Online Appendix for "The Introduction of the Income Tax, Fiscal Capacity, and Migration: Evidence from U.S. States"

Traviss Cassidy* Mark Dincecco† Ugo Antonio Troiano‡

*University of Alabama; tmcassidy@cba.ua.edu

†University of Michigan; dincecco@umich.edu

‡University of California Riverside; troiano@ugotroiano.org. Previous publications by this author have appeared as "Ugo Troiano."

Appendix A Data

A.1 Years of Introduction of Income Tax

Table A.1: Year of Introduction of State-Level Income Tax

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

Notes: This table reports the years in which (continental) U.S. states introduced the income tax (individual and/or corporate). The source for 1900-1980 is Penniman (1980, p. 2). We use the University of Michigan's World Tax Database to extend this source for 1980-2010. Note that a typo in Penniman (1980) identifies Virginia's year of adoption of the individual income tax as 1961 instead of 1916. Penniman (1980) defines two types of corporate income tax: the net income tax and the excise or franchise tax. We date the corporate income tax that was introduced first, regardless of type. For further details, see Section 2.

A.2 Data Sources

Table A.2: Sources for Fiscal Data

Data Year	Source	Edition	Tables	Pages
1902	U.S. Department of Commerce (1907)	1907	10	980-95
1903	U.S. Department of Commerce (1915)	1915	7, 9	38-9, 42-3
1913	U.S. Department of Commerce (1915)	1915	6, 8	36-7, 40-1
1915	U.S. Census Statistical Abstract	1929	228	222
1917[a]	U.S. Census Statistical Abstract	1939	224	220
1922	U.S. Census Statistical Abstract	1923	652	741
	U.S. Department of Commerce (1924)	1924	1	12-6
	U.S. Census Statistical Abstract	1939	224	220
1923	U.S. Census Statistical Abstract	1924	185	199
1924	U.S. Census Statistical Abstract	1925	208	209
1925	U.S. Census Statistical Abstract	1926	214	214
1926	U.S. Census Statistical Abstract	1928	222	216
1927	U.S. Census Statistical Abstract	1930	228	223
	U.S. Census Statistical Abstract	1939	224	220
1928	U.S. Census Statistical Abstract	1931	218	224-5
1929	U.S. Census Statistical Abstract	1931	218	224-5
1930	U.S. Census Statistical Abstract	1932	198	206-7
1931	U.S. Census Statistical Abstract	1933	202	201-2
1932	U.S. Census Statistical Abstract	1934	204	202
	U.S. Census Statistical Abstract	1939	224	220
1937	U.S. Census Statistical Abstract	1939	223	218-9
	U.S. Census Statistical Abstract	1939	224	220
1938	U.S. Census Statistical Abstract	1941	231	240-1
1940	U.S. Census Statistical Abstract	1941	234	243
	U.S. Census Statistical Abstract	1942	234	248-9
1942-2010	U.S. Census Bureau	N/A	N/A	N/A

Notes: State-level data from the U.S. Census Bureau are available biannually from 1942 to 1948 and annually from 1950 to 2008 at https://www.census.gov/programs-surveys/gov-finances/data/historical-data.html, and from 2008 to 2010 at https://www.census.gov/programs-surveys/gov-finances/data/datasets.html. The Census Bureau also provides nationwide aggregate variables for selected years from 1902 to 1940. The Statistical Abstracts are available at https://www.census.gov/library/publications/time-series/statistical_abstracts.html.

[a] Property taxes only.

Table A.3: Sources for Income Tax Rates, Brackets, and Exemptions

Data Year	Source	Description
1911-1929	National Industrial Conference Board (1930)	History of all rates, brackets, exemptions
1922	U.S. Department of Commerce (1922)	Information on all rates, brackets, exemptions
1923	Witte (1923)	Information on all rates, top brackets, exemptions
1930	Bailey (1930)	Changes to rates, brackets, exemptions
1930-1932	Martin (1932)	Changes to top and bottom rates
1931-1932	Groves (1932)	Changes to rates
1931-2010	State of Idaho (2018)	History of Idaho rates and brackets
1933	Manning (1933)	Changes to rates, brackets, exemptions
1934	Manning (1934)	Changes to rates, brackets, exemptions
1935	Manning (1935)	Changes to rates, brackets, exemptions
1935-2010	Commonwealth of Pennsylvania	History of Pennsylvania rates and brackets
1936	Manning (1936)	Changes to rates, brackets, exemptions
1936	National Tax Association (1936)	Changes to rates, brackets, exemptions
1937	Manning (1937)	Changes to rates, brackets, exemptions
1937-2010	Schrock (2010)	History of Colorado rates and brackets
1938	Manning (1938)	Changes to rates, brackets, exemptions
1938	U.S. Department of Commerce (1938)	Information on all rates, brackets, exemptions
1939	Manning (1939)	Changes to rates, brackets, exemptions
1940	Manning (1940)	Changes to rates, brackets, exemptions
1941-2003	Office of Tax Policy Research (2003)	Top rate and bracket, bottom rate and bracket, exemptions
1970-2010	Government of the District of Columbia (2015)	Changes to Washington, D.C. rates, brackets, exemptions
2003-2010	Tax Policy Center (2019)	Top rate and bracket, bottom rate and bracket, exemptions
1934-2007	Akcigit et al. (2022)	Average and marginal tax rates at 90th percentile income

Notes: For detailed information about these sources, see Appendix D.

Appendix B Robustness Checks

B.1 Data Sources and Construction for Economic Shocks

Income per Capita. State-level personal income data are available from the Bureau of Economic Analysis for 1929-2018. We measure economic shocks for early adopters of the income tax (i.e. pre-World War II) in terms of personal income per capita between 1929 and 1933 for the following reasons: (1) state-level GDP data are not available prior to 1963; (2) state-level income data are not available prior to 1929; and (3) the change in income from 1929 to 1933 approximates the state-level impact of the first phase of the Great Depression. For late adopters (i.e. post-World War II), we measure income shocks in terms of the 1-year, lagged 5-year, and lagged 10-year changes in log personal income per capita, respectively.

Industry Shift-Share Employment. The industry shift-share employment shocks are the state employment growth predicted by national employment growth at the three-digit industry level and the base-year employment shares of each industry at the state level. We estimate national employment growth rates using leave-one-out means to avoid bias due to using own-state information. The employment data come from IPUMS and are missing in 1920. We thus control for the shift-share employment shock from 1910 to 1930 for early adopters of the income tax (i.e. pre-World War II). For late adopters (i.e. post-World War II), we control for the 10-year shift-share employment shocks in the current decade and previous decade.

Changes in State Unemployment. For early adopters of the income tax (i.e. pre-World War II), we control for the change in the state unemployment rate from 1910 to 1930. For late adopters (i.e. post-World War II), we measure unemployment shocks in terms of the 1-year, lagged 5-year, and lagged 10-year changes in log unemployment insurance compensation per capita (excluding state unemployment compensation), respectively. We construct the covariates this way because the employment data are missing in 1920 and the unemployment insurance compensation data are only available for 1948-2017.

B.2 Data Construction for Region-by-Year Effects

To control for arbitrary regional shocks, we replace the cohort-by-year effects with cohort-by-region-by-year effects $\phi^h_{c,r(i),t}$ in Equation (1). We define three regions: North, South, and West. The South and West regions correspond to the U.S. Census Bureau's four-region classification, and the North region combines the Census Bureau's Northeast and Midwest regions. We combine

those two regions because the Northeast has no states that never introduced the income tax. As a result, there are no "clean" controls for late adopters of the income tax (i.e. post-World War II) in the Northeast when the four-region classification is used.

A byproduct of this approach is that states that never introduced the income tax in the West (Washington, Nevada, and Wyoming) no longer contribute to the estimates for late adopters, as no Western states introduced the income tax after 1945. As a result, our estimates for late adopters of the income tax exploit variation from only three control states (South Dakota, Texas, and Florida). When the number of control (or treated) clusters is very small, even the wild cluster bootstrap performs poorly, under-rejecting the null hypothesis (MacKinnon and Webb, 2017). We thus report two p-values: one based on the wild cluster bootstrap (in braces in Table B.2), and another based on the wild subcluster bootstrap (in brackets), which uses a bootstrap data-generating process that clusters at the state-year level. The wild subcluster bootstrap performs well in simulations when there are few control clusters (MacKinnon and Webb, 2018).

B.3 Inverse Probability Weighting

Let $Y_{i,t}^{h}(d)$ denote the fiscal outcome (measured in logs) in period $t+h$ for state i whose income tax status in period t is $d \in \{0,1\}$, where $d=0$ denotes no income tax and $d=1$ denotes an income tax. Let the random variable $D_{i,t}$ equal one if state i has an income tax in period t, and zero otherwise. The average effect of introducing the income tax in period t on the outcome h periods later for adopting states is

$$\beta^{h} \equiv \mathrm{E}(Y_{i,t}^{h}(1) - Y_{i,t}^{h}(0) \mid D_{i,t}=1, D_{i,t-1}=0). \tag{B.1}$$

Following Suárez Serrato and Wingender (2016) and Acemoglu, Naidu, Restrepo, and Robinson (2019), we adapt the semiparametric approach in Angrist and Kuersteiner (2011) to a panel context. Our approach models the selection of states into the introduction of the income tax without specifying a parametric model for outcomes. The key identifying assumption is that adopting and non-adopting states with the same recent fiscal and demographic trends would have experienced parallel fiscal trends going forward in the absence of introduction, denoted by $\Delta Y_{i,t}^{h}(0) = Y_{i,t}^{h}(0) - Y_{i,t-1}$. Let $Z_{i,t}$ denote the log population of state i in year t, let $R_{i,t}$ denote log revenue, and let $E_{i,t}$ denote log expenditure. The conditional parallel trends assumption is stated formally as follows.

Assumption 1. $\mathrm{E}(\Delta Y_{i,t}^{h}(0) \mid D_{i,t}=1, D_{i,t-1}=0, X_{i,t}) = \mathrm{E}(\Delta Y_{i,t}^{h}(0) \mid D_{i,t}=0, D_{i,t-1}=0, X_{i,t})$, *where*

$X_{i,t} = (\Delta R_{i,t-1}, \ldots, \Delta R_{i,t-J}, \Delta E_{i,t-1}, \ldots, \Delta E_{i,t-J}, \Delta Z_{i,t-1}, \ldots, \Delta Z_{i,t-K}, t)$, *for* $h \geq 0$.

Assumption 1 is weaker than the standard assumption in difference-in-differences designs since it only imposes parallel trends for states with the same recent fiscal and population dynamics. The second identifying assumption is a standard overlap condition.

Assumption 2. $\mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0) > 0$ *and* $\mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0, X_{i,t}) < 1$ *for all* $X_{i,t}$ *as defined in Assumption 1.*

Denote changes in the observed outcome by $\Delta Y_{i,t}^{h} = Y_{i,t+h} - Y_{i,t-1}$. Under Assumptions 1 and 2, β^h can be identified via inverse probability weighting (IPW) (Abadie, 2005),

$$\beta^h = \mathrm{E}(\omega_{i,t} \Delta Y_{i,t}^{h} \mid D_{i,t-1} = 0), \tag{B.2}$$

where the weighting function is

$$\omega_{i,t} = \frac{1}{\mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0)} \cdot \frac{D_{i,t} - \mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0, X_{i,t})}{1 - \mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0, X_{i,t})}.$$

Intuitively, non-adopting states ($D_{i,t} = 0$) are given greater weight the more similar their recent dynamics were to states that did introduce the income tax in year t (high $\mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0, X_{i,t})$). Our IPW estimator replaces the population objects in Equation (B.2) with their corresponding estimates.[B.1] The estimation sample includes, for each year t, only states that either introduced the income tax in year t or never had the income tax between years t and $t+30$. This ensures that the only "clean" controls are used.

We estimate the propensity score, $\mathrm{P}(D_{i,t} = 1 \mid D_{i,t-1} = 0, X_{i,t})$, via probit. The covariate vector includes year effects, the lagged 3-year and 5-year changes in log revenue and log expenditure, and the lagged 5-year, 10-year, and 15-year changes in log population. In addition, it includes interactions between the lagged changes in the fiscal and population variables and an indicator for post-World War II years. This allows the selection process to differ for early (i.e. pre-World War II) and late adopters (i.e. post-World War II) of the income tax. We report standard errors that are

[B.1] Let $\widehat{\mathrm{P}}(X_{i,t})$ denote the estimated propensity score, and let $\widehat{\mathrm{E}}(\cdot \mid D_{i,t-1} = 0)$ denote the sample average over state-years for which $D_{i,t-1} = 0$. The estimator is $\hat{\beta}^h = \widehat{\mathrm{E}}(\widehat{\omega}_{i,t} \Delta Y_{i,t}^{h} \mid D_{i,t-1} = 0)$, where

$$\widehat{\omega}_{i,t} = \frac{1}{\widehat{\mathrm{E}}(D_{i,t} \mid D_{i,t-1} = 0)} \cdot \frac{D_{i,t} - \widehat{\mathrm{P}}(X_{i,t})}{1 - \widehat{\mathrm{P}}(X_{i,t})}.$$

robust to heteroskedasticity and state-level clustering. Appendix Figure B.11 plots the distribution of the propensity score separately for state-years in which the income tax is introduced and not introduced. The two distributions have similar supports, both of which are bounded away from 1 as required by Assumption 2.

B.4 Tables

Table B.1: Baseline State Characteristics

	Adopters	Non-Adopters	Difference
	Panel A: All Introductions		
Lagged Deficit per Capita	−10.39	−23.83	13.44
			(17.77)
Lagged Total Expenditure per Capita	930.80	768.48	162.32
			(177.75)
Lagged Total Revenue per Capita	941.19	792.31	148.88
			(187.92)
Lagged Population (thousands)	3,287.63	3,226.44	61.19
			(691.18)
Personal Income per Capita	12,758.89	11,964.27	794.62
			(1,611.45)
	Panel B: Pre-World War II		
Lagged Deficit per Capita	10.84	1.35	9.49
			(6.40)
Lagged Total Expenditure per Capita	268.93	274.98	−6.05
			(46.62)
Lagged Total Revenue per Capita	258.09	273.63	−15.54
			(45.53)
Lagged Population (thousands)	1,470.11	2,539.55	−1,069.44
			(660.54)
Personal Income per Capita	4,745.11	7,492.07	−2,746.96
			(766.98)
	Panel C: Post-World War II		
Lagged Deficit per Capita	−37.41	−75.69	38.28
			(41.64)
Lagged Total Expenditure per Capita	1,773.18	1,784.95	−11.77
			(234.83)
Lagged Total Revenue per Capita	1,810.59	1,860.64	−50.05
			(255.90)
Lagged Population (thousands)	5,600.85	4,671.99	928.86
			(1,346.04)
Personal Income per Capita	22,958.23	21,375.91	1,582.33
			(1,417.50)
Observations (All Introductions)	25	205	

Notes: This table reports average baseline characteristics for adopting and non-adopting states of the income tax. The sample of years corresponds to the adoption years used in the fiscal analysis. The fiscal variables and personal income are both measured in constant 2010 USD per capita. Lagged variables are defined as the average of their non-missing values in the four previous years (to account for missing data). Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.2: Average Effects of Introduction of Income Tax: Region-by-Year Effects

	Average Effect of Income Tax Introduction over Time				
Years Since Introduction:	0 to 1	2 to 3	4 to 9	10 to 19	20 to 30
	(1)	(2)	(3)	(4)	(5)
	Panel A: Log Total Revenue				
All Introductions	4.8	10.3	5.3	12.5	10.8
	(2.1)	(3.9)	(5.5)	(7.7)	(5.9)
	{0.158}	{0.136}	{0.407}	{0.225}	{0.177}
	[0.077]	[0.053]	[0.344]	[0.136]	[0.101]
	Panel B: Log Total Expenditure				
All Introductions	4.7	8.4	3.9	9.2	11.6
	(2.6)	(4.6)	(5.3)	(7.6)	(6.1)
	{0.229}	{0.290}	{0.504}	{0.316}	{0.169}
	[0.162]	[0.168]	[0.483]	[0.241]	[0.094]
	Panel C: Log Total Revenue per Capita				
All Introductions	5.5	11.0	6.4	15.5	14.7
	(2.0)	(3.5)	(5.3)	(7.6)	(6.3)
	{0.112}	{0.087}	{0.316}	{0.159}	{0.128}
	[0.045]	[0.026]	[0.247]	[0.085]	[0.057]
	Panel D: Log Total Expenditure per Capita				
All Introductions	5.4	9.1	5.0	12.2	15.6
	(2.5)	(4.5)	(5.2)	(7.5)	(6.7)
	{0.173}	{0.235}	{0.394}	{0.227}	{0.127}
	[0.114]	[0.125]	[0.364]	[0.150]	[0.065]
	Panel E: Log Population				
All Introductions	−0.4	−0.4	−1.0	−2.8	−3.9
	(0.4)	(0.7)	(1.2)	(2.7)	(4.7)
	{0.400}	{0.530}	{0.415}	{0.366}	{0.453}
	[0.432]	[0.589]	[0.501]	[0.356]	[0.429]
Observations	8,919	8,915	8,963	8,924	8,704
States	36	36	36	36	36

Notes: This table reports estimates of $\omega_e \beta^{h,e} + \omega_\ell \beta^{h,\ell}$ ("All Introductions") from Equation (1), where ω_e is the share of early adopters ("Pre-World War II") and ω_ℓ is the share of late adopters ("Post-World War II"), with region-by-year effects Estimates are averaged over the specified time horizons and multiplied by 100. Standard errors clustered by state are in parentheses. p-values based on the restricted wild cluster bootstrap are in braces, and p-values based on the restricted wild subcluster bootstrap (with boostrap draws at the state-year level) are in brackets.

Table B.3: Heterogeneous Effects of Introduction of Income Tax: Region-by-Year Effects

	Average Effect of Income Tax Introduction over Time				
Years Since Introduction:	0 to 1	2 to 3	4 to 9	10 to 19	20 to 30
	(1)	(2)	(3)	(4)	(5)
	Panel A: Log Total Revenue				
Pre-World War II	2.0	8.3	−1.2	12.1	13.4
Introductions	(5.3)	(7.8)	(9.3)	(13.5)	(10.2)
	{0.715}	{0.348}	{0.904}	{0.414}	{0.226}
	[0.720]	[0.346]	[0.898]	[0.372]	[0.188]
Post-World War II	6.4	11.7	13.5	13.1	7.5
Introductions	(1.5)	(3.3)	(2.3)	(2.5)	(4.2)
	{0.054}	{0.224}	{0.041}	{0.036}	{0.319}
	[0.014]	[0.060]	[0.008]	[0.005]	[0.216]
	Panel B: Log Total Expenditure				
Pre-World War II	1.1	7.7	−3.3	6.2	10.7
Introductions	(6.7)	(9.9)	(9.2)	(13.5)	(10.4)
	{0.887}	{0.465}	{0.727}	{0.657}	{0.326}
	[0.883]	[0.459]	[0.721]	[0.640]	[0.295]
Post-World War II	6.7	8.9	13.0	13.1	12.8
Introductions	(1.6)	(3.9)	(2.0)	(2.7)	(4.4)
	{0.087}	{0.643}	{0.026}	{0.039}	{0.302}
	[0.024]	[0.302]	[0.005]	[0.008]	[0.096]
	Panel C: Log Total Revenue per Capita				
Pre-World War II	2.0	8.5	−0.6	13.3	11.7
Introductions	(5.3)	(7.5)	(9.2)	(13.0)	(10.4)
	{0.723}	{0.317}	{0.948}	{0.348}	{0.296}
	[0.727]	[0.314]	[0.945]	[0.315]	[0.275]
Post-World War II	7.4	12.8	15.4	18.3	18.6
Introductions	(1.3)	(2.6)	(2.1)	(3.0)	(4.2)
	{0.039}	{0.064}	{0.017}	{0.042}	{0.205}
	[0.005]	[0.012]	[0.001]	[0.002]	[0.006]
	Panel D: Log Total Expenditure per Capita				
Pre-World War II	1.1	7.9	−2.8	7.4	9.0
Introductions	(6.7)	(9.9)	(9.1)	(13.2)	(11.0)
	{0.882}	{0.452}	{0.771}	{0.593}	{0.436}
	[0.882]	[0.452]	[0.763]	[0.566]	[0.416]
Post-World War II	7.7	10.1	14.9	18.3	23.9
Introductions	(1.4)	(3.4)	(1.9)	(3.2)	(5.1)
	{0.025}	{0.441}	{0.010}	{0.021}	{0.202}
	[0.006]	[0.155]	[0.002]	[0.003]	[0.004]
	Panel E: Log Population				
Pre-World War II	0.1	0.1	−0.2	−0.9	1.7
Introductions	(0.5)	(1.1)	(2.0)	(4.5)	(7.9)
	{0.882}	{0.919}	{0.943}	{0.855}	{0.840}
	[0.887]	[0.917]	[0.939]	[0.844]	[0.841]
Post-World War II	−1.0	−1.1	−2.0	−5.2	−11.1
Introductions	(0.7)	(0.9)	(1.5)	(2.7)	(3.8)
	{0.263}	{0.339}	{0.398}	{0.351}	{0.207}
	[0.330]	[0.425]	[0.419]	[0.216]	[0.078]
Observations	8,919	8,915	8,963	8,924	8,704
States	36	36	36	36	36

Notes: This table reports estimates of $\beta^{h,e}$ for early adopters ("Pre-World War II") and $\beta^{h,\ell}$ for late adopters ("Post-World War II") from Equation (1) with region-by-year effects. Estimates are averaged over the specified time horizons and multiplied by 100. Standard errors clustered by state are in parentheses. p-values based on the restricted wild cluster bootstrap are in braces, and p-values based on the restricted wild subcluster bootstrap (with boostrap draws at the state-year level) are in brackets.

Table B.4: Average Effects of Introduction of Income Tax: Cohort-Specific Effects

Years Since Introduction:	Average Effect of Income Tax Introduction over Time				
	0 to 1	2 to 3	4 to 9	10 to 19	20 to 30
	(1)	(2)	(3)	(4)	(5)
	Panel A: Log Total Revenue				
All Introductions	3.9	10.2	4.9	10.6	12.5
	(2.2)	(2.5)	(4.4)	(6.0)	(6.9)
	[−1.2, 10.0]	[4.4, 16.4]	[−4.4, 14.5]	[−1.9, 23.5]	[−2.6, 27.8]
	Panel B: Log Total Expenditure				
All Introductions	3.9	10.5	6.2	7.1	10.4
	(2.3)	(3.1)	(4.2)	(6.2)	(7.0)
	[−2.0, 10.0]	[2.2, 19.2]	[−2.8, 15.4]	[−6.1, 20.8]	[−4.9, 26.3]
	Panel C: Log Total Revenue per Capita				
All Introductions	4.1	10.4	5.1	12.4	14.2
	(2.1)	(2.4)	(4.1)	(4.7)	(5.1)
	[−1.0, 10.2]	[4.8, 16.5]	[−3.5, 14.1]	[2.8, 22.6]	[3.2, 25.5]
	Panel D: Log Total Expenditure per Capita				
All Introductions	4.1	10.8	6.4	8.9	12.1
	(2.3)	(3.2)	(4.0)	(5.1)	(5.2)
	[−1.9, 10.3]	[2.1, 19.6]	[−2.1, 15.0]	[−1.8, 19.9]	[0.8, 23.7]
	Panel E: Log Population				
All Introductions	0.2	0.4	−0.2	−1.7	−1.8
	(0.3)	(0.6)	(1.2)	(2.7)	(3.8)
	[−0.5, 0.8]	[−0.8, 1.7]	[−2.9, 2.6]	[−7.8, 4.4]	[−10.0, 6.6]
Observations	9,122	9,118	9,165	9,118	8,854
States	36	36	36	36	36

Notes: This table reports estimates of the average of $\beta^{h,j}$ from Equation (2), weighted by cohort size ("All Introductions"). Estimates are averaged over the specified time horizons and multiplied by 100. Standard errors clustered by state are in parentheses. 95-percent confidence intervals based on the restricted wild cluster bootstrap are in brackets.

Table B.5: Heterogeneous Effects of Introduction of Income Tax: Cohort-Specific Effects

	Average Effect of Income Tax Introduction over Time				
Years Since Introduction:	0 to 1	2 to 3	4 to 9	10 to 19	20 to 30
	(1)	(2)	(3)	(4)	(5)
	Panel A: Log Total Revenue				
Pre-World War II	2.9	11.6	2.1	18.6	25.1
Introductions	(5.8)	(5.1)	(7.3)	(10.2)	(10.6)
	[−10.3, 24.5]	[−1.4, 25.6]	[−13.5, 17.3]	[−2.9, 39.7]	[2.8, 47.4]
Post-World War II	4.4	9.2	8.4	0.5	−3.5
Introductions	(1.5)	(2.8)	(3.2)	(6.3)	(5.9)
	[0.6, 8.3]	[2.3, 16.2]	[0.5, 16.4]	[−18.1, 18.9]	[−19.1, 12.4]
	Panel B: Log Total Expenditure				
Pre-World War II	2.1	11.8	3.0	11.1	19.1
Introductions	(6.3)	(7.2)	(7.3)	(10.5)	(9.8)
	[−15.2, 21.5]	[−7.7, 31.5]	[−12.7, 18.4]	[−11.1, 33.1]	[−1.2, 39.6]
Post-World War II	4.8	9.6	10.3	2.0	−0.7
Introductions	(1.2)	(2.3)	(2.9)	(5.2)	(6.7)
	[2.0, 7.7]	[4.0, 15.4]	[2.7, 17.3]	[−12.3, 17.3]	[−19.2, 16.7]
	Panel C: Log Total Revenue per Capita				
Pre-World War II	1.8	9.4	−2.1	11.0	12.9
Introductions	(5.7)	(5.1)	(7.1)	(8.9)	(8.5)
	[−11.5, 23.3]	[−3.5, 23.1]	[−17.3, 12.9]	[−7.7, 29.7]	[−4.6, 31.0]
Post-World War II	5.3	11.2	14.2	14.3	15.8
Introductions	(1.4)	(2.5)	(3.0)	(4.1)	(5.1)
	[1.8, 8.9]	[5.0, 17.6]	[7.1, 21.2]	[3.9, 24.0]	[2.3, 27.1]
	Panel D: Log Total Expenditure per Capita				
Pre-World War II	1.0	9.6	−1.2	3.4	7.0
Introductions	(6.3)	(7.4)	(7.1)	(9.5)	(8.3)
	[−16.0, 20.0]	[−10.3, 29.8]	[−16.9, 14.0]	[−16.8, 23.6]	[−10.2, 24.5]
Post-World War II	5.7	11.7	16.2	15.9	18.6
Introductions	(1.1)	(2.2)	(3.0)	(3.6)	(5.8)
	[3.1, 8.5]	[6.4, 17.0]	[9.1, 23.5]	[6.4, 24.1]	[1.3, 32.6]
	Panel E: Log Population				
Pre-World War II	1.1	2.4	4.3	7.8	12.1
Introductions	(0.5)	(1.0)	(1.8)	(3.7)	(6.4)
	[0.1, 2.0]	[0.2, 4.5]	[0.7, 7.9]	[0.3, 15.3]	[−1.0, 25.2]
Post-World War II	−0.9	−2.0	−5.9	−13.8	−19.4
Introductions	(0.4)	(0.9)	(2.2)	(4.5)	(5.2)
	[−1.7, −0.1]	[−4.0, 0.1]	[−11.1, −0.4]	[−25.2, −2.6]	[−31.0, −6.7]
Observations	9,122	9,118	9,165	9,118	8,854
States	36	36	36	36	36

Notes: This table reports estimates of the average of $\beta^{h,j}$ from Equation (2), weighted by cohort size, separately for early adopters ("Pre-World War II") and late adopters ("Post-World War II"). Estimates are averaged over the specified time horizons and multiplied by 100. Standard errors clustered by state are in parentheses. 95-percent confidence intervals based on the restricted wild cluster bootstrap are in brackets.

Table B.6: Average Effects of Introduction of Income Tax: IPW Estimates

Years Since Introduction:	Average Effect of Income Tax Introduction over Time				
	0 to 1	2 to 3	4 to 9	10 to 19	20 to 30
	(1)	(2)	(3)	(4)	(5)
	Panel A: Log Total Revenue				
All Introductions	4.3	11.1	7.6	11.7	16.9
	(2.7)	(3.4)	(4.6)	(4.7)	(5.6)
	Panel B: Log Total Expenditure				
All Introductions	3.8	9.4	7.4	7.5	15.3
	(3.0)	(4.7)	(4.8)	(4.8)	(5.3)
	Panel C: Log Total Revenue per Capita				
All Introductions	4.6	11.8	8.8	15.3	20.6
	(2.5)	(3.3)	(4.7)	(4.0)	(4.9)
	Panel D: Log Total Expenditure per Capita				
All Introductions	4.1	10.2	8.6	11.2	19.0
	(2.9)	(4.6)	(5.1)	(4.9)	(5.5)
	Panel E: Log Population				
All Introductions	−0.1	−0.1	−1.2	−3.7	−3.7
	(0.4)	(0.7)	(1.5)	(3.4)	(5.2)

Notes: This table reports IPW estimates of the average effect of the introduction of the individual income tax over different time horizons based on Equation (B.2). We report the average treatment effect on the treated, multiplied by 100. The treatment effect is estimated via inverse probability weighting, where the propensity score is specified as a probit model with year effects, lagged 3-year and 5-year changes in log revenue and log expenditure, and lagged 5-year, 10-year, and 15-year changes in log population. In addition, it includes interactions between the lagged changes in the fiscal and population variables and an indicator for post-World War II years. Standard errors clustered by state are in parentheses.

Table B.7: Heterogeneous Effects of Introduction of Income Tax: IPW Estimates

Years Since Introduction:	Average Effect of Income Tax Introduction over Time				
	0 to 1	2 to 3	4 to 9	10 to 19	20 to 30
	(1)	(2)	(3)	(4)	(5)
	Panel A: Log Total Revenue				
Pre-World War II Introductions	−2.1	6.7	1.6	17.6	26.9
	(5.5)	(6.4)	(7.6)	(7.9)	(7.9)
Post-World War II Introductions	7.3	13.4	12.8	1.8	0.2
	(2.1)	(3.4)	(3.5)	(5.6)	(5.3)
	Panel B: Log Total Expenditure				
Pre-World War II Introductions	−1.8	5.4	1.2	9.7	21.7
	(6.9)	(9.2)	(7.3)	(8.1)	(7.9)
Post-World War II Introductions	6.5	11.6	13.6	2.8	2.8
	(2.3)	(3.9)	(4.3)	(5.3)	(5.7)
	Panel C: Log Total Revenue per Capita				
Pre-World War II Introductions	−2.3	6.8	−0.9	11.2	16.9
	(5.4)	(6.4)	(7.5)	(6.7)	(7.3)
Post-World War II Introductions	7.8	14.6	18.2	17.0	20.8
	(1.9)	(3.1)	(3.2)	(3.9)	(3.9)
	Panel D: Log Total Expenditure per Capita				
Pre-World War II Introductions	−1.9	5.5	−1.3	3.4	11.6
	(6.7)	(9.3)	(7.5)	(7.8)	(8.3)
Post-World War II Introductions	6.9	12.8	19.0	18.1	23.4
	(2.2)	(3.8)	(4.5)	(4.6)	(4.6)
	Panel E: Log Population				
Pre-World War II Introductions	0.2	0.8	2.4	6.3	10.0
	(0.3)	(0.8)	(1.9)	(4.0)	(6.8)
Post-World War II Introductions	−0.5	−1.2	−5.4	−15.2	−20.6
	(0.7)	(1.1)	(2.1)	(3.9)	(5.1)

Notes: This table reports IPW estimates of the average effect of the introduction of the individual income tax over different time horizons based on Equation (B.2). We report the average treatment effect on the treated, multiplied by 100, separately for early adopters ("Pre-World War II") and late adopters ("Post-World War II") of the income tax. The treatment effect is estimated via inverse probability weighting, where the propensity score is specified as a probit model with year effects, lagged 3-year and 5-year changes in log revenue and log expenditure, and lagged 5-year, 10-year, and 15-year changes in log population. In addition, it includes interactions between the lagged changes in the fiscal and population variables and an indicator for post-World War II years. Standard errors clustered by state are in parentheses.

Table B.8: Effects of Introduction of Income Tax on Outmigration: Same Sample as Fiscal Analysis

		Outmigration Flows by Occupational Earnings Percentile				
	All Flows	< 25	$[25,50)$	$[50,75)$	$[75,90)$	≥ 90
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Child-Based 5-Year Migration Rate, 1900-2010					
Post Income Tax	0.143	0.049	0.167	0.145	0.164	0.202
(Origin − Destination)	(0.037)	(0.054)	(0.049)	(0.061)	(0.052)	(0.045)
Observations	9,820	2,204	2,204	2,204	2,204	2,204
	Panel B: Child-Based 5-Year Migration Rate, 1940-2010					
Post Income Tax	0.186	−0.038	0.233	0.191	0.224	0.204
(Origin − Destination)	(0.038)	(0.059)	(0.052)	(0.072)	(0.059)	(0.052)
Observations	7,500	1,851	1,851	1,851	1,851	1,851
	Panel C: Census 5-Year Migration Rate, 1940-2000					
Post Income Tax	0.199	0.011	0.214	0.252	0.245	0.291
(Origin − Destination)	(0.036)	(0.043)	(0.046)	(0.042)	(0.042)	(0.041)
Observations	7,137	4,436	4,436	4,436	4,436	4,436

Notes: This table reports estimates of θ in Equation (3), using only state pairs for which both states were included in the fiscal analysis in Section 5. The results in Panels A and B are for the child-based 5-year migration rate between 1900-2010 and 1940-2010, respectively, while the results in Panel C are for the census 5-year migration rate between 1940-2010. Column 1 reports the results for the full sample of interstate migration flows. Columns 2-6 report separate results for different occupational earnings groups, and the sample is restricted to state-pair-years with at least one moving household in each group. The outcome variable is the log odds ratio of the population share that moved from the origin state to the destination state relative to the population share that remained in the origin state. *Post Income Tax (Origin − Destination)* is the difference between the origin's and destination's indicator variable *Post Income Tax*, which equals 1 after the state introduced the individual income tax. All regressions include origin-destination fixed effects and region-pair × year effects. Standard errors, in parentheses, are robust to heteroskedasticity and three-way clustering at the origin-destination pair, origin × year, and destination × year levels.

Table B.9: Effect of Introduction of Income Tax on Outmigration by Income

	Outmigration Flows by Income Percentile				
	< 25	$[25,50)$	$[50,75)$	$[75,90)$	≥ 90
	(1)	(2)	(3)	(4)	(5)
	Panel A: Child-Based 5-Year Migration Rate, 1940-2010				
Post Income Tax	−0.050	0.118	0.250	0.215	0.284
(Origin − Destination)	(0.058)	(0.047)	(0.060)	(0.058)	(0.058)
Observations	3,064	3,064	3,064	3,064	3,064
	Panel B: Census 5-Year Migration Rate, 1940-2000				
Post Income Tax	−0.001	0.117	0.301	0.277	0.270
(Origin − Destination)	(0.038)	(0.034)	(0.038)	(0.039)	(0.043)
Observations	7,780	7,780	7,780	7,780	7,780

Notes: This table reports estimates of θ in Equation (3). The results in Panel A are for the child-based 5-year migration rate, and the results in Panel B are for the census 5-year migration rate, both between 1940 and 2010. Separate results are reported for households in different income groups, and the sample is restricted to state-pair-years with at least one moving household in every income group. The outcome variable is the log odds ratio of the population share that moved from the origin state to the destination state relative to the population share that remained in the origin state. *Post Income Tax (Origin − Destination)* is the difference between the origin's and destination's indicator variable *Post Income Tax*, which equals 1 after the state introduced the individual income tax. All regressions include origin-destination fixed effects and region-pair × year effects. Standard errors, in parentheses, are robust to heteroskedasticity and three-way clustering at the origin-destination pair, origin × year, and destination × year levels.

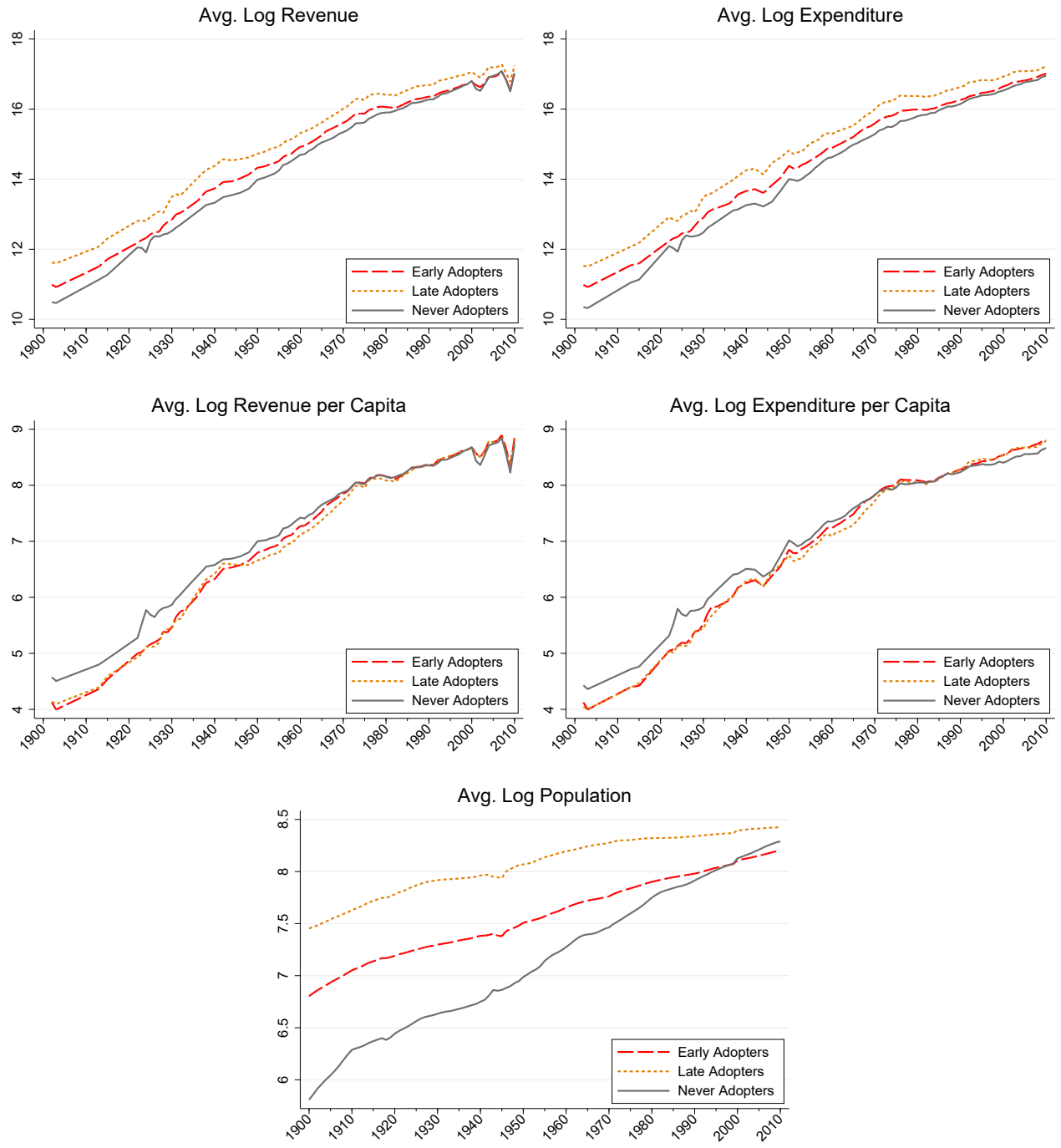
Table B.10: Effect of Income Tax Differentials on Outmigration: Heterogeneity by Proximity

	All Outmigration Flows					
	1900-2010			1940-2010		
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Child-Based 5-Year Migration Rate, 1940-2010					
Post Income Tax (O − D)	0.124	0.118	0.118	0.185	0.179	0.193
	(0.033)	(0.032)	(0.035)	(0.034)	(0.033)	(0.036)
Post Income Tax (O − D) × Neighbors	−0.071			−0.191		
	(0.059)			(0.059)		
Post Income Tax (O − D) × Same Region		−0.036			−0.131	
		(0.056)			(0.081)	
Post Income Tax (O − D) × Same Large Region			−0.017			−0.124
			(0.043)			(0.057)
Observations	17,780	17,780	17,780	13,619	13,619	13,619
	Panel B: Census 5-Year Migration Rate, 1940-2000					
Post Income Tax (O − D)				0.187	0.187	0.201
				(0.047)	(0.044)	(0.043)
Post Income Tax (O − D) × Neighbors				−0.130		
				(0.054)		
Post Income Tax (O − D) × Same Region					−0.111	
					(0.071)	
Post Income Tax (O − D) × Same Large Region						−0.120
						(0.059)
Observations				13,275	13,275	13,275

Notes: This table reports estimates of Equation (3) augmented to include interactions with the indicator variables measuring geographic proximity. *Neighbors* equals 1 if the origin and destination states share a border. *Same Region* equals 1 if the origin and destination states are located in the same region according to the U.S. Census Bureau's nine-region categorization. *Same Large Region* equals 1 if the origin and destination states are located in the same region according to the U.S. Census Bureau's four-region categorization. The results in Panel A are for the child-based 5-year migration rate, and the results in Panel B are for the census 5-year migration rate, both between 1940 and 2010. The outcome variable is the log odds ratio of the population share that moved from the origin state to the destination state relative to the population share that remained in the origin state. *Post Income Tax (O − D)* is the difference between the origin's and destination's indicator variable *Post Income Tax*, which equals 1 after the state introduced the income tax. All regressions include origin-destination fixed effects and year effects. Standard errors, in parentheses, are robust to heteroskedasticity and three-way clustering at the origin-destination pair, origin × year, and destination × year levels.

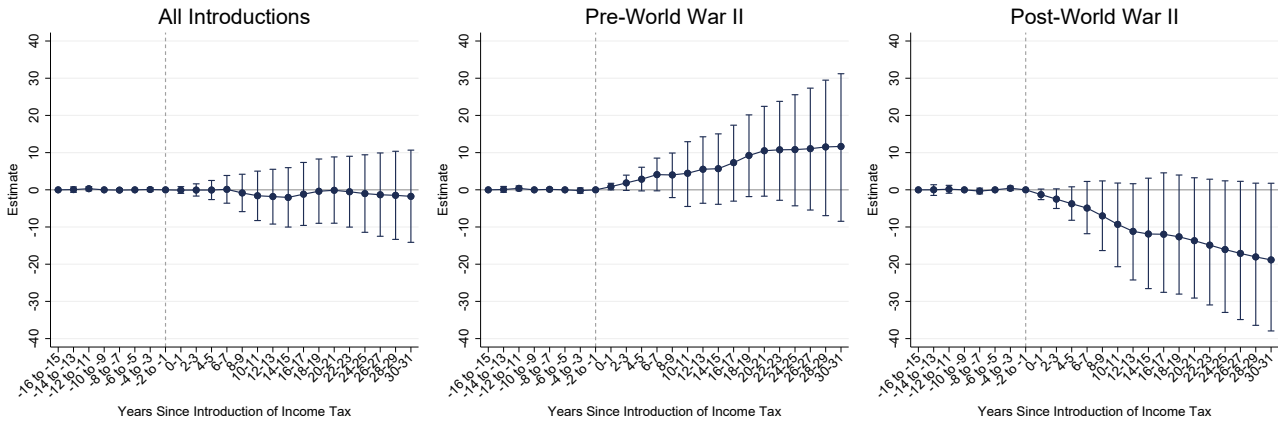
B.5 Figures

Figure B.1: Trends in Outcomes by Treatment Group



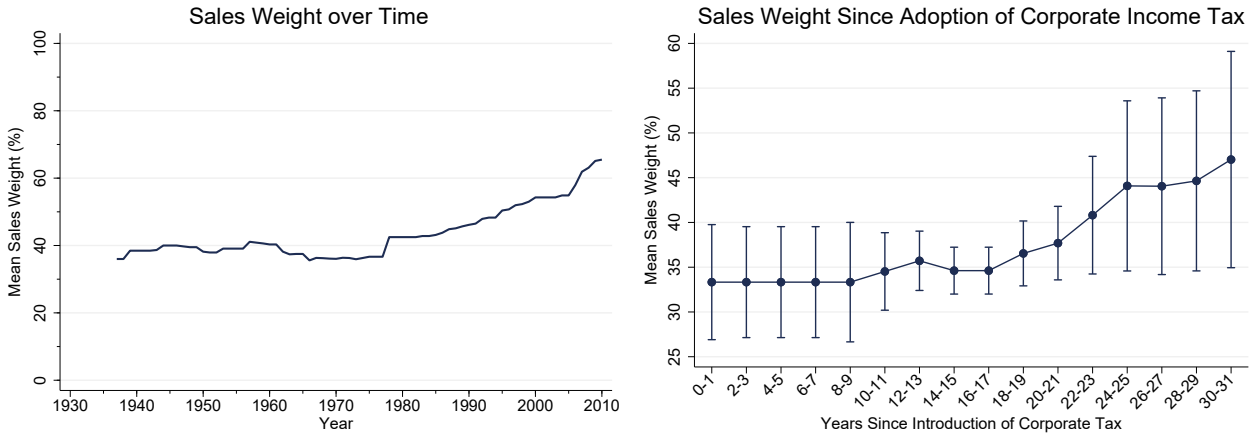
Notes: This figure plots average outcomes over time separately for early adopters ("Pre-World War II"), late adopters ("Post-World War II"), and never-adopters of the income tax.

Figure B.2: Dynamic Effects of the Introduction of the Income Tax on Population



Notes: The outcome is log population. The left panel plots estimates of $\omega_e \beta^{h,e} + \omega_\ell \beta^{h,\ell}$, the middle panel plots estimates of $\beta^{h,e}$, and the right panel plots estimates of $\beta^{h,\ell}$, all from Equation (1), where ω_e is the share of early adopters ("Pre-World War II") and ω_ℓ is the share of late adopters ("Post-World War II"). 95-percent confidence intervals based on the wild cluster bootstrap are reported. All estimates are multiplied by 100.

Figure B.3: Evolution of State Corporate Income Tax Apportionment Rules over Time

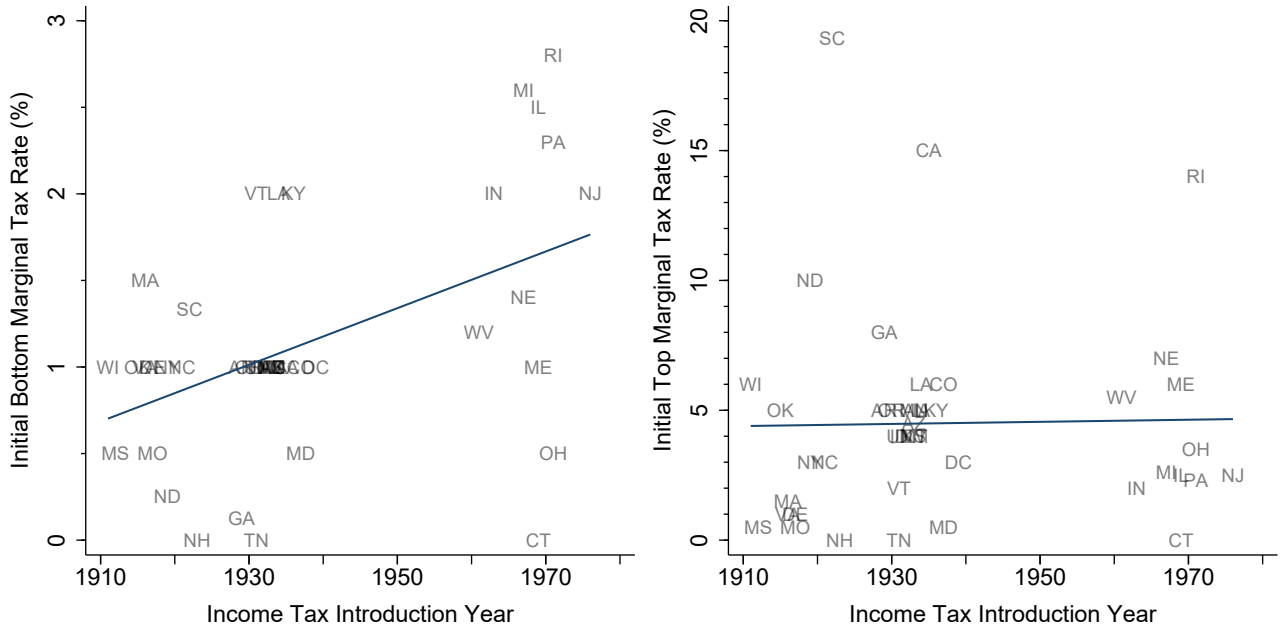


Notes: The left panel plots the average weight over time given to sales in apportioning corporate income of multi-state firms. The right panel plots the average weight given to sales, and 95-percent confidence intervals clustered by state, as a function of the amount of time since the adoption of the corporate income tax. The data are from Akcigit, Grigsby, Nicholas and Stantcheva (2022).

Figure B.4: Initial Tax Rates by Year of Introduction of Income Tax

(a) Bottom Marginal Tax Rate

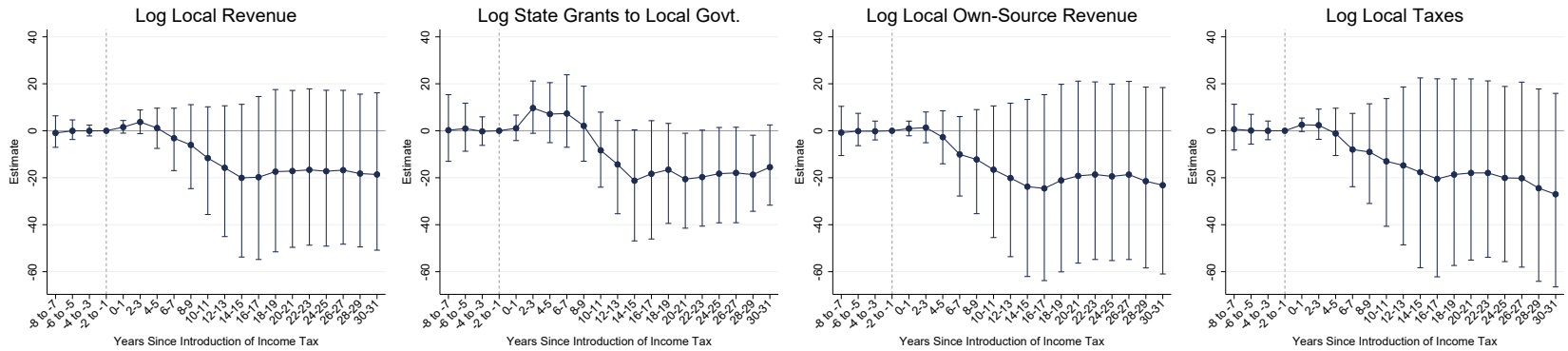
(b) Top Marginal Tax Rate



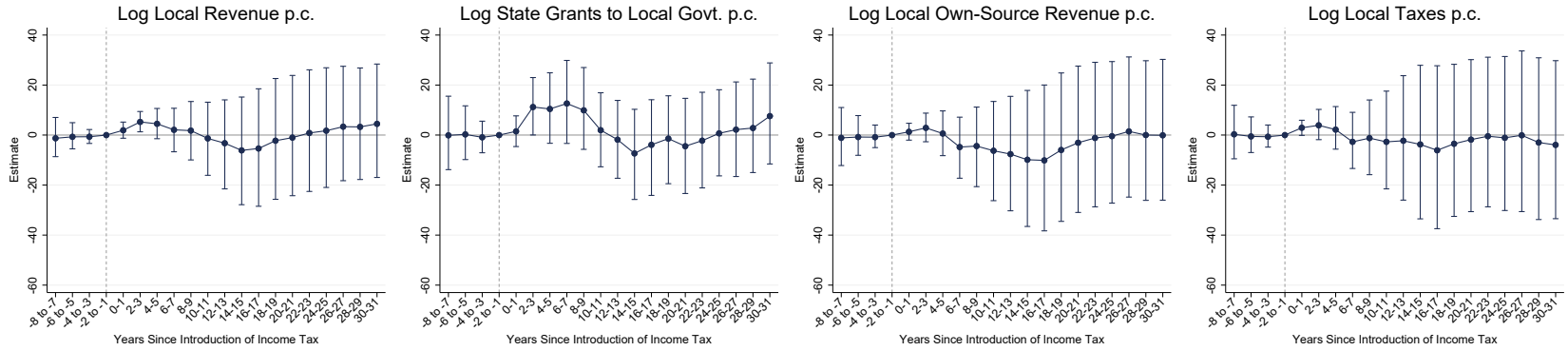
Notes: This figure plots the initial bottom marginal income tax rate (Panel a) and the initial top marginal income tax rate (Panel b) against the year of introduction of the income tax. All tax rates are statutory. The solid line plots the line of best fit from a univariate regression.

Figure B.5: Dynamic Effects of Introduction of Income Tax on Local Government Revenue

(a) Local Government Revenue (Post-World War II)



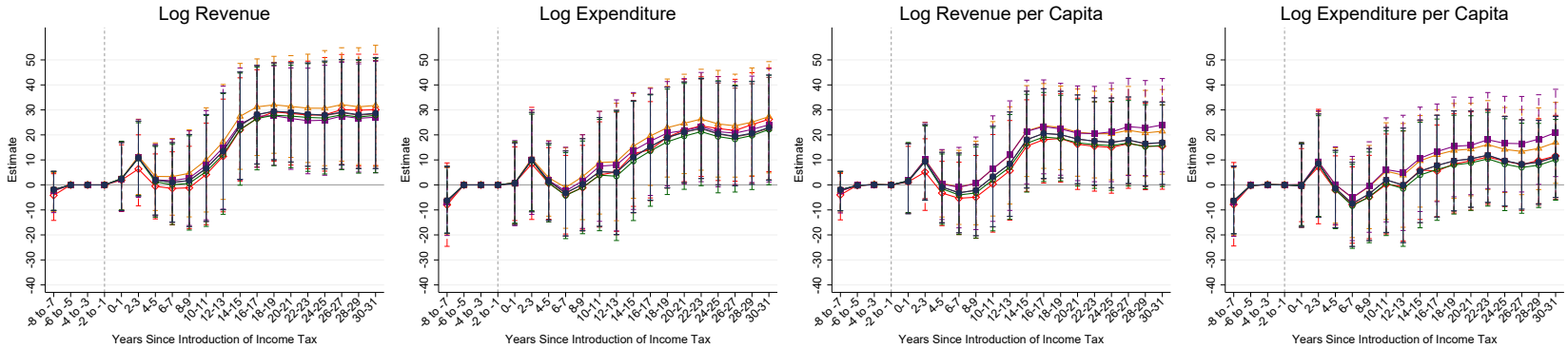
(b) Local Government Revenue Per Capita (Post-World War II)



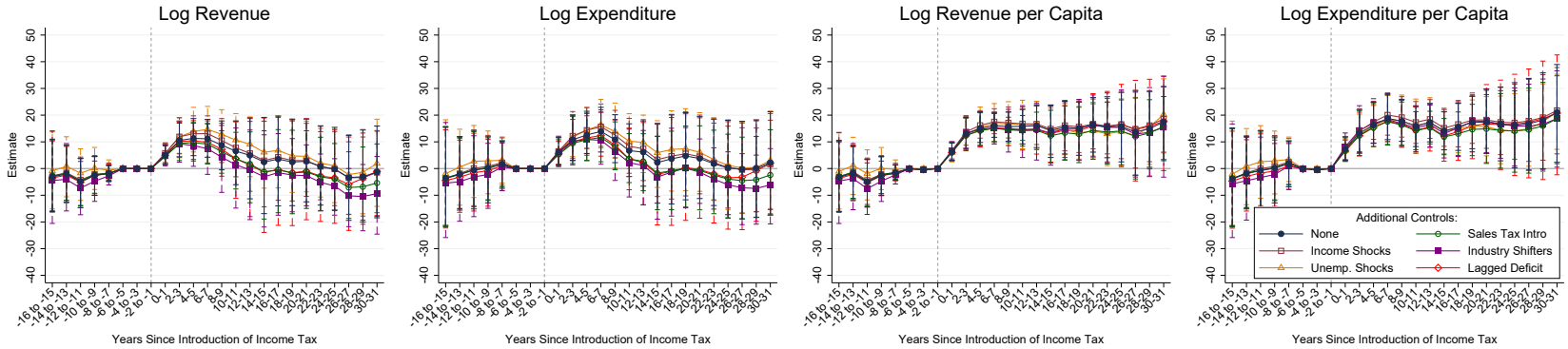
Notes: This figure plots estimates of $\beta^{h,\ell}$ for late adopters ("Post-World War II") from Equation (1). In Panel (a) local government revenue is measured in absolute terms, and in Panel (b) it is measured in per capita terms. Each outcome is aggregated across all local governments in the state. The data come from the Census of Governments and are available for the years 1953, 1957, and 1961-2008. Data on state grants to local government are missing in 1953, so we impute it using total local revenue in 1953 and the share of state grants in total revenue in 1957. To facilitate the estimation of pre-trends, we log-linearly interpolate missing values for years 1954-1956 and 1958-1960 using state-specific annual growth rates from 1953 to 1957. 95-percent confidence intervals based on the wild cluster bootstrap are reported. All estimates are multiplied by 100.

Figure B.6: Dynamic Effects of Introduction of Income Tax on Revenue and Expenditure: Robustness

(a) Early Adopters (Pre-World War II)



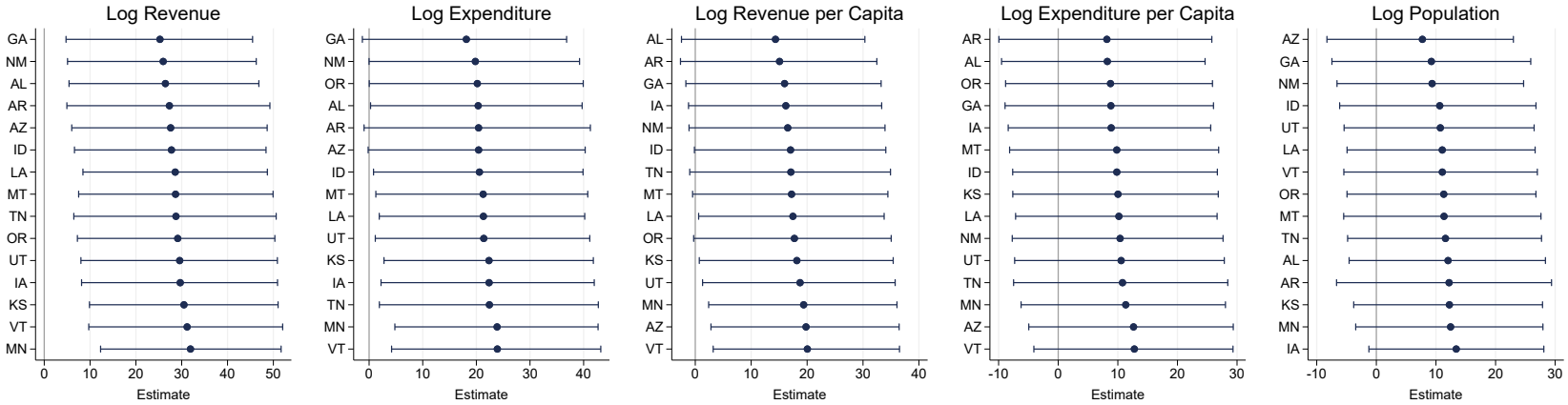
(b) Late Adopters (Post-World War II)



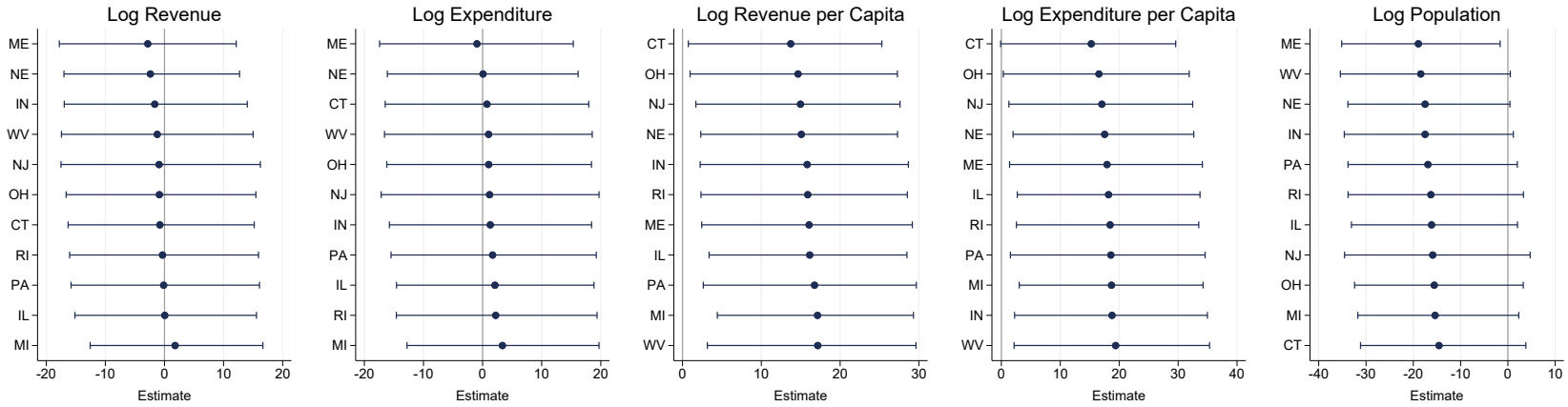
Notes: Panel (a) plots estimates of $\beta^{h,e}$ for early adopters ("Pre-World War II"), and Panel (b) plots estimates of $\beta^{h,\ell}$ for late adopters ("Post-World War II"), both from Equation (1). Additional covariates are added to the model as indicated in the figure's legend. The sales tax control is a dummy variable for the introduction of the sales tax within 10 years (past or future), interacted with pre-1945 and post-1945 dummies. The income shocks are the change in log state personal income per capita from 1929 to 1933, interacted with a pre-1945 dummy; and the 1-year, lagged 5-year, and lagged 10-year changes in log state personal income per capita, all interacted with post-1945 dummies. The industry shifters are the shift-share employment shock from 1910 to 1930, interacted with a pre-1945 dummy; and the 10-year shift-share employment shocks in the current decade and the previous decade, both interacted with post-1945 dummies. The unemployment shocks are the change in the state unemployment rate from 1910 to 1930, interacted with a pre-1945 dummy; and the 1-year, lagged 5-year, and lagged 10-year changes in log unemployment insurance compensation per capita (excluding state unemployment compensation), all interacted with post-1945 dummies. The final covariate is the lagged deficit per capita, interacted with pre-1945 and post-1945 dummies. 95-percent confidence intervals based on the wild cluster bootstrap are reported. All estimates are multiplied by 100.

Figure B.7: Long-Run Effects of Introduction of Income Tax: Exclude Adopting States One by One

(a) Early Adopters (Pre-World War II)



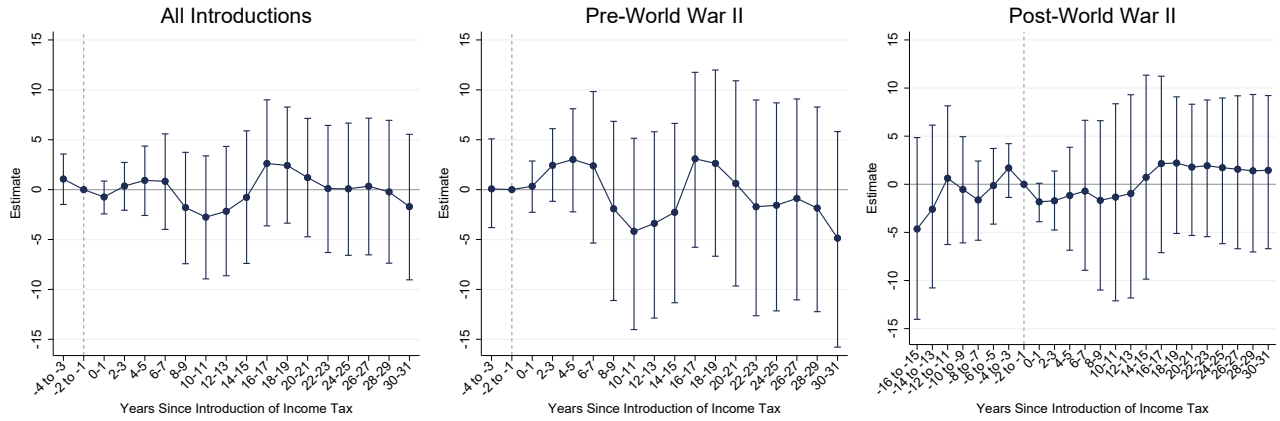
(b) Late Adopters (Post-World War II)



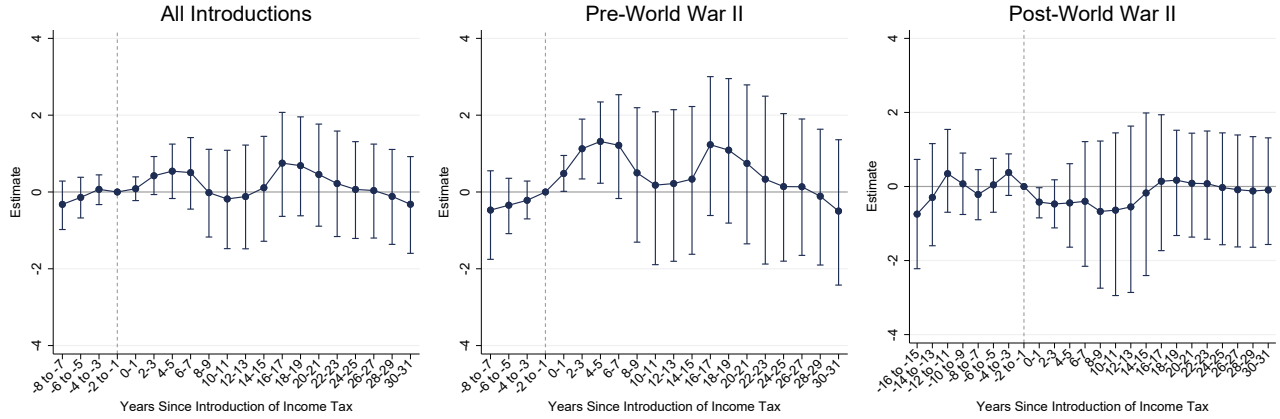
Notes: This figure plots the results when excluding states that introduced the income tax one by one, as indicated in the y-axis. Panel (a) plots estimates of $\beta^{h,e}$ for early adopters ("Pre-World War II"), and Panel (b) plots estimates of $\beta^{h,\ell}$ for late adopters ("Post-World War II"), both from Equation (1) and averaged from $h = 20$ to $h = 30$. 95-percent confidence intervals based on the wild cluster bootstrap are reported. All estimates are multiplied by 100.

Figure B.8: Dynamic Effects of Introduction of Income Tax on Fertility and Mortality

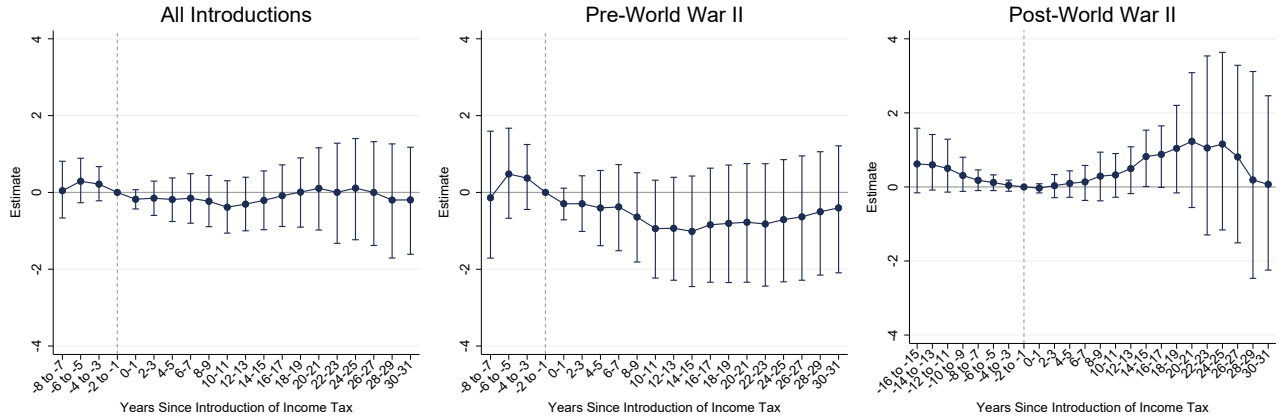
(a) Fertility Rate



(b) Birth Rate

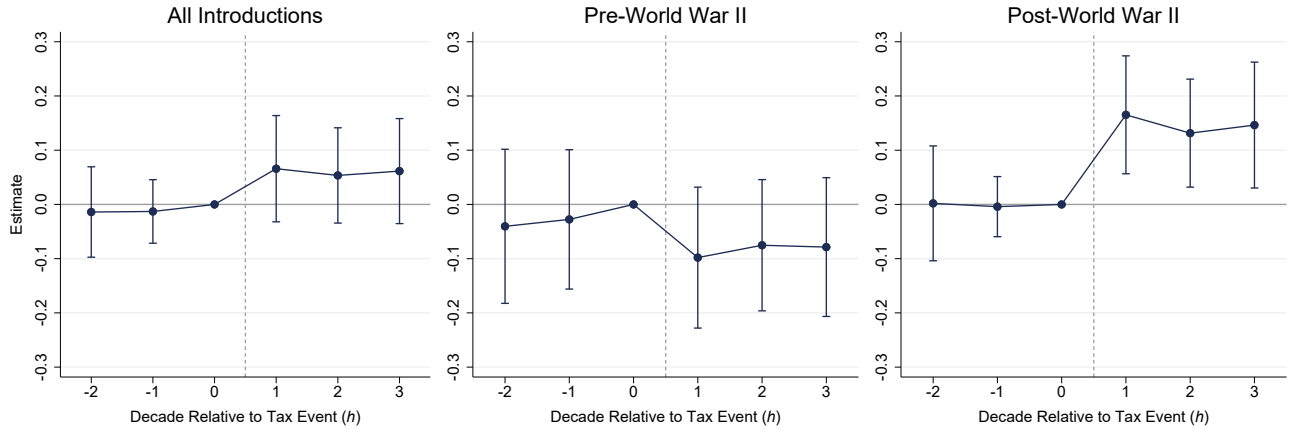


(c) Mortality Rate



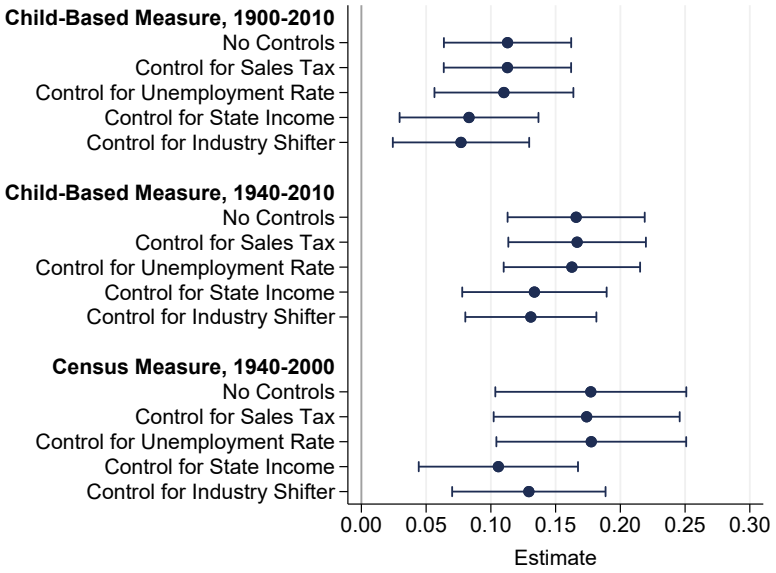
Notes: This figure plots estimates of $\omega_e \beta^{h,e} + \omega_\ell \beta^{h,\ell}$ ("All Introductions"), $\beta^{h,e}$ for early adopters ("Pre-World War II"), and $\beta^{h,\ell}$ for late adopters ("Post-World War II") from Equation (1). The fertility rate is the number of births per 1,000 women aged 15–44. Birth and death rates are both measured per 1,000 people. Fewer periods are available to estimate pre-trends in fertility, because the data on the number of women of reproductive age only starts in 1930. The data on births and deaths begin in 1915. 95-percent confidence intervals based on the wild cluster bootstrap are reported.

Figure B.9: Dynamic Effects of Introduction of Income Tax on Outmigration



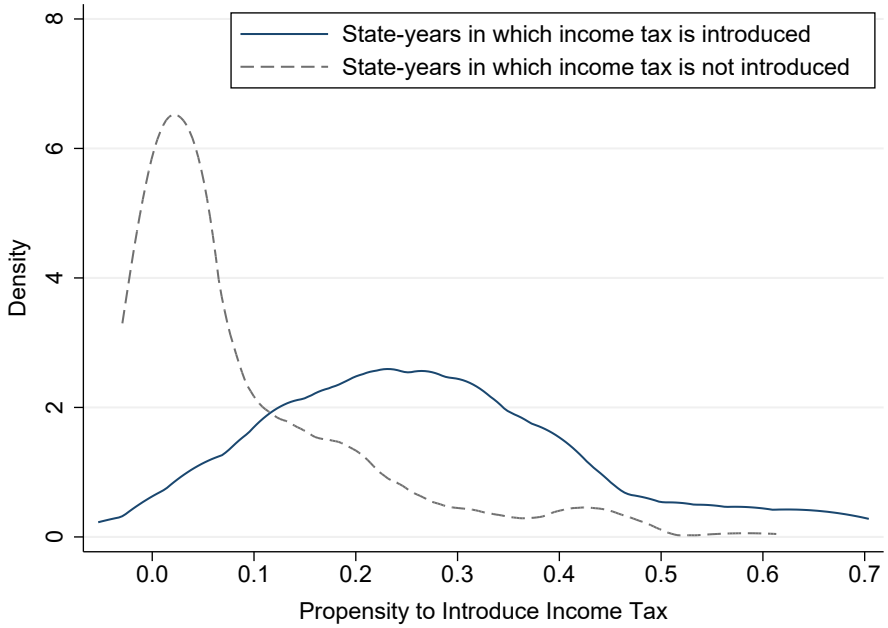
Notes: This figure plots estimates of β^h from Equation (4) using the child-based 5-year migration rate. The estimates are based on a balanced panel from two decades before the event to three decades after. The sample includes "treated" state pairs that experienced the introduction of the income tax and "clean control" pairs that did not during the analysis window. Event time is measured in decades relative to the introduction of the income tax, where the introduction occurred between periods 0 and 1. 95-percent confidence intervals are robust to heteroskedasticity and three-way clustering at the origin-destination pair, origin × year, and destination × year levels.

Figure B.10: Effects of Introduction of Income Tax on Outmigration: Robustness



Notes: This figure plots point estimates and 95-percent confidence intervals for θ in Equation (3) for different measures of outmigration, time periods, and sets of control variables. The sales tax control is $D^S_{ot} - D^S_{dt}$, where D^S_{ot} is an indicator variable equal to one if the origin state had a sales tax in year t. D^S_{dt} is defined similarly for the destination state. The remaining controls are defined as the destination-origin differentials in the state unemployment rate, log state personal income per capita, and the industry shift-share employment shock. The unemployment rate is missing in 1900 and 1920, and state income is missing in 1900, 1910, and 1920. The industry shifter is missing prior to 1940, because it is based on 10-year changes in employment, and employment is missing in 1900 and 1920. Thus, for the estimates using the child-based measure during 1900-2010, we control for the industry shifter interacted with a dummy for years 1940 and later, and the 20-year industry shifter for 1910-1930 interacted with a dummy for year 1930. Years 1900-1920 are omitted when we control for these industry shifters.

Figure B.11: Density of Estimated Propensity Scores



Notes: This figure plots the density of the estimated probability of introducing the income tax in year t conditional on not having the income tax in year $t-1$. The solid line plots the density for state-years in which the income tax was introduced, and the dashed line plots the density for state-years in which the income tax was not introduced. The propensity score is estimated using the probit model from Table 2. Densities are estimated using the Epanechnikov kernel.

Appendix C Deriving Migration Responses to Tax Reforms

C.1 Model of Location Choice

Let the utility of individual i who lived in state o (origin) in year $t-1$ and moves to state d (destination) in year t be

$$U_{iodt} = -\psi D_{dt} + \alpha \log(1-\tau_{dt}) + \alpha \log w_{dt} + Z_d - C_{od} + e_{idt}, \tag{C.1}$$

where D_{dt} is an indicator variable equal to one if the state of residence has an income tax, τ_{dt} is the personal income tax rate in the state of residence, w_{dt} is the before-tax wage in the state of residence, Z_d measures the effect of amenities and cost of living on utility, and C_{od} is the utility cost of moving from state o to state d, where $C_{oo} = 0$. The individual's idiosyncratic preferences for state d in time t are represented by e_{idt}.

The utility function in Equation (C.1) is the same as the one used in Moretti and Wilson (2017), except for the additional term $-\psi D_{dt}$, which allows tax introductions to affect behavior through channels other than the net-of-tax rate.

In every period, individuals choose their location to maximize utility. The desirability of each destination depends on the current state of residence, as indicated in Equation (C.1). An individual currently living in state o moves to state d if and only if she receives higher utility in state d than in state o or any other state, i.e.,

$$U_{iodt} > \max_{d' \neq d} \{U_{iod't}\}.$$

If idiosyncratic preferences, e_{idt}, are i.i.d. with an Extreme Value Type I distribution, then the log odds ratio equals the difference in utility levels in the origin and destination states (McFadden, 1974),

$$\begin{aligned} \log(P_{odt}/P_{oot}) = {} & \psi(D_{ot} - D_{dt}) + \alpha[\log(1-\tau_{dt}) - \log(1-\tau_{ot})] + \alpha \log(w_{dt}/w_{ot}) \\ & + (Z_d - Z_o) - C_{od}, \end{aligned} \tag{C.2}$$

where P_{odt} is the probability that a household living in state o moves to state d, and P_{oot} is the probability that a household living in state o stays in state o.

As noted by Moretti and Wilson (2017), Equation (C.2) characterizes the supply of labor to state

d. Individuals with strong preferences for the origin state (high $e_{iot} - e_{idt}$) are unlikely to move in response to a change in income tax differentials between states o and d. However, individuals that are less attached to their home state (low $e_{iot} - e_{idt}$) may be induced to move if state o introduces an income tax and state d does not. Because this is a model of migration flows, and not population stocks, the model allows for long-run differences in migration across state pairs even in the absence of income tax differentials, due to differences in amenities and moving costs. We do not assume that the initial distribution of households across states is random. Rather, households were making optimal location choices prior to the start of our sample.

C.2 Econometric Model

The dyadic regression based on Equation (C.2) is

$$\log(P_{odt}/P_{oot}) = \psi(D_{ot} - D_{dt}) + \alpha[\log(1-\tau_{dt}) - \log(1-\tau_{ot})] + \gamma_{od} + \phi_{r(o,d),t} + u_{odt}, \qquad \text{(C.3)}$$

where we have omitted the term with wages because it is endogenous. (Though we do control for state differentials in income per capita in a robustness check.) The fixed effect γ_{od} absorbs origin and destination amenities and state-pair moving costs. We add $\phi_{r(o,d),t}$ to capture common shocks to migration within pairs of regions, due to business cycles, transportation infrastructure, or technology.

To interpret the parameters, consider a pair of states, o and d, that initially both lack an income tax. If state o introduces the income tax at a rate of 1 percent, and state d does not introduce the income tax, then the outmigration rate (P_{odt}/P_{oot}) is expected to *increase* by about $100 \cdot \theta + \eta$ percent. If instead state d introduces the income tax at a rate of 1 percent and state o does not introduce the tax, then the outmigration rate is expected to *decrease* by about $100 \cdot \theta + \eta$ percent. Thus, the model assumes that increases and decreases in income tax differentials have symmetric effects. Now say that state o already has an income tax and raises the tax rate, such that the net-of-tax rate falls by 1 percent. Holding the tax policy of state d fixed, the outmigration rate is expected to fall by η percent. Thus, the outmigration response to a tax increase is larger by about $100 \cdot \theta$ when the initial tax rate was zero compared to when the initial tax rate was positive. If only the net-of-tax rate matters for location choices, then $\eta > 0$ and $\theta = 0$.

C.3 Response to Tax Rate Change

According to the model of location choice, the probability that individual i initially living in state o moves to state d in period t is

$$P^i_{odt} = \frac{\exp(-\theta D_{dt} + \eta \log(1-\tau_{dt}) + \gamma_{od})}{\sum_k \exp(-\theta D_{kt} + \eta \log(1-\tau_{kt}) + \gamma_{ok})},$$

where we have ignored the region-pair × year effects to simplify notation. Consider a small change to τ_{dt}, conditional state d already having an income tax. The individual-specific migration elasticity is given by

$$\varepsilon^i_{odt} \equiv \frac{\mathrm{dlog} P^i_{odt}}{\mathrm{dlog}(1-\tau_{dt})} = \eta \cdot (1 - P^i_{odt}).$$

Let I_{ot} denote the set of individuals initially living in state o in period t. Then the number of migrants to state d in period t is $\sum_{o \neq d} \sum_{i \in I_{ot}} P^i_{odt}$, and the inmigration elasticity for state d is

$$\begin{aligned}\varepsilon_{dt} &\equiv \frac{\mathrm{dlog}(\sum_{o \neq d} \sum_{i \in I_{ot}} P^i_{odt})}{\mathrm{dlog}(1-\tau_{dt})} = \frac{\sum_{o \neq d} \sum_{i \in I_{ot}} \mathrm{d}P^i_{odt} / \mathrm{dlog}(1-\tau_{dt})}{\sum_{o \neq d} \sum_{i \in I_{ot}} P^i_{odt}} \\ &= \frac{\sum_{o \neq d} \sum_{i \in I_{ot}} \eta \cdot (1 - P^i_{odt}) P^i_{odt}}{\sum_{o \neq d} \sum_{i \in I_{ot}} P^i_{odt}}\end{aligned}$$

Let N_{ot} denote the number of individuals initially living in state o in period t. Then because the (ex-ante) migration probability does not depend on individual characteristics, we can write $P^i_{odt} = P_{odt}$ and define the number of migrants from o to d as $M_{odt} = N_{ot} P_{odt}$. The elasticity can therefore be written as $\varepsilon_{dt} = \eta \cdot (1 - \overline{P}_{dt})$, where $\overline{P}_{dt} = (\sum_{o \neq d} M_{odt} P_{odt}) / (\sum_{o \neq d} M_{odt})$ is the weighted average of migration probabilities.

Finally, define the overall inmigration elasticity ε to be the weighted average of ε_{dt}, weighting by the number of migrants $M_{dt} = \sum_{o \neq d} M_{odt}$. Then

$$\varepsilon \equiv \frac{\sum_t \sum_d M_{dt} \varepsilon_{dt}}{\sum_t \sum_d M_{dt}} = \eta \cdot (1 - \overline{P}), \tag{C.4}$$

where $\overline{P} = (\sum_t \sum_d \sum_{o \neq d} M_{odt} P_{odt}) / (\sum_t \sum_d \sum_{o \neq d} M_{odt})$. In our setting, $\overline{P}$ equals 0.016 using the child-based measure of migration and 0.007 using the census 5-year migration measure, so the inmigration elasticity is very close to η.

We can similarly define state o's outmigration elasticity with respect to the net-of-tax rate,

$$\xi_{ot} \equiv \frac{\text{dlog}(\sum_{i \in I_{ot}}(1 - P^i_{oot}))}{\text{dlog}(1-\tau_{ot})}.$$

Calculations similar to those above yield $\xi_{ot} = -\eta \cdot P_{oot}$. Define the overall outmigration elasticity ξ to be the weighted average of ξ_{ot}, weighting by the number of people leaving state o, $L_{ot} = N_{ot}(1 - P_{oot})$. Then

$$\xi \equiv \frac{\sum_t \sum_o L_{ot}\xi_{ot}}{\sum_t \sum_o L_{ot}} = -\eta \cdot \tilde{P},$$

where $\tilde{P} = (\sum_t \sum_o L_{ot} P_{oot})/(\sum_t \sum_o L_{ot})$ is the weighted average probability of staying, weighting by the number of people leaving the state. In our setting $\tilde{P}$ equals 0.852 using the child-based measure of migration and 0.907 using the census 5-year migration measure, so the outmigration elasticity is close to $-\eta$.

C.4 Response to Tax Introduction

Next we calculate the percentage change in migration due to the introduction of the income tax at initial rate τ. Define $V_{odt} \equiv -\theta D_{dt} + \eta \log(1-\tau_{dt}) + \gamma_{od}$ and let $P_{odt}|_{\tau_{dt}=\tau}$ denote the individual migration probability (which does not vary across i) when the destination tax rate is τ. The inmigration response to the introduction of the income tax at rate τ is

$$\Delta^{0,\tau}_{odt} \equiv \frac{P_{odt}|_{\tau_{dt}=\tau} - P_{odt}|_{\tau_{dt}=0}}{P_{odt}|_{\tau_{dt}=0}} = A \cdot \exp(-\theta + \eta \log(1-\tau)) - 1,$$

where

$$A = \frac{1 + \sum_{k \neq d} \frac{\exp(V_{okt})}{\exp(\gamma_{od})}}{\exp(-\theta + \eta \log(1-\tau)) + \sum_{k \neq d} \frac{\exp(V_{okt})}{\exp(\gamma_{od})}}.$$

Note that $A > 1$ but $A \approx 1$ because $\sum_{k \neq d} \frac{\exp(V_{okt})}{\exp(\gamma_{od})} = 1/P_{odt}|_{\tau_{dt}=0} - 1$ is large due to the fact that $P_{odt}|_{\tau_{dt}=0}$ is very small.[C.1] We thus use the approximation

$$\Delta^{0,\tau}_{odt} \approx \exp(-\theta + \eta \log(1-\tau)) - 1 \equiv \Delta^{0,\tau}. \tag{C.5}$$

[C.1] $\sum_{k \neq d} \frac{\exp(V_{okt})}{\exp(\gamma_{od})} = 61.5$ when we plug in the average moving probability based on the child-based measure.

This approximation slightly overstates the negative effect of the introduction of the income tax on inmigration in the same way that η slightly overstates the inmigration response to a small change in the tax rate.

Because the approximation to $\Delta_{odt}^{0,\tau}$ does not vary across origins or destinations, the percentage change in the number of migrants M_{dt}, as well as the weighted average of inmigration responses across destinations, are also approximated by $\Delta^{0,\tau}$.

The outmigration response to the introduction of the income tax at rate τ is

$$\Omega_{ot}^{0,\tau} \equiv \frac{(1-P_{oot}|_{\tau_{ot}=\tau}) - (1-P_{oot}|_{\tau_{ot}=0})}{1-P_{oot}|_{\tau_{ot}=0}} = \frac{1-\exp(-\theta+\eta\log(1-\tau))}{\exp(-\theta+\eta\log(1-\tau)) + \sum_{d\neq o}\frac{\exp(V_{od})}{\exp(\gamma_{oo})}}.$$

Note that $\sum_{d\neq o}\frac{\exp(V_{od})}{\exp(\gamma_{oo})} = 1/P_{oot}|_{\tau_{ot}=0} - 1$, which is close to zero because $P_{oot}|_{\tau_{ot}=0}$ is close to one. We can therefore use the approximation[C.2]

$$\Omega_{ot}^{0,\tau} \approx \exp(\theta - \eta\log(1-\tau)) - 1 \equiv \Omega^{0,\tau}. \tag{C.6}$$

[C.2] The calculated effects are very similar if, instead of using an approximation, we plug in values between 0.8 and 1 for $P_{oot}|_{\tau_{ot}=0}$.

Appendix D References

Abadie, Alberto, "Semiparametric Difference-in-Differences Estimators," *Review of Economic Studies*, 2005, *72* (1), 1–19.

Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James Robinson, "Democracy Does Cause Growth," *Journal of Political Economy*, 2019, *127* (1), 47–100.

Advisory Commission on Intergovernmental Relations, *Significant Features of Fiscal Federalism: Volume 1, Budget Processes and Tax Systems* June 1994.

Akcigit, Ufuk, John Grigsby, Tom Nicholas, and Stefanie Stantcheva, "Taxation and Innovation in the Twentieth Century," *The Quarterly Journal of Economics*, 2022, *137* (1), 329–385.

Angrist, Joshua and Guido Kuersteiner, "Causal Effects of Monetary Shocks: Semiparametric Conditional Independence Tests with a Multinomial Propensity Score," *Review of Economics and Statistics*, 2011, *93* (3), 725–747.

Bailey, Beulah, "Review of State Tax Legislation, 1930," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1930, *23*, 421–444.

Bakija, Jon, "Documentation for a Comprehensive Historical U.S. Federal and State Income Tax Calculator Program," Working Paper, Williams College 2019.

Commonwealth of Pennsylvania, "The Tax Compendium," Report, Pennsylvania Department of Revenue 2019.

Government of the District of Columbia, "D.C. Tax Facts," Report, Government of the District of Columbia, Office of the Chief Financial Officer, Office of Revenue Analysis 2015.

Groves, Harold, "Review of State Tax Legislation, 1931-1932," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1932, *25*, 9–25.

Lindert, Peter H. and Richard Sutch, "Consumer Price Indexes, for All Items: 1774–2003," in Susan B. Carter, Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright, eds., *Historical Statistics of the United States, Earliest Times to the Present: Millennial Edition*, New York: Cambridge University Press, 2006, pp. Table Cc1–2. `http://dx.doi.org/10.1017/ISBN-9780511132971.Cc1-65`.

MacKinnon, James and Matthew Webb, "Wild Bootstrap Inference for Wildly Different Cluster Sizes," *Journal of Applied Econometrics*, 2017, *32* (2), 233–254.

__ and __, "The Wild Bootstrap for Few (Treated) Clusters," *Econometrics Journal*, 2018, *21* (2), 114–135.

Manning, Raymond E., "State Tax Legislation, 1933," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1933, *26*, 14–30.

__ , "State Tax Legislation, 1934," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1934, *27*, 17–40.

_ , "State Tax Legislation, 1935," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1935, *28*, 27–62.

_ , "State Tax Legislation, 1936," *Bulletin of the National Tax Association*, 1936, *22* (3), 73–79.

_ , "State Tax Legislation: 1937," *Bulletin of the National Tax Association*, 1937, *23* (1), 4–8.

_ , "State Tax Legislation—1938," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1938, *31*, 7–22.

_ , "State Tax Legislation, 1939," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1939, *32*, 5–26.

_ , "State Tax Legislation, 1940," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1940, *33*, 34–47.

Martin, James, "Changes in State Income Tax Rates, 1930-1932," *Bulletin of the National Tax Association*, 1932, *17* (5), 145–146.

McFadden, Daniel, "Conditional Logit Analysis of Qualitative Choice Behavior," in Paul Zarembka, ed., *Frontiers in Econometrics*, Academic Press, 1974, pp. 105–42.

Moretti, Enrico, and Daniel Wilson. 2017. "The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists." *American Economic Review*, 107(7): 1858–1903.

National Industrial Conference Board, "State Income Taxes," Technical Report, National Industrial Conference Board 1930.

National Tax Association, "State Income Taxes," *Proceedings of the Annual Conference on Taxation under the Auspices of the National Tax Association*, 1936, *29*, 17–24.

Office of Tax Policy Research, "World Tax Database," University of Michigan 2003.

Penniman, Clara, *State Income Taxation*, Baltimore: Johns Hopkins University Press, 1980.

Schrock, Jason, "History of Colorado Income Tax Rates," Memorandum, Colorado Legislative Council Staff 2010.

State of Idaho, "General Fund Revenue Book," Report, Idaho Division of Financial Management, Executive Office of the Governor 2018.

Suárez Serrato, Juan Carlos and Philippe Wingender, "Estimating Local Fiscal Multipliers," Working Paper 22425, NBER 2016.

Tax Policy Center, "State Individual Income Tax Rates: 2000-2019," Technical Report, Urban Institute and Brookings Institution 2019.

U.S. Bureau of Economic Analysis, "Regional Economic Accounts," 2019. `https://apps.bea.gov/regional/downloadzip.cfm`.

U.S. Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCNS]," 2020. retrieved from FRED, Federal Reserve Bank of St. Louis; `https://fred.stlouisfed.org/series/CPIAUCNS`, October 13, 2022.

U.S. Census Bureau, "Annual Estimates of the Population for the U.S. and States, and for Puerto

Rico," 1900-2022. retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/release?rid=118, October 13, 2022.

__, "Annual Survey of State Government Finances and Census of Governments," 1942-2010. https://www.census.gov/programs-surveys/gov-finances/data/historical-data.html.

__, "Annual Surveys of State and Local Government Finances," 2008-2010. https://www.census.gov/programs-surveys/gov-finances/data/datasets.html.

U.S. Department of Commerce, "Wealth, Debt, and Taxation: 1902," Technical Report, U.S. Department of Commerce, Bureau of the Census 1907.

__, "Wealth, Debt, and Taxation: 1913," Technical Report, U.S. Department of Commerce, Bureau of the Census 1915.

__, "Wealth, Debt, and Taxation: 1922. Taxes Collected," Technical Report, U.S. Department of Commerce, Bureau of the Census 1924.

__, "Digest of State Laws Relating to Taxation and Revenue: 1922," Technical Report, U.S. Department of Commerce, Bureau of the Census 1922.

__, "Statistical Abstract of the United States," Technical Report, U.S. Department of Commerce, Bureau of the Census 1923-1942.

__, "Digest of State Laws Relating to Net Income Taxes: 1938," Technical Report, U.S. Department of Commerce, Bureau of the Census 1938.

__, "Annual Survey of State Government Finances and Census of Governments," Technical Report, U.S. Department of Commerce, Bureau of the Census 2010.

Witte, E.E., "Summary of Some Features of the Federal and State Income Tax Laws and of the Model Personal Income Tax Law Promulgated by the National Tax Association," *Bulletin of the National Tax Association*, 1923, *9* (2), 43–46.