Taxes, Private Equity, and Evolution of Income Inequality in the United States[1]

Sebastian Dyrda
University of Toronto

Benjamin W. Pugsley
University of Notre Dame

Federal Reserve Bank of Chicago

Toronto/Chicago
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[1] Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.

Motivation

Facts for 1980-2012 period in the US:

1. **Shift in the composition** of the organizational forms of the US businesses from C corporations (subject to corporate income tax code) to S corporations and partnerships (subject to personal income tax code).

2. Increase of the top income groups shares in total income (pre-tax) and change of their composition: **growth of the entrepreneurial income**.

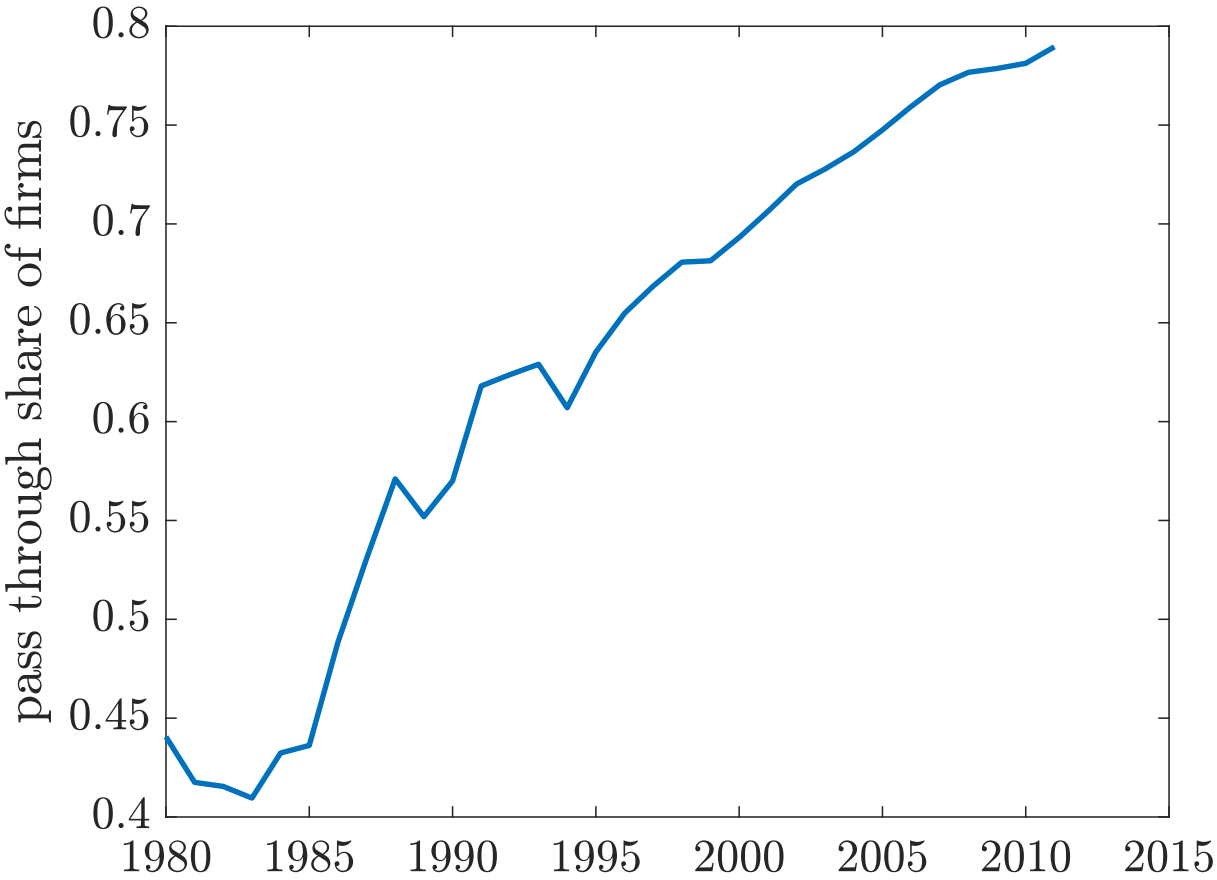
3. Changes in the corporate, dividend and personal **income taxes and regulations** on corporations.

Fact 1: Rise of the pass-throughs since 1980

	Liability Protection	Ownership	Taxation of Profits
Sole Properietorship	No	individual or family	Pass-through
General Partnership	No	general partners	Pass-through
Limited Partnership	No for partners Yes for limited part.	general and limited partners	Pass-through
Limited liability company	Yes	single or multiple members	Pass-through
S Corporation	Yes	one class of 1-100 domestic shareholders	Pass-through
C Corporation	Yes	no limit on number and type	Entity level

Key trade-off: tax and organizational simplicity versus flexibility to raise outside equity

Fact 1: Rise of the pass-throughs since 1980



Source: Authors calculations from Census LBD and Business Register

- Employment share of pass-throughs increased from **17.5** percent in 1980 to **65.4** percent in 2012.

Fact 2: Change in composition of pre-tax top income shares since 1980

	1980				2012			
		Composition				Composition		
	Share	Labor	Entr.	Other	Share	Labor	Entr.	Other
Top 10%	**32.9**	78.1	8.3	13.6	**47.8**	74.3	17.1	8.6
Top 1%	**8.2**	60.5	13.3	26.2	**18.9**	54.9	30.0	15.2
Top 0.1%	**2.2**	49.1	8.4	40.5	**8.4**	41.6	35.4	23.0

Source: IRS

- Labor: wages, salaries, pensions, stock-option exercised and annuities
- Entrepreneurial: sole proprietorships, partnerships and S corporations
- Other: dividends, interest and rents

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This paper: measuring the economic significance of the shift in business organization

1. Provides **new evidence** on the flows between the legal forms of organization of firms and documents that conversion induces changes in employment dynamics (US Census LBD).

2. Establishes **the empirical link** between trend in the distribution of legal forms of organization and income inequality dynamics (SCF data).

3. Proposes a theory of **endogenous choice of legal form and risk diversification** consistent with these empirical findings and quantify the effects of the tax reforms.

Related Literature

1. **Empirical literature on firm dynamics in the US:**

   Chari, Christiano and Kehoe (2008), Moscarini and Postel-Vinay (2012), Kudlyak and Sanchez (2017), Haltiwanger et al. (2013, 2015), Pugsley and Sahin (2016), Smith, Yagan, Zidar, and Zwick (2019).

2. **Macroeconomic implications of entrepreneurship:**

   Quadrini (2000), Cagetti and De Nardi (2006), Cagetti and De Nardi (2009), Chen et al. (2014), Bhandari and McGrattan (2018).

3. **Quantitative macro public finance:**

   Domeij and Heathcote (2004), Conesa et al. (2009), Krueger and Ludwig (2013), Poschke et al. (2012), Heathcote, Storesletten and Violante (2014, 2017, 2019).

4. **Income inequality dynamics:**

   Piketty and Saez (2003), Atkinson, Piketty and Saez (2011), Guvenen and Kaplan (2017), Smith et. al (2019).

Preview of the results

1. Conversions to pass-through entities are concentrated around **major tax reforms** and imply employment-growth **slowdown** at the firm level.

2. Rise of the pass-through entities accounts for **38.8%** of the increase in the pre-tax top income shares since the mid of 80s.

3. A reduction of a personal income tax, calibrated to match 1986 tax reform, implies:
   - **6.1** percentage points (p.p.) rise of pass-throughs,
   - **0.2** p.p. fall in GDP and **5.0** p.p. fall in capital stock,
   - Up to **2.6** p.p. increase in the top income shares.

FIRM-LEVEL EVIDENCE ON CONVERSIONS

LBD - estimating firm level transitions

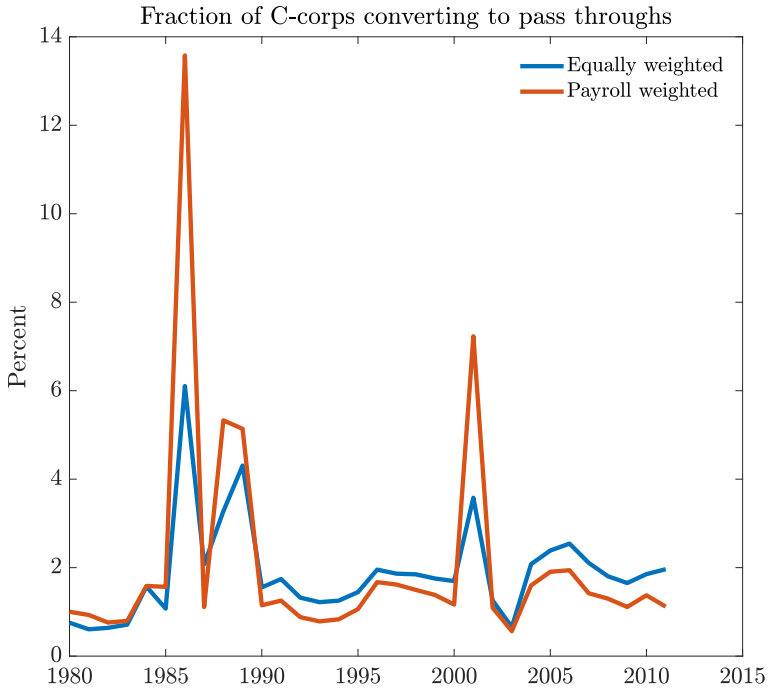
1. US Census Bureau Longitudinal Business Database (LBD) and linked Business Register (BR)
   - Near universal coverage of the nonfarm private sector
   - Longitudinally linked at the establishment level and aggregated to firms
   - Linkages robust to changes in ownership and LFO

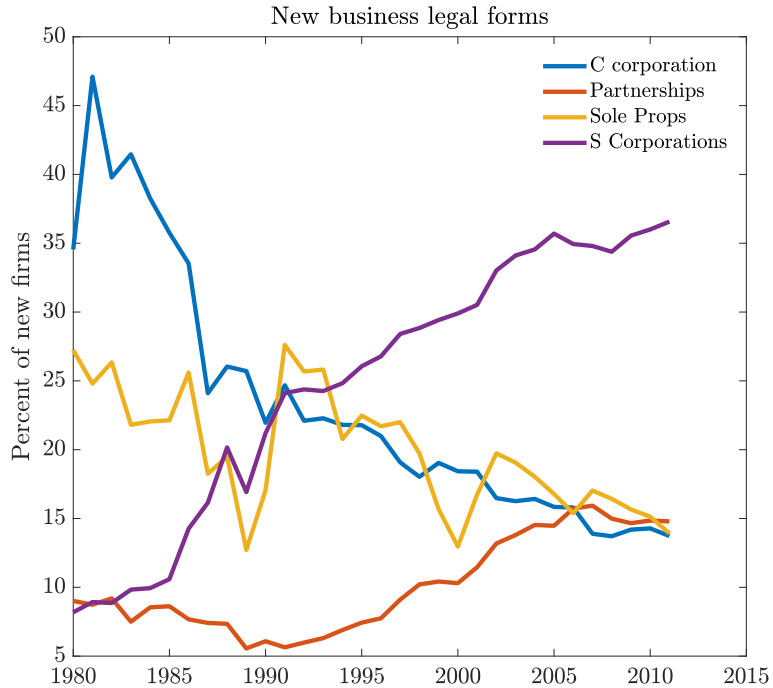
2. Using LBD and linked BR record 4 possible legal forms: **C corporation**, **Partnerships** (General/LLC/LLP), **Sole Proprietors**, and **S corporation**.

3. Estimate transition matrix across these states plus an entry/exit state for the years 1980 to 2012 using empirical distribution.

LBD Summary Statistics

Increases in pass throughs around major tax reforms





Source: Census LBD and Business Register

- Conversions surge around major tax reforms: Tax Reform Act of 1986, Economic Growth and Tax Relief Reconciliation 2001.
- Both reduced personal income tax rates, relative to the dividend and corporate income tax.

Top rates | Average marginal rates

Extracting the real (employment) effects of conversion

- Construct 6 year window around 1986 tax reform episode
- Restrict to 1984 C corporations
- Estimate effects γ of tax-induced pass through conversion

$$\Delta \log E_{it} = \alpha_i + \sum_{\tau \neq 1985} \lambda_\tau D_{it}^\tau + \beta D_{it}^P + \sum_{\tau \geq 1986} \gamma_\tau D_{it}^P \times D_{it}^\tau + \varepsilon_{it}$$

where

- α_i - firm's fixed effect
- D_{it}^τ, D_{it}^P - a time and pass-through dummies
- β - the elasticity of employment growth to a pass through conversion in 1985
- γ_τ compares (within-firm) change in employment growth of converters versus non converters post-tax reform $\tau \geq 1986$ with pre-reform 1985

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Interpretation of γ_τ

γ_τ compares the post-tax reform year τ average change in firm employment growth in a pass through conversion (relative to the average change of corporations who did not convert) to the analogous difference in pre-tax reform 1985

$$\begin{aligned}\gamma_{86} = &\left[E\left[\Delta \log E_{it} | t = 86, D_{it}^P = 1\right] - E\left[\Delta \log E_{it} | t = 85, D_{it}^P = 0\right]\right. \\ &\left. - \left(E\left[\Delta \log E_{it} | t = 86, D_{it}^P = 0\right] - E\left[\Delta \log E_{it} |, t = 85, D_{it}^P = 0\right]\right)\right] \\ &- \left[E\left[\Delta \log E_{it} | t = 85, D_{it}^P = 1\right] - E\left[\Delta \log E_{it} | t = 84, D_{it}^P = 0\right]\right. \\ &\left. - \left(E\left[\Delta \log E_{it} | t = 85, D_{it}^P = 0\right] - E\left[\Delta \log E_{it} | t = 84, D_{it}^P = 0\right]\right)\right]\end{aligned}$$

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Conversion changes employment dynamics: TRA 1986

	$\Delta \log E_{it}$ (1)	$\Delta \log E_{it}$ (2)	$\Delta \log E_{it}$ (3)	$\Delta \log E_{it}$ (4)
β	0.00299*	0.00915**	0.0245***	0.0186***
	(0.0040)	(0.0041)	(0.0084)	(0.0086)
γ_{1986}	-0.0186***	-0.0367***	-0.0183*	-0.0312***
	(0.0050)	(0.0052)	(0.0101)	(0.0107)
γ_{1987}	-0.00206	-0.0198***	-0.0165*	-0.0315***
	(0.0041)	(0.0048)	(0.0089)	(0.0103)
γ_{1988}	-0.0170***	-0.0230***	-0.0378***	-0.0288***
	(0.0041)	(0.0050)	(0.0087)	(0.0108)
γ_{1989}	-0.0159***	-0.00669	-0.0389***	-0.00185
	(0.0041)	(0.0074)	(0.0086)	(0.0306)
Observations	3000000	500000	3000000	500000
R-squared	0.149	0.125	0.302	0.275
Business FE	Yes	Yes	Yes	Yes
Years	1984-1989	1984-1989	1984-1989	1984-1989
Weight	Equal	Equal	Employment	Employment
Sample	All	Converters	All	Converters

Pre TRA 1986: Growth rate increases (mildly) with conversion

Post TRA 1986: Growth rate declines with conversion

2001 Results Figures

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Post TRA 1986: **Growth rate declines with conversion**

2001 Results Figures

LINKING LEGAL FORMS AND INEQUALITY CHANGES IN SCF

Linking legal forms to income inequality dynamics

1. Split the SCF population into workers and Active Business Owners (ABO) i.e. households who own a business and have active management role in it.

2. Attach the legal form of organization to each ABO: (i) C corp. owner (ii) pass-through owner.

3. Use SCF waves (1989 to 2016) and Juhn, Murphy, and Pierce (1993)-style "shift share" decomposition to construct counterfactual top income series holding conditional income distributions fixed.

Details decomposition | Details effects | Shift towards pass-throughs | Relative incomes

Reduced-form effects of pass throughs on top 1% share

Year	Actual	.
1988	**15.00**	
2015	**21.21**	
Difference	6.21	
Percent of	100	

Reduced-form effects of pass throughs on top 1% share

Year	Actual	Δ Composition	.
1988	**15.00**	—	
2015	**21.21**	14.93	
Difference	6.21	-0.07	
Percent of	100	-1.1	

Reduced-form effects of pass throughs on top 1% share

Year	Actual	Δ Composition	+ Δ Worker Distribution	.
1988	**15.00**	—	—	
2015	**21.21**	14.93	18.84	
Difference	6.21	-0.07	+3.91	
Percent of	100	-1.1	63.0	

Reduced-form effects of pass throughs on top 1% share

Year	Actual	Δ Composition	+ Δ Worker Distribution	+ Δ C-corp Distribution	.
1988	**15.00**	—	—	—	
2015	**21.21**	14.93	18.84	18.80	
Difference	6.21	-0.07	+3.91	-0.04	
Percent of	100	-1.1	63.0	-0.6	

Reduced-form effects of pass throughs on top 1% share

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- Change in income distribution of pass through owners accounts for **38.8%** of the increase in **top 1** percent share
- Change in income distribution of pass through owners accounts for **32.5%** of the increase in **top 10** percent share

MODEL WITH ENDOGENOUS CHOICE OF THE LEGAL FORM

Environment

- Unit measure of infinitely-lived households:
  - Fraction μ are workers.
  - Fraction $1 - \mu$ are entrepreneurs (Active Business Owners).
- Workers are subject to idiosyncratic labor productivity risk. Entrepreneurs are subject to idiosyncratic productivity risk. No aggregate risk.
- Incomplete markets with respect to idiosyncratic shocks.
- Entrepreneurs make endogenous choice of the legal form of organization.

Workers

Standard income fluctuation problem:

$$
\begin{aligned}
V^W(a,\varepsilon) \quad = \quad & \max_{c,h,a'} u(c,1-h) + \beta \mathbb{E}\left[V^W(a',\varepsilon') \,|\varepsilon \right] \\
& \text{subject to} \\
& c + a' = a + y - T_y(whs) - \tau_d r a \\
& y = ra + whs \\
& a' \geq \underline{a}
\end{aligned}
$$

a : savings

ε : stochastic labor productivity

$T_y(\cdot)$: income tax schedule

τ_k : dividend income tax

Stylized tradeoff between legal forms

C corporation:

Pro	Con
• Access to the supply of external equity • Completely diversified investment risk	• Profits subject to both corporate income and distribution taxes • Substantial overhead costs

Stylized tradeoff between legal forms

C corporation:

Pro	Con
• Access to the supply of external equity • Completely diversified investment risk	• Profits subject to both corporate income and distribution taxes • Substantial overhead costs

Pass through:

Pro	Con
• Profits taxed once at personal income tax • Simple organization with no overhead costs	• Capital financed only through own equity • Undiversified investment risk

Entrepreneurs: technology and diversification

- DRS technology $f(k, n; z)$ homogeneous in k, n and z
- Gross profits:

$$\pi(z', k) = \max_{n} \{f(k, n; z') - wn\} = f_k k + f_z z'$$

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C-corporation entrepreneur is fully diversified:

- Mutual fund chose capital k^* given z to equate

$$\mathbb{E}[(1 - \tau_c)(f_k(k^*; n^*; z') - \delta)|z] = r$$

- Entrepreneur receives preferred dividend

$$D(z', k^*) = (1 - \tau_c)(f_z(k^*; n^*; z')z' - c_f)$$

where τ_c is the corporate income tax.

Entrepreneurs: technology and diversification

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where τ_c is the corporate income tax.

Pass-through entrepreneur makes an investment decision and bears the idiosyncratic risk.

Entrepreneurs: C corporation (C)

Dynamic problem with pass through conversion option in continuation W^C:

$$
\begin{aligned}
V^C(a, k^*, z) \quad = \quad & \max_{s,c} u\left(c, 1-\overline{h}\right) + \beta W^C(s, z) \\
& \text{subject to} \\
& c + s = a + y - \tau_d(ra + D(z, k^*)) \\
& y = ra + D(z, k^*) \\
& s \geq \underline{a}
\end{aligned}
$$

Dividend and risk free investment return taxed at τ_d

Income fluctuations from stochastic preferred dividend $D(z, k^*)$

Entrepreneurs: pass-through (P)

Dynamic problem with conversion option in continuation W^P

$$
\begin{aligned}
V^P(a, e, z) \quad = \quad & \max_{s,\, c} u\left(c, 1-\overline{h}\right) + \beta\, W^P(s, z) \\
& \text{subject to} \\
& c + s = y + a + e - T_y(\pi - \delta e) - \tau_d r a \\
& y = ra + \pi(e, z) - \delta e \\
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& s \geq \underline{a}
\end{aligned}
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Homogeneity of technology in z, k and n implies:

$$\pi(e, z) = f_k e + f_z z$$

Entrepreneurs: pass-through (P)

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& \text{subject to} \\
& c + s = y + a + e - T_y\left(f_k e + f_z z - \delta e\right) - \tau_d r a \\
& y = ra + f_k e + f_z z - \delta e \\
& s \geq \underline{a}
\end{aligned}
$$

Homogeneity of technology in z, k and n implies:

$$\pi(e, z) = f_k e + f_z z$$

IFP from rents $f_z z$ and undiversified return on business equity $f_k e$

Continuation values: conversion and portfolio choice

Continuation value of the pass-through entrepreneur:

$$W^P(s,z) = \max\left\{\mathbb{E}\left[\,V^C(s,k^*(z),z')\,\middle|\,z\right] - f_{PC},\ \max_{e'\leq s-\bar{a}}\left\{\mathbb{E}\left[\,V^P(s-e',e',z')\,\middle|\,z\right]\right\}\right\}.$$

Continuation value of the C-corp entrepreneur:

$$W^C(s,z) = \max\left\{\mathbb{E}\left[\,V^C(s,k^*(z),z')\,\middle|\,z\right],\ \max_{e'\leq s-\bar{a}}\left\{\mathbb{E}\left[\,V^P(s-e',e',z')\,\middle|\,z\right] - f_{CP}\right\}\right\}.$$

where f_{CP} and f_{PC} are i.i.d. with a logistic distribution with dispersion parameter σ_f.

Continuation values: conversion and portfolio choice

Continuation value of the pass-through entrepreneur:

$$W^P(s,z) = \sigma_f \ln\left\{\exp\left\{\frac{\mathbb{E}\left[V^C(s,k^*(z),z')\middle|z\right]-f_{PC}}{\sigma_f}\right\} + \exp\left\{\frac{\max_{e'\le s-\bar{a}}\mathbb{E}\left[V^P(s-e',e',z')\middle|z\right]}{\sigma_f}\right\}\right\}.$$

and the decision rule becomes conditional choice probability

$$\Pr(C|s,P) = \frac{\exp\left\{\frac{\mathbb{E}\left[V^C(s,k^*(z),z')\middle|z\right]-f_{PC}-\max_{e'\le s-\bar{a}}\mathbb{E}\left[V^P(s-e',e',z')\middle|z\right]}{\sigma_f}\right\}}{1+\exp\left\{\frac{\mathbb{E}\left[V^C(s,k^*(z),z')|z\right]-f_{PC}-\max_{e'\le s-\bar{a}}\mathbb{E}\left[V^P(s-e',e',z')|z\right]}{\sigma_f}\right\}}$$

and $W^C(s,z)$, $\Pr(C|s,P)$ are determined accordingly.

Aggregation and market clearings

- The number of pass-through owners $\mathbf{p}$ is determined by

$$\mathbf{p} = \mu \left(\int_{A \times E \times Z} \left(1 - \Pr\left(C \,|\, s, P\right)\right) d\lambda_P\left(a, e, z\right) + \int_{A \times Z} \Pr\left(P \,|\, s, C\right) d\lambda_C\left(a, z\right) \right)$$

  and then the fraction of the C corporation owners is $(1 - \mu)(1 - p)$

Aggregation and market clearings

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  and then the fraction of the C corporation owners is $\left(1 - \mu\right)\left(1 - p\right)$

- Market clearing for labor requires

$$\begin{aligned} \int_A \int_\epsilon h\left(a, \varepsilon\right) \varepsilon \, d\lambda_w \left(a, \varepsilon\right) &= \int_{A \times Z} n^* \left(z\right) d\lambda_C \left(a, z\right) \\ &+ \int_{A \times E \times Z} n\left(a, e, z\right) d\lambda_P \left(a, e, z\right) \end{aligned}$$

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- Market clearing for the capital stock requires

$$\begin{aligned} \int_{A \times Z} k^* \left(z\right) d\lambda_C \left(a, z\right) &= \int_{A \times \epsilon} a'\left(a, \varepsilon\right) \; d\lambda_w \left(a, \varepsilon\right) + \int_{A \times Z} a'\left(a, z\right) \; d\lambda_C \left(a, z\right) \\ &+ \int_{A \times E \times Z} a'\left(a, e, z\right) \; d\lambda_P \left(a, e, z\right) \end{aligned}$$

Portfolio choice: private equity expected return

Pass through allocates savings s to solve

$$\max_{e' \leq s - \bar{a}} \left\{ \mathbb{E} \left[V^P \left(s - e', e', z' \right) \middle| \right] \right\}$$

Portfolio choice: private equity expected return

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$$\max_{e' \leq s - \bar{a}} \left\{ \mathbb{E} \left[V^P \left(s - e', e', z' \right) \middle| \right] \right\}$$

Choose e' so after-tax net expected return on private equity

$$\mathbb{E} \left[\left(1 - T'_y \right) \left(f_k - \delta \right) \middle| z \right] = \left(1 - \tau_d \right) r - \frac{\mathrm{Cov} \left[u_c, \left(1 - T'_y \right) f_k | z \right]}{\mathbb{E} \left[u_c | z \right]} + \frac{\xi}{\beta \mathbb{E} \left[u_c | z \right]}$$

Multiplier ξ on capital constraint $\xi(s - \bar{a} - e') = 0$

Portfolio choice: private equity expected return

Pass through allocates savings s to solve

$$\max_{e' \leq s - \bar{a}} \left\{ \mathbb{E} \left[V^P \left(s - e', e', z' \right) \middle| \right] \right\}$$

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Multiplier ξ on capital constraint $\xi(s - \bar{a} - e') = 0$

Decompose private equity return:

- Return on savings (mutual fund) $(1 - \tau_d) r$
- Risk premium $-\frac{\mathrm{Cov}\left[u_c, \left(1 - T'_y\right) f_k | z\right]}{\mathbb{E}[u_c | z]}$
- Cost of external finance constraint $\frac{\xi}{\beta \mathbb{E}[u_c | z]}$

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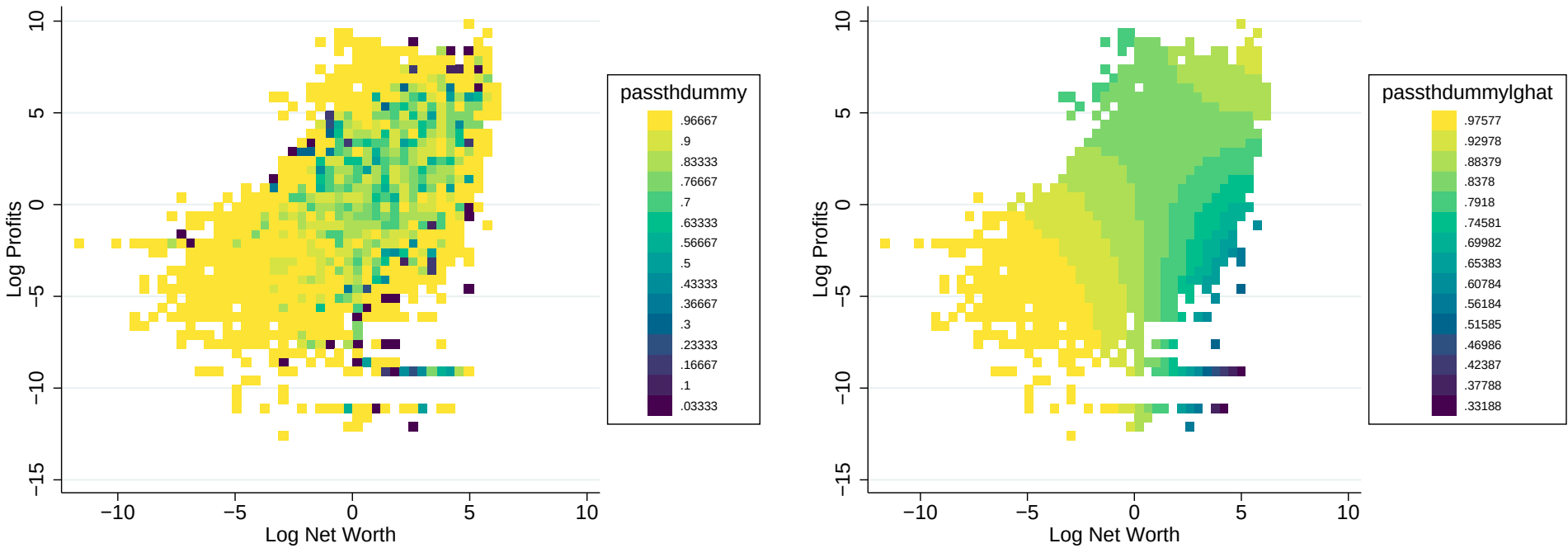
- Cost of external finance constraint $\frac{\xi}{\beta \mathbb{E}[u_c | z]}$

Selection into the LFOs in the SCF

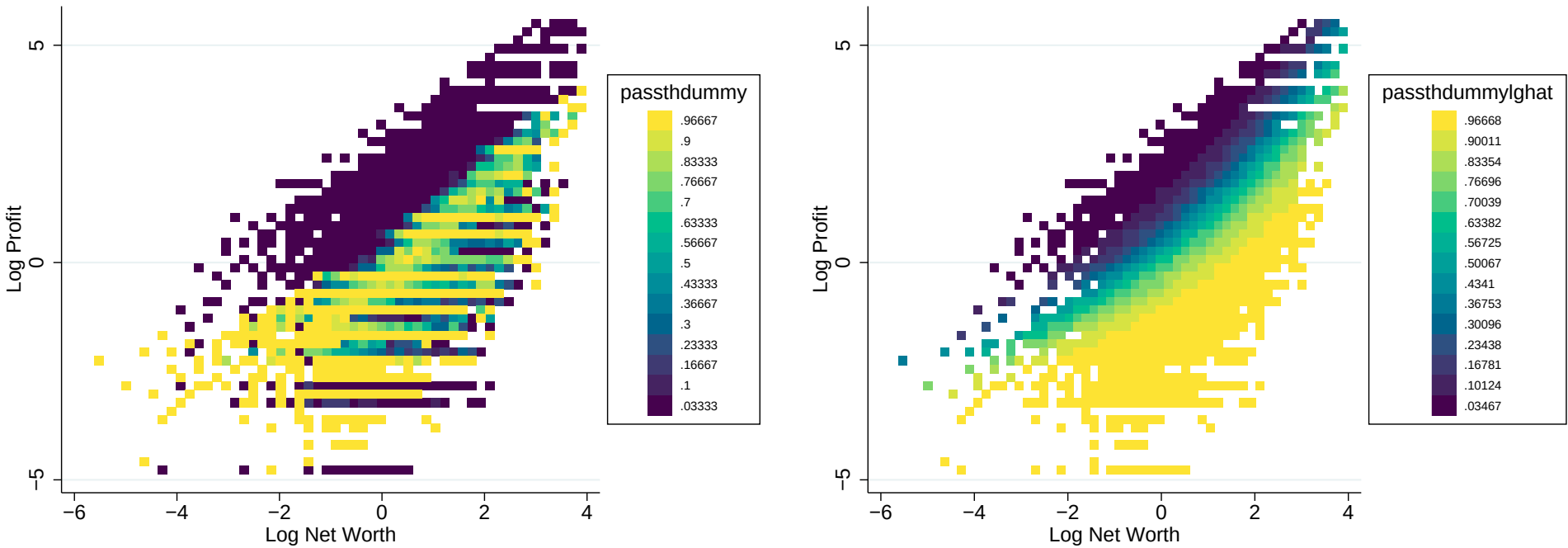
Figure: Conditional Probability of observing the pass-through - empirical distribution (left panel), logit regression (right panel)



Notes: SCF waves 1989-2016, the variables are deviations from annual average

Selection into the LFOs in the model

Figure: Conditional Probability of observing the pass-through - empirical distribution (left panel), logit regression (right panel)



Notes: The variables are deviations from average

Mechanism - effects of a pass through conversion

1. Eliminate overhead cost
   - $\uparrow$ pre-tax profits/income
2. Replace financing with own equity
   - Introduce investment risk (risk premium):

$$Cov\left(u_c\left(c(a', e', z')\right), \left(z'^{\frac{1-\nu}{1-(1-\alpha)\nu}}\right)\right) < 0$$

$$\implies \quad e' < k^*(z) \downarrow \text{ investment and } \uparrow \text{ expected return}$$

   - Introduce financing constraint on investment

$$\implies \quad e' < k^*(z) \downarrow \text{ investment and } \uparrow \text{ expected return}$$

Investment risk + financing constraint, $\uparrow$ dispersion of expected and realized return on equity and amplify increase in inequality.

QUANTITATIVE ANALYSIS

Quantitative experiment

Goal:

- Examine through the lens of the model transitional dynamics of macro variables and inequality in response to 1986 and 2017 tax reforms.

Today:

- Model calibrated to 1983-1985 period.
- The macro and inequality effects of TRA 1986 reform - stationary equilibria comparison.

Model Parametrization

Parameters Calibrated Outside of the Model

Parameter		Source	Parameter Value
Curvature of utility function	σ	-	1.5
Frisch elasticity of labor supply	ν	Chetty (2011) et. al.	0.85
Span of control	ν	-	0.80
Elasticity of capital	α	Labor income share	0.20
Fraction of ABOs in population	μ	SCF data	0.87

Parameters Calibrated Jointly in Equilibrium

Parameter		Target	Parameter Value
Discount factor	β	Capital/Output - NIPA	0.910
Depreciation rate	δ	Investment/Output - NIPA	0.103
Disutility of labor	ψ	Avg. labor supply - CPS	12.683
Borrowing constraint	$\underline{a}$	Debt to Income Ratio (Enhance FA)	-0.102
Mean of labor prod.	μ_ϵ	% of ABOs income in Top 10 - IRS	1.311
Persistence of ent prod.	ρ_z	% of ABOs income in Top 1 - IRS	0.978
Persistence of labor prod.	ρ_ε	Top 10% labor income share - IRS	0.976
Std. dev. of labor prod.	σ_ϵ	Top 1% labor income share - IRS	0.202
Std. dev. of ent. prod.	σ_z	Top 10% total income share - IRS	0.258
Logistic dist. dispersion	σ_f	Top 1% total income share - IRS	5.581
Fixed cost for C corp.	c_f	% of pass-throughs - LBD	0.063
Flow C $\rightarrow$ P	f_{CP}	Transition prob. - LBD	19.73
Flow P $\rightarrow$ C	f_{PC}	Transition prob. - LBD	17.18

Model Fit

	Model	Data
Targeted Moments		
Capital/Output - NIPA	1.27	1.30
Investment/Output - NIPA	0.13	0.14
Avg. labor supply - CPS	0.35	0.33
Debt to Income Ratio (Enhance FA)	0.17	0.17
% of ABOs income in Top 10 - IRS	20.1	20.1
% of ABOs income in Top 1 - IRS	34.8	36.5
Top 1% labor income share (%)	9.2	9.1
Top 10% labor income share (%)	33.2	32.7
Top 1% income share (%)	9.8	10.0
Top 10% income share (%)	36.2	34.6
% of pass-throughs - LBD	0.40	0.42
Flow P $\rightarrow$ C (%)	3.1	4.2
Flow C $\rightarrow$ P (%)	1.9	1.7
Non - Targeted moment		
Mean Emp C/ Mean Emp P	5.3	4.4

Policy change

- Parameterize the personal income tax schedule with Heathcote-Storesletten-Violante (HSV) tax function:

$$T(y) = y - \lambda_y y^{1-\tau_y}$$

Policy change

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$$T(y) = y - \lambda_y y^{1-\tau_y}$$

Instrument	Pre-reform 1983-1985	Post-reform 1986-1990	Source
τ_d	0.309	0.268	Avg. Marginal Rate - TAXSIM
τ_c	0.239	0.282	Auerbach (2006)
τ_y	0.149	0.098	IRS + Mertens, Olea (2018)
λ_y	0.749	0.771	Revenues/GDP = 0.22

HSV - τ_y series | Corporate tax time series | Corporate tax time table

Macro effects of the tax reform

	Baseline
Output	0.742
Capital Stock	0.941
Output C	0.662
Output P	0.080
Capital Stock C	0.888
Capital Stock P	0.053
% of P ent. in ABOs	40.0
Avg Emp C/Avg Emp	1.486
Avg Emp P/Avg Emp	0.271
Wage	0.604
(1 - λ_y)	0.250

Macro effects of the tax reform

	Baseline	**Tax reform PE**
Output	0.742	0.699
Capital Stock	0.941	0.848
Output C	0.662	0.581
Output P	0.080	0.108
Capital Stock C	0.888	0.782
Capital Stock P	0.053	0.066
% of P ent. in ABOs	40.0	43.3
Avg Emp C/Avg Emp	1.486	1.429
Avg Emp P/Avg Emp	0.271	0.303
Wage	0.604	0.604
(1 - λ_y)	0.250	0.250

Macro effects of the tax reform

	Baseline	**Tax reform PE**	**% Change PE**
Output	0.742	0.699	-5.8
Capital Stock	0.941	0.848	-9.9
Output C	0.662	0.581	-12.1
Output P	0.080	0.108	33.9
Capital Stock C	0.888	0.782	-12.0
Capital Stock P	0.053	0.066	25.0
% of P ent. in ABOs	40.0	43.3	8.2
Avg Emp C/Avg Emp	1.486	1.429	-3.8
Avg Emp P/Avg Emp	0.271	0.303	12.0
Wage	0.604	0.604	0
(1 - λ_y)	0.250	0.250	0

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Macro effects of the tax reform

	Baseline	**Tax reform GE**
Output	0.742	0.740
Capital Stock	0.941	0.894
Output C	0.662	0.628
Output P	0.080	0.113
Capital Stock C	0.888	0.816
Capital Stock P	0.053	0.078
% of P ent. in ABOs	40.0	46.1
Avg Emp C/Avg Emp	1.486	1.595
Avg Emp P/Avg Emp	0.271	0.335
Wage	0.604	0.595
(1 - λ_y)	0.250	0.233

Macro effects of the tax reform

	Baseline	**Tax reform GE**	**% Change GE**
Output	0.742	0.740	-0.2
Capital Stock	0.941	0.894	-5.0
Output C	0.662	0.628	-5.1
Output P	0.080	0.113	40.4
Capital Stock C	0.888	0.816	-8.1
Capital Stock P	0.053	0.078	46.9
% of P ent. in ABOs	40.0	46.1	15.3
Avg Emp C/Avg Emp	1.486	1.595	7.3
Avg Emp P/Avg Emp	0.271	0.335	23.8
Wage	0.604	0.595	-1.6
(1 - λ_y)	0.250	0.233	-6.8

The rise of pass-throughs by **6.1 percentage points** in the model vs **12.1 percentage points** in the data.

Inequality statistics

	Baseline
Top 1%	9.8
Top 5%	22.5
Top 10%	36.2
Coeff.Var (Inc Pop)	1.5
Coeff.Var (Inc Ent P)	5.3
Coeff.Var (Inc Ent C)	2.0
% of P ent. in ABOs	40.0

Inequality statistics

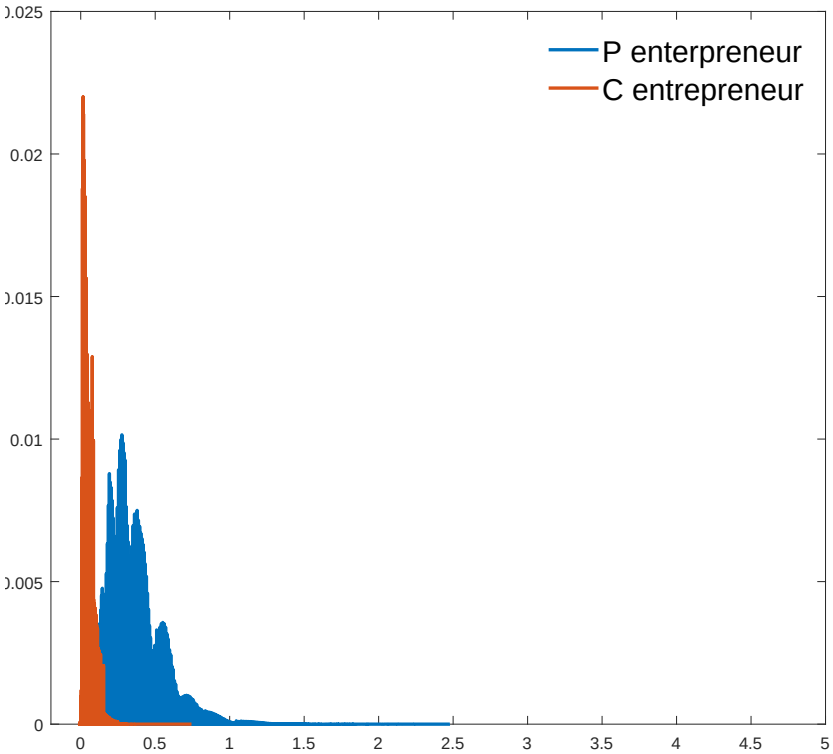
	Baseline	**Tax reform**
Top 1%	9.8	11.1
Top 5%	22.5	24.4
Top 10%	36.2	38.8
Coeff.Var (Inc Pop)	1.5	2.3
Coeff.Var (Inc Ent P)	5.3	6.9
Coeff.Var (Inc Ent C)	2.0	2.5
% of P ent. in ABOs	40.0	46.1

Inequality statistics

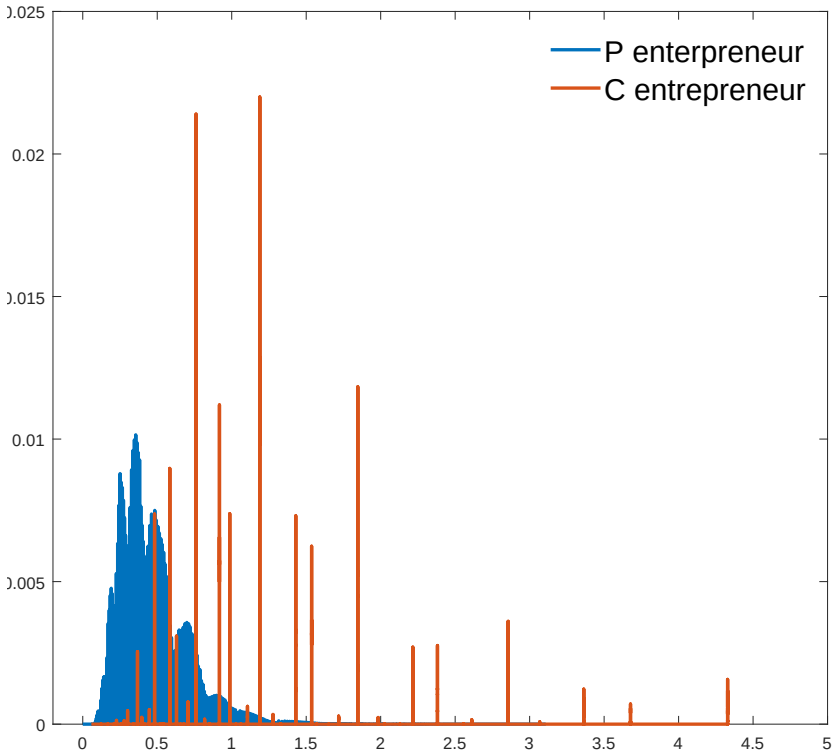
	Baseline	**Tax reform**	**Change**
Top 1%	9.8	11.1	1.3
Top 5%	22.5	24.4	1.9
Top 10%	36.2	38.8	2.6
Coeff.Var (Inc Pop)	1.5	2.3	0.8
Coeff.Var (Inc Ent P)	5.3	6.9	1.6
Coeff.Var (Inc Ent C)	2.0	2.5	0.5
% of P ent. in ABOs	40.0	46.1	6.1

Data: Top 1 % income share rises by **3.5 percentage points** and Top 10% rises by **4.2 percentage points**.

Income distribution: Benchmark

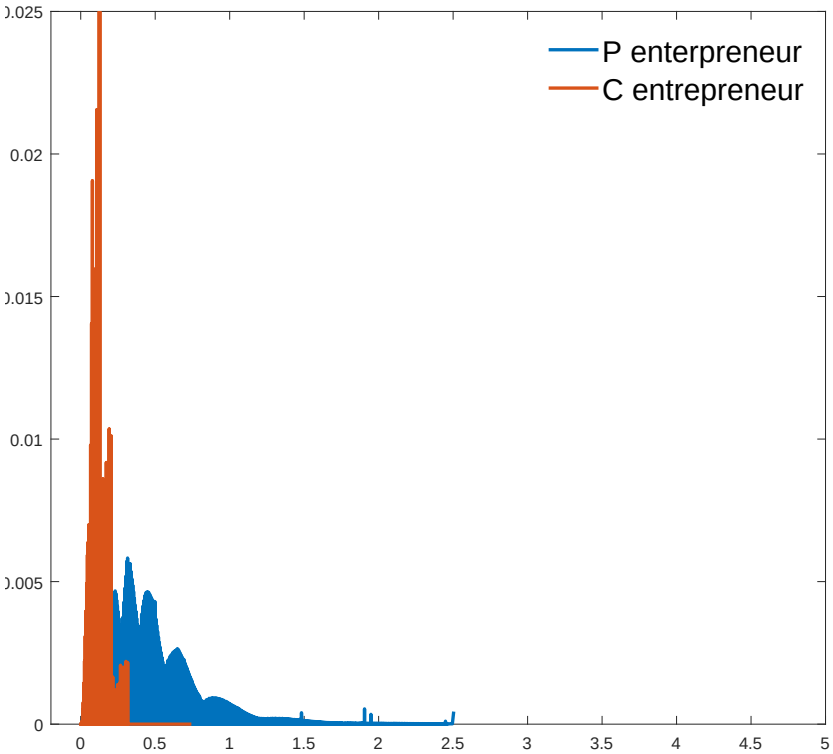


C ent. capital income: ra
P ent. capital income: $ra + f_k e$

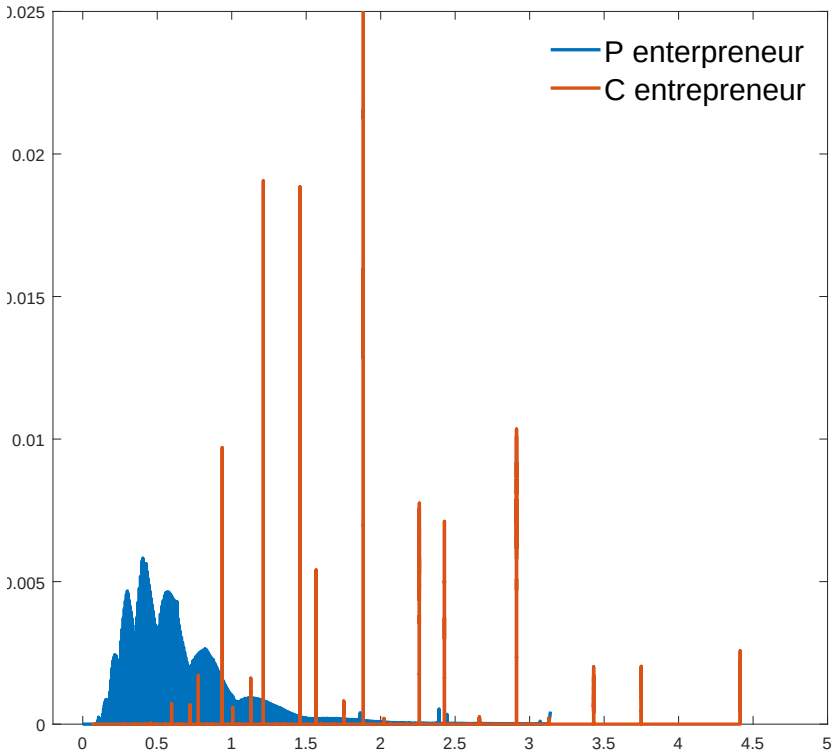


C ent. managerial income: $D(z)$
P ent. managerial income: $f_z z$

Income distribution: Post Reform



C ent. capital income: ra
P ent. capital income: $ra + f_k e$



C ent. managerial income: $D(z)$
P ent. managerial income: $f_z z$

Conclusions

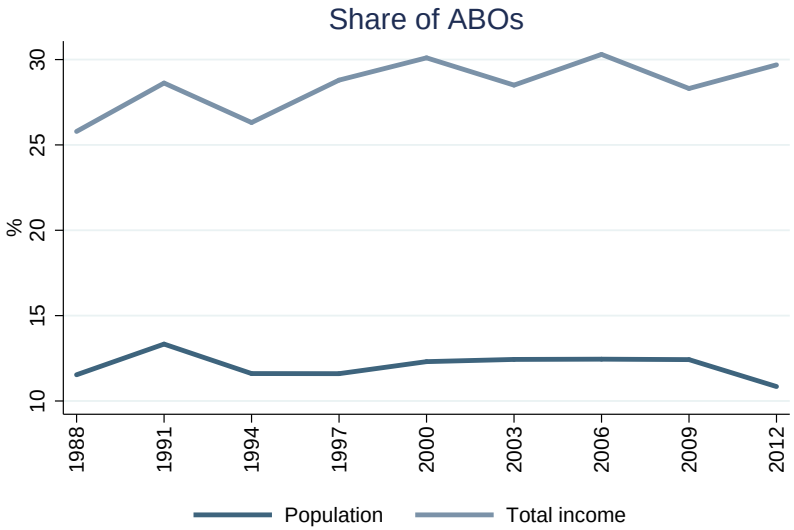
- Changes in the income inequality in the US coincide in time with the shift in the distribution of legal forms of organizations and tax reforms.

- We establish the empirical relationship between the first two trends and document that conversion to pass-through affects employment dynamics.

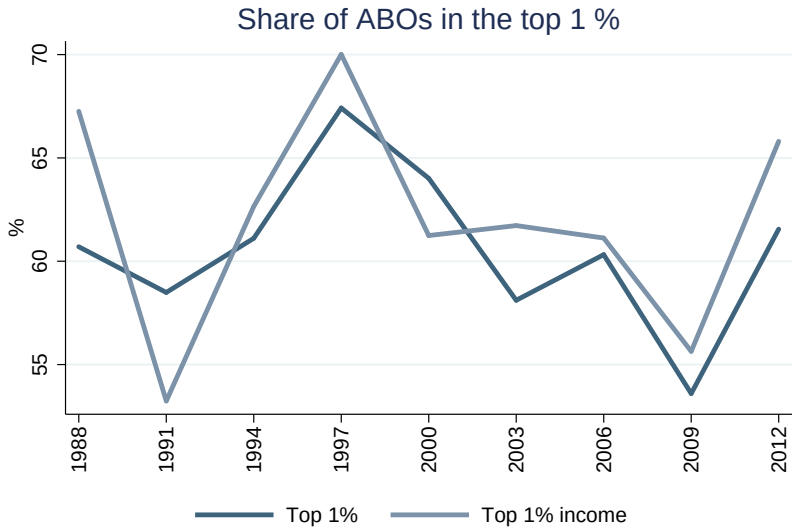
- We propose a quantitative theory to illustrate the link between the taxation of businesses, legal forms of organization and income inequality.

- **Secular shift** from manufacturing to services also drives changes in the LFO distribution in the US - **Dyrda, Pugsley (2020a)**. The optimal design of the tax reform - **Dyrda, Pugsley (2020b)**.

Business owners over time



Source: Own calculations from 1988 − 2012 SCF

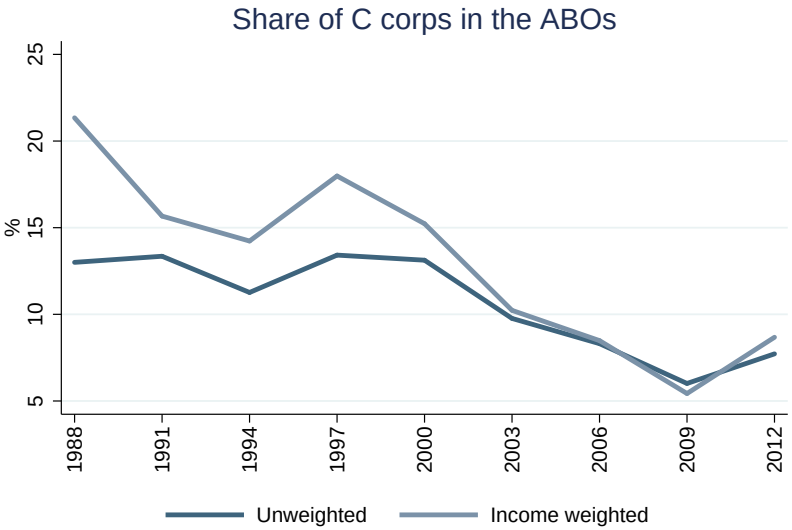


Source: Own calculations from 1988 − 2012 SCF

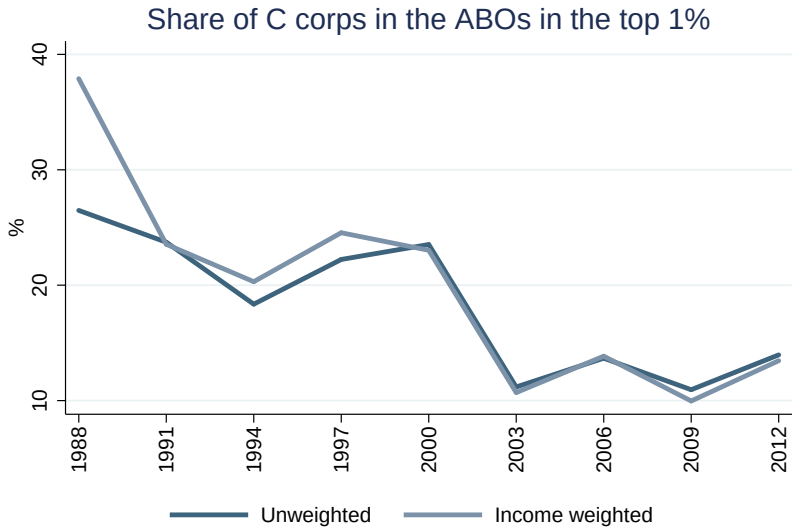
- Slight decline in share of total population between 1988 and 2012, business income remains concentrated in the top 1 percent income group

Back

Shift towards the pass-through entities among ABOs



Source: Own calculations from 1988 − 2012 SCF

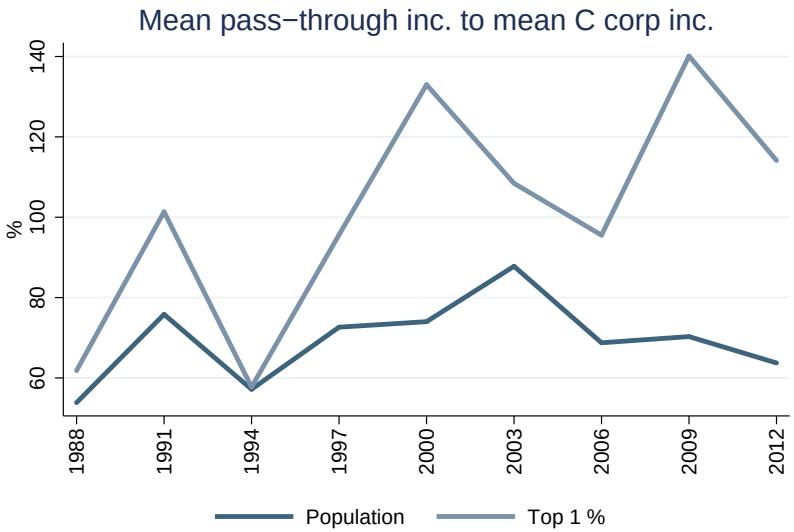


Source: Own calculations from 1988 − 2012 SCF

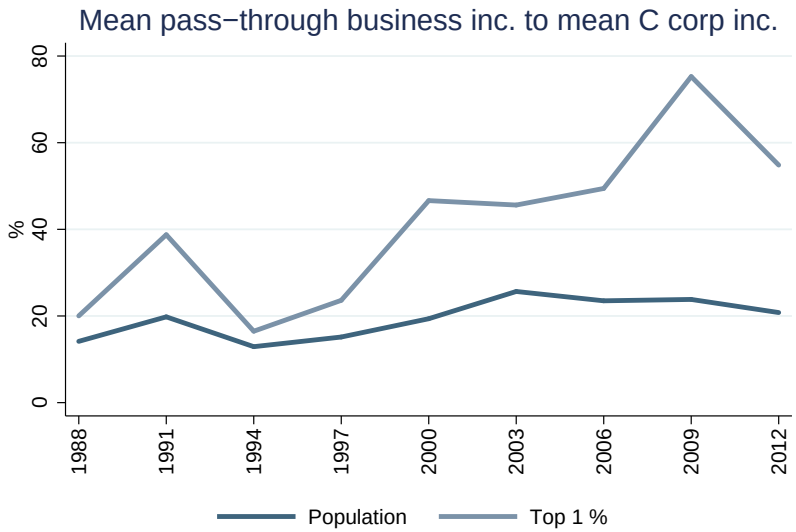
- Similar decline in the role of the C corps as observed in the IRS and LBD data

Back

Relative income of pass-throughs rises sharply at the top



Source: Own calculations from 1988 − 2012 SCF



Source: Own calculations from 1988 − 2012 SCF

- The ratio of mean incomes rises by 18.2% in the population and by 84.6% in the top 1%
- The ratio of business income to C corp income rises by 47.5% in the population and by 174.2% in the top 1%

Back

SCF Income definitions

- C corp owner: Wage/Salary + Dividends + Interest/Rents + Other Market Income
- Pass-through owner:
  1. Business: Business Income in excess of Wage/Salary
  2. Non Business: Wage/Salary + Dividends + Interest/Rents + Other Market Income

Back

Composition of top income shares averaged 1989-2016

	Percent		
	worker	pass-through	C corporation
Overall	87.94	10.77	1.29
Top 15%	67.28	27.74	4.98
Top 10%	61.75	31.95	6.31
Top 5%	51.89	39.47	8.64
Top 1%	37.13	51.31	11.56

Back

Conversions and Tax Reform Act of 2001

	$\Delta \log E_{it}$ (1)	$\Delta \log E_{it}$ (2)	$\Delta \log E_{it}$ (3)	$\Delta \log E_{it}$ (4)
β	0.0257***	0.0210***	0.0230***	0.0184**
	(0.0033)	(0.0036)	(0.0068)	(0.0072)
γ_{2000}	-0.0207***	-0.0160***	-0.00926	-0.00836
	(0.0037)	(0.0044)	(0.0071)	(0.0087)
γ_{2001}	-0.0301***	-0.0264***	-0.0340***	-0.0385***
	(0.0035)	(0.0042)	(0.0067)	(0.0136)
γ_{2002}	-0.0315***	-0.0215***	-0.0226***	-0.0127
	(0.0034)	(0.0058)	(0.0073)	(0.0199)
γ_{2003}	-0.0293***	0.0134	-0.0296***	0.0167
	(0.0034)	(0.0133)	(0.0080)	(0.0250)
Observations	3900000	300000	3900000	300000
R-squared	0.134	0.119	0.25	0.234
Business FE	Yes	Yes	Yes	Yes
Years	1998-2003	1998-2003	1998-2003	1998-2003
Weight	Equal	Equal	Employment	Employment
Sample	All	Converters	All	Converters

Post TRRA 2001: Growth rate declines with conversion (in relative and absolute terms)

Back

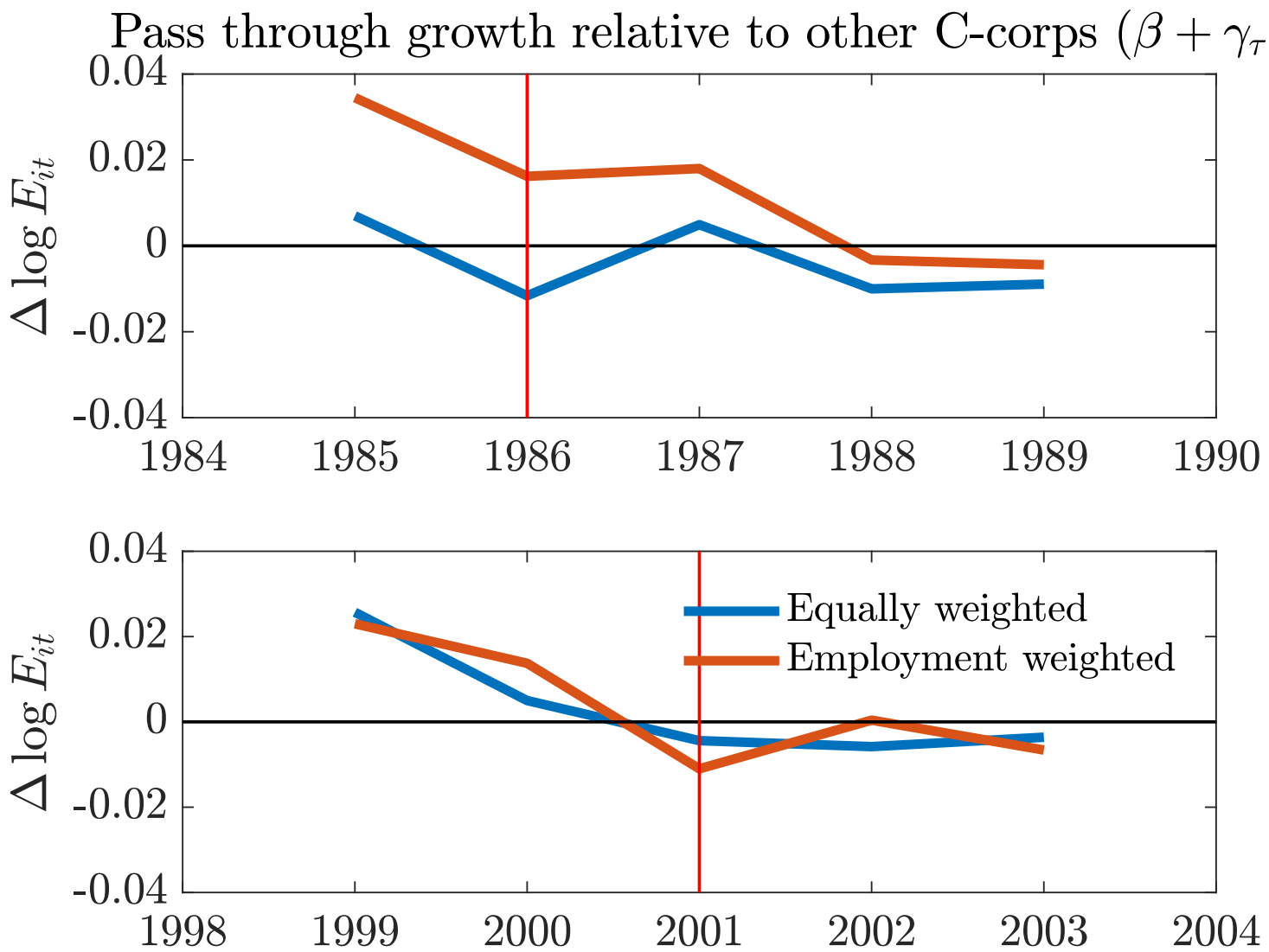
Conversions and Tax Reform Act of 2001

	$\Delta \log E_{it}$ (1)	$\Delta \log E_{it}$ (2)	$\Delta \log E_{it}$ (3)	$\Delta \log E_{it}$ (4)
β	0.0257***	0.0210***	0.0230***	0.0184**
	(0.0033)	(0.0036)	(0.0068)	(0.0072)
γ_{2000}	-0.0207***	-0.0160***	-0.00926	-0.00836
	(0.0037)	(0.0044)	(0.0071)	(0.0087)
γ_{2001}	-0.0301***	-0.0264***	-0.0340***	-0.0385***
	(0.0035)	(0.0042)	(0.0067)	(0.0136)
γ_{2002}	-0.0315***	-0.0215***	-0.0226***	-0.0127
	(0.0034)	(0.0058)	(0.0073)	(0.0199)
γ_{2003}	-0.0293***	0.0134	-0.0296***	0.0167
	(0.0034)	(0.0133)	(0.0080)	(0.0250)
Observations	3900000	300000	3900000	300000
R-squared	0.134	0.119	0.25	0.234
Business FE	Yes	Yes	Yes	Yes
Years	1998-2003	1998-2003	1998-2003	1998-2003
Weight	Equal	Equal	Employment	Employment
Sample	All	Converters	All	Converters

Post TRRA 2001: Growth rate declines with conversion (in relative and absolute terms)

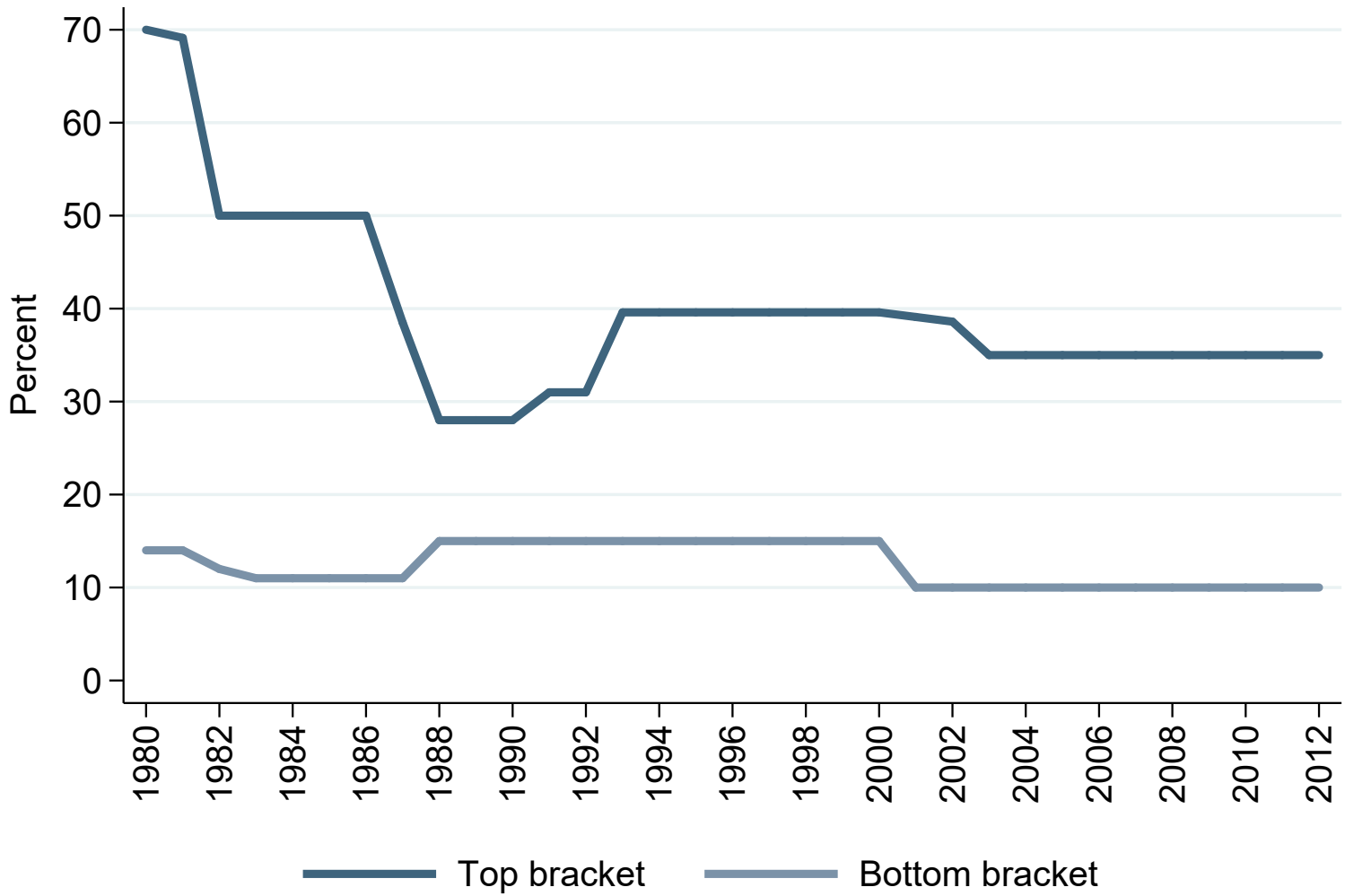
Back

Cumulated effect on growth



Back

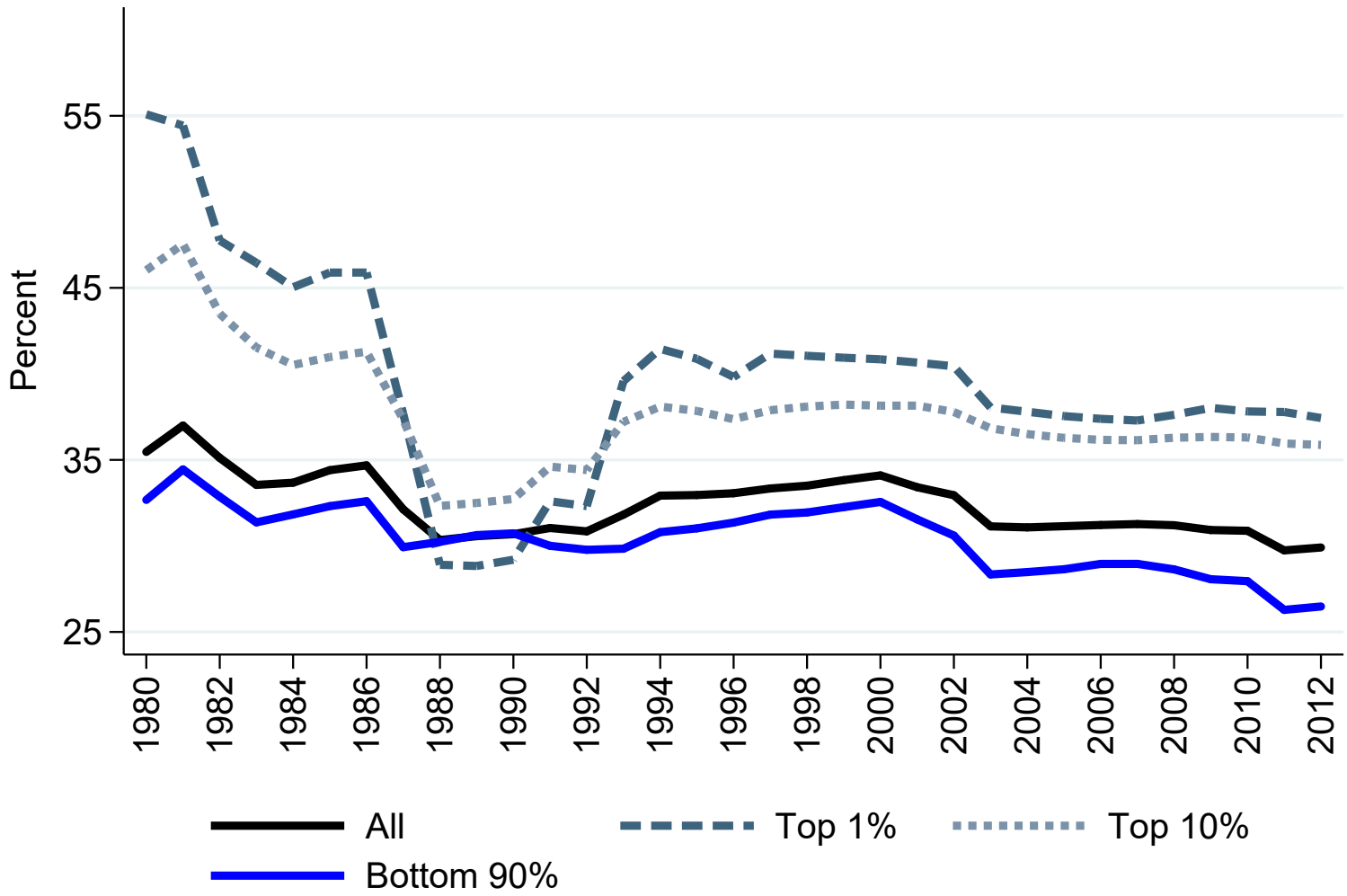
Marginal income tax rates



Source: U.S. Department of the Treasury. Internal Revenue Service

Back

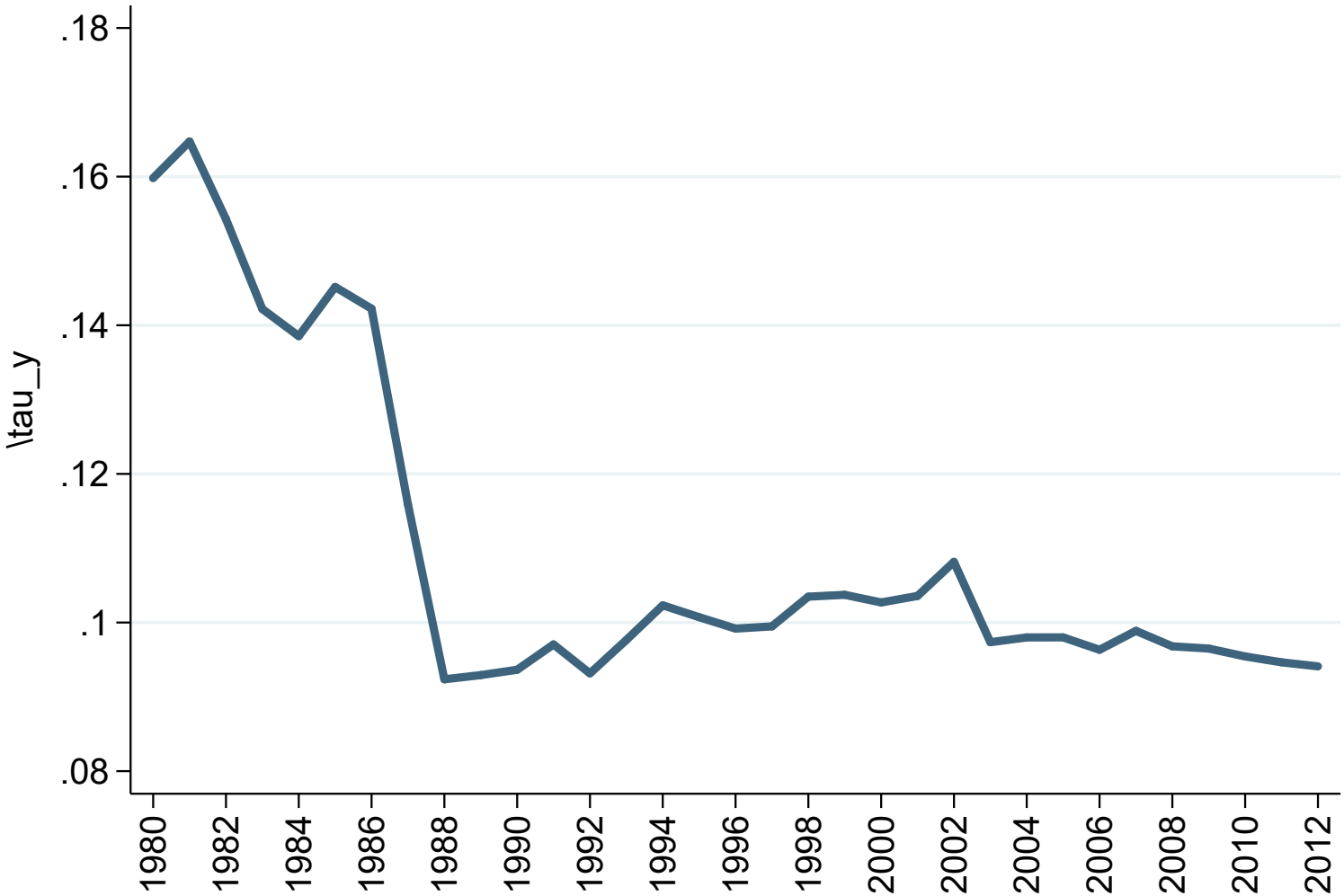
Average marginal personal income tax rates



Source: Data from Mertens, Olea (2018)

Back

HSV progressivity measure - τ_y



Source: Own calculations based on IRS data and Mertens, Olea (2018)

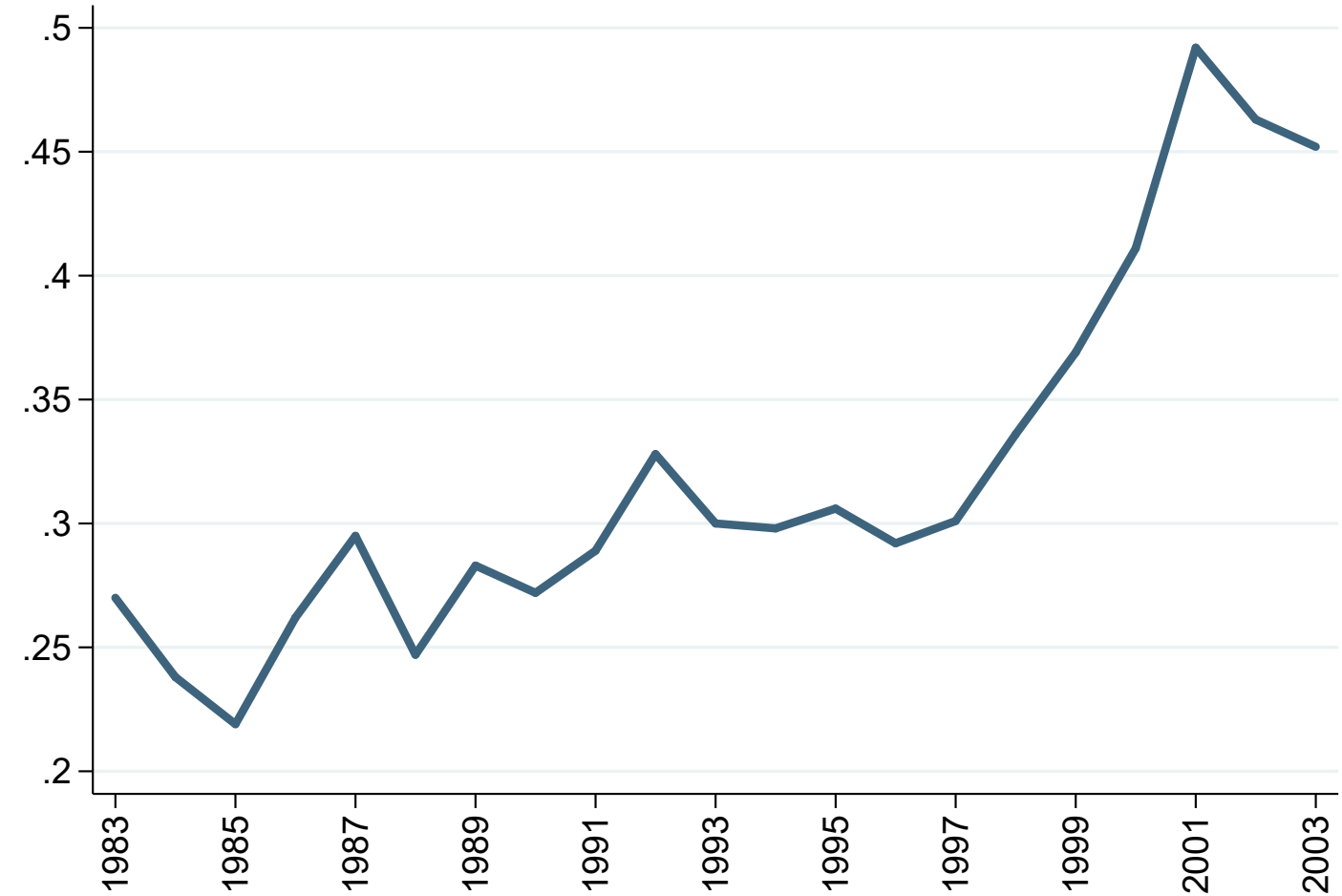
Back

Causes of Changing Average Tax Rates, 1983-2003

Table 3. Causes of Changing Average Tax Rates, 1983-2003

Year	Statutory Rate	Capital Recovery	Other Inflation	Tax Losses	Foreign Tax Effects	Progres-sivity	Other Factors	Average Tax Rate
1983	46.0	-22.9	-5.9	10.6	1.7	-3.6	1.0	27.0
1984	46.0	-19.8	-6.3	7.8	1.1	-3.8	-1.2	23.8
1985	46.0	-21.7	-6.4	9.6	0.0	-3.9	-1.7	21.9
1986	46.0	-15.9	-8.0	10.4	1.7	-4.9	-3.0	26.2
1987	40.0	-9.7	-5.8	6.1	3.2	-2.0	-2.2	29.5
1988	34.0	-7.0	-5.6	3.4	1.1	0.1	-1.4	24.7
1989	34.0	-7.0	-7.5	6.6	2.6	0.3	-0.5	28.3
1990	34.0	-5.9	-10.4	6.2	2.5	1.4	-0.6	27.2
1991	34.0	-4.6	-12.1	10.0	1.6	0.8	-0.8	28.9
1992	34.0	-4.7	-7.5	9.4	2.2	1.0	-1.6	32.8
1993	35.0	-4.7	-7.1	6.3	2.0	0.2	-1.7	30.0
1994	35.0	-4.8	-4.8	3.6	1.8	0.2	-1.2	29.8
1995	35.0	-5.1	-3.6	3.4	2.3	0.1	-1.5	30.6
1996	35.0	-5.4	-4.9	4.3	1.9	-0.1	-1.5	29.2
1997	35.0	-5.9	-4.9	4.9	2.1	0.3	-1.4	30.1
1998	35.0	-6.2	-4.9	8.8	2.4	-0.2	-1.3	33.6
1999	35.0	-6.8	-5.3	11.6	3.6	-0.2	-1.0	36.9
2000	35.0	-6.8	-7.7	18.3	3.9	-0.1	-1.7	41.1
2001	35.0	-8.1	-19.6	38.3	5.5	-0.4	-1.6	49.2
2002	35.0	-17.1	-13.4	35.9	6.1	-0.2	0.1	46.3
2003	35.0	-11.5	-10.2	30.1	2.8	-0.4	-0.5	45.2

Average Corporate Tax Rates, 1983-2003



Source: Auerbach (2006)

Back

Equilibrium

A recursive stationary competitive equilibrium consists of

1. prices r_f and w
2. optimal worker savings $a'(a, \epsilon)$
3. optimal corporate entrepreneur savings $s_c(a, z)$
4. optimal pass through entrepreneur savings $s_c(a, z)$
5. optimal pass through entrepreneur equity $e(a, z)$
6. optimal choice of legal form $D(a, z)$
7. stationary distribution consistent with these policies

such that

1. worker labor supply equals corporate plus pass through labor demand
2. worker, corporate, and pass through savings (less equity) equals corporate capital demand

Aggregation Details

How would changes in LFOs lead to changes in inequality?

1. **Mechanical**: retained earnings from C corporations only recognized when distributed to shareholders (typically as capital gains); pass through income recognized immediately, even when retained in the business. See Feenberg and Poterba (1993).

2. **Economic**: change in retained earnings or pre-tax profitability due to endogenous response in investment, employment or costs.

SCF allows (contrary to the tax data) to disentangle the two effects:

- Provides information about the net profits of the businesses owned and shares in the business (Mechanical).
- Asks directly about the amount of business income received by the owner on the top of wages and salaries (Economic).

Back

A very recent example: WSJ May 3, 2018

"KKR to Ditch Partnership Structure and Become Corporation"

> *For decades, businesses have typically preferred to avoid becoming C corporations, which pay taxes on their profits and then face another layer of taxation when those profits are distributed to shareholders as dividends; partnerships, on the other hand, allow income to pass through directly to owners' tax returns and get taxed at individual rates. Under the old tax law, C corporation status mostly made sense for companies that wanted access to public capital markets.*

Back

LBD Summary Statistics

	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009
Average size (employees)						
C corporations	23.12	18.25	19.62	19.68	19.83	19.06
S corporations	10.67	13.94	13.91	13.17	12.63	11.99
Partnerships	8.44	9.33	11.34	12.53	17.14	18.35
Sole proprietors	3.94	4.07	4.14	4.37	4.89	5.46
Exit rate (percent)						
C corporations	11.11	9.97	8.68	8.56	9.03	9.27
S corporations	14.51	10.83	8.71	8.67	8.57	9.42
Partnerships	22.20	19.67	16.18	15.99	14.35	14.23
Sole proprietors	20.22	17.26	15.55	16.35	16.10	17.44
Share of employers (percent)						
C corporations	55.59	50.05	39.52	34.83	29.27	24.15
S corporations	9.27	15.77	26.35	33.35	39.80	45.44
Partnerships	7.78	7.90	6.70	6.91	9.61	12.64
Sole proprietors	27.36	26.27	27.42	24.91	21.32	17.78

Back

Decomposing Δ in unconditional income distribution

Juhn-Murphy-Pierce (1993) decomposition:

$$Y_{it}^{l} = \mu_{t}^{l} + \varepsilon_{it}^{l} \qquad l \in \{w, p, c\}$$

Conditional CDF maps residual ε to quantile θ

$$\theta_{t}^{l} = F(\varepsilon | t, l)$$

For actual $\theta_{i2015}^{l} = F(\varepsilon_{i2015}^{l} | 2015, l)$, counterfactual 2015 income using 1988 distribution

$$\tilde{Y}_{i2015}^{l} = \mu_{1988}^{l} + F^{-1}(\theta_{i2015}^{l} | l, 1988)$$

Given shares for each l, can construct entire counterfactual unconditional distribution.

Back

Decomposing Δ in unconditional income distribution

1. Composition effect: use 2015 shares and 1988 distributions for each type $l \in w, p, c$

$$\{\tilde{Y}^w_{i2015}, \tilde{Y}^p_{i2015}, \tilde{Y}^c_{i2015}\}$$

2. Worker effect: use 2015 distribution for only workers

$$\{Y^w_{i2015}, \tilde{Y}^p_{i2015}, \tilde{Y}^c_{i2015}\}$$

3. C-corp effect: and use 2015 distribution for C-corp ABO

$$\{Y^w_{i2015}, \tilde{Y}^p_{i2015}, Y^c_{i2015}\}$$

4. Pass-thru effect: and use 2015 distribution for pass-thru ABO

$$\{Y^w_{i2015}, Y^p_{i2015}, Y^c_{i2015}\},$$

   i.e., the actual 2015 income distribution

Back

Decomposing Δ in unconditional income distribution

Additional details:

- Drop negatives (little effect) and use log income decomposition

$$\log Y_{it}^{l} = \mu_{t}^{l} + \varepsilon_{it}^{l}$$

- Then exponentiate counterfactual log income distributions
- Counterfactual income adjusts for aggregate growth using Δ in average worker (log) income

$$\log Y_{i2015}^{l} = \mu_{1988}^{l} + \mu_{2015}^{w} - \mu_{1988}^{w} + F^{-1}(\theta_{i2015}^{l} | l, 1988)$$

- Results little changed if adjust by overall average (log) income

Back