Capital Share Dynamics When Firms Insure Workers: Separate Online Appendix, Not For Publication.

This Appendix consists of five sections. In Section A, we study compositional changes that drive the factor share dynamics. In Section B, we examine the international evidence on factor share dynamics. In Section C, we examine the evidence on the relation between factor share dynamics and concentration. In Section D, we examine whether the facts we document in Sections 1 are driven by entry cohorts. In Section F, we demonstrate that the findings we present in Sections 1 and 5 are robust to adding R&D expenses to our measure of capital income and to different winsorization criteria.

A Composition Effects and the Aggregate Capital Share

A.1 Exchanges

This section investigates whether our results are driven by the accession of NASDAQ firms to the Compustat database. Figure A.1 plots the aggregate and average capital-income-to-sales ratios for NYSE and NASDAQ firms separately. There is similar divergence between the aggregate and average capital shares in the universe of NYSE firms, though the trends are quantitatively less pronounced.

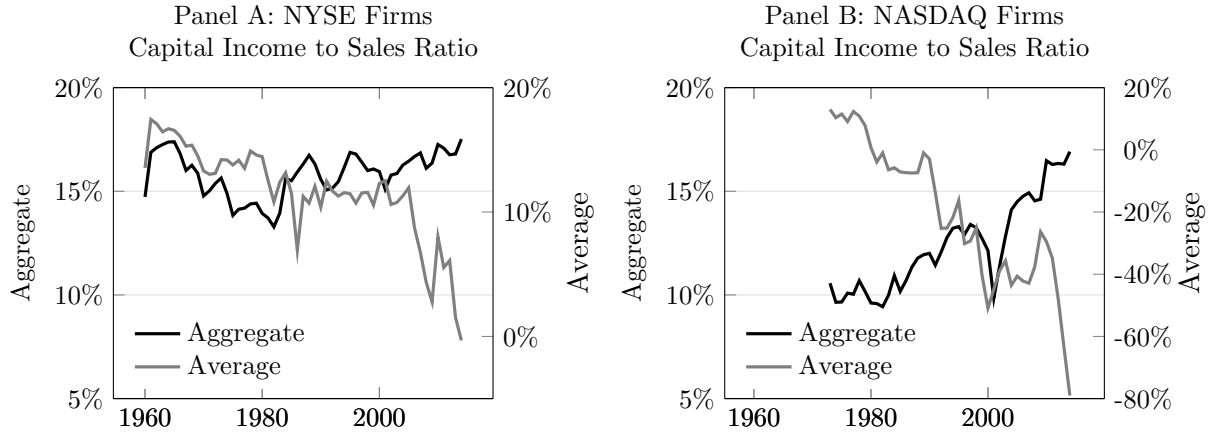
Figure A.2 reports the average capital-income-to-sales ratio by firm size (total assets) for NYSE and NASDAQ separately. We found qualitatively similar patterns in the average capital-income-to-sales ratio in the NYSE and NASDAQ universe separately, as documented in Figure A.2 (a) and (b). Across the two major exchanges, there is a clear ordering of average capital-income-to-sales ratio by firm size and the average capital-income-to-sales ratio trended down dramatically (on average negative) in the smallest firm size group since 1980s. However, the decline is much more pronounced for the smallest NASDAQ firms, as one would expect. Hence, the entry of small NASDAQ firms does contribute to the decline in the capital-income-to-sales ratio that started in the 1980s, but even after excluding the NASDAQ firms, we document a steep decline.

A.2 Across- vs. Within-Industry Effects

Although we document a significant relation between industry level average capital share and the idiosyncratic volatility in Table 3, we do not find a similar relation between industry level aggregate capital share and idiosyncratic volatility. This is because the trend in the aggregate capital share is driven primarily by changes in the cross industry share of aggregate sales, rather than a within industry change in the firm size distribution. Figure A.3 plots the weighted capital-income-to-sales ratio in 1970 where the weights are the sales in year t given by given by:

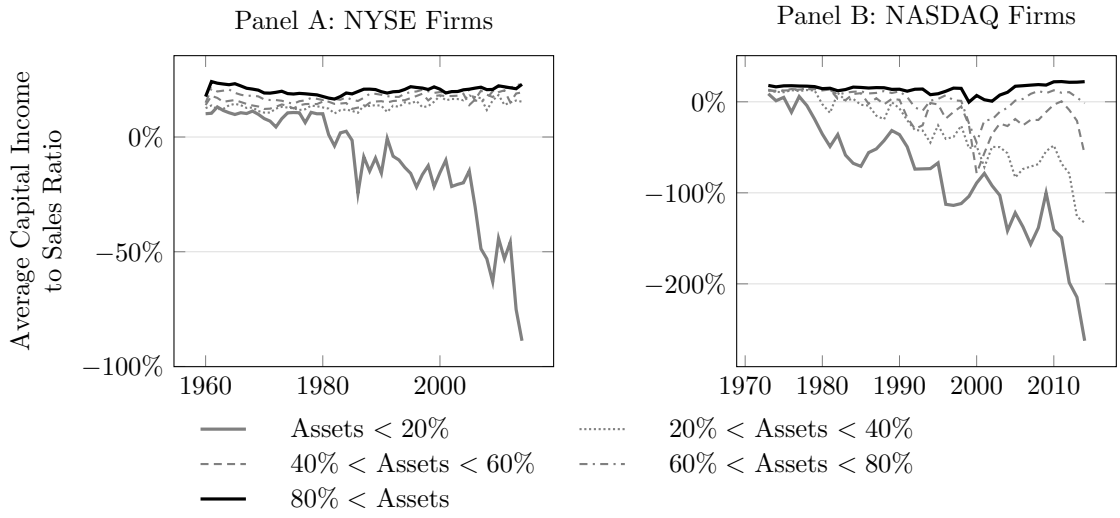
$$\text{Across Industry Effect}_t = \frac{\sum_i \text{Sales}_{it} \frac{\text{Capital Income}_{i1970}}{\text{Sales}_{i1970}}}{\sum_i \text{Sales}_{it}} \tag{45}$$

Figure A.1: Capital Share Dynamics Across the NYSE and NASDAQ



This figure presents the average and aggregate capital income to sales ratios separately for firms listed in the NYSE and NASDAQ Exchanges The aggregate capital-income-to-sales ratio = $\sum_i$ Operating Income$_i$ divided by $\sum_i$ Sales$_i$ for each year. The average capital-income-to-sales ratio = mean (Operating Income divided by Sales) for each year. The sample is winsorized at 1%. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

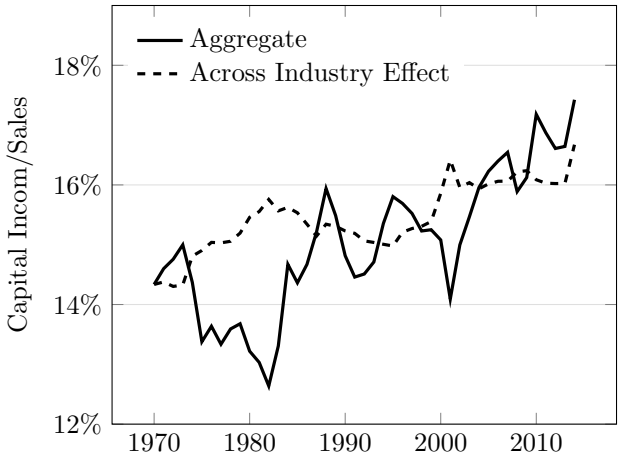
Figure A.2: Capital-Income-to Sales Ratio by Firm Size: Exchanges



This figure presents the average capital-income-to-sales ratio by size over time separately for firms listed in the NYSE and NASDAQ Exchanges. Size is measured by total assets, and the capital-income-to-sales ratio is measured as operating income (OIBDP) divided by sales. For each year, firms are categorized into five groups based on their total assets, and we estimate the average capital-income-to-sales ratio within each group for a given year. The sample is winsorized at 1%. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

This ratio measures the across-industry component of the aggregate capital share. The remainder (i.e., the gap between the aggregate ratio and the across-industry component) measures the within-industry effect. Note that the across-industry effect accounts for most of the increase in the aggregate capital-income-to-sales ratio. Figure A.3 indicates that industries with high within industry aggregate capital income to sales ratios in the 1970s became larger.

Figure A.3: The Across-Industry Effect on the Aggregate Capital Share



Industry classification is according to the Fama-French 48 industry classification. The solid line is the aggregate capital share. The dashed line is the across-industry effect we describe in Equation (45). Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

B International Evidence

To provide further support for our mechanism, we explore the capital share dynamics in Japan, UK and Europe (EU). The EU countries include Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden.[1]

Our main analysis is conducted using Compustat Global. Compustat Global contains the widely available accounting data for us to obtain key firm fundamental variables. The daily stock returns are calculated using Compustat Global Security Daily. We estimated the idiosyncratic return volatility within each year by estimating the Fama/French 3 factor model where we obtain the Fama-French global three factors from Ken French's website. The global three factors start in the year 1990, so our the majority of our international evidence is presented for the sample period from 1990 to 2017. Our sample excludes financial firms (SIC code between 6000 and 6799).

Since the shift in the firm size distribution only gradually reflects the changes in idiosyncratic volatility, we extend the time series of idiosyncratic volatility using stock return data from Datastream. For UK and Japan, we can extend the estimates of idiosyncratic volatility back to 1975 and

[1]The list of EU countries are chosen following the Fama/French European 3 Factors Portfolios excluding the U.K.

1978 respectively by estimating a single factor model. The daily stock return data and interest rate data for most of the European countries are not available before 1990, so we are not able to extend the time series of idiosyncratic volatility for EU.

Our firm-level variables are constructed as follows:

- Idiosyncratic stock return volatility
  - Compustat Global Security Data: The daily stock return of company j in country k is calculated using data from (1990-2017) as follows

$$R_{j,k,t} = \frac{PRCCD_t/AJEXDI_t \times TRFD_t - PRCCD_{t-1}/AJEXDI_{t-1} \times TRFD_{t-1}}{PRCCD_{t-1}/AJEXDI_{t-1} \times TRFD_{t-1}},$$

    where $PRCCD$ is the closing price at the end of each trading day, $AJEXDI$ is the cumulative adjustment factor (issue) ex-date and $TRFD$ is the total return adjustment factor.

    We then convert the daily stock return in the local currency to US dollars $r_{j,k,t}$, and then we calculate the idiosyncratic volatility within each year τ by estimating a factor model using all daily observations within the year for each country k:

$$r_{j,k,t} = \delta_{j,k} + \gamma_{\mathbf{j,k}}\mathbf{F_{k,t}} + \epsilon_{j,k,t}$$

    where $\mathbf{F_{k,t}}$ are factors Fama-French global three factors for EU and Japan from Ken-French Data Library (1990-2017). For the U.K., we used European 3 factors for the estimation.

    Idiosyncratic volatility $\sigma_{j,k,\tau}$ is the standard deviation of $\epsilon_{j,k,t}$ within each year τ.
  - Datastream: We obtained individual security return (RI, adjusted and US dollar denominated) for the U.K. (1975-2017) and Japan (1978-2017), and then calculate the idiosyncratic volatility within each year τ by estimating a factor model using all daily observations within the year for each country k:

$$r_{j,k,t} = \delta_{j,k} + \gamma_{j,k}MKT_{k,t} + \epsilon_{j,k,t}$$

    where $MKT_{k,t}$ are factors excess return of market indexes for the U.K. and Japan over the same period of time. The interest rate for the U.K. is U.K. sterling 1-month deposit rate, and the market index for the U.K. is UK total market index (TOTMKUK). The interest rate for Japan is the 1-month deposit rate, and the market index is the NIKKEI 225 average share index.

    The idiosyncratic volatility of firm j in country k, $\sigma_{j,k,\tau}$ is the standard deviation of $\epsilon_{j,k,t}$ within each year τ. For the U.K. and Japan, we are able to employ longer equity stock return data from Datastream. Given that it is noisy to merge the security daily return data from Datastream to Compustat Fundamental Global, the estimates of idiosyncratic

volatility is only used to show the evolution of idiosyncratic volatility over a longer sample period. In Table 1. we show that summary statistics of the idiosyncratic volatility from two databases are very similar.

- Firm fundamental variables (Compustat Global Fundamental Annual)
  - Capital Share: Ratio of the operating income (OIBDP) to sales (SALE).
  - M/B ratio: Ratio of the market value of total assets (AT + PRCCD× SCHO-CEQ) to the book value of total assets (AT).
  - Tangibility: Ratio of physical assets (PPEGT) to total assets (AT).

Table A.1 reports summary statistics of all variables.

We start by documenting the shifts in the firm size distribution and idiosyncratic volatility in the U.K., the E.U. and Japan. The U.K. experience largely mirrors that of the U.S. Figure A.4 visualizes the change in size distribution and capital share of U.K. firms throughout the sample period (1990-2017). The right tail of the firm size distribution gets fatter as idiosyncratic volatility increases from 1975 to 2017. We also documented the divergence of aggregate and average capital-income-to-sales ratio. Consistent with our model mechanism, the relationship between firm size and capital-income-to-sales ratio has changed dramatically since 1990. In Figure A.4 (d), we see that the capital-income-to-sales ratio was much more strongly increasing in firm size than in 1995. We found qualitatively similar patterns when investigating the major countries in Europe (see Figure A.4).

On the other hand, the Japanese economy behaved differently from the UK and EU economies (Figure A.4), but the evidence is largely consistent with our model mechanism. First, the right tail of the Japanese firm size distribution is not getting fatter over time, and there is no clear trend in the idiosyncratic volatility from 1978-2017. Consistent with our mechanism, there is *no* divergence between the average and the aggregate capital-income-to-sales ratio. The relationship between firm size and capital-income-to-sales ratio has changed since 1990, but 1) the slope of capital-income-to-sales ratio was not much steeper in 2010 than 1995; 2) more than 90% of Japanese firms experienced an increase in capital share over the sample period (not just the tail 10% as seen in US, UK and EU). This implies that there is no strong left tail effect that drives a decline in average capital share.

Figure A.4: International Evidence

This figure presents the time series of idiosyncratic volatility, average and aggregate capital income to sales ratio, the average capital income to sales ratio within each size percentile, the average capital income to sales ratio over each volatility percentile, and the power law coefficient of the top 5-percentile firms for the U.K., the E.U. and Japan.

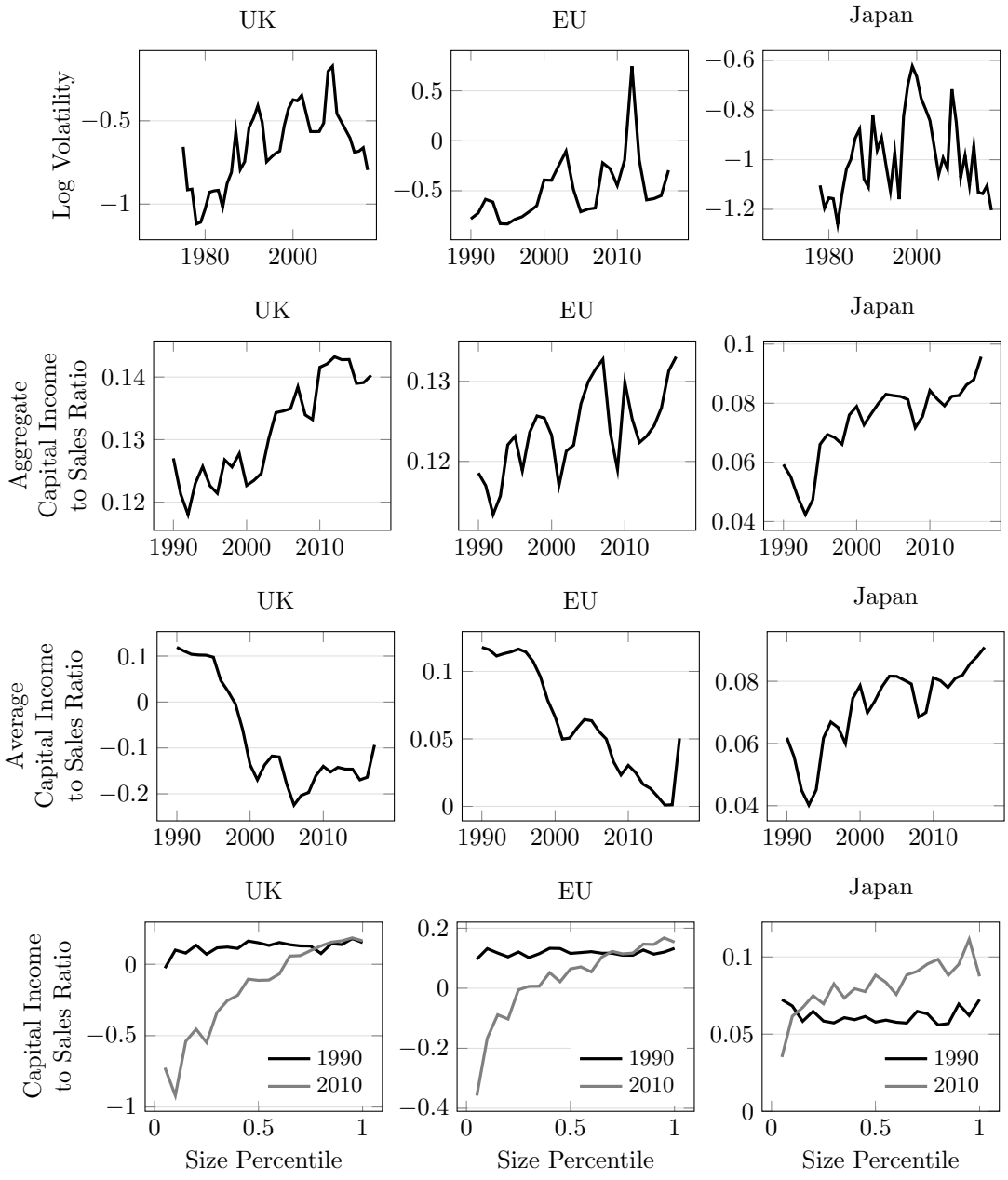


Table A.1: Summary Statistics

This table reports summary statistics of firm-level variables for the international facts. All variables are defined in Section A. Sample period: 1990-2017. All variables are winsorized at 5%. For US data, all variables are winsorized at 1%. Data Source: Compustat Global Fundamental Annual (1990-2017), Compustat Global Security Daily (1990-2017), and Datastream (1975-2017).

Panel A: UK

Variable	Obs	Mean	Std. Dev.	P10	P50	P90
Log(Idio. Vol.) Datastream	92711	-.8944	.7194	-1.8019	-.9711	.1751
Log(Idio. Vol.) Compustat	28310	-.8779	.5588	-1.6142	-.9273	-.0501
MB Ratio	27857	1.9204	1.3886	.7958	1.4263	3.8982
Capital Income/Sales Ratio	32031	-.0955	.6566	-.4915	.0932	.2559
Tangibility	32544	.465	.3862	.0281	.383	1.0494

Panel B: Japan

Variable	Obs	Mean	Std. Dev.	P10	P50	P90
Log(Idio. Vol.) Datastream	110607	-1.0431	.4361	-1.6452	-1.05	-.4232
Log(Idio. Vol.) Compustat	64039	-1.0038	.4341	-1.5926	-1.0217	-.3756
MB Ratio	63594	1.176	.5247	.6999	1.0191	1.8951
Capital Income/Sales Ratio	68930	.0736	.0528	.0111	.0655	.1544
Tangibility	68699	.6497	.4113	.1178	.5963	1.2567

Panel C: EU

Variable	Obs	Mean	Std. Dev.	P10	P50	P90
Log(Idio. Vol.) Compustat	58275	-.8799	.5194	-1.539	-.9465	-.0933
MB Ratio	56417	1.6354	1.0795	.8116	1.2348	3.1694
Capital Income/Sales Ratio	75166	.0518	.2202	-.1331	.0936	.2425
Tangibility	69894	.5568	.4638	.0522	.4444	1.255

Panel D: US

Variable	Obs	Mean	Std. Dev.	P10	P50	P90
Log(Idio. Vol.)	167573	-.7671	.6099	-1.5469	-.7909	.0542
MB Ratio	200611	1.8861	1.6288	.8317	1.332	3.4881
Capital Income/Sales Ratio	204722	-.171	1.6367	-.1686	.1023	.2936
Tangibility	207021	.5581	.3937	.1154	.4764	1.1047

B.1 International Regression Evidence

Table A.2 below replicates our industry level analysis reports industry evidence for UK, EU and Japan using Compustat Global. We confirm the robust and significant negative correlation between average capital share (at SIC 3 digit and SIC 2 digit) and idiosyncratic return volatility. Idiosyncratic stock return volatility is estimated using daily stock return data from Compustat Global Security (1990-2017). Given the relative shorter time series and lower frequency of Compustat Global, we did not use cash flow volatility to proxy idiosyncratic volatility. A one standard deviation increase in vol above that industry's (SIC 3 digit) average lowers the average capital share by 3.8 pps., 2.4 pps. and .5 pps in the U.K., Europe and Japan respectively.[2] This effect is economically significant in the U.K. and Europe., but less so in Japan.

Table A.2: Average Capital Share and Idiosyncratic Volatility: International Evidence 1990-2017

The table reports the regression results of industry capital income/sales ratios on the average idiosyncratic volatility for Japan, UK and Europe.

$$CS_{i,t} = \alpha + \beta_1 Idio.Vol._{i,t} + \beta_2 MB_{i,t} + \beta_3 Tang_{i,t} + \gamma_t + \eta_i + \epsilon_{i,t},$$

where i stands for industry. The estimation is done for each country separately. The industry's average capital income/sales ratio is calculated as the equal-weighted average of capital income/sales ratios across firms within industry. *Idio. Vol(ret)* is the average annualized idiosyncratic stock return volatility within industry. *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Column (1) and column (2) define industry using 2-digit SIC code, and column (3) and column (4) define industry using 3-digit SIC code. The sample includes all firms in Compustat Global Daily database, 1990-2017. The sample is winsorized at 5%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
	U.K.		E.U.		Japan	
	SIC2	SIC3	SIC2	SIC3	SIC2	SIC3
Idio.Vol(ret)	-0.432**	-0.200***	-0.176***	-0.141***	-0.025	-0.041***
	(-2.43)	(-3.85)	(-3.03)	(-6.22)	(-1.60)	(-5.46)
Tangibility	0.311***	0.175***	0.093***	0.023*	0.029*	0.018***
	(2.87)	(3.76)	(2.95)	(1.75)	(1.76)	(2.78)
M/B Ratio	-0.057	-0.067***	-0.013	-0.010**	0.013*	0.014***
	(-1.62)	(-5.21)	(-0.92)	(-2.08)	(1.88)	(4.77)
Constant	0.184	0.192***	0.145***	0.182***	0.031*	0.039***
	(1.26)	(4.43)	(5.57)	(11.00)	(1.74)	(5.30)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Y	Y	Y	Y	Y	Y
N	1,632	5,171	1,665	6,034	1,638	5,960
N_clust	62	232	65	251	64	240
r2_a	0.245	0.129	0.232	0.173	0.352	0.284

[2] A one standard deviation increase in vol above that industry's (SIC 3 digit) average lowers the average capital share by 6.6 pps., 2.6 pps. and .3 pps in the U.K., Europe and Japan respectively.

C Concentration versus Selection

In this section, we run reexamine our industry-level analysis reported in Table 3 linking the average capital share at the industry level to idiosyncratic volatility to determine the extent to which our selection mechanism is robust the concentration explanation advocated by other authors. To conduct this analysis, we use the following measure of industry-level concentration:

- Concentration ratios using the Compustat-CRSP sample
  - *Concentration*4 is the sales share of the top 4 largest firms within industry.
  - *Concentration*20 is the sales share of the top 20 largest firms within industry.
- Census Concentration Ratio (2002 & 2007)
  - *Census*4 is the sales share of the top 4 largest companies within industry (4 digit SIC). Within each 3-digit SIC industry, we compute the average of the concentration ratio to obtain the industry (3-digit SIC) level concentration ratio.
  - *Census*20 is the sales share of the top 20 largest companies within industry (4 digit SIC). Within each 3-digit SIC industry, we compute the average of the concentration ratio to obtain the industry (3-digit SIC) level concentration ratio.
- Herfindahl-Herschmann Index (1982-2007, Manufacturing only): Herfindahl-Herschmann index for 50 largest companies from the Census Bureau. The HH Index is scaled by 10000. The HHIs after 1997 are reported at the NAICS level, but we used the method in Bustamante and Donangelo (2017) to convert NAICS to SIC.[3] The Census provide the HH index every five years starting 1982. We follow Bustamante and Donangelo (2017) and repeat the data from the available year in the following four years after that survey year. For example, we report the data from 92 in the years 93, 94, 95, and 96).

Summary statistics for our concentration measures are reported in Table A.3.

Table A.3: Summary Statistics

Variable	Obs	Mean	Std. Dev.	P10	P50	P90
Concentration4 (SIC2)	3322	.6584	.2408	.3492	.6449	1
Concentration20 (SIC2)	3322	.9201	.1167	.7424	.9831	1
Concentration4 (SIC3)	12665	.8564	.1719	.5986	.9275	1
Concentration20 (SIC3)	12665	.9892	.038	.9769	1	1
Census 4 (SIC3)	727	.3688	.2137	.105	.335	.676
Census 20 (SIC3)	723	.5953	.2505	.23	.619	.932
HH Index (SIC4)	14406	.0697	.0637	.0095	.049	.1615

[3]Thanks to Andres Donangelo for kindly providing the data.

Next, we run the same panel regressions at the industry level of average capital shares on industry-level volatility and some controls, while controlling for variation in concentration. Tables A.4-A.8 report the results. Essentially, the baseline results reported in the paper, which document a sizeable negative effect of firm-level vol. on the industry's average capital share, are robust to controlling for various measures of concentration. Table A.4 uses the Compustat sales-based concentration measures and idiosyncratic return vol as the vol measure. Table A.5 uses the Compustat sales-based concentration measures and idiosyncratic sales vol as the vol measure. Table A.6 uses the Census concentration measures and idiosyncratic sales vol as the vol measure. Table A.7 uses the HHI for manufacturing and the return-based vol measure. Table A.8 uses the HHI for manufacturing and sales-based vol measures. Overall, the evidence is weaker using sales-based vol measures than when using return-based vol measures, but the concentration controls never drive out the vol variables on the right hand side.

Table A.4: Average Capital Share, Idiosyncratic Return Volatility and Concentration: Industry Level 1960 – 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Capital Share(SIC3)				Capital Share(SIC2)			
	1960-2014	1980-2014	1960-2014	1980-2014	1960-2014	1980-2014	1960-2014	1980-2014
Idio.Vol(ret)	-0.403***	-0.401***	-0.396***	-0.398***	-0.601***	-0.468**	-0.588***	-0.467**
	(-6.08)	(-6.13)	(-6.21)	(-6.14)	(-3.04)	(-2.60)	(-3.00)	(-2.61)
Tangibility	0.157**	0.130*	0.155**	0.123	0.233	0.106	0.230	0.105
	(2.52)	(1.71)	(2.56)	(1.62)	(1.36)	(0.47)	(1.36)	(0.47)
M/B Ratio	-0.071***	-0.123***	-0.071***	-0.123***	-0.083**	-0.103***	-0.084**	-0.103***
	(-3.80)	(-4.70)	(-3.80)	(-4.70)	(-2.50)	(-3.94)	(-2.53)	(-4.01)
Concentration4	0.106	-0.191***			0.061	0.004		
	(1.50)	(-2.62)			(1.20)	(0.06)		
Concentration20			0.977**	0.064			0.478***	0.053
			(2.14)	(0.22)			(3.63)	(0.35)
Constant	0.052	0.437***	-0.812*	0.216	0.152	0.317*	-0.291	0.272
	(0.64)	(4.76)	(-1.77)	(0.72)	(1.20)	(1.78)	(-1.50)	(1.32)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
N	11,836	8,299	11,836	8,299	3,090	2,127	3,090	2,127
N_clust	252	252	252	252	65	65	65	65
r2_a	0.084	0.059	0.087	0.058	0.162	0.077	0.168	0.077

The table reports the regression results of industry capital income/sales ratios on the average idiosyncratic volatility when we control for industry concentration.

$$CS_{i,t} = \alpha + \beta_1 Idio.Vol._{i,t} + \beta_2 MB_{i,t} + \beta_3 Tang_{i,t} + \beta_4 Concentration_{i,t} + \gamma_t + \eta_i + \epsilon_{i,t},$$

where i stands for industry. The estimation is done for each country separately. The industry capital income/sales ratio is calculated as the average of capital income/sales ratios across firms within industry. *Idio.Vol(ret)* is the average idiosyncratic stock return volatility within industry. *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Industry concentration $Concentration(n)$ is the sales share of the top N largest firms within industry in the Compustat public firm sample. Concentration4 is the sales share of the top 4 largest firms within industry. Concentration20 is the sales share of the top 20 largest firms within industry. Column (1)- (3) define industry using 3-digit SIC code, and column (4) - (6) define industry using 2-digit SIC code. The sample includes all firms in Compustat-CRSP, 1960-2014. The sample is winsorized at 1%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Average Capital Share, Idiosyncratic Sales Volatility and Concentration: Industry Level 1960 – 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Capital Share(SIC3)				Capital Share(SIC2)			
	1960-2014	1980-2014	1960-2014	1980-2014	1960-2014	1980-2014	1960-2014	1980-2014
Idio.Vol(sales)	-0.142*	-0.163*	-0.138*	-0.160*	-0.390	-0.391	-0.386	-0.390
	(-1.75)	(-1.91)	(-1.73)	(-1.87)	(-1.51)	(-1.26)	(-1.49)	(-1.26)
Tangibility	0.127*	0.100	0.127**	0.094	0.288	0.268	0.284	0.260
	(1.95)	(1.39)	(1.99)	(1.30)	(1.66)	(1.38)	(1.64)	(1.33)
M/B Ratio	-0.094***	-0.111***	-0.094***	-0.111***	-0.108**	-0.110***	-0.108**	-0.111***
	(-4.47)	(-4.78)	(-4.47)	(-4.77)	(-2.32)	(-3.20)	(-2.33)	(-3.26)
Concentration4	0.105	-0.180**			0.036	-0.076		
	(1.40)	(-2.50)			(0.75)	(-1.34)		
Concentration20			1.058**	0.206			0.437***	-0.053
			(2.40)	(0.69)			(3.91)	(-0.37)
Constant	0.093	0.286***	-0.893*	-0.067	0.140	0.169	-0.239	0.174
	(0.95)	(3.34)	(-1.96)	(-0.22)	(1.48)	(1.16)	(-1.66)	(0.86)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10,391	8,067	10,391	8,067	2,774	2,102	2,774	2,102
N_clust	249	249	249	249	63	63	63	63
r2_a	0.060	0.039	0.064	0.037	0.176	0.117	0.181	0.116

The table reports the regression results of industry capital income/sales ratios on the average idiosyncratic volatility when we control for industry concentration.

$$CS_{i,t} = \alpha + \beta_1 Idio.Vol._{i,t} + \beta_2 MB_{i,t} + \beta_3 Tang_{i,t} + \beta_4 Concentration_{i,t} + \gamma_t + \eta_i + \epsilon_{i,t},$$

where i stands for industry. The estimation is done for each country separately. The industry capital income/sales ratio is calculated as the average of capital income/sales ratios across firms within industry. *Idio. Vol(sales)* is the average idiosyncratic sales volatility within industry. *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Industry concentration $Concentration(n)$ is the sales share of the top N largest firms within industry in the Compustat public firm sample. Concentration4 is the sales share of the top 4 largest firms within industry. Concentration20 is the sales share of the top 20 largest firms within industry. Column (1)- (3) define industry using 3-digit SIC code, and column (4) - (6) define industry using 2-digit SIC code. The sample includes all firms in Compustat-CRSP, 1960-2014. The sample is winsorized at 1%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Average Capital Share, Idiosyncratic Sales Volatility and Census Concentration: Industry Level 2002 & 2007

	Capital Share (SIC3)			
Idio.Vol(ret)	-0.451**	-0.452**		
	(-2.08)	(-2.06)		
Idio.Vol(sales)			0.089	0.080
			(0.55)	(0.50)
Tangibility	0.364	0.371	0.458	0.476
	(0.93)	(0.94)	(1.11)	(1.14)
M/B Ratio	-0.201	-0.199	-0.172	-0.172
	(-0.89)	(-0.88)	(-1.10)	(-1.10)
Census 4	0.225		0.212	
	(1.17)		(1.17)	
Census 20		0.238		0.401
		(0.66)		(1.16)
Constant	0.207	0.144	-0.160	-0.328
	(0.86)	(0.45)	(-1.20)	(-1.37)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	697	692	642	637
N_clust	437	436	405	404
r2_a	0.032	0.032	0.025	0.027

The table reports the regression results of industry capital income/sales ratios on the average idiosyncratic volatility when we control for industry concentration.

$$CS_{i,t} = \alpha + \beta_1 Idio.Vol._{i,t} + \beta_2 MB_{i,t} + \beta_3 Tang_{i,t} + \beta_4 Census(n)_{i,t} + \gamma_t + \eta_i + \epsilon_{i,t},$$

where i stands for industry. The estimation is done for each country separately. The industry capital income/sales ratio is calculated as the average of capital income/sales ratios across firms within industry. *Idio. Vol(sales)* is the average idiosyncratic sales volatility within industry. *Idio. Vol(ret)* is the average idiosyncratic stock return volatility within industry. *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Industry concentration $Census(n)$ is the sales share of the top N largest firms within industry obtained from the Census Bureau. Census 4 is the sales share of the top 4 largest firms within industry. Census 20 is the sales share of the top 20 largest firms within industry. Industry is defined using 3-digit SIC code. The sample includes all firms in Compustat-CRSP, 1960-2014. The sample is winsorized at 1%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D Cohort Effects

First, we show the average and aggregate capital-income-to-sales ratio for firms that entered the public domain at different years and survived throughout the entire sample in Figure (A.5). We keep the identity of firms in each vintage cohort unchanged. Figure A.5 (a) shows that on average firms who entered in the 1960s and survived till the recent decades have the highest capital-income-to-sales ratio, while firms who have entered recently (1990s and 2000s cohorts) on average have

Table A.7: Average Capital Share, Idiosyncratic Return Volatility and Herfindahl-Herschmann Indexes: Manufacturing 1982-2015

	Capital Share(SIC4)		
Idio.Vol(ret)	-0.449***	-0.489***	-0.326***
	(-4.75)	(-4.04)	(-2.78)
Tangibility	0.106	0.071	-0.034
	(0.86)	(0.28)	(-0.40)
M/B Ratio	-0.122**	-0.153**	-0.055**
	(-2.57)	(-2.45)	(-2.14)
HH Index	-0.634	-1.228	-0.169
	(-1.23)	(-1.05)	(-0.13)
Constant	0.326**	0.457*	0.188**
	(2.47)	(1.88)	(2.23)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
N	3,854	2,228	1,746
N_clust	135	134	126
r2_a	0.044	0.038	0.042

The table reports the regression results of industry capital income/sales ratios on the average idiosyncratic volatility when we control for industry concentration.

$$CS_{i,t} = \alpha + \beta_1 Idio.Vol._{i,t} + \beta_2 MB_{i,t} + \beta_3 Tang_{i,t} + \beta_4 HHI_{i,t} + \gamma_t + \eta_i + \epsilon_{i,t},$$

where i stands for industry. The estimation is done for each country separately. The industry capital income/sales ratio is calculated as the average of capital income/sales ratios across firms within industry. *Idio. Vol(sales)* is the average idiosyncratic sales volatility within industry. *Idio. Vol(ret)* is the average idiosyncratic stock return volatility within industry. *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Industry concentration is measured using Herfindahl-Herschmann Indexes (HHI) obtained from the Census Bureau. Industry is defined using 4-digit SIC code. The sample includes all firms in Compustat-CRSP, 1960-2014. The sample is winsorized at 1%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: Average Capital Share, Idiosyncratic Sales Volatility and Hirschmann-Herfindahl Indexes: Manufacturing 1982-2015

	Capital Share(SIC4)		
Idio.Vol(sales)	-0.205*	-0.189	-0.016
	(-1.79)	(-1.11)	(-0.29)
Tangibility	0.053	0.066	-0.041
	(0.61)	(0.41)	(-0.44)
M/B Ratio	-0.126***	-0.155***	-0.082***
	(-2.92)	(-2.75)	(-2.89)
HH Index	-0.517	-0.833	-0.613
	(-1.00)	(-0.76)	(-0.50)
Constant	0.182*	0.245	-0.025
	(1.89)	(1.46)	(-0.33)
Year FE	Y	Y	Y
Industry FE	Y	Y	Y
N	3,733	2,150	1,583
N_clust	133	133	121
r2_a	0.031	0.025	0.030

The table reports the regression results of industry capital income/sales ratios on the average idiosyncratic volatility when we control for industry concentration.

$$CS_{i,t} = \alpha + \beta_1 Idio.Vol._{i,t} + \beta_2 MB_{i,t} + \beta_3 Tang_{i,t} + \beta_4 HHI_{i,t} + \gamma_t + \eta_i + \epsilon_{i,t},$$

where i stands for industry. The estimation is done for each country separately. The industry capital income/sales ratio is calculated as the average of capital income/sales ratios across firms within industry. *Idio. Vol(sales)* is the average idiosyncratic sales volatility within industry. *Idio. Vol(ret)* is the average idiosyncratic stock return volatility within industry. *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Industry concentration is measured using Herfindahl-Herschmann Indexes (HHI) obtained from the Census Bureau. Industry is defined using 4-digit SIC code. The sample includes all firms in Compustat-CRSP, 1960-2014. The sample is winsorized at 1%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the lowest highest capital-income-to-sales ratio, consistent with selection. Furthermore, the steeper upward drift over time in average ratios for the more recent 1990 and 2000 vintages is the hallmark of our selection mechanism. This selection mechanism is stronger for recent vintages because they have been exposed to higher vol early on in their life. However, from the aggregate capital shares plotted in Figure A.5 (b), we see that there is no clear pattern across vintages in aggregate capital shares. It is not the case that only firms who entered recently (Google, Apple, or Facebook which are in the 90s and 2000s cohorts) have become more profitable. The largest firms in the right tail of firm size distribution, who are the driving force behind the aggregate ratio, can be either firms from older vintages that have survived long enough or firms that have entered recently with good draws of productivity.

Second, we explore the cohort effects among the largest and smallests firms in Figure A.6. Each year, we identify firms in the top (bottom) 20 percentile of size (measured by total assets or sales) distribution. Among the top 20 (bottom 20) percentile largest (smallest) firms, we identify the entry year of each firms and group them into five entry cohorts (1960s, 1970s, 1980s, 1990s, 2000s). We then compute the average capital-income-to-sales ratio of each entry cohort.The average capital-income-to-sales ratio among the largest firms has been trending up for all cohorts, not just the most recent ones. There is some evidence to suggest that the largest firms from recents cohorts are somewhat more profitable than those from older cohorts, but the evidence is not overwhelming.

Third, as shown in Figure A.6, there is a very strong vintage effect amongst the smallest firms, consistent with our model: lower capital-income-to-sales ratios are more likely to prevail in the recent sample period for the young vintages who have experienced higher idiosyncratic volatility early on in their lifespan, when they are more likely to generate negative profits. They are willing to wait because the option value of waiting is so high. The Autor et al. (2017) mechanism cannot speak to this vintage effect in the left tail. One important difference between our mechanism and the "super-star" firm mechanism (or other prevailing explanations of declining costs of capital goods, etc.) is that our real option mechanism predicts the increase in the left tail of firm size distribution.

E Additional Cross Sectional Evidence

Since the firm size distribution may reflect not just the change in contemporaneous volatility but also, to some extent, reflect the cumulative changes in the past volatility. In this section, we show our industry-level regression of industry average capital income to sales ratio on past idiosyncratic volatility to provide further evidence on the past volatility and the dispersion of capital share. We consider two regression models: 1) use lagged industry level idiosyncratic volatility directly as a control; 2) use a moving average of current and past idiosyncratic volatility to capture the cumulative effect of past volatility.

Figure A.5: Capital-Income-to-Sales Ratio by Entry Cohorts

This figure presents the average and the aggregate capital-income-to-sales ratio by different entry cohorts. Vintage 1960s represents the set of firms who went public between 1960-1970 and survived throughout the entire sample period (till 2014), and we keep the composition of firms in this group fixed and plot the average and aggregate capital-income-to-sales ratio within each cohorts. The vintage here represents the survival period of firms. The sample is winsorized at 1%. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

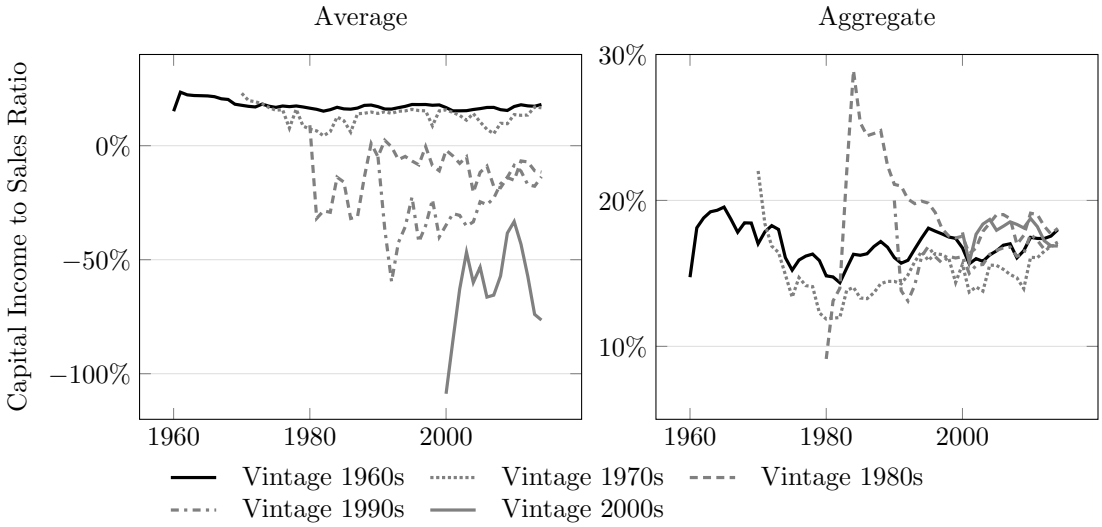


Figure A.6: Capital-Income-to-Sales Ratio by Entry Cohorts among Largest and Smallest Firms

This figure presents the average and the aggregate capital-income-to-sales ratio by different entry cohorts among the largest and smallest firms. Each year, we identify firms in the top and bottome 20 percentile of size distribution. Within each size group, we then identify the entry year of each firms and group them in to five entry cohorts. We then compute the average capital-income-to-sales ratio of each entry cohort. Source: Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

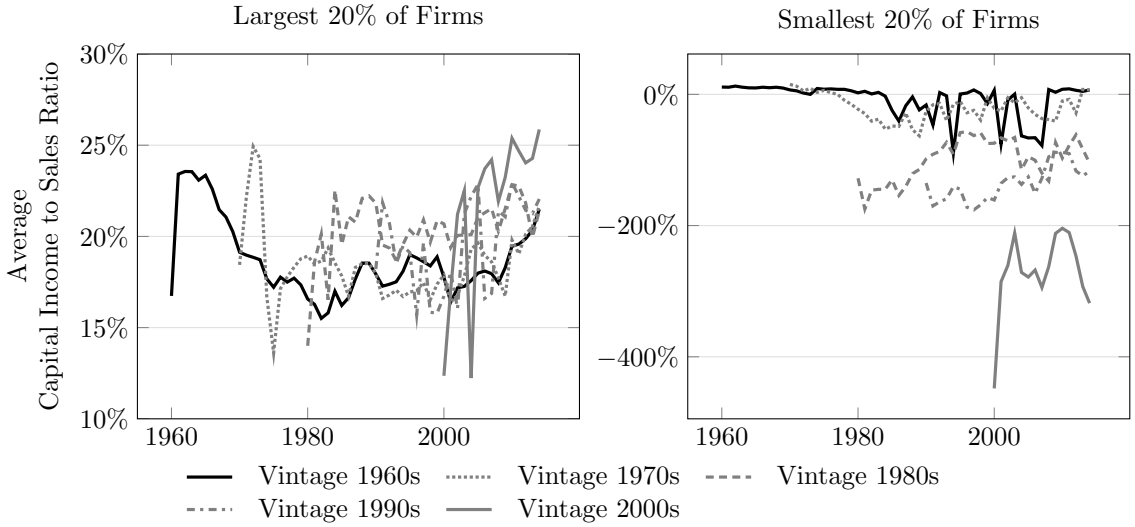


Table A.9: Average Capital Share and Past Idiosyncratic Volatility: Industry Level 1960 – 2014

	(1)	(2)	(3)	(4)	(5)	(6)
	Capital Share(SIC2)			Capital Share(SIC3)		
Idio.Vol(ret)	-0.593***			-0.406***		
	(-3.02)			(-6.07)		
idio_ret_vol_MA5		-0.800***			-0.449***	
		(-2.78)			(-4.61)	
idio_ret_vol_MA10			-0.920**			-0.477***
			(-2.61)			(-3.83)
Tangibility	0.242	0.287	0.336*	0.161***	0.160**	0.157**
	(1.42)	(1.58)	(1.72)	(2.62)	(2.57)	(2.50)
M/B Ratio	-0.080**	-0.089**	-0.094**	-0.071***	-0.069***	-0.069***
	(-2.42)	(-2.57)	(-2.65)	(-3.81)	(-3.69)	(-3.67)
Constant	0.185	0.238	0.254	0.155***	0.171***	0.182***
	(1.50)	(1.53)	(1.33)	(2.99)	(3.16)	(3.01)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Y	Y	Y	Y	Y	Y
N	3,091	3,100	3,106	11,838	11,888	11,896
N_clust	65	65	65	252	252	252
r2_a	0.161	0.160	0.163	0.084	0.075	0.071

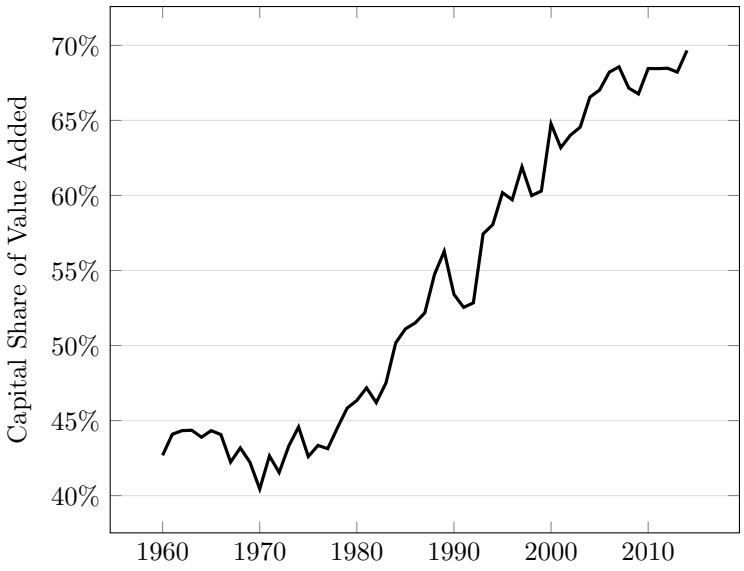
The table reports the regression results of industry capital income/sales ratios on the the past average idiosyncratic volatility. The industry capital income/sales ratio is calculated as the average of capital income/sales ratios across firms within industry. *Idio.Vol(ret)* is the average annualized idiosyncratic stock return volatility within industry. *MA(n).Idio.Vol(ret)* is the moving average of industry level idiosyncratic return volatility over from year t-n to year t (including the current year). *Tangibility* is the average of gross property, plant and equipment (PPEGT) to total assets (AT) ratio within industry. *M/B* ratio is the industry average market-to-book ratio within industry. Column (1)- (3) define industry using 3-digit SIC code, and column (4) - (6) define industry using 2-digit SIC code. The sample includes all firms in Compustat-CRSP, 1960-2014. The sample is winsorized at 1%. t statistics in parentheses, and * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

F Robustness

F.1 Adjusting For R&D

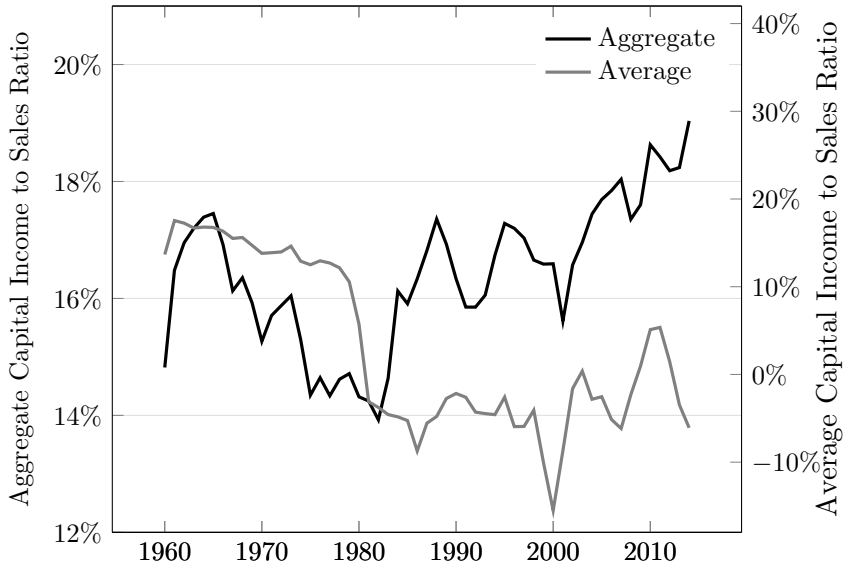
In this section, we reconstruct our main results from 1 and 5 adjusting our measure of capital income by adding R&D expenses.

Figure A.7: The Aggregate Capital Share of Value Added



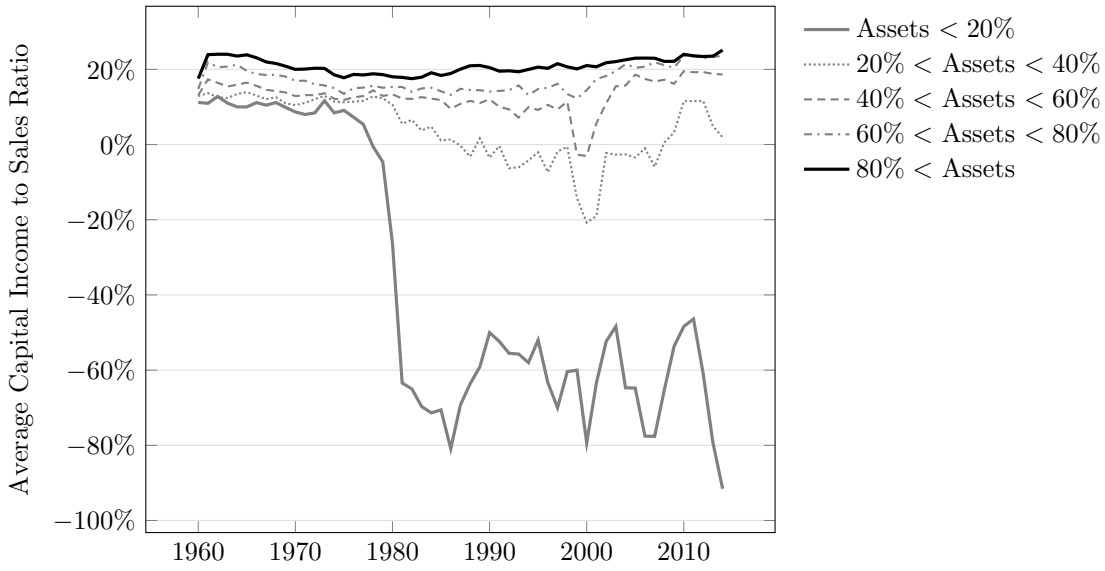
This figure plots the aggregate capital share.The aggregate capital share is $\sum_i$ Operating Income$_i$ + R&D Expenses$_i$ divided by $\sum_i$ Imputed XLR$_i$ + Operating Income$_i$ + R&D Expenses$_i$. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

Figure A.8: Aggregate and Average Capital Share



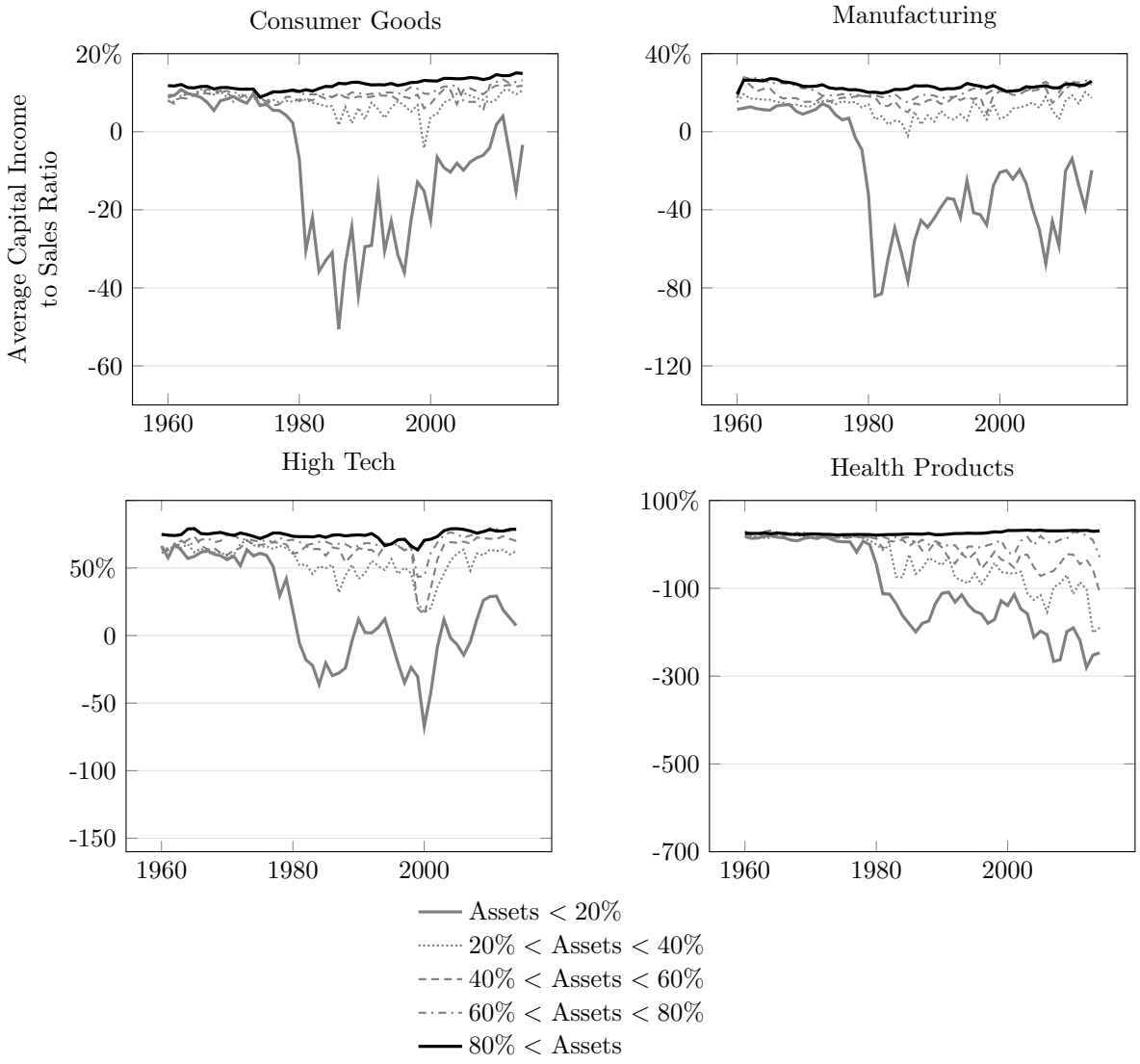
This figure plots the aggregate and average capital income to sales ratio. We define capital income as operating income + R&D expenses. The aggregate capital income to sales ratio is $\sum_i \text{Operating Income}_i + \text{R\&D Expenses}_i$ divided by $\sum_i \text{Sales}_i$ for each year. The average capital-income-to-sales ratio is the simple average of the firm level capital capital-income-to-sales ratio for each year. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

Figure A.9: Average Capital Share in Size Groups



This figure presents the average capital-income-to-sales ratio by size over time. We measure capital income as operating income + R&D expenses. Size is measured by total assets, and the capital-income-to-sales ratio is measured as capital income (OIBDP+XRD) divided by sales. For each year, firms are categorized into five groups based on their total assets, and we estimate the average capital-income-to-sales ratio within each group for a given year. The sample is winsorized at 1%. The sample includes all firms in Compustat-CRSP merged Fundamentals Annual for 1960-2014.

Figure A.10: Average Capital Income to Sales Ratio in Size Groups (FF 5 Industry)

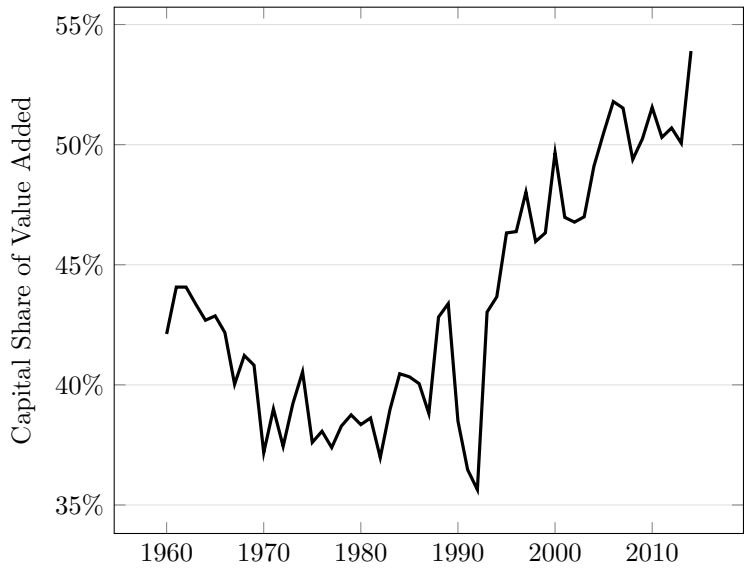


Industries are defined Fama-French five-industry classification. We omit the industry classification "other" because it contains few firms after excluding financial firms. Within each industry, we sort firms into five groups based on their total assets. The plot shows the average capital income (OIBDP+XRD) to sales ratio within each size group for four industries. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

F.2 Winsorization

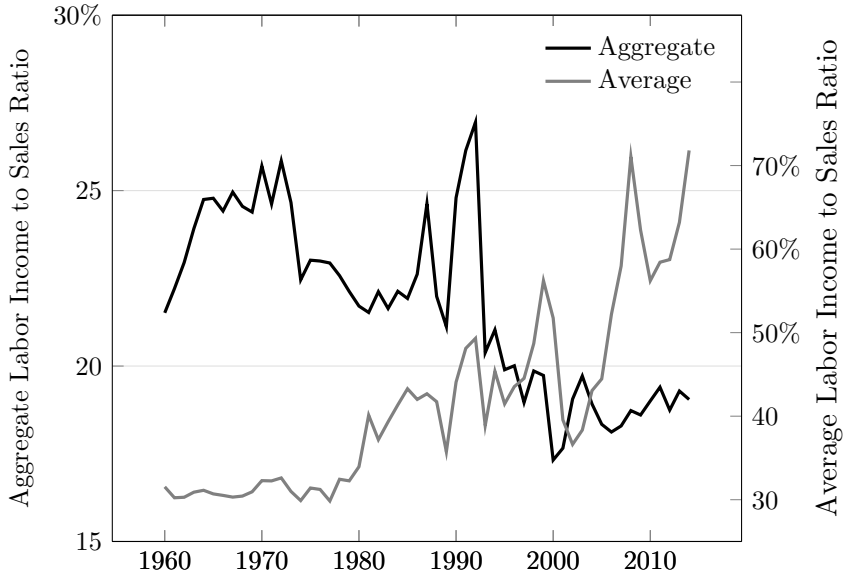
This subsection presents our results with different winsorization procedures.

Figure A.11: The Aggregate Capital Share of Value Added



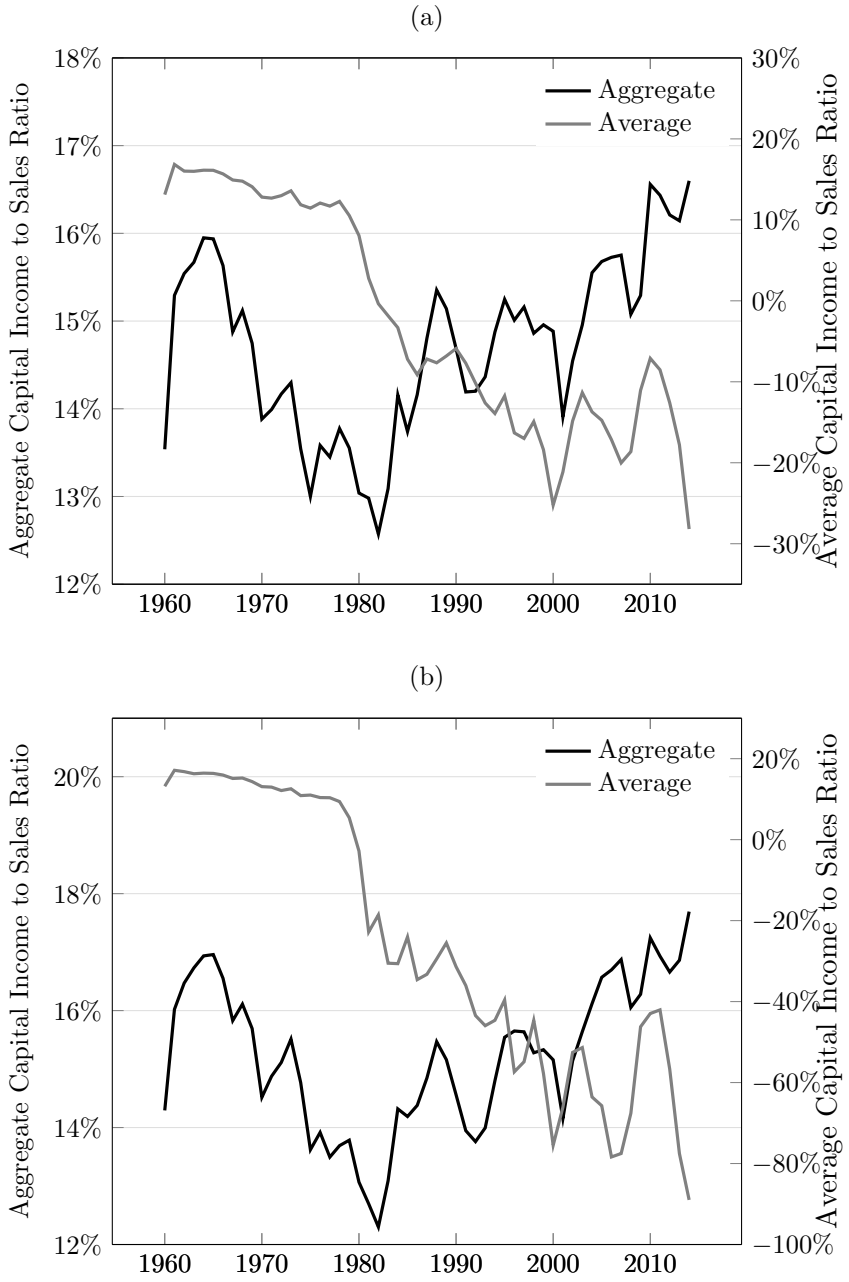
This figure plots the aggregate capital share. The aggregate capital share is $\sum_i$ Operating Income$_i$ divided by $\sum_i$ Imputed XLR$_i$ + Operating Income$_i$. The sample is winsorized at **1%**. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

Figure A.12: Aggregate and Average Labor Income to Sales Ratio



The aggregate labor income to sales ratio is $\sum_i$ Extended XLR$_i$ divided by $\sum_i$ Sales$_i$ for each year. The average labor income to sales ratio is the simple average of the within firm labor income to sales ratio for each year. The sample is winsorized at **1%**. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).

Figure A.13: Aggregate and Average Capital Share



This figure reports the capital income to sales ratio. The aggregate capital income to sales ratio is $\sum_i \text{Operating Income}_i$ divided by $\sum_i \text{Sales}_i$ for each year. The average capital-income-to-sales ratio is the simple average of the firm level capital capital-income-to-sales ratio for each year. Part (a) use the sample with winsorization at 2.5%. Part(b) use the sample with winsorization at .5%. Source: Compustat/CRSP Merged Fundamentals Annual (1960-2014).