# Internet Appendix for “Capital Share Dynamics When Firms Insure Workers"

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This appendix consists of five sections. In Section I, we study compositional changes that drive the factor share dynamics. In Section II, we examine international evidence on factor share dynamics. In Section III, we examine evidence on the relation between factor share dynamics and concentration. In Section IV, we examine whether the facts we document in Section I of the main article are driven by entry cohorts. In Section VI, we demonstrate that the findings that we present in Sections I and V of the main article are robust to adding R&D expenses to our measure of capital income and to different winsorization criteria.

## I. Composition Effects and the Aggregate Capital Share

### *A. Exchanges*

In this section, we investigate whether our results are driven by the accession of NASDAQ firms to the Compustat database. Figure IA1 plots the aggregate and average capital-income-to-sales ratios for NYSE and NASDAQ firms separately. We find similar divergence between the aggregate and average capital shares in the universe of NYSE firms, though the trends are quantitatively less pronounced.

Figure IA2 plots the average capital-income-to-sales ratio by firm size (total assets) for NYSE and NASDAQ separately. We find qualitatively similar patterns in the average capital-income-to-sales ratio in the NYSE and NASDAQ universe separately, as documented in panels A and B, respectively. Across the two major exchanges, there is a clear ordering of average capital-income-to-sales ratios by firm size, with the average capital-income-to-sales ratio trending down dramatically (on average negative) in the smallest firm size group since the 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 we document a steep decline even after excluding NASDAQ firms.

### *B. Across- vs. Within-Industry Effects*

Although we document a significant relation between industry-level average capital share and idiosyncratic volatility in Table III, 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 by a within-industry change in the firm size distribution. Figure IA3 plots the weighted capital-income-to-sales

*Citation format: Hartman-Glaser, Barney, Hanno Lustig, and Mindy Z. Xiaolan, Internet Appendix for "Capital Share Dynamics When Firms Insure Workers," *Journal of Finance* [DOI STRING]. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the authors of the article.

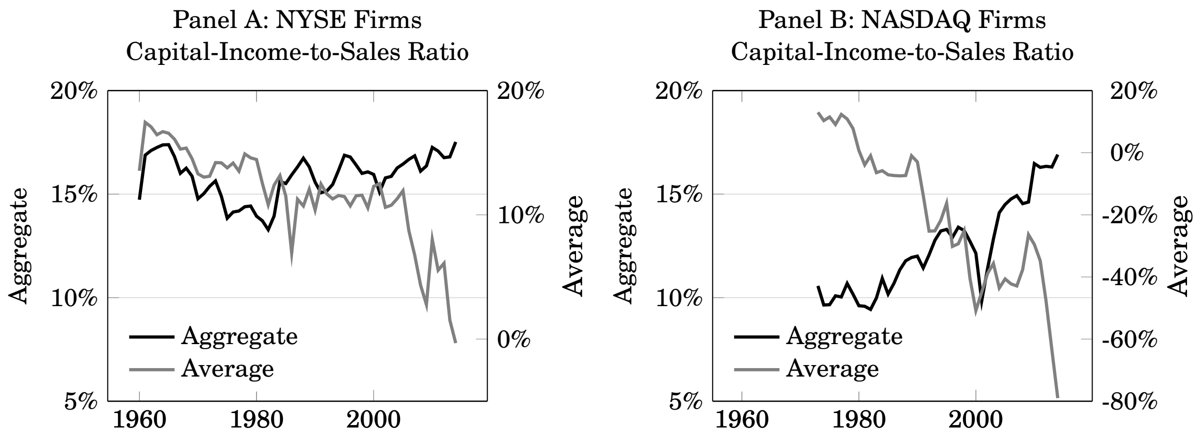



**Figure IA1. Capital share dynamics across NYSE and NASDAQ.** This figure presents the average and aggregate capital-income-to-sales ratios separately for firms listed in the NYSE and NASDAQ exchanges. The aggregate capital-income-to-sales ratio is equal to $\sum_i \text{Operating Income}_i / \sum_i \text{Sales}_i$ for each year. The average capital-income-to-sales ratio is equal to the mean (Operating Income/Sales) for each year. The sample is winsorized at the 1% level. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

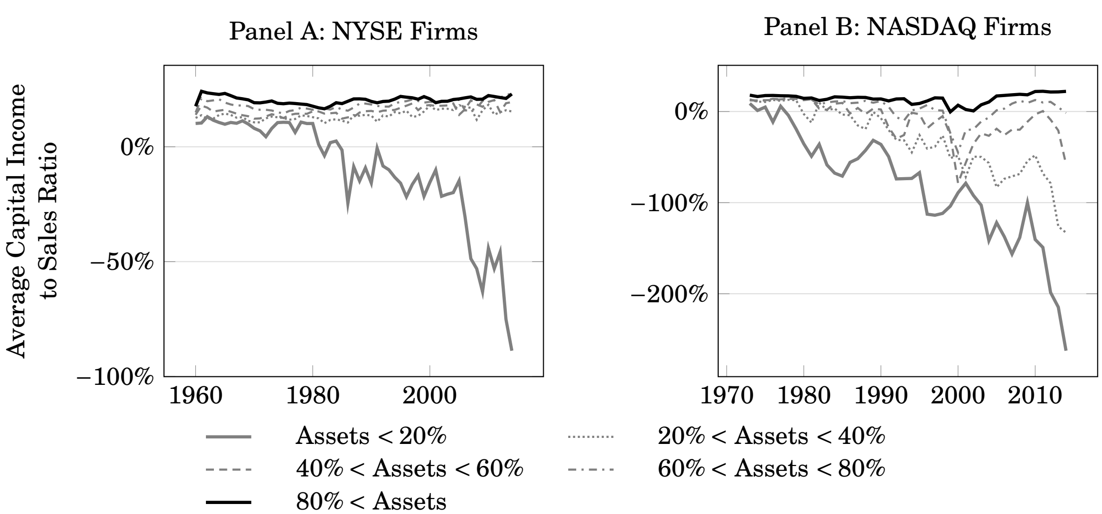



**Figure IA2. Capital-income-to-sales ratio by firm size: exchanges.** This figure presents the average capital-income-to-sales ratio by size over time separately for firms listed in the NYSE and NASDAQ exchanges. Size is measured by total assets, and the capital-income-to-sales ratio is equal to operating income (OIBDP) divided by sales. For each year, firms are categorized into five groups based on their total assets. We then estimate the average capital-income-to-sales ratio within each group for a given year. The sample is winsorized at the 1% level. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

ratio where the weights are sales in year $t$ given by

$$\text{Across Industry Effect}_t = \frac{\sum_i \text{Sales}_{it} \frac{\text{Capital Income}_{i1970}}{\text{Sales}_{i1970}}}{\sum_i \text{Sales}_{it}}. \quad \text{(IA1)}$$

This ratio measures the cross-industry component of the aggregate capital share. The remainder (i.e., the gap between the aggregate ratio and the cross-industry component) measures the within-industry effect. Note that the cross-industry effect accounts for most of the increase in the aggregate capital-income-to-sales ratio. Figure IA3 indicates that industries with high within-industry aggregate capital-income-to-sales ratios in the 1970s became larger.

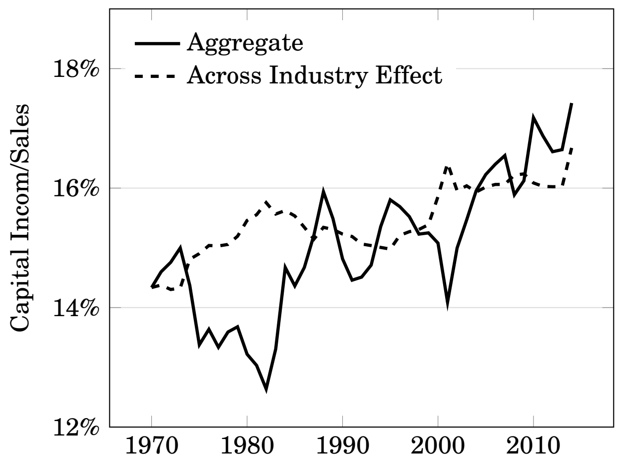



**Figure IA3. The cross-industry effect on the aggregate capital share.** Industries are formed according to the Fama-French 48 industry classification. The solid line is the aggregate capital share. The dashed line is the cross-industry effect described in equation (IA1). Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

## II. International Evidence

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

Our main analysis is conducted using Compustat Global. Compustat Global contains widely available accounting data from where we obtain key firm fundamental variables. Daily stock returns are calculated using Compustat Global Security Daily. We estimate idiosyncratic return volatility within each year by estimating the Fama-French three-factor model, where we obtain the Fama-French global three factors from Ken French's Data Library. The global three factors start in 1990, so the majority of our international evidence is presented for the period 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 changes in idiosyncratic volatility, we extend the time series of idiosyncratic volatility using stock return data from Datastream. For

[1]The list of EU countries are chosen following the Fama-French European three-factors portfolios excluding the U.K.

the U.K. and Japan, we can extend the estimates of idiosyncratic volatility back to 1975 and 1978, respectively, by estimating a single-factor model. 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 the 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 to 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 U.S. dollars $r_{j,k,t}$, and we calculate the idiosyncratic volatility within each year $\tau$ 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 the Fama-French global three factors for the EU and Japan from the Ken-French Data Library (1990 to 2017). For the U.K., we used European three factors for the estimation. Idiosyncratic volatility $\sigma_{j,k,\tau}$ is the standard deviation of $\epsilon_{j,k,t}$ within each year $\tau$.
  - Datastream: We obtain individual security return (RI, adjusted and U.S. dollar denominated) for the U.K. (1975 to 2017) and Japan (1978 to 2017), and then calculate idiosyncratic volatility within each year $\tau$ 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 the excess returns of the market indexes for the U.K. and Japan over the same period. The interest rate for the U.K. is the U.K. sterling one-month deposit rate, and the market index for the U.K. is the U.K. total market index (TOTMKUK). The interest rate for Japan is the one-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 $\tau$. 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 security daily return data from Datastream to Compustat Fundamental Global, the estimates of idiosyncratic volatility are used only to show the evolution of idiosyncratic volatility over a longer sample period. In Table IA1, we show that summary statistics for idiosyncratic volatility from the two databases are very similar.

- Firm fundamental variables (Compustat Global Fundamental Annual)
  - Capital Share: Ratio of 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).

**Table IA1. Summary Statistics**

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

Panel A: U.K.

| Variable | Obs. | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|---|
| Log(Idio. Vol.) Datastream | 92,711 | -0.8944 | 0.7194 | -1.8019 | -0.9711 | 0.1751 |
| Log(Idio. Vol.) Compustat | 28,310 | -0.8779 | 0.5588 | -1.6142 | -0.9273 | -0.0501 |
| MB Ratio | 27,857 | 1.9204 | 1.3886 | 0.7958 | 1.4263 | 3.8982 |
| Capital Income/Sales Ratio | 32,031 | -0.0955 | 0.6566 | -0.4915 | 0.0932 | 0.2559 |
| Tangibility | 32,544 | 0.465 | 0.3862 | 0.0281 | 0.383 | 1.0494 |

Panel B: Japan

| Variable | Obs. | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|---|
| Log(Idio. Vol.) Datastream | 110,607 | -1.0431 | 0.4361 | -1.6452 | -1.05 | -0.4232 |
| Log(Idio. Vol.) Compustat | 64,039 | -1.0038 | 0.4341 | -1.5926 | -1.0217 | -0.3756 |
| MB Ratio | 63,594 | 1.176 | 0.5247 | 0.6999 | 1.0191 | 1.8951 |
| Capital Income/Sales Ratio | 68,930 | 0.0736 | 0.0528 | 0.0111 | 0.0655 | 0.1544 |
| Tangibility | 68,699 | 0.6497 | 0.4113 | 0.1178 | 0.5963 | 1.2567 |

Panel C: EU

| Variable | Obs. | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|---|
| Log(Idio. Vol.) Compustat | 58,275 | -0.8799 | 0.5194 | -1.539 | -0.9465 | -0.0933 |
| MB Ratio | 56,417 | 1.6354 | 1.0795 | 0.8116 | 1.2348 | 3.1694 |
| Capital Income/Sales Ratio | 75,166 | 0.0518 | 0.2202 | -0.1331 | 0.0936 | 0.2425 |
| Tangibility | 69,894 | 0.5568 | 0.4638 | 0.0522 | 0.4444 | 1.255 |

Panel D: U.S.

| Variable | Obs. | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|---|
| Log(Idio. Vol.) | 167,573 | -0.7671 | 0.6099 | -1.5469 | -0.7909 | 0.0542 |
| MB Ratio | 200,611 | 1.8861 | 1.6288 | 0.8317 | 1.332 | 3.4881 |
| Capital Income/Sales Ratio | 204,722 | -0.171 | 1.6367 | -0.1686 | 0.1023 | 0.2936 |
| Tangibility | 207,021 | 0.5581 | 0.3937 | 0.1154 | 0.4764 | 1.1047 |

– Tangibility: Ratio of physical assets (PPEGT) to total assets (AT).

Table IA1 reports summary statistics for all variables.

We start by documenting the shifts in the firm size distribution and idiosyncratic volatility in the U.K., the EU, and Japan. The U.K. experience largely mirrors that of the U.S. The first column of Figure IA4 reports the change in size distribution and capital share of U.K. firms over the sample period (1990 to 2017). The right tail of the firm size distribution gets fatter as idiosyncratic volatility increases from 1975 to 2017. We also document the divergence of the aggregate and average capital-income-to-sales ratios in the U.K. Consistent with our model mechanism, the relationship between firm size and the capital-income-to-sales ratio has changed dramatically since 1990. In Figure IA4, Panel D of the first column, we see that the capital-income-to-sales ratio was much more strongly increasing in firm size in 2010 than in 1990. We find qualitatively similar patterns when investigating the major countries in the E.U. (see the second column of Figure IA4).

On the other hand, the Japanese economy behaved differently from the UK and EU economies (the third column of Figure IA4), 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 idiosyncratic volatility from 1978 to 2017. Consistent with our mechanism, there is *no* divergence between the average and aggregate capital-income-to-sales ratios. The relationship between firm size and the capital-income-to-sales ratio has changed since 1990, but 1) the slope of the capital-income-to-sales ratio was not much steeper in 2010 than 1990; 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 the U.S., the U.K., and the EU). This implies that there is no strong left-tail effect that driving a decline in average capital share.

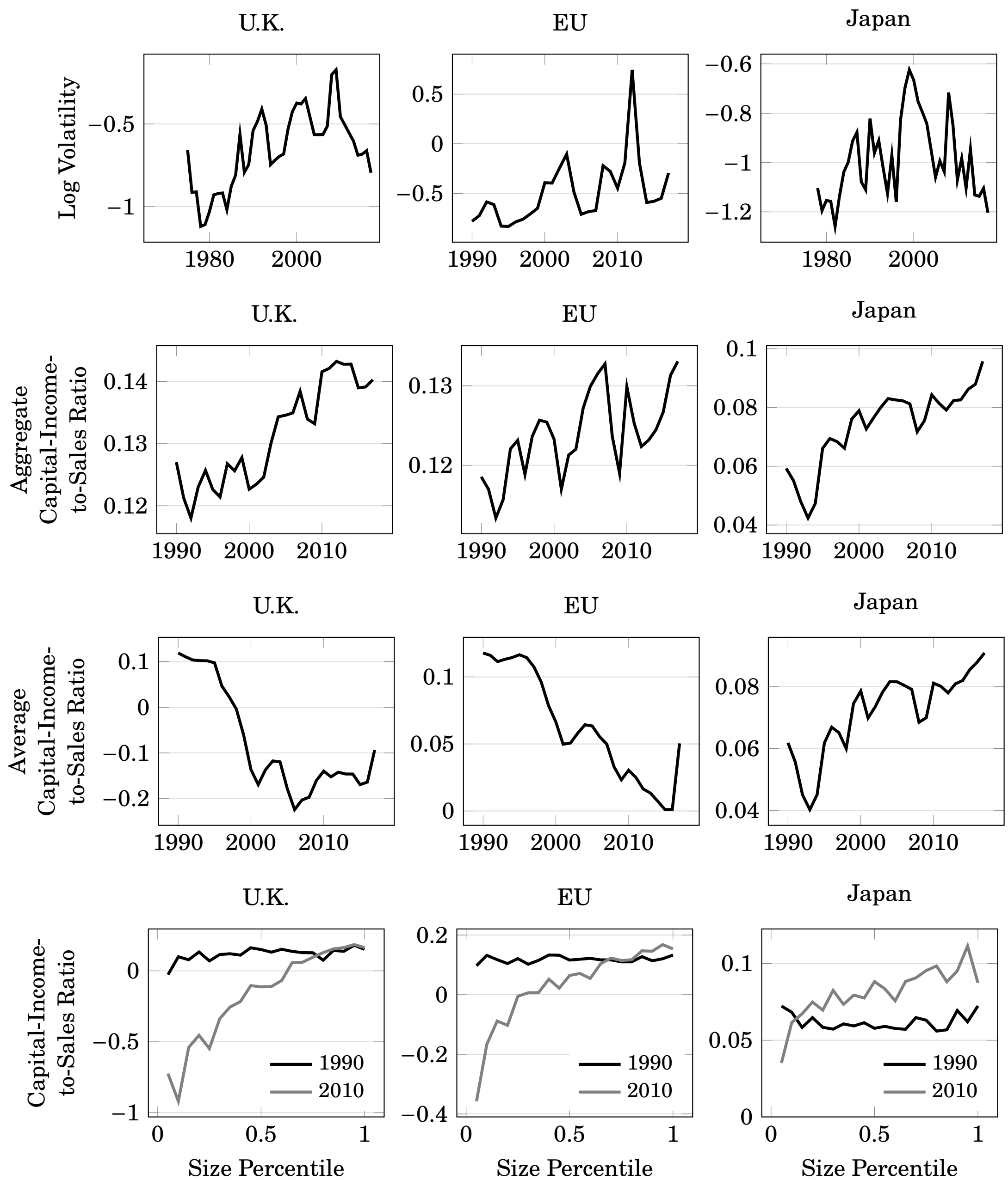



**Figure IA4. International evidence.** This figure presents the time series of idiosyncratic volatility, the average and aggregate capital-income-to-sales ratios, and the average capital-income-to-sales ratio within each size percentile for the U.K., the EU, and Japan. All variables are winsorized at the 5% level. Data Source: Compustat Global Fundamental Annual (1990 to 2017), Compustat Global Security Daily (1990 to 2017), and Datastream (1975 to 2017).

## A. *International Regression Evidence*

Table IA2 replicates our industry-level analysis for the U.K., the EU, and Japan using Compustat Global. We confirm the robust and significant negative correlation between average capital share (at three-digit and two-digit SIC levels) and idiosyncratic return volatility. Idiosyncratic stock return volatility is estimated using daily stock return data from Compustat Global Security (1990 to 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 volatility above that industry's (three-digit SIC level) average lowers the average capital share by 3.8 pps., 2.4 pps., and 0.5 pps in the U.K., the EU, and Japan, respectively.[2] This effect is economically significant in the U.K. and the EU, but less so in Japan.

**Table IA2. Average Capital Share and Idiosyncratic Volatility: International Evidence 1990 to 2017**

The table reports the regression results of industry capital-income-to-sales ratios on average idiosyncratic volatility for Japan, the U.K., and the EU.

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

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

| | U.K. | | EU | | Japan | |
|---|---|---|---|---|---|---|
| | SIC2 | SIC3 | SIC2 | SIC3 | SIC2 | SIC3 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 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 |
| $R^2$-Adj. | 0.245 | 0.129 | 0.232 | 0.173 | 0.352 | 0.284 |

[2] A one-standard-deviation increase in volatility above that industry's (three-digit SIC level) average lowers the average capital share by 6.6 pps., 2.6 pps., and 0.3 pps in the U.K., the EU, and Japan, respectively.

## III. Concentration versus Selection

In this section, we re-examine our industry-level analysis reported in Table III of the main article 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 measures of industry-level concentration.

- Concentration ratios using the Compustat-CRSP sample:
  - $Concentration4$ is the sales share of the top four largest firms within an industry.
  - $Concentration20$ is the sales share of the top 20 largest firms within an industry.
- Census Concentration Ratio (2002 & 2007):
  - $Census4$ is the sales share of the top four largest companies within an industry (three-digit SIC). Within each three-digit SIC industry, we compute the average of the concentration ratio to obtain the industry-level (three-digit SIC) concentration ratio.
  - $Census20$ is the sales share of the top 20 largest companies within an industry (three-digit SIC). Within each three-digit SIC industry, we compute the average of the concentration ratio to obtain the industry (three-digit SIC) level concentration ratio.
- Herfindahl-Herschmann Index (1982 to 2007, Manufacturing only): Herfindahl-Herschmann index for the 50 largest companies from the Census Bureau. The HH index is scaled by 10,000. 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 1992 in the years 1993, 1994, 1995, and 1996).

Summary statistics for our concentration measures are reported in Table IA3.

**Table IA3. Summary Statistics**

| Variable | Obs. | Mean | Std. Dev. | P10 | P50 | P90 |
|---|---|---|---|---|---|---|
| Concentration4 (SIC2) | 3,322 | 0.6584 | 0.2408 | 0.3492 | 0.6449 | 1 |
| Concentration20 (SIC2) | 3,322 | 0.9201 | 0.1167 | 0.7424 | 0.9831 | 1 |
| Concentration4 (SIC3) | 12,665 | 0.8564 | 0.1719 | 0.5986 | 0.9275 | 1 |
| Concentration20 (SIC3) | 12,665 | 0.9892 | 0.038 | 0.9769 | 1 | 1 |
| Census 4 (SIC3) | 727 | 0.3688 | 0.2137 | 0.105 | 0.335 | 0.676 |
| Census 20 (SIC3) | 723 | 0.5953 | 0.2505 | 0.23 | 0.619 | 0.932 |
| HH Index (SIC4) | 14,406 | 0.0697 | 0.0637 | 0.0095 | 0.049 | 0.1615 |

Next, we run the same industry-level panel regressions of average capital shares on industry-level volatility and some controls, while controlling for variation in concentration. Tables IA4-IA8 report the results. Essentially, the baseline results reported in the paper, which document a sizeable negative effect of firm-level volatility on the industry's average capital share, are robust to controlling for various measures of concentration. Table IA4 uses the Compustat sales-based concentration

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

measures and idiosyncratic return volatility as the volatility measure. Table IA5 uses the Compustat sales-based concentration measures and idiosyncratic sales volatility as the volatility measure. Table IA6 uses the Census concentration measures and idiosyncratic sales volatility as the volatility measure. Table IA7 uses the HHI for manufacturing and the return-based volatility measure. Table IA8 uses the HHI for manufacturing and sales-based volatility measures. Overall, the evidence is weaker using sales-based volatility measures than when using return-based volatility measures, but the concentration controls never drive out the volatility variables on the right-hand side.

## Table IA4. Average Capital Share, Idiosyncratic Return Volatility, and Concentration: Industry Level 1960 to 2014

The table reports the regression results of industry capital-income-to-sales ratios on 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-to-sales ratio is calculated as the average capital-income-to-sales ratio across firms within an industry. *Idio.Vol(ret)* is the average idiosyncratic stock return volatility within an industry. *Tangibility* is the average of gross property, plant, and equipment (PPEGT) to total assets (AT) within an industry. $M/B$ ratio is the industry average market-to-book ratio within an industry. Industry concentration $Concentration(n)$ is the sales share of the top $N$ largest firms within an industry in the Compustat public firm sample. Concentration4 is the sales share of the top four largest firms within an industry. Concentration20 is the sales share of the top 20 largest firms within an industry. Columns (1) to (3) define industries using three-digit SIC codes, and columns (4) to (6) define industries using two-digit SIC codes. The sample includes all firms in Compustat-CRSP, 1960 to 2014. The sample is winsorized at the 1% level. $t$ statistics are in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, and $^{***}$ $p < 0.01$.

| | Capital Share(SIC3) | | | | Capital Share(SIC2) | | | |
|---|---|---|---|---|---|---|---|---|
| | 1960-2014 (1) | 1980-2014 (2) | 1960-2014 (3) | 1980-2014 (4) | 1960-2014 (5) | 1980-2014 (6) | 1960-2014 (7) | 1980-2014 (8) |
| 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 |
| $R^2$-Adj. | 0.084 | 0.059 | 0.087 | 0.058 | 0.162 | 0.077 | 0.168 | 0.077 |

## Table IA5. Average Capital Share, Idiosyncratic Sales Volatility, and Concentration: Industry Level, 1960 to 2014

The table reports the regression results of industry capital-income-to-sales ratios on 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-to-sales ratio is calculated as the average capital-income-to-sales ratio across firms within an industry. *Idio.Vol(sales)* is the average idiosyncratic sales volatility within an industry. *Tangibility* is the average of gross property, plant, and equipment (PPEGT) to total assets (AT) within an industry. $M/B$ ratio is the industry average market-to-book ratio within an industry. Industry concentration $Concentration(n)$ is the sales share of the top $N$ largest firms within an industry in the Compustat public firm sample. Concentration4 is the sales share of the top four largest firms within an industry. Concentration20 is the sales share of the top 20 largest firms within an industry. Columns (1) to (3) define industries using three-digit SIC codes, and columns (4) to (6) define industries using two-digit SIC codes. The sample includes all firms in Compustat-CRSP, 1960 to 2014. The sample is winsorized at the 1% level. $t$ statistics are in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, and $^{***}$ $p < 0.01$.

| | Capital Share(SIC3) | | | | Capital Share(SIC2) | | | |
|---|---|---|---|---|---|---|---|---|
| | 1960-2014 | 1980-2014 | 1960-2014 | 1980-2014 | 1960-2014 | 1980-2014 | 1960-2014 | 1980-2014 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 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 |
| $R^2$-Adj. | 0.060 | 0.039 | 0.064 | 0.037 | 0.176 | 0.117 | 0.181 | 0.116 |

## Table IA6. Average Capital Share, Idiosyncratic Sales Volatility, and Census Concentration: Industry Level, 2002 & 2007

The table reports regression results of industry capital-income-to-sales ratios on 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 capital-income-to-sales ratio across firms within an industry. *Idio.Vol(sales)* is the average idiosyncratic sales volatility within an industry. *Idio.Vol(ret)* is the average idiosyncratic stock return volatility within an industry. *Tangibility* is the average of gross property, plant, and equipment (PPEGT) to total assets (AT) within an industry. $M/B$ ratio is the industry average market-to-book ratio within an industry. Industry concentration $Census(n)$ is the sales share of the top $N$ largest firms within an industry obtained from the Census Bureau. Census 4 is the sales share of the top four largest firms within an industry. Census 20 is the sales share of the top 20 largest firms within an industry. Industries are defined using three-digit SIC codes. The sample includes all firms in Compustat-CRSP, 1960 to 2014. The sample is winsorized at the 1% level. $t$ statistics are in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, and $^{***}$ $p < 0.01$.

| | 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 |

**Table IA7. Average Capital Share, Idiosyncratic Return Volatility, and Herfindahl-Herschmann Index: Manufacturing, 1982 to 2015**

The table reports regression results of industry capital-income-to-sales ratios on 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–to-sales ratio is calculated as the average capital-income-to-sales ratio across firms within an industry. *Idio.Vol(sales)* is the average idiosyncratic sales volatility within an industry. *Idio.Vol(ret)* is the average idiosyncratic stock return volatility within an industry. *Tangibility* is the average of gross property, plant, and equipment (PPEGT) to total assets (AT)within an industry. $M/B$ ratio is the industry average market-to-book ratio within an industry. Industry concentration is measured using the Herfindahl-Herschmann Index (HHI) obtained from the Census Bureau. Industries are defined using four-digit SIC codes. The sample includes all firms in Compustat-CRSP, 1960 to 2014. The sample is winsorized at the 1% level. $t$ statistics are in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, and $^{***}$ $p < 0.01$.

| | 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 |
| $R^2$-Adj. | 0.044 | 0.038 | 0.042 |

**Table IA8. Average Capital Share, Idiosyncratic Sales Volatility, and Hirschmann-Herfindahl Index: Manufacturing, 1982-2015**

The table reports regression results of industry capital-income-to-sales ratios on 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-to-sales ratio is calculated as the average of capital-income-to-sales ratio across firms within an industry. *Idio.Vol(sales)* is the average idiosyncratic sales volatility within an industry. *Idio.Vol(ret)* is the average idiosyncratic stock return volatility within an industry. *Tangibility* is the average of gross property, plant, and equipment (PPEGT) to total assets (AT) within an industry. $M/B$ ratio is the industry average market-to-book ratio within an industry. Industry concentration is measured using Herfindahl-Herschmann Index (HHI) obtained from the Census Bureau. Industries are defined using four-digit SIC codes. The sample includes all firms in Compustat-CRSP, 1960 to 2014. The sample is winsorized at the 1% level. $t$ statistics are in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, and $^{***}$ $p < 0.01$.

| | 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 |
| $R^2$-Adj. | 0.031 | 0.025 | 0.030 |

# IV. Cohort Effects

In Figure IA5, we plot the average and aggregate capital-income-to-sales ratio for firms that entered the public domain in different years and survived throughout the entire sample. We keep the identity of firms in each vintage cohort unchanged. Figure IA5, Panel A, shows that on average firms that entered in the 1960s and have survived up to recent decades have the highest capital-income-to-sales ratios, while firms that entered recently (1990s and 2000s cohorts) have on average the lowest capital-income-to-sales ratios, consistent with selection. Furthermore, the steeper upward drift in average over time 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 volatility early on in their life. However, from the aggregate capital shares plotted in Figure IA5, Panel B, we find no clear pattern across vintages in aggregate capital shares. It is not the case that only firms that 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 the firm size distribution, which are the driving force behind the aggregate ratio, can be firms from older vintages that have survived long enough or firms that entered recently with good draws of productivity.

In Figure IA6, we explore the cohort effects among the largest and smallests firms. Each year, we identify firms in the top (bottom) 20 percentile of the 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 firm 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 recent cohorts are somewhat more profitable than those from older cohorts, but the evidence is not overwhelming.

In Figure IA6, 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 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, Dorn, Katz, Patterson, and Reenen (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 the firm size distribution.

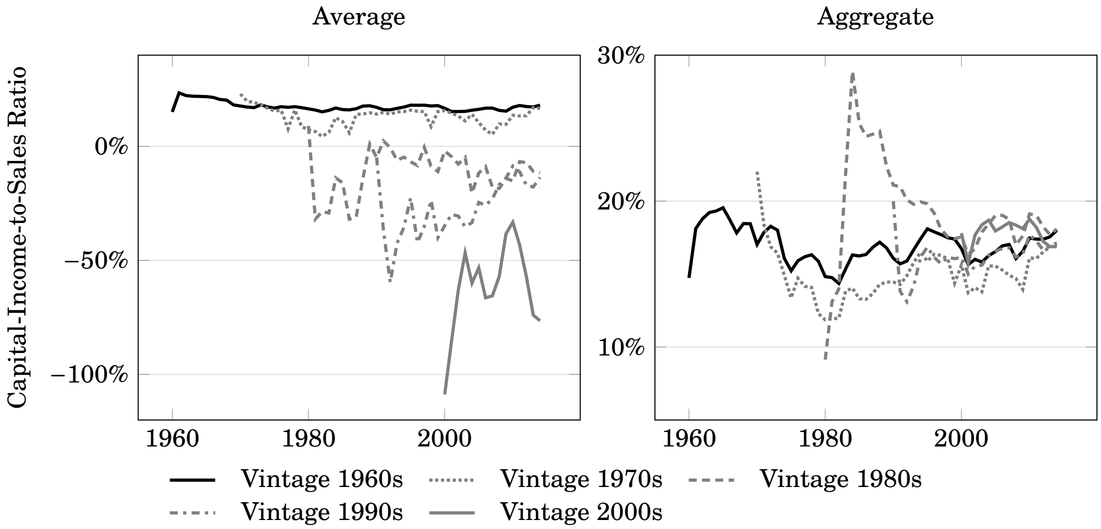



**Figure IA5. Capital-income-to-sales ratio by entry cohorts.** This figure plots the average and the aggregate capital-income-to-sales ratio by entry cohort. For example, wintage 1960s corresponds to the set of firms who went public between 1960 to 1970 and survived over the entire sample period (until 2014). We keep the composition of firms in each group fixed and plot the average and aggregate capital-income-to-sales ratio within each cohort. Thus, the vintage here represents firms' survival period. The sample is winsorized at the 1% level. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

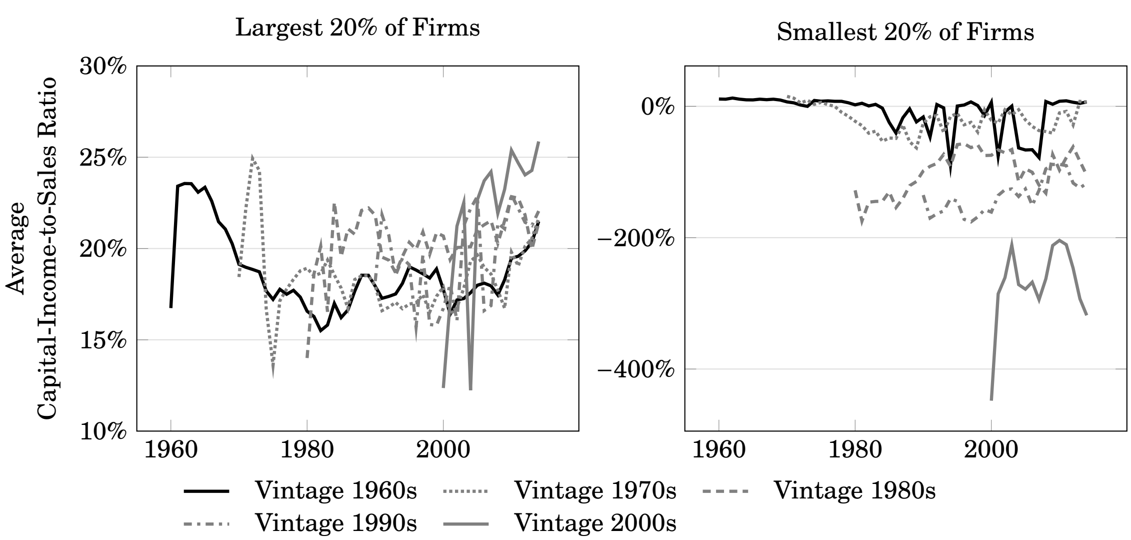



**Figure IA6. Capital-income-to-sales ratio by entry cohorts among largest and smallest firms.** This figure presents the average and the aggregate capital-income-to-sales ratio by entry cohort among the largest and smallest firms. Each year, we identify firms in the top and bottom 20 percentile of the size distribution. Then, within each size group, we identify the entry year of each firm and group them in to five entry cohorts. We next compute the average capital-income-to-sales ratio of each entry cohort. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

# V. Additional Cross-Sectional Evidence

Since the firm size distribution may reflect not just the change in contemporaneous volatility but also, to some extent, 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 additional evidence on past volatility and the dispersion of capital share. We consider two models. In the first, we use lagged industry-level idiosyncratic volatility directly as a control, while in the second, we use a moving average of current and past idiosyncratic volatility to capture the cumulative effect of past volatility.

### Table IA9. Average Capital Share and Past Idiosyncratic Volatility: Industry Level, 1960 to 2014

The table reports regression results of industry capital-income-to-sales ratios on past average idiosyncratic volatility. The industry capital-income-to-sales ratio is calculated as the average capital-income-to-sales ratio across firms within an industry. *Idio.Vol(ret)* is the average annualized idiosyncratic stock return volatility within an 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) within an industry. $M/B$ ratio is the industry average market-to-book ratio within an industry. Columns (1) to (3) define industry using three-digit SIC codes, and columns (4) to (6) define industries using two-digit SIC codes. The sample includes all firms in Compustat-CRSP, 1960 to 2014. The sample is winsorized at the 1% level. $t$ statistics are in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, and $^{***}$ $p < 0.01$.

| | Capital Share(SIC2) | | | Capital Share(SIC3) | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 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 |
| $R^2$-Adj. | 0.161 | 0.160 | 0.163 | 0.084 | 0.075 | 0.071 |

# VI. Robustness

In Figures IA7 to IA10, we reconstruct our main results from Section I and SectionV of the main article adjusting our measure of capital income by adding back R&D expenses.

In Figures IA11 to IA13, we present our results using different winsorization procedures.

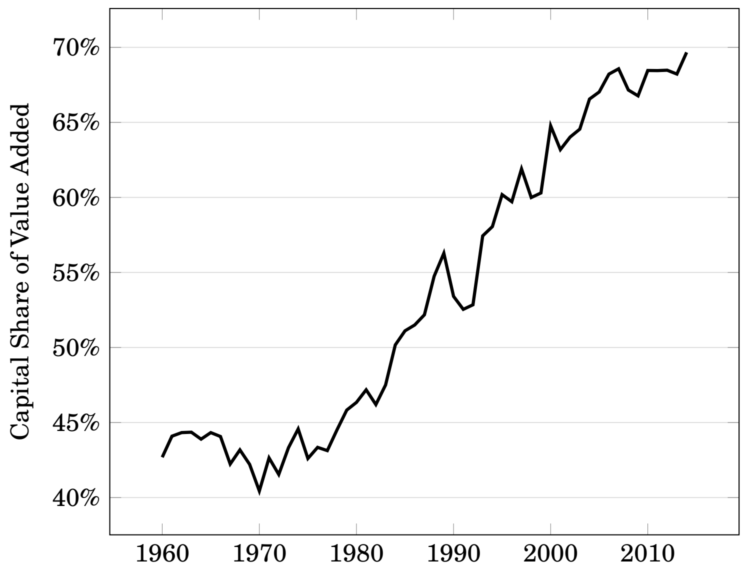



**Figure IA7. The aggregate capital share of value added.** This figure plots the aggregate capital share of value added.The aggregate capital share is $\sum_i$ Operating Income$_i$ + R&D Expenses$_i$ divided by $\sum_i$ Imputed XLR$_i$ + Operating Income$_i$ + R&D Expenses$_i$. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

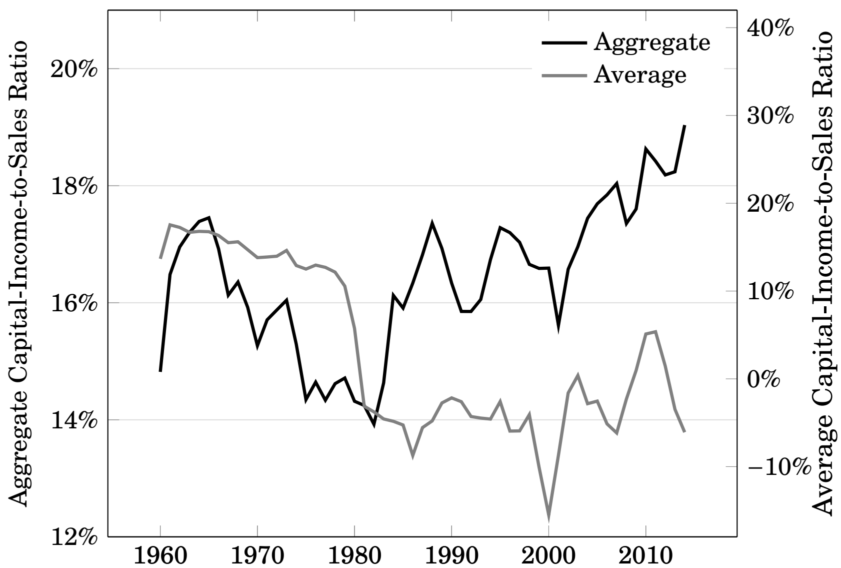



**Figure IA8. Aggregate and average capital share.** This figure plots the aggregate and average capital-income-to-sales ratio. We define capital income as operating income + R&D expenses. The aggregate capital income to sales ratio is $\sum_i$ Operating Income$_i$ + R&D Expenses$_i$ divided by $\sum_i$ 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 to 2014).


**Figure IA9. 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 the 1% level. The sample includes all firms in Compustat-CRSP merged Fundamentals Annual for 1960 to 2014.

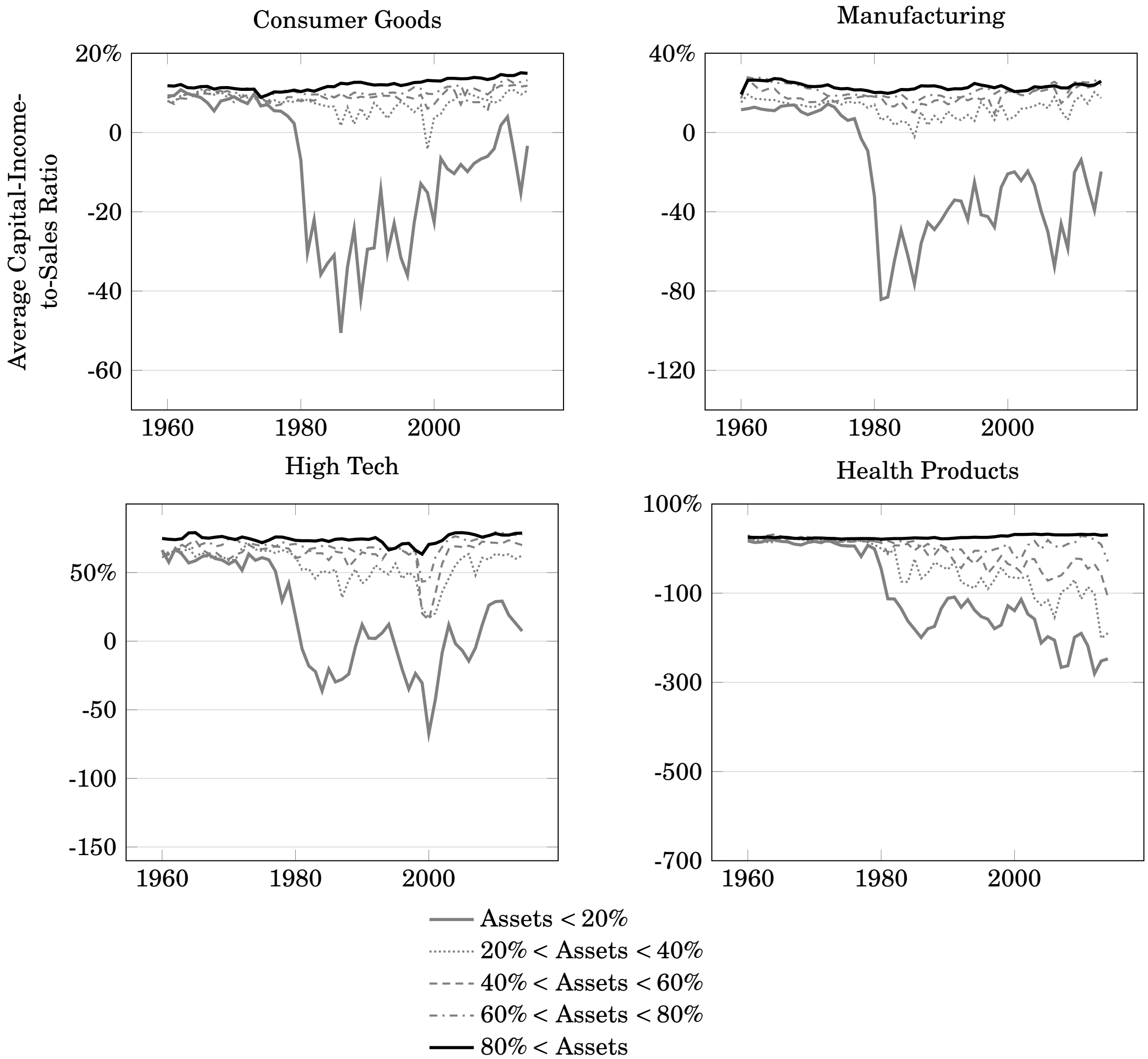



**Figure IA10. Average capital-income-to-sales ratio in size groups (FF 5 Industrires).** Industries are defined using the Fama-French five-industry classification. We omit the industry classification "other" because it contains few firms after excluding financial firms. Within each industry, we sort firms into five groups based on their total assets. The plot shows the average ratio of capital income (OIBDP+XRD) to sales within each size group for four industries. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

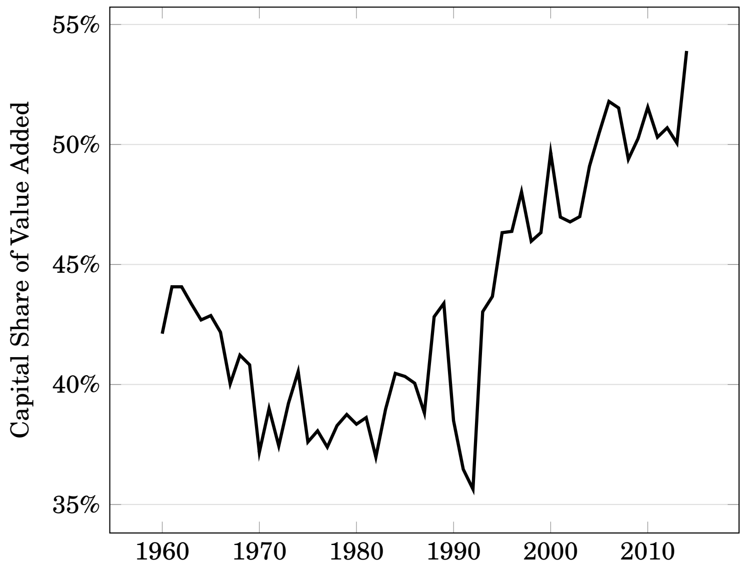



**Figure IA11. The aggregate capital share of value added.** This figure plots the aggregate capital share of value added. The aggregate capital share is $\sum_i$ Operating Income$_i$ divided by $\sum_i$ Imputed XLR$_i$ + Operating Income$_i$. The sample is winsorized at the **1%** level. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

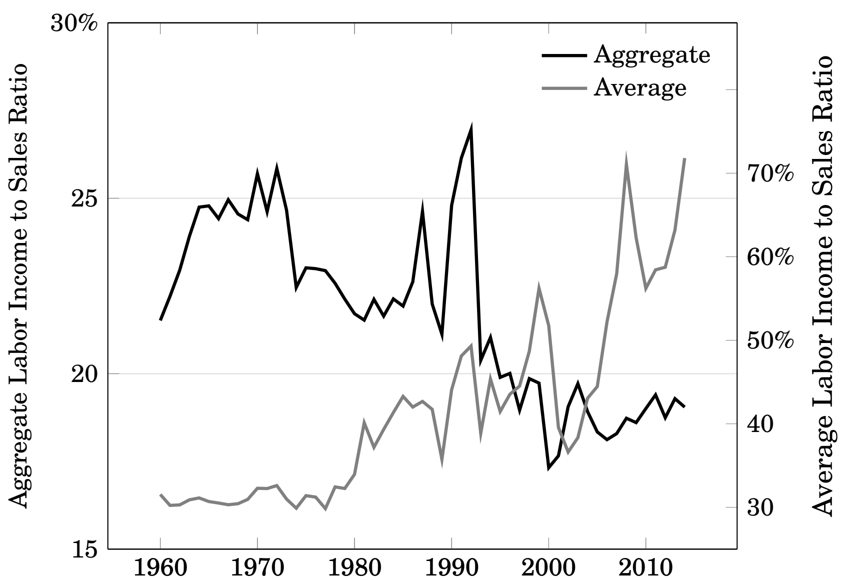
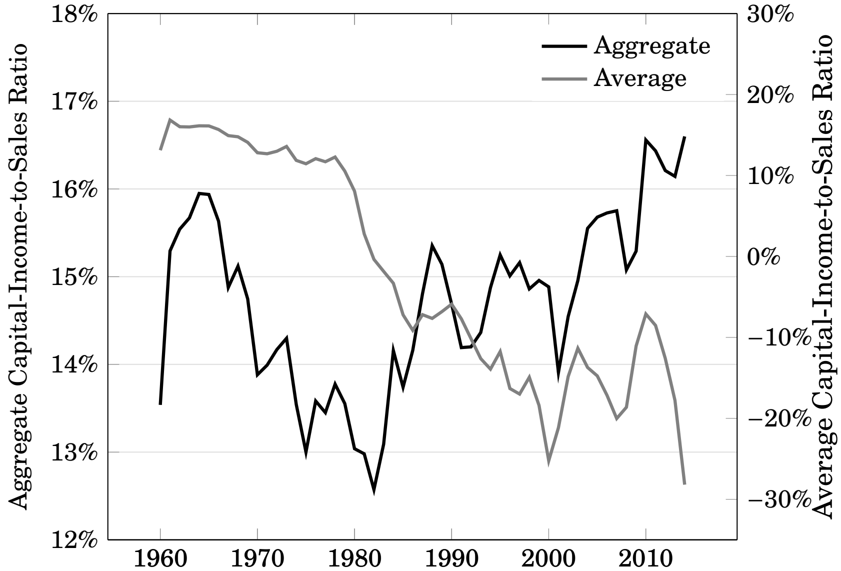



**Figure IA12. Aggregate and average labor-income-to-sales ratio** The aggregate labor-income-to-sales ratio is $\sum_i$ Extended XLR$_i$ divided by $\sum_i$ Sales$_i$ for each year. The average labor-income-to-sales ratio is the simple average labor-income-to-sales ratio across firms for each year. The sample is winsorized at the **1%** level. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

Panel A




Panel B

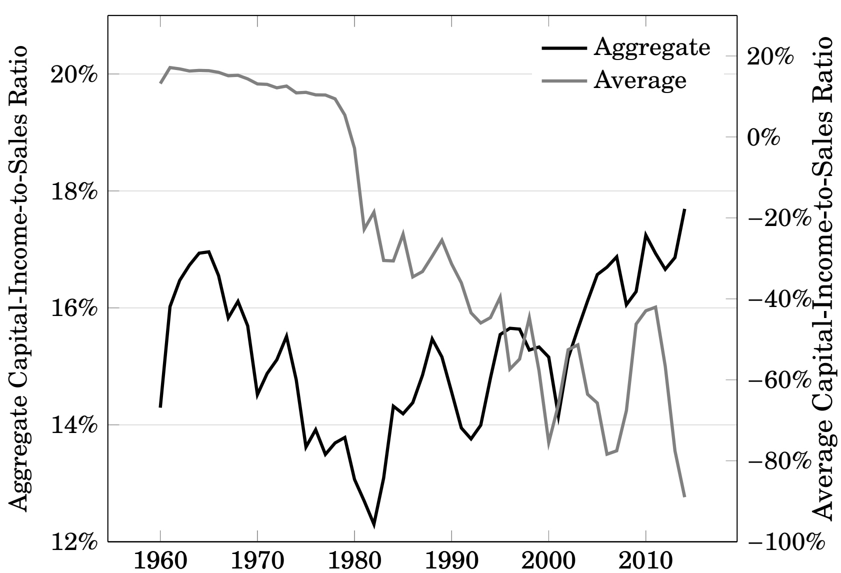



**Figure IA13. Aggregate and average capital share.** This figure reports the capital-income-to-sales ratio. The aggregate capital-income-to-sales ratio is $\sum_i \text{Operating Income}_i$ divided by $\sum_i \text{Sales}_i$ for each year. The average capital-income-to-sales ratio is the simple average of the firm-level capital capital-income-to-sales ratio for each year. In Panel A, we use the sample with winsorization at the 2.5% level. In Panel B, we use the sample with winsorization at the 0.5% level. Source: Compustat/CRSP Merged Fundamentals Annual (1960 to 2014).

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