The Returns to High-Powered Entrepreneurship

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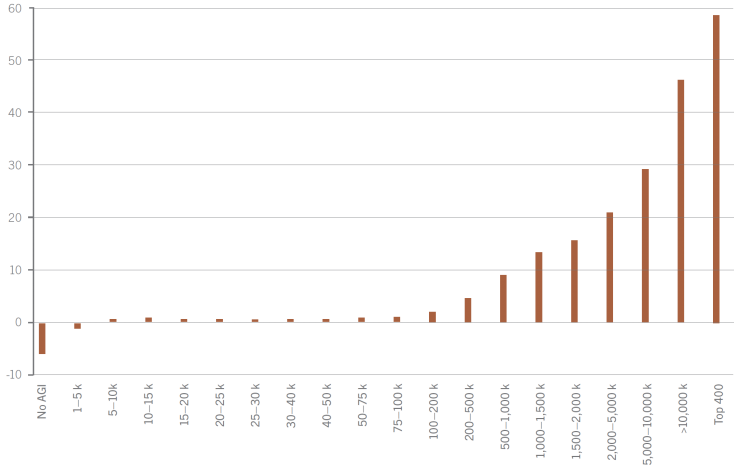
The role of capital gains at the top

Net capital gains (% of AGI) in the US in 2016 in U.S. $



Source: Scheuer and Slemrod (2020)

Entrepreneurship and taxes

- Entrepreneurs face lots of risk
  $\rightarrow$ Under-entry?
- Additional dilution due to tax liability and lack of liquidity
  $\rightarrow$ Loss of control
- But: tax only applies in case of success
  $\rightarrow$ Low marginal utility

This paper:

1. What are the returns to high-powered entrepreneurship?
2. How are they affected by tax policy?

Plan

1. Data and evidence
    - Success rates
    - Exit values
    - Lifetimes
    - Dilution
2. Effects of tax regimes in calibrated model

Data

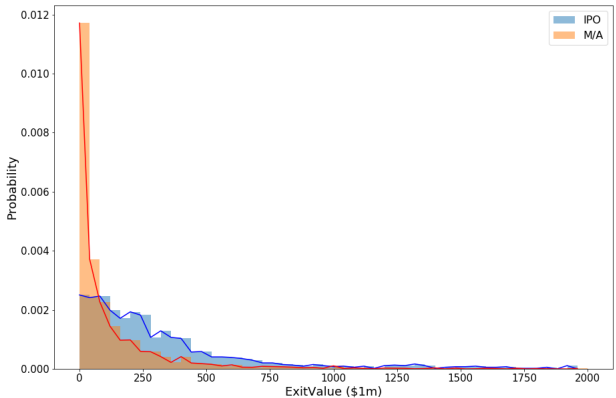
Universe of US-based, VC-backed companies

Combining sources from Pitchbook, PrivCo, Capital IQ, SEC filings

- founded between 1970 and 2020
- exit values
- all funding rounds
- founders
- cap tables from S-1 filings (IPOs)

Exit type	#
IPO	2630
Merger/acquisition	19,553
Shutdown (confirmed)	21,106
Shutdown (inferred)	11,337
Ongoing	52,344

Company exit values



Dilution

Deal	Premoney Valuation	Invested Capital	Postmoney Valuation	Founder Share
				100%
Angel	\$1m	\$1m	\$2m	50%
Series A	\$4m	\$2m	\$6m	33%
Series B	\$9m	\$3m	\$12m	25%
Acquisition			\$20m	

$\rightarrow$ Exit value going to founders: \$5m

Complications

- (convertible) debt deals
- down rounds
- preferences
- employee stock

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	$1630m	58%
2014	Acquisition		$17bn	

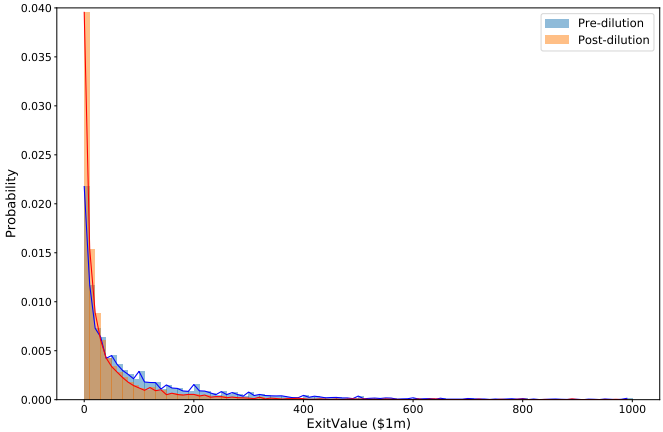
Example — Dropbox

Date	Deal	Invested Capital	Postmoney Valuation	Founder Share
2007	Incubator	$15k		80%
2007	Seed	$1.25m	$4.75m	59%
2008	Early VC	$6m	$25m	45%
2011	Early VC	$250m	$4bn	42%
2014	Later VC	$350m	$10bn	41%
2017	Later VC	N/A	N/A	41%
2018	IPO		$7.5bn	

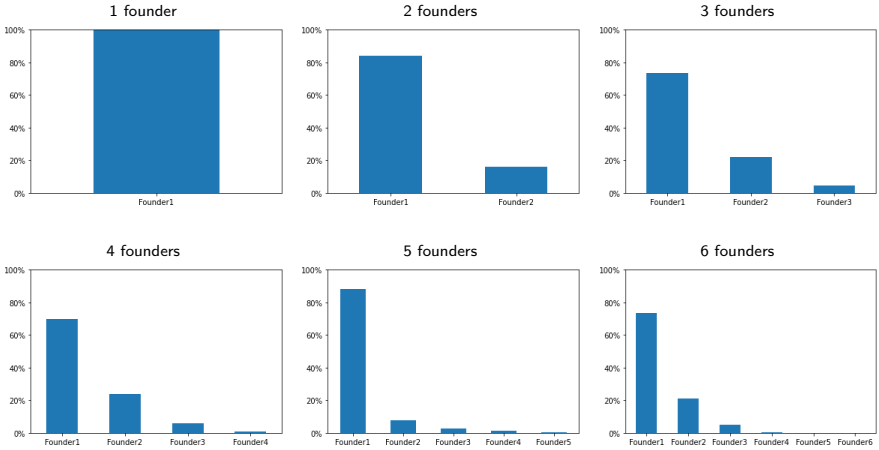
Example — Theranos

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		31%
2018	Liquidation			

Dilution

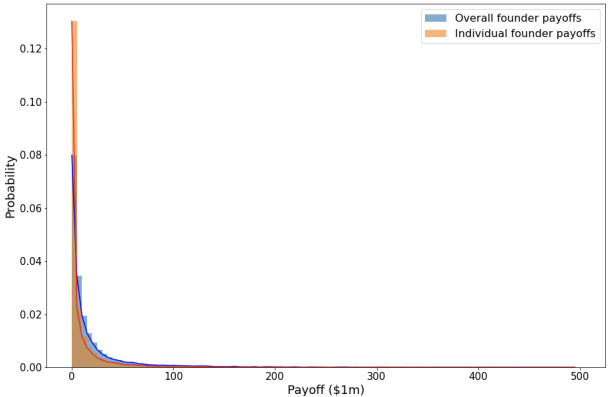

Pre-dilution
Post-dilution
Probability
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0
200
400
600
800
1000
ExitValue ($1m)

Ownership across founders (IPOs)



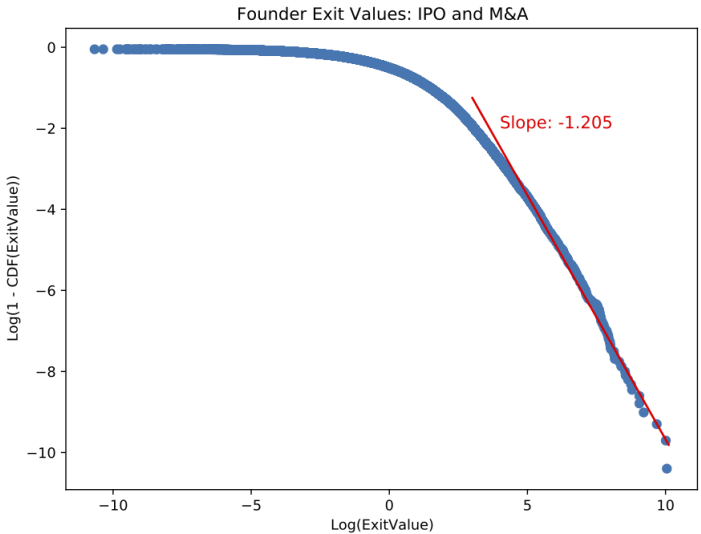
Average fraction of total founders' shares held by each founder at exit

Payoffs to founders

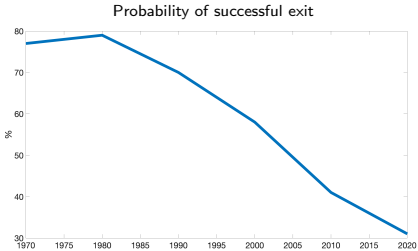


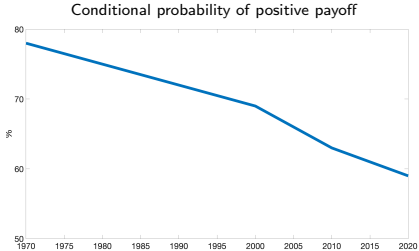
P(success)	43%
P($x > 0$|success)	65%
Mean cond'l on success	$26m
Median cond'l on success	$4m
Top-1% share	41%

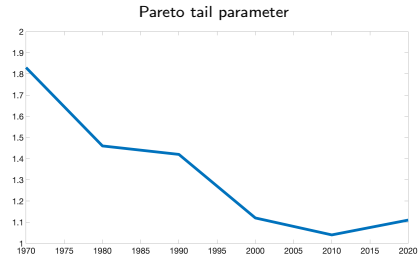
Pareto tail


Founder Exit Values: IPO and M&A
Slope: -1.205
Log(1 - CDF(ExitValue))
Log(ExitValue)
0
−2
−4
−6
−8
−10
−10
−5
0
5
10

Payoff distribution over time







Preferences

$$\mathbb{E}\sum_{t=0}^{\infty} R^{-t} u(c_t)$$

with $R \equiv 1 + r$

Entrepreneur in startup initially:

- startup wage $w_s < w_m$ market wage
- probability of exit π
- random payoff x (after tax) in case of exit
- save (not borrow) at rate R

$$a_{t+1} = Ra_t + w - c_t$$

Bellman equation

$$V_s(a) = \max_{c,a'} u(c) + \frac{\pi \mathbb{E}[V_m(a' + x)] + (1 - \pi) V_s(a')}{R}$$

s.t.

$$a' = Ra + w_s - c$$

$$a' \geq 0$$

where

$$V_m(a) = \frac{R}{r} u(ra + w_m)$$

Calibration

Parameter		Value
Interest rate	r	5%
Startup wage (pre-tax)	w_s	\$150k
Exit probability per year	π	5%
Success probability	p	28%
Mean exit value per founder cond'l on success	m	\$26m
Pareto coefficient	α	1.2
Top long-term capital gains tax	t	20%

- CRRA preferences
- no borrowing

Critical wage gap $\Delta^* \equiv w_m - w_s$

		Initial assets			
		\$100k	\$1m	\$5m	\$20m
σ	0	\$325k	\$325k	\$325k	\$325k
	1	\$51k	\$61k	\$83k	\$119k
	2	\$20k	\$26k	\$39k	\$65k

Accrual-based capital gains tax

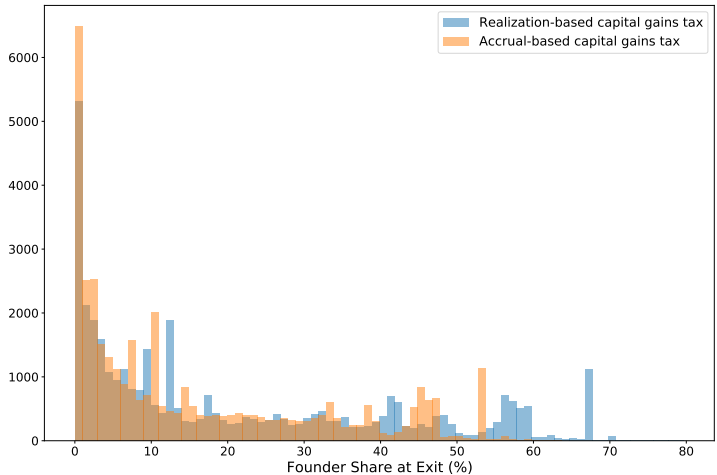
Deal	Premoney Valuation	Invested Capital	Postmoney Valuation	Founder Share
				100%
Series A	\$1m	\$1m	\$2m	50%
IPO	\$10m			

$\rightarrow$ After-tax payoff to founders $(1-t)\times$\$5m=\$4m

Deal	Capital Gains	Taxes Due	Founder Share
			100%
Series A	\$1m	\$0.2m	40%
IPO	\$3.2m	\$0.64m	

$\rightarrow$ After-tax payoff to founders \$4m-\$0.64m=\$3.36m

Dilution with accrual-based CGT



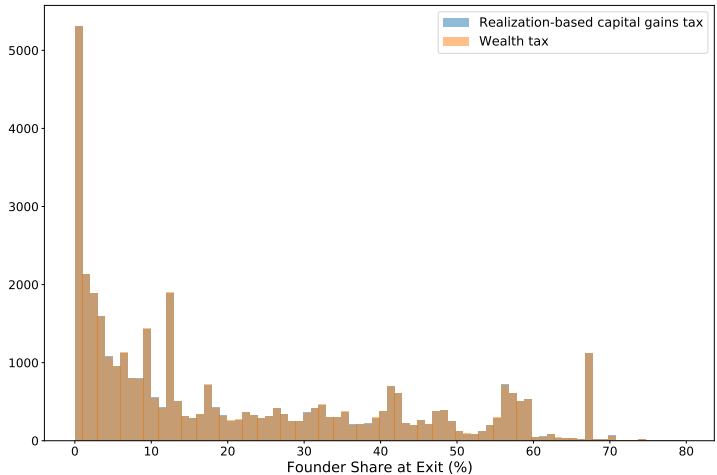
Δ^* with accrual-based CGT

		Initial assets			
		\$100k	\$1m	\$5m	\$20m
	0	\$325k	\$325k	\$325k	\$325k
		\$197k	\$197k	\$197k	\$197k
σ	1	\$51k	\$61k	\$83k	\$119k
		\$41k	\$49k	\$65k	\$89k
	2	\$20k	\$26k	\$39k	\$65k
		\$18k	\$23k	\$33k	\$51k

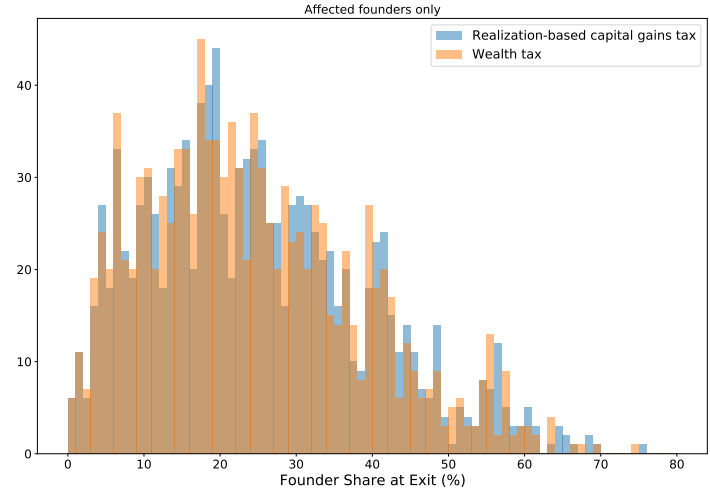
Equivalent realization-based CGT rate

		Initial assets			
		\$100k	\$1m	\$5m	\$20m
	0	52%	52%	52%	52%
σ	1	46%	46%	46%	47%
	2	44%	44%	45%	45%

Dilution with Warren/Sanders wealth tax



Dilution with Warren/Sanders wealth tax



Δ^* with Warren/Sanders wealth tax

		Initial assets			
		\$100k	\$1m	\$5m	\$20m
	0	\$325k	\$325k	\$325k	\$325k
		\$310k	\$310k	\$310k	\$310k
σ	1	\$51k	\$61k	\$83k	\$119k
		\$51k	\$61k	\$82k	\$118k
	2	\$20k	\$26k	\$39k	\$65k
		\$20k	\$26k	\$39k	\$65k

Equivalent realization-based CGT rate

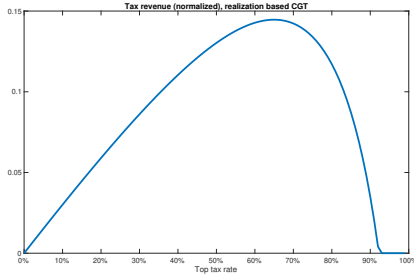
		Initial assets			
		\$100k	\$1m	\$5m	\$20m
	0	24%	24%	24%	24%
σ	1	21%	21%	21%	21%
	2	20%	20%	20%	20%

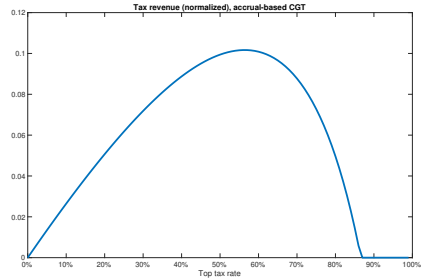
Risk aversion and progressivity

		Alternative tax regimes			
		accrual-based CGT no threshold	accrual-based CGT threshold	wealth tax no threshold	wealth tax threshold
σ	0	52%	35%	60%	24%
	1	46%	23%	63%	21%
	2	44%	21%	65%	20%

Laffer curve

- $w_m \sim$ Pareto with coefficient $\alpha = 1.5$
- $\sigma = 2$
- $a_0 =$\$1m





Conclusion

1. Evidence on returns to high-powered entrepreneurship
   $\rightarrow$ Power Law
2. Response to taxes in calibrated model

$\rightarrow$ Tax regime matters more than rate!

Left out so far:

- decision to raise capital
- decision to seek an exit

Externalities

- $Y(t)$ — private value created by entrepreneurs
- e — externality (percentage)

- Optimal tax

$$\max_t \ (t+e)Y(t)$$

$$\Rightarrow t^* = \frac{1 - e\varepsilon_{Y,1-t}}{1 + \varepsilon_{Y,1-t}}$$

t high unless e very large!

Gabaix-Landier (2008)

$$p(n) = \bar{p}(1 - n^{2/3}) \text{ and } w(n) = \underline{w} n^{-2/3}$$

where $n \sim U(0,1)$ is the "rank" in the ability distribution