Dilution vs. Risk Taking: Capital Gains Taxes and Entrepreneurship

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How to tax capital gains?

- Current realization based system is at odds with classic law / public finance principle

$$\text{Haig–Simons' comprehensive income} = \text{consumption} + \Delta\text{wealth}$$

- Allows delaying of taxation by borrowing against assets.
- Recent proposals
  - Tax capital gains on accrual (Biden/Harris administration, H.R. 6498, Netherlands "actual return" legislative proposal)
  - Tax wealth (see BPEA 2019 Saez and Zucman / Kopczuk discussion)
- Key concern: effects on entrepreneurship (VC funded companies = 60% of IPOs and corporate R&D)

Reception in the VC Industry

National Venture Capital Association:
"direct attack on entrepreneurial ecosystem"
"slows down startup formation" *The Times (2024)*

Marc Andreesen:
"makes startups completely implausible" "kills venture capital"
"the thing that tipped me to support Donald Trump" *Vox (2024)*

Phillipe Aghion:
"With the Zucman tax, Mistral AI will have to find financiers to pay its taxes instead of being able to fund innovation. They will have to close their doors, as there will be similar companies who won't face these constraints."

Marginal Contribution and Main Results

1. New data on U.S. venture-backed startups, deals, and founders.
   - Update Hall and Woodward (2010).
   - Average equity "salary" $450,000 per year.
   - 85% of founders get zero.
   - Top 2% capture 80% of total value.
   - Pareto tail coefficient 1.03.
2. Simple model of accrual-based taxation in startup lifecycle.
   - Neutrality of valuations.
   - Accrual taxation $\approx$ actuarially unfair insurance to founders.
3. Evaluate effects of accrual-based taxation in the data.
   - Founder ownership share at exit drops by 25%.
   - Fraction receiving positive payoffs increases from 15% to 50% with complete tax credits.
   - Insurance and dilution effects cancel out with moderate risk aversion.

Literature

1. Capital gains taxation: Auerbach (1989, 1991), Poterba (1989), Kopczuk (2019), Scheuer–Slemrod (2021), Aguiar et al. (2025)
2. Returns to entrepreneurship: Hall–Woodward (2010), Smith et al. (2019, 2023), Bhandari et al. (2021, 2025)
3. Optimal taxation & entrepreneurship: Cagetti–De Nardi (2006), Scheuer (2013, 2014), Jaimovich–Rebelo (2017), Bell et al. (2019), Guvenen et al. (2023)

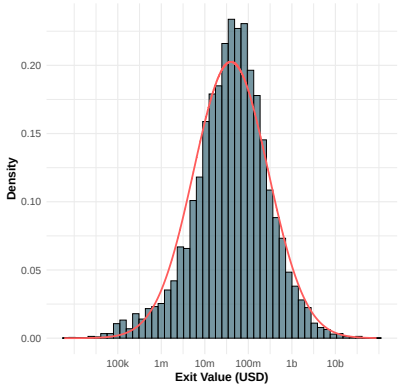
Plan

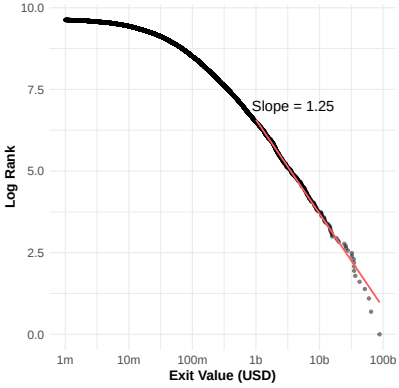
1. Data.
2. Simple model.
3. Evaluate effects of accrual-based taxation in the data.
4. Extensions.

Data

- Updating Hall and Woodward (2010).
- **Venture Capital Data on Companies, Deals, and Founders:**
  - $\approx$ universe of U.S. VC-backed startups (1987–2021).
  - Sources: *PitchBook*, *CB Insights*, *PrivCo*, *Capital IQ*, *Compustat*, SEC filings, Wikipedia.
- **Founder Identification:** Founder names compiled from *PitchBook*, *PrivCo*, and *Capital IQ*, validated on a hand-collected Wikipedia benchmark.
- **Founder Ownership (S-1 Sample):** SEC *Form S-1* filings (1,077 IPOs) used to measure within-founder ownership shares.
- 96,000 companies, 167,000 funding rounds, 48,000 exits, 185,000 founders.

Company Exit Values





$\Pr(x > 0) = 41\%$

Conditional median: \$44m

Conditional mean: \$258m

Top 1%: \$3.3bn

Example — WhatsApp

Date	Deal	Invested Capital	Postmoney Valuation	Founder Share
2010	Seed	$0.26m		80%
2011	Early VC	$8m	$40m	60%
2013	Later VC	$53m	$1.6bn	58%
2014	Acquisition	–	$17bn	58%

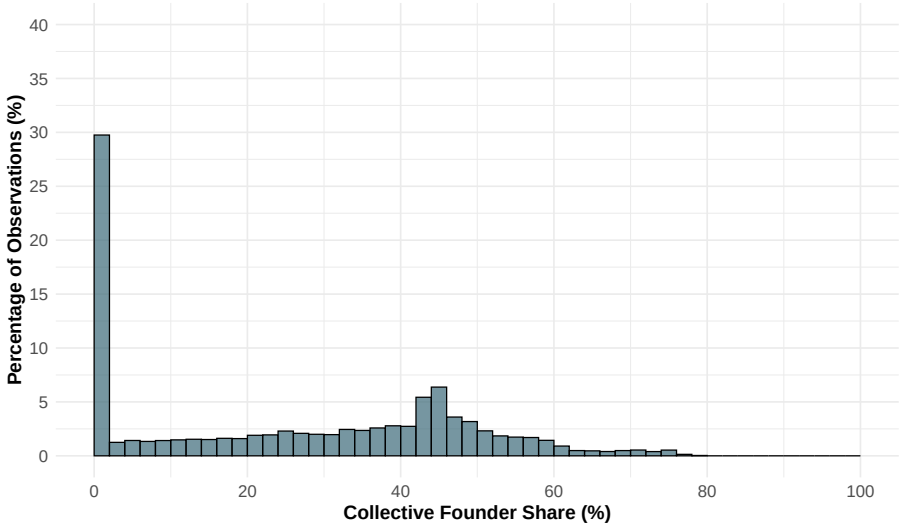
Complications:

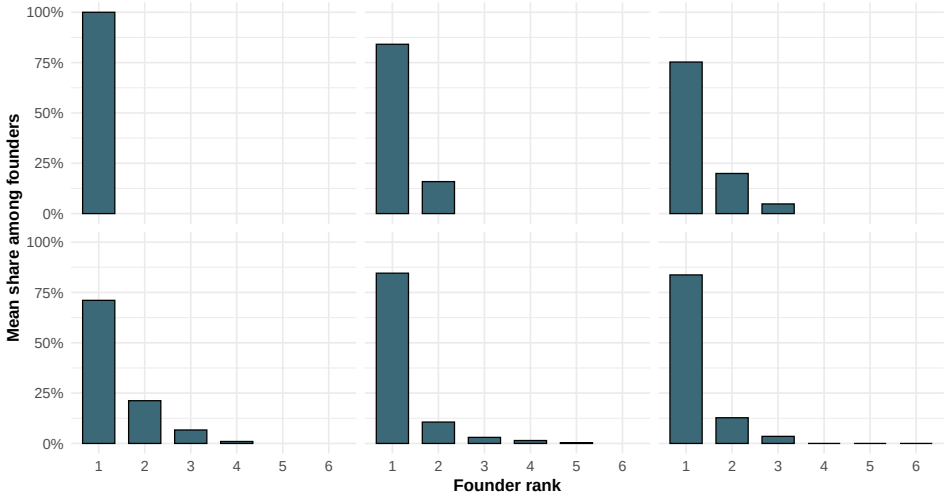
- (Convertible) debt deals
- Down rounds
- Preferences
- Employee stock
- Missing data

Example — Theranos

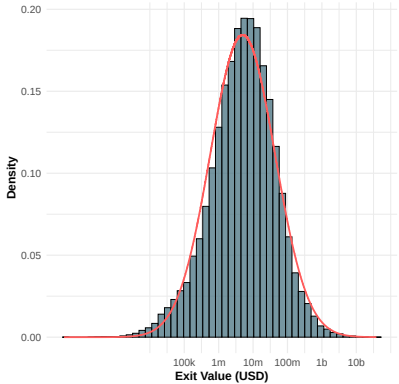
Date	Deal	Invested Capital	Postmoney Valuation	Founder Share
2005	Early VC	$7m	$27m	59%
2006	Early VC	$9m	$46m	46%
2006	Later VC	$32m	$159m	37%
2010	Later VC	$45m	$1.1bn	35%
2013	Later VC	$84m	$1.3bn	33%
2014	Later VC	$633m	$9.1bn	31%
2017	Debt	$100m	–	–
2018	Liquidation	–	–	–

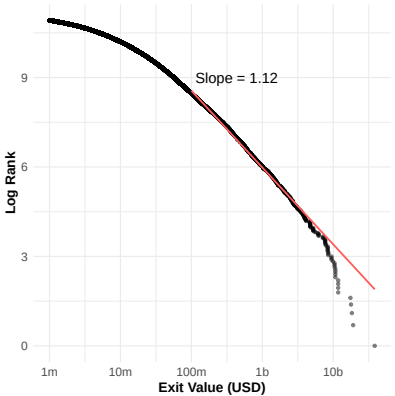
Collective Founder Share at Exit for IPO and MnA exits




Mean ranked founder shares by number of founders (S−1 sample)
Mean share among founders
100%
75%
50%
25%
0%
1
2
3
4
5
6
Founder rank

Individual Founder After-Tax Exit Values





$\Pr(x > 0) = 16\%$

Median: \$6m

Mean: \$46m

Top 1%: \$620m

Top 1% share: 45%

Top 2% share: 80%

Career Choice Model

Preferences:

$$\mathbb{E}\sum_{t=0}^{\infty}(1+r)^{-t}u(c_t).$$

Career options:

- **Worker:** earns wage w^* each period.
- **Founder:** earns wage $w < w^*$, but with probability π receives a jackpot payoff x and becomes a worker.

Critical Paycut:

Δ such that startup wage of $w^* - \Delta$ makes the founder indifferent between careers.

Quantitative Results

$$\Delta = \beta\pi\,\mathbb{E}[x] \approx \underbrace{\beta}_{\text{risk discount}} \times \underbrace{6.4\%}_{\text{exit rate}} \times \underbrace{\$7.2\text{m}}_{\mathbb{E}[x]} \approx \beta \times \$460\text{k}$$

risk aversion σ	critical paycut Δ	risk discount β
0.0	\$462,719	100.0%
0.9	\$57,946	12.5%
2.0	\$23,731	5.1%

Notes: $r = 5\%$, worker wage = \$194,126, initial assets = \$1,000,000, capital gains tax = 20%.

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Simple Model

Timeline:

- $t = 0$: Company founded, value 0.
- $t = 1$: VC invests d.
- $t = 2$: Company value realized $y = Y$ with probability p otherwise $y = 0$.

Contract:

- VC gets fraction $1 - s$ of company at $t = 1$.
- Notation: pre-money valuation v, post-money $v + d$, so $s = v/(v + d)$.
- Equilibrium: s set so that VC gets expected return ψ.

Solution without taxes

Post-money valuation is expected discounted value:

$$v + d = \frac{pY}{1+\psi}.$$

Investor break-even implies that s solves

$$(1-s)pY = (1+\psi)d.$$

So founders expected payoff is

$$pY - (1+\psi)d.$$

Numerical Example

Parameters:

$$Y = 100 \text{ million}, \quad p = 10\%, \quad d = 5 \text{ million}, \quad \psi = 20\%$$

Compute valuations:

$$v + d = \frac{pY}{1+\psi} = \frac{0.1 \times 100}{1.2} = 8.33 \text{ million}.$$

$$v = 8.33 - 5 = 3.33 \text{ million}.$$

Shares:

$$s = \frac{v}{v+d} = \frac{3.33}{8.33} = 0.40.$$

Founders own 40%, VC owns 60%.

Expected payoff to founders: 4 million.

Capital Gains Taxes

- **Tax rate** τ
- **Realization-based:** taxes due at $t = 2$
- **Accrual-based:** fraction **accrual level** $\alpha \in [0, 1]$ due at $t = 1$.
- Founders sell shares at $t = 1$.
- If company fails at $t = 2$, each \$1 of tax credit valued at $\phi \leq 1$.
- Period 1 taxes paid: $T = \alpha\tau v + (1 - \alpha)\tau T$.

Effects of increasing Accrual Level α

Neutrality results. The following do not depend on the accrual level α:

- Investor welfare.
- Pre-money and post-money valuations.
- Government welfare.

Increase in total investment:

- Total investment $d + T$ increases in α.
- Founder share s decreases in α.

Effects on founders:

- Failed founders ($y = 0$) receive some tax credits.
- Successful founders' ($y = Y$) payoff goes down.
- Average founder payoff is lower.

Main Tradeoff

Founders get more insurance. But at an actuarially unfair price to get costly additional venture capital finance.

Average founder payoff:

$$\underbrace{(1-\tau)(\mathbb{E}[y]-\tilde{\Psi}d)}_{\text{mean jackpot in realization regime}} - \underbrace{(1-\tau)(\tilde{\Psi}-1)T}_{\text{mean additional cost of capital}} - \underbrace{(1-\phi)(1-p)(1-\tau)T}_{\text{unused tax credits}},$$

where

$$\tilde{\Psi} \equiv 1 + \frac{\psi}{1-\tau} + \frac{\tau}{1-\tau}(1-p)(1-\phi).$$

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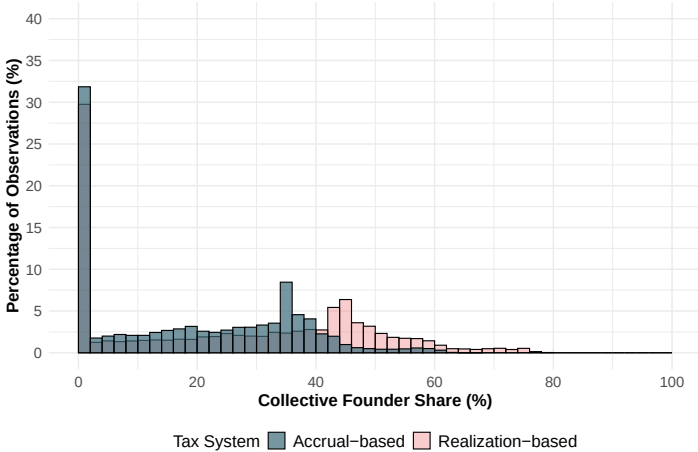
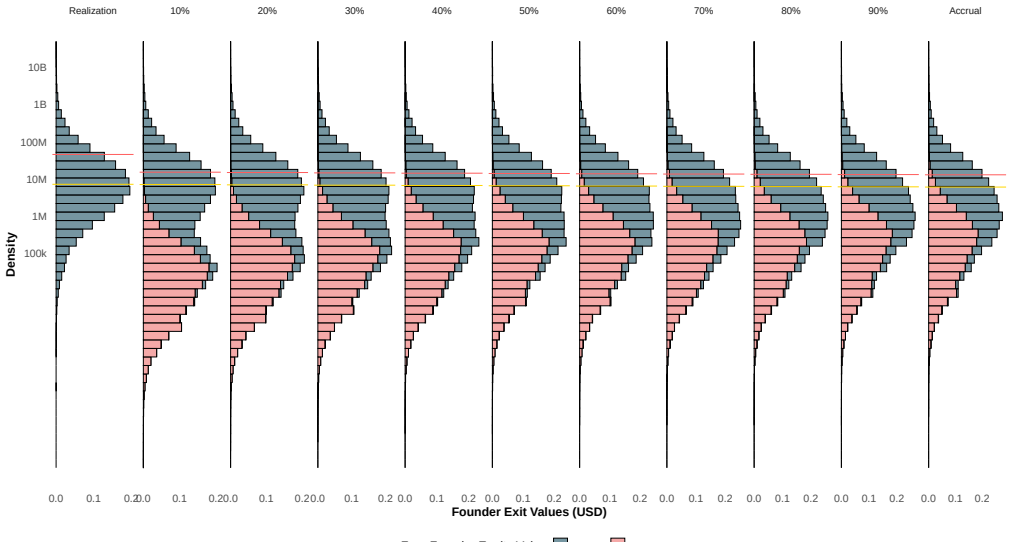
Quantitative Results: Extra Dilution



Average collective founder share at exit drops by 25% under accrual-based taxes

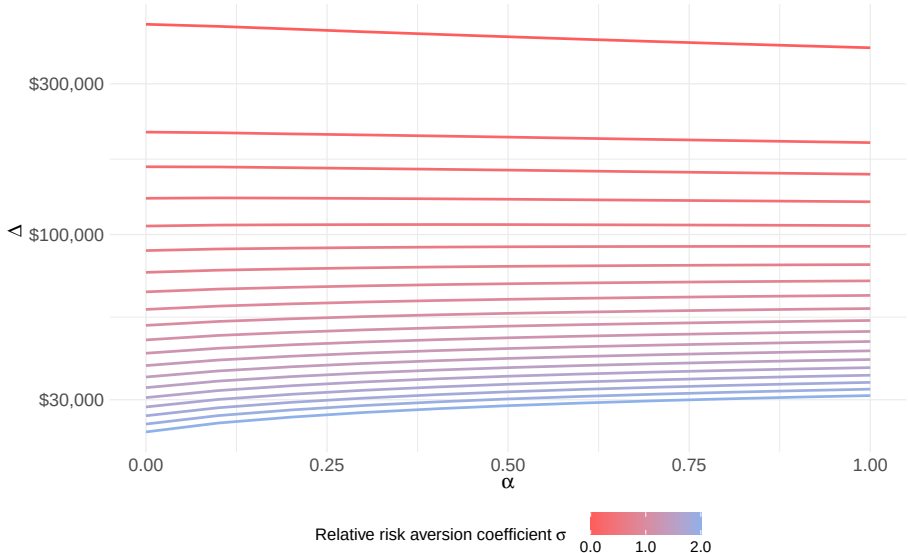
Effect on Founder Payoffs (costly insurance)



Effect on Founder Payoffs (costly insurance)

Accrual Level α	All Exit Values			Positive Exit Values			
	Average Tax Refund	Probability Positive	Mean	Mean	Median	99th Percentile	Pareto Tail Coefficient
0%	0.000	16%	7.2	45.6	5.558	621	1.03
10%	0.043	47%	7.1	15.2	0.070	236	1.03
20%	0.085	47%	7.0	14.9	0.126	227	1.03
30%	0.124	47%	6.8	14.6	0.177	220	1.04
40%	0.162	47%	6.7	14.3	0.220	214	1.05
50%	0.198	47%	6.6	14.1	0.259	206	1.05
60%	0.232	47%	6.5	13.8	0.296	202	1.06
70%	0.265	47%	6.4	13.6	0.330	198	1.07
80%	0.293	47%	6.3	13.4	0.360	194	1.07
90%	0.321	47%	6.2	13.2	0.389	191	1.08
100%	0.347	47%	6.1	13.0	0.416	187	1.08

Effect on Value of Entrepreneurship (sign depends on risk aversion)



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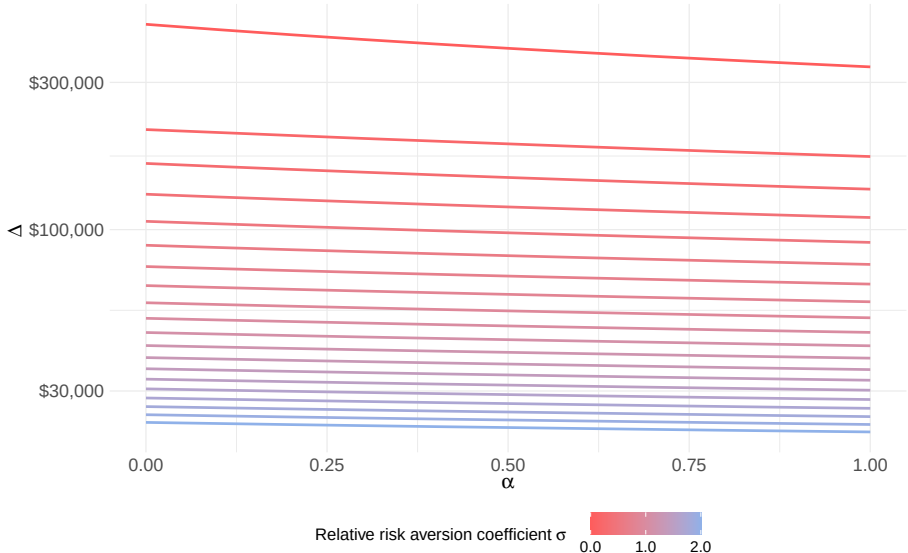
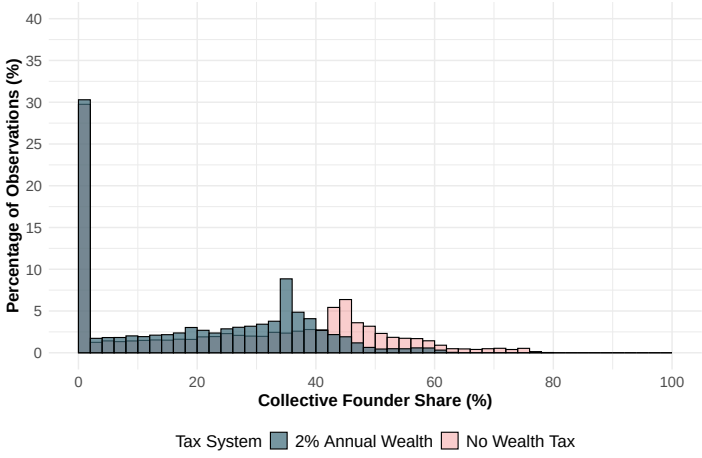
   - Loss carry-forward
   - Wealth tax
   - Ex-post risk vs. ex-ante heterogeneity

Loss Carryforward

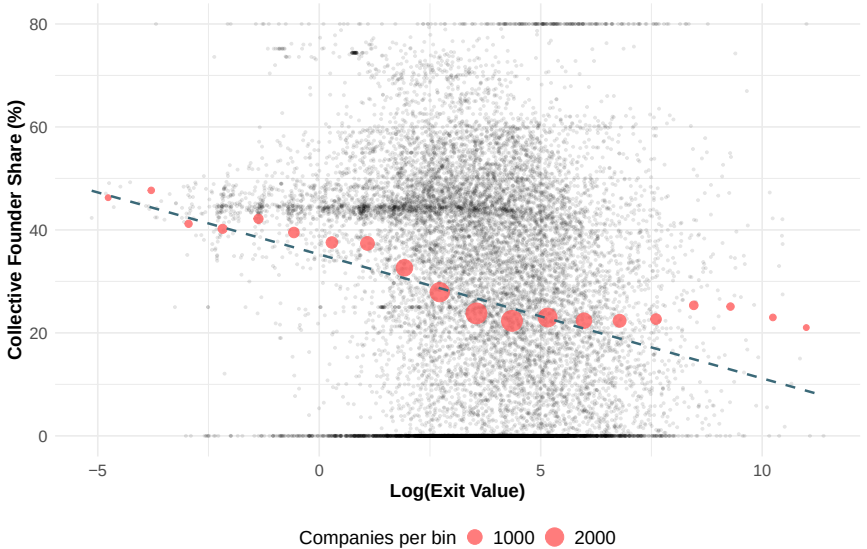


Additional Wealth Tax of 2%



Similar loss in ownership as accrual-based taxation.

Ex-ante Heterogeneity vs. Ex-post Risk



Ex-ante Heterogeneity vs. Ex-post Risk

Round	N	Prob. Positive Value	Mean	P25	P50	P75	IQR
1st	43,638	50%	283	19	58	161	142
2nd	24,441	66%	332	30	76	200	170
3rd	15,623	73%	403	41	100	257	216
4th	9,598	76%	498	54	129	333	279
5th	5,610	78%	591	66	152	407	341
6th	3,244	80%	785	76	184	502	426
7th	1,784	82%	1024	88	229	591	502

Conclusion

- New evidence on VC founder payoffs (power law)
- Accrual-based taxation causes ownership dilution through advance tax payments
- Provides downside insurance through early cashing out
- Loss provisions are key for risk-sharing benefits
- Key open question: why don't contracts provide this insurance already?