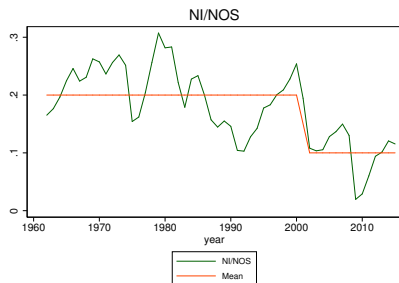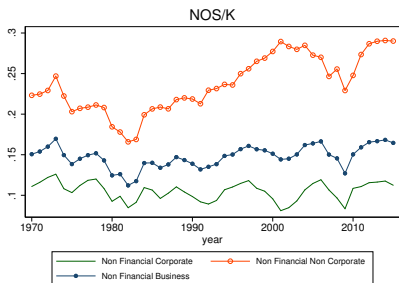# Investment-less Growth: An Empirical Investigation

Germán Gutiérrez and Thomas Philippon

NYU, NBER, CEPR
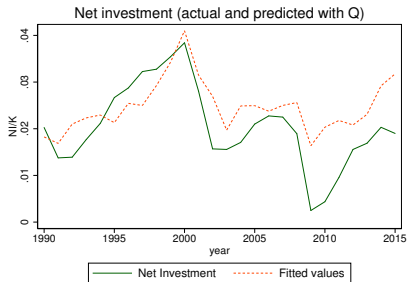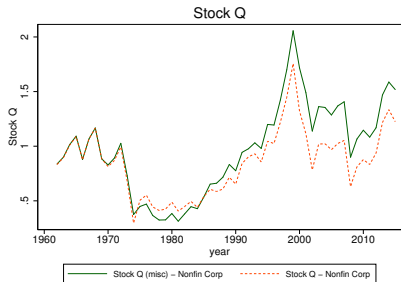
September 2017, Brookings

Business is Profitable but does not Invest

Notes: Annual data for Non financial Business sector (Corporate and Non corporate).

Investment is Low Relative to Fundamentals

Note: Annual data. Predictions based on regression of net investment on Q from 1990 to 2007. Q for Non Financial Corporate sector, investment for Non Financial Business sector.

Theory

- Q-theory to distinguish among competing explanations

- Theories that predict low I/K <u>*because*</u> they predict low Q
    - E.g.: spreads & risk premia, low expected growth, uncertainty...
    - Solve the wrong puzzle: Q is high, but $^I/_K$ is low.

- Theories that predict a <u>*gap*</u> between Q and $^I/_K$
    - Deviations from $1K$, PC, and MM
    - E.g.: intangible investment, market power, gap between Q and manager's objective function

Summary of Firm- and Industry-level OLS results

Potential explanation		Relevant data field(s)	Significance Industry	Firm
Financial constraints	External finance	RZ external finance dependence ('99)	✗	✗
	Bank dependence	Missing S&P rating ('99)	✗	
	Safe asset	Industry spread ('99)	✗	✗
		Firm-level ratings ('99)	✗	✗
Globalization / Intangibles	Intangibles	Intangibles ex. goodwill/assets	✓	✓ -
		Share of intangible investment	✓	✓
	Globalization	% foreign profits	✓	✗
Competition	Regulation	**Regulation index**		✓
		Occupational Licensing	✗	✗
	Concentration	**Lerner index (Compustat)**	✓	✗
		Herfindahl (Compustat)	✓	✓
		Modified Herfindahl (Compustat)	✓	✓
Governance	Ownership	Share of Institutional ownership	✓	✓
		Share of QIX ownership	✓	✓
		Share of DED ownership	✗	✗
		Share of TRA ownership	✓	✓

Our View 1: Decreasing Competition

Aggregate Lerner Index and Mod–Herfindahl
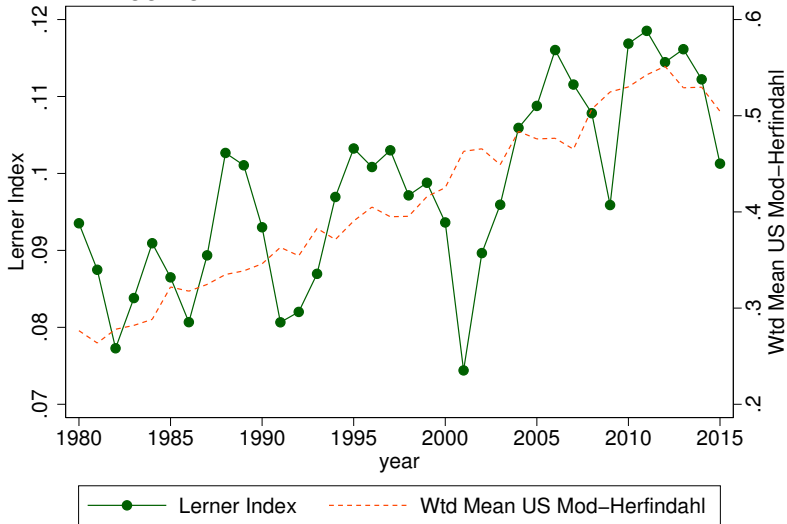
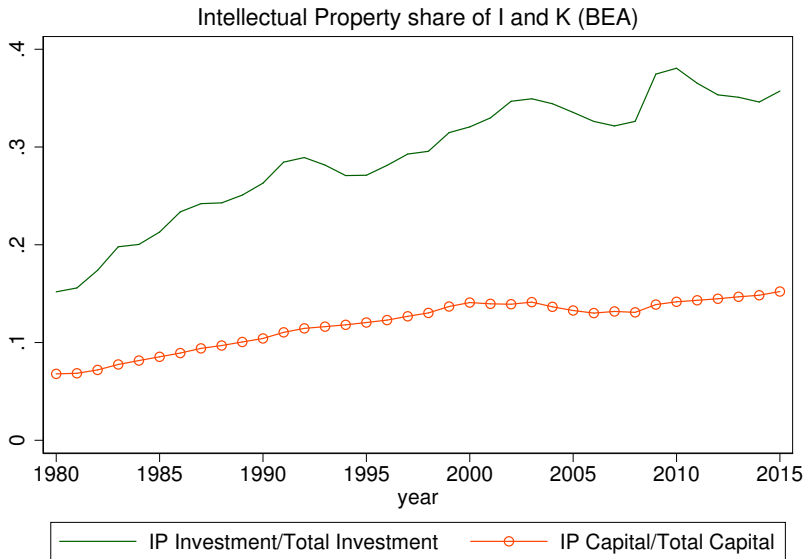# Our View 2: Shifting Preference for Payouts
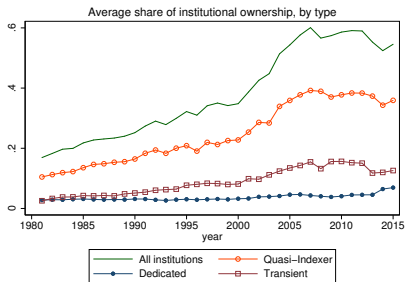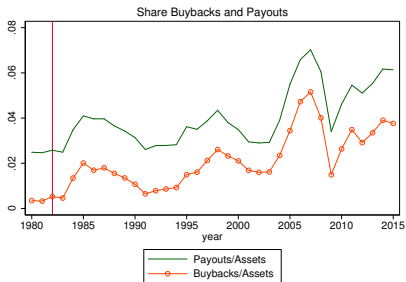
Notes: Annual data for all US incorporated firms in Compustat. Results are similar when including foreign-incorporated firms. The vertical line in the first graph highlights the passing of SEC rule 10b-18, which allows companies to repurchase their shares on the open market without regulatory limits.

Our View: Regression Results

	(1) Industry NI/K ≥1981	(2) Firm NI/K ≥1990	(3) ≥1990	(4) Firm payout ≥1990
Q (t-1)	0.17**	0.22**	0.14**	-0.34**
	[14.6]	[51.79]	[59.7]	[-29.6]
% QIX own (t-1)	**-0.09***	**-0.12****	**-0.07****	**0.01****
	[-2.3]	**[-6.67]**	**[-6.3]**	**[3.2]**
Mod-Herfindahl (t-1)	**-0.06***	**-0.07****		
	[-2.6]	**[-2.75]**		
Market cap, OS/K...				...
Observations	1,445	77,772	77,772	66,643
Age Controls	YES	YES	YES	YES
Year FE	YES	YES	NO	NO
Industry de-mean	YES	NO	NO	NO
Firm de-mean	NO	YES	NO	NO
Industry-Yr de-mean	NO	NO	YES	YES
ρ^2	0.38	0.27	0.22	0.16

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Regression Appendix

Select Discussion: Intangibles

Intellectual Property share of I and K (BEA)

Select Discussion: Intangibles

Firm–level FE with and w/o intangibles
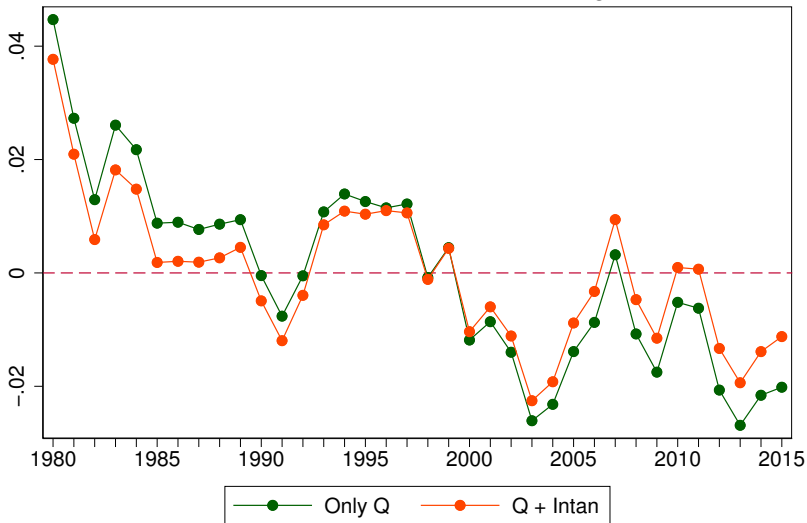
Select Discussion: Super Star

- Our interpretation of the hypothesis (Autor et al.)
    - Not simply a description of skewness.
    - But an explanation for concentration: efficiency instead of market power
- What we find: some support in the 1990s, but not after 2002.

	(1)	(3)
	ΔTFP	
	97-02	02-12[†]
ΔCensus CR4	**0.481****	**0.051**
	[4.439]	**[0.301]**
Observations	469	297
R^2	4%	0%

Select Discussion: Safe Assets

- Our interpretation of the hypothesis (Caballero et al.)
    - Shift in savings curve do not create gap in Q-theory
    - Safety premium could explain high values, and if safety does not scale (why? rents?) relatively low I/K

- What we find: Some evidence during crisis. No support (in fact reverse) post 2010.

Debt Issuance/Assets, by Rating
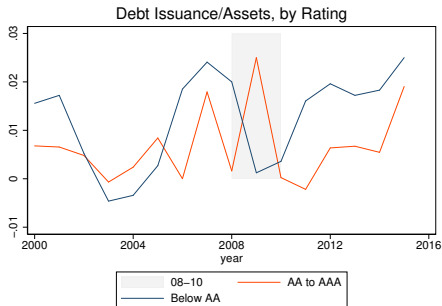
Select Discussion: Macro

- Fernald, Hall, Stock & Watson (2017)'s decomposition

$$y_t = c_t + \mu_t + z_t$$

- Our model (Jones & Philippon, 2016): NK-DSGE with time-varying market power
  - K, Q, risk premia, Calvo, ZLB
  - Calibrated & estimated via Kalman filter 1984Q1-2015Q3
  - Where would rents show up in macro data? Structural wedges?

Select Discussion: Macro, Increasing Markup
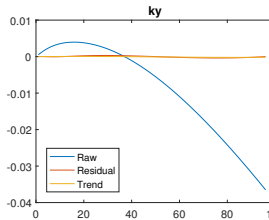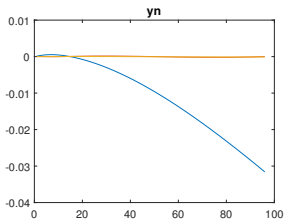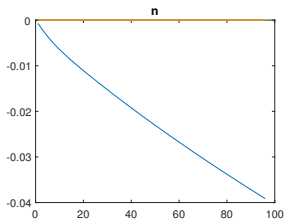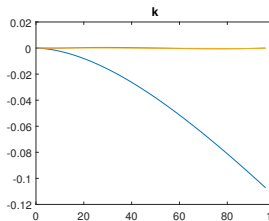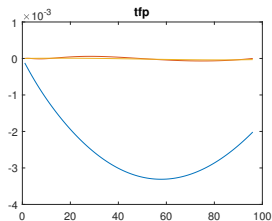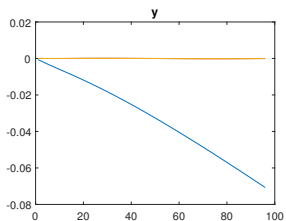
Select Discussion: Macro, with Stochastic Shocks
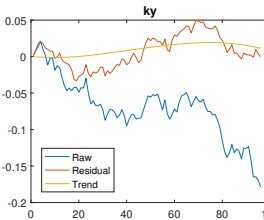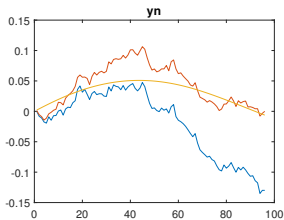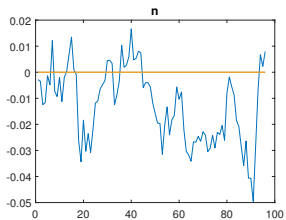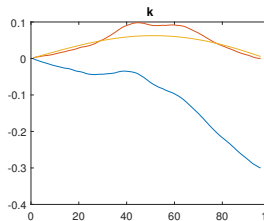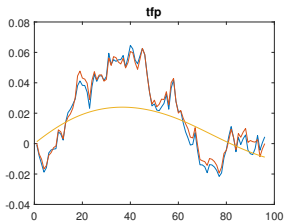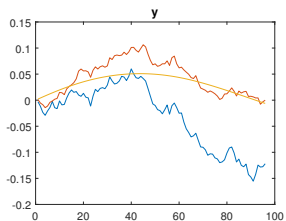
Industry Fixed Effects after controlling for Intangibles, Competition and Ownership
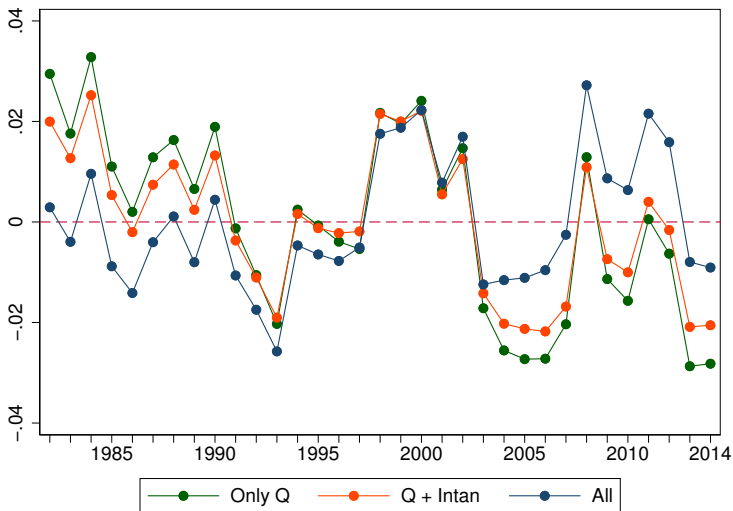
Thank you.

Our story 1: Competition
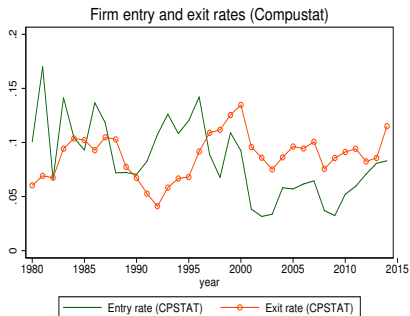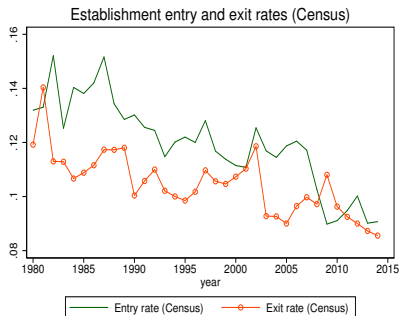
Notes: Annual data from the Census BDS (left) and Compustat (right)

Firms' Fixed Effects after controlling for Intangibles, Competition and Ownership
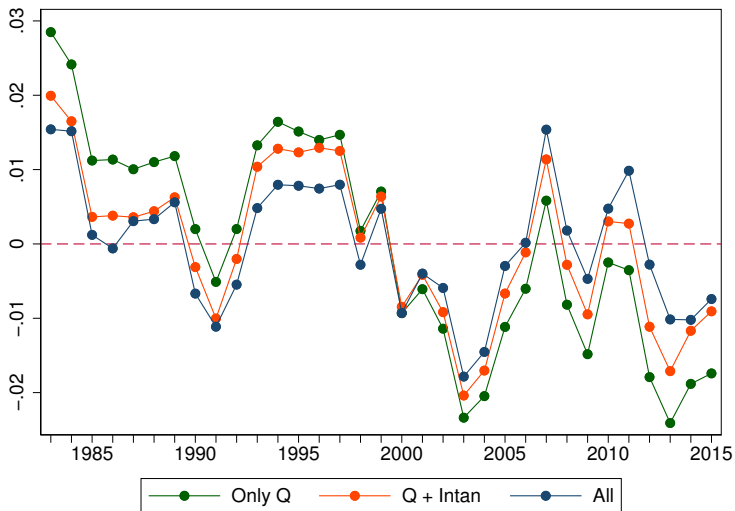
Investment and Depreciation over time

Non financial Corporate
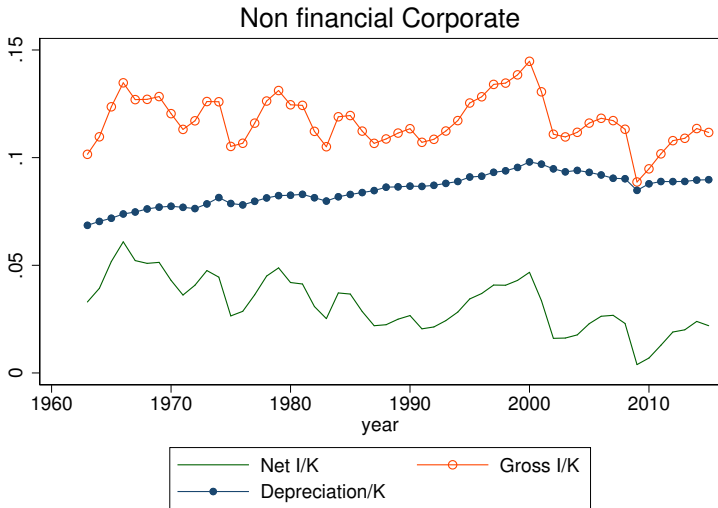
Three measures of mark-ups (1985 = 1)
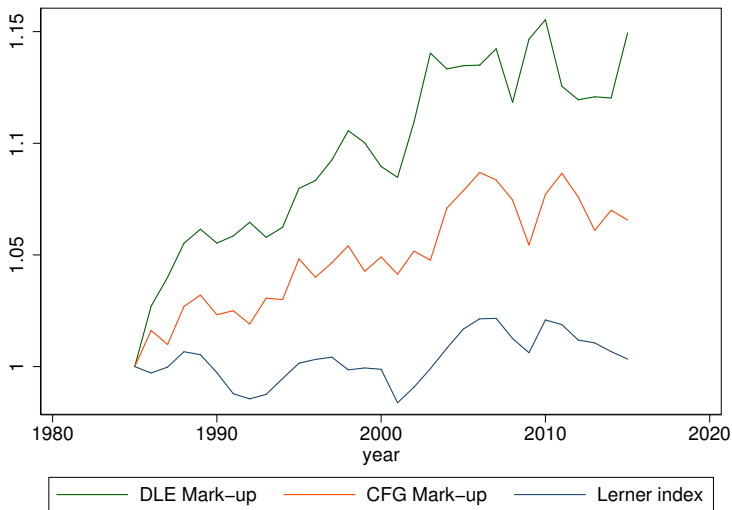
Appendix: Data

Data fields by potential explanation

	Data fields	Source	Granularity
Primary datasets	Aggregate investment and Q	US Financial Accounts	Sector
	Industry investment and GOS	BEA	~NAICS L3
	Firm-level financials	Compustat	Firm
Additional datasets	Sales Concentration	Census	NAICS L3
	Entry/Exit; firm demographics	Census	SIC L2
	Occupational Licensing	PDII Survey	NAICS L3
	Regulation index	Mercatus	NAICS L3
	Industry-level spreads	Egon Zakrajsek	NAICS L3
	NBER-CES database	NBER-CES	NAICS L6
	Institutional ownership	Thomson Reuters 13F	Firm
	Institutional investor classification	Brian Bushee's website	Institutional Investor

Data fields by potential explanation

Potential explanation		Relevant data field(s)
1	Safe asset scarcity	Industry-average spread as of 1999
		Firm-level Corporate Bond ratings as of 1999
2	Financial Constraints	Rajan-Zingales (1998) external finance dependence as of 1999
		Bank-dependence indicator (firms missing S&P rating)
3	Regulation	Mercatus industry-level regulation index (restriction count)
		Sales and stock market return volatility
4	Globalization	% foreign profits, as proxy for foreign activities at the firm level
5	Competition	Change in number of firms (Compustat and Census)
		Share of total sales/market value of top X firms (Compustat and Census)
		Sales and Market Value Herfindahls (Compustat)
		Share of workers with Occupational Licensing (PDII)
		Firm age and size (Compustat and Census BDS)
7- 8	Governance/short-termism	Firm-level share of institutional ownership
		Firm-level QIX, DED and TRA ownership (Bushee (2001), through 2013)

Appendix: Time Effects

Time Effects from Total Regressions
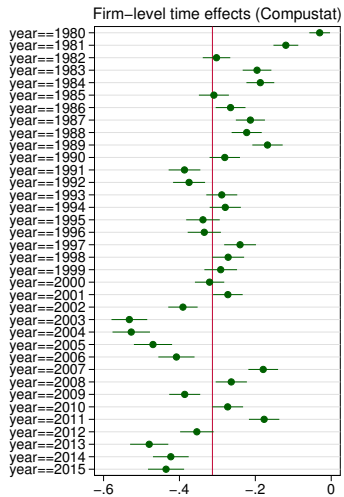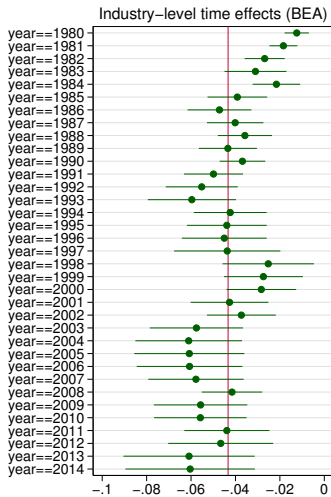
Time Effects from Intangible Regressions

Industry–level time effects (BEA) — Firm–level time effects (Compustat)
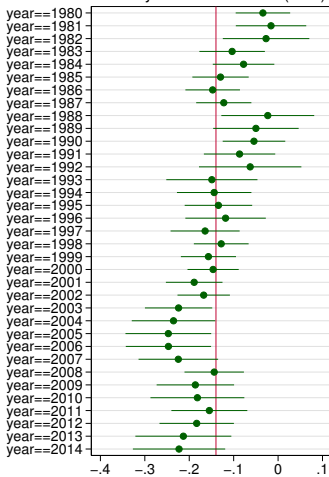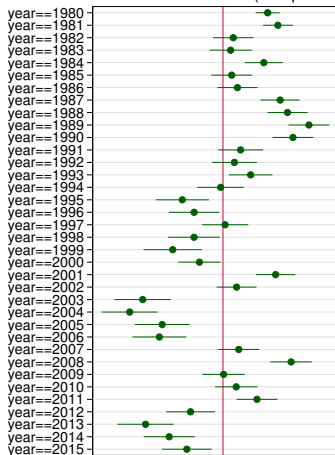
Appendix: Regressions

and Other Tables

Industry Regressions: 'Core' Explanations

September 2017, Brookings Institute

	(1)	(2)	(3)	(4)
	Net I/K			
	$\geq$1981	$\geq$1990	$\geq$1981	$\geq$1990
Median Log-Q (t-1)	0.170**	0.163**	0.173**	0.275**
	[14b.633]	[16.812]	[14.894]	[6.610]
Mean % QIX own (t-1)	-0.091*	-0.118**	-0.092*	-0.125*
	[-2.276]	[-3.068]	[-2.269]	[-2.454]
Mod-Herfindahl (t-1)	**-0.056***	**-0.056***		
	[-2.556]	**[-2.394]**		
Herfindahl (t-1)			**-0.054***	**-0.093****
			[-2.417]	**[-2.614]**
CO Herf adjustment (t-1)			**-0.063***	**-0.104***
			[-2.373]	**[-2.373]**
Observations	1,445	1,110	1,445	1,110
Age Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry de-meaned	YES	YES	YES	YES
ρ^2	0.38	0.39	0.381	0.499

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Industry Regressions: By Asset Type

	(1)	(2)	(3)
		Net I/K	
Mean	All fixed	Excluding	IP[2]
	assets[1+2]	IP[1]	
Median Log-Q (t-1)	0.163**	0.190**	0.166+
	[16.812]	[7.870]	[1.940]
Mean % QIX own (t-1)	**-0.118****	**-0.114****	**-0.368**
	[-3.068]	**[-2.869]**	**[-1.340]**
Mod-Herfindahl (t-1)	**-0.056***	**-0.083****	**-0.143+**
	[-2.394]	**[-2.950]**	**[-1.754]**
Observations	1,110	1,110	1,109
Age controls	YES	YES	YES
Year FE	YES	YES	YES
Industry de-meaned	YES	YES	YES
ρ^2	0.39	0.427	0.194

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Industry Regressions: Intangible Measurement Error

	(1)	(2)	(3)
		Net I/K	
	≥1990	≥1990	≥1990
Median Log-Q (t-1)	0.163**	0.138**	
	[16.812]	[23.700]	
Median Log-Q^{tot} (t-1)			**0.138**
			[20.330]
Mean % QIX own (t-1)	-0.118**	-0.110**	-0.183**
	[-3.068]	[-3.015]	[-3.231]
Mod-Herfindahl (t-1)	-0.056*	-0.043*	-0.075**
	[-2.394]	[-2.111]	[-2.703]
Share of Intan Inv(t-1)		**-0.064***	**-0.015**
		[-2.298]	**[-0.295]**
Observations	1,110	1,110	1,109
Age Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry de-meaned	YES	YES	YES
ρ^2	0.39	0.387	0.545

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Firm regressions: 'Core' explanations - CAPX

	(1)	(2)	(3)
	Net CAPX/PPE		
	≥1990	≥1990	≥1990
Q (t-1)	0.120**	0.223**	0.138**
	[59.779]	[51.793]	[59.732]
% QIX own MA2(t-1)	**-0.067****	**-0.120****	**-0.072****
	[-6.417]	**[-6.671]**	**[-6.381]**
Mod-Herfindahl (t-1)	**-0.055***	**-0.074****	
	[-2.251]	**[-2.753]**	
Observations	77,772	77,772	77,772
Age controls	YES	YES	YES
Year FE	YES	YES	NO
Industry de-meaned	YES	NO	NO
Firm de-meaned	NO	YES	NO
Industry-Year de-meaned	NO	NO	YES
ρ^2	0.218	0.267	0.221

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Firm regressions: 'Core' explanations - R&D

	(1)	(2)	(3)
	Log-R&D/Assets		
	≥1990	≥1990	≥1990
Log-Q (t-1)	1.082**	0.940**	1.093**
	[51.468]	[24.118]	[51.145]
% QIX own MA2(t-1)	**-0.731****	**-0.483****	**-0.719****
	[-9.081]	**[-7.405]**	**[-8.903]**
Mod-Herfindahl (t-1)	**-0.286+**	**-0.404****	
	[-1.833]	**[-3.739]**	
Observations	40,696	40,696	40,696
Age controls	YES	YES	YES
Year FE	YES	YES	NO
Industry de-meaned	YES	NO	NO
Firm de-meaned	NO	YES	NO
Industry-Year de-meaned	NO	NO	YES
ρ^2	0.241	0.169	0.24

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Firm regressions: Buybacks and Payouts

	(1)	(2)	(3)	(4)	(5)	(6)
	Buybacks/Assets			Payouts/Assets		
	≥1990	≥1990	≥1990	≥1990	≥1990	≥1990
Log-Q (t-1)	-0.173**	0.019**	-0.066**	-0.618**	0.035**	-0.341**
	[-14.878]	[3.543]	[-9.411]	[-33.272]	[8.206]	[-29.640]
% QIX own MA2(t-1)	**0.015****	**0.010****	**0.014****	**0.016****	**0.010****	**0.006****
	[10.143]	**[6.092]**	**[9.947]**	**[9.748]**	**[6.133]**	**[3.174]**
Market cap, OS/K...	...	...	...	...	...	...
Observations	66,699	66,699	66,699	66,699	66,699	66,643
Age controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	NO	YES	YES	NO
Industry de-meaned	YES	NO	NO	YES	NO	NO
Firm de-meaned	NO	YES	NO	NO	YES	NO
Industry-Yr de-mean	NO	NO	YES	NO	NO	YES
ρ^2	0.148	0.0648	0.122	0.129	0.0653	0.162

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Firm regressions: Intangible Measurement Error

	(1)	(2)	(3)	(4)	(5)
			Net CAPX/PPE		
	≥1980	≥1980	≥1980	≥1980	≥1980
Q^{used} (t-1)	0.218**			0.103**	
	[50.108]			[50.807]	
Q^{alt} (t-1)		**0.000****			
		[3.154]			
Q^{tot} (t-1)			0.207**		0.098**
			[65.656]		[71.389]
Intan/Assets(t-1)	**0.158****	-0.103**	**0.123****	-0.028*	**-0.049****
	[7.574]	[-6.214]	**[5.724]**	[-2.338]	**[-4.103]**
Observations	116,351	113,527	115,473	116,351	115,473
Method		EW		EW	
Age Controls		YES		YES	
Year FE		YES		YES	
Firm de-meaned		YES		NO	
Industry de-meaned		NO		YES	
ρ^2	0.258	0.0747	0.33	0.205	0.246

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Percentiles of three measures of Q

Percentile	1975-1980			2010-2015		
	Q^{BV}	Q^{PPE}	Q^{tot}	Q^{BV}	Q^{PPE}	Q^{tot}
1%	0.5	-4.8	-1.0	0.5	-5.1	-0.9
5%	0.7	-1.5	-0.5	0.7	-0.6	-0.2
10%	0.7	-0.8	-0.3	0.9	0.0	0.0
25%	0.8	-0.2	-0.1	1.1	0.7	0.3
50%	1.0	0.3	0.2	1.6	2.1	0.8
75%	1.3	0.9	0.6	2.5	7.6	1.6
90%	1.9	**2.5**	1.4	4.4	**30.0**	3.4
95%	2.7	**4.6**	2.4	6.5	**73.1**	5.9
99%	6.6	**24.1**	9.6	16.2	**746.2**	22.4

Safe Asset Scarcity: Valuation tests

	(1)	(2)	(1)	(2)	(1)	(2)
	Log MV (2014)		Log PPE (2014)		Log Assets (2014)	
AA to AAA rated (2006)	**-0.079**	**-0.241**	**-0.362**	**-0.224**	**-0.205**	**-0.274**
	[-0.34]	**[-1.03]**	**[-0.94]**	**[-0.65]**	**[-0.98]**	**[-1.31]**
Log MV (2006)	0.036	0.021	0.192*	0.170*	0.032	0.034
	[0.70]	[0.40]	[2.27]	[2.22]	[0.70]	[0.73]
Log Assets (2006)	1.034**	1.001**	0.373**	0.459**	0.546**	0.552**
	[25.75]	[24.17]	[5.60]	[7.55]	[15.27]	[14.98]
Log(age)	-0.008	0.03	0.748**	0.613**	0.455**	0.443**
	[-0.20]	[0.73]	[11.36]	[10.09]	[12.90]	[12.04]
Industry FE	No	Yes	No	Yes	No	Yes
Observations	1795	1795	1781	1781	1795	1795
Overall R^2	0.85	0.858	0.721	0.793	0.873	0.879

Notes: T-stats in brackets. + p<0.10, * p<0.05, ** p<.01.

Macro Simulations: Summary of Results I

	(1)	(2)	(3)	(4)
	Generalized Okun's law coeff.			
	GP		FHSW[‡]	
	Median	St. Dev.	Coeff	St. Dev.
1. Y^{a+b+c}	**0.68**	**0.08**	**2.02**	**0.20**
a. *TFP*	0.09	0.08	0.5	0.19
b. αK_t	0.01	0.01	0.09	0.06
c. $(1-\alpha)N_t$	0.58	0.01	1.43	0.14
2. Y_t/N_t^{d+e+f}	**-0.32**	**0.08**	**-0.28**	**0.22**
d. $TFP/(1-\alpha)$	0.16	0.14	0.75	0.29
e. $K/Y \times \alpha/(1-\alpha)$	-0.48	0.06	-0.90	0.09
f. Labor Quality	NA	NA	-0.13	0.05

Macro Simulations: Summary of Results ||

	(5)	(6)	(7)	(8)	(9)	(10)
	Std. deviation of components					
	GP: Sim. Median			FHSW: Actual		
	cycle	trend	irregular	cycle	trend	irregular
	(c)	(μ)	(z)	(c)	(μ)	(z)
1. Y^{a+b+c}	**1.19**	**0.08**	**1.22**	**2.51**	**0.54**	**2.12**
a. TFP	0.32	0.08	1.20	1.24	0.24	2.27
b. αK_t	0.03	0.06	0.13	0.2	0.19	0.32
c. $(1-\alpha)N_t$	0.97	0.00	0.04	1.54	0.26	1.24
2. Y_t/N_t^{d+e+f}	**0.61**	**0.08**	**1.22**	**0.77**	**0.37**	**2.23**
d. $TFP/(1-\alpha)$	0.54	0.13	2.09	1.88	0.35	3.41
e. $K/Y \times \alpha/(1-\alpha)$	0.84	0.09	0.90	1.3	0.07	1.09
f. Labor Quality	NA	NA	NA	0.37	0.05	0.99

Macro Simulations: Summary of Results |||

	(11) Median R^2 from Okun's law regression	(12) (13) Gap to trend at $t = 100$	
		Median	St. Dev.
1. Y^{a+b+c}	**0.48**	**0.00**	**0.01**
a. *TFP*	0.06	0.00	0.01
b. αK_t	0.04	0.00	0.01
c. $(1-\alpha)N_t$	1.00	0.00	0.00
2. Y_t/N_t^{d+e+f}	**0.20**	**0.00**	**0.01**
d. $TFP/(1-\alpha)$	0.06	0.00	0.02
e. $K/Y \times \alpha/(1-\alpha)$	0.46	0.00	0.01
f. Labor Quality	NA	NA	NA