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Abstract

This paper studies how the macroeconomic effects of tax cuts depend on occupational targeting—toward entrepreneurs versus wage workers. Using a new state-level panel of occupation-specific federal tax shocks for the United States from 1981 to 2017, we find that entrepreneur-targeted tax cuts generate substantially larger increases in output, consumption, and employment than revenue-equivalent worker-targeted cuts. These effects coincide with increases in both entrepreneurship and wage employment, pointing to business formation and firm expansion as key transmission channels. An incomplete-markets model with occupational choice attributes these findings to earnings-based borrowing constraints and demand-driven amplification that jointly produce large entrepreneur multipliers.

Keywords: Tax policy, Entrepreneurship, Earnings-based constraints, Occupational choice
JEL Codes: E62, H25, J23

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1 Introduction

Entrepreneur-focused tax relief has been a recurring feature of U.S. fiscal policy, appearing both in crisis-time interventions[1] and in ordinary tax reforms.[2] Despite its frequent use, little is known about whether its macroeconomic effects differ from those of tax cuts accruing to wage earners. The distinction is economically important: wage earners primarily adjust consumption and labor supply, while entrepreneurs also make business entry, financing, investment, and hiring decisions. This paper asks whether this occupational incidence matters for fiscal transmission. We find that entrepreneur tax cuts are more expansionary than revenue-equivalent worker tax cuts.

Our empirical contribution is to construct a new annual state-level panel of occupation-specific tax shocks from 1981 to 2017. Using microdata from the Current Population Survey (CPS), we define tax units at the household level and compute federal tax liabilities with NBER TAXSIM. We then implement the fixed-income approach of Zidar (2019), applying adjacent-year tax laws to a common tax base to isolate policy-driven liability changes. This procedure maps national tax reforms into state-level shocks that vary across states and occupation types. The resulting variation reflects two sources of differential exposure: the distinct tax treatment of self-employment income and W-2 wages, especially through payroll taxation, and differences in the income distributions of entrepreneurs and workers across states. This variation allows us to compare the macroeconomic effects of tax cuts accruing to entrepreneurs and wage workers.

We find that entrepreneur-targeted tax cuts generate substantially larger increases in real GDP, employment, and real consumption than worker-targeted cuts. An important source of this differential exposure is the payroll tax channel: because self-employment income and W-2 wages face different payroll-tax treatment, reforms that alter payroll-tax liabilities can generate sizable wedges between entrepreneur and worker tax shocks. The labor-market comovement is also distinct: entrepreneur tax cuts are associated with rising employment and rising real wages, consistent with a labor-demand-driven expansion, whereas worker tax cuts raise employment while real wages fall, consistent with a stronger labor-supply component. The occupational dynamics support a business-formation channel: entrepreneur tax cuts increase the number of entrepreneurs and also raise wage employment, indicating that these policies expand entrepreneurial activity and labor demand. Finally, we provide suggestive evidence of an earnings-based borrowing channel: entrepreneur-targeted tax cuts are more powerful for financially constrained groups, which micro evidence shows are also more exposed to income-related borrowing frictions.

[1] For example, the 2009 American Recovery and Reinvestment Act (ARRA) included over $50 billion in business tax incentives, while the 2020 Coronavirus Aid, Relief, and Economic Security (CARES) Act directed hundreds of billions of dollars toward small business support through programs such as the $670 billion Paycheck Protection Program (PPP) and payroll tax deferrals for the self-employed.

[2] For instance, the 2013 reform had a relatively larger payroll-tax effect on entrepreneurs than on wage earners, because both the expiration of the payroll-tax holiday and the introduction of the Additional Medicare Tax applied at the margin to payroll-taxable self-employment earnings.

We use an incomplete-markets general equilibrium model with occupational choice to interpret the channels behind these reduced-form patterns. The model builds on the entrepreneurial-choice framework of Quadrini (2000) and Cagetti and De Nardi (2006). Households face idiosyncratic shocks to labor productivity and entrepreneurial productivity and choose among wage work, entrepreneurship, and non-employment. Entrepreneurs operate a decreasing-returns technology with outside labor demand. To allow aggregate demand to feed back into production, we follow Krueger, Mitman and Perri (2016) and incorporate a parsimonious demand externality. Another key ingredient is entrepreneurial finance: following Drechsel (2023), we adopt an earnings-based borrowing constraint that links credit capacity to contemporaneous cash flow, and we contrast it with a conventional collateral-based formulation.

The model reproduces two qualitative patterns that help organize the empirical findings. First, entrepreneur-targeted tax cuts are more expansionary than revenue-equivalent worker-targeted tax cuts, generating larger responses of aggregate output and employment. This stronger aggregate response is accompanied by increases in entrepreneurial employment and, through stronger labor demand, wage employment. Second, worker-targeted tax cuts operate mainly through the wage-employment margin, with little movement in entrepreneurial employment. Mechanism decompositions further show that, following entrepreneur tax cuts, indirect general-equilibrium amplification—operating through equilibrium wages and the demand externality—accounts for an increasing share of the output response over time. By contrast, the effects of worker tax cuts are driven mainly by the direct tax-wedge channel, with relatively limited indirect amplification. The earnings-based borrowing constraint is central to generating large entrepreneur tax multipliers: when borrowing capacity depends instead on slowly adjusting collateral, the responses of hiring and investment are muted, and the multiplier advantage of entrepreneur tax cuts is substantially reduced.

Our paper relates to the empirical literature on the macroeconomic effects of tax policy. This literature moves beyond representative-agent views of tax policy by showing that tax multipliers depend on the characteristics of the recipients. Existing work has focused mainly on income (Zidar, 2019) and balance-sheet heterogeneity (Cloyne and Surico, 2016). We contribute by introducing occupation as a distinct dimension of tax incidence and by comparing tax cuts accruing to entrepreneurs with those accruing to wage workers.

Our paper builds on the empirical tax-shock literature that uses plausibly exogenous variation in tax policy to estimate macroeconomic effects. Romer and Romer (2010) provide foundational evidence on the aggregate consequences of narrative tax changes.[3] Subsequent work emphasizes that the incidence of tax changes across households can materially alter measured multipliers. Zidar (2019) shows that the output effects of tax cuts vary sharply with the income distribution

[3] See Wilson (2012), among others, for evidence on the economic effects of the ARRA, and Granja et al. (2022) and Autor et al. (2022) for analyses of the impact of the PPP.

of recipients, with larger effects when tax relief is concentrated among lower-income households. Cloyne and Surico (2016) highlight household balance sheets as a key source of heterogeneity, documenting larger consumption responses among households with mortgage debt. Our approach is consistent with this "who receives the tax cut" perspective, but shifts the relevant dimension of heterogeneity from income and liquidity positions to occupation.[4]

Our paper also connects to the literature on taxation, entrepreneurship, and business activity. Cullen and Gordon (2007) as well as Gentry and Hubbard (2000) analyze how differential treatment of business income, loss offsets, and marginal tax rates affects the incentives to become and remain an entrepreneur. Bruce (2000) provides early reduced-form evidence that income and payroll tax wedges influence transitions from wage-and-salary work into self-employment, while Heim (2010) shows that self-employment income is highly responsive to net-of-tax rates. More recently, Goodman et al. (2025) study responses to the Section 199A deduction and document increases in reported eligible business income, reinforcing the view that tax reforms can trigger strong responses among pass-through businesses.

A related body of work studies how tax policy affects investment, hiring, and the allocation of business activity. Mertens and Ravn (2013) distinguish personal and corporate income tax shocks. House and Shapiro (2008) use bonus depreciation to infer large investment responses, while Zwick and Mahon (2017) emphasize heterogeneity in investment responses across firms. Giroud and Rauh (2019) show that state taxes affect business activity at the establishment level, including employment and entry/exit, highlighting reallocation as a central margin. In addition, Akcigit et al. (2021) provide long-run evidence that tax rates can affect innovation outcomes, underscoring that taxes may influence growth-relevant margins beyond short-run demand and labor-supply channels. These papers show that tax policy can affect production-side decisions, not only household demand or labor supply.

Finally, our structural interpretation builds on macro-entrepreneurship models in which financial frictions shape entrepreneurial scale, wealth accumulation, and aggregate dynamics. Quadrini (2000) and Cagetti and De Nardi (2006) formalize how borrowing constraints and incomplete markets generate realistic entrepreneurial wealth concentration and dynamics. More recently, Drechsel (2023) emphasizes the empirical relevance of earnings-based borrowing constraints, a feature we use to discipline the amplification mechanism in our model.

Road Map The remainder of the paper is organized as follows. Section 2 presents the empirical analysis, where we use a local projection framework to estimate the differential effects of entrepreneur and worker tax shocks on macroeconomic outcomes. This section also examines, to the extent possible, the empirical relevance of the underlying mechanisms. Section 3 develops a DSGE

[4] Closest to our empirical setting, Liu and Williams (2019) document substantial cross-state heterogeneity in responses to federal tax shocks, emphasizing the value of state-level exposure variation.

model with occupational choice and earnings-based borrowing constraints to interpret the empirical findings and quantify the mechanisms behind the stronger effects of entrepreneur-targeted tax cuts. Section 4 concludes.

2 Empirical Analysis

2.1 Measuring Occupation-Specific Tax Exposure

2.1.1 CPS-Based Occupational Classification

We begin by constructing state-level occupation-specific tax shocks, distinguishing between entrepreneurs and workers, for the period 1981–2017.[5] A key step in constructing group-specific tax shocks is to classify households consistently as entrepreneurs or workers. The CPS provides detailed information on respondents' employment status and income sources, which we use to define entrepreneurial status at the household level.[6] In our baseline definition, a household is classified as entrepreneurial *if the primary taxpayer reports self-employment as their main occupation.* We identify occupational status using the CPS variable 'classwly', which records the class of worker in the job where the respondent spent the longest time during the year prior to the survey. We map this information to calendar years and classify each primary taxpayer's annual employment status. The entrepreneurial category includes both unincorporated and incorporated self-employed individuals, and we do not distinguish between farm and non-farm self-employment in the main definition. Households that do not meet this criterion are classified as workers. In the baseline classification, we do not use the occupational status of other household members. To assess robustness, we also consider alternative definitions of entrepreneurial households.[7] Our main results are robust to these alternative classifications, as discussed later in the paper.

2.1.2 Exposure Variation by State and Income

Before constructing the tax shocks, we first document the cross-state and income-group variation that generates differential exposure to entrepreneur-related tax reforms. Figure 1 and Table 1 highlight two sources of variation in exposure to entrepreneur-related tax reforms: geography and income. Figure 1 reports the average share of taxpayers classified as entrepreneurs, combining farm and non-farm self-employment, over 1981–2017. Entrepreneurial activity is relatively concentrated

[5] Because the exposure measures incorporate a four-year lag, the estimation sample begins in 1981 despite underlying data being available from the late 1970s.

[6] Throughout, we treat each CPS household as a tax unit and construct the relevant income measures at the household level.

[7] We consider alternative definitions of entrepreneurial households beyond our baseline: (1) a broad definition, under which at least one household member reports self-employment as their main occupation or reports nonzero business income, regardless of sign; and (2) a narrow definition, under which the primary taxpayer reports both self-employment as their main occupation and positive business income.

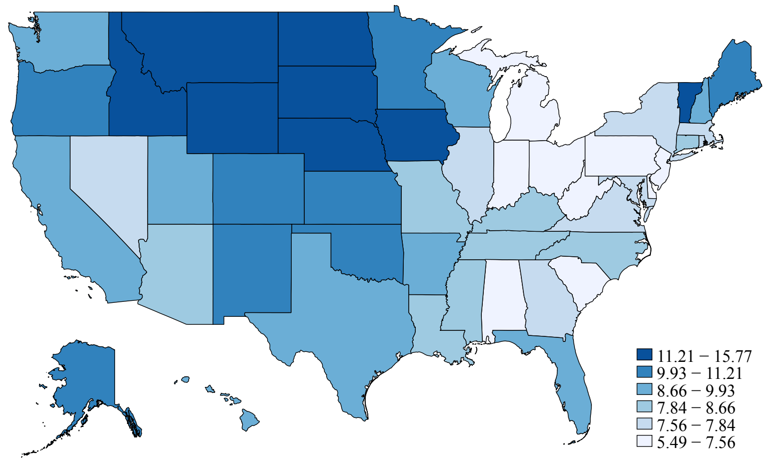

Figure 1: AVERAGE SHARE OF ENTREPRENEURIAL TAXPAYERS BY STATE
Note: The figure reports the average share of taxpayers classified as entrepreneurs across U.S. states from 1981 to 2017. Darker shades indicate higher shares of entrepreneurial households.

Table 1: POPULATION SHARE BY INCOME GROUP: ENTREPRENEURS VS. WORKERS

	Quintiles				Percentile (%)		Total
	1st	2nd	3rd	4th	80-95	95-100	
Entrepreneur	6.4	6.7	7.7	8.1	10.4	24.3	8.5
Worker	93.6	93.3	92.3	91.9	89.6	75.7	91.5

Note: The table reports the share of households classified as entrepreneurs and workers within each income group. The "Total" column reports the unconditional population shares across all households.

in the Upper Midwest and Plains, where entrepreneur shares exceed roughly 11 percent in states such as North Dakota, South Dakota, and Iowa. By contrast, several northeastern and southeastern states, including New York and Florida, exhibit much lower shares, around 6 percent. Table 1 shows that entrepreneurs are also unevenly distributed across income groups. Although they constitute only roughly 9 percent of households overall, entrepreneurs are disproportionately concentrated at the top of the income distribution: their share rises from 6.4 percent in the bottom quintile to 24 percent in the top 5 percent. Together, these state- and income-level differences imply that a uniform federal tax reform can generate heterogeneous exposure across states, depending not only on the size of a state's entrepreneurial base but also on where its entrepreneurs are located in the income distribution. This motivates our state-level design and the construction of employment-type-specific tax shocks.

Taken together, these patterns imply that federal tax reforms generate heterogeneous exposure through both state-level entrepreneurial shares and the income distribution of entrepreneurs. We therefore construct employment-type-specific tax shocks that capture this differential exposure and use them to study how tax policy transmits to state-level economic activity for entrepreneurs versus workers.

2.1.3 Tax Shock Construction

We now describe how we convert federal tax reforms into state-by-occupation tax shocks. Because many tax changes are implemented in response to prevailing or anticipated economic conditions, endogeneity poses a significant concern. To mitigate this issue, we restrict attention to exogenous tax changes identified by Romer and Romer (2010).[8] Their narrative-based approach uses legislative records, contemporaneous economic reports, and presidential statements to isolate tax actions motivated by long-run policy objectives—such as deficit reduction or long-run growth—rather than by short-run stabilization considerations. To measure policy-driven changes in household tax liabilities, we use the NBER TAXSIM model, which computes federal income tax liabilities from detailed income and demographic inputs. For each CPS household (treated as a tax unit), we feed the primary taxpayer's information and household income components into TAXSIM to obtain annual tax liabilities. We identify tax shocks following Zidar (2019) by holding taxable income fixed and comparing liabilities under two adjacent policy regimes. Specifically, the tax liability change in year t is calculated as the difference between:

(i) the *actual* liability, computed using year $t-1$ tax law applied to the same year $t-1$ income, and

(ii) the *counterfactual* liability, computed using year t tax law applied to year $t-1$ income.

This procedure isolates policy-driven changes in tax burdens, holding economic behavior constant. Taxpayers are grouped into two categories: *entrepreneurial households* and *worker households*. We define the *tax shock*, $T^g_{s,t}$, for group g (entrepreneurs or workers) in state s in year t as:

$$T^g_{s,t} \equiv \frac{\text{Tax Liability Change}^g_{s,t}}{\text{Total Tax Liability}_{s,t-1}}, \tag{1}$$

where the numerator represents the aggregate change in tax liability for group g in state s, and the denominator normalizes this by state-level tax liability in year $t-1$.[9] This standardization enables meaningful comparison of tax shocks across states and over time.

Figure 2 plots the resulting tax shock measures for entrepreneurs and workers, both as aggregate series averaged across states and as state-level series. The top panel reports shocks normalized by total state tax liability, while the bottom panel reports population-normalized shocks. The figure shows that entrepreneur and worker tax shocks often comove, reflecting common federal reforms, but their magnitudes and sometimes their signs differ substantially. This divergence arises

[8] We define an exogenous tax reform year as any calendar year that contains at least one quarter with an exogenous tax change in the Romer and Romer series. Zidar (2019) implements this classification using the Romer and Romer series through 2007, and Liu and Williams (2019) extend the series through 2017. Notably, the post-2007 series includes only unanticipated exogenous tax shocks and excludes anticipated changes.

[9] We avoid using total income or GDP, as this would exaggerate the shock size given entrepreneurs' small share of aggregate income.

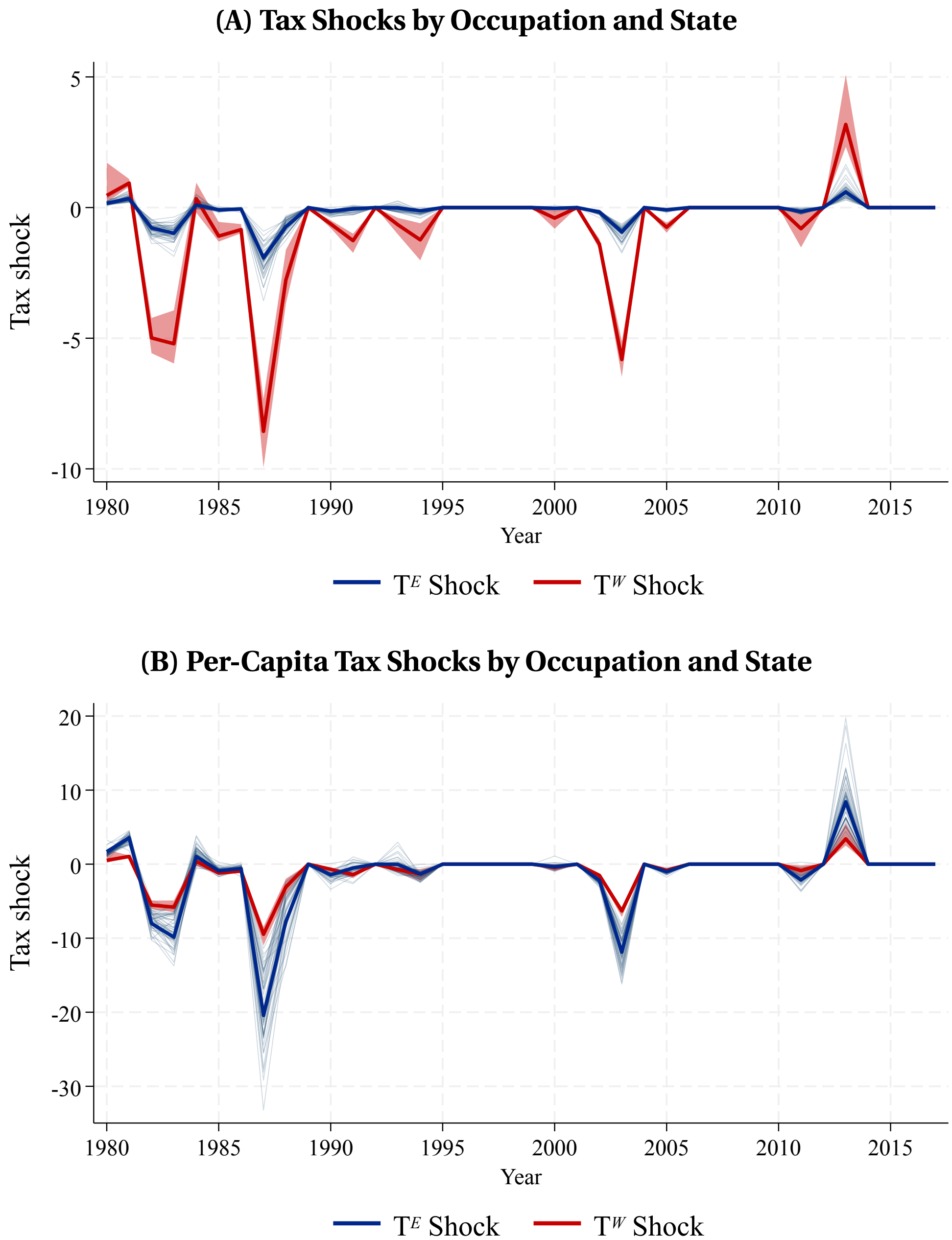

Figure 2: TAX SHOCK MEASURES: ENTREPRENEURS VS. WORKERS

Note: The tax shock measures are defined as the change in tax liabilities for each occupational group, scaled by total tax liabilities. The top panel reports shocks scaled by total state-level tax liabilities, while the bottom panel additionally normalizes by the population of each occupation group.

because states differ in occupational composition, income distribution, and exposure to specific provisions of the federal tax code. On a per-capita basis, tax changes for entrepreneurs are often larger than those for workers, despite entrepreneurs representing a smaller share of the population. The state-level series also display sizable variation across both states and groups, providing the cross-sectional and time-series variation used to identify the heterogeneous effects of tax policy.

2.2 Sources of Differential Tax Exposure

We next decompose the variation in occupation-specific tax shocks into two sources: payroll-tax treatment and exposure to the progressive income-tax schedule. The **payroll channel** reflects the differential treatment of W-2 wages versus net self-employment earnings under payroll taxation. The **income-position channel** captures differential exposure to common changes in the progressive income-tax schedule across groups, driven by where entrepreneurs and workers are located in the income distribution.

Payroll Channel Federal tax reforms are typically enacted as uniform statutory changes—adjustments to marginal rates, bracket thresholds, and broad deductions and credits. Yet the effective tax shock can differ systematically between entrepreneurs and wage earners because payroll taxation treats self-employment earnings differently from W-2 wages. In our setting, the primary employment-type-specific mechanism is a payroll-tax channel arising from the different statutory bases and incidence of the Federal Insurance Contributions Act (FICA) and the Self-Employment Contributions Act (SECA).[10] FICA governs payroll taxes on employee wages, with the employee-side tax withheld from W-2 earnings (and the employer-side remitted by the employer and not recorded as an individual tax payment in our liability concept). SECA governs payroll taxes on net self-employment earnings, effectively applying the Social Security and Medicare payroll tax schedule to business owners who earn income outside the W-2 system. Consequently, changes in Social Security and Medicare payroll parameters—rates, the taxable maximum, and related rules—can generate distinct and often more concentrated liability movements for entrepreneurs, even when income-tax provisions move in parallel.[11] Because this payroll channel directly generates differential tax changes between entrepreneurs and wage earners, we view it as a central driver of the differences in transmission between the two groups.

[10]Provisions such as bonus depreciation and certain expensing rules can be particularly important for entrepreneurs. However, we cannot capture their effects for two reasons. First, our TAXSIM-based tax shocks are constructed by applying current-law parameters to the previous year's tax base (holding behavior fixed), whereas these provisions mainly affect net business income through deductions tied to contemporaneous investment and accounting choices. Second, the CPS does not contain the investment and depreciation information required to simulate these provisions directly.

[11]In practice, major changes to the SECA earnings-base definition are rare; most time variation in entrepreneurs' payroll-tax liabilities instead reflects changes in Social Security and Medicare payroll parameters—especially statutory rates and the Social Security taxable maximum.

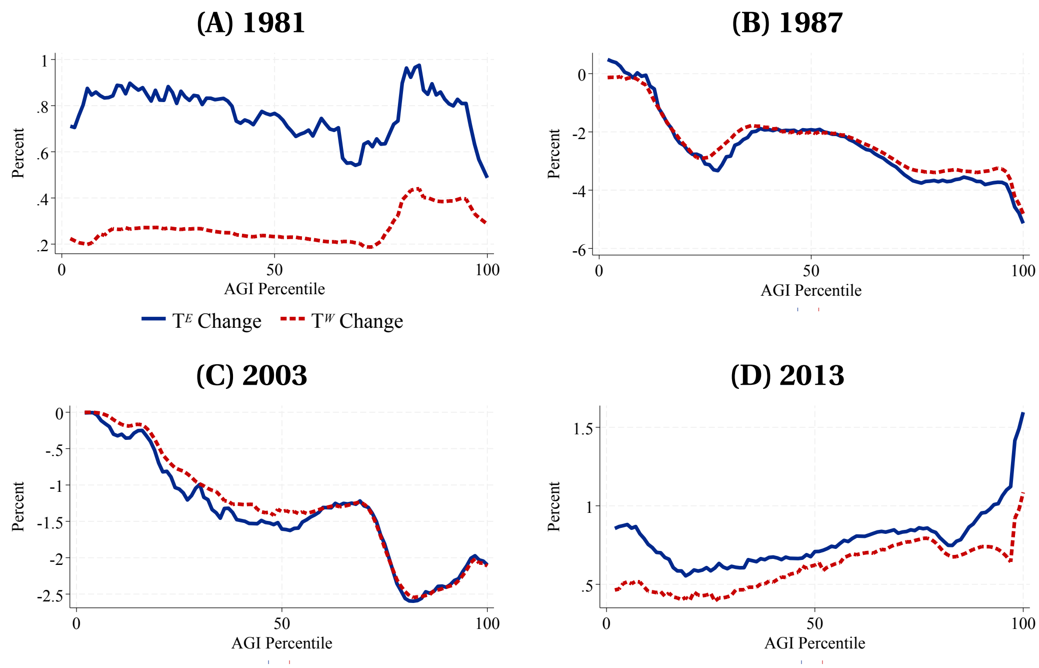

Figure 3: Tax Changes by AGI: Entrepreneurs vs. Workers

Note: The figure plots the average change in tax liabilities—expressed as a share of AGI—across the AGI distribution, separately for entrepreneurs and wage earners.

Income-Position Channel A second mechanism operates through the progressive individual income-tax schedule. Common changes in rates, brackets, deductions, and credits apply to both wage and business income, but their effective impact depends on where each group lies in the income distribution. Since entrepreneurs and wage earners occupy different income positions, and states differ in entrepreneurial intensity and income composition, the same federal reform can generate different measured shocks across groups and states. This income-position channel captures differential exposure to a common reform, rather than a direct entrepreneur-targeted policy change.

Reform Episodes Figure 3 provides case-study evidence from four reform years—1981, 1987, 2003, and 2013—by plotting the average change in tax liability (as a share of AGI) across the AGI distribution for entrepreneurs and wage earners. The episodes illustrate two recurring patterns. In payroll episodes, changes in payroll-tax parameters differentially affect self-employment earnings relative to W-2 wages, producing a clear entrepreneur–worker wedge—i.e., the payroll channel dominates. In tax-schedule episodes, both groups move similarly across the distribution because statutory income-tax changes are common; remaining differences are driven primarily by the income-position channel (differential exposure along the income distribution), even though aggregate entrepreneur shocks can be larger due to the concentration of entrepreneurial tax liabilities in the upper tail and in high-exposure states.

The 1981 profile is positive across the income distribution and markedly larger for entrepreneurs, consistent with a payroll-driven wedge. Payroll tax parameters rose for both the self-employed and employees, but the increase was larger on the self-employment tax schedule, reflecting step-ups in both the Social Security (OASDI) and Medicare (HI) components under SECA relative to the employee-side FICA rate.[12] This asymmetry mechanically raises entrepreneurs' implied liability changes relative to workers at nearly all income levels.[13]

The sharp negative movement for both entrepreneurs and wage earners in 1987 primarily reflects the first major implementation year of the Tax Reform Act of 1986 (TRA86). By redesigning the individual income-tax schedule effective in 1987, TRA86 generated sizable mechanical tax cuts for both groups under our fixed-income construction. A temporary credit against self-employment payroll taxes may slightly amplify the decline for entrepreneurs, but the near overlap of the two profiles indicates that 1987 is best interpreted as a broad, common income-tax schedule shock rather than an occupation-targeted episode.[14]

The 2003 episode shows tax cuts across nearly the entire AGI distribution for both entrepreneurs and workers, with larger cuts toward the upper tail.[15] This pattern is consistent with the Jobs and Growth Tax Relief Reconciliation Act of 2003, which accelerated previously scheduled income-tax rate reductions, expanded marriage-penalty relief, and temporarily raised Alternative Minimum Tax (AMT) exemption amounts.[16]

The 2013 profile is a canonical payroll episode. Two payroll-tax changes are central. First, the expiration of the 2011–12 payroll-tax holiday increased the Social Security payroll rate for employees and for the self-employed, generating a broad-based rise in payroll liabilities across the distribution. Second, the Additional Medicare Tax introduced in 2013 added a 0.9 percent levy on wages and self-employment income above the $200,000 (single) and $250,000 (joint) thresholds, producing the pronounced increase in the upper tail.[17]

[12] Specifically, the SECA total rate rose from 8.10% in 1979–80 (OASDI 7.05% + HI 1.05%) to 9.30% in 1981 (OASDI 8.00% + HI 1.30%), while the employee-side FICA rate increased from 6.13% (OASDI 5.08% + HI 1.05%) to 6.65% in 1981 (OASDI 5.35% + HI 1.30%).

[13] The gap widens toward the top of the distribution, consistent with higher-income entrepreneurs being more exposed to payroll-tax features such as the Social Security taxable maximum and related thresholds.

[14] The larger negative aggregate entrepreneur shock in 1987 (Figure 2) reflects aggregation rather than a stark difference in the underlying percentile profiles.

[15] As discussed above, we cannot separately reconstruct business-tax-base provisions that depend on detailed investment and deduction items. Accordingly, the close comovement of the entrepreneur and worker series suggests that the 2003 shocks are driven primarily by common changes in the individual income-tax schedule. Any remaining differences between entrepreneurs and workers therefore reflect differential exposure—stemming from differences in income levels and income composition—rather than separately identified business-deduction channels.

[16] As in 1987, aggregate entrepreneur shocks can be larger even when percentile profiles look similar because aggregation places disproportionate weight on high-income filers and high-exposure states; thus, residual differences are naturally interpreted through the income-position channel rather than occupation-specific tax provisions.

[17] The upper-tail steepening is mechanically larger for entrepreneurs because high-AGI entrepreneurs are more likely to have payroll-taxable self-employment earnings at the margin, increasing their exposure to Medicare payroll taxation.

2.3 State-Level Outcomes and Non-Tax Data

We use state GDP and consumption as our main measures of state-level economic activity. Annual state GDP is obtained from the BEA GDP by State series. State-level consumption is measured using BEA Personal Consumption Expenditures by state for 1997–2017. We construct labor-market outcomes from the CPS Annual Social and Economic Supplement (ASEC). Employment is defined as the number of individuals reporting either wage-and-salary employment or self-employment, excluding unpaid family workers. We also construct separate measures of wage employment and entrepreneurial employment using the same CPS-based occupational classification described above. Unless otherwise noted, labor-market outcomes are restricted to prime-age individuals with full-time, full-year attachment. Nominal hourly wages are computed as annual wage income divided by annual hours worked and then aggregated to the state-year level. To express outcomes in real terms, we deflate nominal variables using a state-level ACCRA price index.[18] This adjustment accounts for cross-state variation in purchasing power and allows consistent comparisons of real wages and real consumption across states and over time.[19]

2.4 Econometric Methodology

We next describe the empirical strategy used to estimate how federal tax policy changes targeted to entrepreneurs and workers affect subsequent state-level economic activity. Our approach is closely related to the state-level exposure design of Zidar (2019), but we construct separate exposure measures for entrepreneurial and worker households rather than a single aggregate tax shock. The key source of identification is that states differ in the prevalence of self-employment, business income, and pass-through activity, generating systematic cross-state variation in exposure to occupation-specific tax shocks even though the underlying federal reforms are national. For each horizon $h \in \{0, 1, 2, 3, 4\}$, we estimate the following local-projection specification:

$$\frac{y_{s,t+h} - y_{s,t-1}}{y_{s,t-1}} = \alpha_h^E T_{s,t}^E + \alpha_h^W T_{s,t}^W + trend_t \times \mu_{s,h} + \mu_{s,h} + \theta_{t,h} + \varepsilon_{s,t,h}, \tag{2}$$

where $\frac{y_{s,t+h} - y_{s,t-1}}{y_{s,t-1}}$ denotes the cumulative growth in economic activity in state s from $t-1$ to $t+h$. The key regressors are the group-specific tax shocks. $T_{s,t}^E$ measures the exogenous change in tax liabilities for taxpayers in the entrepreneur group in state s and year t, expressed as a share of total tax liability; $T_{s,t}^W$ is defined analogously for the worker group. The coefficients α_h^E and α_h^W trace out the dynamic responses of state economic activity to entrepreneur- and worker-specific tax shocks, respectively, across horizons. Inference is based on standard errors clustered at the

[18] We begin with the ACCRA series used in Zidar (2019) and extend it to a balanced panel by imputing missing observations with state-level inflation rates from a recently constructed state CPI series based on micro price data.

[19] All details on data sources, variable definitions, sample restrictions, and construction procedures are provided in the Appendix.

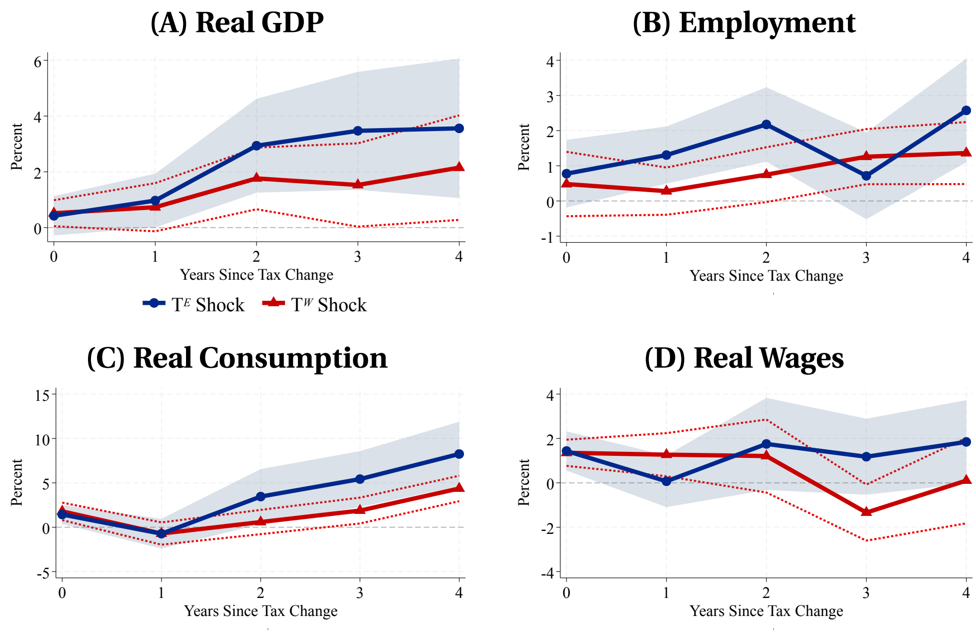

Figure 4: REAL EFFECTS OF TAX CUTS FOR ENTREPRENEURS VS. WORKERS
Note: The figure plots cumulative responses of real GDP, employment, real consumption, and real wages to a 1 percent tax cut, with tax shocks scaled by total state-level tax liability. Responses are estimated separately for entrepreneur-targeted and worker-targeted tax cuts using the baseline local-projection specification in equation (2). All nominal variables are deflated using the ACCRA state-level price index; consumption denotes real personal consumption expenditures. Consumption is available only from 1997 onward, so Panel (C) is estimated over a shorter sample. Standard errors are clustered at the state level, and shaded areas denote 68 percent confidence intervals.

state level. Observations are weighted by real state GDP lagged by four years. The regression includes horizon-specific state fixed effects $\mu_{s,h}$ and horizon-specific year fixed effects $\theta_{t,h}$. To flexibly control for differential long-run growth across states, we also allow for state-specific linear trends by interacting a linear time trend $trend_t$ with the horizon-specific state component $\mu_{s,h}$.[20]

2.5 Estimation Results

Effects on Real Economic Activity Figure 4 plots impulse responses of real economic activity to a one-percent tax cut (scaled by total state-level tax liability), separately for reforms that primarily reduce taxes for entrepreneurs versus wage earners. The figure reports responses relative to the year immediately preceding the tax change (event time 0). We examine real GDP, employment, real consumption, and real wages; all nominal series are deflated using the ACCRA state-level price index.[21]

Two results emerge. First, entrepreneur-targeted tax cuts generate substantially larger real

[20] As robustness checks, we augment the baseline specification with additional controls; the results remain robust. See Section 2.7 for details.

[21] Because both shocks originate from the same federal reforms, they remain correlated even with year fixed effects, which contributes to relatively wide confidence bands. We therefore interpret the results cautiously, focusing on the relative magnitude, persistence, and consistency of the responses rather than horizon-by-horizon statistical significance.

effects than worker-targeted tax cuts. Panel (A) shows that real GDP rises steadily following an entrepreneurial tax cut, reaching roughly 3–4 percent within two to three years.[22] The corresponding response to a worker-targeted tax cut is markedly smaller, on the order of 1–2 percent over the same horizon. We compute the medium-run output effect using a four-year GDP multiplier. The estimated four-year multiplier is about 5 for entrepreneur-targeted tax changes, compared with about 2 for worker-targeted tax changes.[23] Interpreted in tax-cut terms, an equally sized tax reduction delivers a substantially larger medium-run increase in output when it is targeted to entrepreneurs than when it is targeted to wage earners. Second, the output differential is mirrored in labor-market quantities. Panel (B) indicates that employment increases sharply after entrepreneur tax cuts—peaking around 2 percent in the second year—whereas worker-targeted tax cuts produce an employment gain below 1 percent and a flatter trajectory.

Panels (C) and (D) shed light on transmission through aggregate demand and factor prices. Real consumption responds more gradually than GDP but remains elevated over the medium run, especially after entrepreneur tax cuts: the consumption response continues to build through years 3–4, reaching several percentage points above baseline, while the worker-targeted response remains considerably smaller throughout.[24] Real wages move less than quantities, but the wage–employment comovement differs sharply across the two reforms. Entrepreneur tax cuts are associated with sustained increases in both employment and real wages, consistent with an expansion in labor demand. In contrast, worker-targeted tax cuts raise employment while real wages temporarily decline—most notably around year 3—before partially recovering, a pattern more consistent with a labor-supply expansion. Overall, the stronger and more persistent consumption and wage responses under entrepreneur shocks point to larger aggregate-demand amplification relative to worker-targeted tax cuts.

Occupational Employment Responses The aggregate responses above could reflect either (i) reallocation across occupations with limited net job creation, or (ii) an expansion in entrepreneurial activity that raises labor demand and increases wage employment alongside entrepreneurship. To distinguish these channels, we decompose employment into the number of entrepreneurs and the number of wage earners and trace their dynamic responses to entrepreneur- versus worker-targeted tax cuts. Figure 5 reports the resulting impulse responses. Panel (A) shows that entrepreneur-

[22]We also include the pre-reform period in the event study, specifying event time $h \in \{-3,-2,-1\}$. There is no statistically significant variation prior to the tax shocks, as shown in Figure A.2 in the Appendix.

[23]Following Zidar (2019), we estimate the multipliers using the following regression specification:

$$\frac{y_{s,t}-y_{s,t-h}}{y_{s,t-h}} = \chi^E \sum_{m=0}^{h} T^E_{s,t-m} + \chi^W \sum_{m=0}^{h} T^W_{s,t-m} + \text{controls} + \varepsilon_{s,t},$$

where $y_{s,t}$ is nominal state GDP. The tax shock for group $g \in \{E, W\}$ is the change in tax liabilities in year t, scaled by lagged nominal state GDP. With this normalization, χ^g is the h-year GDP multiplier.

[24]Results are robust when restricting consumption to nondurables only, further reinforcing the robustness of our main conclusions.

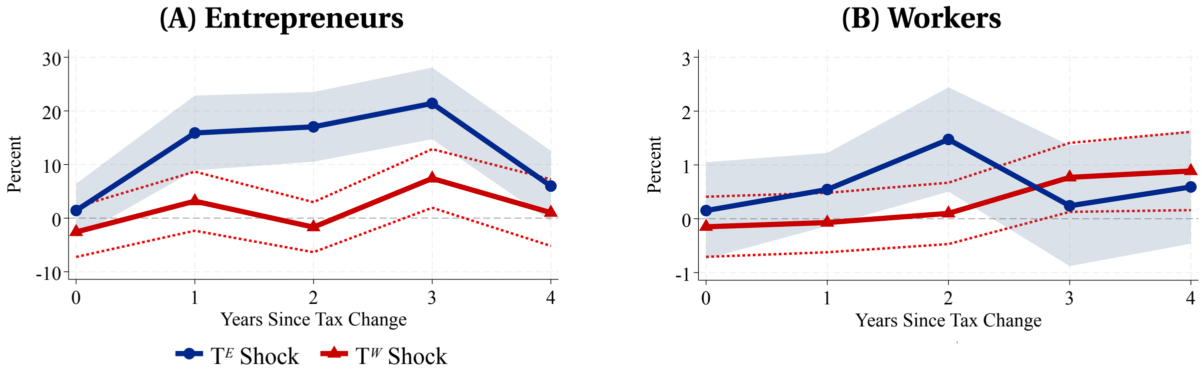

Figure 5: EMPLOYMENT RESPONSES BY OCCUPATION

Note: Cumulative responses of occupational employment to a 1 percent tax cut—expressed as a share of total state-level tax liability—separately for entrepreneurs and workers. Estimates are based on the baseline event-study specification in equation (2). Standard errors are robust and clustered at the state level. The 68 percent confidence intervals are shown as shaded areas or dotted lines.

targeted tax cuts are followed by a sizable and sustained increase in the number of entrepreneurs, whereas worker-targeted tax cuts generate a smaller and less persistent response. This pattern points to an important extensive-margin adjustment in entrepreneurial activity—through entry, continuation, or shifts in organizational form—when the after-tax return to entrepreneurship rises. Panel (B) shows that wage employment also increases after entrepreneur tax cuts, especially at short horizons. The simultaneous rise in entrepreneurs and wage earners indicates that entrepreneur tax cuts are not primarily reshuffling workers across occupations; instead, they are accompanied by net job creation consistent with firm entry and the scaling up of incumbent businesses. By contrast, worker-targeted tax cuts produce a more gradual and persistent increase in wage employment with comparatively muted movements in entrepreneurship, consistent with a dominant wage-work margin.

Payroll vs. Income-Position Channels Next, we separate our tax shocks into payroll and income-tax components to identify which statutory channel accounts for the differential transmission between entrepreneurs and wage earners. Figure 6 decomposes the mechanical change in tax liabilities into a payroll component and a federal income-tax component, plotting average changes (as a share of AGI) across the AGI distribution for entrepreneurs and wage earners.[25] For clarity, we focus on two illustrative reform years—1981 and 1987—that provide a clean contrast and help identify which statutory margin generates the entrepreneur–worker wedge. First, 1981 is overwhelmingly payroll-driven. In the 1981 panel, the federal income-tax component is modest and nearly indistinguishable across entrepreneurs and workers. By contrast, the payroll component exhibits a large upward shift for entrepreneurs relative to workers throughout the distribution, with a particularly pronounced wedge in the upper tail. This pattern is precisely what one would

[25] See Figure A.1 in the Appendix for the aggregate time-series tax shock measures for entrepreneurs and wage earners, decomposed into payroll and income-position components.

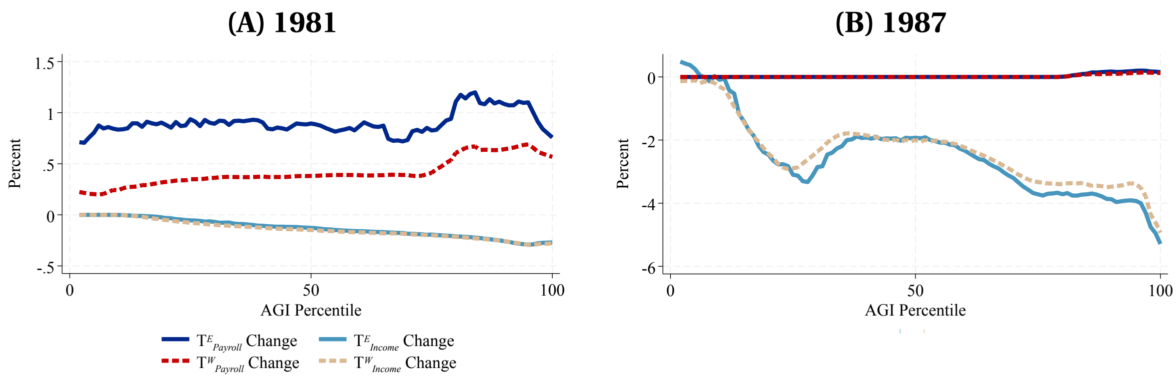

Figure 6: TAX CHANGES BY AGI: ENTREPRENEURS VS. WORKERS
Note: The figure plots the average mechanical change in tax liabilities—scaled by AGI—across the AGI distribution, separately for entrepreneurs and wage earners. The change is decomposed into a payroll component and an income-position (income-tax) component. $T^g_{Payroll}$ denotes payroll-related tax changes for occupation g, while T^g_{Income} denotes changes attributable to the federal income-tax schedule.

expect when the effective change is dominated by payroll parameters that apply more strongly to self-employment earnings than to employee wages. In the 1987 panel, the payroll component is essentially flat and close to zero for both groups, indicating that payroll-tax parameters contribute little to the year-to-year liability change. Instead, nearly the entire movement comes from the federal income-tax component, which shows large mechanical tax reductions across the distribution. The entrepreneur and worker profiles move closely together, consistent with a common statutory change in the income-tax schedule.[26]

Figure 7 shows the impulse responses of real activity (measured by real GDP and consumption) into components transmitted through the payroll channel versus the income-position channel, separately for entrepreneurs and wage earners. The markedly larger macroeconomic effects associated with entrepreneur-directed tax cuts are driven overwhelmingly by the payroll channel. In both panels, the response attributed to the entrepreneur payroll component rises sharply and remains elevated over the medium run, accounting for the bulk of the cumulative increase in real GDP and consumption. The payroll-driven GDP response for entrepreneurs is an order of magnitude larger than the corresponding income-tax component, and it continues to build thereafter; the same dominance appears for consumption. The income-position channel plays a limited role in explaining the entrepreneur–worker gap. The income-tax components are comparatively small for both groups and move closely together across horizons, implying that common income-tax schedule changes—together with differential exposure along the income distribution—contribute little to the differential real effects. If anything, the income-position responses are modest and do not replicate the pronounced divergence between entrepreneurs and workers observed in the overall estimates.

[26]Any residual differences are naturally interpreted through the income-position channel: entrepreneurs and workers (and the states in which they are concentrated) occupy different parts of the income distribution, so a uniform schedule change can translate into different measured shocks once liability changes are aggregated to the state level.

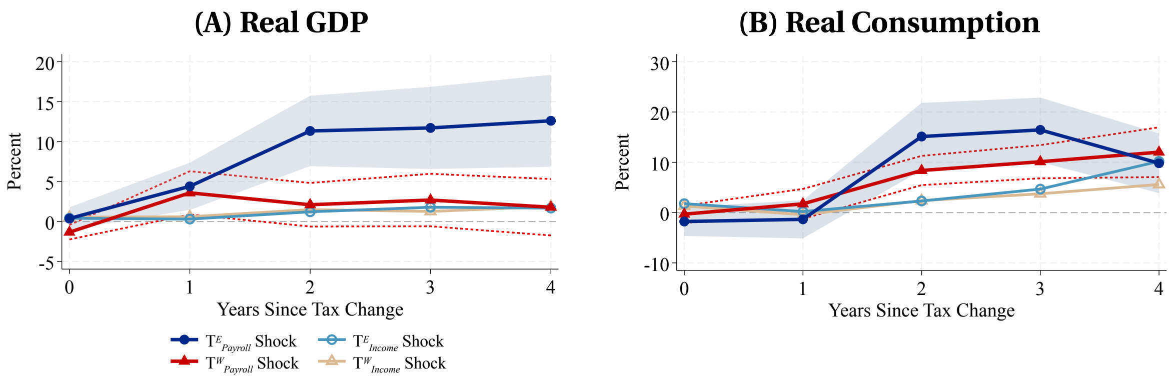

Figure 7: RESPONSES OF GDP AND CONSUMPTION: PAYROLL VS. INCOME-POSITION

Note: Cumulative responses of real GDP and consumption to a 1 percent tax cut (scaled by total state tax liability), shown separately for entrepreneurs and wage earners and decomposed into *payroll* and *income-position* shocks. $T^g_{Payroll}$ denotes the payroll-related tax shock for occupation g, while T^g_{Income} denotes the income-position (income-tax schedule) shock. Estimates use the baseline specification with occupation-specific shocks included jointly. For $T^g_{Payroll}$ shocks, standard errors are heteroskedasticity-robust and clustered at the state level, and shaded areas indicate 68 percent confidence intervals. For T^g_{Income} shocks, we do not plot confidence intervals for readability.

Hence, the stronger real-activity effects of entrepreneur-targeted tax cuts appear to operate mainly through the payroll treatment of self-employment earnings, rather than through differential exposure to common income-tax schedule reforms. This decomposition motivates our model's focus on the payroll channel as the key entrepreneur–worker tax wedge.

2.6 Evidence for Earnings-Based Financing

Recent micro-level evidence suggests that firms' borrowing capacity is often tied more closely to current income or cash flow than to collateral values alone (Lian and Ma, 2020). Related work also shows that income-based borrowing specifications can better account for aggregate dynamics than purely collateral-based formulations (Drechsel, 2023). Motivated by this evidence, we argue that an earnings-based borrowing constraint is an important channel through which tax cuts targeted to entrepreneurs generate larger real effects than equivalent tax cuts targeted to wage earners. Because this mechanism is difficult to establish directly in reduced-form evidence, we provide two complementary pieces of suggestive evidence. First, using the state-level panel from the preceding analysis, we examine whether entrepreneur-targeted tax cuts have stronger effects for groups that are more likely to be financially constrained. Second, we use the Survey of Consumer Finances (SCF), which contains detailed information on household debt and credit experiences, to assess more directly whether these same groups are more exposed to income-related borrowing frictions.

2.6.1 Financing-Sensitive Heterogeneity

We begin by asking whether the effects of entrepreneur-targeted tax cuts are strongest precisely where an earnings-based borrowing constraint is most likely to bind. Income is the natural empirical

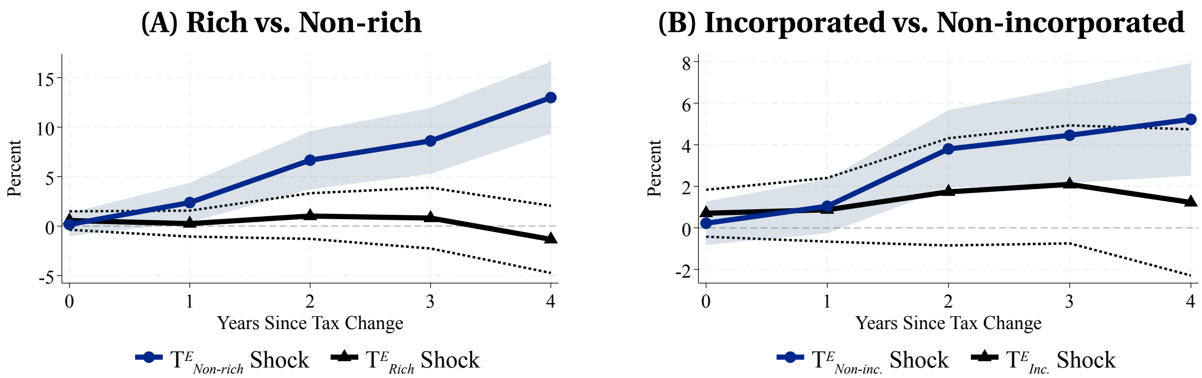

Figure 8: RESPONSE OF GDP: FINANCING-SENSITIVE HETEROGENEITY

Note: Cumulative responses of real GDP to a 1 percent tax cut, expressed as a share of total state-level tax liability. Panel (A) compares responses to tax cuts targeted to rich entrepreneurs—defined as those in the top 10 percent of the AGI distribution—and non-rich entrepreneurs in the bottom 90 percent. Panel (B) compares responses to tax cuts targeted to incorporated and non-incorporated entrepreneurs. Standard errors are robust and clustered at the state level. Shaded areas indicate 68 percent confidence intervals.

margin for this test. If borrowing capacity depends on current income or cash flow, then tax relief should have larger real effects for entrepreneurs with lower income, whose financing limits are more likely to be tight. By contrast, for high-income entrepreneurs, the same tax relief should be more likely to be inframarginal. To examine this implication, we split entrepreneurs by AGI. "Rich" entrepreneurs are defined as those in the top 10 percent of the AGI distribution, while "non-rich" entrepreneurs are those in the bottom 90 percent. We then re-estimate equation (2) with separate entrepreneur tax shocks for the two groups. The left panel of Figure 8 reports the results. The responses display a sharp asymmetry. Tax cuts targeted to non-rich entrepreneurs generate large and steadily rising effects on real activity: real state GDP increases monotonically and reaches roughly 8 percent.[27] By contrast, tax cuts targeted to rich entrepreneurs produce much weaker and shorter-lived responses. This pattern is consistent with the view that, for non-rich entrepreneurs, tax relief raises after-tax cash flow and relaxes borrowing capacity on impact when credit limits comove with earnings, thereby enabling more immediate expansion in hiring and production. For rich entrepreneurs, constraints are less likely to bind, so the same tax relief is more likely to be inframarginal and therefore generates smaller real effects. In this sense, the income split provides suggestive evidence that the entrepreneur advantage in tax multipliers is tied to the strength of earnings-based financing frictions.

We next provide a second suggestive exercise by distinguishing between incorporated and non-incorporated entrepreneurs. This comparison is useful because non-incorporated entrepreneurs are more likely to face tight financing constraints, whereas incorporated entrepreneurs typically have greater access to external finance and are therefore less likely to be constrained at the margin.

[27] The results are also informative in light of Zidar (2019)'s finding that, in the aggregate, income-tax cuts accruing to the bottom 90 percent are more expansionary. Our decomposition delivers a sharper, occupation-based interpretation: the expansionary effects of "bottom-90" tax relief appear to be driven disproportionately by entrepreneurs within that group rather than by wage earners.

If the mechanism operates through earnings-based borrowing capacity, tax cuts should again be more powerful for the group more exposed to such financing frictions. We therefore decompose entrepreneur-targeted tax shocks into separate shocks for incorporated and non-incorporated entrepreneurs. The results point in the same direction as the income split. The right panel of Figure 8 shows that tax cuts targeted to non-incorporated entrepreneurs generate large and steadily rising output effects. The response of real state GDP is substantially stronger for this group, consistent with the view that tax relief is especially powerful when it relaxes financing constraints for more marginal businesses.

These two exercises deliver a consistent message. Tax cuts are especially expansionary when directed toward entrepreneurs who are more likely to be financially constrained—namely, non-rich and non-incorporated entrepreneurs. While these patterns are only suggestive and do not by themselves identify the mechanism, they align closely with the idea that the entrepreneur advantage in tax multipliers operates through earnings-based borrowing constraints. This evidence provides empirical motivation for the cash-flow-linked financing channel that we formalize in the structural model, together with its amplification through hiring and demand spillovers.

2.6.2 Cross-Sectional Evidence from the Survey of Consumer Finances

The state-level evidence above shows that entrepreneur-targeted tax cuts are especially expansionary for groups that are more likely to be financially constrained, in particular non-rich and non-incorporated entrepreneurs. While these response patterns are consistent with an earnings-based financing channel, they do not by themselves establish that the relevant entrepreneur groups are indeed more exposed to income-related borrowing frictions. To speak more directly to this mechanism, we turn to cross-sectional evidence from the SCF, which contains unusually rich information on households' credit experiences, balance sheets, income, and business ownership.[28]

The SCF is particularly useful for our purposes because it allows us to distinguish not only whether a household is borrowing constrained, but also the reported reason for the constraint. We classify a household as borrowing constrained if it satisfies at least one of the following conditions: (i) a credit application was denied, (ii) the household received less credit than requested, or (iii) the household refrained from applying because it expected to be rejected. Using the SCF follow-up questions, we further classify the underlying reason for the constraint as income-related, collateral-related, or other. We define occupational groups at the household level in a manner similar to our CPS-based classification.

Table 2 reports the fraction of households that are borrowing constrained and, among constrained households, the share citing income-related reasons, by occupation and income group. Two patterns stand out. First, borrowing constraints are substantially more prevalent among lower-income households than among high-income households across all occupation groups. In Panel

[28]We use the 2001 wave of the SCF, which lies near the midpoint of our CPS sample period.

Table 2: Income-Related Borrowing Constraints by Occupation and Income

	All	Non-rich	Rich
(A) Fraction of Constrained (%)			
Non-incorporated entrepreneurs	23.1	26.4	11.9
Incorporated entrepreneurs	13.8	24.5	4.6
Workers	27.6	29.2	8.3
(B) Income-related Reasons among Constrained (%)			
Non-incorporated entrepreneurs	36.4	37.9	24.7
Incorporated entrepreneurs	9.4	10.9	2.9
Workers	25.8	25.9	24.6

Notes: Panel (A) reports the fraction of households that are borrowing constrained. Panel (B) reports, among borrowing-constrained households, the share citing income-related reasons for the constraint.

(A), the borrowing-constraint rate is 26.4 percent for non-incorporated entrepreneurs, 24.5 percent for incorporated entrepreneurs, and 29.2 percent for workers among lower-income households, compared with 11.9, 4.6, and 8.3 percent, respectively, among high-income households. This pattern indicates that financing constraints are closely related to income position.

Second, the composition of constraints also points to the importance of income, but this pattern differs sharply across occupation groups. In Panel (B), among borrowing-constrained households, the share citing income-related reasons rises markedly for entrepreneurs as income falls. For non-incorporated entrepreneurs, the share is 37.9 percent in the lower-income group, compared with 24.7 percent in the high-income group; for incorporated entrepreneurs, the corresponding figures are 10.9 and 2.9 percent. By contrast, workers show little variation across income groups. Thus, the stronger income gradient in Panel (B) is specific to entrepreneurship rather than a general feature of all households. Overall, the SCF evidence suggests that the relevant financing friction is closely tied to income or cash flow, especially for entrepreneurs.

2.7 Robustness

We conduct a battery of robustness checks to assess whether our core findings depend on particular measurement choices or specification details.

Alternative Definitions In the baseline classification, we define a household as entrepreneurial if the primary taxpayer reports self-employment as their main occupation. As a robustness check, we consider two alternative classifications: a broader definition and a narrower definition. **Alternative Definition 1 (Broad)—**A household is classified as entrepreneurial if at least one household member reports self-employment as their main occupation or reports nonzero business income (regardless of sign)**. Alternative Definition 2 (Narrow)—**A household is classified as entrepreneurial if the primary taxpayer has positive business income and reports self-employment as their main occupation. Figures A.5 and A.6 in the Appendix report the results under Alternative Definitions 1 and 2, respectively. The main conclusion is unchanged: across both alternative classifications, tax cuts targeting entrepreneurs generate larger effects on real GDP and consumption than tax cuts aimed at wage earners.

Unanticipated Tax Shocks We also re-estimate the effects using unanticipated exogenous tax shocks following Mertens and Ravn (2012).[29] Figure A.8 in the Appendix reports the corresponding results and shows that the main findings remain robust.

Excluding Incorporated Businesses To ensure that the results are not driven by incorporated businesses, we exclude incorporated business owners from the entrepreneurial group (they account for around 30% of entrepreneurs in our sample). Figure A.7 in the Appendix presents the results and confirms that the main conclusions are unchanged.

Additional Macro Controls Finally, we augment the baseline specification by including lagged dependent variables as controls and adding additional state-level business-cycle controls, including the unemployment rate and state-level GDP, to better account for cyclical conditions across states. The results are reported in Figures A.9 and A.10 in the Appendix. As shown, adding these controls does not materially affect the estimated responses: the qualitative patterns and relative magnitudes of entrepreneur-targeted versus worker-targeted tax cuts remain intact.

3 The Occupational Choice Model

To interpret the empirical asymmetry between entrepreneur- and worker-targeted tax cuts, we develop a DSGE model with occupational choice and incomplete asset markets. Building on Quadrini (2000) and Cagetti and De Nardi (2006), the model features an entrepreneurial margin driven by idiosyncratic shocks to managerial ability. Each period, households endogenously choose among three occupational states—wage employment, entrepreneurship, and non-employment. Embedding occupation-specific tax shocks in this environment allows us to quantify how entrepreneur- versus worker-targeted tax policy transmits to aggregate output and consumption through occupational reallocation and general-equilibrium feedback.

[29] Mertens and Ravn (2012) treat tax changes with an implementation lag of less than one quarter as unanticipated. Liu and Williams (2019) extend their quarterly unanticipated tax shock series through 2017. We map the quarterly shocks to an annual frequency by setting the annual measure to be nonzero whenever at least one quarter in that calendar year records a nonzero unanticipated shock.

3.1 Heterogeneity

Households differ along two idiosyncratic state variables—labor productivity, x, and managerial ability, z—each of which evolves as a stationary log-AR(1) process,

$$\ln s_t = (1-\rho_s)\ln \overline{s} + \rho_s \ln s_{t-1} + \epsilon_{s,t}, \;\; \epsilon_{s,t} \sim N(0,\sigma_s^2), \tag{3}$$

where $\overline{s}$ denotes the unconditional mean of the corresponding state, where $s \in \{x, z\}$. To solve the model numerically, each continuous process is discretized via the Tauchen (1986) method, yielding a Markov transition matrix Π^s, where $s \in \{x, z\}$. The two shocks are (i) independent across households, (ii) identically distributed for households in the same current state, and (iii) mutually orthogonal.

3.2 Technology

The economy comprises two production sectors: a representative corporate sector and an entrepreneurial (owner-managed) sector. Introducing a corporate sector alongside entrepreneurs follows standard practice in the entrepreneurship literature (e.g., Quadrini, 2000 and Cagetti and De Nardi, 2006). Capital depreciates at the common rate $0 < \delta < 1$ in both sectors.

Corporate Production The corporate sector employs capital K and effective labor L to produce output according to a constant-returns Cobb–Douglas technology:

$$F(K_t, L_t, d_t) = d_t K_t^{\alpha} L_t^{1-\alpha}, \tag{4}$$

where α is the capital income share, and d_t captures a demand externality. A benchmark real business cycle (RBC) model provides limited scope for aggregate demand to feed back into aggregate supply.[30] While such feedback can be introduced through nominal rigidities, we instead follow Krueger, Mitman and Perri (2016) and Phan (2025) and adopt a parsimonious demand–supply link by allowing effective productivity to depend positively on aggregate private consumption, i.e., $d_t = C_t^{\omega}$, where ω governs the strength of the consumption externality. We prefer this approach to a New Keynesian model with nominal rigidities because it allows us to decompose the total effect of tax shocks more transparently into a direct effect and an indirect demand-driven effect. In this

[30]Profit maximization implies the standard first-order conditions:

$$w_t = (1-\alpha) d_t K_t^{\alpha} L_t^{-\alpha},$$
$$r_t = \alpha d_t K_t^{\alpha-1} L_t^{1-\alpha} - \delta,$$

so the competitive wage w_t and rental rate r_t clear the factor markets each period.

setup, higher consumption raises TFP, which induces an endogenous demand–supply feedback: higher consumption raises effective productivity, increases factor incomes, and thus further affects consumption.[31]

Entrepreneurial Production An entrepreneur endowed with idiosyncratic managerial ability z hires effective outside labor l and operates own capital k through a decreasing-returns technology

$$f(k_t, l_t, z_t, d_t) = d_t z_t \left(k_t^{\alpha} l_t^{1-\alpha}\right)^{\psi}, \tag{5}$$

where $0 < \psi < 1$ denotes a span-of-control parameter.[32] After paying the market wage w_t and rental rate r_t, the entrepreneur retains residual profits, π_t:

$$\pi_t(k_t, l_t, z_t, d_t) = f(k_t, l_t, z_t, d_t) - (r_t + \delta)k_t - w_t l_t \tag{6}$$

Earnings-Based Financing Constraint Rather than imposing a conventional collateral (asset-based) borrowing constraint, we adopt an earnings-based financing formulation in the spirit of Drechsel (2023):

$$k_t \leq \theta \max\{\widetilde{\mathbb{E}}_t \pi_t, 0\}, \tag{7}$$

where $\theta \geq 1$ captures the degree of capital market imperfection for entrepreneurial production activities, and $\max\{\widetilde{\mathbb{E}}_t \pi_t, 0\}$ implies that only households capable of generating positive current profits are able to operate a business. This earnings-based constraint is consistent with micro-level evidence and has been shown to reproduce aggregate dynamics more accurately than collateral-based formulations (Lian and Ma, 2020; Drechsel, 2023). To avoid computational complications from the simultaneous determination of profits and input choices, we assume that lenders base credit limits on *expected* profits, denoted $\widetilde{\mathbb{E}}_t \pi_t$. Lenders form rational, model-consistent, and numerically tractable expectations conditional on information available at time t,

$$\widetilde{\mathbb{E}}_t \pi_t = \pi_t(\tilde{k}_t, \tilde{l}_t, z_t, d_t). \tag{8}$$

We further assume that lenders' perceived capital input scales with the entrepreneur's net worth a_t,

$$\tilde{k}_t = \eta a_t, \tag{9}$$

[31] As in Krueger, Mitman and Perri (2016) and Phan (2025), we assume that only private consumption generates such external effects, while investment and government spending do not directly influence TFP.

[32] Decreasing returns to scale are routinely adopted in the entrepreneurship literature to capture the entrepreneur's limited span-of-control—see, for example, Buera, Kaboski and Shin (2011), Buera and Shin (2013), and Midrigan and Xu (2014).

where $\eta > 0$ governs how strongly net worth translates into perceived entrepreneurial scale.[33] Given $\tilde{k}_t$ and prevailing prices, $\tilde{l}_t$ is chosen to maximize expected profits, so $\widetilde{\mathbb{E}}_t \pi_t$ depends only on state variables and prices.

3.3 Household's Problem

Wage Worker's Problem A (wage) worker chooses next-period assets a' and current consumption c to maximize expected lifetime utility subject to a standard budget constraint and a borrowing limit. Given the market wage w and the interest rate r and an idiosyncratic efficiency level x, the budget constraint is

$$c + a' = y + a - T(y, y^p), \tag{10}$$

where market income y is the sum of capital income and payroll-taxable income y^p. For wage earners, payroll-taxable income coincides with labor income, so $y = ra + y^p$ and $y^p = wx$. $T(y, y^p)$ denotes total tax payments, comprising payroll taxes and income taxes. Payroll taxes are levied only on y^p, whereas income taxes are assessed on y.[34] A household that chooses wage employment supplies one unit of labor inelastically and incurs a fixed utility cost, Γ^W. The individual state is $\chi \equiv (a, x, z)$ and the aggregate state is (μ, τ), where μ is the joint distribution of (a, x, z) across households, and τ is tax shocks. The worker's value function solves

$$V^W(\chi; \mu, \tau) = \max_{c, a'} \{u(c) - \Gamma^W + \beta \mathbb{E}\left[V(\chi'; \mu', \tau')\right]\} \tag{11}$$

subject to the budget constraint above and the law of motion for the distribution,

$$\mu' = \mathbb{T}(\mu, \tau), \tag{12}$$

where $\mathbb{T}$ is the aggregation operator implied by individual decisions and the idiosyncratic and aggregate shock processes.

Entrepreneur's Problem When a household chooses entrepreneurship, it incurs the fixed utility cost, Γ^E. The entrepreneur's value function is

$$V^E(\chi; \mu, \tau) = \max_{c, a', k, l} \{u(c) - \Gamma^E + \beta \mathbb{E}\left[V(\chi'; \mu', \tau')\right]\}, \tag{13}$$

subject to the earnings-based borrowing limit discussed above and the budget constraint.[35] For

[33] In the benchmark calibration, we set $\eta = 1$. Our results remain largely unchanged for reasonable alternative values of η, for example, in the range of 0.5 to 2.0. Detailed results are available upon request.

[34] The specific functional form of $T(\cdot)$ and the underlying assumptions are introduced later.

[35] The distribution evolves according to the same law of motion as in the rest of the model.

entrepreneurs, payroll-taxable income coincides with the business net cash flow π, so $y = ra + y^p$ and $y^p = \pi$.

Non-employed Worker's Problem A household that chooses to remain non-employed solves

$$V^N(\chi;\mu,\tau) = \max_{c,a'}\{u(c) + \beta\mathbb{E}\left[V(\chi';\mu',\tau')\right]\}, \tag{14}$$

subject to the budget constraint. For a non-employed household, market income consists only of capital income and payroll-taxable income is zero: $y = ra$ and $y^p = 0$.

Occupational Choice Given individual state χ and aggregate state (μ,τ), a household compares the value of wage work V^W, entrepreneurship V^E, and non-employment V^N

$$V = \max\left\{V^W, V^E, V^N\right\}. \tag{15}$$

It becomes a wage earner, an entrepreneur or remains non-employed, respectively, when this maximum is attained by V^W, V^E, or V^N.

3.4 The Government

We assume that total taxes are the sum of a progressive income tax levied on total market income and a proportional payroll tax levied on payroll-taxable income:

$$T\left(y_t, y_t^p\right) \equiv T^{inc}(y_t) + T^{pay}\left(y_t^p\right). \tag{16}$$

We follow Heathcote, Storesletten and Violante (2017) and adopt a parsimonious reduced-form specification for income-tax progressivity, $T^{inc}(y_t) = y_t - \lambda_1 y_t^{1-\lambda_2}$, where λ_2 governs the degree of progressivity and λ_1 pins down the average level of income taxation in steady state. Payroll taxes are proportional to payroll-taxable income, $T^{pay}\left(y_t^p\right) = \tau_t^o y_t^p$, where τ_t^o is the payroll tax rate for occupation o. The government plays a deliberately limited role. It finances non-productive public spending G_t using tax revenues, issues no public debt, and balances its budget each period:

$$G_t = \int T\left(y_t, y_t^p\right) d\mu_t, \tag{17}$$

where μ_t denotes the cross-sectional distribution of households. Because differences in payroll taxation are central to the empirical entrepreneur–worker wedge, we consider a single fiscal shock, which affects the payroll-tax rate. The payroll-tax rate for occupation o, τ_t^o, evolves exogenously according to an AR(1) process, discretized using the Tauchen (1986) method:

$$\tau_{t+1}^o = (1-\rho_\tau)\overline{\tau}^o + \rho_\tau \tau_t^o + \epsilon_{\tau,t+1}, \qquad \epsilon_{\tau,t+1} \sim \mathcal{N}\left(0,\sigma_\tau^2\right). \tag{18}$$

Table 3: PARAMETERS OF BENCHMARK ECONOMY

Parameter	Value	Description	Source or Target Moments
(A) From Data or Previous Literature			
ρ_x	0.94	Persistence of x shocks	Chang, Kim and Schorfheide (2013)
σ_x	0.287	Standard deviation of x shocks	Chang, Kim and Schorfheide (2013)
$\mathbb{E}(x)$	1.0	Unconditional mean of x shocks	Normalized
$\underline{a}$	-1.0	Credit constraint	Kaplan, Moll and Violante (2018)
ρ_z	0.94	Persistence of z shocks	See text
ψ	0.88	Parameter for DRS	Cagetti and De Nardi (2006)
θ	3.5	Entrepreneur's borrowing constraint	Drechsel (2023)
α	0.36	Capital income share	Standard
ρ_τ	0.5	Persistence of tax shocks	Standard
σ_τ	0.01	Standard deviation of tax shocks	Standard
$\bar{\tau}^W$	0.08	S.S worker payroll tax rate	See text
$\bar{\tau}^E$	0.15	S.S entrepreneur payroll tax rate	See text
λ_2	0.18	Income tax progressivity	Heathcote, Storesletten and Violante (2017)
δ	0.025	Depreciation rate	Standard
ω	0.2	Demand externality	Krueger, Mitman and Perri (2016)
(B) Calibrated to Target Steady State Values			
β	0.9792	Discount factor	Real interest rates
Γ^W	0.364	Fixed cost for workers	Population share of workers
Γ^E	0.205	Fixed cost for entrepreneurs	Population share of entrepreneurs
$\mathbb{E}(z)$	1.385	Unconditional mean of z shocks	Entrepreneur income share
σ_z	0.385	Standard deviation of z shocks	Gini for entrepreneur income
λ_1	0.88	Income tax level	Average income tax rate

which spans up to

To isolate the effects of tax shocks targeted to entrepreneurs versus wage earners, we consider counterfactual cases in which the fiscal shock applies only to one group—either entrepreneurs or wage earners—while holding the other group's payroll-tax schedule fixed.

3.5 Calibration and Model Fits

Table 3 reports the calibration targets and the corresponding parameter values. Following standard practice in the business-cycle literature, our baseline calibration draws on well-established estimates and is chosen to match key U.S. moments over the 1981–2017 period.

Individual labor productivity follows a highly persistent AR(1) process with substantial dispersion, consistent with the evidence in Floden and Lindé (2001) and Chang, Kim and Schorfheide (2013) among others. We adopt the PSID-based estimates from Chang, Kim and Schorfheide (2013) and set $\rho_x = 0.94$ and $\sigma_x = 0.287$, normalizing $\mathbb{E}[x] = 1$. Following Kaplan, Moll and Violante (2018), we set the credit limit to $\underline{a} = -1$, which allows households to borrow up to approximately one quarter of average income. For entrepreneurial productivity, firm-level studies such as Cooper and

Table 4: SUMMARY OF KEY MOMENTS: DATA VS. MODEL

Moment	Data	Model
(A) Targeted		
Population share of workers	0.60	0.60
Population share of entrepreneurs	0.09	0.09
Gini coefficient for entrepreneurs' income	0.55	0.55
Income share of entrepreneur	0.13	0.13
(B) Untargeted		
Gini coefficient for income	0.53	0.57
Gini coefficient for wealth	0.80	0.77
Gini coefficient for workers' income	0.50	0.47
Wealth share of entrepreneur	0.27	0.24

Note: The wealth share of entrepreneurs and the Gini coefficient for wealth are from the PSID 2000. The remaining statistics are the averages from the CPS 1981-2017.

Haltiwanger (2006) and Lee and Mukoyama (2015) report quarterly persistence estimates ranging from 0.84 to 0.99. We set $\rho_z = 0.94$, consistent with the midpoint of these findings. To match the Gini coefficient of entrepreneurial income (0.55), we set $\sigma_z = 0.385$, implying $\sigma_z > \sigma_x$. The mean productivity level $\mathbb{E}[z]$ is calibrated to generate an entrepreneurial income share of approximately 13 percent. We impose an earnings-based borrowing constraint on entrepreneurial capital, setting $\theta = 3.5$ as in Drechsel (2023). This allows entrepreneurs to finance up to about one year of expected earnings through external funds. We set the returns-to-scale parameter $\psi = 0.88$ based on Abraham and White (2006) and Cagetti and De Nardi (2006).

The payroll tax shock process is specified as $\rho_\tau = 0.5$ and $\sigma_\tau = 0.01$. The steady-state payroll tax rates are set to $\bar{\tau}^E = 0.15$ for entrepreneurs and $\bar{\tau}^W = 0.08$ for workers, broadly corresponding to U.S. payroll tax rates around 2000. Following Heathcote, Storesletten and Violante (2017), we set the tax progressivity parameter, λ_2, to 0.18, while the level parameter, λ_1, is chosen to match an average U.S. income tax rate of 15 percent given the sample period. We also set the capital share to $\alpha = 0.36$ and a quarterly depreciation rate $\delta = 0.025$. The demand externality parameter, ω, is set to 0.2 in the benchmark case, following Krueger, Mitman and Perri (2016).

There are three more parameters to be calibrated: β, Γ^W, and Γ^E. We choose β to be consistent with a one percent quarterly return to capital and set Γ^W and Γ^E to target the population shares of workers and entrepreneurs, respectively.

Table 4 reports the data moments and their model counterparts, distinguishing targeted moments (upper panel) from untargeted moments (lower panel). The calibration targets four key distributional aggregates: the population shares of workers and entrepreneurs, the Gini coefficient of entrepreneurs' income, and the entrepreneur income share. The model matches these targets closely. It also reproduces a broad set of untargeted moments reasonably well. In particular, the overall income and wealth Gini coefficients are well captured, and the income Gini for workers is

Table 5: DISTRIBUTION OF ENTREPRENEURS ACROSS INCOME GROUP

	Quintiles				Percentile (%)		Total
	1st	2nd	3rd	4th	80-95	95-100	
(A) Population Share of Entrepreneur							
Data	6.4	6.7	7.7	8.1	10.4	24.3	8.5
Model	3.5	5.7	7.7	8.0	10.7	24.6	8.7
(B) Income Share of Entrepreneur							
Data	3.9	6.8	7.7	8.1	10.7	27.1	12.6
Model	5.0	5.8	7.7	8.2	11.1	25.1	12.6

Note: This table reports entrepreneurs' population and income shares by income group. "Population Share" is the fraction of individuals who are entrepreneurs within each income group. "Income Share" is the fraction of total income within each income group that accrues to entrepreneurs. Data statistics are computed from the CPS, averaged over 1981–2017.

also close to its empirical counterpart. One discrepancy is that the entrepreneur wealth share is 24 percent in the benchmark model, somewhat below the U.S. estimate of 27 percent.

Table 5 shows that the model captures well how entrepreneurship is distributed across the income distribution, both in terms of the population share and the income share. In the data, entrepreneurs are increasingly concentrated in higher income groups, and their contribution to total income rises sharply toward the top of the distribution. The model reproduces these patterns closely: the entrepreneur population share increases with income and aligns particularly well in the upper tail, and the entrepreneur income share similarly rises steeply and remains concentrated among top-income households. While the model shows small discrepancies in the lower quintiles, it matches the overall cross-income gradients and the top-tail concentration in both measures. This fit indicates that the model generates realistic sorting of entrepreneurs across the income distribution and a plausible concentration of entrepreneurial income at the top.

3.6 The Macroeconomic Effects of Tax Cuts: Entrepreneurs vs. Workers

This subsection compares the aggregate effects of revenue-equivalent tax cuts targeted to entrepreneurs versus wage earners. We scale both experiments so the impact change in the tax-to-GDP ratio equals one, and then summarize the dynamics using impulse responses and impact and cumulative output multipliers. The goal is to isolate how occupational targeting alters both the initial response and the subsequent propagation through general-equilibrium channels.

Figure 9 compares the impulse responses of key aggregates to revenue-equivalent tax cuts targeted to entrepreneurs versus wage earners.[36] To isolate occupational targeting, we consider counterfactual experiments in which the fiscal shock applies only to one group—entrepreneurs or wage earners—while holding the other group's tax schedule fixed. Entrepreneur-targeted cuts are clearly more expansionary. Real GDP rises by about 1 percent on impact following an en-

[36] For comparability, each experiment is scaled so that the impact change in the tax-to-GDP ratio equals one.

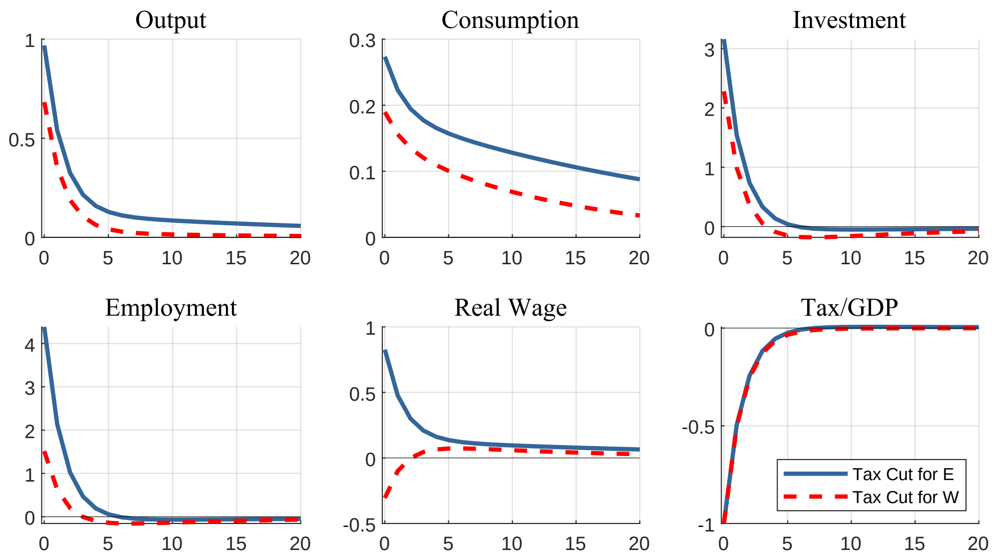

Figure 9: Impulse Responses of Key Aggregates
Note: The impulse responses of key aggregates to equivalent tax cuts for entrepreneurs (blue solid line) and wage earners (red dashed line).

trepreneurial tax cut, whereas a wage-tax cut increases output by only about 0.7 percent. Consumption also responds more strongly and persistently under the entrepreneurial tax cut. Higher after-tax entrepreneurial income relaxes financing constraints, raising investment and hiring; the resulting increase in income feeds back into consumption, strengthening aggregate demand and further supporting capital accumulation and labor input. Labor demand rises, real wages increase, and higher profits expand entrepreneurs' borrowing capacity, reinforcing employment growth. By contrast, in the wage-tax experiment, consumption rises but decays more quickly and generates weaker amplification. The shock operates primarily through a labor-supply channel: lower taxes raise the after-tax wage, inducing additional labor supply and putting downward pressure on real wages, with a smaller and less persistent boost to aggregate activity.

Table 6 compares tax multipliers across two distinct policy experiments: one in which tax cuts are targeted at entrepreneurs and another where they are applied to wage earners. For both cases, we report the impact multiplier—defined as the immediate output response relative to the tax cut—as well as cumulative multipliers calculated over multiple time horizons, including two, four, and eight years. These results provide insight into the dynamic effects of tax policy on aggregate output. A consistent pattern emerges across all horizons: tax multipliers are notably larger when the policy targets entrepreneurs rather than wage earners.[37] This difference reflects the stronger general equilibrium effects triggered by entrepreneurial activity, including investment and job creation. For example, the two-year cumulative multiplier is 1.31 in the entrepreneurial tax-cut scenario, compared to just 0.74 in the wage-tax cut case—almost half as large. The larger multiplier

[37] Our empirical multipliers reflect regional responses to cross-state variation, which are typically larger than aggregate multipliers. The structural model is therefore used to interpret the relative strength and mechanisms of entrepreneur- versus worker-targeted tax cuts, not to match the absolute multiplier levels.

Table 6: TAX MULTIPLIERS

	On-Impact	2-year	4-year	8-year
For Entrepreneurs	0.97	1.31	1.68	2.19
For Workers	0.68	0.74	0.78	0.82

Note: The table reports tax multipliers for two distinct policy experiments—a tax cut for entrepreneurs and a tax cut for wage earners.

in the entrepreneurial case reflects a broader and more sustained boost to output, employment, and private investment. Importantly, the entrepreneurial tax multiplier increases sharply over time, indicating strong propagation effects. The persistent rise in consumption—driven by both higher entrepreneurial income and spillovers to labor income—sustains aggregate demand well beyond the initial shock. By the eight-year mark, the cumulative multiplier exceeds twice the size of the impact response, underscoring the long-lasting nature of the effect. In contrast, wage-income tax cuts yield more modest multiplier growth over time. While they do increase disposable income and consumption in the short run, the absence of a strong entrepreneurial investment and financing channel limits their contribution to long-term output gains.

We also consider alternative values of the demand externality parameter, ω, and find that our main results remain robust. For example, when $\omega = 0.1$, the four-year multiplier is 1.58 for entrepreneurs, which is substantially larger than 0.68 for workers. When $\omega = 0.3$, the multiplier at the same horizon rises to 1.85 for entrepreneurs, compared with 0.97 for workers.[38]

Figure 10 reports impulse responses of occupation-specific employment, providing the model counterpart to Figure 5 in the empirical section. An entrepreneur-targeted tax cut generates a sharp, front-loaded increase in entrepreneurial employment (left panel). The mechanism is direct: by raising entrepreneurs' net-of-tax returns, the policy makes expansion along the entrepreneurial margin privately optimal on impact. Spillovers to workers are present but modest. In the right panel, worker employment rises slightly, consistent with a demand-driven transmission in which higher entrepreneurial activity increases labor demand and temporarily draws workers into employment. The responses to a worker-targeted tax cut are qualitatively different. Worker employment jumps strongly on impact (right panel), consistent with a higher after-tax return to work. Entrepreneurial employment, however, is essentially unchanged (left panel, dashed red near zero throughout). This limited cross-response indicates that entrepreneurial employment is not mechanically driven by aggregate conditions in the model; instead, it moves primarily when policy directly alters entrepreneurs' net returns and incentives to scale up.

Overall, the results imply that the aggregate effects of tax cuts hinge on whether policy directly relaxes entrepreneurs' financing constraints. Entrepreneur-targeted tax cuts expand borrowing capacity and trigger a broad hiring-driven demand externality, whereas worker-targeted tax cuts mainly operate through labor supply with limited demand spillovers. We return to this distinction below by decomposing the impulse responses into direct and general-equilibrium (indirect) com-

[38] See Table A.1 in the Appendix for the full set of multiplier estimates under alternative values of ω.

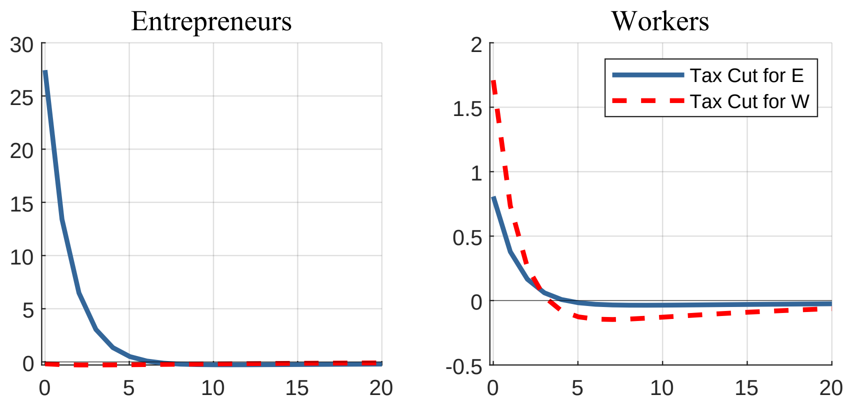

Figure 10: EMPLOYMENT RESPONSE BY OCCUPATION
Note: The figure compares employment responses by occupation—entrepreneurs and wage earners—to occupation-specific tax shocks.

Table 7: DECOMPOSITION OF THE EFFECT ON GDP

	(A) For Entrepreneurs			(B) For Workers		
	On-Impact	2-year	4-year	On-Impact	2-year	4-year
(A) Direct Effect						
-Tax Rates (%)	69.2	52.1	41.5	95.4	87.7	85.4
(B) Indirect Effect						
-Wages (%)	15.4	16.5	17.2	-0.5	0.0	0.3
-Demand Externality (%)	15.3	31.4	41.3	5.1	12.3	17.3

Note: The table decomposes the GDP response to two revenue-equivalent policy experiments—a tax cut targeted to entrepreneurs (Panel A) and a tax cut targeted to wage earners (Panel B). For each experiment, the total GDP response is split into a direct component driven by the statutory tax wedge (holding general-equilibrium feedbacks fixed) and indirect components arising from endogenous equilibrium adjustments. The indirect effects are further separated into (i) a wage channel, reflecting changes in equilibrium wages, and (ii) a demand-externality channel, operating through the consumption-driven productivity rise.

ponents, and by clarifying how the underlying tax instruments differ across the entrepreneur and worker experiments.

3.7 Mechanisms and Decomposition

Decomposition: Direct and Indirect Effects Table 7 decomposes the GDP response to two revenue-equivalent policy experiments—a tax cut targeted to entrepreneurs (Panel A) and a tax cut targeted to wage earners (Panel B)—into a *direct* component operating through the statutory tax wedge and *indirect* components operating through endogenous equilibrium adjustments.[39] Specifically, we separate the total GDP response into (i) the **direct tax-rate effect**, holding general-equilibrium feedbacks fixed, and (ii) two **indirect** channels: a **wage channel** capturing the endogenous response of equilibrium wages (and thus labor income and hiring incentives), and a **demand-externality channel** operating through the consumption-driven productivity term $d_t = C_t^{\omega}$.

Panel (A) of the table shows that entrepreneur-targeted tax cuts generate sizable and persistent

[39] Figure A.3 in the Appendix provides the corresponding graphical decomposition of the GDP impulse responses.

GDP gains. On impact, roughly 69% of the GDP response is explained by the direct tax-rate (partial-equilibrium) effect. The remaining 31% reflects general-equilibrium amplification, split almost evenly between the wage channel (15.4%) and the demand-externality channel (15.3%). The wage channel is economically intuitive: lowering the entrepreneur tax wedge raises the post-tax return to expanding entrepreneurial activity, inducing higher hiring of outside labor. The resulting increase in labor demand pushes equilibrium wages up, lifting labor income and supporting aggregate consumption, which feeds back into output. The composition of the response changes materially at longer horizons. Two years after the shock, the direct channel accounts for about 52% of the total effect, while the demand-externality channel rises to 31% and the wage channel contributes about 17%. By four years, the direct component falls further to about 42%, and the demand-externality channel becomes the dominant source of amplification (41%), with the wage channel accounting for the remaining 17%. This pattern indicates that the propagation of entrepreneur tax cuts is increasingly governed by endogenous feedback effects rather than the initial mechanical improvement in after-tax incentives. In the model, the demand externality operates through higher consumption raising effective productivity, which boosts factor payments and household income and thereby reinforces consumption and output over time.

Panel (B) of the table exhibits a markedly different decomposition for worker-targeted tax cuts. About 95% of the on-impact response is attributable to the direct tax-rate effect (95.4%). General-equilibrium channels are comparatively small. The wage channel is essentially nil on impact (–0.5%) and remains close to zero even at longer horizons, while the demand-externality channel provides the main source of amplification—positive but modest—rising from 5.1% on impact to 12.3% at two years and 17.3% at four years. This pattern suggests that worker tax cuts mainly operate through disposable-income and labor-supply margins, with limited factor-price amplification. Higher labor supply puts downward pressure on wages, leaving the wage contribution near zero (slightly negative on impact) and partially offsetting gains by dampening labor income and consumption spillovers. Demand externalities remain positive because after-tax income supports consumption, but they are modest relative to the entrepreneur case.

Earnings-based vs. Collateral Constraints We next evaluate how the nature of entrepreneurial financing frictions shapes the transmission of tax cuts. We contrast a collateral-based borrowing limit—under which credit expands only as pledgeable assets accumulate—with an earnings-based limit, where borrowing capacity comoves with contemporaneous cash flow. In the collateral-based specification, entrepreneurs can borrow against their assets according to

$$k_t \leq \eta^C a_t,$$

where η^C denotes the borrowing parameter. Following Cagetti and De Nardi (2006), we set

Table 8: TAX MULTIPLIERS: EARNINGS-BASED VS. COLLATERAL CONSTRAINTS

	On-Impact	2-year	4-year
(A) For Entrepreneurs			
Earnings-based	0.97	1.31	1.68
Collateral-based	0.29	0.57	1.16
(B) For Workers			
Earnings-based	0.68	0.74	0.78
Collateral-based	0.52	0.66	0.87

Note: The table reports tax multipliers for two revenue-equivalent policy experiments—(i) a tax cut targeted to entrepreneurs and (ii) a tax cut targeted to wage earners—under two alternative borrowing-constraint environments: earnings-based and collateral-based.

$\eta^C = 1.5$.[40] The key distinction is timing: whether tax relief relaxes financing constraints immediately, enabling entrepreneurs to scale hiring and production on impact, or whether the response is mechanically delayed, weakening propagation and persistence.

Table 8 reports tax multipliers for occupation-specific tax cuts under these two borrowing environments, clarifying how the financing technology governs both the magnitude and the horizon profile of policy effects. Under the earnings-based constraint, entrepreneur-targeted tax cuts are consistently more expansionary than worker tax cuts at all horizons.[41] This outcome follows directly from the mechanism: a cut in entrepreneur taxes raises current after-tax earnings, which instantaneously expands borrowing capacity in the same period. Constrained entrepreneurs can therefore increase external finance right away, scale up variable inputs—especially outside labor—and raise output and profits. These higher profits further loosen the constraint, generating a reinforcing feedback that sustains the expansion and delivers large medium-run multipliers.

By contrast, the pattern reverses in the short run under the collateral-based constraint. Entrepreneur multipliers drop sharply—0.29 on impact and 0.57 at two years—and are both below the corresponding worker multipliers (0.52 and 0.66). The reason is that collateral-based borrowing is pinned to pledgeable assets that adjust only gradually. In this environment, the same tax cut improves entrepreneurs' cash flow but leaves collateral largely unchanged on impact, so credit does not respond one-for-one. Hiring and investment therefore remain constrained precisely when the policy shock arrives, muting the initial increase in production and causing the impulse responses to fade relatively quickly. Only at longer horizons—once entrepreneurs have accumulated sufficient wealth and collateral stocks have risen—does the entrepreneur multiplier begin to catch up, reaching 1.16 at four years and slightly exceeding the worker multiplier (0.87).

The evidence underscores a sharp implication: large and persistent multipliers from entrepreneur-targeted tax cuts require a borrowing constraint that moves with earnings. When credit is instead

[40] For this collateral-based economy, we follow the same calibration strategy as in the baseline model, targeting the same set of moments whenever applicable.

[41] Figure A.4 in the Appendix compares the impulse responses of key aggregate variables under the two borrowing environments.

tied to slowly evolving collateral, the central amplification mechanism—rapid, contemporaneous credit expansion that supports hiring, production, and associated demand spillovers—is delayed until collateral has time to build, mechanically attenuating both the short-run impact and the persistence of the policy effect.

4 Conclusion

This paper studies how the macroeconomic effects of tax cuts depend on occupational incidence. We construct a state-level panel of occupation-specific exogenous federal tax shocks for the United States from 1981 to 2017 and show that tax cuts accruing to entrepreneurs generate larger increases in real GDP, employment, and consumption than revenue-equivalent tax cuts accruing to wage earners.

The evidence suggests that this asymmetry reflects differences in the margins through which tax relief operates. Entrepreneur-targeted tax cuts are accompanied by increases in entrepreneurial employment, wage employment, and real wages, pointing to business formation and stronger labor demand. Worker-targeted tax cuts, by contrast, operate more through the wage-employment margin and are associated with downward pressure on real wages, consistent with a larger labor-supply component. The entrepreneur effects are concentrated among non-rich and non-incorporated entrepreneurs, groups more likely to face binding financing constraints.

To interpret these patterns, we develop an incomplete-markets model with occupational choice and entrepreneurial borrowing constraints. The model highlights the interaction between an earnings-based financing channel and aggregate demand amplification. Tax relief raises current entrepreneurial earnings, relaxes borrowing constraints, and allows constrained entrepreneurs to expand hiring and production. The resulting increase in income and consumption strengthens aggregate demand, which further amplifies the initial expansion. This feedback is much weaker when borrowing capacity is tied to slowly evolving collateral rather than current earnings.

Overall, our findings highlight occupation as a first-order dimension of tax incidence. The aggregate effects of tax policy depend not only on the income distribution of recipients, but also on whether tax relief reaches households whose occupational choices and financing constraints shape production, hiring, and demand. These results suggest that the design and evaluation of tax policy should account for occupational composition and entrepreneurial financing frictions as key determinants of fiscal transmission.

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APPENDIX

A Data

A.1 Tax Data

A.1.1 Exogenous Tax Reform

Following Zidar (2019), we classify a year as an exogenous tax-reform episode if at least one quarter contains an exogenous tax change—namely, a reform motivated by long-run objectives such as deficit reduction or growth, rather than by short-run stabilization or contemporaneous spending needs. Because TAXSIM computes liabilities at the annual frequency, we aggregate the quarterly Romer and Romer's series to the annual level. As a robustness check, we also use the unanticipated exogenous tax shock classification of Mertens and Ravn (2012), with similar results.[42]

A.1.2 Tax Shock Construction

The tax liability change for individual taxpayers is calculated using CPS data and the NBER's TAXSIM program. Following the methodology outlined in Zidar (2019), we implement the following procedure to compute the tax shock for each group g in a given state s and year t. The tax liability change of each taxpayer i in a given year t is defined as

$$\textbf{Tax liability change}_{i,t} = \textbf{Counterfactual tax liability}_{i,t} - \textbf{Actual tax liability}_{i,t-1}$$

where **Counterfactual tax liability**$_{i,t}$ is calculated using the tax rate of year t applied to information of individual i from year $t-1$, and **Actual tax liability**$_{i,t-1}$ is calculated using the tax rate of year $t-1$ applied to information of individual i from year $t-1$. The individual information dataset is constructed using raw data from the CPS ASEC. By inputting each taxpayer's demographic and income information into the TAXSIM program and specifying the tax calculation year, we derive the variables representing both the counterfactual tax liability and the actual tax liability.[43] The sum of tax liability changes for each taxpayer group within a given year t and state s is represented as $\text{Tax Liability Change}^{g}_{s,t} = \sum_{i \in \text{All taxpayers in group g}} \text{Tax liability change}_{i,s,t}$. Taxpayer groups are denoted as g $\in$ {Entrepreneur, Worker}. The tax shock in a given year t and state s is calculated by dividing the tax liability change for each group by the total state-level income tax liability, as shown in the following equation: $T^{g}_{s,t} \equiv \frac{\text{Tax Liability Change}^{g}_{s,t}}{\text{Total Tax Liability}_{s,t-1}} \times 100$.

[42] Mertens and Ravn (2012) define tax changes with an implementation lag of less than one quarter as unanticipated. Liu and Williams (2019) extend the quarterly series of unanticipated personal and corporate income tax shocks through 2017. We aggregate the quarterly unanticipated shock series to the annual frequency by defining the annual measure to be nonzero whenever the quarterly series is nonzero in at least one quarter of that calendar year (i.e., the annual indicator equals one if any quarter exhibits an unanticipated tax change, and zero otherwise).

[43] Our tax liability concept combines two TAXSIM output variables. The first is "fiitax," which captures federal income tax liability including capital gains rates, surtaxes, the Maximum Tax, NIIT, AMT, and refundable and non-refundable credits such as the CTC, ACTC, and EIC, but excludes self-employment and FICA taxes. The second is "tfica," which reports the taxpayer's liability for FICA and SECA (OASDI and HI, sum of employee and employer shares, including the Additional Medicare Tax). Because our liability concept is defined from the taxpayer's perspective, we subtract the employer-side FICA contribution from "tfica" and retain only the employee-side FICA tax for wage earners and the full SECA tax for the self-employed.

A.2 Non-tax Macroeconomic Data

Consumption. U.S. Department of Commerce, Bureau of Economic Analysis; SAPCE1 Personal consumption expenditures (PCE) by major type of product, 1997 – 2017.

Employment. This variable represents the number of employed individuals in a given state and year. Source: U.S. Census Bureau; Current Population Survey, Annual Social and Economic Supplement (ASEC). Employment status is determined using the variable 'classwly', which is the class of worker last year. Individuals who report working as "self-employed" or "works for wages and salary" are classified as employed, while unpaid family workers are excluded.

The sample is restricted to individuals ages 25-64. To focus on full-time workers, we further exclude individuals who report working fewer than 48 weeks during the year, as measured by 'wkswork' as detailed below, and retain only those who indicate 'full-time' in the variable 'fullpart', which indicates whether the respondent worked full or part time in a given year. Based on these classifications, we distinguish between entrepreneurs (self-employed) and wage earners (including both private-sector and government employees) when analyzing employment by occupation.

Hours. This variable represents the average hours worked by employed residents in a given state-year. It is constructed using data from the U.S. Census Bureau; Current Population Survey, Annual Social and Economic Supplement (ASEC). The sample is restricted to individuals aged 16 or older, and the number of weeks worked is approximated using the variables 'uhrsworkly', 'wkswork1', and 'wkswork2'. Specifically, when 'wkswork1' is missing, the mean value of 'wkswork2' is used as a proxy for weeks worked, referred to as 'wkswork'. The total hours worked is then calculated as the product of 'wkswork' and 'uhrsworkly'.

Labor force participation rate. Bureau of Labor Statistics (BLS); Local Area Unemployment Statistics (LAUS); statewide labor force participation rate, seasonally adjusted.

Nominal GDP. U.S. Department of Commerce, Bureau of Economic Analysis; Regional Data; Annual Gross Domestic Product (GDP) by State.

Population. U.S. Census Bureau, Resident Population by state, retrieved from FRED, Federal Reserve Bank of St. Louis

Wage. This variable represents the average hourly wage of full-time workers in a given state and year. It is constructed using data from the U.S. Census Bureau; Current Population Survey, Annual Social and Economic Supplement (ASEC). The sample is restricted to individuals aged 25-64 who worked at least 48 weeks in a given year, as measured by the proxy variable 'wkswork' described above. We further restrict the sample to wage earners, excluding the self-employed and unpaid family workers. For wage income, we use the CPS variable 'incwage' (wage and salary income) for years up to 1987. From 1988 onward, wage income is constructed as the sum of 'inclongj' (earnings from the longest job) and 'oincwage' (earnings from other work included wage and salary earnings). Hourly wages are then computed by dividing annual wage income by annual hours worked, using the 'hours' variable described above.

ACCRA price index. ACCRA price index $P_{s,t}^{ACCRA}$, which represents the state-level price index, is sourced from the replication data package provided by Zidar (2019). For some periods, however, this series contains missing observations. To improve the temporal coverage and ensure consistency of the real-income measures used in our analysis, we extend and interpolate the ACCRA series using state-level inflation rates. We use the newly constructed state-level inflation data from Hazell et al. (2022) who build state-level CPI measures using micro price data collected by the Bureau of Labor Statistics. Their replication package reports quarterly inflation rates for state-level CPI subcategories excluding shelter for the period 1978-2017.[44]

A.3 Survey of Consumer Finances (SCF)

For information on households' credit experiences, especially regarding borrowing constraints, we use the 2001 wave of the Survey of Consumer Finances (SCF), which corresponds to the midpoint of the baseline period. The SCF is a triennial cross-sectional survey of the U.S. families that provides detailed information on balance sheets, pensions, income, and demographic characteristics. It collects comprehensive demographic and income data for the primary respondent and, if applicable, the spouse or partner. As the SCF oversamples rich households, all statistics are computed using survey weights.

A.3.1 Definition of Borrowing Constraints

To identify whether a household is borrowing constrained and to classify the underlying reasons, we use survey responses on credit experiences. A household is defined as borrowing constrained if the household head or spouse was denied credit, received only partial approval, or did not apply for credit due to the expectation of rejection. We further classify the reasons for borrowing constraints based on survey responses. The detailed classification is as follows.

A household is classified as borrowing constrained if it responds *"yes"* to either of the following questions. *"In the past five years, has a particular lender or creditor turned down any request you or your (spouse/partner) made for credit, or not given you as much credit as you applied for?"; "Was there any time in the past five years that you or your (spouse/partner) thought of applying for credit at a particular place, but changed your mind because you thought you might be turned down?"*

Borrowing-constrained households are further classified by the reported reason, as follows: i) **Income-related reasons**: Amount and source of income; Size of debt and ability to repay loan; Employment stability; **ii) Collateral-related reasons**: Insufficient assets, collateral, or equity to secure the loan; Lack of homeownership; and iii) Other reasons: all remaining responses, such as personal characteristics, credit history, or lender-specific criteria.

A.3.2 Definition of Occupations

We classify households as entrepreneurs or workers based on the presence of business income. A household is classified as entrepreneurial if at least one household member reports income or losses from a professional practice, business, limited partnership, or farm. All remaining households are classified as workers. Among entrepreneurs, we further distinguish between incorporated and non-incorporated entrepreneurs based on the legal form of the first actively managed business owned by the household. We also classify households into rich and non-rich groups based on total household income in the previous survey year. Households in the top 10 percent of the income distribution are classified as the rich group, while those in the bottom 90 percent are classified as the non-rich group.

[44] ACCRA price index was constructed by the following steps. (a) We convert the quarterly measured annual inflation rates from Hazell et al. (2022) into annual price level series. (b) For states with missing observations at the beginning or at the end of the sample period, we impute CPI values by forward or backward iteration using adjacent inflation rates. (c) When gaps of two or more consecutive years occur within a state, we recursively reconstruct the missing values by applying the observed inflation rates over time, which provides a smooth intertemporal approximation of the underlying price path. (d) Any remaining missing values are filled using the average inflation rate at the year-by-region level, where regions are defined as West, Midwest, Northeast, and South. This procedure yields a balanced panel of state-level price indexes that extends the ACCRA series provided by Zidar (2019) and allows us to construct consistent real-income measures over the full sample period, which spans 1977–2017.

B Computational Procedures

In what follows, we summarize the computational methods and procedures for the benchmark economy.

B.1 Stationary Equilibrium

We use the algorithm suggested by Ríos-Rull (1997) to find the stationary measure, $\mu_s(a,x,z)$. The steps are as follows.

1. Setting guess for endogenous parameters: We start with the initial guess for endogenous parameters.

2. Constructing grids for a, x, and z: The numbers of a, x, and z grids are denoted by n_a, n_x, and n_z, respectively. We choose $n_a = 101$, $n_x = 13$, and $n_z = 13$. The range of the asset holding is $[-1, 300]$, and asset grids are not equally spaced. $\hat{s}\,(\equiv \ln s)$, is equally spaced in the range of $[-3\sigma_{\hat{s}}, 3\sigma_{\hat{s}}]$, where $\sigma_{\hat{s}} = \sigma_s / \sqrt{1-\rho_s^2}$ and $s \in \{x, z\}$.

3. Approximating the transition probability matrices for x and z : We use the method developed by Tauchen (1986) to approximate the transition probability matrices for x and e, $Q_x(x'|x)$ and $Q_z(z'|z)$, respectively.

4. Solving the individual value functions: Given the parameters, we solve a set of value functions, $\{V_W, V_E, V_N, V\}$, on each grid point of the individual states. In this step, we obtain the optimal decision rules for asset holding, $a'(a,x,z)$, consumption, $c(a,x,z)$, effective labor used for entrepreneurial production, $l(a,x,z)$, and investment on entrepreneurial production, $k(a,x,z)$.

5. Obtaining time-invariant measures: We obtain the time-invariant measures, $\mu_s(a,x,z)$. Using cubic spline interpolation, obtain the new value functions with fine grid points for assets. Compute the new optimal decision rules by using the new value functions. Compute the time-invariant measures by using the new optimal decision rules and the transition probability matrices for x and z.

6. Updating the parameters: Compute the aggregate variables by using $\mu_s(a,x,z)$. If the obtained values are close enough to the targeted values, the steady-state economy is found. Otherwise, we update the parameters and go back to Step 4.

B.2 Equilibrium with Aggregate Shocks

For an equilibrium with aggregate fluctuations, we follow Krusell and Smith (1998), who suggest that a very high precision can be obtained by approximating the type distribution of individuals using the mean asset (the first moment of the distribution). The steps are as follows.

1. Constructing K and τ grids: The grids for individual state variables are the same as those used in the steady state economy. The number of grids for K and τ are denoted by n_K and n_τ, respectively. We chose $n_K = 7$ and $n_\tau = 7$. The range of K is $[0.8K_s, 1.2K_s]$, where K_s is the steady-state mean capital. The tax shock, τ, is equally spaced in the range of $[-3s_\tau, 3s_\tau]$, where $s_\tau = \sigma_\tau / \sqrt{1-\rho_\tau^2}$.

2. Parameterizing the forecasting function: We use the log-linear functional form for forecasting functions of K', d and w.

We set the initial guess for the coefficients in the forecasting functions.

3. Solving the optimization problem for the individual households: Using the forecasting functions obtained in the previous step, we solve the individual optimization problem to obtain a set of value functions and optimal decision rules.[45]

4. Implementing the simulation: Using the forecasting functions and value functions, solve the individual optimization problem for 3,500 periods with fine grid points for assets given the initial values for K, τ, and $\mu(a,x,z)$.

5. Obtaining new values for coefficients: We obtain the new set of coefficients in the forecasting functions from an OLS regression with the 3,000 simulated data for K', d, and w^*.[46] If the new coefficients obtained are close enough to the previous coefficients, we are done. Otherwise, we update the set of coefficient and go back to Step 3. We check the goodness of fit for the forecasting functions with R^2.

C Additional Figures and Tables

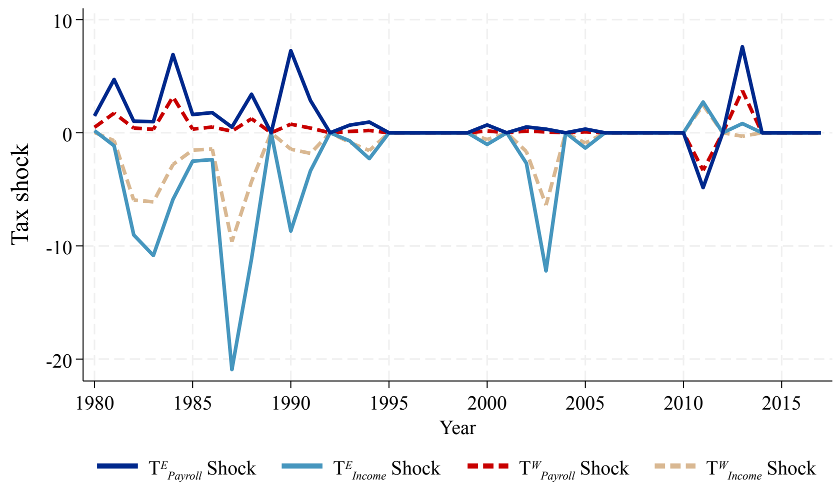

Figure A.1: Tax Shock Measures: Payroll vs. Income-Position Channels

Note: The figure reports tax shock measures for entrepreneurs and wage earners, decomposed into payroll and income-position components.

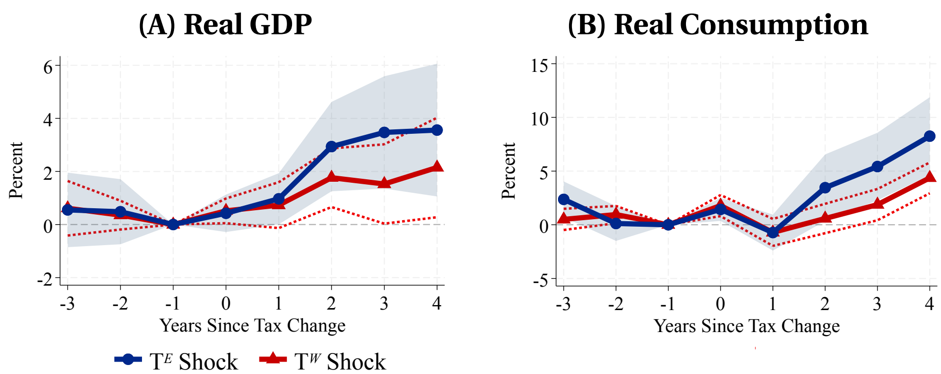

Figure A.2: Pre-Reform Event Study of GDP and Consumption Responses

Note: The figure plots cumulative responses of real GDP and real consumption to a 1 percent tax cut—scaled by total state-level tax liability—separately for entrepreneurs and wage earners. It also includes a pre-reform event-study window ($h = -3$ to -1) to assess pre-trends.

[45]Given the wage rate w, the real interest rate, r, is computed from the corporate firm's profit maximization.

[46]We drop the first 500 periods of 3,500 periods to eliminate the influence of the arbitrary choice of initial values.

Table A.1: TAX MULTIPLIERS UNDER ALTERNATIVE VALUES OF ω

	On-Impact	2-year	4-year	8-year
	(A) $\omega = 0.1$			
Tax Cuts for Entrepreneurs	1.04	1.31	1.58	1.89
Tax Cuts for Workers	0.61	0.64	0.67	0.70
	(B) $\omega = 0.2$			
Tax Cuts for Entrepreneurs	0.97	1.31	1.68	2.19
Tax Cuts for Workers	0.68	0.74	0.78	0.82
	(C) $\omega = 0.3$			
Tax Cuts for Entrepreneurs	0.86	1.32	1.85	2.71
Tax Cuts for Workers	0.69	0.84	0.97	1.09

Note: The table reports tax multipliers for entrepreneur-targeted and wage-earner-targeted tax cuts under alternative calibrations of the demand externality parameter, ω.

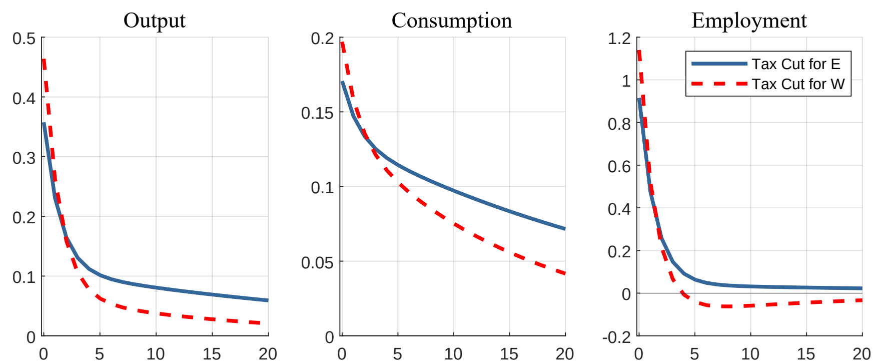

Figure A.4: IMPULSE RESPONSES OF KEY AGGREGATES: EARNINGS-BASED VS. COLLATERAL CONSTRAINTS

Note: The figure shows impulse responses of key aggregate variables to two revenue-equivalent policy experiments—a tax cut targeted to entrepreneurs and a tax cut targeted to wage earners—under two alternative borrowing-constraint environments: earnings-based and collateral-based.

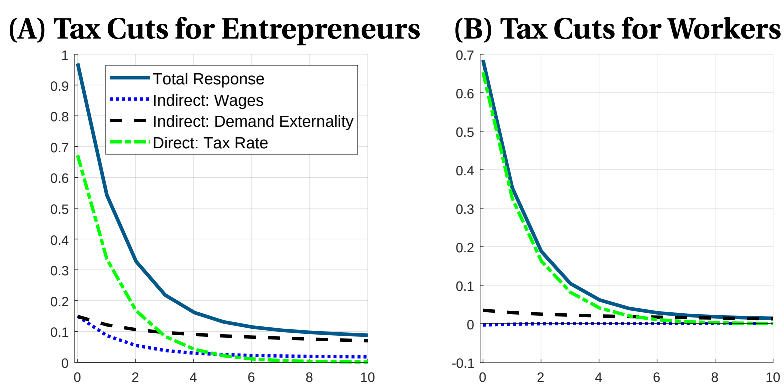

Figure A.3: DECOMPOSITION OF THE GDP RESPONSE

Note: The figure decomposes the GDP response to two revenue-equivalent policy experiments—a tax cut targeted to entrepreneurs (Panel A) and a tax cut targeted to wage earners (Panel B). For each experiment, the total GDP response is split into a direct component driven by the statutory tax wedge (holding general-equilibrium feedbacks fixed) and indirect components arising from endogenous equilibrium adjustments. The indirect effects are further separated into (i) a wage channel, reflecting changes in equilibrium wages, and (ii) a demand-externality channel, operating through the consumption-driven productivity rise.

D Robustness

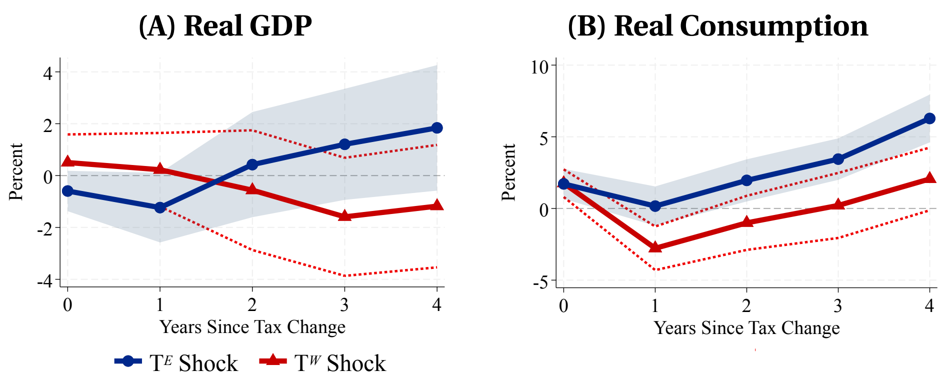

Figure A.5: ROBUSTNESS: ALTERNATIVE DEFINITION 1
Note: Alternative Definition 1—A household is classified as entrepreneurial if at least one household member reports self-employment as their main occupation or reports nonzero business income (regardless of sign).

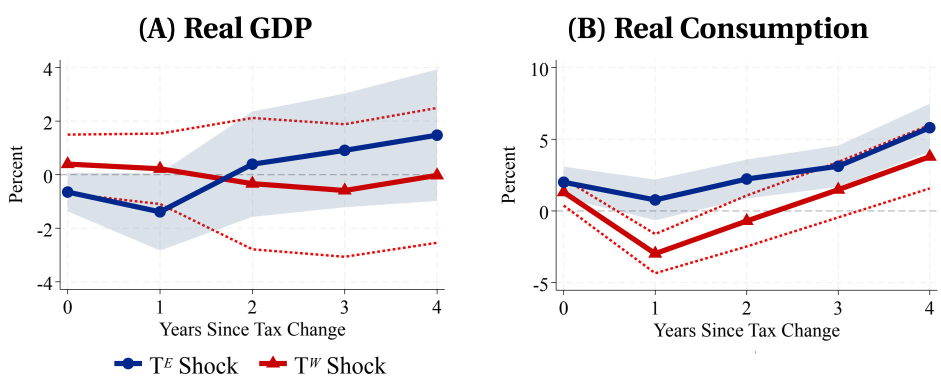

Figure A.6: ROBUSTNESS: ALTERNATIVE DEFINITION 2
Note: Alternative Definition 2—A household is classified as entrepreneurial if the primary taxpayer has positive business income and reports self-employment as their main occupation.

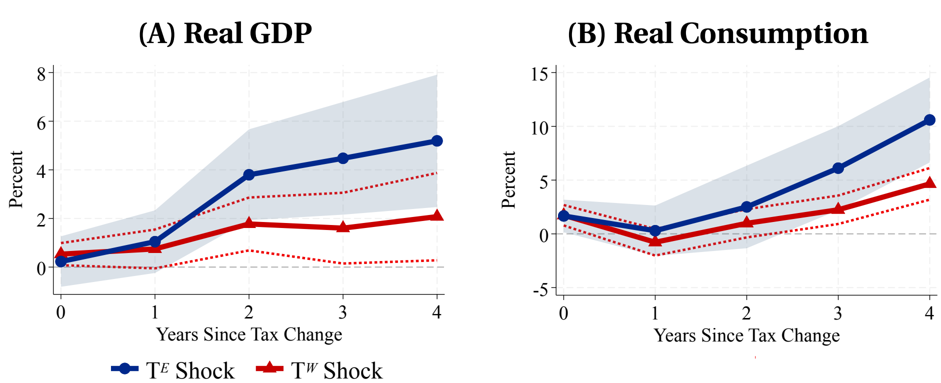

Figure A.7: ROBUSTNESS: EXCLUDING INCORPORATED BUSINESSES
Note: We exclude incorporated business owners from the entrepreneurial group to ensure that the results are not driven by incorporated businesses.

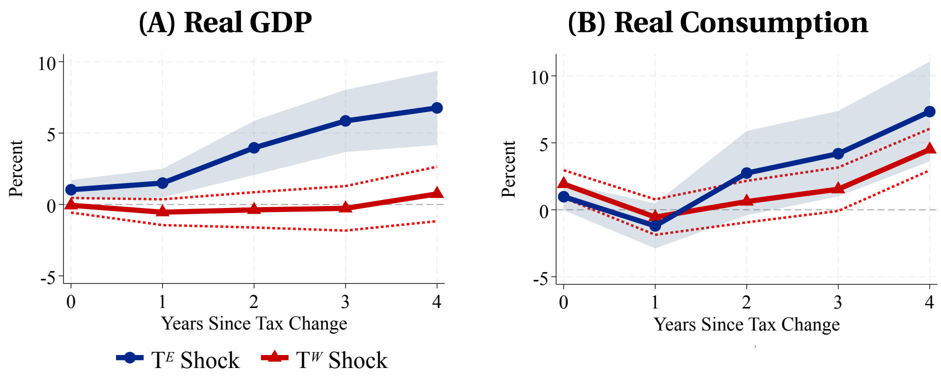

Figure A.8: ROBUSTNESS: UNANTICIPATED TAX SHOCKS

Note: We also re-estimate the effects using unanticipated exogenous tax shocks following Mertens and Ravn (2012).

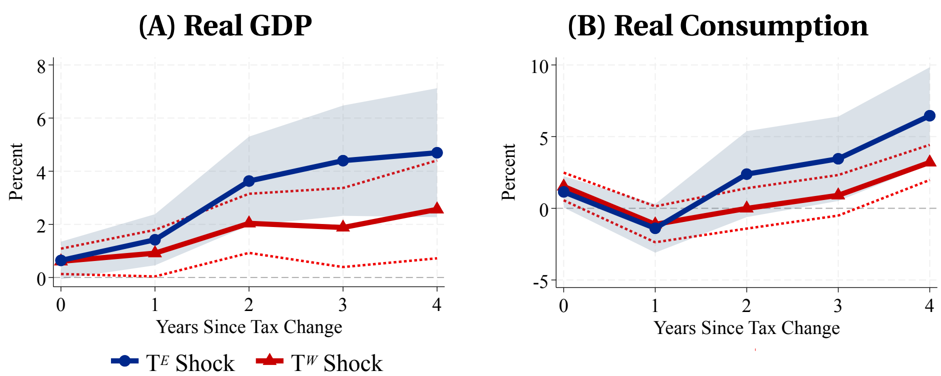

Figure A.9: ROBUSTNESS: LAGGED DEPENDENT VARIABLES

Note: We augment the baseline specification by including lagged dependent variables (1 and 2 years) as controls.

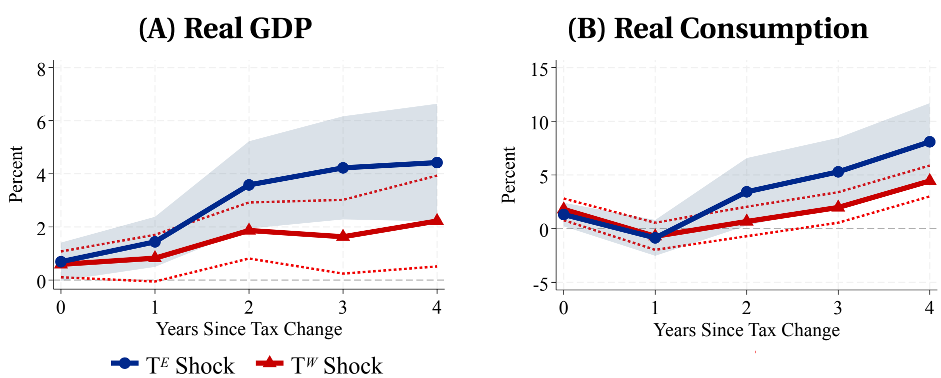

Figure A.10: ROBUSTNESS: ADDITIONAL MACRO CONTROLS

Note: We add additional state-level business-cycle controls, including the unemployment rate and state-level GDP.