

Taxes, Regulations of Businesses and Evolution of Income Inequality in the US

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Motivation

Facts for 1980-2012 period in the US:

1. Increase of the top income groups shares in total income (pre-tax) and change of their composition: **growth of the entrepreneurial income**.
2. **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).
3. Changes in the corporate, dividend and personal **income taxes and regulations** on corporations.

This paper: conversion is more than accounting

1. Establishes **the empirical link** between trend in the distribution of legal forms of organization and income inequality dynamics using data from the Survey Consumer Finances (SCF).
2. Using firm-level administrative data provides **new evidence** on the flows between the legal forms of organization of firms in the US since 1980 and documents that conversion induces changes in employment dynamics.
3. Propose a theory of **endogenous choice of legal form and risk diversification** consistent with these empirical findings and quantify the contribution of tax reform and regulations to income inequality dynamics (in progress)

Related literature

- Income inequality dynamics and taxes: Piketty and Saez (2003, 2013), Atkinson, Piketty and Saez (2011), Alvaredo, Atkinson, Piketty and Saez (2013), Bricker, Henriques, Krimmel and Sabelhaus (2016), Piketty, Saez and Zucman (2016). Smith, Yagan, Zidar and Zwick (2017)
- Macroeconomic effects of entrepreneurship: Quadrini (2003), Cagetti and De Nardi (2009), Buera, Kaboski and Shin (2015), Buera and Shin (2011), Chen, Qi and Schlagenhauf (2014)
- Firm dynamics: Haltiwanger, Jarmin and Miranda (2013), Fort, Haltiwanger, Jarmin and Miranda (2015), Chari, Christiano and Kehoe (2008), Moscarini and Postel Vinay (2012)

Pre-tax top income shares have risen since 1980 ...



Source: Own calculations. NBER Tax Model Files. Series exclude capital gains.

... and their composition has changed

	Share	1980 Composition			Share	2012 Composition		
		Labor	Entr.	Other		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: Own calculations. NBER Tax Model Files.

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

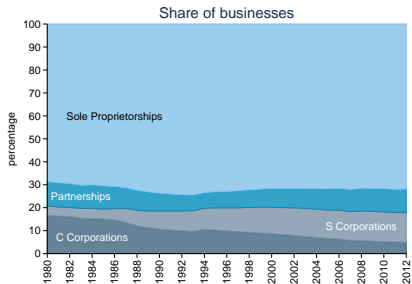
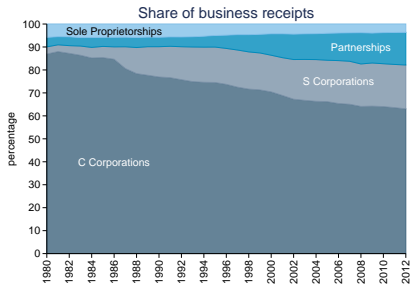
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Rise of the pass-throughs since 1980



Notes: Business receipts are the revenues businesses receive from their sales of goods and services. Source: IRS Integrated Business Data

- Share of business receipts of pass-through entities in total receipts increased from **12.5%** in 1980 to **37.0%** in 2012 (left panel).
- Share of C Corporations in total entities dropped from **16.6%** in 1980 to **4.9%** (right panel).

Linking legal forms to income inequality dynamics

Use SCF waves (1988 to 2012) and “shift share” decomposition to construct two counterfactual top income series:

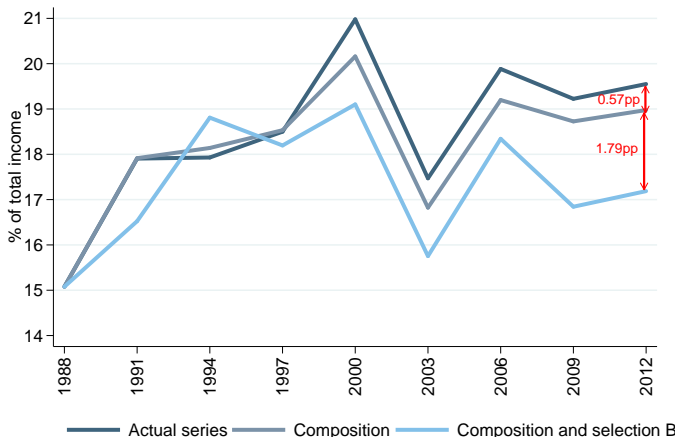
1. **Composition effect**: fix the fraction of HHs who own the pass-through business at the 1988 level.
2. **Selection effect**: fix the ratio of mean income of C corporation owners to the business income of pass-through owners.

Details effects

Details decomposition

Income definitions

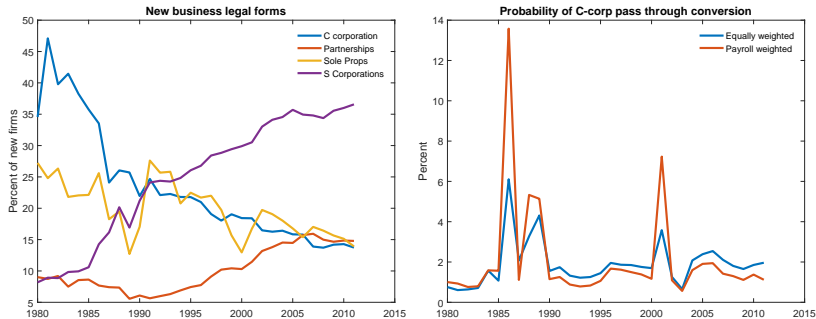
Counterfactuals: top 1 percent income share evolution



Source: Own calculations from 1988 – 2012 SCF data

- Composition: **13.0%** of the increase
- Composition and selection: **52.8%** of the increase

Conversions around periods of major tax reforms



Source: Census LBD and Business Register

- Conversions around periods of major tax reforms: Tax Act Reform of 1986, Economic Growth and Tax Relief Reconciliation 2001. Both reduced personal income tax, in particular the top rates.

Conversion induces changes in employment dynamics

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

$$\Delta \log E_{it} = \alpha_i + \sum_{\tau \neq 1985} \lambda_{\tau} D_{it}^{\tau} + \beta D_{it}^P + \sum_{\tau \geq 1986} \gamma_{\tau} D_{it}^P \times D_{it}^{\tau} + \varepsilon_{it} \quad (1)$$

Triple difference

γ compares (within-firm) change in employment growth of converters versus non converters pre- and post- tax reform

γ interpretation

Conversion induces changes in employment dynamics

	$\Delta \log E_{it}$ (1)	$\Delta \log E_{it}$ (2)	$\Delta \log E_{it}$ (3)	$\Delta \log E_{it}$ (4)
β	0.00699* (0.0040)	0.00915** (0.0041)	0.0345*** (0.0084)	0.0286*** (0.0086)
γ_{1986}	-0.0186*** (0.0050)	-0.0367*** (0.0052)	-0.0183* (0.0101)	-0.0312*** (0.0107)
γ_{1987}	-0.00206 (0.0041)	-0.0198*** (0.0048)	-0.0165* (0.0089)	-0.0315*** (0.0103)
γ_{1988}	-0.0170*** (0.0041)	-0.0230*** (0.0050)	-0.0378*** (0.0087)	-0.0288*** (0.0108)
γ_{1989}	-0.0159*** (0.0041)	-0.00669 (0.0074)	-0.0389*** (0.0086)	-0.00185 (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 with conversion

Post TRA 1986: Growth rate (mostly) declines with conversion

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Post TRA 1986: **Growth rate (mostly) declines with conversion**

MODEL

Model ingredients

- Workers and entrepreneurs
- Uninsurable idiosyncratic risk:
 - Labor productivity (workers)
 - Firm productivity (entrepreneurs)
 - ⇒ equilibrium income and wealth inequality
- Firm productivity determines optimal scale (decreasing returns)
- Entrepreneurs choose organizational form
 - Tradeoff between tax benefit and access to external finance
- Mutual fund invests household savings into **C corporations** and **diversifies all corporate investment risk**
- Endogenous distribution of wealth, income and business organizations in equilibrium

Model captures *stylized* tradeoff between legal forms

Pass through:

Pro	Con
<ul style="list-style-type: none">• Profits taxed once at personal income tax• Simple organization with no overhead costs	<ul style="list-style-type: none">• Capital financed only through own equity• Undiversified investment risk

C corporation:

Pro	Con
<ul style="list-style-type: none">• Access to (perfectly elastic) supply of external equity• Completely diversified investment risk	<ul style="list-style-type: none">• Profits subject to both corporate income and distribution taxes• Substantial overhead costs

Workers

Standard income fluctuation problem:

$$V^W(a, \varepsilon) = \max_{c, h, a'} u(c, 1 - h) + \beta \mathbb{E} [V^W(a', \varepsilon')]$$

subject to

$$c + a' = a + y - T_i(y) + T$$

$$y = ra + wh\varepsilon$$

$$a' \geq \underline{a}$$

a : savings

ε : Stochastic labor productivity

$T_i(y) + T$: Income tax

Entrepreneurs: C corporation

Income fluctuation problem with pass through option in continuation W^C :

$$V^C(a, z) = \max_{a', c} u(c, 1 - \bar{h}) + \beta W^C(a', z)$$

subject to

$$c + a' = y + a - T_i(ra) - T_d(f_z(k^*(z))z) + T - c_f$$

$$y = ra + f_z(k^*(z))z$$

$$a' \geq \underline{a}$$

c_f : overhead costs

$f_z(k^*)z$: taxable Ricardian rent

$T_i(ra) + T_d(f_z z) + T$: income and dividend tax

Mutual fund:

- Supplies efficient level of capital $k^*(z)$ —equates expected return on capital with risk free rate
- Absorbs all investment risk $f_k k^*$

Entrepreneurs: pass-through entity

Income fluctuation from undiversified business investment:

$$\begin{aligned} V^P(a, e, z) &= \max_{a', e', c} u(c, 1 - \bar{h}) + \beta W^P(a', e', z) \\ &\text{subject to} \\ c + a' + e' &= y + a + (1 - \delta)e - T_i(y - \delta e) + T \\ y &= ra + \pi(e, z) \\ a' &\geq \underline{a} \end{aligned}$$

$$\pi(e, z) = \max_n \{ z^{1-\nu} (e^\alpha n^{1-\alpha})^\nu - wn \}. \quad \text{taxable net profit}$$

Continuation values: converting decision

- The continuation value of the pass-through owner is

$$W^P(a', e', z) = \mathbb{E} [\max \{ V^C(\mathbf{a}' + \mathbf{e}', \mathbf{z}'), V^P(a', e', z') \} | z]$$

- To convert, the owner of the C corporation has to purchase all equity from the outside investors using personal assets. Therefore, the continuation value becomes

$$W^C(a', z) = \begin{cases} \mathbb{E}[V^C(a', z') | z] & \text{if } a' < k^*(z) \\ \mathbb{E}[\max \{ V^C(a', z'), V^P(\mathbf{a}' - \mathbf{k}^*(\mathbf{z}), k^*(z), z') \} | z] & \text{if } a' \geq k^*(z) . \end{cases}$$

Aggregation

Effects of pass through conversion

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

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

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

- Introduce financing constraint on investment
 $\implies e' < k^*(z) \downarrow$ investment and \uparrow expected return

Together, investment risk and financing constraint, \uparrow dispersion of expected and realized return on equity and amplify increase in inequality

Top income shares following tax reform (in progress)

	Economy 1	Economy 2	Economy 3
	$\tau_i = 0.25, \text{ GE}$	$\tau_i = 0.15, \text{ PE}$	$\tau_i = 0.15, \text{ GE}$
Top 1%	5.8	6.9	6.5
Top 5%	22.3	24.8	23.3
Top 10%	38.0	40.8	39.1
Top 15%	45.3	49.3	47.0

Notes: GE - general equilibrium, PE - partial equilibrium.

- Following the **10 percentage points** reduction of personal income tax, the top income shares increase between **0.7 to 1.7 percentage point**.
- GE effects counter the initial impact: interest rate falls, wage rises.

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 use the SCF to 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.

Estimating firm level transitions

US Census Bureau Longitudinal Business Database (LBD) and linked Business Register (BR)

- Nearly universal coverage of the nonfarm private sector from 1977 to 2012
- Longitudinally linked at the physical establishment level
- Linkages robust to changes in ownership and legal form of organization
- Establishments further aggregated to firms: highest level of operational control
- Linked BR records how firms are organized from Federal tax filings

Using LBD and linked BR record 5 possible legal forms: **C corporation**, **Partnerships** (General/LLC/LLP), **Sole Proprietors**, and **S corporation**.

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

Interpretation of γ_k

γ_k compares change in firm employment from pass through conversion (relative to corporations who have not converted) k years following tax reform to change in firm employment from pass through conversion prior to tax reform

$$\gamma_{1986} = \frac{(E[\Delta \log N_{it}|1986, D^P = 1] - E[\Delta \log N_{it}|1986, D^P = 0])}{(E[\Delta \log N_{it}|1985, D^P = 1] - E[\Delta \log N_{it}|t = 1985, D^P = 0])}$$

Back

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 pre-tax profitability from endogenous changes in investment, employment and costs.
 - Key issue: separate the two effects
 - We use a modified shift share framework in the SCF data applied to the business component of total income.

Linking tax and inequality changes

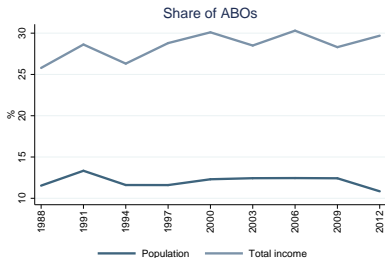
Counterfactual is suggestive, BUT:

1. By assigning entire shift in pass through profitability to selection, deliver at most an upper bound on potential effect
 - For example, secular shifts away from large capital intensive firms might increase the ratio of pass through to C corporation income
2. Does not tell us whether and how the changes in tax and regulation affected income inequality

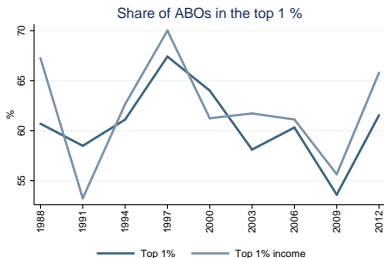
Use a model with endogenous choice of legal form of organization to measure the effects of tax and regulation changes

- Key economic **trade-offs**:
 - pass-through entities taxed based on the personal income tax code (no double taxation of profits)
 - easier access to capital for C corporations

Business owners over time



Source: Own calculations from 1988 – 2012 SCF

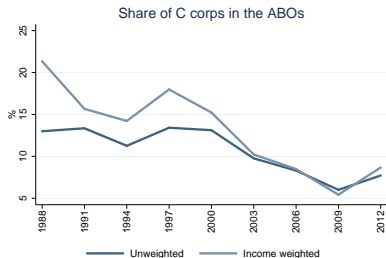


Source: Own calculations from 1988 – 2012 SCF

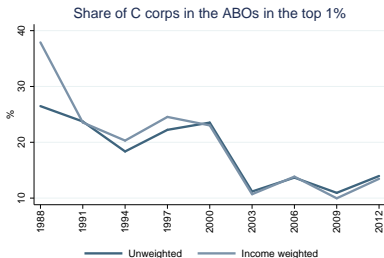
- Slight decline in share of total population between 1988 and 2012, business income remains concentrated in the top 1 percent income group

Back

Shift towards the pass-through entities among ABOs



Source: Own calculations from 1988 – 2012 SCF

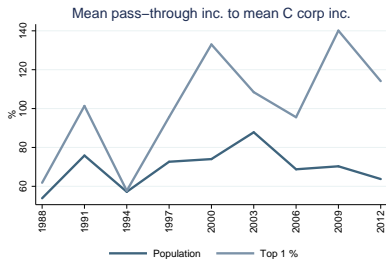


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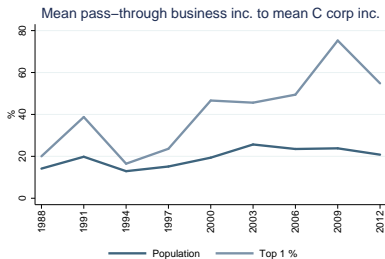
- Similar decline in the role of the C corps as observed in the IRS and LBD data

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%

Simple income decomposition

- Let x_t be the share of ABOs in the overall SCF population and p_t be the share of pass-through owners among ABOs. Then the mean income i_t is

$$i_t = x_t [p_t(i_t^{PB} + i_t^{PNB}) + (1 - p_t) i_t^C] + (1 - x_t) i_t^W$$

where i_t^{PB} , i_t^{PNB} , i_t^C and i_t^W are the mean incomes of respectively pass-through owners (business, non-business), C corporation owners and workers.

- Similarly, the mean income within the top 1 percent is

$$i_t^1 = x_t^1 [p_t^1(i_t^{1,PB} + i_t^{1,PNB}) + (1 - p_t^1) i_t^{1,C}] + (1 - x_t^1) i_t^{1,W}$$

where variables with superscript 1 denote proper shares and means within the top 1 percent.

- The top 1 percent income share is

$$s_t^1 = \frac{N^1 \times i_t^1}{N \times i_t}$$

Quantifying the impact of shift in the legal forms

- **Composition effect:** hold the shares p constant at the 1988 level

$$i_{t,c1} = x_t [p_{88}(i_t^{PB} + i_t^{PNB}) + (1 - p_{88}) i_t^C] + (1 - x_t) i_t^W$$

and analogously for the mean income of the top 1 percent.

- **Composition and selection effect A:** hold the shares p constant AND the ratio of the mean incomes

$$\omega_{c2A} = \frac{i_{88}^{PB} + i_{88}^{PNB}}{i_{88}^C}$$

and define counterfactual series

$$i_{t,c2A} = x_t [p_{88}\omega_{2A} i_t^C + (1 - p_{88}) i_t^C] + (1 - x_t) i_t^W$$

and analogously for the mean income of the top 1 percent.

Quantifying the impact of shift in the legal forms

- **Composition and selection effect B:** the ratio of the mean pass through component of income

$$\omega_{c2B} = \frac{i_{88}^{PB}}{i_{88}^C}$$

and define the counterfactual series

$$i_{t,c2B} = x_t [p_{88}(\omega_{c2B}i_t^C + i_t^{PNB}) + (1 - p_{88})i_t^C] + (1 - x_t)i_t^W$$

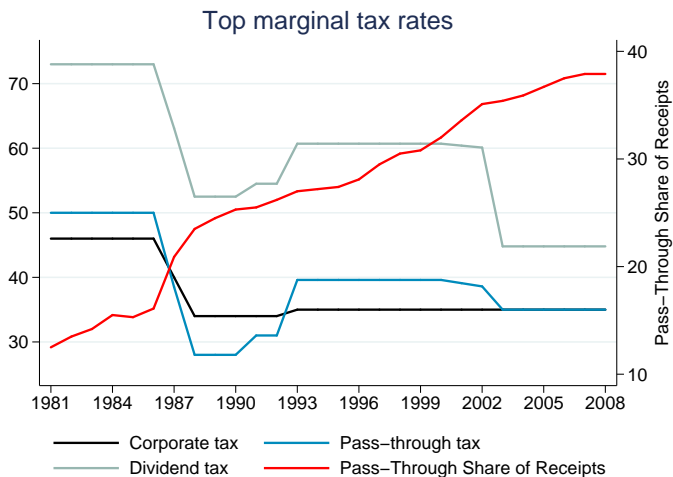
and analogously for the mean income of the top 1 percent.

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

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Changes in tax policy and regulations



Source: Congressional Budget Office and IRS

Mutual fund

- The owners of the C corporations in the model have access to the infinitely elastic supply of outside equity, through the mutual fund, at the cost of $1 + r - T'_i(\cdot)$
- Mutual fund makes investment decisions for the C corporations and aggregates the idiosyncratic risks faced by their owners and by the LLN it is able to fully diversify it.
- The capital stock of the C corporation $k^*(z)$ is determined by

$$\mathbb{E}[(1 - T'_c(\pi(k^*; z))) \pi_k(k^*; z) - \delta|z] + 1 = 1 + r - T'_i(\cdot)$$

where T_c is the corporate income tax schedule.

Aggregation and market clearings

- The number of pass-through owners p is determined by

$$p = \mu \left(\int_{A \times E \times Z} d_P(a, e, z) d\lambda_P(a, e, z) + \int_{A \times Z} (1 - d_C(a, z)) d\lambda_C(a, z) \right)$$

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

- Market clearing for labor requires

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

and market clearing for the capital stock requires

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

The role of taxes

Lemma

Suppose tax schedules are linear and suppose there is no idiosyncratic risk associated with productivity, i.e. z is fixed. Then the allocations of capital for pass-through entities and C corporations are:

$$e'(a, e, z) = \left[\left(\frac{\Delta}{r + \delta} \right) \left(z^{\frac{1-\nu}{1-(1-\alpha)\nu}} \right) \right]^{\frac{1-(1-\alpha)v}{1-v}}$$
$$k^*(z) = \left[\left(\frac{\Delta}{\frac{(1-\tau_i)}{(1-\tau_c)(1-\tau_d)} r + \delta} \right) \left(z^{\frac{1-\nu}{1-(1-\alpha)\nu}} \right) \right]^{\frac{1-(1-\alpha)v}{1-v}}$$

where Δ is a constant depending on production function parameters.

Moreover, for a given z we have $e' < k^*$ as long as $(1 - \tau_c)(1 - \tau_d) > (1 - \tau_i)$.

The role of risk premium

Lemma

Suppose T_i, T_d, T_c are set to zero and the borrowing constraint is slack. Then the allocations of capital for pass-through entities and C corporations are:

$$e'(a, e, z) = \left[\left(\frac{\Delta}{r + \delta} \right) \left(\frac{\mathbb{E} \left[u_c(c(a', e', z')) \left(z' \frac{1-\nu}{1-(1-\alpha)\nu} \right) \mid z \right]}{\mathbb{E} \left[u_c(c(a', e', z')) \mid z \right]} \right) \right]^{\frac{1-(1-\alpha)v}{1-v}}$$
$$k^*(z) = \left[\left(\frac{\Delta}{r + \delta} \right) \mathbb{E} \left[\left(z' \frac{1-\nu}{1-(1-\alpha)\nu} \right) \right] \right]^{\frac{1-(1-\alpha)v}{1-v}}$$

where Δ is a constant depending on production function parameters.

For a given z , if .

The role of taxes

Composition of agents across income distribution

	Economy 1 $\tau_i = 0.25$, GE			Economy 2 $\tau_i = 0.15$, PE			Economy 3 $\tau_i = 0.15$, GE		
	Work.	C ent.	P ent.	Work.	C ent.	P ent.	Work.	C ent.	P ent.
Population	87.9	5.4	6.6	87.9	4.8	7.3	87.9	5.1	7.0
Top 25%	51.3	22.1	26.6	50.3	19.7	30.0	46.7	23.6	29.6
Top 10%	6.1	27.6	66.4	2.8	24.0	73.1	5.7	26.9	67.5
Top 5%	0.0	3.1	96.9	0.0	1.1	98.9	0.0	4.3	95.7
Income	83.7	5.3	11.0	82.6	4.3	13.1	84.0	4.7	11.4
Top 25%	29.3	22.8	47.9	26.7	17.7	55.6	26.6	22.9	50.5
Top 10%	3.8	21.8	74.4	1.7	16.1	82.3	3.6	21.0	75.5
Top 5%	0.0	2.8	97.2	0.0	1.0	99.0	0.0	3.7	96.3

Notes: GE - general equilibrium, PE - partial equilibrium.

- Shift in top income shares induced by the increase of the number of owners in total population and total income.
- Pass-through business owners over represented at the top of the income distribution.