Corporate Taxes and Retail Prices

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Corporate Tax Incidence

"It is well understood that high corporate taxes may be borne by capital owners in the form of lower after-tax profits, by consumers in the form of higher prices, or by workers in the form of reduced wages." Urban-Brookings Tax Policy Center

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- Incidence on capital: Harberger 1962; Giroud & Rauh 2019
- Incidence on wages: Fuest, Peichl & Siegloch, 2018; Ljungqvist & Smolyansky, 2016
- Incidence on both: Suarez Serrato & Zidar 2016; Fajgelbaum, Morales, Suarez Serrato & Zidar 2018
- Little empirical work on incidence on consumers
 ⇒ Important implications for progressivity of corporate taxes

Incidence: New York Times



Numbers include income taxes, capital gains taxes, payroll taxes, estate taxes, gift taxes and corporate taxes (which are effectively paid by stockholders). 2004 tax rates are based on 2004 tax law applied to 2000 income adjusted for income growth.

Source: Thomas Piketty and Emmanuel Saez

Incidence: Harvard Public Economics (EC2450A)

CBO TAX INCIDENCE ASSUMPTIONS

The Congressional Budget Office (CBO) analysis considers the incidence o the full set of taxes levied by the *federal government*. Their key assumptions follow:

1. Individual Income taxes are borne fully by the households that pay them

2. **Payroll taxes** are borne fully by workers, regardless of whether these taxes are paid by the workers or by the firm.

3. Excise taxes are fully shifted to prices and so are borne by individuals in properties to their consumption of the taxed item.

4. Corporate taxes are allocated 75% to owners of capital (not only shareholders but owners of capital in general) in proportion to capital income and 25% to labor in proportion to labor income [Most controversia] Debate whether corporate tax really as progressive as CBO typically assumed.

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- Policy-makers:
 - CBO model incident fully on capital and labor
 - Treasury incident fully on capital and labor

This Paper

- Study the impact of corporate taxes on barcode-level product prices using linked survey and administrative data
 - Nielsen Retail Scanner Data
 - GS1 Barcode Database
- Strategy exploits firms who produce and sell in different states
 - \Rightarrow Avoids endogeneity of own-state tax changes
 - \Rightarrow Can control for local demand shocks
- Estimate model allowing for changes in consumer welfare
 - \Rightarrow Allows for decomposition of tax incidence
 - \Rightarrow Can use as input to policy models

- Significant effects of corporate tax increases on prices
 - \Rightarrow Estimated elasticity of 0.27
- Policymakers' models underestimate incidence of corporate taxes on consumers
 - \Rightarrow Approximately 41% of incidence falls on consumers
- Effects are largest for lower-price items and products purchased by low-income households
 - $\Rightarrow~$ Corporate taxes have more nuanced effects on progressivity

Outline

- Data
- Theoretical Framework
- Empirical Strategy & Results
- Incidence
- Conclusion

Linking Products to Corporate Taxes

- Goal: calculate applicable corporate tax for a given retail good
 - \Rightarrow Requires linking retail products to *producer's* HQ state
 - ⇒ Alternately, use 'tax nexus' approximation (Ljungqvist & Smolyansky, 2016)
- Primary data sources:
 - Prices Nielsen Retail Scanner Data retail prices
 - GS1 Barcode Database UPC links to producers
 - Giroud & Rauh 2019 (extended) Corporate tax rates
 - Orbis locations of producers' HQs

Variation of Large Tax Changes



- Simplified version of Suarez Serrato & Zidar 2016
- Firms are endowed with productivity level B, and combine labor, L and capital K to produce output $y = B \cdot L^{\gamma} \cdot K^{1-\gamma}$
- Firms solve:

$$\max_{L,K} (1-\tau) \cdot (p \cdot y - w \cdot L) - \rho \cdot K \tag{1}$$

• $\tau = \text{Tax rate}; w = \text{wage rate}; \rho = \text{rate of return on capital}$

• CES demand

Model Framework

• Firm's optimal price level in logs, ln(p) will be given by

$$\ln(p) = -(1 - \gamma)\ln(1 - \tau) + (1 - \gamma)\ln(\rho) + \gamma\ln(w) + Z \qquad (2)$$

 \Rightarrow Directly motivates estimating equation









$$\ln(p_{i,s,t+1}) = \alpha_{r,s,t} + \alpha_i + \beta \ln(1 - \tau_{c,h,t}) + \gamma_1 X_{i,t} + \gamma_2 X_{h,t} + \varepsilon_{i,t}$$

- $p_{i,s,t}$ is the retail price of product *i* sold in state *s* at time *t*
- $\tau_{c,h,t}$ is the tax rate in the state where the producer has their HQ, h at time t (Ljungqvist & Smolyansky, 2016)
- $X_{i,t}$ and $X_{h,t}$ include product sales, state tax revenues, state GDP, and state unemployment rates
- Standard errors clustered by seller's state

Product Level Controls

$$\ln(p_{i,s,t+1}) = \alpha_{r,s,t} + \frac{\alpha_i}{\alpha_i} + \beta \ln(1 - \tau_{c,h,t}) + \gamma_1 X_{i,t} + \gamma_2 X_{h,t} + \varepsilon_{i,t}$$

• α_i are product/UPC level fixed effects

 \Rightarrow Absorbs time invariant product-specific factors

Location-Time Level Controls

$$\ln(p_{i,s,t+1}) = \alpha_{r,s,t} + \alpha_i + \beta \ln(1 - \tau_{c,h,t}) + \gamma_1 X_{i,t} + \gamma_2 X_{h,t} + \varepsilon_{i,t}$$

- $\alpha_{r,s,t}$ are sold-state by retailer by time fixed effects
 - \Rightarrow Capture local factors like state-specific business cycles

Effects of Corporate Taxes on Retail Prices

The tables shows the relationship between retail prices and corporate taxes from weighted regressions, using sales as weight. Retail prices are measured in the geographic location where a good is sold. Corporate taxes are measured in the state where a firm is headquartered. The inclusion of controls and fixed effects is denoted beneath each specification. The sample is restricted to firms that we can identify as C-Corporations. Standard errors are clustered at the headquarter state level. Source: Nielsen and GS1. *p < .1, ** p < .05, *** p < .01.

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)
$\log(1 - \tau_c)$	-0.428***	-0.297***	-0.303***	-0.279***	-0.275***	-0.268***
	(0.136)	(0.0371)	(0.0374)	(0.0406)	(0.0365)	(0.0395)
Controls	X	X	X	X	X	X
UPC×Retailer×Sold State	X	X	X	Х	X	X
Year		Х				
Sold State × Year			Х		Х	
Retailer×Year				Х	X	
Sold State × Retailer × Year						Х
Observations	344,564	344,564	344,564	344,564	344,564	344,564

Effects of Corporate Taxes on Retail Prices



'Placebo' Test: S-Corps Respond Only to Income Taxes



Effects of Tax Increases Persist for Multiple Years



Variants of Main Specifications

- Estimates are robust to:
 - Equally weighting firms
 - Using alternative definitions of tax nexus
 - Excluding any given state
 - Excluding any given tax change
 - Excluding any given product category or type of retailer

Low-Priced Goods see Larger Price Effects



 \Rightarrow Effects larger for low price items

'Low-Income Goods' see Larger Price Effects



 \Rightarrow Measured using average household income of purchasers of a **given** good

- Treasury and CBO models assume incidence on consumers is zero
- Can we apportion impacts across labor, capital, consumers?

- We enrich the setting in Fuest, Peichl and Siegloch (2018)
 - Allow for changes in consumer welfare from a change in taxes

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$$p \cdot C_s = (1 - \tau_{p,s}) w_s L_s$$

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• Representative firm faces tax $\tau_{c,h}$ and maximizes profits:

$$\Pi = (1 - \tau_{c,h})(pF(K, L_h) - w_h L_h) - rK$$

Estimating Incidence

- Empirically estimate $\delta_p = \frac{dp}{d(1-\tau)} \frac{(1-\tau)}{p}$
- Share of consumers in the tax burden can be expressed as:

$$\begin{split} I_{cons} &= \frac{s_{con}\delta_p}{s_{con}\delta_p - (1 - \tau_{p,h})s_{labor}\delta_w - (1 - \tau_{c,h})\delta_p - (1 - \tau_{c,h})(1 - s_{labor})} \\ s_{con} &= \frac{pC_s}{pF(K,L_s)} \text{ consumption share over total output} \\ s_{labor} &= \frac{w_h L_h}{pF(K,L_h)} \text{ is the labor share over total output} \\ \delta_w \text{ is the tax elasticity of wage} \end{split}$$

• Calibrate with estimates from literature or NIPA data

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• Calibrate with estimates from literature or NIPA data \Rightarrow Incidence on consumers is 41%

Concluding Remarks

- We link administrative and survey data to estimate impacts of corporate tax changes on retail prices
 - Use out-of-state HQ producers to absorb demand-side effects
 - Find price elasticity of 0.27
- Incidence on consumers is 41%
- Effects are largest for lower-price items and products purchased by low-income households
- Corporate taxes are likely significantly less progressive than policymakers assume

Backup Slides

Summary Statistics

Table 1: Summary Statistics

This table shows summary statistics for the main analysis sample.Observations are at the UPC- Retailer Store - Sold State -Year level.The sale-weighted price is the average price of one UPC sold by a particular retailer at a state in one year, and it is weighted by the sold quantities. The sales are the dollar sales of a UPC product sold by a retailer in a state in a given year. The top panel shows all data, while the bottom panel shows data for firms identified as C-corporations. Source: Nielsen and GSI.

	(1)						
	Total Sample						
	Mean	Std. Dev.	25 th Pctl.	Median	75 th Pctl.		
Sale-weighted Price	3.31	4.15	1.32	2.22	3.47		
Sales	735.01	4275.06	127.91	228.69	464.86		
State Corporate Tax Rate	8.53	4.10	6.50	7.75	9.50		
State Personal Income Tax Rate	6.02	2.99	3.75	6.08	7.21		
Observations			787,960				
			(1)				
	C-Corporations						
	Mean	Std. Dev.	25th Pctl.	Median	75 th Pctl.		
Sale-weighted Price	2.73	2.73	1.18	2.10	3.12		
Sales	342.69	618.84	116.28	199.10	363.66		
State Corporate Tax Rate	7.60	3.16	6.50	7.10	8.84		
State Personal Income Tax Rate	6.90	3.06	5.40	7.11	7.95		
Observations			344,564				

Alternative Nexus Definition

Table A.6: Corporate Taxes and Retail Prices, with nexus data

The table replicates the analysis in Table 2 and also accounts for apportionment factors. Retail prices are measured in the geographic location where a good is sold. Corporate taxes are measured as the average tax rate weighted by the apportionment factors. The inclusion of controls and fixed effects is denoted beneath each specification. The sample is restricted to firms that we can identify as C-Corporations. Standard errors are clustered at the headquarter state level. Source: Nielsen and GS1. *p < .1, **p < .05, ***p < .01.

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)
$log(1 - \tau_{c,apportioned})$	-0.760***	-0.390**	-0.412**	-0.372**	-0.333**	-0.362**
	(0.255)	(0.161)	(0.163)	(0.151)	(0.156)	(0.167)
Controls	Х	Х	Х	Х	Х	Х
UPC×Retailer×Sold State	Х	Х	Х	Х	Х	Х
Year		Х				
Sold State × Year			Х		Х	
Retailer×Year				Х	Х	
Sold State × Retailer × Year						Х
Observations	336,401	336,401	336,401	336,401	336,401	336,401

Placebo

Table 4: Corporate Taxes and Retail Prices: Placebo Estimates

The tables shows placebo estimates by repeating the analysis for S-Corporations, which do not pay corporate taxes. Retail prices are measured in the geographic location where a good is sold. Corporate taxes are measured in the state where a firm is headquartered. The inclusion of controls and fixed effects is denoted beneath each specification. Standard errors are clustered at the headquarter state level. Source: Nielsen and GS1. *p < .1, **p < .05, ***p < .01.

		··· · · · ·				
	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)
$Log(1 - \tau_c)$	-0.451	0.0605	0.0248	-0.0477	-0.0594	-0.0253
	(0.548)	(0.156)	(0.177)	(0.171)	(0.174)	(0.167)
Controls	Х	Х	Х	Х	Х	Х
UPC×Retailer×Sold State	Х	Х	Х	Х	X	X
Year		Х				
Sold State×Year			Х		Х	
Retailer×Year				Х	Х	
Sold State × Retailer × Year						Х
Observations	404,556	404,556	404,556	404,556	404,556	404,556

S-Corporations

S vs. C Corporations

Table 5: Taxes, Firm Type and Retail Prices

The tables shows the relationship between retail prices, corporate and personal taxes, by whether a firm is identified as a C or S Corporation. Retail prices are measured in the geographic location where a good is sold. Corporate taxes are measured in the state where a firm is headquartered. The inclusion of controls and fixed effects i dende beneath each specification. The sample is restricted to firms that we can identify as C-Corporations. The regression is weighted by sales. Standard errors are clustered at the headquarter state level. Source: Nielsen and GSL *p < .1, ** p < .05, *** p < .01.

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)	Log(Price)
$Log(1 - \tau_c) \times C$ -Corp.	-0.469***	-0.278***	-0.272***	-0.270***	-0.263***	-0.246***
	(0.149)	(0.0767)	(0.0825)	(0.0437)	(0.0501)	(0.0509)
$Log(1 - \tau_n) \times C$ -Corp.	-0.228	0.0515	0.0273	-0.0554	-0.0645	-0.0351
et p, i i	(0.220)	(0.159)	(0.163)	(0.135)	(0.136)	(0.126)
$Log(1 - \tau_c) \times S$ -Corp.	0.185	0.567**	0.437**	0.401	0.366	0.399*
	(0.386)	(0.253)	(0.210)	(0.249)	(0.228)	(0.237)
$Log(1 - \tau_p) \times S$ -Corp.	-5.039***	-3.258	-3.268	-2.755	-2.748	-2.434
	(1.669)	(2.313)	(2.284)	(2.082)	(2.077)	(1.828)
Controls	Х	Х	Х	Х	Х	Х
UPC×Retailer×Sold State	х	х	Х	х	Х	х
Year		X				
Sold State×Year			Х		Х	
Retailer×Year				х	Х	
Sold State × Retailer × Year						х
Observations	787,960	787,960	787,960	787,960	787,960	787,960

Little Impact for Tax *Cuts*



 \Rightarrow Asymmetry consistent with Ljungqvist & Smolyansky, 2016