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# BROADENING THE STATE:
# POLICY RESPONSES TO THE INTRODUCTION OF THE INCOME TAX

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## ABSTRACT

We present new evidence about a mechanism – the broadening of the tax base – through which governments increase state capacity. Our difference-in-differences identification strategy exploits the staggered introduction of the income tax across twentieth-century US states. We find that tax broadening is associated with 1) a significant increase in total revenues and 2) a significant increase in total government expenditures, and in particular spending on public goods in education and health. We show suggestive evidence that political ideology affects policy responses to the broadening of the tax base.



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# 1 Introduction

The state's capacity to extract revenues and productively spend them matters for economic development (Besley and Persson, 2013, Dincecco and Katz, 2014). Increasing state capacity is important for at least two reasons. First, governments provide the administrative infrastructure that supports a well-functioning market economy: secure property rights, market regulations, and quick and fair legal resolution. Second, governments in developed nations provide public goods including education that can make the economy more productive (Barro, 1990, Goldin and Katz, 2008, Gennaioli, La Porta, Lopez-de-Silanes, and Shleifer, 2013, Ponzetto and Troiano, 2014).

Over the past 200 years, there has been major growth in extractive capacity and public goods provision (Tanzi and Schuknecht, 2000, Lindert, 2004, Besley and Persson, 2013). What underpins this striking trend? History suggests that reducing exemptions and broadening the tax base is key. For example, the elimination of noble tax privileges following the French Revolution (1789-99) was associated with a large increase in the state's ability to tax (Dincecco, 2011). Over the twentieth century, the establishment of the income tax has arguably been the most important part of tax broadening (Wallis, 2000, Besley and Persson, 2013). Still, we lack systematic evidence about the actual fiscal mechanisms through which states become strong. Furthermore, we lack systematic evidence about the consequences for public goods – if any – as extractive capacity increases.

This paper presents new evidence on both fronts. We exploit a novel laboratory: twentieth-century US states. The twentieth-century US well represents the growth of the modern state: the tax-to-GNP ratio increased from 8 percent in 1902 to 38 percent by 1992 (Wallis, 2000).[1] We test the consequences of a major institutional reform – the introduction of the state-level income tax – for revenue and spending outcomes. To perform this analysis, we employ data on per capita state revenues and expenditures between 1902 and 2008.

Institutional change can be endogenous (Aghion, Alesina, and Trebbi, 2004, Greif and Laitin, 2004), which makes it difficult to assess the true consequences of reform. Cross-sectional comparisons between places with different institutions does not allow us to esti-

[1] These data refer to all levels of government (i.e., local, state, and national). For the state level only, this ratio increased from 1 to 9 percent over this period. Novak (2008) highlights the role of state-level governments in long-run US state formation.

mate the treatment effect of interest, because there may be omitted variables that influence the likelihood of change. We employ a difference-in-differences identification strategy that exploits the staggered introduction of the income tax from state to state. Under reasonable assumptions, which we verify for our setting, this strategy enables us to identify the causal effects of broadening the tax base on revenue and expenditure outcomes. Such assumptions do not require that treated and control states resemble each other, but only that their fiscal trends prior to the introduction of the income tax are parallel.

Broadening the tax base does not mechanically imply that government size increases. According to the crowding out hypothesis, reduced reliance on other revenue sources will crowd out the effect of the introduction of a new revenue source, leaving overall government size unchanged. We find that the introduction of the income tax does in fact increase government size. This result runs counter to the crowding out hypothesis. Specifically, we show a positive and significant relationship between the introduction of the income tax and 1) per capita income taxes, 2) per capita total taxes, and 3) per capita total revenues. Our estimates indicate that the introduction of the income tax is associated with a 12-14 percent increase in total revenues. We verify our assumption of parallel trends for treated and control states by showing that fiscal trends prior to the introduction of the income tax are similar.

Furthermore, we show that broadening the tax base has significant policy consequences. We find a positive and significant relationship between the introduction of the income tax and 1) per capita total expenditures, 2) per capita education expenditures, and 3) per capita health expenditures. According to our estimates, the introduction of the income tax is associated with a 10-13 percent increase in total expenditures and a 23-24 percent increase in education expenditures. We verify that fiscal pre-trends do not drive this set of results.

There is evidence that political ideology affects the voting behavior of legislators (e.g., Lee, Moretti, and Butler, 2004). To conclude our analysis, we test the relationship between political ideology and fiscal policy responses. We find that the introduction of the income tax only increases government size under Democratic governors. Republican governors appear to offset any greater tax revenues from income taxation by reducing revenues from other sources. Furthermore, we find that the introduction of the income tax only increases spending on education under Democratic governors. Our evidence suggests that political ideology influences the nature of policy responses to tax broadening.

Our paper presents new evidence about the fiscal mechanisms that form the basis of strong states. Standard economic theory takes the power to tax as given. However, historical accounts indicate that the development of the state's extractive capacity took centuries (Brewer, 1989, Dincecco, 2011, O'Brien, 2011). The results of our study shed new light on an actual mechanism – the introduction of the income tax – through which governments increase extractive and productive capacity. To the best of our knowledge, our paper is the first systematic evaluation of the policy consequences of this historic fiscal reform.

The nature of our empirical laboratory provides a novel way to disentangle the policy responses of fiscal reform from two key potential confounders: warfare and political institutions. The literature on long-run state development highlights the role of warfare (Tilly, 1992, Bates, 2009, Besley and Persson, 2009). Tilly (1992) argues that, to fend off external military threats, governments in history undertook fiscal reforms that enabled them to secure greater and more regular forms of taxation. Scheve and Stasavage (2010, 2012) find a positive and significant cross-country relationship between warfare and progressive taxation over the past two centuries. Aghion, Persson, and Rouzet (2012) link external military threats with government investments in primary education at the cross-country level. Given a national system of military defense, the external threat environment is constant across US states. Furthermore, state-level political institutions are very similar. Thus, our within-country analysis is less vulnerable than the cross-country approach to any omitted variables – beyond those captured by fixed effects – that may bias our estimates.

Our paper also contributes to the literature that analyzes policy responses to fiscal reforms. This literature finds that government spending responds significantly to budgetary institutions and tax enforcement technology (Poterba, 1994, Casaburi and Troiano, 2015). Our paper complements this literature by showing how tax broadening affects public policy.[2]

Finally, our paper relates to the literature that tests the causes (e.g., franchise extension) rather than the consequences of tax reforms (Slemrod, 2005, Aidt and Jensen, 2009, Dharmapala and Hines, 2009).

[2]There is a large literature that explores the relationship between franchise extension and tax and spending outcomes, both at the cross-country level (Lindert, 2004, Aidt, Dutta, and Loukoianova, 2006) and the within-country level (Husted and Kenny, 1997, Lott and Kenny, 1999, Aidt, Daunton, and Dutta, 2010). We contribute to this literature by focusing on the broadening of the fiscal base rather than the voter base.

The paper proceeds as follows. In Section 2, we discuss the data and general trends. In Section 3, we describe the empirical strategy. In Section 4, we present our results. In Section 5, we test the role of politics. Section 6 concludes.

# 2 Data

## 2.1 Income Tax Introduction

Following Wallis (2000), we define the income tax to include individual or corporate income taxes. For more than 60 percent of adopting states, this distinction is immaterial, because individual and corporate income taxes were introduced in the same year. For the remaining states, we define our treatment as the year that the individual income tax was introduced. In the appendix, we show that our results are unchanged if we define our treatment as the year that the corporate income tax was introduced.[3]

Table 1 describes the introduction of the income tax by states over time according to Penniman (1980).[4] The first state to introduce the individual income tax was Wisconsin in 1911. Seven more states introduced individual income tax laws over the 1910s, followed by five states over the 1920s, and eighteen states over the 1930s. No states introduced the individual income tax over the 1940s, while two states introduced it over the 1950s, eight states over the 1960s, and four states over the 1970s. Six states (Florida, Nevada, South Dakota, Texas, Washington, and Wyoming) never introduced an individual income tax.[5]

Once states introduce the individual income tax, they typically retain it.[6] There are only two cases where states have repealed or fundamentally changed the income tax. Alaska had an income tax when it became a state in 1959, but repealed it in 1980. Connecticut introduced a progressive income tax in 1991; from 1969 to 1990, the state only taxed interest

[3]Penniman (1980) defines two types of corporate income tax: the net income tax and the excise or franchise tax. We always date the corporate income tax that is introduced first, regardless of type.

[4]We use administrative data to extend Penniman's account from 1980 to 2008.

[5]Two states (New Hampshire and Tennessee) have individual income taxes that only tax interest and dividends. The individual income tax in Connecticut was of this type between 1969-1990. We define these states as having individual income taxes. However, defining them as having no individual income tax and re-running our regression analysis does not change our results.

[6]Most state income taxes are progressive. Some states (e.g., Indiana, Michigan, Pennsylvania) use flat-rate income taxes. Occasionally, states adjust income tax rates. Many states use income tax withholding (Dusek, 2006).

and dividends.[7]

## 2.2 Fiscal Data

We use census data on state-level revenues and expenditures that span the whole twentieth century and the start of the twenty-first century. The first census data are for 1902 (US Department of Commerce, 1907). The 1902 census was the first to attempt to collect complete fiscal information (Wallis, 2000). Prior to this census, the Bureau of the Census did not collect data on revenues (as opposed to taxes) or expenditures. Follow-up census data for state-level fiscal activity are available for 1903, 1913, 1922, 1931, and 1932 (US Department of Commerce, 1915, 1924, 1935).[8] Census data are available online every two years from 1942 to 1950 and annually from 1950 onward (US Department of Commerce, 2015). The result is an unbalanced panel that covers all 50 states between 1902 and 2008.[9]

We focus on the main public finance outcomes in the census data, which we select according to two criteria. First, to investigate the total effect of our treatment on state finances, we use total revenues and expenditures. Second, we include individual fiscal outcomes that we can match across different censuses, which do not always follow the same accounting procedures. On the revenue side, we focus on 1) income tax revenues, 2) property tax revenues, 3) total tax revenues, and (4) total revenues. On the expenditure side, we focus on 1) total expenditures, 2) education expenditures, 3) health expenditures, and 4) public safety expenditures.

Table 2 displays the summary statistics for our variables. The public finance variables are in logarithms in real (2008) dollars per capita.

[7] Once introduced, the corporate income tax is also generally stable. Only two states have repealed or fundamentally changed this tax. Michigan introduced a corporate income tax in 1967, but repealed it in 1975; this tax was re-introduced in 2011 (after our sample period ends). Similarly, Ohio introduced a corporate income tax in 1971, but repealed it in 2005.

[8] Expenditure data are not available for 1922.

[9] We exclude Washington DC from our analysis, even though census data are available, because it is not a state.

# 3 Empirical Strategy

To estimate the policy responses to the introduction of the income tax, we use a difference-in-differences identification strategy. We base this strategy on the staggered introduction of the income tax across states. Our rationale for identification is that the introduction of the income tax constitutes a plausibly exogenous shock – arguably related to idiosyncratic political factors, and not systematically correlated with other policy changes (Penniman, 1980, ch. 1) – to the breadth of the statutory tax base in a given state.

Our baseline specification is:

$$Y_{it} = \beta_0 + \beta_1 Post_{is} + \phi_i + \phi_t + \epsilon_{ist}. \tag{1}$$

The dependent variables are public finance outcomes (revenues and expenditures) in state $i$ and year $t$ in real per capita terms. All dependent variables are in logarithms. The dummy variable *Post* is equal to one after the introduction of the income tax in year $s$, which differs across states. We define *Post* as the year that the individual income tax is introduced, which in most states overlaps with the year that the corporate income tax is introduced.[10] The state fixed effects $\phi_i$ control for state-specific differences in geographical features, innate "preferences" for government programs, and institutional structures. The year fixed effects $\phi_t$ control for time-varying changes in the relative prices of government services, national economic conditions, "tastes" for federal government programs, and other year-specific shocks. The standard errors $\epsilon_{ist}$ are robust to heteroskedasticity and are clustered at the state level. The coefficient of interest $\beta_1$ captures the causal effect of tax broadening on fiscal policies under plausible assumptions.

A potential challenge to our identification strategy is that the adoption of the income tax may be correlated with past fiscal trends. For example, a state may decide to introduce the income tax in the face of greater budgetary demands. If this is the case, then our identifying assumptions will be violated. Our setting enables us to verify just how relevant this concern is. If broadening the tax base is actually exogenous to past fiscal policy choices, then we would expect fiscal pre-trends in treated and control states to be parallel before the intro-

[10] In the Appendix, we report the results when we define *Post* as the first year that either the individual income tax or the corporate income tax is introduced (we label this variable "Post Income Tax 2"). The results are virtually unchanged.

duction of the income tax and to diverge only after our treatment. We verify our identifying assumptions ahead.

Another potential challenge is that the introduction of the income tax may be systematically correlated with other contemporaneous changes to state policies. If so, then contemporaneous policy changes, and not the adoption of the income tax itself, may be responsible for any policy responses after adoption. However, Penniman (1980, ch. 1) suggests that the introduction of the state-level income tax was largely a function of idiosyncratic political factors, and uncorrelated with other contemporaneous policy changes.

Finally, tax broadening does not necessarily imply that any change to status quo fiscal policies will result. According to the crowding out hypothesis, a state government can broaden the tax base but still leave total revenues unchanged (or even reduced) by decreasing other current tax rates.

# 4 Main Results

We present our results for state revenues and expenditures for two types of specifications. The first specification is Equation 1, our baseline, which we present in Panel A of the following tables. To control for fiscal pre-trends, the second specification adds state-specific linear time trends to the baseline equation. Panel B of the following tables presents the results for this specification.

## 4.1 State Revenues

In Table 3, we consider the effect of broadening the tax base on state revenues. Column 1 reports the effect of tax broadening on income tax revenue. We can think of this specification as our "first stage": in order to show that the introduction of the income tax increases government size, we must first show that it fact increases income tax revenue. There is a positive relationship between tax broadening and income taxation, significant at the 1 percent level.

Column 2 reports the effect of the introduction of the income tax on revenues from property taxation. There is no significant relationship between tax broadening and property taxation. This result suggests that the adoption of the income tax did not crowd out other

tax revenue sources.

Similarly, Column 3 reports the effect on total tax revenue. We find that the introduction of the income tax is associated with a 17 percent increase in total tax revenue. The coefficient on $\beta_1$ is highly significant. This result indicates that – at least on on average – state governments did not offset broadening the tax base with reductions in other forms of taxation.

Column 4 reports one of our main results: broadening the tax base increases total state revenues by 14 percent. Relative to the previous results, this result indicates that the introduction of the income tax did not just increase revenue from income taxation or total taxation, but actually led to greater government size overall.

The similarities in magnitude and significance of the coefficients across Panels A and B suggest that pre-existing linear trends in state budgets do not drive our results. However, it is still possible that non-linear trends are relevant. To rule out this concern, Figure 1 plots the fiscal pre-trends. As expected, we see clear trend breaks for the revenue variables (income tax, total tax, total revenues) after the introduction of the income tax, and parallel trends before the treatment. This figure provides further support for our identifying assumptions.[11]

## 4.2 State Expenditures

Table 4 considers the corresponding effect of broadening the tax base on state expenditures. Column 1 reports the effect of tax broadening on total state spending. There is a significant relationship between the introduction of the income tax and government spending, which increases total state expenditures by 13 percent. Reassuringly, the magnitude of this coefficient corresponds well with the estimate for total revenues (column 4 of Table 3).

Columns 2-4 break down this increase by spending categories. The introduction of the income tax has the largest effect for education spending (column 2): broadening the tax base is associated with a 25 percent increase in education expenditures. This effect is highly significant. This result suggests that tax broadening led to the greater provision of productivity-enhancing public goods (Barro, 1990, Goldin and Katz, 2008). Column 3 reports the effect of the introduction of the income tax on health spending. This effect is also large, though not

[11] Our identifying assumptions do not require that treated and control states resemble each other, but only that their fiscal trends prior to the introduction of the income tax are parallel. Interestingly, we find that states that adopt the income tax have lower average revenues prior to the treatment compared to non-adopting states around the same time.

as big as the effect for education. Tax broadening is associated with a 13 percent increase in health expenditures, significant at the 10 percent level. Column 4 reports the results for public safety expenditures. Unlike for education or health spending, the introduction of the income tax has no significant effect on average spending on this type of public good.

Finally, the similarities in magnitude and significance of the coefficients in Panels A and B, along with the pre-trends plotted in Figure 2, provide support for our identifying assumptions.

# 5 The Politics of Tax Broadening

Party affiliation matters for the types of public policies that are implemented (e.g., Lee, Moretti, and Butler, 2004). Motivated by this evidence, we ask how politics affects our main results. As a simple and intuitive proxy for the political stripe of states, we use the governor's party affiliation at the time of the introduction of the income tax.

We estimate the following equation:

$$Y_{it} = \beta_0 + \beta_1 Post_{is} + \beta_2 Post_{is} * Democrat_{is} + \phi_i + \phi_t + \epsilon_{ist}, \quad (2)$$

where $Democrat_{is}$ equals one if there was a Democratic governor in office in state $i$ in the year $s$ that the income tax is introduced, and zero otherwise. Sixty-six percent of states have Democrat governors at the time of this institutional reform (Table 2). The other variables are defined as in Equation 1.

Table 5 presents the results of this analysis for state revenues. The introduction of the income tax increases total tax revenues in all states (column 3), but only increases total state revenues in Democratic states (column 4). This result suggests that whether tax broadening leads to larger government depends on the political ideology and policy goals of the government in office. Republican states appear to offset any potential increase in revenue from income taxation with a reduction in revenues from other tax and non-tax sources. Put differently, the validity of the crowding out hypothesis seems to be party-specific. Given that the political ideology of states at the time of the introduction of the income tax is not randomly assigned, we are careful not to interpret these estimates as causal. Still, it is reassuring that

these estimates are robust to fixed effects for states and years.

Table 6 presents the corresponding results for state expenditures. Consistent with the previous set of findings, total expenditures (column 1) and education expenditures (column 2) only increase after the introduction of the income tax in Democratic states. Furthermore, once we distinguish between states by political stripe, we find that Democratic states significantly increase spending on public safety, but that Republican states significantly reduce it (column 4).

# 6 Conclusion

The state's capacity to extract revenues and provide public goods matters for economic development. In this paper, we present new evidence about an actual mechanism – broadening the tax base – through which states become strong. We test the policy consequences of a major institutional reform in recent fiscal history: the twentieth-century introduction of the income tax by US states. Our difference-in-differences identification strategy exploits the staggered introduction of the income tax across states. Under reasonable assumptions, we can thus identify the causal effects of tax broadening on state revenue and expenditure outcomes.

Our main results are two-fold. First, we find that the introduction of the income tax is associated with a significant increase in total revenues, largely driven by an increase in revenues from taxation. Our results thus run counter to the hypothesis that a new revenue source will crowd out (the sum of all) other revenue sources. Second, we find that the introduction of the income tax is associated with a significant increase in government expenditures, and in particular spending on public goods in education and health. We verify that the assumptions of the difference-in-differences identification strategy hold in our setting.

Politics appears to influence the fiscal consequences of tax broadening. We find that the introduction of the income tax only leads to greater extractive capacity and higher spending on public goods in Democratic states. These results suggest that there is an important link between political ideology and the nature of policy responses to tax broadening. They also suggest that the validity of the crowding out hypothesis may be party-specific.

Our results offer several directions for future research. One direction is to study the

policy responses of tax broadening through means other than income taxation. Another direction is to further analyze our results about political ideology and the development of state capacity. Identifying precise mechanisms through which political ideology affects the state's extractive and productive capacity is an important but under-explored topic. We view this paper as a first step in this analysis.

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Table 1: Introduction of State-Level Income Tax

| State | Individual | Corporate |
|---|---|---|
| Wisconsin | 1911 | 1911 |
| Mississippi | 1912 | 1921 |
| Oklahoma | 1915 | 1931 |
| Massachusetts | 1916 | 1919 |
| Delaware | 1917 | 1957 |
| Missouri | 1917 | 1917 |
| New York | 1919 | 1917 |
| North Dakota | 1919 | 1919 |
| North Carolina | 1921 | 1921 |
| South Carolina | 1922 | 1922 |
| New Hampshire | 1923 | 1970 |
| Arkansas | 1929 | 1929 |
| Georgia | 1929 | 1929 |
| Oregon | 1930 | 1929 |
| Idaho | 1931 | 1931 |
| Tennessee | 1931 | 1923 |
| Utah | 1931 | 1931 |
| Vermont | 1931 | 1931 |
| Alabama | 1933 | 1933 |
| Arizona | 1933 | 1933 |
| Kansas | 1933 | 1933 |
| Minnesota | 1933 | 1933 |
| Montana | 1933 | 1917 |
| New Mexico | 1933 | 1933 |
| Iowa | 1934 | 1934 |
| Louisiana | 1934 | 1934 |
| California | 1935 | 1929 |
| Kentucky | 1936 | 1936 |
| Colorado | 1937 | 1937 |
| Maryland | 1937 | 1937 |
| Washington DC | 1939 | 1939 |
| Alaska | 1959-80 | 1959 |
| Hawaii | 1959 | 1959 |
| Virginia | 1961 | 1915 |
| West Virginia | 1961 | 1967 |
| Indiana | 1963 | 1963 |
| Michigan | 1967 | 1967-75 |
| Nebraska | 1967 | 1967 |
| Connecticut | 1969 | 1915 |
| Illinois | 1969 | 1969 |
| Maine | 1969 | 1969 |
| Ohio | 1971 | 1971-2005 |
| Pennsylvania | 1971 | 1935 |
| Rhode Island | 1971 | 1947 |
| New Jersey | 1976 | 1958 |
| Florida | None | 1971 |
| Nevada | None | None |
| South Dakota | None | None |
| Texas | None | None |
| Washington | None | None |
| Wyoming | None | None |

Source: Penniman (1980) for 1902-1980. We use administrative data to extend this source for 1980-2008.

Table 2: Summary Statistics

| | Mean | Std Dev | Min | Max | Obs |
|---|---|---|---|---|---|
| *General* | | | | | |
| Population (1000s) | 4128.80 | 4725.24 | 49.00 | 36580.00 | 3527 |
| Consumer Price Index | 78.03 | 62.00 | 8.34 | 211.08 | 3544 |
| Price Deflator | 0.37 | 0.29 | 0.04 | 1.00 | 3544 |
| Post Income Tax | 0.73 | 0.44 | 0.00 | 1.00 | 3544 |
| Post Income Tax 2 | 0.75 | 0.43 | 0.00 | 1.00 | 3544 |
| Democrat | 0.66 | 0.48 | 0.00 | 1.00 | 44 |
| *Public Finance Outcomes (log)* | | | | | |
| Total Income Taxes | 5.68 | 1.47 | −4.32 | 8.56 | 2859 |
| Total Taxes | 6.93 | 0.99 | 2.67 | 9.51 | 3478 |
| Property Tax Revenues | 2.58 | 2.24 | −7.44 | 8.21 | 3047 |
| Total Revenues | 7.67 | 1.09 | 2.85 | 10.30 | 3429 |
| Education Expenditures | 6.40 | 1.18 | −0.76 | 8.37 | 3427 |
| Public Safety Expenditures | 4.01 | 1.29 | −6.36 | 7.66 | 3426 |
| Health Expenditures | 3.71 | 1.57 | −5.74 | 6.83 | 3172 |
| Total Expenditures | 7.61 | 1.08 | 2.44 | 9.83 | 3427 |
| *Public Finance Outcomes (nominal)* | | | | | |
| Total Income Taxes | 462.74 | 490.33 | 0.00 | 5235.59 | 3379 |
| Total Taxes | 1433.42 | 1062.15 | 14.45 | 13447.59 | 3478 |
| Property Tax Revenues | 63.96 | 211.62 | 0.00 | 3668.79 | 3478 |
| Total Revenues | 3211.15 | 2668.89 | 17.30 | 29797.37 | 3429 |
| Education Expenditures | 925.84 | 651.61 | 0.47 | 4300.75 | 3427 |
| Public Safety Expenditures | 105.73 | 168.65 | 0.00 | 2112.83 | 3426 |
| Health Expenditures | 80.77 | 95.05 | 0.00 | 925.38 | 3413 |
| Total Expenditures | 2976.77 | 2290.77 | 11.46 | 18615.11 | 3427 |

*Notes*: Public finance outcomes in logs use real (2008) dollars.

Table 3: Effects of Individual Income Tax Implementation on State Revenues

| *Panel A: State-specific Linear Time Trends Excluded* | (1) Income Tax Revenue | (2) Property Tax Revenue | (3) Total Tax Revenue | (4) Total Revenue |
|---|---|---|---|---|
| Post Income Tax | 0.755*** | 0.0433 | 0.174*** | 0.141*** |
| | (0.2618) | (0.4789) | (0.0445) | (0.0459) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.921 | 0.594 | 0.969 | 0.980 |
| Observations | 2859 | 3047 | 3478 | 3429 |
| *Panel B: State-specific Linear Time Trends Included* | Income Tax Revenue | Property Tax Revenue | Total Tax Revenue | Total Revenue |
| Post Income Tax | 0.938*** | 0.473 | 0.183*** | 0.119** |
| | (0.3145) | (0.3962) | (0.0519) | (0.0470) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.942 | 0.726 | 0.977 | 0.987 |
| Observations | 2859 | 3047 | 3478 | 3429 |

*Notes*: Standard errors are in parentheses. Estimates are obtained by OLS, using an indicator variable that takes the value 1 after a state introduces an individual income tax. Heteroskedasticity-robust standard errors are clustered at the state level. Sample covers years 1902-2008. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Effects of Individual Income Tax Implementation on State Expenditures

| *Panel A: State-specific Linear Time Trends Excluded* | (1) Total Expend. | (2) Education Expend. | (3) Health Expend. | (4) Public Safety Expend. |
|---|---|---|---|---|
| Post Income Tax | 0.127*** | 0.246*** | 0.129* | −0.0746 |
| | (0.0471) | (0.0715) | (0.0758) | (0.0669) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.980 | 0.966 | 0.942 | 0.936 |
| Observations | 3427 | 3427 | 3172 | 3426 |
| *Panel B: State-specific Linear Time Trends Included* | Total Expend. | Education Expend. | Health Expend. | Public Safety Expend. |
| Post Income Tax | 0.0929* | 0.234*** | 0.149* | 0.0965 |
| | (0.0516) | (0.0812) | (0.0843) | (0.0802) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.986 | 0.976 | 0.955 | 0.961 |
| Observations | 3427 | 3427 | 3172 | 3426 |

*Notes*: Standard errors are in parentheses. Estimates are obtained by OLS, using an indicator variable that takes the value 1 after a state introduces an individual income tax. Heteroskedasticity-robust standard errors are clustered at the state level. Sample covers years 1902-2008. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Heterogeneous Effects of Individual Income Tax Implementation on State Revenues – Political Stripe

| | (1) Income Tax Revenue | (2) Property Tax Revenue | (3) Total Tax Revenue | (4) Total Revenue |
|---|---|---|---|---|
| Post Income Tax | 0.304 | 0.991 | 0.126* | 0.0320 |
| | (0.2119) | (0.9041) | (0.0635) | (0.0600) |
| Post Income Tax*Democrat | 0.528** | −1.149 | 0.0510 | 0.111* |
| | (0.2455) | (0.8429) | (0.0686) | (0.0615) |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.900 | 0.126 | 0.967 | 0.981 |
| Observations | 2692 | 2641 | 3004 | 2962 |

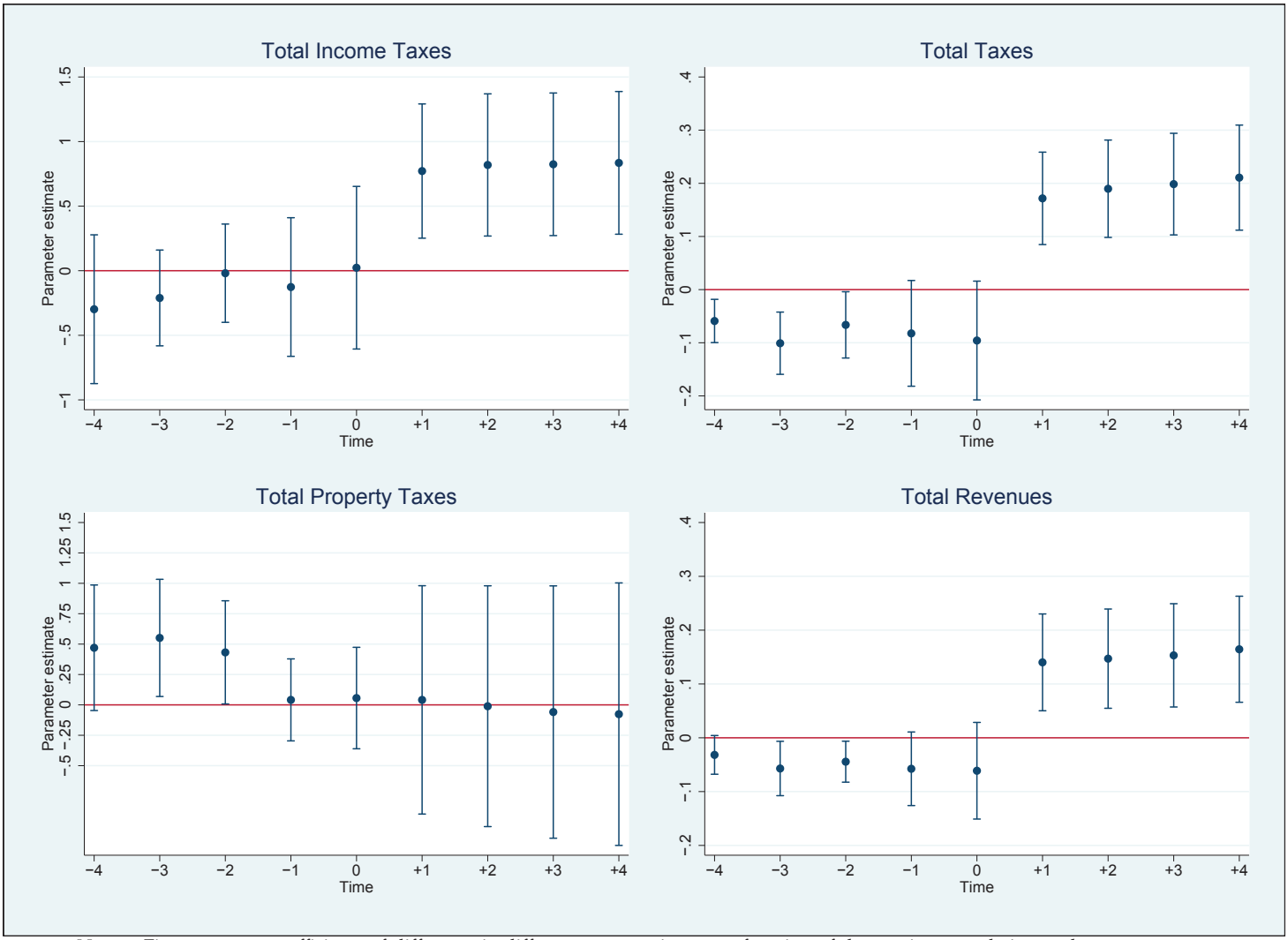
*Notes*: Standard errors are in parentheses. Estimates are obtained by OLS, using an indicator variable that takes the value 1 after a state introduces an individual income tax. Political stripe variable takes the value 1 if the adopting governor was a Democrat and the value 0 otherwise. Heteroskedasticity-robust standard errors are clustered at the state level. Sample covers years 1902-2008. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Heterogeneous Effects of Individual Income Tax Implementation on State Expend. – Political Stripe

| | (1) Total Expend. | (2) Education Expend. | (3) Health Expend. | (4) Public Safety Expend. |
|---|---|---|---|---|
| Post Income Tax | 0.0269 | 0.0375 | −0.0207 | −0.293** |
| | (0.0656) | (0.1018) | (0.1557) | (0.1263) |
| Post Income Tax*Democrat | 0.112* | 0.247** | 0.241 | 0.377** |
| | (0.0665) | (0.1078) | (0.1817) | (0.1475) |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.980 | 0.965 | 0.938 | 0.926 |
| Observations | 2960 | 2960 | 2740 | 2960 |

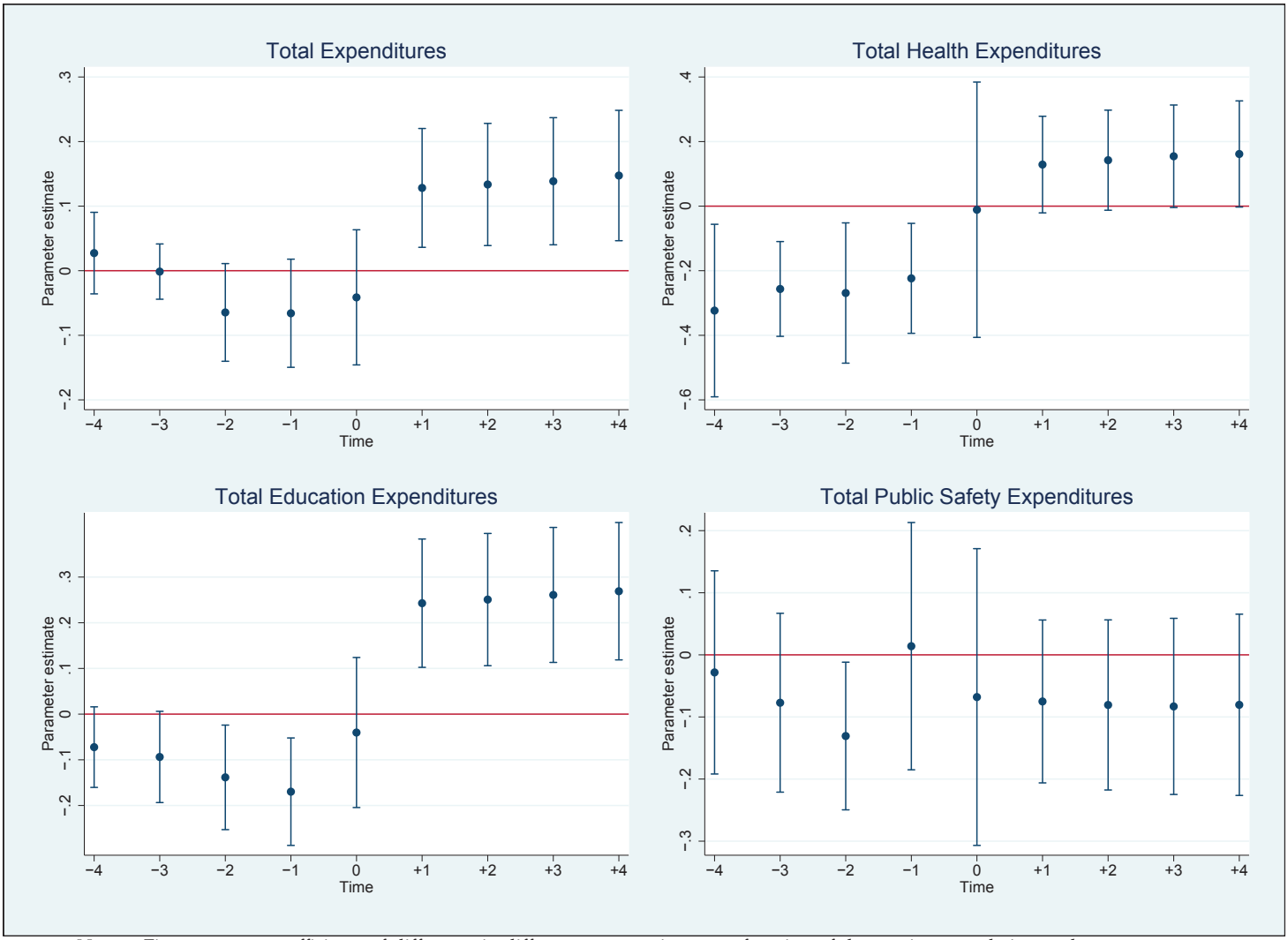
*Notes*: Standard errors are in parentheses. Estimates are obtained by OLS, using an indicator variable that takes the value 1 after a state introduces an individual income tax. Political stripe variable takes the value 1 if the adopting governor was a Democrat and the value 0 otherwise. Heteroskedasticity-robust standard errors are clustered at the state level. Sample covers years 1902-2008. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 1: Time Evolution of Revenue Point Estimates




**Notes.** Figures report coefficients of difference-in-differences regressions as a function of the x-axis year relative to the pre-treatment period. On the x-axis, time is ranked based on the year relative to the introduction of the income tax. Regressions include state and year fixed effects. For each time rank (two-year period), we report the point estimate and the 95% confidence interval.

Figure 2: Time Evolution of Expenditure Point Estimates




**Notes.** Figures report coefficients of difference-in-differences regressions as a function of the x-axis year relative to the pre-treatment period. On the x-axis, time is ranked based on the year relative to the introduction of the income tax. Regressions include state and year fixed effects. For each time rank (two-year period), we report the point estimate and the 95% confidence interval.

# Appendix Tables

Table A1: Effects of Either Corporate or Individual Income Tax Implementation on State Revenues

| *Panel A: State-specific Linear Time Trends Excluded* | (1) Income Tax Revenue | (2) Property Tax Revenue | (3) Total Tax Revenue | (4) Total Revenue |
|---|---|---|---|---|
| Post Income Tax 2 | 1.033** | −0.127 | 0.168*** | 0.141*** |
| | (0.4289) | (0.4821) | (0.0501) | (0.0493) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.922 | 0.594 | 0.969 | 0.980 |
| Observations | 2859 | 3047 | 3478 | 3429 |
| *Panel B: State-specific Linear Time Trends Included* | Income Tax Revenue | Property Tax Revenue | Total Tax Revenue | Total Revenue |
| Post Income Tax 2 | 1.131** | 0.249 | 0.170*** | 0.110** |
| | (0.4871) | (0.3978) | (0.0585) | (0.0502) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.942 | 0.725 | 0.977 | 0.987 |
| Observations | 2859 | 3047 | 3478 | 3429 |

*Notes*: Standard errors are in parentheses. Estimates are obtained by OLS, using an indicator variable that takes the value 1 after a state introduces either a corporate or an individual income tax. Heteroskedasticity-robust standard errors are clustered at the state level. Sample covers years 1902-2008. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

Table A2: Effects of Either Corporate or Individual Income Tax Implementation on State Expenditures

| *Panel A: State-specific Linear Time Trends Excluded* | (1) Total Expend. | (2) Education Expend. | (3) Health Expend. | (4) Public Safety Expend. |
|---|---|---|---|---|
| Post Income Tax 2 | $0.131^{**}$ | $0.246^{***}$ | $0.164^{**}$ | $-0.135^{*}$ |
| | (0.0503) | (0.0758) | (0.0815) | (0.0720) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.980 | 0.966 | 0.942 | 0.936 |
| Observations | 3427 | 3427 | 3172 | 3426 |
| *Panel B: State-specific Linear Time Trends Included* | Total Expend. | Education Expend. | Health Expend. | Public Safety Expend. |
| Post Income Tax 2 | 0.0887 | $0.237^{***}$ | $0.178^{**}$ | 0.0375 |
| | (0.0546) | (0.0879) | (0.0881) | (0.0806) |
| State Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| Year Fixed Effects | *Yes* | *Yes* | *Yes* | *Yes* |
| $R^2$ | 0.986 | 0.976 | 0.955 | 0.961 |
| Observations | 3427 | 3427 | 3172 | 3426 |

*Notes*: Standard errors are in parentheses. Estimates are obtained by OLS, using an indicator variable that takes the value 1 after a state introduces either a corporate or an individual income tax. Heteroskedasticity-robust standard errors are clustered at the state level. Sample covers years 1902-2008. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$