshire

New Hampshire



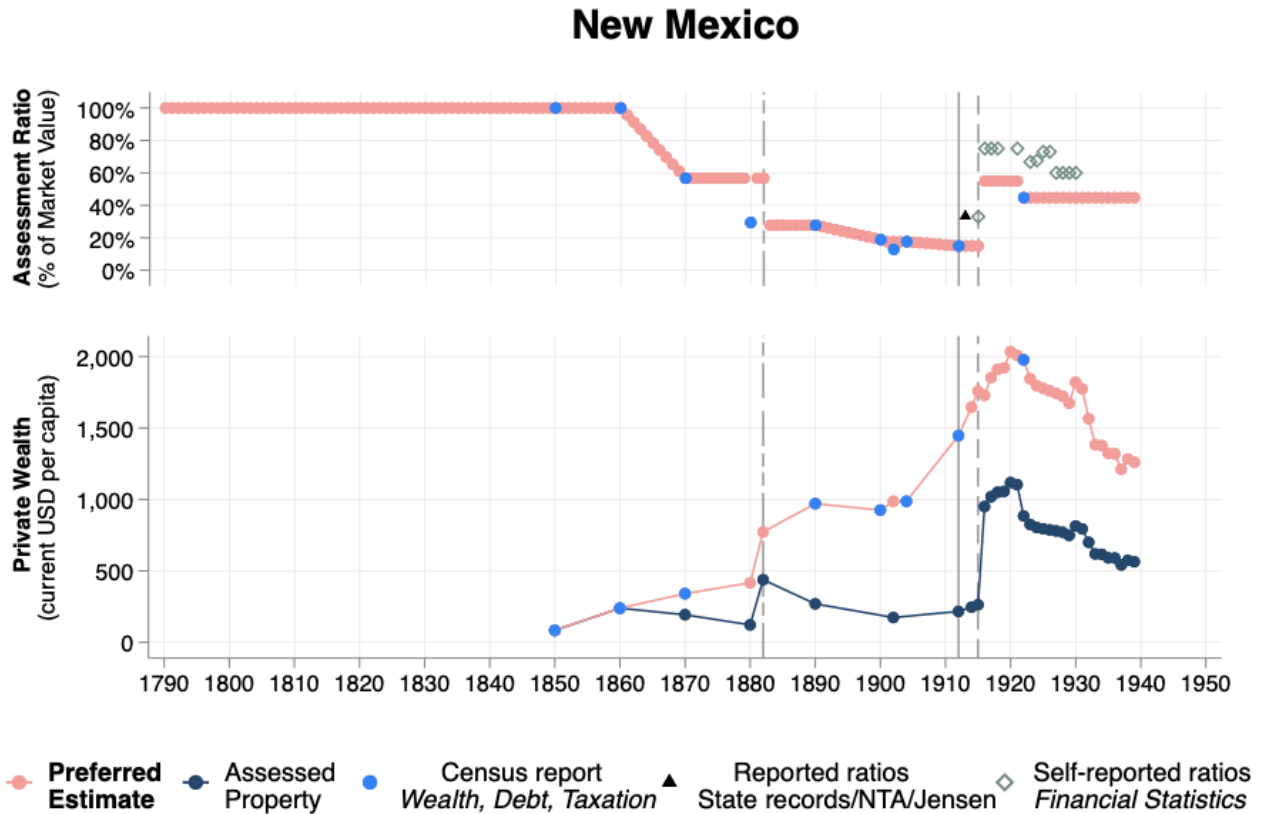
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

New Jersey



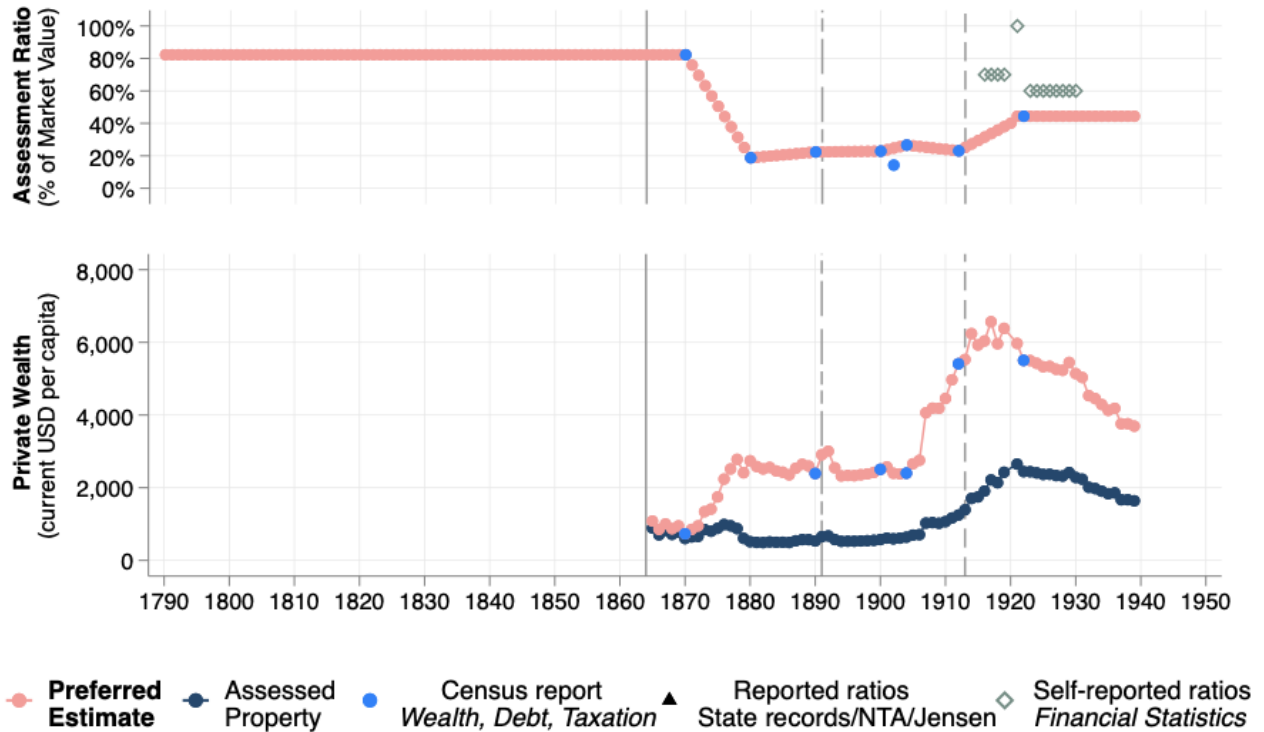
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

New Mexico



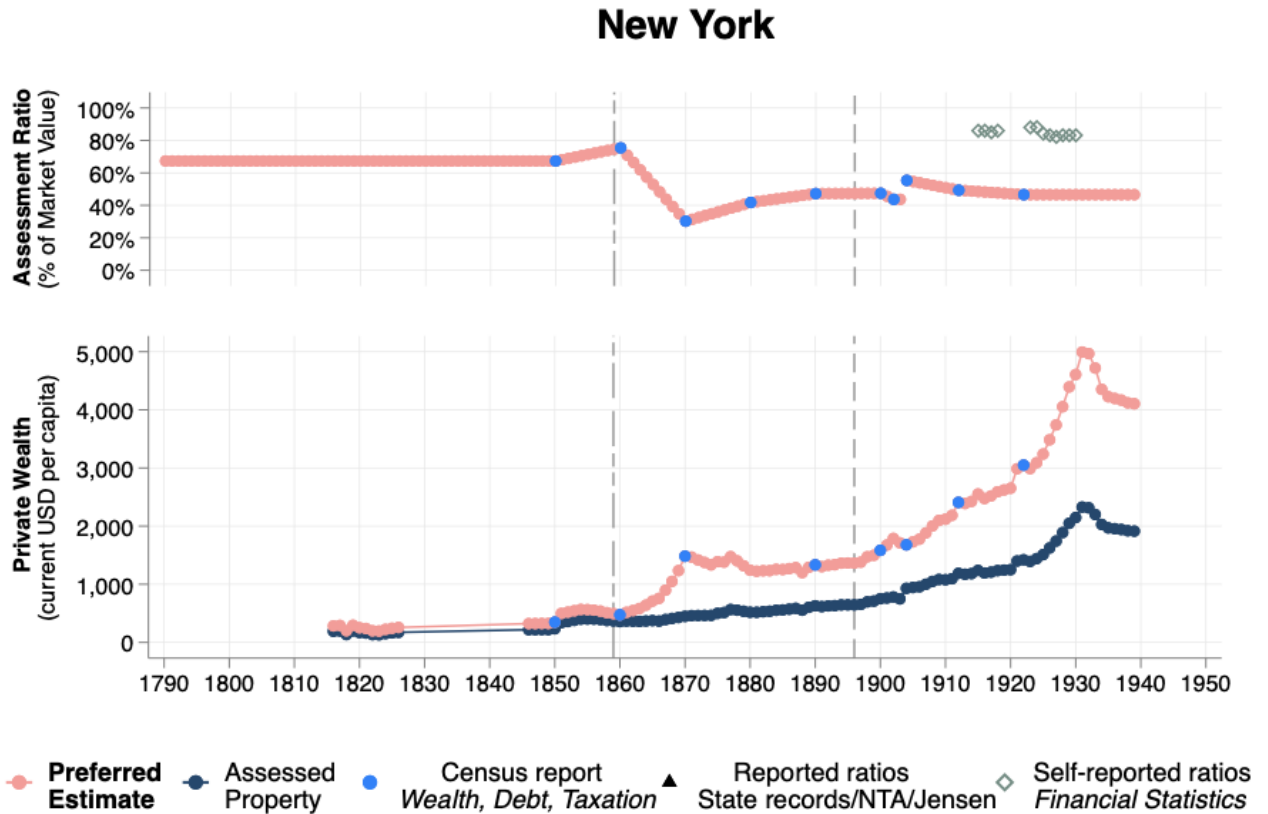
Nevada

Nevada



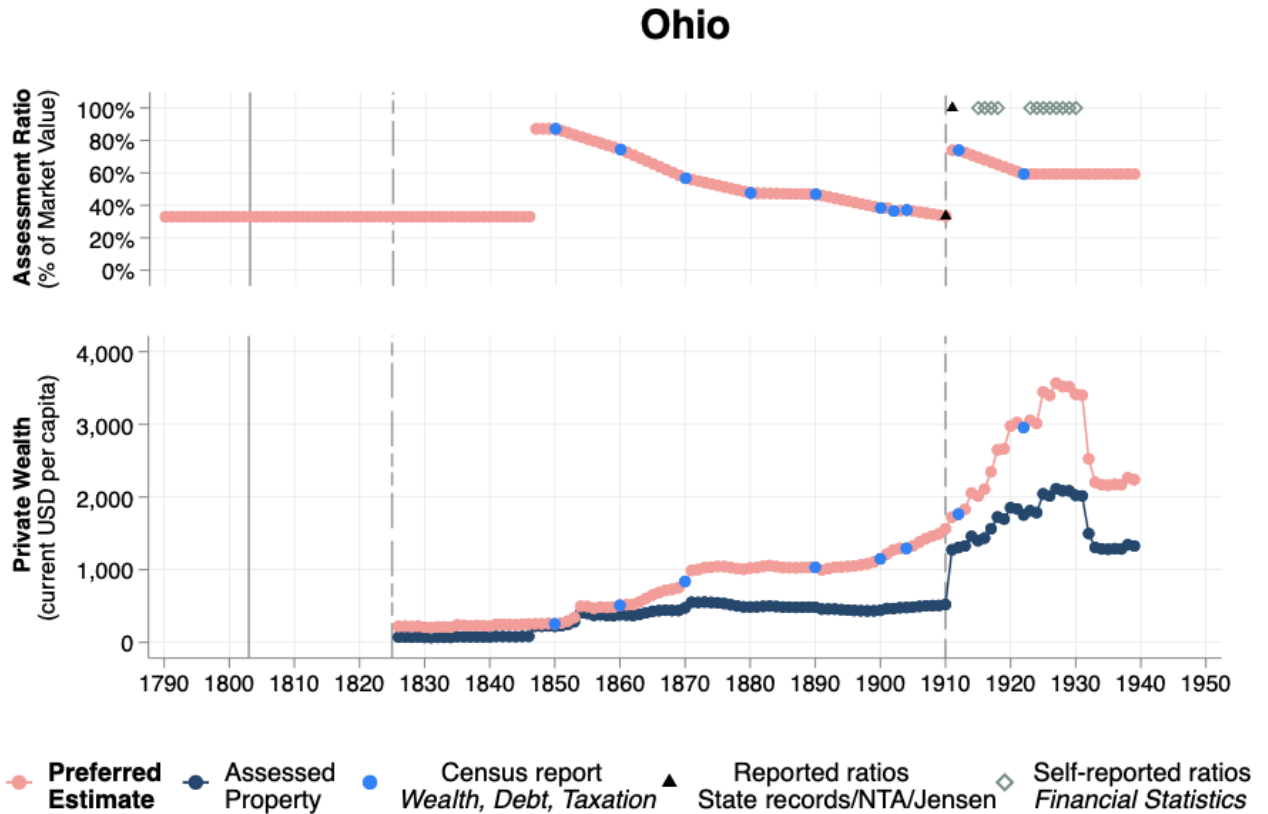
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

New York



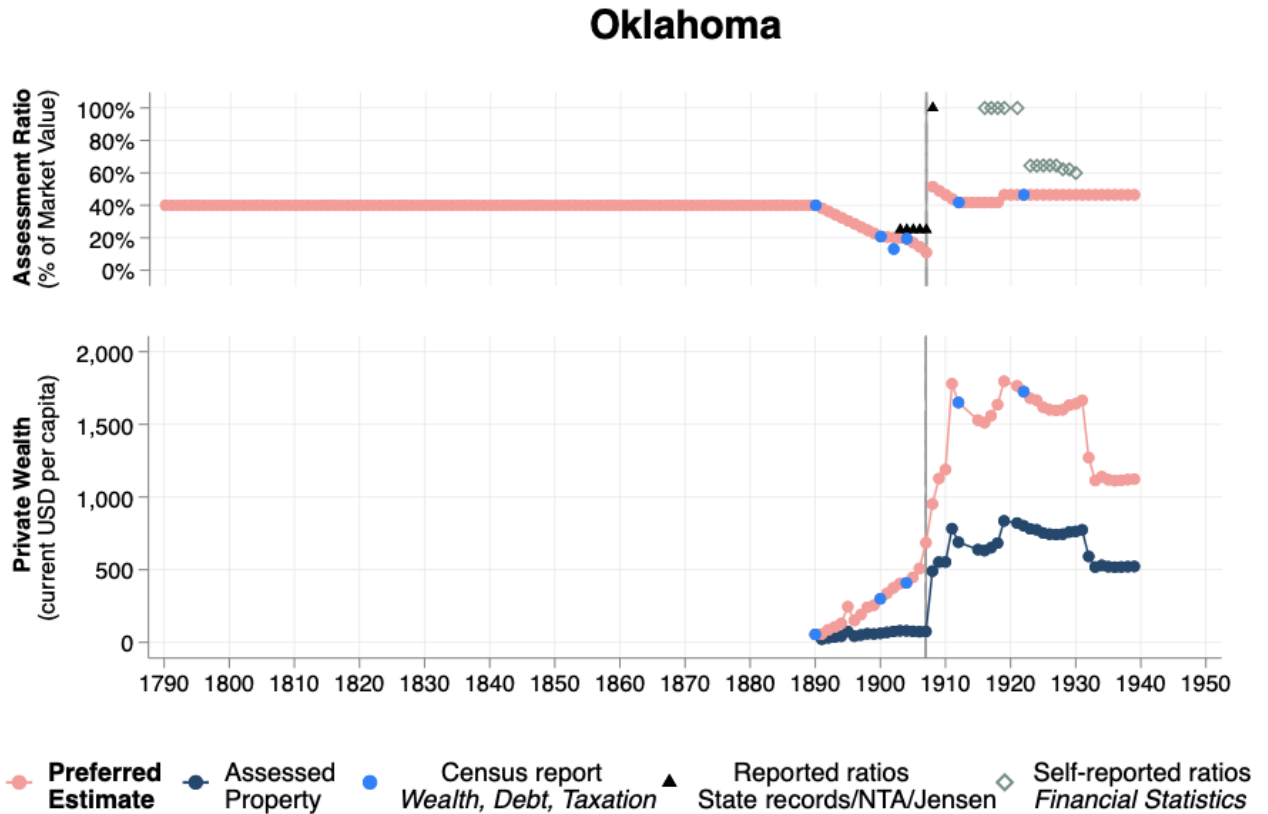
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

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.

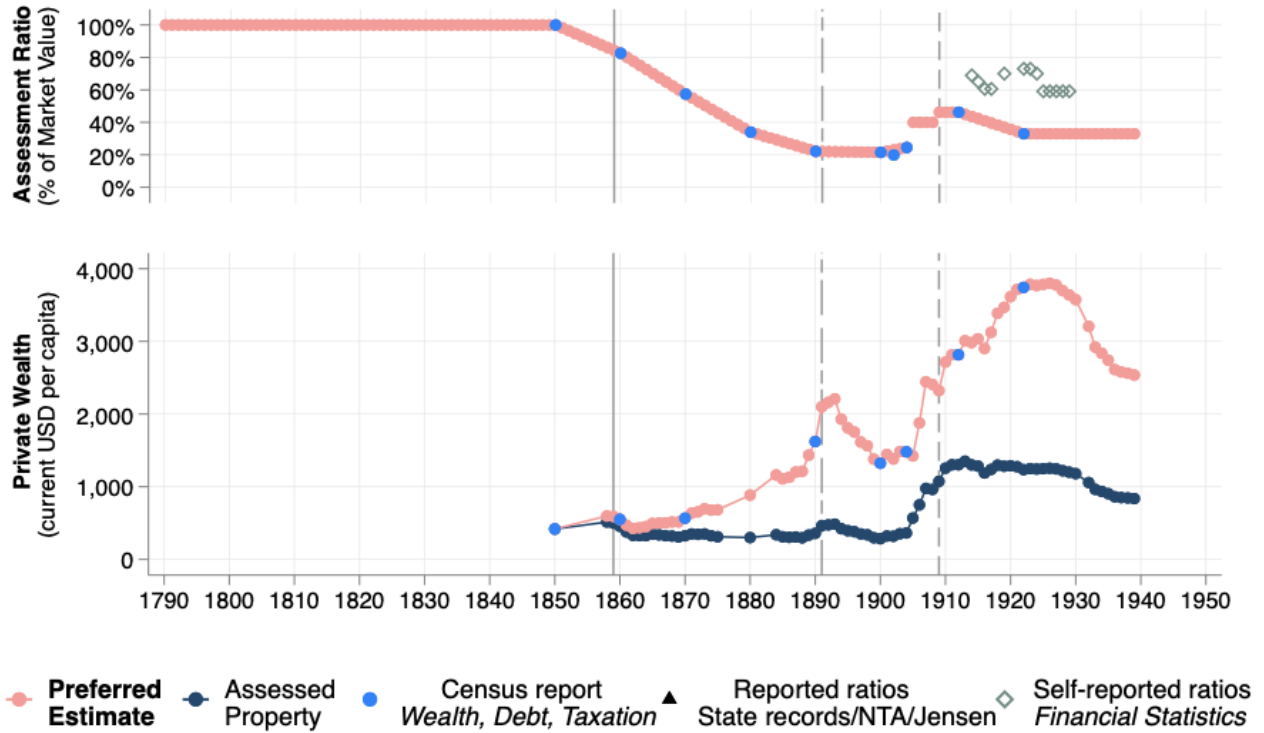
Oklahoma



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.

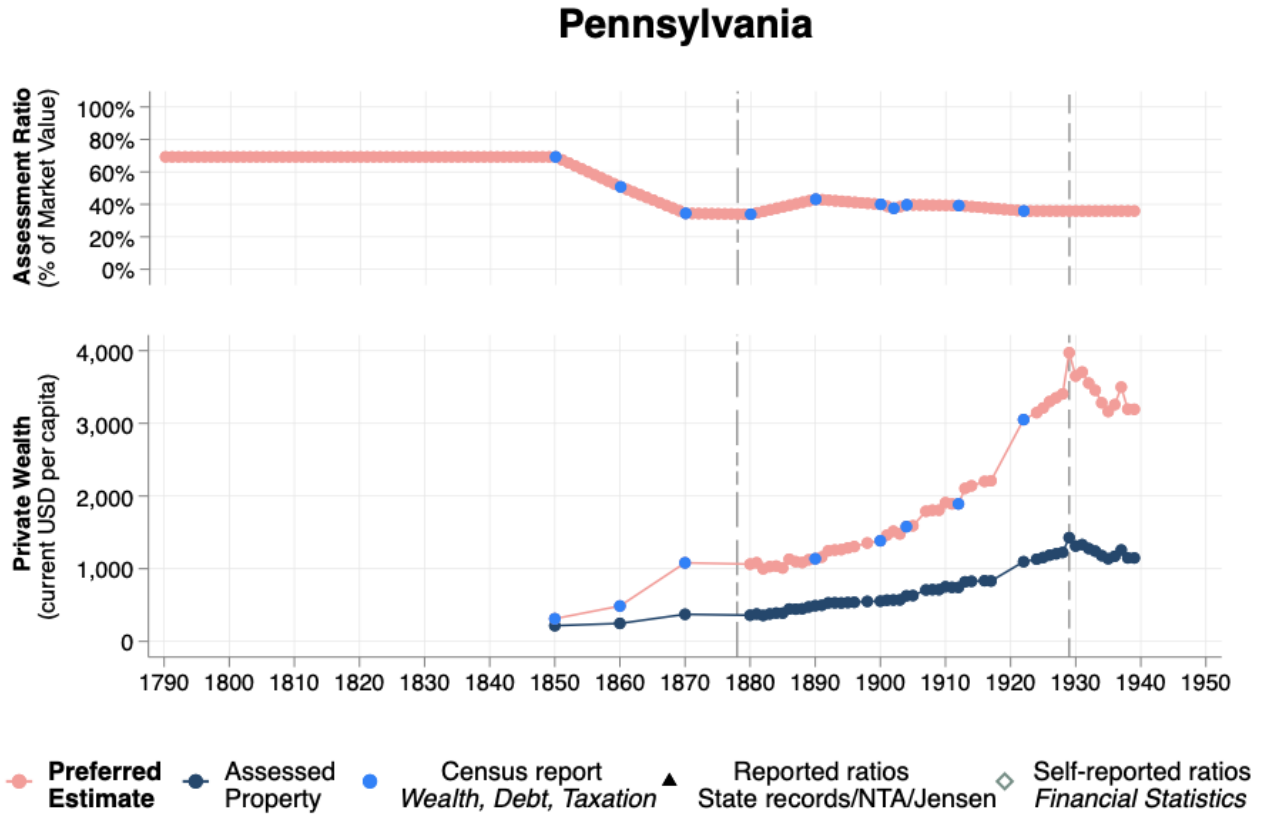
Oregon

Oregon



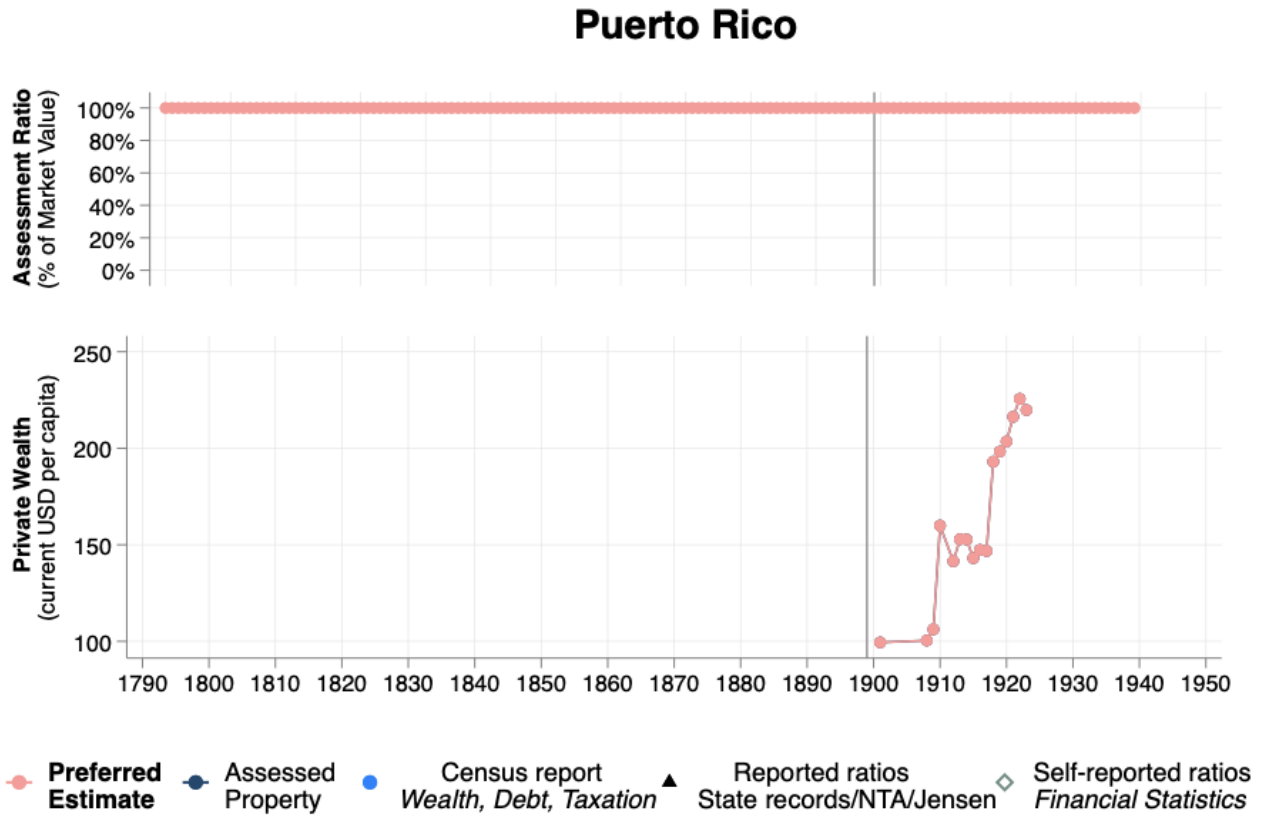
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association. Census ratios for 1880 and 1902 are inferred from tax rates.

Pennsylvania



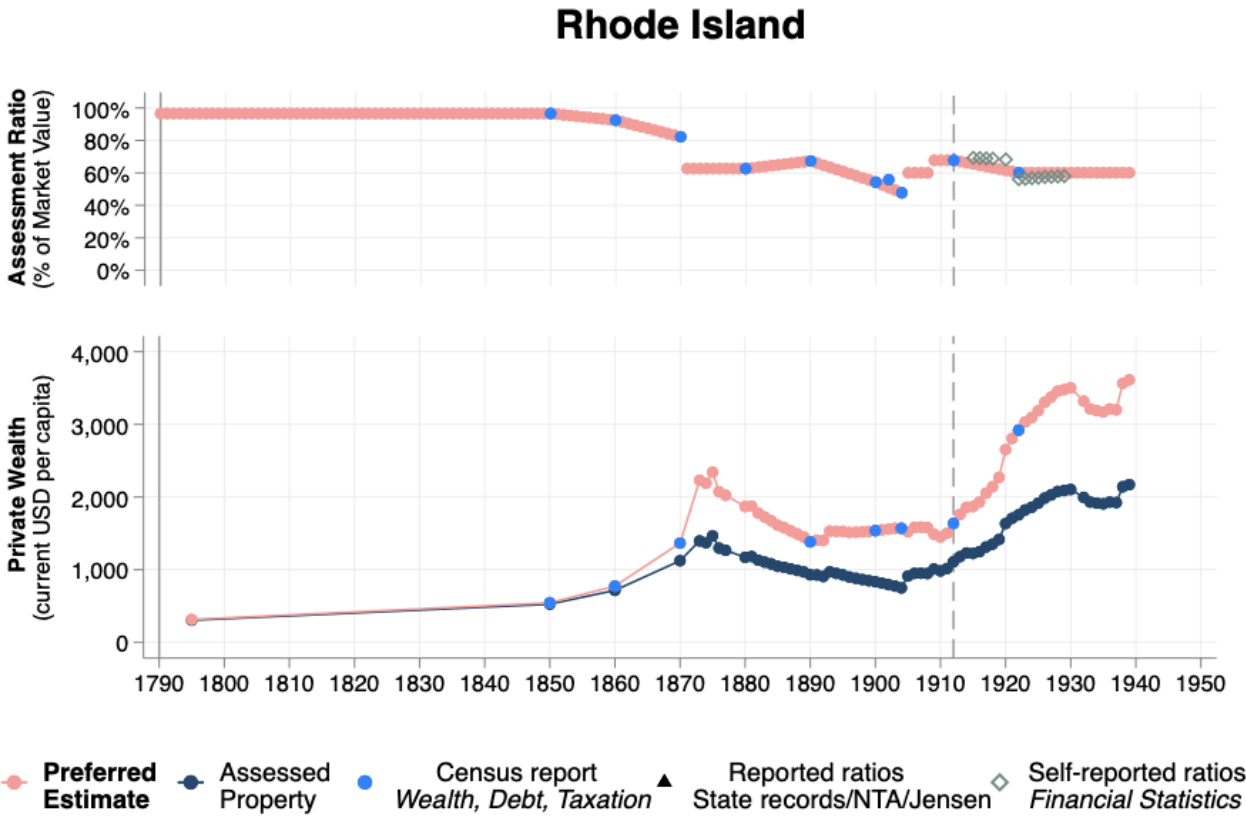
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

Puerto Rico



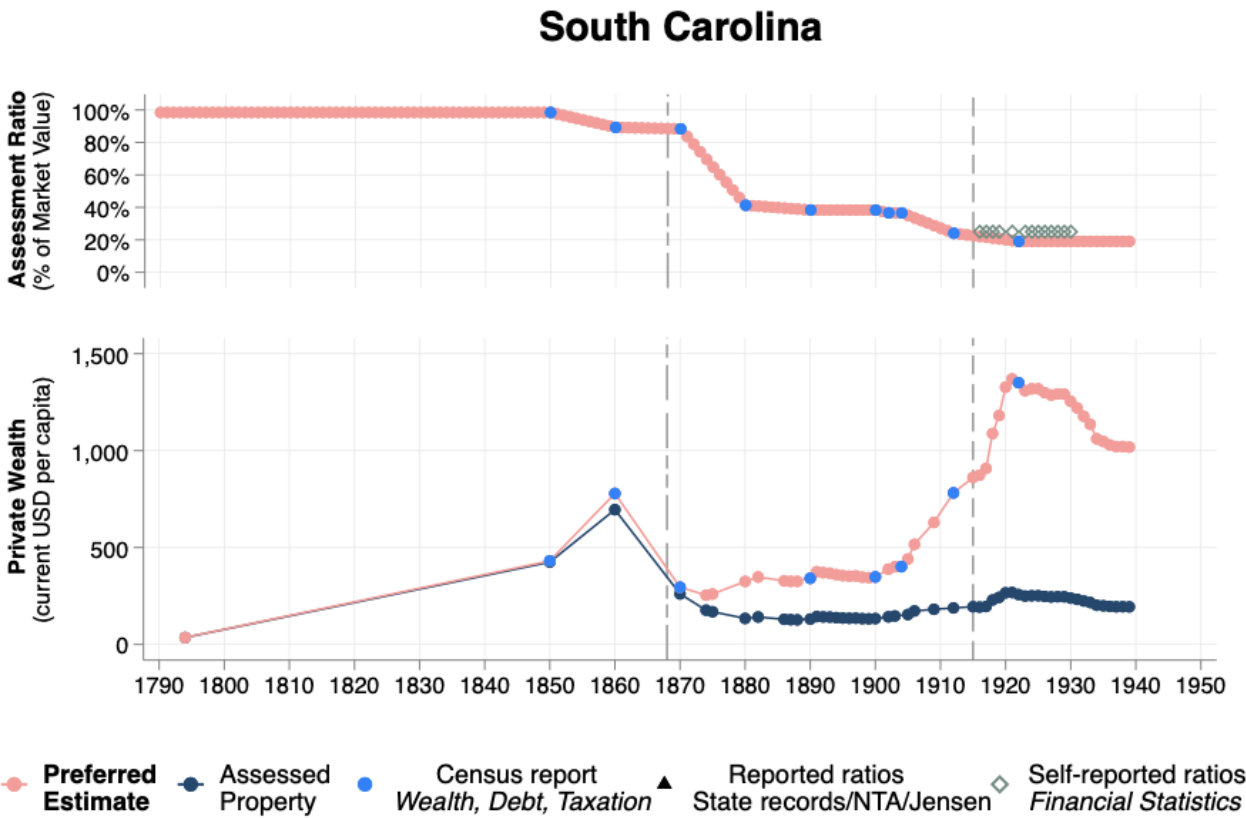
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Rhode Island



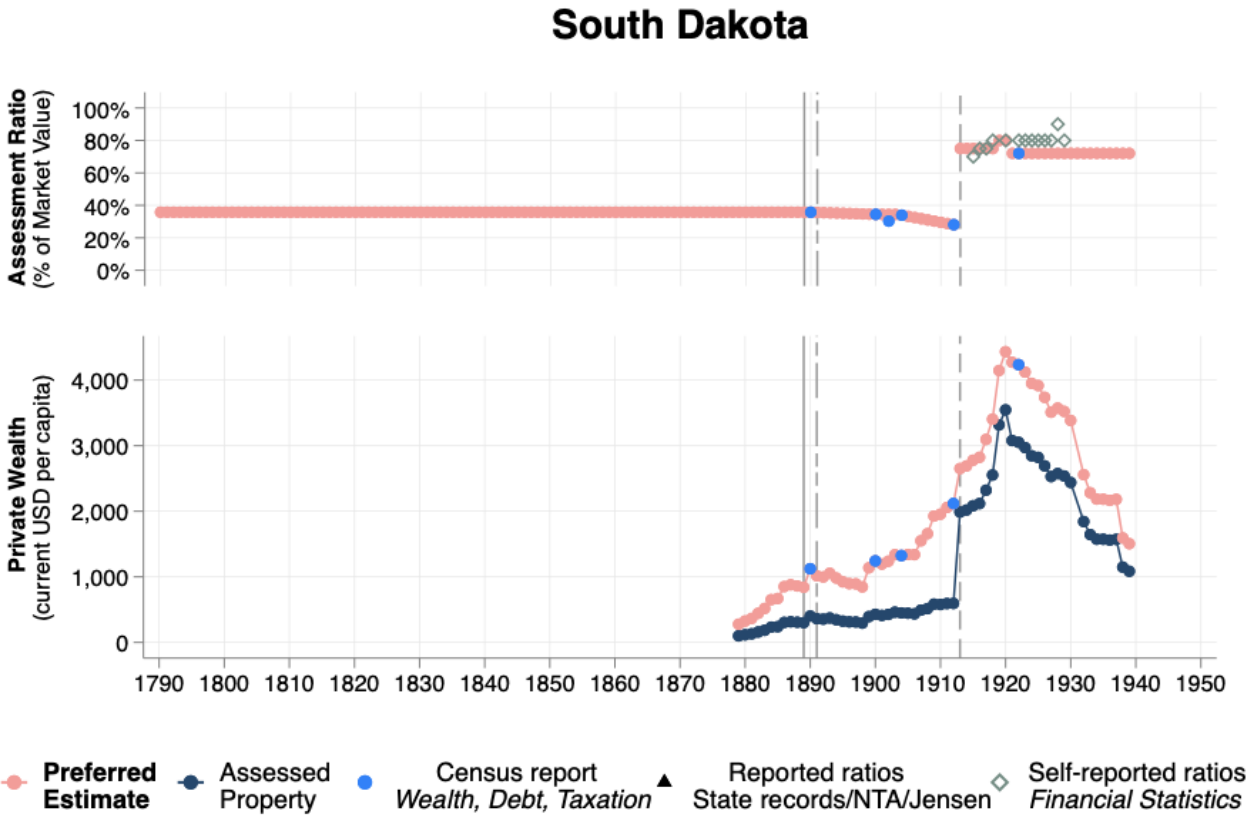
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

South Carolina



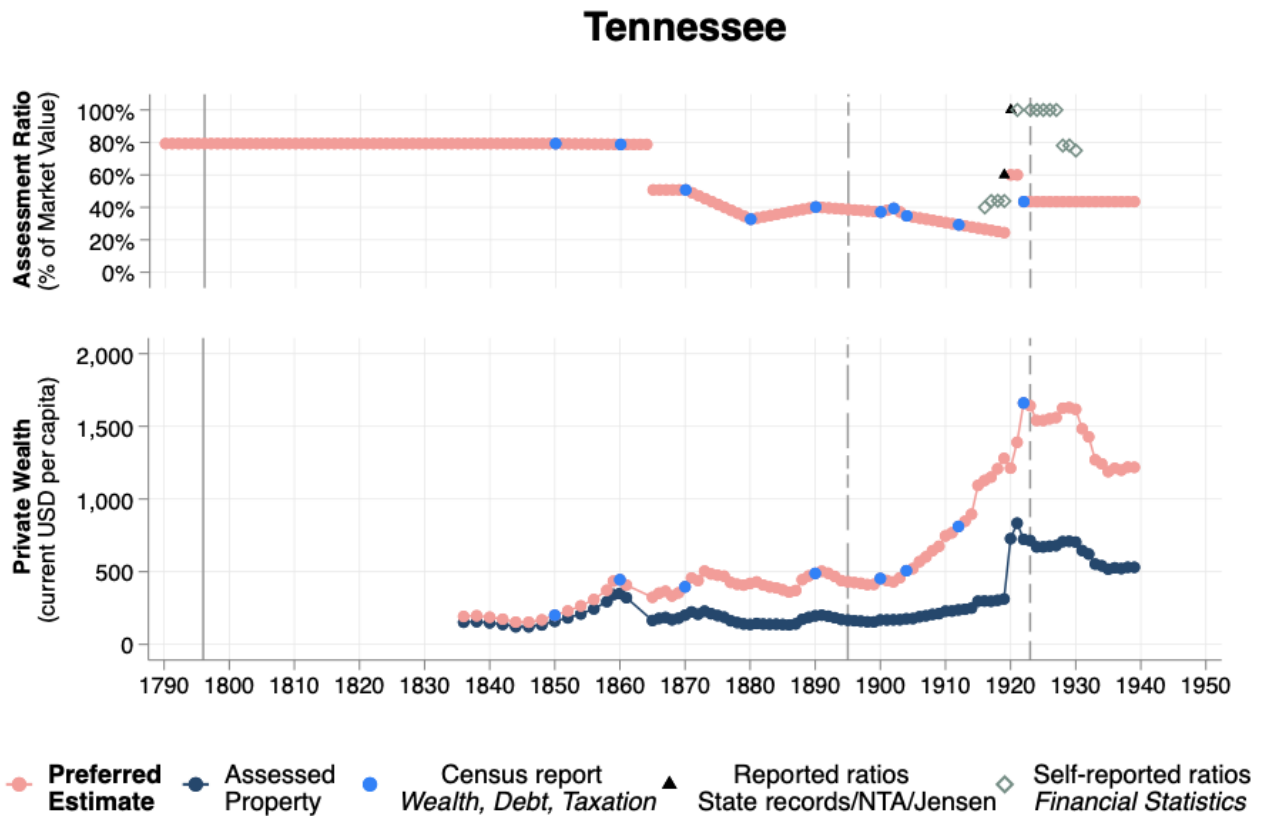
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

South Dakota



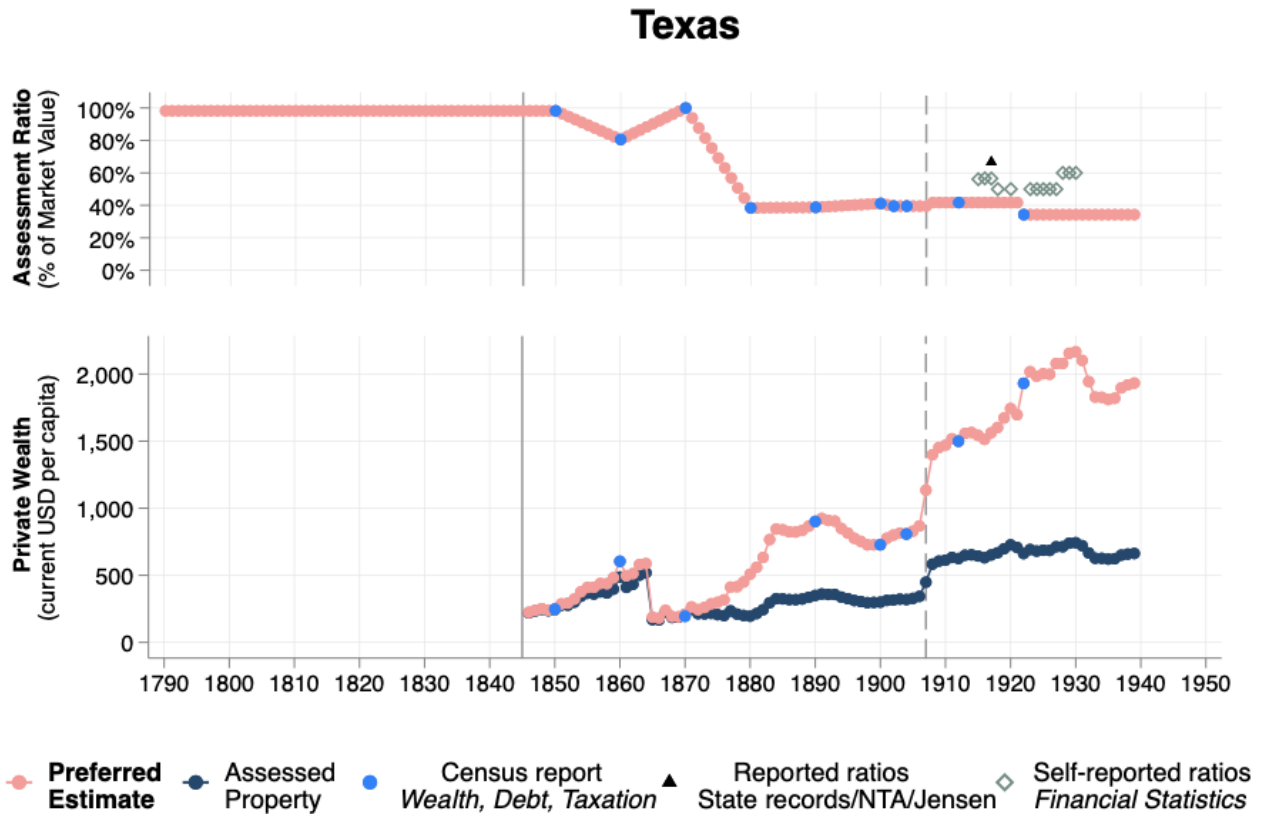
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Tennessee



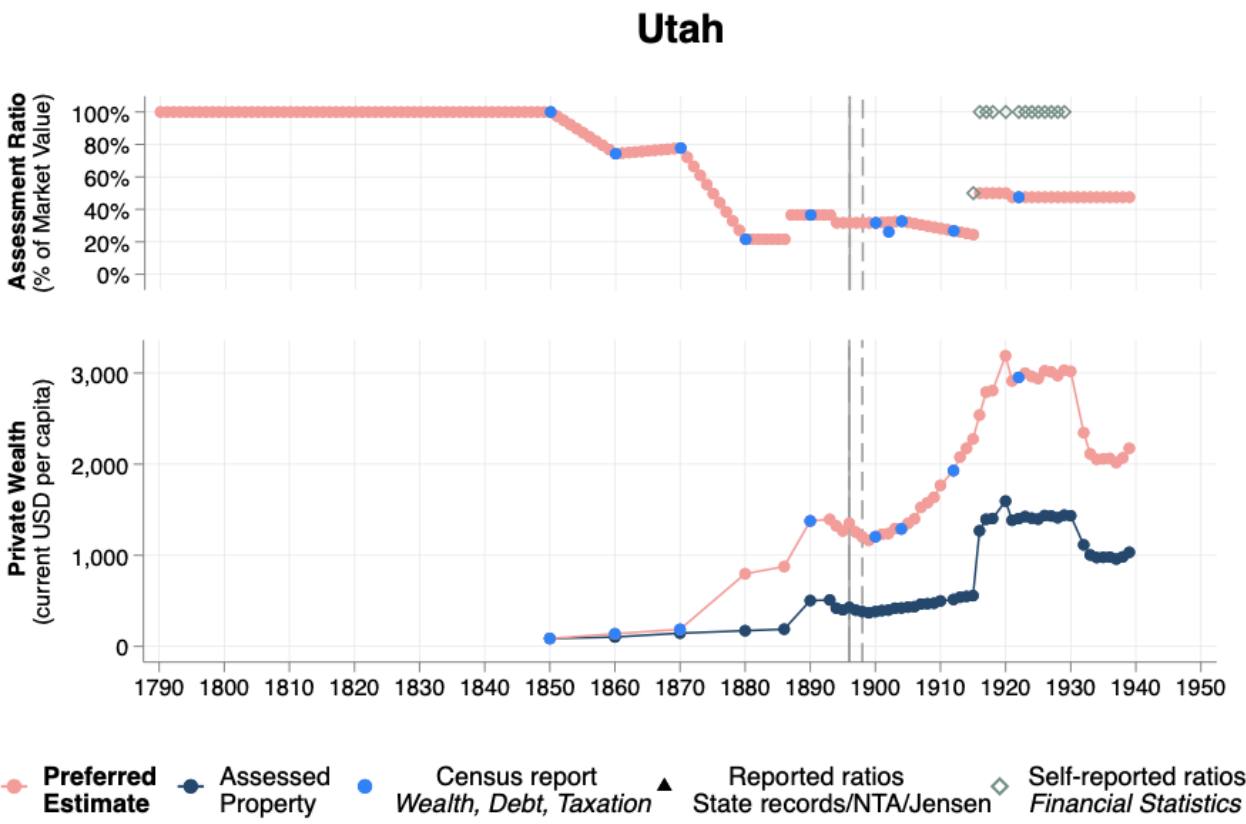
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

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.

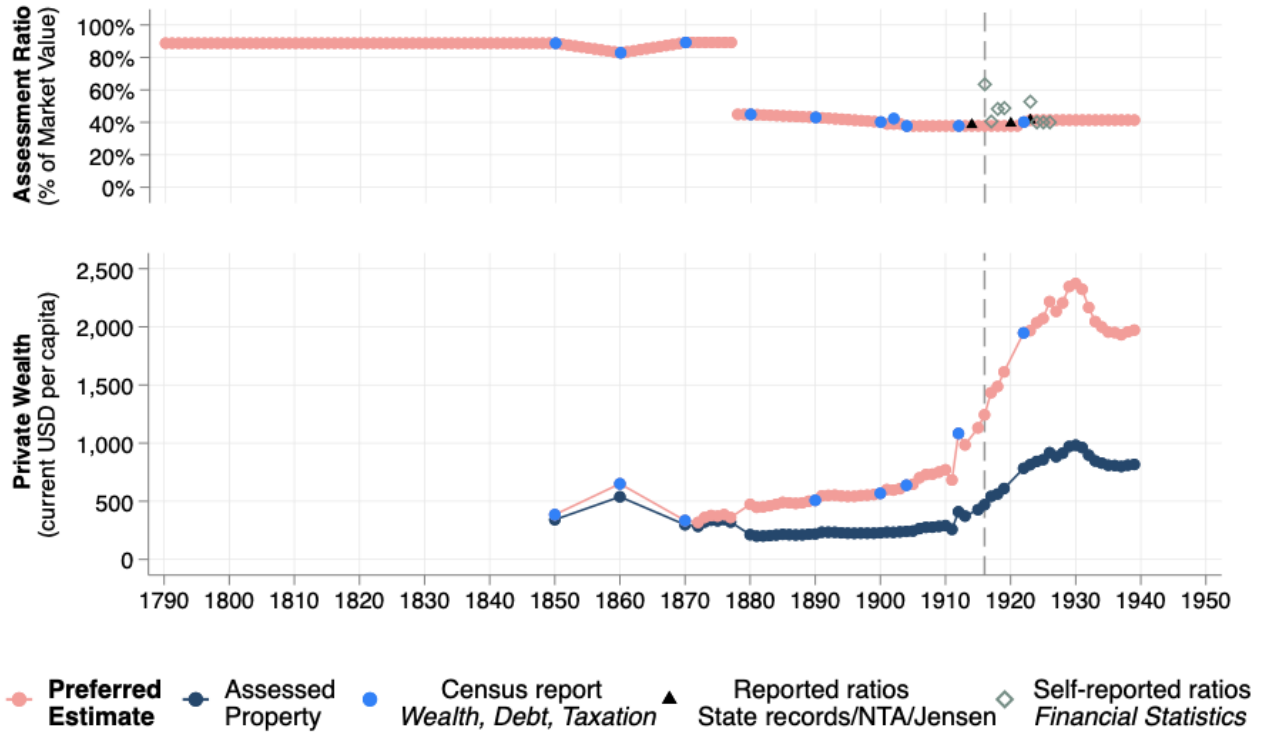
Utah



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.

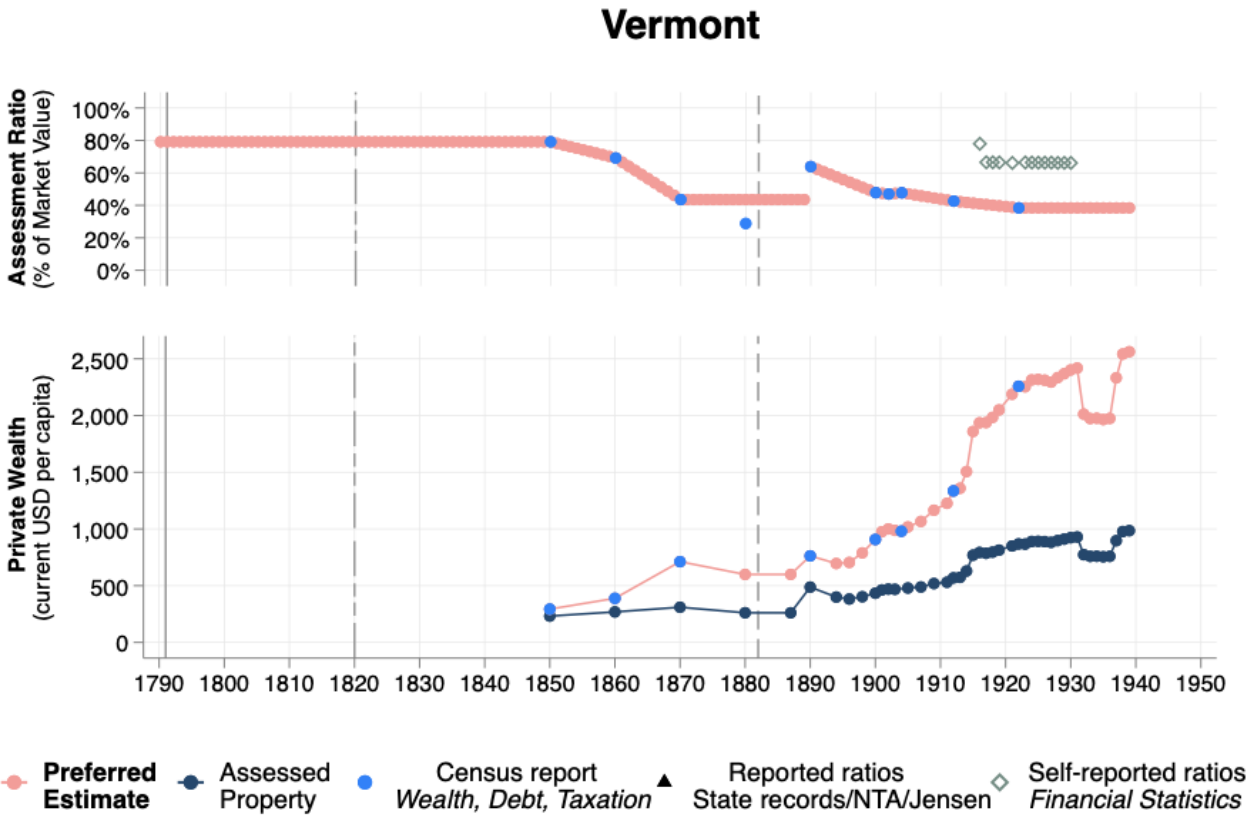
Virginia

Virginia



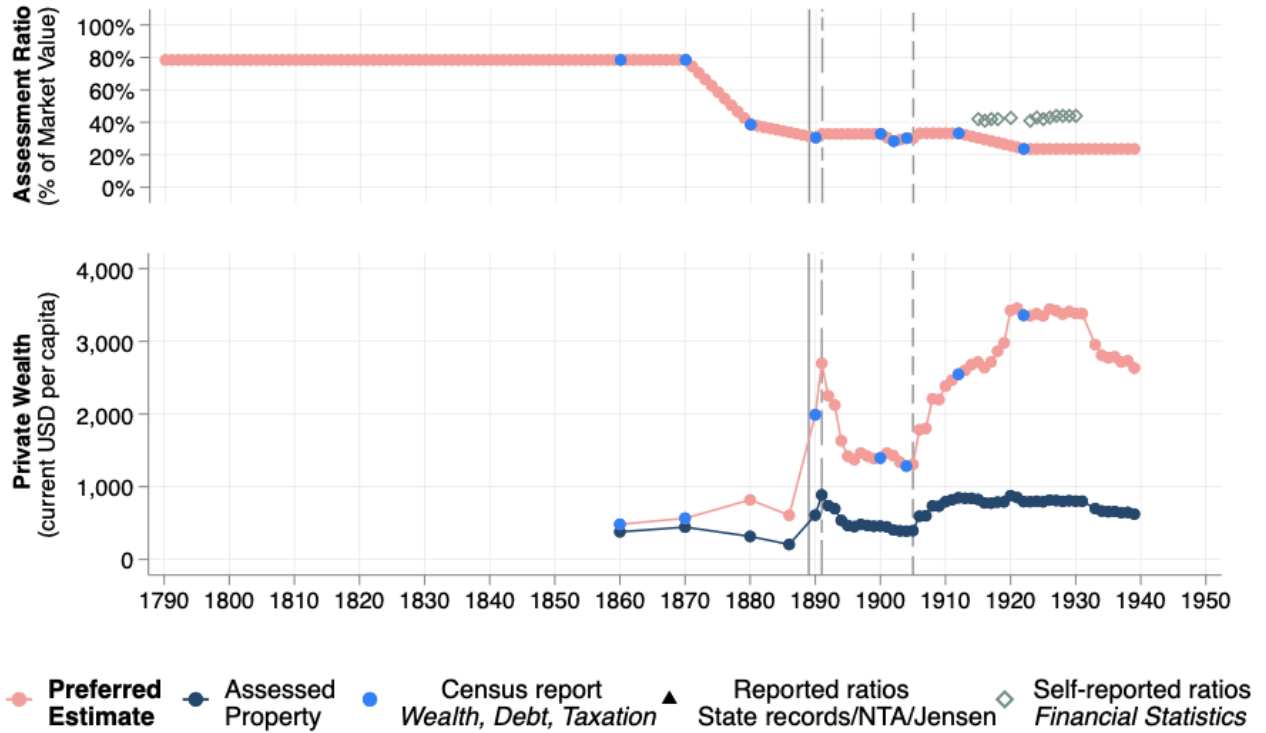
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Vermont



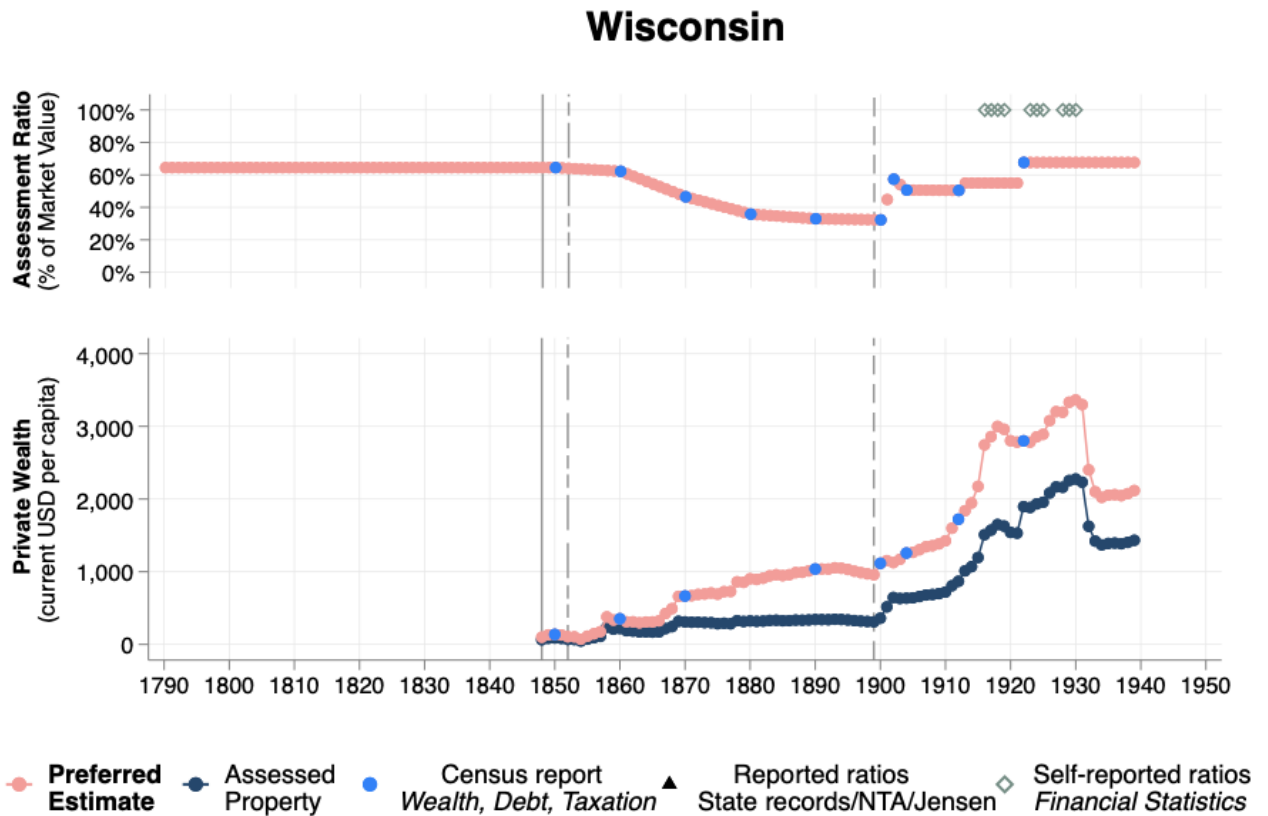
Washington

Washington



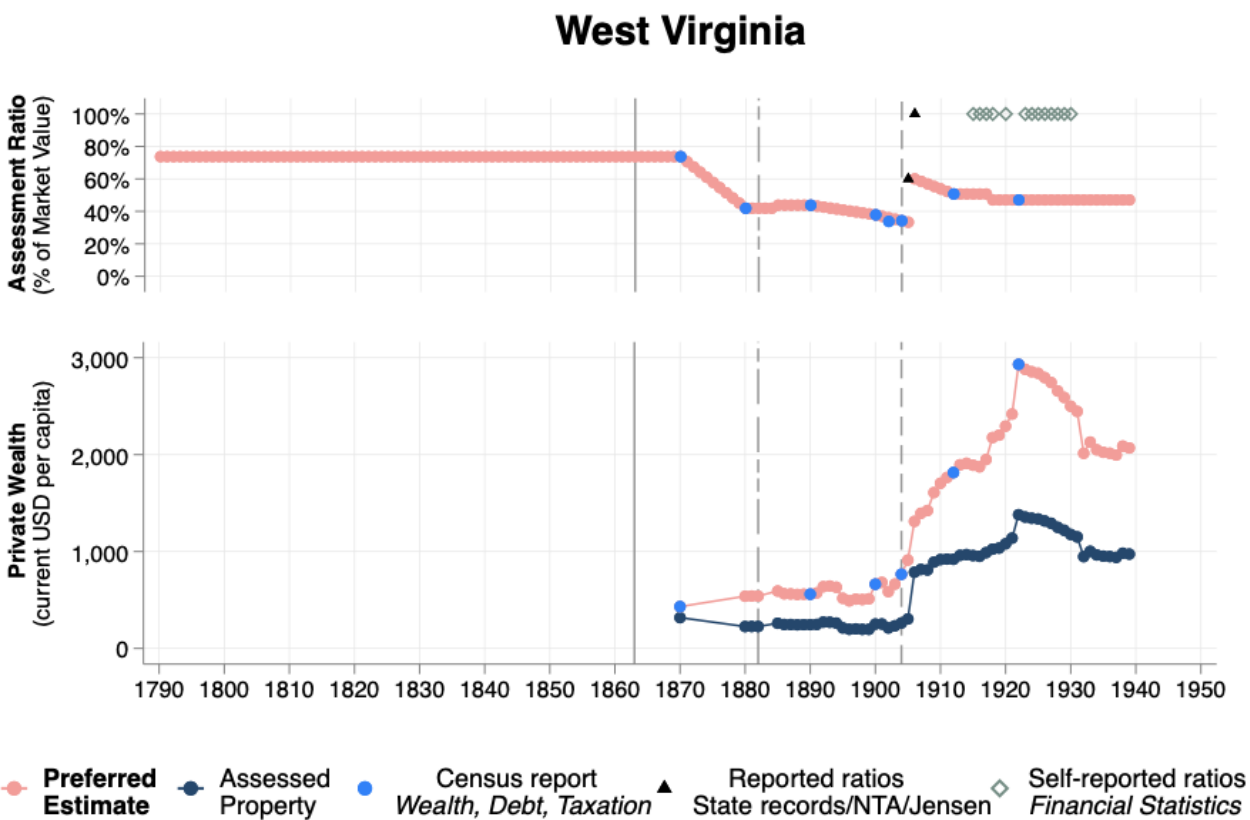
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
Census ratios for 1880 and 1902 are inferred from tax rates.

Wisconsin



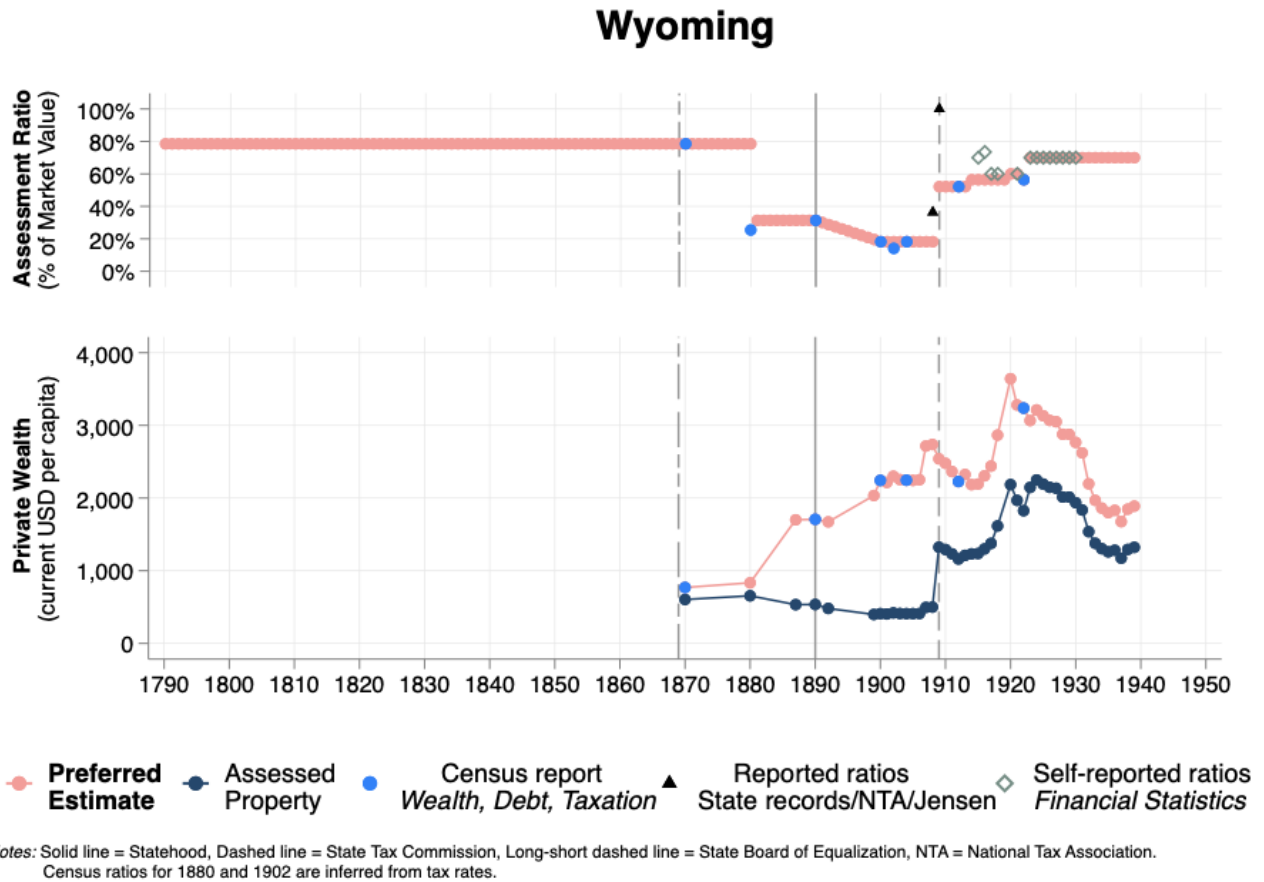
Notes: Solid line = Statehood, Dashed line = State Tax Commission, Long-short dashed line = State Board of Equalization, NTA = National Tax Association.
 Census ratios for 1880 and 1902 are inferred from tax rates.

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



III.4. County Level property data

1870-1930 decadal data. We measure county-level property by using measures of 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. We separately observe real and personal property. As detailed in the 1870 report, both real and personal property values were measured as assessed values used for the purpose of property taxation in State and local governments. There was no harmonisation to account for differences in exemption, assessment practices or differences in what counts as real vs personal property across States. However, these statistics were compiled with great care. For instance, in 1870 the collection of these statistics were devoted to members of the US

marshal service that were specially commissioned for this task, with extensive training and access to all the existing official data available at the time.

For 1870, we have county-level assessment ratios from the Census report on Wealth, Debt, and Taxation¹¹. We can thus compare the state assessment ratios described in Section III.3 to the average county-level assessment ratios. Figure A11 shows that these values are broadly quite similar, so that our assumption of using the state-level assessment ratio for the counties is well-justified.

1850 and 1860 wealth estimation based on Census data. For 1850 and 1860, we obtain county-level wealth data from the Census, as described in Section III.1. In order to have consistency between the county-level data and the state-level data, we rescale county-level wealth by multiplying it by factor (fixed at the state-level) equal to the ratio of state-level wealth to the sum of county-level wealth for each state.

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. City Level property data

Municipal wealth series come from the Census *Annual Financial Statistics of Cities* that compile statistics on assessed property values, tax rates, and assessment ratios from tax assessment records for the largest US cities between 1899 and 1938. Sampled cities had a population above 30,000 for 1899-1931, and above 100,000 for 1932-1938. This corresponds to 311 and 95 cities in 1931 and 1938 respectively. These annual statistics were obtained from municipal records and harmonized by the Census Bureau. Prior to 1899, city tax rates for Baltimore, Boston, and Cincinnati were obtained from Ely (1888).

From the Annual Financial Statistics of Cities, we use available variables on *Government Expenditures*, which contain the total municipal spending in nine general categories (excluding payment for public enterprises, debt interest repayments, and capital expenses). These categories cover all forms of general expenditures by municipalities as reported in their financial records. They are:

1. *General government*: expenditures for the legislative office, executive office, judicial department, elections, and maintenance of government buildings.

¹¹See 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.

2. *Public order*: expenditures for the protection of people and property, which includes the police department, fire department, militia, and register of deeds. It also includes expenses related to correction facilities.
3. *Health*: expenditures for vital statistics, prevention of communicable diseases, conservation of child life, food regulation and inspection, and city hospitals.
4. *Sanitation*: expenditures for sewage disposal, street cleaning, and refuse collection.
5. *Highways*: expenditures for the construction and maintenance of highways, roadways, waterways, and bridges.
6. *Public Assistance* ("Charities"): expenditures for the care of children, the poor, old age assistance, veterans' relief, or public institutions for physical and mental health.
7. *Education*: all expenditures for schools and libraries.
8. *Recreation*: expenditures for recreational facilities, public parks, and trees.
9. *Miscellaneous*: all other expenditures of general natures, including public trust funds.

Second, we also derive from the Annual Financial Statistics records variables related to *Property Tax Enforcement* which is an indicator for the presence of property tax classification, i.e. the use of different tax rates by class of property. Classification was mainly used to better enforce taxation of personal property, which would otherwise tend to avoid taxation.¹² We complement these variables by state-level indicators of enforcement, namely the presence of tax ferrets in the State (officials remunerated for discovering properties avoiding the property tax) from [Parrillo \(2013\)](#), and the presence of a State tax commission (in charge of centralizing and regulating assessment) from [Jensen \(1931\)](#) and [Benson et al. \(1965\)](#).

We also construct three indicator variables corresponding to different levels of the assessment ratio (between 0 and 20%, between 20% and 40%, between 40% and 60%, between 60% and 80%, between 80% and 100% and above 100%) and three variables related to past property net-of-tax rates. For any year t , these are the average net-of-tax rate between i) $t - 10$ and t ; ii) $t - 11$ and $t - 20$; iii) and $t - 21$ and $t - 30$.

¹²We additionally rely on information about the adoption of classification from the Census 1902 Wealth, Debt, Taxation, [Jensen \(1931\)](#), [Benson et al. \(1965\)](#), and the Kansas 1918 Tax Commission (p40).

Municipal tax rates come mainly from the Financial Statistics of Cities (U.S. Census Bureau (1899-1931, 1919, 1921, 1932-1938)) for cities having a population over 30000, but also partly from Ely (1888) for 8 cities. In total, we have data between 1899 and 1940 for 586 cities in 47 states, Puerto Rico, and the District of Columbia.

III.6. Land property data

The assessed values of taxable land at the state level are available in some of the State reports from which we source our assessed property data (see Table A11 and Section III.3), from 1854 to 1938. We corrected this assessed value using the same assessment ratio as for the rest of the property (see Appendix Section III.3.1). In total, we have 602 year-state observations of the value of taxable land, for 19 states.

We construct the share of land in total property at the state level where available and linearly interpolate at the state level. This results in a total of 791 year-state interpolated observations. We also assume a constant share of land in total property at the state level between 1840 and 1860. To construct Figures ?? for all the Union, we compute the average share of land at the national level by taking the average value across states, weighted by their population. We depict the 5-year moving average of the national shares on the figures. Figure ?? (for the South only) proceeds similarly, but only for Southern states.

III.7. National wealth series

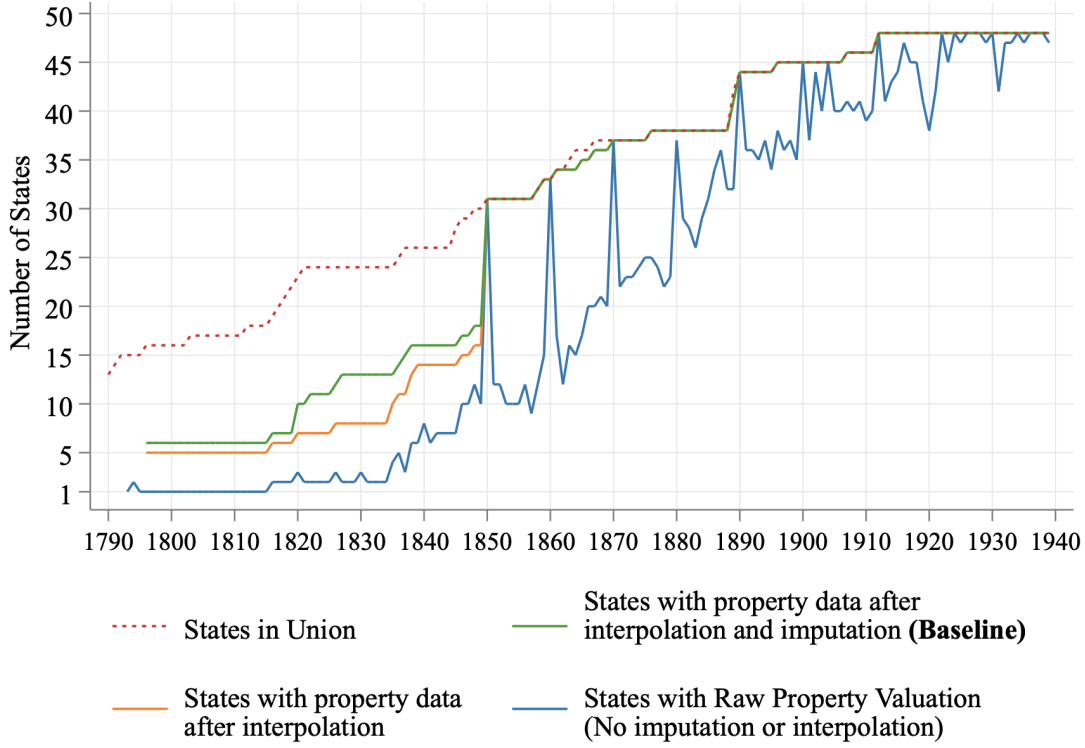
The national wealth series that we constructed is based on the aggregation of state-level wealth series. We explained the construction of these series in Section III.3. It is worth distinguishing the method used before and after 1850.

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 for wealth at the state level can be seen in Figure ?. 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:

Figure A31: 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.

$$\tilde{W}_{it} = \frac{R_{it}}{\tilde{\tau}_{it_{first}}} \quad (4)$$

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.

(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

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

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 A12 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 A12). 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 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 A12. 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 A12 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 ??).

III.8. 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, to which we compare our estimates in Section III.9:

1. **Measures based on individual-level Census questions.** The Census directly asked individuals about the value of 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.9, and use it with some modifications to extend our county-level data to 1860 and 1850 (see Section III.4).
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.9.
3. **Measures of wealth based on national balance sheets data from national accounts.** Such balance sheets information becomes available only in 1916 for the US, so it 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 of 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, and Tennessee for the period 1798-1860.

III.9. Comparison with Other Sources

In this section, we compare our database on wealth to the other historical sources described in Section [III.8](#).

III.9.1. Comparison with the Census of Agriculture Data at the state level

In Figure ??, 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.9.2. Comparison with the IPUMS USA Full Count

At the state level, Figure [A15](#) 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 [A16](#) 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). There are, again, more discrepancies between these two data sources in terms of Personal Wealth rather than real wealth, but there is no clear systematic over- or undervaluation by any of these data. As alluded to

multiple times, the definition of Personal Wealth is not streamlined in the property tax assessments and could vary across and within states. The comparisons by type of wealth are thus much noisier.

III.9.3. [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 durables¹³ (ii) they upgrade household net wealth by 7% for consistency with their post-1945 data. [Kopczuk and Saez \(2004\)](#) estimates also exclude non-transmissible wealth.

III.9.4. [Gallman and Rhode \(2019\)](#)

([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.

¹³They 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).

III.10. Data on Property tax revenues and tax rates

We also collect property tax revenue data from multiple sources.

Figure ?? 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.

We collect the data on revenues 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 different GDP series for the States in the Union at that time:

- For the period 1929 to 2021, we use the US Census Bureau of Economic Analysis GDP series ([U.S. Census Bureau \(2022\)](#))).
- For the period 1879 to 1928, we use the Dincecco-Prado GDP series ([Dincecco, Mark and Prado, Mauricio \(2013\)](#))).

- For the period 1850 to 1878, we use the Lindert and Williamson GDP series (Lindert, Peter and Williamson, Jeffrey (2011), Lindert, Peter and Williamson, Jeffrey (2012) and Lindert, Peter and Williamson, Jeffrey (2016)).

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.

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 control if that estimation 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 ??, the numerator is the levies such as computed for Figure 1. The denominator is the property valuation. In Panel D of Figure ??, the sources are similar to those just described. However, we use the values of total revenues by state, where available.

The sources are similar than the ones used for the Figure 1 above. Here, we are using the values of the total levy broken down by States when the information was indeed available. As mentioned above, in 1850, we had to estimate the values for some States by using the total estimation given in the 1850 Decennial report and the shares of these States in the total levy in 1860.

Because there are missing values for the property valuation and the levies broken down by State, we decided to go with a linear interpolation of both the property valuation and

Table A9: 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														

the levies of the general property tax.

III.11. Data Appendix Tables

Table A10: Overview of wealth data series constructed

Variable	Unit	Period	Frequency	Sample	Sources	Note
Total Private Property	City	1899-1938	Annual	1899-1931: All cities >30,000 population 1932-1938: All cities >100,000 population	<i>Financial Statistics of Cities</i>	$N = 7,026, n = 327, \bar{T} = 21.5$ 139 cities in 1899, 311 cities in 1931, 95 cities in 1938
	County	1860-1930	Decennial	All counties	Census (1860-1870) <i>Wealth, Debt, Taxation</i> (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) <i>Financial Statistics of States</i> (1915-1939)	$N = 4,583, n = 52, \bar{T} = 88.1$
Real Property	City	1899-1938	Annual	1899-1931: All cities >30,000 population 1932-1938: All cities >100,000 population	<i>Financial Statistics of Cities</i>	$N = 6,998, n = 327, \bar{T} = 21.4$ 139 cities in 1899, 311 cities in 1931, 95 cities in 1938
	County	1860, 1870, 1910, 1920, 1930	Decennial	All counties	Census (1860-1870) <i>Wealth, Debt, Taxation</i> (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) <i>Financial Statistics of States</i> (1915-1939)	$N = 2,227, n = 51, \bar{T} = 43.7$
Personal Property	City	1899-1938	Annual	1899-1931: All cities >30,000 population 1932-1938: All cities >100,000 population	<i>Financial Statistics of Cities</i>	$N = 6,453, n = 322, \bar{T} = 20$ 139 cities in 1899, 311 cities in 1931, 95 cities in 1938
	County	1860, 1870, 1910, 1920, 1930	Decennial	All counties	Census (1860-1870) <i>Wealth, Debt, Taxation</i> (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) <i>Financial Statistics of States</i> (1915-1939)	$N = 2,161, n = 51, \bar{T} = 42.4$
Property tax rate	City	1899-1938	Annual	1899-1931: All cities >30,000 population 1932-1938: All cities >100,000 population	<i>Financial Statistics of Cities</i>	$N = 6,963, n = 327, \bar{T} = 21.9$ 139 cities in 1899, 311 cities in 1931, 95 cities in 1938
	County	1870-1930	Decennial	All counties	<i>Wealth, Debt, Taxation</i> (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) <i>Financial Statistics of States</i> (1915-1939)	$N = 2,753, n = 51, \bar{T} = 54$
Assessment ratio	City	1899-1938	Annual	1899-1931: All cities >30,000 population 1932-1938: All cities >100,000 population	<i>Financial Statistics of Cities</i> State reports <i>Wealth, Debt, Taxation</i>	$N = 7,027, n = 327, \bar{T} = 21.5$ 139 cities in 1899, 311 cities in 1931, 95 cities in 1938
	County	1860-1930	Decennial	All counties	State reports <i>Wealth, Debt, Taxation</i>	$N = 23,071, n = 3,368, \bar{T} = 6.7$
	State	1798-1940	Annual	All States + Washington DC and Puerto Rico	State reports <i>Wealth, Debt, Taxation</i>	$N = 5,289, n = 52, \bar{T} = 101.7$

Table A11: 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

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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

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

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

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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)

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

Table A11 continued from previous page

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

Table A11 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.12. Additional variables: geography, weather, occupations, and demographic characteristics

III.12.1. 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](http://worldclim.org)
- Average Maximum July Temperature
 - Unit: Celsius Degrees
 - Source: [WorldClim.org](http://worldclim.org)
- Average January Precipitation
 - Unit: millimeters
 - Source: [WorldClim.org](http://worldclim.org)
- Average July Precipitation
 - Unit: millimeters
 - Source: [WorldClim.org](http://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 millimetres
- 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 if 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. \(2021b\)](#) 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. \(2021b\)](#) and were combined as follows:

- Agriculture (code 100)
- Mining (code 200)
- Production: sum of Manufacturing (code 300), and Non-durable production (code 400)

- Commerce: sum of Transportation (500), Retail/Trade (code 600), Finance (code 700), and B usiness (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.

Presence of oil

- Source: [Michaels \(2011\)](#)
- An oil abundant county is a county located above an oilfield. To match our sample, we only keep counties located above an oilfield in Texas, Oklahoma and Louisiana (N=171)

III.12.2. 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.

Finally, Demographics and Occupation shares are from [Ruggles et al. \(2021b\)](#) and as described for the county level.

III.12.3. City level

Number of patents

- This is a count of patents between 1836 and 1975 in a city-year
- Source: the [Petralia \(2019\)](#) database
- The image recognition technique does not uniquely identify patent information, we construct three counts: counts of unique patents (uniquely identified), minimum and maximum count in a city-year

Railroad Length

- We use a state-year measure of railroad construction
- Source: [Sequeira, Nunn and Qian \(2020\)](#) data
- Unit = kilometer, N = 48 states + DC, T = 15 years from 1830-1921

Demographics

- Percentage of farm households based on Census questions, with the Census identifying a farm if any household contained a member which was a farmer, or if the household lived on a farm¹⁴
- Percent of population engaged in commerce: based on Census question and using the 1950 Census industry classification, denoting Commerce as the sum of Manufacturing (codes 300, 400) Trade (600), Finance (700) Business (800)

¹⁴The definition of farm household used by the Census has evolved over time, see the Census Bureau's definition summarized by IPUMS for the variable entry "farm".

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