

NBER Graduate Workshop on Business Taxation

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Princeton and NBER

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*Acknowledgements: This workshop was made possible by financial support from NSF Grant Number 1752431.

- 1 Overview (**Zidar**, 1-1:30pm)
 - Introductions
 - Overview of U.S. business taxation
 - Simple framework and classic research questions
- 2 Firm location, corporate tax incidence, TCJA (1:30-2:30pm)
- 3 International taxation and reform (**Auerbach**, 2:45-3:45pm)
- 4 Beak/ discussion breakout rooms (**Students + Faculty**, 4-4:30pm)
- 5 Taxes, Financial Policy, and Investment (**Poterba**, 4:30-5:15pm)

1 Stark equity and efficiency considerations

- Business owners prevail at the top of the wealth and income distributions (Smith Yagan Zidar Zwick, 2019; SZZ, 2020)
- Business taxes key for falling US tax progressivity (Saez Zucman, 2019)
- Incidence and efficiency effects are debated; “There’s a pretty wide band of possible outcomes that are plausible” (Auerbach, WSJ 2017)

2 Important and open policy debates

- Reforming the Tax Cuts and Jobs Act (TCJA)
- A corporate tax system for the 21st century

3 Plentiful research opportunities: theory and evidence needed

- How to structure of international tax system? Global apportionment?
- Tax base and rates? Investment incentives vs low rates & broad base?
- Business location subsidies and economic development
- Innovation policy and firms in public finance

I. Overview of U.S. Business Taxation

Overview of Business Taxes

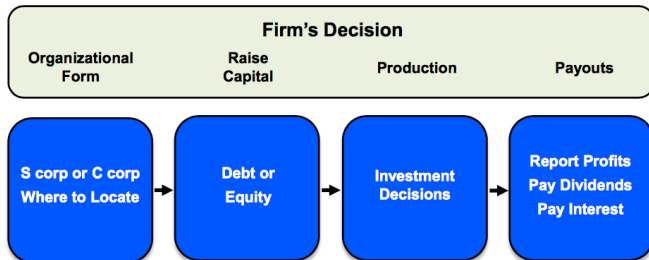
- 1 Brief overview of firm decisions and tax policies
- 2 Economics: Simple Framework and Research Questions
 - Simplest possible neoclassical framework
 - Research Questions

U.S. Business Tax Structure

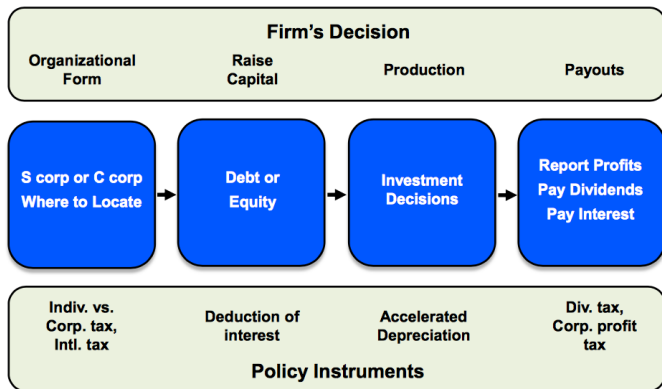
- Taxes on firms in the US consist of several elements
 - ① Tax corporate profits (earnings - expenses) at approx flat rate of 21%
 - Expenses include wages+materials, depreciation, and interest payments
 - Acceleration of depreciation used to stimulate investment
 - ② Individual-level taxes on payouts (capital gains, dividends, interest income)
 - ③ International tax provisions (transfer pricing, tax havens, FTC)
 - ④ Pass-throughs: most privately-owned firms (S corporations and partnerships) subject to individual income tax system
- **Goal:** characterize the consequences of this tax system and optimal design of business taxation

Corporate Decisions and Tax Policies

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Corporate Decisions and Tax Policies



Overview of Business Taxes

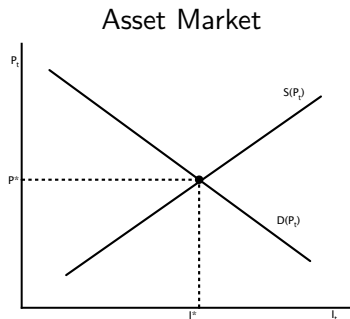
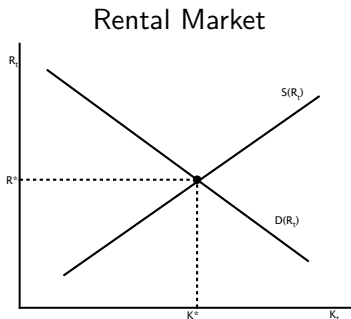
1 Brief overview of firm decisions and tax policies

2 Economics: Simple Framework and Research Questions

- Simplest possible neoclassical framework
- Research Questions

Rental and asset markets are linked

Use the link between rental and asset markets to analyze capital markets



where R_t is the **rental price** of using capital services K_t and P_t is the **purchase price**, which depends on the level of investment I_t .

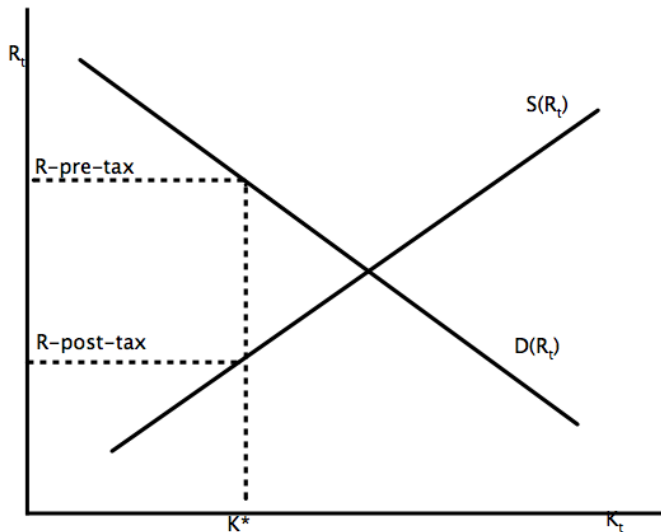
4 key equations

- 1 **Stock Adjustment:** $K_t = (1 - \delta)K_{t-1} + I_t$
- 2 **Asset pricing equilibrium** The rental cost of using an asset is simply the cost of buying the good and re-selling it after one period
- 3 **Rental market equilibrium:** $K = D(R)$
- 4 **Investment market equilibrium:** $I = S(P)$

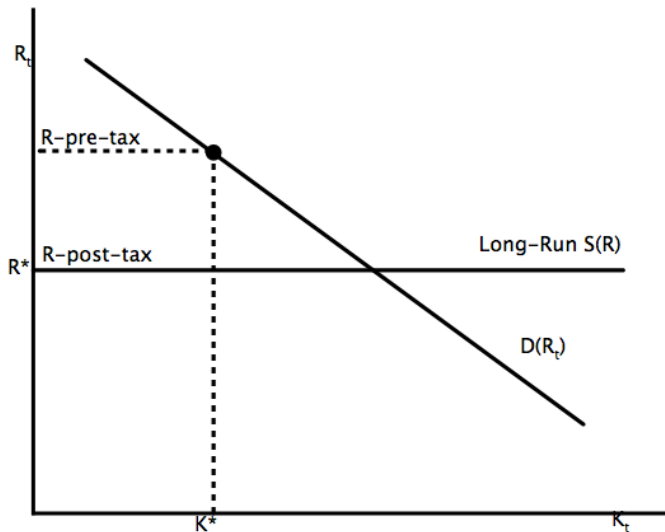
Simplest Possible Framework: Impact of a Capital Tax

- The real price of capital will be determined in the use market
 - Price is the user cost of capital (i.e., the price of using capital services for one period)
 - Quantity is the stock of capital
- A tax on capital will increase the pre-tax return to capital and decrease the after-tax return
- A key question is how the capital tax is split between a decline in the after-tax return and a rise in the pre-tax return
 - Short run: supply of capital is likely to be quite inelastic so that a tax on capital will mostly reduce the after-tax return with little increase in the pre-tax return
 - Long run: supply of capital is likely more elastic (net returns tend to be about 6 to 7% and independent of level of capital taxes, but there's little evidence on long-run capital supply elasticities).

Simple Framework: Impact of a Capital Tax



Simple Framework: Impact of a Capital Tax (in Long Run)



Simple Framework: Impact of a Capital Tax

Who bears the capital tax in the long run? What are growth and tax revenue effects?

- Who gets the triangle above R-pre-tax (i.e., consumer surplus in the typical S and D graph)?
- If firms don't earn profits, this all goes to workers in terms of higher wages or lower prices
- A key object is the **elasticity of capital supply**, is likely larger (and some think infinite) in the LR
- Note that the distortion in the capital market reduces surplus more than it increases tax revenues (as with most taxes)
- Finally, distortions due to capital taxation are often considered in a dynamic context in which the distortion compounds overtime (See Ivan Werning's recent paper on the classic Chamley-Judd results)

Some Classic Research Questions

What is the effect of τ (or a tax base component) on:

1 Supply of corporate capital

- Extensive margin: firm location, entrepreneurship, innovation
- Intensive margin: domestic investment, FDI, innovation

2 Labor market

- Wage and employment effects

3 Product markets

- Effects on consumer prices

4 Tax revenues

- Effect on corporate tax revenue
- Fiscal externalities on personal and sales tax base

5 Asset markets

- Effect on price of investment goods
- Old versus new capital

What does the classic framework miss?

What is the effect of τ (or a tax base component) on:

① Supply of corporate capital

- Real versus reporting location responses; firm location shaped by worker pref, productivity, market access, factor prices, etc
- Decisions of multinationals and multi-product firms are more complex
- Spillovers of foreign investment on domestic markets
- Heterogeneous impacts of base and rate provisions across different firms

② Labor market

- Heterogeneous impacts by skill type
- When owners also workers; agency issues between owners and managers

③ Profits/rents/product markets

- Marshall's view of corporate tax as falling on pure profits?

④ Tax revenues

- Interactions with other policy (e.g., tariffs and trade policy)
- Interactions with other distortions (financial frictions, product market and labor market power, etc)
- Endogenous responses of other locations and tax competition

⑤ Asset markets

- Expectations, risk, etc. Impacts on other capital markets (e.g., land)

II. Firm Location and Corp Tax Incidence

1 Firm Location Decisions

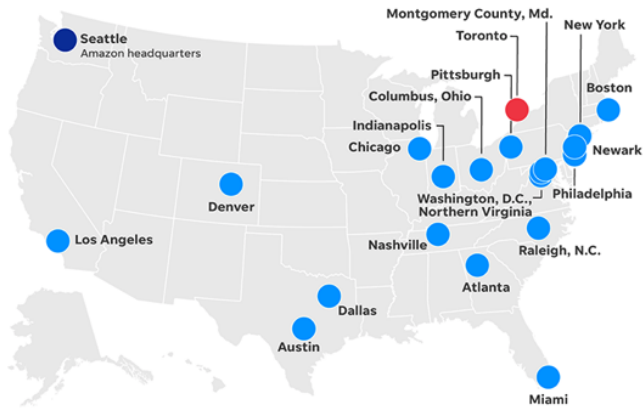
- Model of firm location
- Empirical implementation: taxes and firm location
- Hines (AER, 1996)
- Giroud and Rauh (2019, JPE)

2 Corporate Tax Incidence

- Motivation
- Local Labor Market Approach of Suárez Serrato and Zidar (AER, 2016)
- Brief discussion of Local vs National/Global Effects
- Fuest, Peichl, Siegloch (AER, 2018)

How do taxes affect firm location?

Amazon narrows HQ2 cities list to 19 American cities, 1 Canadian



SOURCE Amazon
George Petras/USA TODAY

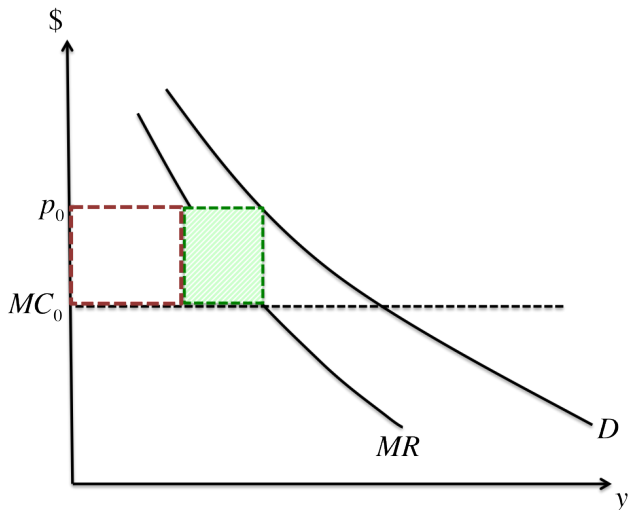
Model of Firm Location

Assumptions and economic environment:

- **Assume** firms make location decision to maximize after-tax profits
- **Geography:** Small open economy $c \in C$
- **Agents:** E_c establishments
- **Market Structure:**
 - Monopolistically competitive traded goods market for each variety j
 - Global capital market
 - Local labor market
 - Local housing market (only used by workers, not firms)

Source: Suárez Serrato and Zidar (AER, 2016)

Establishment Production



Source: Suárez Serrato and Zidar (AER, 2016)

Local Labor Demand: Establishment Production

- Demand for variety j is $y_{jc} = I \left(\frac{p_{jc}}{P} \right)^{\varepsilon^{PD}}$

Local Labor Demand: Establishment Production

- Demand for variety j is $y_{jc} = I \left(\frac{p_{jc}}{P} \right)^{\varepsilon^{PD}}$
- Establishment j produces its variety with the following technology

$$y_{jc} = \underbrace{B_{jc}}_{\equiv \bar{B}_c + \zeta_{jc}} l_{jc}^{\gamma} k_{jc}^{\delta} M_{jc}^{1-\gamma-\delta}$$

Local Labor Demand: Establishment Production

- Demand for variety j is $y_{jc} = I \left(\frac{p_{jc}}{P} \right)^{\varepsilon^{PD}}$
- Establishment j produces its variety with the following technology

$$y_{jc} = \underbrace{B_{jc}}_{\equiv \bar{B}_c + \zeta_{jc}} l_{jc}^{\gamma} k_{jc}^{\delta} M_{jc}^{1-\gamma-\delta}$$

- Firm Value Function

$$V_{jc}^F = \underbrace{\frac{\overbrace{\ln(1 - \tau_s^b)}^{\text{Taxes}}}{-(\varepsilon^{PD} + 1)}}_{\equiv v_c} - \underbrace{\overbrace{\gamma \ln w_c - \delta \ln \rho}^{\text{Factor Prices}} + \bar{B}_c + \zeta_{jc}}_{\equiv v_c}$$

Source: Suárez Serrato and Zidar (AER, 2016)

Fraction of Establishments:

$$E_c = P \left(V_{jc}^F = \max_{c'} \{ V_{jc'}^F \} \right) = \frac{\exp \frac{v_c}{\sigma^F}}{\sum_{c'} \exp \frac{v_{c'}}{\sigma^F}}$$

Fraction of Establishments:

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Establishment Growth:

$$\Delta \ln E_{c,t} = \frac{\Delta \ln(1 - \tau_{c,t}^b)}{-\sigma^F(\varepsilon^{PD} + 1)} - \frac{\gamma}{\sigma^F} \Delta \ln w_{c,t} + \phi_t + \frac{1}{\sigma^F} \Delta \bar{B}_{c,t}$$

Key Parameter:

- Dispersion of idiosyncratic productivity σ^F
- Larger σ^F means lower responsiveness to tax changes

Source: Suárez Serrato and Zidar (AER, 2016)

Estimating Equation:

$$\Delta \ln E_{c,t} = \frac{\Delta \ln(1 - \tau_{c,t}^b)}{-\sigma^F(\varepsilon^{PD} + 1)} - \frac{\gamma}{\sigma^F} \Delta \ln w_{c,t} + \phi_t + \frac{1}{\sigma^F} \Delta \bar{B}_{c,t}$$

Regression

- **LHS:** Log change in the number of establishments $\Delta \ln E_{c,t}$
- **RHS # 1:** Log change in the keep rate $\Delta \ln(1 - \tau_{c,t}^b)$
- **RHS # 2:** Log change in factor prices $\Delta \ln w_{c,t} + \phi_t$
- **Error term:** TFP shocks $\Delta \bar{B}_{c,t}$ and other factors outside the model

Source: Suárez Serrato and Zidar (AER, 2016)

Reduced Form:

$$\Delta \ln E_{c,t} = \underbrace{\left(\frac{1}{-\sigma^F(\varepsilon^{PD} + 1)} - \frac{\gamma}{\sigma^F} \dot{w}(\theta) \right)}_{\beta^E} \Delta \ln(1 - \tau_{c,t}^b) + \phi_t + u_{c,t}$$

Regression

- **LHS:** Log change in the number of establishments $\Delta \ln E_{c,t}$
- **RHS:** Log change in the keep rate $\Delta \ln(1 - \tau_{c,t}^b)$
- **Estimate:** β^E will depend on direct effects plus indirect effects on factor prices (in this case, the incidence on wages)!

Source: Suárez Serrato and Zidar (AER, 2016)

Alternative Estimating Equation (from FMSZ, 2018):

$$\ln E_{nt} = b_0 \ln((1 - \bar{t}_n) MP_{nt}) + b_1 \ln c_{nt} + b_2 \ln \tilde{R}_{nt} + \psi_t^M + \xi_n^M + \nu_{nt}^M$$

where

- $c_{nt} = (w_{nt}^{1-\beta} r_{nt}^\beta)^\gamma P_{nt}^{1-\gamma}$ are unit costs
- $\ln \tilde{R}_{nt}$ is government spending
- ψ_t^M is a time effect
- $\xi_n^M + \nu_{nt}^M$ accounts for state effects and deviations from state and year effects in log productivity, $\ln z_{nt}$
- MP_{nt} is the market potential of state n in year t ,

$$MP_{nt} = \sum_{n'} E_{n't} \left(\frac{\tau_{n't}}{P_{n't}} \frac{\sigma}{\sigma - \tilde{t}_{n't}} \frac{\sigma}{\sigma - 1} \right)^{1-\sigma}$$

where $E_{n't} \equiv P_{n't} Q_{n't}$ denotes aggregate expenditures in state n' .

Source: Fajgelbaum, Morales, Suárez Serrato, and Zidar (Restud, 2018)

Three papers:

- Event study from Suárez Serrato and Zidar (AER, 2016), which uses apportioned tax rate which is approx $\tau^c/3$
- Hines (AER, 1996)
- Giroud and Rauh (JPE, 2019)

How do business tax cuts affect firm location?

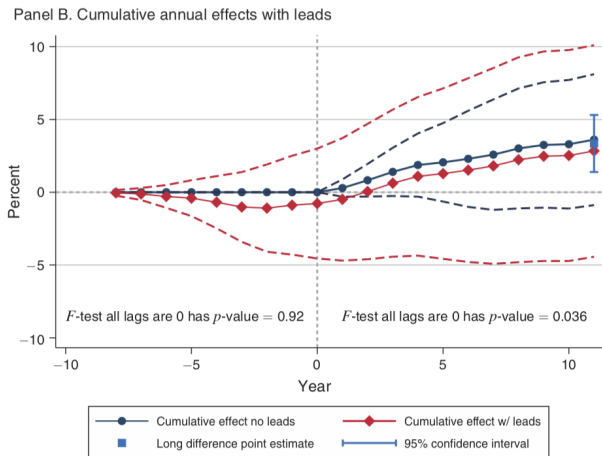


FIGURE 4. CUMULATIVE EFFECTS OF BUSINESS TAX CUTS ON ESTABLISHMENT GROWTH

Source: Suárez Serrato and Zidar (AER, 2016)

- Paper: Hines, James R. "Altered States: Taxes and the Location of Foreign Direct Investment in America." *American Economic Review*, Vol. 86, No. 5 (1996): 1076-1094.
- Question: How do international taxation on FDI and state taxation interact when affecting business location?
- Motivation: Effect of taxes on investment and firm location are key determinants of the incidence and efficiency consequences of business taxation

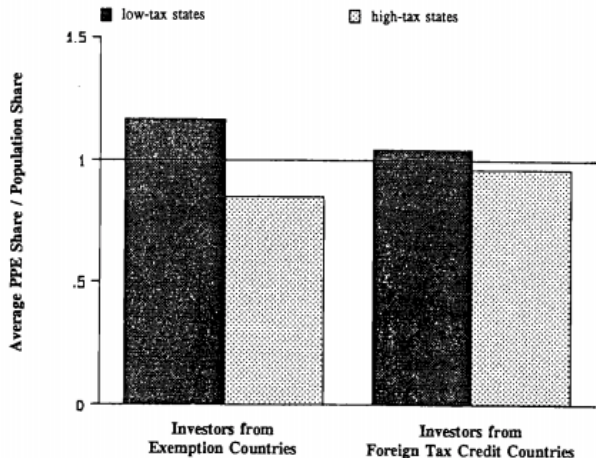
Institutional Background

Countries have different policies on taxation of domestic firm income earned abroad.

- Foreign earnings of domestic firms effectively exempt from taxation
 - Ex: Australia, Canada, France, Germany, Switzerland
- Foreign Tax Credits (FTCs): firms pay taxes on profits earned abroad, claim credits against liabilities in the home country
 - Only corporate income taxes can be creditable in countries with FTC policies
 - Ex: United States, the United Kingdom, Japan
- Key idea: countries that can use FTCs are less sensitive to tax differences since they can write them off

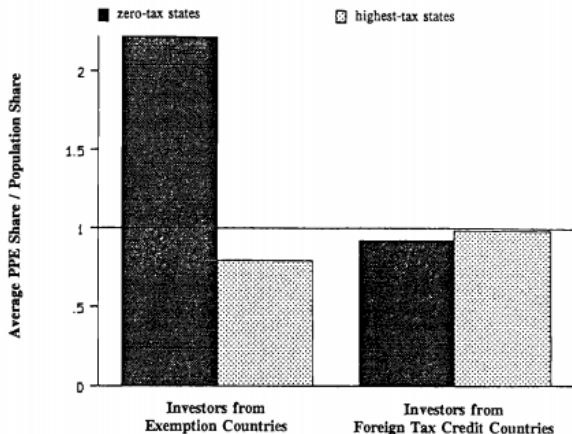
- Investment data: BEA 1987 Census of Manufactures
 - State-by-country FDI data
 - Investing countries: Australia, Canada, France, Germany, Japan, Switzerland, and the United Kingdom → “Together, the seven [...] countries account for 78% of the manufacturing PPE controlled by foreign investors in the United States in 1987” (p. 1083)
 - Dataset excludes the Netherlands, because of role of Dutch companies in international tax avoidance
- State corporate income tax rate: top statutory rate, correcting for depreciation rules and federal deductibility

Investors from Exemption Countries Less Likely to Invest in High-Tax States



NOTES: Figure plots investment-to-population ratios in 25 high-tax states and 25 low-tax states. High-tax states have tax rate that is 7% or higher.

Disparity in Investment Even Higher Across Highest- and Zero-Tax States



NOTES: Figure plots investment-to-population ratios in highest-tax states and zero-tax states. Highest-tax states have tax rate that is greater than 8.8%.

Main Findings:

- 1% higher state corp tax rate \leftrightarrow 9-11% higher investment shares of firms from FTC countries relative to non-FTC countries
- State tax rate differences of 1% are correlated with diff of 3% in the likelihood of investors to establish affiliates

Key takeaway: results suggest that even small variations in local tax rates may have affect capital flows and on the economy as a whole

Overview of Giroud and Rauh (JPE, 2019)

- Paper: Giroud, Xavier and Joshua Rauh. “State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data.”
- Question: How does state-level business taxation impact business activity and location decisions?

1 Firm data

- U.S. Census Bureaus Longitudinal Business Database (LBD) → 27.6 million establishment-year observations, or 647,000 firm-year observations
- Sample: All multi-unit U.S. establishments from 1977-2011 belonging to firms with at least 100 employees and having operations in at least two states

2 Tax data

- Type of state corporate taxation and the corporate tax rates: the University of Michigan Tax Database (1977-2002), the Tax Foundation (2000-2011) and the Book of States
- Apportionment factors and throwback rules: the Commerce Clearing Houses State Tax Handbooks

Findings:

- For C corporations, employment and the number of establishments have short-run corporate tax elasticities of -0.4 to -0.5, and do not vary with changes in personal tax rates.
- Pass-through entity activities show tax elasticities of -0.2 to -0.4 with respect to personal tax rates, and are invariant with respect to corporate tax rates.
- Capital shows similar patterns.
- Reallocation of productive resources to other states drives around half the effect.
- The responses are strongest for firms in tradable and footloose industries.

Firm Location and Corporate Tax Incidence

1 Firm Location Decisions

- Model of firm location
- Empirical implementation: taxes and firm location
- Hines (AER, 1996)
- Giroud and Rauh (2019, JPE)

2 Corporate Tax Incidence

- Motivation
- Local Labor Market Approach of Suárez Serrato and Zidar (AER, 2016)
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Abolish the Corporate Income Tax

By LAURENCE J. KOTLIKOFF JAN. 5, 2014

*I, like many economists, suspect that our corporate income tax is economically self-defeating – **hurting workers, not capitalists***

*What can workers do to mitigate their plight? One useful step would be to lobby to eliminate the corporate income tax. That might sound like a giveaway to the rich. It's not. The rich, including Boeing's **stockholders, can take their companies & run***

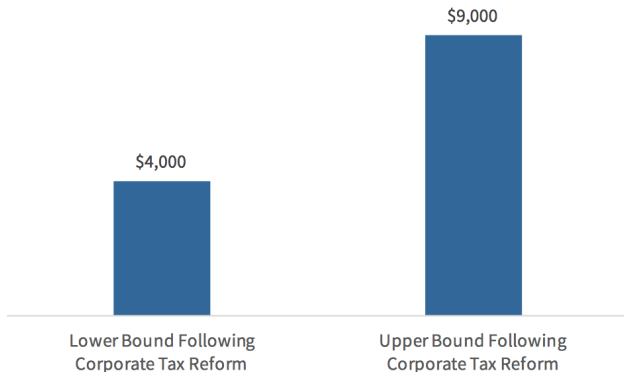
Who will benefit from corporate tax cuts?

A photograph of the White House in Washington, D.C., featuring a large fountain in the foreground surrounded by a circular bed of red flowers. The image is overlaid with a semi-transparent blue filter.

Corporate Tax Reform and Wages: Theory and Evidence

Who will benefit from corporate tax cuts?

Figure 2. Estimated Increases in Average Household Income under the Corporate Tax Proposal of the Unified Framework (\$2016)



Source: Census Current Population Survey; CEA calculations

Source: CEA (2017).

Who will benefit from corporate tax cuts?

THE WALL STREET JOURNAL.

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<https://www.wsj.com/articles/who-ultimately-pays-for-corporate-taxes-the-answer-may-color-the-republican-overhaul-1502184603>

POLITICS

Who Ultimately Pays for Corporate Taxes? The Answer May Color the Republican Overhaul

Investors and workers bear tax burdens, but the politics of tax-code changes hinge on which group carries the heavier load



Lawmakers and Trump administration officials in Washington are preparing to mount a business-tax-overhaul campaign this fall, but debate over whether workers or investors bear the brunt of the corporate tax burden may affect the nature of the

Who will benefit from corporate tax cuts?

“This is about creating jobs” Treasury Secretary Steven Mnuchin said on CBS in April, because many surveys show that 70% or more of the tax burden is borne by the American worker. This is about putting money back in the American worker’s pocket”
Last month, Mr. Mnuchin offered an increased estimate, saying 80% of business taxes are paid by workers.

“There’s a pretty wide band of possible outcomes that are plausible,” said Alan Auerbach

Source: WSJ (2017).

① Local Labor Market Approach

- Framework from Suárez Serrato and Zidar (AER, 2016)

② Brief discussion of Local vs National Effects

- State vs federal impacts
- Harberger-type general equilibrium models

③ Recent Estimates

- Fuest, Peichl, Siegloch (AER, 2018)
- Other considerations when measuring labor market impacts of corporate tax cuts (e.g., Auerbach, 2005 & Slattery Zidar, 2020)

A Spatial Equilibrium Model with Firms

You have to start this conversation with the philosophy that businesses have more choices than they ever have before. And if you don't believe that, you say taxes don't matter. But if you do believe that, which I do, it's one of those things, along with quality of life, quality of education, quality of infrastructure, cost of labor, it's one of those things that matter.

—DELAWARE GOVERNOR JACK MARKELL (11/3/2013) ¹

1 Setup

2 Worker Location, Labor Supply

Moretti (2011), Busso et al (2013)

3 Housing Market

Kline (2010), Notowidigdo (2012)

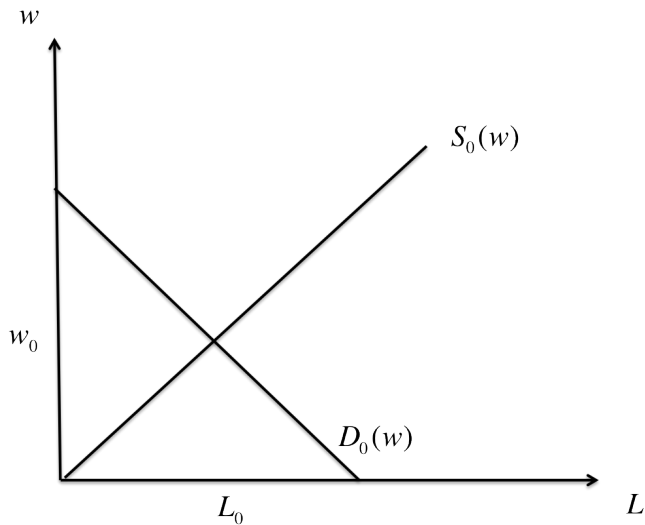
4 Firm Location and Labor Demand

Dixit-Stiglitz (1977), Krugman (1979), Melitz (2003)

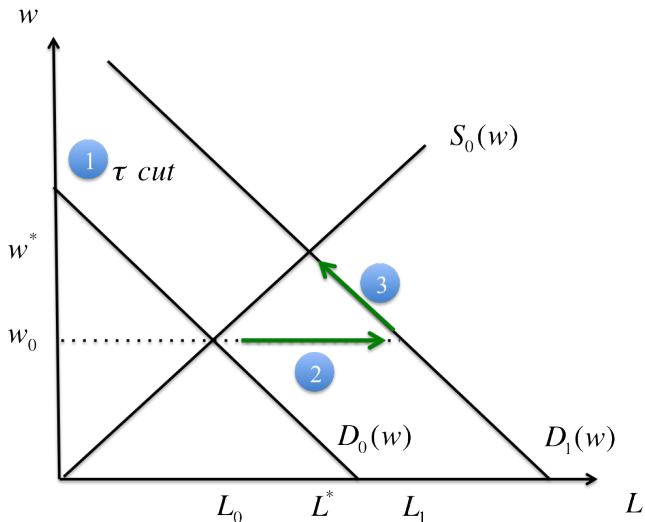
5 Results: Incidence $\dot{w}(\theta)$, $\dot{\pi}(\theta)$, $\dot{r}(\theta)$

- $\varepsilon^{LS}(\theta)$ and $\varepsilon^{LD}(\theta)$, and $b(\theta)$

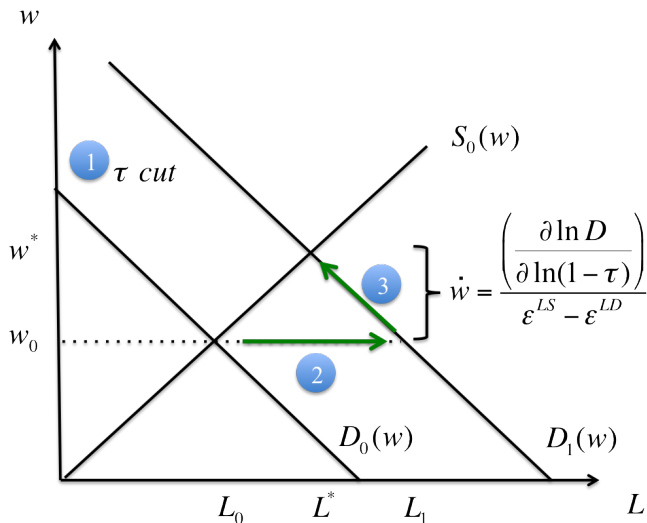
Equilibrium in the Local Labor Market



Equilibrium in the Local Labor Market



Equilibrium in the Local Labor Market



- 1 **Geography:** Small open economy $c \in C$
- 2 **Agents:** N_c households, E_c establishments, representative landowner in each location c
- 3 **Market Structure:**
 - Monopolistically competitive traded goods market for each variety j
 - Global capital market
 - Local labor market
 - Local housing market
- 4 **Timing:** Steady state, exogenous tax shock, new steady state

Local Labor Supply

Location choice: Workers choose location with max utility:

$$\max_c \underbrace{a_0 + \ln w_c - \alpha \ln r_c + \bar{A}_c}_{\equiv u_c} + \xi_{nc}.$$

Local Labor Supply

Location choice: Workers choose location with max utility:

$$\max_c \underbrace{a_0 + \ln w_c - \alpha \ln r_c + \bar{A}_c}_{\equiv u_c} + \xi_{nc}.$$

Local Population:

$$N_c = P \left(V_{nc}^W = \max_{c'} \{ V_{nc'}^W \} \right) = \frac{\exp \frac{u_c}{\sigma^W}}{\sum_{c'} \exp \frac{u_{c'}}{\sigma^W}}$$

Local Labor Supply

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$$\max_c \underbrace{a_0 + \ln w_c - \alpha \ln r_c + \bar{A}_c}_{\equiv u_c} + \xi_{nc}.$$

Local Population:

$$N_c = P \left(V_{nc}^W = \max_{c'} \{ V_{nc'}^W \} \right) = \frac{\exp \frac{u_c}{\sigma^W}}{\sum_{c'} \exp \frac{u_{c'}}{\sigma^W}}$$

(Log) Local Labor Supply:

$$\ln N_c(w_c, r_c; \bar{A}_c) = \frac{1}{\sigma^W} (\ln w_c - \alpha \ln r_c + \bar{A}_c) + C_0$$

Key Parameter: σ^W , dispersion of idiosyncratic preferences ξ_{nc}

Housing Market: Upward-sloping supply of housing:

$$H_c^S = (B_c^H r_c)^{\eta_c}$$

- B_c^H is housing productivity
- r_c is price of housing

With Cobb-Douglas H_c^D , HM equilibrium given by:

$$\ln r_c = \frac{1}{1 + \eta_c} \underbrace{(\ln N_c + \ln w_c)}_{\text{Housing Demand}} + C_1$$

Key Parameter: η_c elasticity of housing supply

Aggregate labor demand for firms in location c :

$$L_c^D = \underbrace{E_c}_{\text{Extensive margin}} \times \underbrace{\mathbb{E}_\zeta[l^*(\zeta_{jc})|c]}_{\text{Intensive margin}}$$

Elasticity of labor demand:

$$\frac{\partial \ln L_c^D}{\partial \ln w_c} = \underbrace{\gamma - 1}_{\text{Substitution}} + \underbrace{\gamma \varepsilon^{PD}}_{\text{Scale}} - \underbrace{\frac{\gamma}{\sigma^F}}_{\text{Firm-Location}} \equiv \varepsilon^{LD}$$

More elastic ε^{LD} when:

- Higher output elasticity of labor γ
- Higher product demand elasticity ε^{PD}
- Lower productivity dispersion σ^F (i.e. firms more mobile)

Result: Local Incidence of State Corporate Taxes (1/2)

- Let $\dot{w}_c(\theta) \equiv \frac{\partial \ln w_c}{\partial \ln(1-\tau^b)}$. Incidence on wages is:

$$\dot{w}_c(\theta) = \frac{-\frac{1}{(\epsilon^{PD}+1)\sigma^F}}{\underbrace{\left(\frac{1+\eta_c-\alpha}{\sigma^W(1+\eta_c)+\alpha}\right)}_{\epsilon^{LS}} - \underbrace{\gamma\left(\epsilon^{PD}+1-\frac{1}{\sigma^F}\right)}_{\epsilon^{LD}} + 1}$$

Smaller wage increase if:

- 1 Productivity Dispersion σ^F is large (i.e. immobile firms)
- 2 Preferences Dispersion σ^W is small (i.e. mobile people)
- 3 Any other reason why ϵ^{LS} and $|\epsilon^{LD}|$ are large

Result: Local Incidence of State Corporate Taxes (2/2)

Rental Costs: $\dot{r}_c(\theta) = \left(\frac{1+\varepsilon^{LS}}{1+\eta_c} \right) \dot{w}_c$

- Smaller rent increases if housing supply is very elastic

Firm Profits:

$$\dot{\pi}_c(\theta) = 1 \underbrace{-\delta(\varepsilon^{PD} + 1)}_{\text{Reducing Capital Wedge}} + \underbrace{\gamma(\varepsilon^{PD} + 1)\dot{w}_c}_{\text{Higher Labor Costs}}$$

- Mechanical effects vs. higher production costs

Welfare Effects of Corporate Tax Cut

Stakeholder	Benefit	Statistic
Workers	Disposable Income	$\dot{w}_c - \alpha \dot{r}_c$
Landowners	Housing Costs	\dot{r}_c
Firm Owners	After-tax Profit	$1 - \delta(\varepsilon^{PD} + 1) + \gamma(\varepsilon^{PD} + 1)\dot{w}_c$

Welfare Effects of Corporate Tax Cut

Stakeholder	Benefit	Statistic
Workers	Disposable Income	$\dot{w}_c - \alpha \dot{r}_c$
Landowners	Housing Costs	\dot{r}_c
Firm Owners	After-tax Profit	$1 - \delta(\varepsilon^{PD} + 1) + \gamma(\varepsilon^{PD} + 1)\dot{w}_c$ $= 1 + \underbrace{\gamma(\varepsilon^{PD} + 1)}_{\substack{\text{Labor cost factor} \\ \text{Net Markup}}} \times \left(\dot{w}_c - \frac{\delta}{\gamma} \right)$

Empirical Implementation and Identification

Structural Form of the Model

$$\mathbb{A}Y_{c,t} = \mathbb{B}Z_{c,t} + e_{c,t}$$

where

$$\bullet \mathbb{A} = \begin{bmatrix} -\frac{1}{\sigma^W} & 1 & \frac{\alpha}{\sigma^W} & 0 \\ 1 & -\frac{1}{\varepsilon^{LD}} & 0 & 0 \\ -\frac{1}{1+\eta} & -\frac{1}{1+\eta} & 1 & 0 \\ \frac{\gamma}{\sigma^F} & 0 & 0 & 1 \end{bmatrix}, \mathbb{B} = \begin{bmatrix} 0 \\ 1 \\ \frac{1}{\varepsilon^{LD}\sigma^F(\varepsilon^{PD}+1)} \\ 0 \\ \frac{1}{-\sigma^F(\varepsilon^{PD}+1)} \end{bmatrix}$$

$$\bullet Y_{c,t} = [\Delta \ln w_{c,t} \quad \Delta \ln N_{c,t} \quad \Delta \ln r_{c,t} \quad \Delta \ln E_{c,t}]'$$

$$\bullet Z_{c,t} = [\Delta \ln(1 - \tau_{c,t}^b)]$$

• $e_{c,t}$ is a structural error term

Exact Reduced Form of the Model

$$Y_{c,t} = \underbrace{A^{-1}B}_{\equiv \beta^{\text{Business Tax}}} Z_{c,t} + A^{-1}e_{c,t}$$

where $\beta^{\text{Business Tax}}$ is a vector of reduced-form effects of business tax changes:

$$\beta^{\text{Business Tax}} = \begin{bmatrix} \beta^W \\ \beta^N \\ \beta^R \\ \beta^E \end{bmatrix} = \begin{bmatrix} \dot{w} \\ \dot{w} \epsilon^{LS} \\ \frac{1+\epsilon^{LS}}{1+\eta} \dot{w} \\ \frac{\mu-1}{\sigma^F} - \frac{\gamma}{\sigma^F} \dot{w} \end{bmatrix} .$$

4 Reduced-Form Equations of the Model

Effects on establishments, pop., wages, & rental cost growth over 10 years

$$\Delta \ln w_{c,t} = \underbrace{(\dot{w}(\theta))}_{\beta^W} \Delta \ln(1 - \tau_{c,t}^b) + \phi_t^1 + u_{c,t}^1$$

$$\Delta \ln N_{c,t} = \underbrace{(\varepsilon^{LS} \dot{w}(\theta))}_{\beta^N} \Delta \ln(1 - \tau_{c,t}^b) + \phi_t^2 + u_{c,t}^2$$

$$\Delta \ln r_{c,t} = \underbrace{\left(\frac{1 + \varepsilon^{LS}}{1 + \eta_c} \dot{w}(\theta) \right)}_{\beta^R} \Delta \ln(1 - \tau_{c,t}^b) + \phi_t^3 + u_{c,t}^3$$

$$\Delta \ln E_{c,t} = \underbrace{\left(\frac{1}{-\sigma^F(\varepsilon^{PD} + 1)} - \frac{\gamma}{\sigma^F} \dot{w}(\theta) \right)}_{\beta^E} \Delta \ln(1 - \tau_{c,t}^b) + \phi_t^4 + u_{c,t}^4$$

Identification of Local Welfare Effects

Stakeholder	Benefit	Statistic
Workers	Disposable Income	$\hat{\beta}^W - \alpha \hat{\beta}^R$
Landowners	Housing Costs	$\hat{\beta}^R$
Firm Owners	After-tax Profit	$1 + \left(\frac{\hat{\beta}^N - \hat{\beta}^E}{\hat{\beta}^W} + 1 \right) \left(\hat{\beta}^W - \frac{\delta}{\gamma} \right)$

Benefits of the incidence formulae

This framework enables us to:

- ① Accommodate the conventional view
- ② Transparently evaluate the sensitivity of our incidence estimates
- ③ Use data to govern relative factor mobility
- ④ Conduct inference and compare results to existing estimates

Brief discussion of Local vs National/Global Effects

Brief discussion of Local vs National/Global Effects

A few considerations:

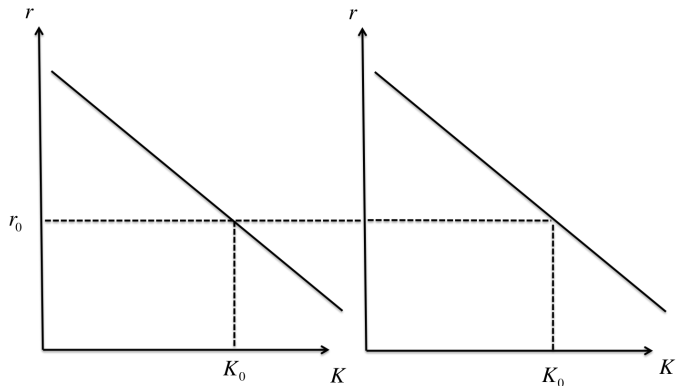
- ① Local versus national labor supply and demand are different
- ② Key question is how elastic supply of capital is, and how that impacts labor market (both in short and long run)
- ③ At national level, other issues, like deficit financing's impact on interest rates, and the effects of those higher interest rates on growth, capital accumulation, and labor demand matter more
- ④ We have more variation and empirical evidence from changes at state and local level. National effects more uncertain

Impact of Capital Tax: One factor, two locations

Setup

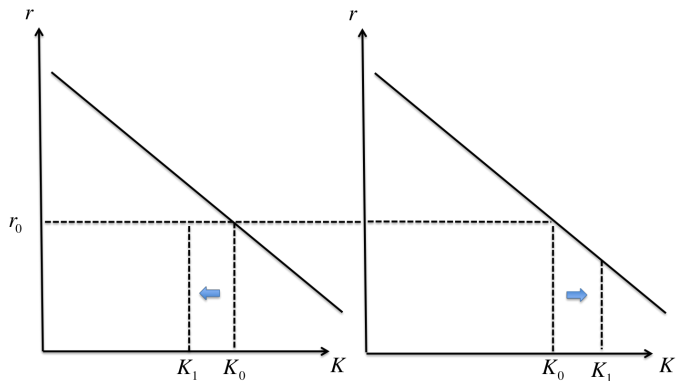
- 1 One factor (capital)
- 2 Two locations: east and west
- 3 Capital market in each location
- 4 Total K fixed in economy overall

Initial equilibrium



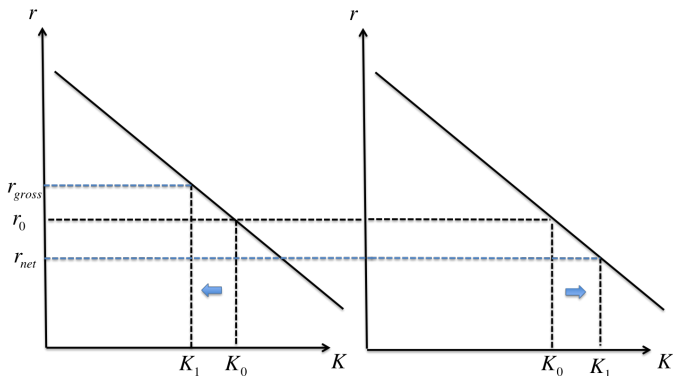
Tax in west

Causes capital to flee to east



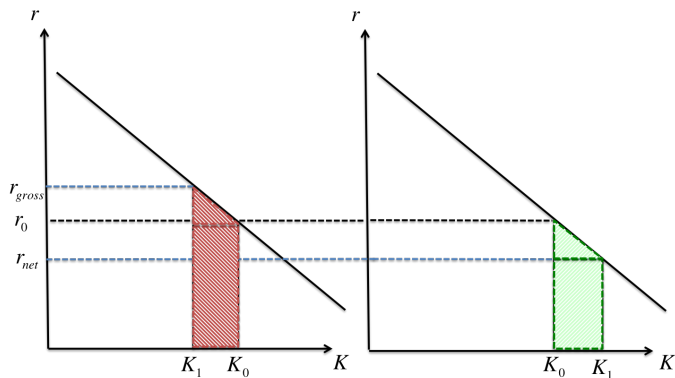
New allocation of capital

- K flows to east, lowering net returns in both
- Flows continue until after tax return is equalized across markets



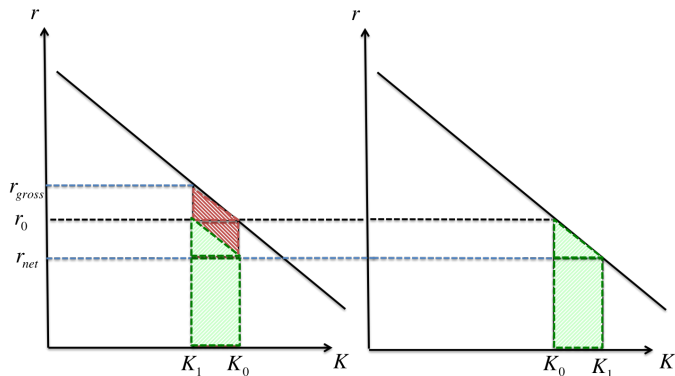
Welfare changes in each location

- Welfare in west falls by red amount
- Welfare in east increases



Net welfare changes in aggregate

- Net welfare loss in red



What determines size of welfare loss in this toy example?

- ① Size of tax change
- ② Size of market being taxed (depends on fundamentals)
- ③ Elasticity of demand in both regions (quantity response more generally, which depends on S and D elasticities)
- ④ Strength of complementarities across markets (e.g., labor market)
- ⑤ Assumptions about effects/value of government spending (assumed to be zero here)
- ⑥ Presence of existing distortions

Could formalize these ideas more, but this example provides intuition for some key forces in the Harberger model

Brief overview of (Harberger, JPE 1962)

(Harberger, JPE 1962) brief overview of setup

1 Goals

- Characterize effects of corporate tax change in a GE model
- Who bears the burden of corporate taxes? (also capital, output taxes)

2 Two sectors (or locations)

- Corporate sector produces output X
- Non-corporate sector produces output Y

3 Markets

- Capital: prices r_i , quantities K_i where $i \in \{X, Y\}$
- Labor: prices w_i , quantities L_i
- Goods: prices p_i , quantities X, Y

4 Agents

- Workers (representative, perfectly mobile, supply 1 unit of labor)
- Firm (representative, perfectly competitive, CRS)

5 Equilibrium Conditions

- Good and factor markets clear, factor price equalization
- Consumers max utility, firms earn zero profits

Two Main Effects of Taxing K_x

- 1 **Substitution effects:** capital bears incidence
- 2 **Output effects:** capital may not bear all incidence

Substitution effects

- Tax on K_x shifts production in X away from K so aggregate demand for K goes down
- Because total K is fixed, r falls $\rightarrow K$ bears some of the burden

Another intuition for this is that capital is misallocated across sectors, which lowers r and rK

Output effects

- Tax on K_x makes X more expensive
- Demand shifts to Y
- *Case 1:* $K_x/L_x > K_y/L_y$ (X : cars, Y : bikes)
 - X more capital intensive \rightarrow lower aggregate demand for K
 - Output + subst. effect: K bears the burden of the tax
- *Case 2:* $K_x/L_x < K_y/L_y$ (X : bikes, Y : cars)
 - X less capital intensive \rightarrow higher aggregate demand for K
 - Subst. and output effects have opposite signs \rightarrow labor may bear some the tax

Harberger showed that under a variety of reasonable assumptions, capital bears exactly 100 percent of the tax. Note that this is the burden on all capital – as capital flees the corporate sector, it depresses returns in the noncorporate sector as well. Both the realism of the model and the characterization of the corporate income tax as an extra tax on capital in the corporate sector are subject to question, as discussed in considerable detail by the subsequent literature on the effects of the corporate tax. – Alan Auerbach

See Auerbach TPE paper on who bears the corporate tax for more details on what's missing (e.g., dynamics, investor taxation, corporate financial policy, assumption that corporate and non-corporate sectors represent different industries, etc)

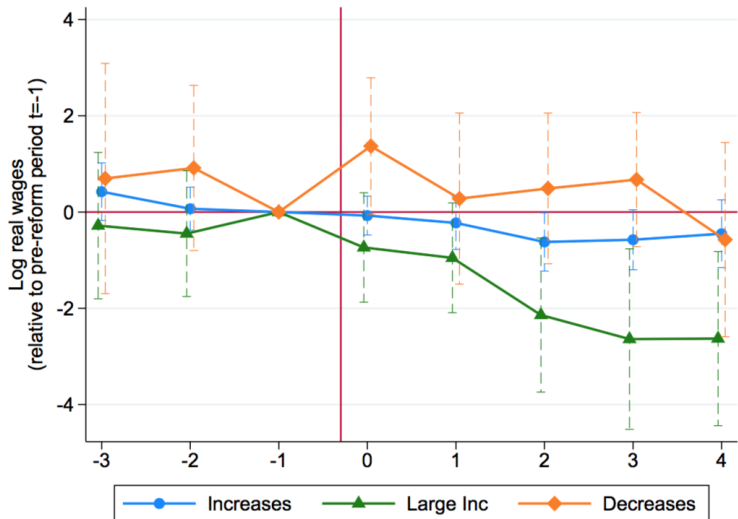
- 1 Harberger is workhorse analytical model: 2 sector and 2 factors
- 2 Fixed supply of capital and labor (short run, closed economy)
- 3 Key intuition is misallocation (magnitude depends on factor intensity, demand elasticities, etc)
- 4 Fullerton and Ta (2017) simplifies Harberger analysis (Cobb Douglas)
- 5 Similar to Hecksher-Ohlin model
- 6 When interpreting as locations not sectors, then implicitly assume no trade costs. Similarly, implicitly assumes no adjustment costs for capital and labor (so long run in that sense)
- 7 Abstracts from amenity or productivity effects of government spending (lump sum rebates or purchases in same share as consumers)

Empirical Estimates of Corporate Tax Incidence on Wages

Overview of Fuest, Peichl, Siegloch (AER, 2018)

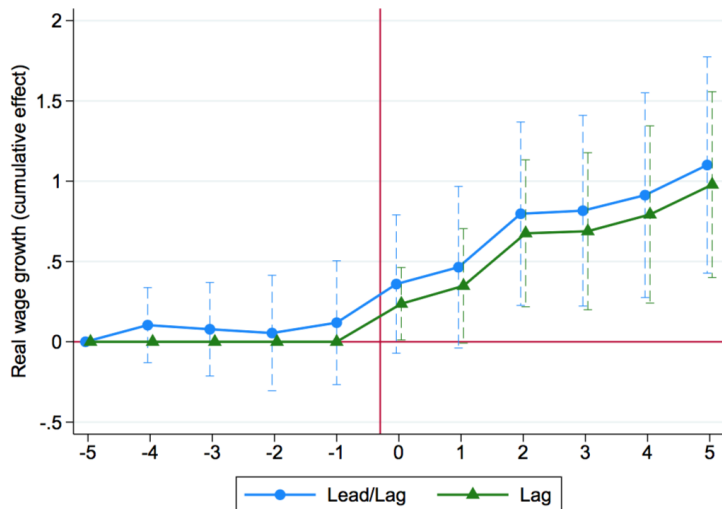
- Paper: C. Fuest, A. Peichl, S. Siegloch . “Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany?”
- Question: What is the effect of corporate taxes on wages?
- Data: 20-year panel of German municipalities. Administrative linked employer-employee data
- Findings:
 - Workers bear roughly half the burden of corporate taxes
 - Low-skilled, young and female employees bear a larger share of the tax burden

Event Study: Effects of corp tax change on log real wages



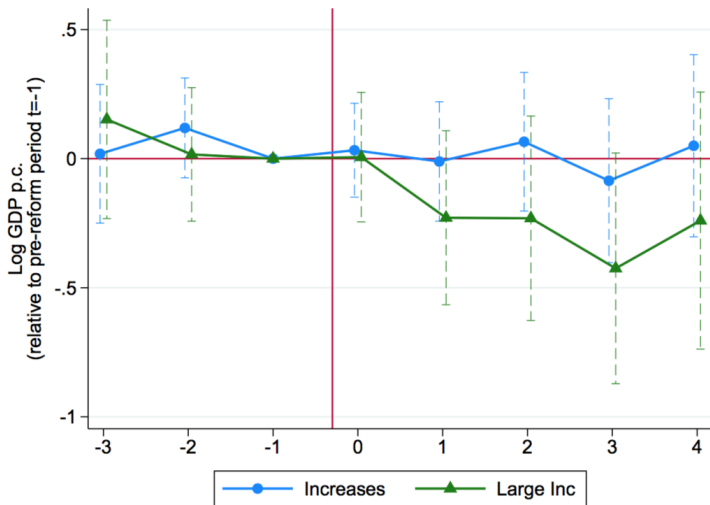
Source: Fuest, Peichl, Sieglösch.

Distributed lag: Effects of corp tax change on log real wages



Source: Fuest, Peichl, Sieglösch.

Event Study: Effects of corp tax change on log GDP



Source: Fuest, Peichl, Sieglöch.

Estimating equation:

$$\ln w_{f,t}^{p50} = \delta \ln(1 - \tau_{m,t}) + \mu_f + \mu_m + \psi_{s,t} + \varepsilon_{f,t},$$

Effects of corp tax change on median wages

Table 1: Differences-in-differences estimates: baseline wage effects

	(1)	(2)	(3)	(4)	(5)	(6)
Log net-of-LBT rate	0.388 (0.127)	0.229 (0.110)	0.386 (0.127)	0.396 (0.128)	0.343 (0.164)	0.399 (0.118)
Incidence (I^w)	0.505 (0.170)	0.288 (0.140)	0.502 (0.170)	0.516 (0.172)	0.442 (0.217)	0.520 (0.159)
State \times year FE	✓			✓	✓	✓
Year FE		✓				
CZ \times year FE			✓			
Municipal controls $t - 2$				✓		
Firm controls $t - 2$					✓	
Worker shares						✓
Observations	44,654	44,654	44,654	44,654	25,241	44,654

Source: LIAB and Statistical Offices of the Laender. *Notes:* This table presents the DiD estimates, $\hat{\delta}$, of regression model (3) at the firm level. Coefficients measure the wage elasticity with respect to the net-of-local-business-tax rate. The incidence effect I^w is measured according to formula (4) as the share of the total tax burden borne by workers. All regression models include municipal and firm fixed effects. Additional control variables and fixed effects (year, “state \times year” or “commuting zone (CZ) \times year”) vary depending on the specification (as indicated at the bottom of the table). The estimation sample is restricted to all establishments liable to the LBT in non-merged municipalities. Standard errors are clustered at the municipal level. Corresponding standard errors for the incidence measure are obtained using the Delta method. Our preferred (baseline) specification is shown in column (1).

Source: Fuest, Peichl, Siegloch.

Heterogeneous effects on median wages

Table 4: Differences-in-differences estimates: wage effects by worker type

Stratified by ...	Effect of log net-of-LBT rate by worker type			N
	High	Medium	Low	
Skill				9, 295, 488
	0.013	0.357	0.377	
	(0.120)	(0.115)	(0.168)	
Gender	Female	Male		9, 295, 488
	0.530	0.325		
	(0.129)	(0.119)		
Occupation	Blue-collar	White-collar		9, 295, 442
	0.363	0.250		
	(0.132)	(0.104)		
Age	Young	Medium	Old	9, 295, 488
	0.507	0.317	0.329	
	(0.127)	(0.111)	(0.106)	

Source: LIAB and Statistical Offices of the Laender. *Notes:* This table presents the DiD estimates $\hat{\delta}$ of regression model (3) with the log individual wage as dependent variables for different worker types as indicated in the table. The heterogeneous effects are estimated by interacting the LBT rate with dummy variables for different firms types. Coefficients measure the wage elasticity with respect to the net-of-local-business-tax rate. All specifications include worker, firm and municipal fixed effects, as well as “state \times year” and “worker type \times year” fixed effects. The estimation sample comprises all establishments liable to the LBT in non-merged municipalities. Standard errors are clustered at the municipal level.

Source: Fuest, Peichl, Sieglösch.

III. User Cost, Impact of TCJA, Open Questions

User Cost, Impact of TCJA, Open Research Questions

- 1 User Cost
 - User Cost expression with taxes
- 2 Impact of TCJA (Barro Furman, BPEA 2018)
 - Measuring User Cost in Practice
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User Cost expression with taxes

User Cost expression with taxes

Jorgenson's (1963) user cost of capital R_t is the classic way to analyze the effect of taxation on investment

$$R = \frac{q(1 - \tau z)(r + \delta - \pi)}{1 - \tau}$$

- q is the price of capital goods and π is the corresponding inflation rate
- τ is the corporate tax rate
- z is the present value of depreciation deductions per dollar of new capital
- Can also include an investment tax credit term (which would enter, e.g., $z = ITC/\tau$)
- r is the firm's nominal cost of funds (presumably a weighted avg of debt and equity costs)
- δ is the rate at which capital depreciates

With immediate expensing, $z = 1$ so the tax terms cancel, yielding:

$$R = q(r + \delta - \pi)$$

- This expression is the continuous time version of what we had before without taxes
- Dynamics/expectations re path of q, τ, z, ITC change the expression
- See Hall and Jorgenson (AER, 1967) for derivations or more recent notes by Poterba (MIT open course web 14.471 Fall 2012) or Auerbach (2005) paper “Taxation and Capital Spending”
- See Yagan (AER, 2015) appendix D for empirical implementation

User Cost, Impact of TCJA, Open Research Questions

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Summary of the 2017 Tax Reform (TCJA)

Overall Revenue Score and Major Business Provisions

- 1 Static cost of **1.5T** in federal revenue over ten years (JCT 2017)
- 2 Corporate Tax Changes
 - 1 Lowered corporate rate from 35% to 21% (**-150B/yr**, **-1.4T** 2018-27)
 - 2 Full expensing for next 5 years (**-30B/yr** in 2018-20, **-86B/yr** 2018-27)
 - 3 To offset, repeal/limit DPAD, interest deductibility, R&E, losses
- 3 Pass-through provisions (sunset 12/31/2025)
 - 1 New 20% deduction for certain pass-through income (**-45B/yr**)
 - 2 Lowered top rate from 39% to 37%
 - 3 To offset, disallow active losses in excess of \$500K (15B/yr)
- 4 International provisions
 - 1 Establish territorial system and reduce rate on foreign intangibles associated with income derived in US
 - 2 To offset, minimum tax on global intangibles (GILTI) of 10.5% through 2025 and 13.125% thereafter and (BEAT) which is like a minimum tax on inbound investment. Also one-time payment on existing overseas earnings and free repatriation thereafter

Measuring User Cost (Barro Furman, BPEA 2018)

Start by ignoring debt financing and assume τ and z are constant:

$$R = \frac{(1 - \tau z)(r + \delta)}{1 - \tau}$$

- τ and z summarize the tax system (note $\lambda \equiv z$ in BF)
- r is set to 8.2 (see paper for discussion); implicitly assumes horizontal supply of capital
- δ is the rate at which capital depreciates
 - Equipment $\delta = 8.8\%$
 - Structures $\delta = 2.0\%$
 - Rental residential property $\delta = 2.7\%$
 - R&D intellectual property $\delta = 12.3\%$
 - Other intellectual property $\delta = 19.5\%$

BF then add debt financing tradeoff between tax advantage and cost of higher default probability

Adding this extra term for debt financing gives:

$$R = \frac{(1 - \tau z)(r + \delta)}{1 - \tau} - \frac{1}{2} \left(\frac{\tau}{1 - \tau} \right) \textit{debtshare} \times i$$

- $\frac{1}{2}$ is from calibrated marginal cost of debt financing (see eq 5; fn 14)
- *debtshare* is the share of financing from debt, which they set to 1/3
- *i* is the nominal interest rate on corporate bonds

TCJA effect on C-corp tax rates

Barro and Furman (BPEA, 2018)

BF consider three scenarios:

- 1 **Baseline in 2017:** $\tau = 38\%$
 - Federal $(\frac{2}{3})35\% + (\frac{1}{3})31.85\%$ (from DPAD) = 34%
 - Add 4% for state corporate tax
- 2 **Law as written (applicable as of 2027):** $\tau = 27\%$
 - Federal = 21%
 - Adjust to reflect NOL limitations and smaller offsets (1.5pp)
 - Add 4% for state corporate tax
- 3 **Provisions permanent (applicable as of 2019):** $\tau = 26\%$
 - Federal = 21%
 - Adjust to reflect NOL limitations and smaller offsets (0.25pp)
 - Add 4% for state corporate tax

TCJA effect on C-corp user costs

Barro and Furman (BPEA, 2018)

Table 5
Estimated Effects on C Corporations from 2017 Tax Law

	Baseline	Scenario I Law as written	Scenario II Provisions permanent
Corporate-profits tax rate, τ	38%	27%	26%
Effective expensing rate, λ			
Equipment	0.812	0.812	1.000
Structures	0.338	0.338	0.338
Rental residential property	0.336	0.336	0.336
R&D intellectual property	1.132	1.011	1.192
Other intellectual property	0.842	0.842	0.842
User cost of capital, Ω (% change from baseline)			
Equipment	0.186	0.180 (-3%)	0.168 (-10%)
Structures	0.139	0.125 (-10%)	0.124 (-11%)
Rental residential property	0.149	0.134 (-10%)	0.132 (-11%)
R&D intellectual property	0.185	0.202 (+10%)	0.189 (+2%)
Other intellectual property	0.300	0.291 (-3%)	0.290 (-3%)
<i>Average</i>		<i>(-4%)</i>	<i>(-8%)</i>

TCJA effect on pass-through tax rates

Barro and Furman (BPEA, 2018)

BF consider three scenarios:

- 1 **Baseline in 2017:** $\tau = 35.2\%$
 - Assumed value for average marginal tax rate for owners of non-C-corporate businesses
- 2 **Law as written (applicable as of 2027):** $\tau = 35.5\%$
 - Reflects elimination of DPAD and some bracket creep due to shifting to chained CPI
- 3 **Provisions permanent (applicable as of 2019):** $\tau = 31.1\%$
 - Reflects reduction in individual tax rates and allowable part of the 20 percent pass-through deduction
 - Partially offset with higher marginal rates from capping SALT

TCJA effect on pass-through user costs

Barro and Furman (BPEA, 2018)

Table 9
Estimated Effects on Pass-through Businesses from 2017 Tax Law

	Baseline	Law as written	Provisions permanent
Pass-through tax rate, τ	35.2%	35.5%	31.1%
Effective expensing rate, λ			
Equipment	0.812	0.812	1.000
Structures	0.338	0.338	0.338
Rental residential property	0.336	0.336	0.336
R&D intellectual property	1.000	0.785	1.000
Other intellectual property	0.842	0.842	0.842
User cost of capital, Ω (% change from baseline)			
Equipment	0.184	0.185 (0)	0.167 (-9%)
Structures	0.135	0.136 (+1%)	0.130 (-4%)
Rental residential property	0.145	0.146 (+1%)	0.139 (-4%)
R&D intellectual property	0.202	0.226 (+12%)	0.202 (0)
Other intellectual property	0.297	0.298 (0)	0.294 (-1%)
<i>Average</i>		<i>(+1%)</i>	<i>(-5%)</i>

From user cost changes to impacts on economic activity

Barro and Furman (BPEA, 2018)

1 Production Function

- $Y = AK^\alpha L^{1-\alpha}$ where $\alpha = .38$
- $K^\alpha = K_1^{\alpha_1} K_2^{\alpha_2} K_3^{\alpha_3} K_4^{\alpha_4} K_5^{\alpha_5}$ for each type of capital

2 Elasticity of capital labor ratio (K/L) w.r.t user cost

- $MPK = \alpha A \left(\frac{K}{L}\right)^{-(1-\alpha)}$
- Implies that the elasticity of (K/L) to user cost is $-1/(1-\alpha) \approx 1.6$

3 Output per worker

- Elasticity of (Y/L) to user cost is $-\alpha/(1-\alpha) \approx .6$
- With 5 types of capital, numerator is α_k -weighted average of user cost change
- Also note that wages are proportional to Y/L from labor FOC

TCJA effect on C-corp economic activity

Barro and Furman (BPEA, 2018)

User cost of capital, Ω (% change from baseline)			
Equipment	0.186	0.180 (-3%)	0.168 (-10%)
Structures	0.139	0.125 (-10%)	0.124 (-11%)
Rental residential property	0.149	0.134 (-10%)	0.132 (-11%)
R&D intellectual property	0.185	0.202 (+10%)	0.189 (+2%)
Other intellectual property	0.300	0.291 (-3%)	0.290 (-3%)
<i>Average</i>		<i>(-4%)</i>	<i>(-8%)</i>

Percent change in capital-labor ratio, K/L		
Equipment	5.6%	14.3%
Structures	12.9%	16.1%
Rental residential property	13.0%	16.2%
R&D intellectual property	-7.1%	2.3%
Other intellectual property	5.4%	8.0%
<i>Average</i>	<i>6.6%</i>	<i>12.5%</i>

Percent change in output per worker, Y/L	2.5%	4.7%
------------------------------------------	------	------

Notes: The effective expensing rate, λ , is calculated as a present value, including tax credits. The economic and tax law parameters were listed in Tables 3 and 4 and are described in the text where appropriate.

Averages reflect the average percent changes for each type of capital, weighted by the capital income shares.

TCJA effect on pass-through economic activity

Barro and Furman (BPEA, 2018)

User cost of capital, Ω (% change from baseline)			
Equipment	0.184	0.185 (0)	0.167 (-9%)
Structures	0.135	0.136 (+1%)	0.130 (-4%)
Rental residential property	0.145	0.146 (+1%)	0.139 (-4%)
R&D intellectual property	0.202	0.226 (+12%)	0.202 (0)
Other intellectual property	0.297	0.298 (0)	0.294 (-1%)
<i>Average</i>		<i>(+1%)</i>	<i>(-5%)</i>
Percent change in capital-labor ratio, K/L			
Equipment		-1.2%	12.2%
Structures		-1.5%	7.2%
Rental residential property		-1.5%	7.2%
R&D intellectual property		-13.1%	2.8%
Other intellectual property		-1.0%	4.2%
<i>Average</i>		<i>-2.1%</i>	<i>8.3%</i>
<u>Percent change in output per worker, Y/L</u>		<u>-0.8%</u>	<u>3.1%</u>

Note: Uses pass-through tax rates as shown. R&E credit assumed to be zero in all cases. See Tables 3, 4 and 5 on other aspects.

TCJA effect on overall economic activity, switching

Barro and Furman (BPEA, 2018)

Table 10
Estimated Effects on Economy-wide Output per Worker

	Percent change in output per worker, Y/L		
	Initial share	Law as written	Provisions permanent
C corporations	39%	2.5%	4.7%
Pass-throughs	36%	-0.8%	3.1%
Government, Households, and Institutions	25%	0.0%	0.0%
Percent change in overall output per worker		0.9%	3.1%
<u>Sensitivity analysis when productivity rises by 10% for switchers</u>			
<i>Percent change in overall output per worker</i>		<i>1.6%</i>	<i>3.5%</i>

Notes: The initial shares in value added are in Table 3. Values of change in output per worker for law-as-written and provisions-permanent scenarios are from Table 5 for C corporations and Table 9 for pass-through businesses. These values reflect changing capital-labor ratios within sectors. The change in output per worker is assumed to be zero for government, households, and institutions. The percent change in overall output per worker is the sum of the changes by sector weighted by the final shares, which are assumed, because of shifting across

1 Tax rate vs base

- Effects of expensing vs interest deductibility
- How to model NOLs, etc, and their impacts on user cost and growth

2 Actual Investment responses

- Do estimates line up with predictions? Heterogeneity by type of capital
- Where does investment come from? Extensive, intensive, FDI?
- More broadly, what are the effects on the international provisions?
- Crowd-out from deficits? How do responses change w/ higher r ?

3 Output per worker and wages

- How do these changes impact Y/L and wages? what are the distributional impacts?

4 Others

- How much corporate form switching was there? Are there productivity gains from switching? Tax revenue impacts?
- What do firms do with the windfalls to old capital?
- How much reallocation of capital and labor is there?

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A few more open research questions

1 Business Income, Taxation, and Inequality

- Who owns C-corporations? Important for top wealth & inequality
- How much of business wealth is self-made versus inherited? How does this respond to taxation?

2 Business Property Taxes

- Effect of prop taxes (expected prop tax/fiscal health) on firm location

3 Reform

- How much would dollar depreciate if the DBCFT reform were enacted? Effects on wealth?
- International Reforms related to tax evasion and avoidance

4 Other topics

- Rents vs normal returns to capital
- Size, causes, and consequences of business location subsidies
- How do federal changes affect state revenues and economic activity (e.g., bonus)?
- Repatriation: decision to send money back in 2003 holiday
- Corporate financial policy

IV. International Taxation and Fundamental Reform (Auerbach)

IV. Taxes, Financial Policy, and Investment (Poterba)