Asymmetric Investment Rates

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Abstract

Integrating national accounting with financial accounting, we measure firm-specific current-cost capital stocks and flows for the entire Compustat universe. The firm-level current-cost investment rate distribution is heavily right-skewed, with a small fraction of negative investment rates, 5.51%, but a huge fraction of positive investment rates, 91.64%. Firm-level investment is also lumpy, featuring a fraction of 32.66% for positive spikes (investment rates higher than 20%). For a typical firm, 39% of total investment is completed within 20% of the sample years. Our data infrastructure facilitates empirical investment research and guides the calibration of theoretical models on firm investment.

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1 Introduction

How to measure the investment rate? While largely settled at the macro level, as exemplified by the fixed assets accounts at Bureau of Economic Analysis (BEA), this deceptively simple problem remains a serious challenge at the micro firm level. A meta-analysis of the published literature from 2000 onward at top-five finance journals identifies 347 articles that contain 393 appearances of 40 different firm-level investment rates (mostly based on Compustat).[1] Across the 40 measures, the mean varies wildly from 3.38% per annum to 64.03%, the cross-sectional standard deviation from 7.13% to 128.63%, the skewness from 1.48 to 4.49, and the serial correlation from 0.14 to 0.66 (Figure 1). This giant mess of 40 different investment rates cries out for more scientifically accurate measurement.[2]

The main challenge to overcome is the macro-micro disconnect in accounting (Becker et al. 2006). Ideally, capital stocks and flows should be measured first at the micro level (firms or establishments) from the universe of micro units or its representative surveys. Their macro counterparts should then be measured as the properly weighted aggregates of the micro data. In practice, however, macro (national) accounting and micro (financial) accounting follow dramatically different approaches. Macro accounting is based on a top-down, supply-side approach, with its key inputs from production data of capital goods producing industries. In contrast, micro accounting is based on a bottom-up, demand-side approach, with its key inputs from investment demand data of a micro unit. The two different data inputs yield markedly different properties for the investment rate, giving rise to much confusion and inconsistency in the prior literature on firm investment.

[1] The top-five finance journals include Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Financial and Quantitative Analysis, and Review of Finance.

[2] We focus only on tangible, fixed investments. Because tangible and intangible investments forecast returns with opposite slopes (Hou et al. 2021), we do not sum up tangible and intangible investments. More important, measuring intangible investments other than research and development at the firm level is mostly speculative. Many intangible investments such as supply chain management, employee training, and information technology are immediately expensed. However, no accounting information is available to recover the portion of intangible investments from selling, general, and administrative expenses. Even advertising contains both current period expense and intangible investment components, the portions of which are difficult to determine across firms and over time. In addition, to form the intangibles stock, one must take a stand on the amortization rate and capital price deflator, which are likely to differ across industries, if not across firms or types of intangibles. All in all, in our view, measuring intangibles is unlikely to be based on accounting data alone but inferred from the market value of equity in the context of a structural model. Our construction of the replacement cost of (fixed) capital can serve as an essential building block in this endeavor.

To measure the firm-level investment rate, we attempt to integrate macro accounting in national accounts with financial accounting in Compustat. We exploit their respective strengths, while avoiding their respective weaknesses. Doing so requires a broad understanding of both national and financial accounting and, more important, an in-depth knowledge of the intricacies of Compustat dataset, intricate details that matter a great deal when designing our measurement procedure.

The centerpiece of our data infrastructure is firm-specific current-cost capital stocks (the replacement costs of capital) via perpetual inventory method. We measure investment flows as the change in net property, plant, and equipment (PPE) plus accounting depreciation in Compustat. We calculate industry-specific capital and investment price deflators as well as economic depreciation rates based on the BEA data and assign them to all the firms within a given industry. As a byproduct, we develop a meticulous mapping between Compustat firms and industry classification based on North American Industry Classification System (NAICS), while converting different versions of Standard Industry Classification (SIC) codes into NAICS codes prior to June 1985.

In our 1963–2020 working sample that contains 169,828 firm-years drawn from Compustat, the current-cost investment rate (change in net PPE plus accounting depreciation scaled by current-cost capital) has an average of 23.84% per annum, which is much higher than the median of 13.03%. The cross-sectional standard deviation is 37.2%, and the serial correlation 0.34. As a testimony for the importance of our economic accounting, the ratio of current-cost capital to historical-cost capital (net PPE) is on average 2.11, with a median of 1.61, and a standard deviation of 1.79. The difference between current- and historical-cost capital is largely due to the difference between economic and accounting depreciation rates, 6.9% versus 20.94% per annum, on average.

Strikingly, our first major contribution is to show that the firm-level asymmetry is even stronger than the Cooper-Haltiwanger (2006, CH hereafter) plant-level asymmetry, apparently contradicting the intuition of aggregation. The firm-level current-cost investment rate distribution is heavily right-skewed (skewness = 3.33), with a small fraction of negative investment rates (below −1%), 5.51%, a tiny fraction of inactive investment rates (between −1% and 1%) of 2.85%, and a huge fraction of positive investment rates (above 1%), 91.64%.[3] With CH's cutoffs of −20% and 20% for negative and positive investment spikes, the negative and positive spike rates are 1.26% and 32.66% in our sample, respectively. The asymmetry between the small fraction of negative investment rates and the huge fraction of positive investment rates as well as the asymmetry between the tiny negative spike rate and the large positive spike rate strongly indicate costly reversibility.

Compared with the prior plant-level evidence, the firm-level fraction of negative investment rates is smaller, 5.51% versus 10.4%, but the fraction of positive investment rates is larger, 91.64% versus 81.5%. Similarly, the firm-level negative spike rate is lower, 1.26% versus 1.8%, but the positive spike rate is higher, 32.66% versus 18.6%. Digging deeper into the data, we identify CH's use of balanced panel, which contains relatively large manufacturing plants in continuous operations in their 1972–1988 sample, as the most likely source of our "inversion" of the plant-to-firm aggregation intuition. Imposing a balanced panel on our firm data shows weaker asymmetry than CH. However, while acknowledging the plant-level asymmetry (in unobserved plants population) as likely stronger than the firm-level asymmetry, the *observable* patterns are indeed reversed.

Our second major contribution is to show that firm-level investment is also lumpy, again working against the intuition of plant-to-firm aggregation. In addition to the positive spike rate of 32.66%, we extend Doms and Dunne's (1998, DD hereafter) classic, plant-level tests to the firm level. To ease comparison with their balanced panel of plants, we split our unbalanced Compustat panel of firms by decade. For each decade, we include only firms with a complete coverage to yield a balanced panel. We show that averaged across six decades, about 39% of total investment is completed within just two years (20% of the sample years). For comparison, DD show that about 50% of total investment is done within three out of 16 years (about 20%) in their sample.

Our third, and most important, contribution is our data infrastructure on firm-specific current-

[3] Our definition of negative investment rates (below −1%), inactive investment rates (between −1% and 1%), and positive investment rates (above 1%) follows exactly CH's definition.

cost capital stocks and flows for the entire Compustat universe. Attempting to mitigate the macro-micro disconnect in accounting, our data infrastructure represents a major progress in firm-level capital measurement. Another meta-study covers 33 prior studies, starting from Lindenberg and Ross (1981). Only ten out of 33 are published from 2000 onward at the top journals, outcompeted by the huge literature based only on financial accounting in our first meta-study. Our experience is that *the devil is in the details*. The prior studies fall short in many empirical, technical details and fail to realize the full potential of the data. Most important, we view our data infrastructure as representing the state-of-the-art for measuring firm-level capital stocks and flows.

Our data infrastructure is likely of broad impact. Initiated by Arrow (1968), a theoretical literature on irreversibility has long established.[4] Available evidence is mostly from plant-level studies on manufacturing plants from the Census Bureau's Longitudinal Research Database (LRD) (Caballero, Engel, and Haltiwanger 1995; DD 1998; CH 2006). Unfortunately, the Census Bureau has stopped collecting relevant data such as capital retirements since 1987. Without updated evidence, theorists are left in the dark when calibrating (estimating) firm investment models. Also, plant-level moments do not transport directly to the firm level. As shown in the enormous heterogeneity in our first meta-study, even basic moments such as the mean, standard deviation, skewness, and autocorrelation of the investment rate are controversial, not to say other important moments such as the fractions of negative and inactive investment rates as well as the spike rates. Our data infrastructure provides a much needed, long overdue update of CH for characterizing micro investment behavior.

Our accurately measured investment moments are of critical importance. In asset pricing, for example, investment irreversibility is widely viewed as a causal force underlying the value premium (Zhang 2005; Tuzel 2010). However, irreversibility has recently been challenged on empirical grounds.[5] In corporate finance, moments (such as standard deviation and serial correlation) on

[4]Costly reversibility has featured in the real options framework (Bernanke 1983; McDonald and Siegel 1986; Dixit and Pindyck 1994) and in the neoclassical q-theory of investment (Abel 1983; Abel and Eberly 1994, 1996).

[5]In a recent *Journal of Finance* article, Clementi and Palazzo (2019) report a largely *symmetric* investment rate distribution in Compustat, with a large fraction of negative investment rates, 18.2%, and conclude "no sign of irreversibility (p. 289)." Their evidence is flawed, as shown in our replication study (Bai et al. 2024). A data error

investment (and capital structure) are essential empirical targets for theorists to gauge the magnitude of frictions, such as taxation, bankruptcy costs, and external financing costs (Hennessy and Whited 2007; DeAngelo, DeAngelo, and Whited 2011). By securing the calibration targets on solid empirical foundation, our data infrastructure paves the way for future theoretical development. More broadly, our firm-level capital measurement, with comparable quality with national accounts, allows one to reexamine many prior, empirical results on investment and other corporate policies.

Our data work is also of interest to macroeconomists. Becker et al. (2006, p. 543) write: "getting capital measurement right at the micro level needs to be viewed as a critical part of the data infrastructure used to measure capital in the United States." Compustat is one of very few micro datasets on which one can construct current-cost capital due to its long coverage on investment series.[6]

The rest of the article is organized as follows. Section 2 elucidates the macro-micro disconnect in accounting in order to motivate our massive data work. Section 3 details our construction of firm-specific current-cost capital stocks and flows. Section 4 characterizes firm-level investment behavior. Finally, Section 5 concludes. A separate Internet Appendix furnishes supplementary results.

2 Why? The Macro-Micro Disconnect in Accounting

In subsection 2.1, we briefly review capital measurement in national accounts. In subsection 2.2, we conduct a meta-study on firm-level investment rates in Compustat.

2.1 National Accounting in the BEA

We provide a primer on economic accounting for fixed assets in the U.S. national accounts (the Internet Appendix A). Briefly, aggregate capital is based on a top-down supply-side approach (BEA

on depreciation rates understates gross investment and shifts the whole gross investment rate distribution leftward. Nonstandard sample screens on age and acquisitions further curb its right tail, which is then truncated at 0.2. Their flawed evidence enters their model calibration, which ultimately gives rise to problematic theoretical conclusions.

[6]Since 1993, the Census Bureau has been conducting Annual Capital Expenditures Survey (ACES) to collect firm-level data on capital stocks and investment flows for both manufacturing and non-manufacturing firms. However, measuring current-cost capital stocks in ACES faces severe difficulties. Because the data start in 1993, the left-censoring problem is severe. More important, the sampling rotation in ACES is annual, meaning that accumulating investment series via perpetual inventory is infeasible for many small firms. These two problems are absent in Compustat. However, ACES covers more firms than just publicly traded companies. We leave its exploration to future work.

2003; Becker et al. 2006). BEA obtains the domestic supply of each capital good from production data of capital goods producing industries. Capital purchases by government and consumers are deducted to obtain gross investment flows by asset class. To form capital stocks by asset class, BEA applies the perpetual inventory method (PIM) on gross investment series, depreciation profiles, and investment price deflators (mostly Producer Price Indexes from Bureau of Labor Statistics).

While the top-down approach works well for aggregates, it is more challenging at the industry-asset level. Distributing investment totals by asset type across industries is based on strong assumptions on the employment-capital relation, especially for equipment investment (Meade, Rzeznik, and Robinson-Smith 2003; Becker et al. 2006). For most asset types, BEA uses geometric depreciation rates because geometric, rather than straight-line, patterns more closely approximate actual profiles of used capital price declines in the data (Hulten and Wykoff 1981a, 1981b; Fraumeni 1997).

To provide an economic benchmark with which we compare firm-level investment rates, we show the basic properties of aggregate, sector, and industry investment rates from the BEA. From the detailed tables for 63 private NAICS-industries from the BEA's fixed assets accounts, we obtain: (i) current-cost investments in private nonresidential equipment, $I_{jt}^{\mathcal{E}\$}$, and structure, $I_{jt}^{\mathcal{S}\$}$, by industry, millions of dollars, annual, 1947–2020; and (ii) current-cost capital stocks in private nonresidential equipment, $K_{jt}^{\mathcal{E}\$}$, and structure, $K_{jt}^{\mathcal{S}\$}$, by industry, millions of dollars, annual, 1947–2020.

For industry j in year t, we calculate its current-cost investment rate as $I_{jt}^{\$}/K_{jt-1}^{\$} = (I_{jt}^{\mathcal{E}\$} + I_{jt}^{\mathcal{S}\$})/(K_{jt-1}^{\mathcal{E}\$} + K_{jt-1}^{\mathcal{S}\$})$. We calculate current-cost investment rates for the 20 BEA sectors by summing up investments and capital stocks across all industries within each sector, i.e., for sector s in year t, we calculate its current-cost investment rate as $I_{st}^{\$}/K_{st-1}^{\$} = (\sum_{j\in s} I_{jt}^{\mathcal{E}\$} + \sum_{j\in s} I_{jt}^{\mathcal{S}\$})/(\sum_{j\in s} K_{jt-1}^{\mathcal{E}\$} + \sum_{j\in s} K_{jt-1}^{\mathcal{S}\$})$. Analogously, we calculate the aggregate current-cost investment rate as $I_t^{\$}/K_{t-1}^{\$} = (\sum_j I_{jt}^{\mathcal{E}\$} + \sum_j I_{jt}^{\mathcal{S}\$})/(\sum_j K_{jt-1}^{\mathcal{E}\$} + \sum_j K_{jt-1}^{\mathcal{S}\$})$.

Table 1 shows that the aggregate investment rate is on average 9.63% per annum in the 1963–2020 sample, with a standard deviation of 1.27%. We start the sample in 1963 to ease comparison with the Compustat sample that starts in 1963. The aggregate investment rate distribution is close to normal, with tiny skewness and excess kurtosis. The power of aggregation is in full display, as it erases any trace of asymmetry and lumpiness. The investment rate moves within a relatively narrow range from 6.6% to 12.1%, with a high serial correlation of 0.83. The investment rate distribution starts to show a skewness of 1.06 at the sector level and 1.61 at the industry level. The histograms confirm the weak asymmetry (Figure S1 in the Internet Appendix).

2.2 Financial Accounting in Compustat

For a meta-study on investment rates in Compustat, we systematically search the articles published from 2000 onward at the top-five journals. In total, we have identified 347 studies that contain 393 appearances of 40 different investment rates. Appendix A details the variable definitions.[7]

Figure 2 reports the frequency distribution of the 40 investment rates in our dataset. The three most popular measures are CAPX/AT (capital expenditure over total assets); CAPX/PPENT (capital expenditure over net PPE); and dAT/AT (the growth of total assets), which account for 34.61%, 13.74%, and 12.72%, respectively, of the 393 total appearances. The top three measures add up to 61.07%. On the other extreme, 14 measures have each appeared only once, and five measures twice.

Most studies work with gross investment. The most popular gross investment is capital expenditure from cash flow statement. Several studies work with net investment such as change in net PPE, but the most popular net investment is change in total assets, especially in asset pricing (Cooper, Gulen, and Schill 2008). For the denominator to scale investment, three popular choices are net PPE, gross PPE, and total assets. Net PPE is historical-cost capital in financial accounting. The use of gross PPE implicitly indicates that net PPE is a poor proxy of current-cost capital.

We obtain accounting variables from annual Standard and Poor's Compustat industrial files.

[7] Table S1 in the Internet Appendix details the references of the 347 articles. In addition, after completing a first pass of our meta-study, we come across Mitton (2022), who reviews several popular variables, including investment, in empirical corporate finance within top-three finance journals in the 2000–2018 sample. We thank Todd Mitton for kindly sharing his data on 30 investment variables, which we use to cross-check with our dataset. Among the 30 variables, two are scaled by replacement costs of capital (which we review in depth in the Internet Appendix C), and 12 are either investment levels or investment scaled by sales. Only 16 variables are investment rates.

We exclude financials (SIC between 6,000 and 6,999), firms with negative book equity, and firm-years with nonpositive total assets, net PPE, or sales. In Compustat, both stocks and flows are recorded at the end of period t. When working with annual data, for $t = 2002$, for example, we take time-t stocks from the 2001 balance sheet and time-t flows from the 2002 income or cash flow statement. As such, in the investment rate, capital is 1-period-lagged relative to investment.

Table 2 shows the time series averages of cross-sectional moments for the 40 investment rates in the 1963–2020 sample. The mean investment rate varies wildly from 3.38% for (CAPX−DP)/AT (capital expenditure minus depreciation, scaled by total assets) to 64.03% for (CAPXV+AQC)/PPENT (capital expenditure on PPE plus acquisitions, scaled by net PPE). The standard deviation ranges drastically from 7.13% for (CAPX−DP)/AT to 128.63% for (CAPXV+AQC)/PPENT. The serial correlation, which is the key target for calibrating adjustment costs in firm investment models, also varies greatly from 0.14 for dNAT/NAT (growth in nonfinancial assets [total assets minus current assets plus total inventories]) to 0.66 for CAPX/AT.

The pairwise correlations among the 40 investment rates vary greatly (Table S2 in the Internet Appendix). The Pearson correlation ranges from 0.18 between dBe/Be (the growth of book equity) and CAPX/(PPENT−CAPX+DP) to 0.988 between CAPXV/PPENT and (CAPXV−SPPE)/PPENT (CAPXV minus sales of PPE, scaled by net PPE), with a mean of 0.56. The Spearman correlation varies from 0.23 between CAPX/(AT−CHE) (CAPX scaled by noncash assets, item AT minus cash and cash equivalents) and dBe/Be to 0.987 between (CAPX−SPPE)/avePPENT (CAPX minus SPPE, scaled by average net PPE) and (CAPX−SPPE)/PPENT, with a mean of 0.61. The wild wild west of firm-level investment rates, often with low pairwise correlations, cries out a dire need for more accurate measurement.

3 Firm-level Capital Measurement

To instill discipline in measurement, we attempt to mitigate the macro-micro disconnect in accounting. We rely on financial accounting in Compustat to supply firm-specific investment flows, thereby avoiding the BEA's weakness in disaggregated data. We rely on the BEA for data on economic depreciation and price deflators, thereby avoiding Compustat's weakness on such information.

Our main challenge is to construct the current-cost capital stock, denoted $K^{\$}_{it}$, for the entire Compustat universe. The quantity of capital stock, denoted K_{it}, is $K^{\$}_{it}$ scaled by the capital price deflator that is applicable to firm i, denoted P^K_{it}. The quantity of capital stock accumulates as:

$$K_{it+1} = (1 - \delta_{it})K_{it} + I_{it}, \tag{1}$$

in which δ_{it} is the economic depreciation rate, and I_{it} is the quantity of investment.

Let $I^{\$}_{it}$ denote the current-cost investment. The current cost and quantity are related via $I_{it} = I^{\$}_{it}/P^I_{it}$, in which P^I_{it} is the investment price deflator. The capital and investment price deflators are not identical in the BEA data, i.e., $P^K_{it} \neq P^I_{it}$ (Section 3.2). Intuitively, their underlying asset compositions differ, and relative asset prices change over time. Investment tends to include newer types of assets than existing capital stock. Accordingly, the prices of capital and investment inflate at different rates. Another difference is the timing of measurement. The capital price deflator is measured at the end of a given period, but the investment price deflator is in the middle of the period.

Rewriting equation (1) in terms of current-cost capital and investment yields:

$$\frac{K^{\$}_{it+1}}{P^K_{it+1}} = (1 - \delta_{it})\frac{K^{\$}_{it}}{P^K_{it}} + \frac{I^{\$}_{it}}{P^I_{it}} \qquad \Rightarrow \qquad K^{\$}_{it+1} = \left((1 - \delta_{it})\frac{K^{\$}_{it}}{P^K_{it}} + \frac{I^{\$}_{it}}{P^I_{it}}\right) P^K_{it+1}, \tag{2}$$

in which $(1 - \delta_{it})K^{\$}_{it}/P^K_{it} + I^{\$}_{it}/P^I_{it}$ is the next-period quantity of capital, K_{it+1}, to be inflated with P^K_{it+1} to obtain the current cost, $K^{\$}_{it+1}$. To iterate on equation (2), we need to measure: (i) current-cost investment flows, $I^{\$}_{it}$; (ii) capital and investment price deflators, P^K_{it} and P^I_{it}; (iii) economic depreciation rates, δ_{it}; and (iv) the initial value of current-cost capital stock, $K^{\$}_{i0}$, to start the iteration. In what follows, we detail our procedures for measuring these components.

3.1 Investment Flows

We measure the current-cost investment, $I^{\$}_{it}$, as the historical-cost investment, I^{H}_{it}, which is the change in net PPE plus accounting depreciation. In what follows, we explain why this $I^{\$}_{it}$ measure is arguably the best option given a myriad of data limitations in Compustat.

Expanding on Hayashi and Inoue (1991), we detail different investment flows. Let PPEGT_t, PPENT_t, and DPACT_t be the gross PPE, net PPE, and accumulated depreciation at the beginning of year t, respectively; DP_t be the accounting depreciation during year t; ACQ_t be the gross book value of fixed assets acquired during year t; ACDACQ_t be the accumulated depreciation of acquired fixed assets; $\text{NACQ}_t = \text{ACQ}_t - \text{ACDACQ}_t$ be the net book value of acquired fixed assets; SR_t be the gross book value of fixed assets disposed during year t; ACDSR_t be the accumulated depreciation for disposed fixed assets; and $\text{NSR}_t = \text{SR}_t - \text{ACDSR}_t$ be the net book value of disposed fixed assets.

In addition to capital expenditure, firms also acquire assets via mergers and acquisitions (M&A). For mergers recorded with the pooling-of-interests method, balance sheet items are directly combined. In such cases, ACQ_t includes the accumulated depreciation from the target. Based on the Compustat data on acquisition method (item ACQMETH), 9.71% of M&As involve the pooling-of-interests method. Because ACQ_t can include accumulated depreciation, we need to keep track of ACDACQ_t as accumulated depreciation and NACQ_t as net book value of acquired fixed assets.[8]

Accounting identities yield: (i) net PPE equals gross PPE minus accumulated depreciation:

$$\text{PPENT}_t = \text{PPEGT}_t - \text{DPACT}_t; \tag{3}$$

[8] In Compustat, item ACQMETH (acquisition method) is available from June 1974 onward. For firms that have had a common stock traded on NYSE, Amex, or Nasdaq, the distribution of acquisition methods is as follows: 89.17% purchase method (code 'AP'); 7.19% pooling-of-interests method (code 'AI'); 2.45% a combination of purchase method and pooling-of-interests method (code 'AE'); 1.03% reverse purchase method (code 'RP'); 0.10% a combination of reverse purchase method and purchase method (code 'RU'); 0.06% a combination of reverse purchase method and pooling-of-interests method (code 'RO'); and 0.01% a combination of all three methods (code 'RW'). In total, 9.71% of all observations involve the pooling-of-interests method. The Financial Accounting Standards Board (FASB) issues Statement No. 141 in 2001 to end the usage of the pooling-of-interests method. In Compustat, M&As via the pooling-of-interests method (or a combination that involves its use) largely stop in 2001. However, there still exist a few observations afterward, including 23 occurrences of 'AI' in as late as 2017, 15 'AE' in 2018, and 17 'RO' in 2019.

(ii) the next-period gross PPE equals the current-period gross PPE plus the gross book value of acquired fixed assets, ACQ_t, net of the gross value of disposed fixed assets during year t, SR_t:

$$\mathrm{PPEGT}_{t+1} = \mathrm{PPEGT}_t + \mathrm{ACQ}_t - \mathrm{SR}_t; \tag{4}$$

and (iii) the next-period accumulated depreciation (a stock variable) equals its current-period value plus current depreciation expense (a flow variable), plus the accumulated depreciation of acquired fixed assets, ACDACQ_t, net of the accumulated depreciation for disposed fixed assets, ACDSR_t:

$$\mathrm{DPACT}_{t+1} = \mathrm{DPACT}_t + \mathrm{DP}_t + \mathrm{ACDACQ}_t - \mathrm{ACDSR}_t. \tag{5}$$

In terms of historical-cost accounting data, investment flows can be measured equivalently as:

$$I_{it}^H = \mathrm{PPENT}_{t+1} - \mathrm{PPENT}_t + \mathrm{DP}_t \tag{6}$$

$$I_{it}^H = \mathrm{PPEGT}_{t+1} - \mathrm{PPEGT}_t - (\mathrm{DPACT}_{t+1} - \mathrm{DPACT}_t) + \mathrm{DP}_t \tag{7}$$

$$I_{it}^H = \mathrm{PPEGT}_{t+1} - \mathrm{PPEGT}_t - \mathrm{ACDACQ}_t + \mathrm{ACDSR}_t \tag{8}$$

$$I_{it}^H = (\mathrm{ACQ}_t - \mathrm{ACDACQ}_t) - (\mathrm{SR}_t - \mathrm{ACDSR}_t) \tag{9}$$

$$I_{it}^H = \mathrm{NACQ}_t - \mathrm{NSR}_t, \tag{10}$$

in which equation (7) follows from equation (3), (8) from (5), and (9) from (4). As noted, we measure the historical-cost investment, I_{it}^H, as the change in net PPE plus accounting depreciation per equation (6). Both items PPENT and DP have broad coverage in Compustat.

From equation (8), I_{it}^H as the change in gross PPE, while ignoring ACDACQ and ACDSR, can be problematic. In pooling-of-interests mergers, ACDACQ can be substantial, if the target has a lot of accumulated depreciation. For disposed assets that are near the end of their service lives, the accumulated depreciation of disposed assets, ACDSR, can be close to the original costs, SR. Alas, ACDACQ and ACDSR are not covered by Compustat. In our 1963–2020 sample, the change in gross PPE has a slightly lower coverage of 169,463 firm-years versus 169,828 firm-years for I_{it}^H per equation (6). More important, the difference (change of PPEGT minus I_{it}^H) scaled by $|I_{it}^H|$ has a median of -17%, a 5th percentile of -292.84%, and a 95th percentile of 9.05%. The mean difference is -70.65%. As such, the change in gross PPE underestimates investment by a substantial amount.

Measuring investment, I_{it}^H, as NACQ minus NSR per equation (10) is not feasible. First, NACQ includes acquired fixed assets via not only capital expenditures but also M&As. However, for M&As, Compustat only provides the cash payment for a target (item AQC). A breakdown across different assets, especially PPE, is not available. Acquired PPE (item ACQPPE) is available from 2011 onward only for a very limited sample of several hundred firms.

Second, NSR includes disposed fixed assets via both sales and retirement. Neither is well covered by Compustat. For asset sales, item SPPE measures only the proceeds received, not the net book value of disposed assets. To fill the gap, one needs the gain or loss from asset sales, but no good data are available. In Compustat, sale of property, plant and equipment and investments—(gain) loss (item SPPIV) is available only from 1987 onward. Gain (loss) on sale of property (item SRET) is virtually unavailable. The retirement of PPE (item PPEVR) is available only from 1969 to 1994.

We assume that the current-cost investment, $I_{it}^{\$}$, equals the historical-cost investment, I_{it}^H. For acquired assets, their historical costs are close to current costs. Assets acquired via capital expenditures are recorded at the current costs. Except for the pooling-of-interests mergers (footnote 8), assets acquired via M&As are recorded at the fair values (current costs). For disposed assets, their historical costs are typically not equal to their current costs. One possible proxy for the current costs is the sales of PPE (item SPPE) from the statement of cash flows. However, item SPPE ignores asset-for-equity and asset-for-debt sales (Slovin, Sushka, and Polonchek 2005) and other disposition methods, such as exchanges of nonmonetary assets, involuntary conversion (fire, flood, theft, and condemnation), and retirement (Kieso, Weygandt, and Warfield 2019, chapter 10). Other possibilities include spin-offs and changes in consolidation status (when a subsidiary is no longer consolidated). As such, item SPPE underestimates the frequency and magnitude of disinvestment.

However, our investment measure per equation (6) likely overstates the frequency and amount of disinvestment. Net PPE can decrease not only from capital retirements and sales of PPE but also from restructuring charges, impairment losses, and foreign currency translations, all of which do not involve actual disinvestment (Wahlen, Baginski, and Bradshaw 2018, chapter 8). In particular, U.S. Generally Accepted Accounting Principles require that the values of long-lived assets must be reevaluated periodically for impairment and written down in the presence of impairment losses. However, asset values are not allowed to adjust upward in reevaluation via write-ups.

Finally, because historical- and current-cost investment flows are identical and their capital stocks are both positive, the fractions of negative investment rates, with 0% as the cutoff, should be identical across historical- and current-cost measures. The fractions differ slightly with −1% as the cutoff for negative investment rates because capital stocks in the denominator differ.

3.2 Capital and Investment Price Deflators

Ideally, if data were available on detailed asset types and their amounts that a firm employs in any period, we could combine this information with asset-specific price deflators and economic depreciation rates to construct firm-level capital and investment price deflators and depreciation rates. Unfortunately, such firm-level information on detailed assets is not available. To deal with this data challenge, we construct industry-specific price deflators and depreciation rates based on the BEA data and assign them to all the firms within a given industry. The implicit assumption is that firms within the same industry have the same asset composition. Although far from perfect, we view this procedure as arguably the best option in the presence of the data limitations.

3.2.1 Assigning Firms to BEA's NAICS Industries

The BEA provides fixed assets data for 63 private industries in 20 sectors based on NAICS. To assign a firm in Compustat to an industry or a sector in BEA in a given fiscal year, we use its historical NAICS code (item NAICSH). We drop firms that have ever been classified as non-private and discard firm-years with unclassified NAICS codes. The coverage of item NAICSH starts in June 1985.

Prior to June 1985, firm-level NAICS codes are not available. Accordingly, we need to use SIC codes to make industry assignments indirectly. Because historical SIC codes are not available in Compustat until June 1987, we obtain SIC codes from CRSP (item SICCD) at a firm's fiscal year end. We convert SIC codes into NAICS codes using the 1987 SIC to 1997 NAICS concordance table from the U.S. Census Bureau. We drop firms that have ever been classified as non-private and discard firm-years with unclassified or missing SIC codes.

When applying the price deflators to individual firms, we use industry-specific price deflators (if not available, sector-specific price deflators). Sector-level deflators are used for less than 1% of the firm-years. Because the mapping between SIC and NAICS is not one-to-one, one SIC code can be assigned to multiple BEA industries. To deal with this issue, we aggregate the fixed assets data for the assigned industries before computing industry-specific price deflators and economic depreciation rates. In the 1950–2020 sample, our mapping procedure produces a unique industry classification for 91.76% of all firm-years (74.02% before June 1985 and 99.98% afterwards).[9] The classification remains constant over time for 70.92% of firms and changes only once for 19%, twice for 5.95%, and three or more times for 4.12% of firms. Appendix B details our firm-industry mapping procedure.

We should clarify that we view our firm-industry mapping as an essential, technical innovation. To the best of our knowledge, no such easy-to-use mapping is available. Many technical details in developing such a mapping demand our careful *manual* work, such as aligning industry classifications across various versions of SIC and NAICS, cross-checking with their codes in Compustat and CRSP, and experimenting with alternative firm-industry mapping to maximize sample coverage (Appendix B). Developing this mapping alone has taken us about six months of intense work. Again, the devil is in the details. Studies often chase flashy results but shortchange details. We guard against such publication bias and strive to polish every aspect of our measurement procedure.

A further complication arises because the capital and investment price deflators from the BEA

[9]While our working sample starts in 1963, we use as much information from the BEA and Compustat as possible, including pre-1963 information, when constructing the initial values of current-cost capital, $K_{i0}^{\$}$ (Section 3.4).

are computed for calendar years, but the fiscal years of firms do not always end in December. As such, we need to adjust for the differences. Appendix C furnishes the details of our procedure.

3.2.2 Industry-specific Capital and Investment Price Deflators

From the detailed tables for 63 private industries from BEA's fixed assets accounts, we obtain: (i) current-cost (current-dollar) capital stocks in private non-residential equipment, $K_{jt}^{\mathcal{E}\$}$, and structure, $K_{jt}^{\mathcal{S}\$}$, by industry, annual, 1947–2020; (ii) fixed-cost (constant-dollar) capital stocks in private non-residential equipment, $K_{jt}^{\mathcal{E}}$, and structure, $K_{jt}^{\mathcal{S}}$, by industry, annual, 1947–2020; (iii) current-cost investments in private non-residential equipment, $I_{jt}^{\mathcal{E}\$}$, and structure, $I_{jt}^{\mathcal{S}\$}$, by industry, annual, 1947–2020; and (iv) fixed-cost investments in private non-residential equipment, $I_{jt}^{\mathcal{E}}$, and structure, $I_{jt}^{\mathcal{S}}$, by industry, annual, 1947–2020. We calculate industry j's capital and investment price deflators as $P_{jt}^{K} = (K_{jt}^{\mathcal{E}\$} + K_{jt}^{\mathcal{S}\$})/(K_{jt}^{\mathcal{E}} + K_{jt}^{\mathcal{S}})$ and $P_{jt}^{I} = (I_{jt}^{\mathcal{E}\$} + I_{jt}^{\mathcal{S}\$})/(I_{jt}^{\mathcal{E}} + I_{jt}^{\mathcal{S}})$, respectively.[10]

As suggested by the BEA staff, we use the detailed (not standard) tables. First, the numbers from the standard tables are rounded to \$0.1 billion. Such large rounding errors make price deflators imprecise for small industries in early years. In contrast, the numbers from the detailed tables are rounded to \$1 million. Second, the detailed tables provide both fixed-cost and current-cost data that can be used to back out the price deflators. The standard tables provide chain-type quantity indexes but not the fixed-cost data. Finally, the standard tables include residential fixed assets.[11]

In addition, because not all firms can be assigned to a BEA industry (and industry-specific price

[10] The fixed-cost data are measured in mid-year 2012 dollars. Because current-cost investments are also in mid-year dollars, the investment price deflator equals one in 2012. However, because current-cost capital stocks are measured in end-of-year dollars, the 2012 capital price deflator differs slightly from one.

[11] When calculating the investment price deflator, we require the current-cost and fixed-cost investments to be both above \$10 million. (The current-cost and fixed-cost capital stocks are always above \$10 million.) First, current-cost investments can be very small for some industries in early years. The price deflators can be imprecise, as the data are rounded to \$1 million. Second, investments are occasionally negative, yielding unreliable price deflators. The current-cost and fixed-cost investments can even have oppositive signs (due to changing relative prices). The resulting price deflators would be negative. One such instance occurs in industry "Transit and ground passenger transportation" in 1947. During this year, the industry has a positive investment of \$202 million in structure but a negative investment of \$194 million in equipment, giving rise to a total current-cost investment of \$8 million. However, equipment has experienced higher inflation rates than structure from 1947 to 2012. Consequently, in 2012 dollars the amount of investment in structure (\$1,953 million) becomes smaller than the amount of disinvestment in equipment (\$2,592 million), giving rise to a total fixed-cost investment of −\$639 mllion. The resulting price deflator then has a negative value of −0.0125.

deflators can be missing), we also construct sector-level price deflators. We aggregate investments and capital stocks for the industries within each of the 20 sectors and recompute the sector-level price deflators. Because sector-level investments and capital stocks are much larger, we do not need to impose the $10 million minimum when computing the price deflators.

In the current-cost capital accumulation equation (2), price adjustment appears via the growth rate of capital price deflators, P^K_{it+1}/P^K_{it}, and the ratio of capital-to-investment price deflators, P^K_{it+1}/P^I_{it}. Accordingly, we report the moments of (net) growth rates, $P^K_{it+1}/P^K_{it} - 1$, in Table 3 and the moments of P^K_{it+1}/P^I_{it} in Table 4 based on the BEA data. To the best of our knowledge, no such information has been reported before, but it provides essential inputs into our data infrastructure.

From Table 3, the aggregate inflation rate of capital goods in the 1963–2020 sample is on average 4.14% per annum, with a standard deviation of 3.4% and a serial correlation of 0.66. Across the 20 sectors, the inflation rate varies from 2.55% for information to 5.9% for mining. Across the 63 industries, the inflation rate ranges from 2.36% for broadcasting and telecommunications to 6.15% for oil and gas extraction. Table 4 shows that the ratio of capital-to-investment price deflators, P^K_{it+1}/P^I_{it}, is on average 0.91 in the 1963–2020 sample, with a small standard deviation of 0.09 and a high serial correlation of 0.97. Across the 20 sectors, the average P^K_{it+1}/P^I_{it} varies from 0.8 for professional, scientific, and technical services to 0.99 for agriculture, forestry, fishing, and hunting. Across the 63 industries, the average P^K_{it+1}/P^I_{it} ranges from 0.7 for computer systems design and related services to 1.02 for oil and gas extraction (the only industry with the average ratio above one).[12]

3.3 Economic Depreciation Rates

We assign the BEA-based industry-level depreciation rates to firms within a given industry.

[12] Because the growth rate of investment price deflator does not appear in equation (2), we delegate the $P^I_{it+1}/P^I_{it} - 1$ moments to the Internet Appendix. Table S3 shows that the aggregate inflation rate of investment goods in the 1963–2020 sample is on average 3.81% per annum, with a standard deviation of 3.43% and a serial correlation of 0.57. Across the 20 sectors, the inflation rate varies from 2.64% for information to 4.98% for mining. Across the 63 industries, the inflation rate ranges from 2.48% for broadcasting and telecommunications to 5.21% for oil and gas extraction.

3.3.1 Industry-specific Economic Depreciation Rates

From the detailed tables for 63 private industries from BEA's fixed assets accounts, we obtain: (i) fixed-cost depreciations in private non-residential equipment, $D^{\mathcal{E}}_{jt}$, and structure, $D^{\mathcal{S}}_{jt}$, by industry, annual, 1947–2020; (ii) fixed-cost capital stocks in private non-residential equipment, $K^{\mathcal{E}}_{jt}$, and structure, $K^{\mathcal{S}}_{jt}$, by industry, annual, 1947–2020; and (iii) fixed-cost investments in private non-residential equipment, $I^{\mathcal{E}}_{jt}$, and structure, $I^{\mathcal{S}}_{jt}$, by industry, annual, 1947–2020.

For industry j in year t, we calculate its economic depreciation rate as:

$$\delta_{jt} = \frac{D^{\mathcal{E}}_{jt} + D^{\mathcal{S}}_{jt}}{(K^{\mathcal{E}}_{jt-1} + K^{\mathcal{S}}_{jt-1}) + 0.5 \times (I^{\mathcal{E}}_{jt} + I^{\mathcal{S}}_{jt})}. \tag{11}$$

In the denominator of equation (11), we add 50% of current investments because the BEA does so when calculating the depreciation amount at the asset level. In particular, the BEA assumes that investments depreciate immediately without any time lags. As such, equation (11) allows us to uncover the implicit depreciation rates implied by the BEA's fixed-cost data.[13]

Equation (11) uses fixed-cost data rather than current-cost data to calculate the economic depreciation rate, δ_{jt}, which appears in both the quantity-based capital accumulation equation (1) and its current-cost version in equation (2). The depreciation rate, δ_{jt}, differs from the current-cost rate, $\delta^{\$}_{jt} = (D^{\mathcal{E}\$}_{jt} + D^{\mathcal{S}\$}_{jt})/((K^{\mathcal{E}\$}_{jt-1} + K^{\mathcal{S}\$}_{jt-1}) + 0.5 \times (I^{\mathcal{E}\$}_{jt} + I^{\mathcal{S}\$}_{jt}))$, in which all the variables in the right-hand side are in current costs. Because the price deflators for depreciation, capital, and investment all differ from one another, $\delta^{\$}_{jt}$ does not reduce to δ_{jt}.

The BEA publishes industry-specific economic depreciation rates in the detailed tables from its fixed assets accounts.[14] However, when calculating these depreciation rates, the BEA includes both

[13] To calculate the depreciation rates for 1947, we need the 1946 fixed-cost capital (unavailable). However, the capital accumulation equation (1) holds well in early years. We impute the 1946 capital via the 1947 data on capital, investment, and depreciation. Also, we do not impose the \$10 million minimum because the numerator and denominator of equation (11) are always above \$10 million. As noted, although our working sample starts in 1963, we use all available BEA data because data in the early years enter our calculation of the initial values of current-cost capital.

[14] In response to correspondence with us from November to December 2020, the BEA has revised its industry-specific depreciation rates in its 2021 annual update. The BEA used to calculate the depreciation rates based on the "free-running" capital stocks data that are not adjusted for natural disasters and transfers across industries. The 2021 edition has based the depreciation rates on the published (and properly adjusted) capital and investment data.

normal depreciation and "other changes in volume of assets" (OCVA, the amount of damages from natural disasters such as hurricanes). Conceptually, OCVA reduces capital stocks. The BEA treats OCVA as part of depreciation (not disinvestment). However, as a form of write-downs, OCVA is implicitly treated as part of our investment measure in Compustat. Also, the BEA does not provide the combined depreciation rates across equipment and structure or the sector-level rates. As such, we calculate the depreciation rates per equation (11) instead of using the BEA's posted rates.

Table 5 shows the economic depreciation rates per equation (11) in the 1963–2020 sample. The aggregate δ_t is on average 5.71% per annum with a small standard deviation of 0.48%. Within the 20 NAICS sectors, the average δ_{st} varies from 2.78% for educational services to 11.63% for construction. Within the 63 private industries, the average δ_{jt} ranges from 2.73% for railroad transportation to 14.67% for truck transportation. The depreciation rates are persistent, with many sector- and industry-level serial correlations above 0.99. The depreciation rates are also stable, with the sector-level standard deviation varying from 0.11% for accommodation and food services to 1.74% for professional, scientific, and technical services, and the industry-level standard deviation from 0.08% for railroad transportation to 3.72% for computer systems design and related services.

For firms that cannot be assigned to an industry, we calculate the depreciation rates at the sector level. We aggregate depreciation, investment, and capital stocks across all the industries within each sector before applying equation (11). We use industry-specific rates whenever available, otherwise we use sector-specific rates (used for less than 1% of the firm-years). In addition, prior to June 1985, when a firm is assigned to multiple BEA industries based on its SIC code, we aggregate the data across all the assigned industries before applying equation (11).

3.4 The Initial Values of Current-Cost Capital Stocks

To initialize the current-cost capital, $K_{i0}^{\$}$, we adopt the PIM based on the age of firm i's oldest assets. Although inspired by Salinger and Summers (1983), our method differs in many technical details. We start from the acquisition date of the firm's oldest assets (not its founding date). Because we aim to estimate the replacement cost of capital that the firm currently owns, we do not need to account for its investments that have been fully depreciated or disposed.

At the end of a firm's first year with available net and gross PPE in Compustat (year 0), we estimate the firm's asset age (since acquiring its oldest assets), denoted A_i, as its average asset age times two (rounded to the nearest integer). The average asset age is accumulated depreciation (item DPACT) divided by depreciation (item DP minus item AM, zero if missing).[15] As detailed in the Internet Appendix B, if investment remains constant, the age distribution of assets in gross PPE is uniform. Because the age of the newest asset is zero, the age of the oldest asset would be two times the average asset age. This asset age approximation works well even with growing investments.

We construct the initial capital stock, $K^{\$}_{i0}$, by iterating on equation (2) from a starting year of $-A_i$. To accommodate the availability of industry-level data, we truncate $-A_i$ to ensure that the calendar year starts no earlier than 1948.[16] This truncation affects about 7.7% of firms. To impute investment flows from year $-A_i$ to year 0 ($A_i + 1$ years), we distribute the gross PPE at year 0, PPEGT_{i0}, equally, i.e., investment in each year equals $\text{PPEGT}_{i0}/(A_i + 1)$. Also, the beginning-of-year capital stock is assumed to be zero in year $-A_i$. Finally, we set $K^{\$}_{i0}$ to zero if PPEGT_{i0} is zero.[17]

3.5 Innovating on the Prior Studies

Our data infrastructure represents a major progress in firm-level capital measurement. In the Internet Appendix C, we conduct another meta-study, consisting of 33 studies that apply the PIM at the firm level. Only ten out of the 33 are published from 2000 onward in the top finance journals. Once again, the devil is in the details. In the first meta-study, empiricists work with Compustat, but

[15] We require both accumulated depreciation and depreciation to be positive. When item DPACT is missing, we impute it as the difference between gross PPE and net PPE. When a firm's asset age is missing (about 8.3% of the firms in our sample), we impute it as the median asset age of the firms that appear in Compustat during the same year.

[16] The starting year of 1948 maximizes our sample coverage. Firms with non-December fiscal year end in Compustat require linear interpolation that uses the industry-level BEA data on price deflators and depreciation rates in 1947.

[17] We also explore two alternative approaches to initializing $K^{\$}_{i0}$. The first is to set $K^{\$}_{i0}$ to be firm i's first available net PPE in Compustat. In our 1950–2020 sample, at the end of a firm's first year with available net PPE, the mean of oldest asset age is 9.1 years, and the median is 6 years. The 5th and 25th percentiles are three and four years, whereas the 75th and 95th percentiles are 11 and 22 years, respectively. This evidence prompts us to use this simple method only as a robustness check. In the second approach, we set $K^{\$}_{i0}$ to be firm i's first available PPENT times the ratio of current-cost to historical-cost capital stocks for the BEA industry to which the firm belongs.

insights from national accounting tend to elude them. In the second meta-study, theorists attempt to apply national accounting, but the intricacies of Compustat tend to elude them.[18] Overall, the prior 33 studies fall short in many empirical details and fail to realize the full potential of the data.

First, most prior studies use small samples with only manufacturing firms. We instead work with the entire Compustat universe. Second, most studies use capital expenditure as investment. We instead use net PPE data to back out investment flows. Third, most studies only use a single, aggregate series of implicit price deflator for fixed nonresidential investment to adjust for inflation. We instead use the BEA's industry-specific capital and investment price deflators. Finally, many studies estimate firm-specific (but constant) economic depreciation rates with the Salinger-Summers (1983) double declining-balance method. However, BEA (2003) shows the declining-balance rate to be significantly below two. We instead work with the BEA's industry-specific (and time-varying) economic depreciation rates and assign them to all the firms within an industry.

4 Results

In Section 4.1, we characterize firm investment behavior, including its asymmetry. In Section 4.2, we explain, with detailed evidence, why much controversy exists, even on the *basic* moments (mean, standard deviation, skewness, and serial correlation) of the investment rate. When calibrating their investment models, theorists are mostly shooting in the dark. With our painstakingly constructed data infrastructure, we aim to settle the debate. In Section 4.3, we study firm-level lumpiness. In Section 4.4, we quantify how our benchmark investment rate differs from (CAPX−SPPE)/PPEGT. Finally, in Section 4.5, we attempt to reconcile the macro-micro accounting in Compustat.

4.1 Characterizing Investment Rates

Panel A of Table 6 shows the time series averages of cross-sectional moments of current-cost investment rates, $I^{\$}_{it}/K^{\$}_{it}$, in the 1963–2020 sample. This sample contains in total 169,828 firm-years.

[18] We should probably emphasize that our data infrastructure is not exactly a low-hanging fruit. Its construction requires a broad knowledge of both national and financial accounting as well as an in-depth knowledge of empirical finance, including the intricate details in Compustat, knowledge that has taken us many years to accumulate.

For each fiscal year we winsorize the firm-level $I_{it}^{\$}/K_{it}^{\$}$ at the 1%–99% level. The average $I_{it}^{\$}/K_{it}^{\$}$ is 23.84% per annum, which is substantially higher than the median of 13.03%. The cross-sectional standard deviation is large, 37.2%. The skewness is 3.33, and excess kurtosis (relative to the kurtosis of three for the normal distribution) 14.28. The first-order autocorrelation estimated from cross-sectional regressions of current-cost investment rates on lagged investment rates is 0.34.

The fraction of negative $I_{it}^{\$}/K_{it}^{\$}$ is small, only 5.51%, and the fraction of inactive $I_{it}^{\$}/K_{it}^{\$}$ is tiny, 2.85%. As such, the asymmetry between the fractions of negative and positive investment rates, 5.51% versus 91.64%, strongly indicates costly reversibility at the firm level. The asymmetry is also present in the negative versus positive investment spike rate. With CH's cutoff of ±20% for spikes, the fraction of negative spikes is only 1.26%, which is much lower than 32.66% for the fraction of positive spikes. With alternative cutoffs of ±30%, ±40%, and ±50%, the contrast is between 0.73%, 0.44%, and 0.28% for negative spikes and 20.7%, 14.49%, and 10.8% for positive spikes, respectively. Figure 3 shows the histogram of the pooled firm-years of current-cost investment rates. Clearly, the firm-level $I_{it}^{\$}/K_{it}^{\$}$ distribution is heavily right-skewed, with a massive, fat right tail.

The properties of current-cost investment rates are robust to alternative ways of initializing current-cost capital (the Internet Appendix).[19] However, using industry-adjusted net PPE as current-cost capital without going through the PIM recursion yields more different results. The mean investment rate rises to 29.2%, the standard deviation to 46.3%, and the serial correlation falls to 0.27. We interpret this evidence as validating our benchmark PIM procedure.

[19] From Table S6 in the Internet Appendix, initializing with net PPE yields a mean investment rate of 25% and a standard deviation of 39%. Both are close to the mean of 23.8% and the standard deviation of 37.2% in the benchmark estimation, respectively. Initializing with industry-adjusted net PPE again yields similar estimates, 22.9% and 35%, respectively. The serial correlation and fractions of negative and inactive investment rates are all quite similar. However, the two alternative procedures do yield somewhat different initial values of capital stocks. In untabulated results, we show that in the 1950–2020 sample, the ratio of $K_{i0}^{\$}$ to the first available net PPE is on average 1.32, with a median of 1.14. The 5th and 25th percentiles are 0.78 and 0.98, whereas the 75th and 95th percentiles are 1.42 and 2.22, respectively. The ratio of $K_{i0}^{\$}$ to industry-adjusted net PPE is on average 0.95, with a median of 0.83. The 5th and 25th percentiles are 0.55 and 0.68, whereas the 75th and 95th percentiles are 1.01 and 1.59, respectively.

4.1.1 Robustness

The firm-level asymmetry is robust to sample periods, the exclusion of firm-years with large mergers and acquisitions, in which the difference between our investment measure and capital expenditure is higher than 15% of a firm's current-cost capital, and the removal of the first three years of observations for a given firm. The firm-level asymmetry is also present in both the small- and big-firm subsamples split by the median NYSE market equity (and current-cost capital), as well as in 19 nonfinancial NAICS sectors and 58 nonfinancial private industries (the Internet Appendix).

4.1.2 Comparison with the Plant-level Evidence

CH draw a balanced panel with 7,000 large manufacturing plants in continuous operation in the 1972–1988 sample from up to 360,000 plants in the LRD. The balanced panel is necessary to work around LRD's sampling rotation (once every five years). CH show that the plant-level investment rate distribution is heavily skewed to the right, with a fraction of 10.4% for negative investment rates, 8.1% for inactive investment rates, and 81.5% for positive investment rates. In addition, the negative investment spike rate is only 1.8%, but the positive spike rate is large, 18.6%.

CH (2006) emphasize a "striking asymmetry between positive and negative investment" as the most important feature of the plant-level investment rate distribution (p. 614). From this perspective, our evidence is even more striking, as the firm-level distribution is even more asymmetric, with an even longer right tail, than the plant-level distribution. The firm-level distribution has a lower fraction of negative investment rates than the plant-level distribution, 5.51% versus 10.4%, but a higher fraction of positive investment rates, 91.64% versus 81.5%. The negative spike rate is also lower at the firm level, 1.26% versus 1.8%, but the positive spike rate is higher, 32.66% versus 18.6%. Our evidence is "striking" because it works against the plant-to-firm aggregation. As noted, at the macro level, the power of aggregation erases any trace of asymmetry and lumpiness.

What gives? In Panel B of Table 6, we dig deeper to see what causes our "inversion" of the plant-to-firm aggregation. To ease comparison with CH, we switch to the real investment rate, defined as $I_{it}/K_{it} \equiv (I^{\$}_{it}/K^{\$}_{it})(P^K_{it}/P^I_{it})$, in which P^K_{it} and P^I_{it} are capital and investment price deflators, respectively. We also compute panel data moments as in CH.[20] For I_{it}/K_{it}, the asymmetry between the fractions of negative and positive investment rates continues to be stark: 5.73% versus 90.87%, and the asymmetry between the negative and positive investment spike rates, 1.17% versus 29.16%.

The next three rows in Panel B show that the sample period is inconsequential for our inversion. Restricting our data to CH's sample period (1973–1988 for the investment *rates*) yields largely similar evidence. The asymmetry between negative and positive investment rates remains at 6.02% versus 90.5%, and the asymmetry between negative and positive spike rates, 1.22% versus 25.58%. However, in the more recent 1989–2020 sample, the positive spike rate is somewhat higher, 31.45%.

From the subsequent two rows, including non-manufacturing firms is also inconsequential for our inversion. The fraction of negative investment rates is comparable between manufacturing and non-manufacturing samples, 5.2% versus 6.39%, and the fraction of positive investment rates, 91.3% versus 90.35%. However, although the negative spike rate is comparable, 0.9% versus 1.46%, the positive spike rate is somewhat higher for non-manufacturing firms, 26.07% versus 32.72%.

The last two rows in Panel B reveal the true cause of our inversion. Imposing a balanced panel of firms in the 1973–1988 sample largely replicates CH's evidence. The mean investment rate is 11.57%, which is close to 12.2% in CH. The fraction of negative investment rates is 4.11%, and the inactive rate is 2.87, in contrast to CH's 10.4% and 8.1%, respectively. The evidence indicates the plant-to-firm aggregation at work. Negative investments by some plants can be offset by positive investments by other plants within the same firm. Inactive investments by some plants can be offset by active investments by other plants. This within-firm aggregation most likely gives rise to the smaller fractions of negative and inactive investment rates at the firm level.

[20]For the time series averages of cross-sectional moments of I_{it}/K_{it} (untabulated), because the P^K_{it}/P^I_{it} ratio is on average less than one (Table 4), the mean I_{it}/K_{it} is lower, 20.43%. The standard deviation of I_{it}/K_{it} is also lower, 31.48%. The fractions of negative and inactive investment rates are 5.42% and 3.26%, respectively. The fractions of negative and positive spike rates are 1.08% and 28.19%, respectively. However, the skewness, kurtosis, and serial correlation are largely similar. We emphasize current-cost rather than real investment rates because the latter can be sensitive to the choice of base year in capital and investment price deflators (Landefeld, Moulton, and Vojtech 2003).

Most important, from the next-to-last row, although the negative spike rate remains low at 0.44% for the balanced panel of firms, the positive spike rate is only 14.19%, which is even lower than 18.6% in CH. As such, the *un*balanced panel of firms is the true cause of our inversion. Intuitively, balancing the panel means dropping the youngest, new public firms, with high investment rates, as well as older, distressed firms, which have delisted during the sample period, with low or even negative investment rates. Balancing the panel shrinks both tails, especially the right tail.

Forced by LRD's sampling rotation, CH must work with a balanced panel of plants to ensure uninterrupted investment series. We are not restricted by sampling rotation because Compustat covers all public traded companies. In addition, Compustat imposes no restrictions on industry, size, or age. As such, our firms are substantially more heterogeneous than CH's plants. This heterogeneity suffices to overcome the power of aggregation to yield our reversal. We should acknowledge that the plant-level asymmetry in the unobserved (unbalanced) population of plants is likely stronger than the firm-level asymmetry. However, the *observed* patterns are indeed reversed.

4.2 The Macro-Micro Disconnect in Action: Why Are Even the Basic Investment Moments Controversial at the Firm Level?

The macro-micro disconnect in accounting is the culprit why even the basic investment moments are unsettled at the firm level. When calibrating (estimating) their investment models, theorists tend to fall back on national accounting for guidance on the magnitudes of investment moments. However, financial accounting in Compustat paints a vastly different picture. Forced to mitigate the differences, theorists resort to a variety of ad hoc adjustments, such as scaling investment by gross PPE or even total assets. With our data infrastructure on firm-level capital stocks and flows, we clear up the confusion that has been accumulating for decades.

4.2.1 How Historical- and Current-cost Investment Rates Differ

Table 7 shows the properties of historical-cost investment rates, I_{it}^H/K_{it}^H, measured as change in net PPE plus accounting depreciation scaled by net PPE.[21] The mean I_{it}^H/K_{it}^H is 40.27% per annum and its standard deviation 62.9%, both of which are about 70% higher than their counterparts for current-cost investment rates, $I_{it}^\$/K_{it}^\$$, 23.84% and 37.2%, respectively. The serial correlation of I_{it}^H/K_{it}^H is 0.25, which is lower than 0.34 for $I_{it}^\$/K_{it}^\$$. In addition, the positive spike rate is 53.94% for I_{it}^H/K_{it}^H, in contrast to only 32.66% for $I_{it}^\$/K_{it}^\$$. The firm-level I_{it}^H/K_{it}^H distribution in Panel A of Figure 4 further shows its stronger asymmetry than the $I_{it}^\$/K_{it}^\$$ distribution.

Because we measure current-cost investment as its historical cost, $I_{it}^\$ = I_{it}^H$, the differences between I_{it}^H/K_{it}^H and $I_{it}^\$/K_{it}^\$$ originate only from the differences between K_{it}^H and $K_{it}^\$$. Table 7 shows that the $K_{it}^\$/K_{it}^H$ ratio is on average 2.11, with a median of 1.61 and a standard deviation of 1.79. The $K_{it}^\$/K_{it}^H$ ratio is also right-skewed (Panel B of Figure 4). The skewness is 3.58.

We trace the differences between current- and historical-cost capital stocks further to the differences between economic and accounting depreciation rates. From Table 7, the economic depreciation rate, δ_{it}, is on average 6.9%, with a standard deviation of 1.96%. In contrast, the accounting depreciation rate, δ_{it}^H, is on average 20.94%, with a high standard deviation of 16.65%. The histogram of δ_{it} in Panel C of Figure 4 is close to a normal distribution, whereas the histogram of δ_{it}^H in Panel D is highly non-normal, with a large dispersion and a long right tail.

The differences between δ_{it} and δ_{it}^H cause the differences between current- and historical-cost capital. When we replace δ_{it} with δ_{it}^H in our PIM estimation, the ratio of $K_{it}^\$$ to this alternative $K_{it}^\$$ is on average 1.93, which is close to the mean $K_{it}^\$/K_{it}^H$ ratio of 2.11. The investment rate scaled by the alternative $K_{it}^\$$ has a mean of 39.33%, which is close to the historical-cost mean of 40.27%.

[21] In financial accounting, gross PPE is the accumulated historical costs of investments, and net PPE is gross PPE minus accumulated depreciation. Net PPE is part of a firm's total assets, but gross PPE is not, because the accumulated depreciation is not part of the existing assets. Using $K_{it+1}^H = I_{it}^H + (1 - \delta_{it}^H)K_{it}^H$ to recursively substitute K_{is}^H, for $s = 0, 1, \ldots, t-1$, in which year 0 is the year when firm i first records fixed assets, yields $K_{it}^H = \left(K_{i0}^H + \sum_{s=0}^{t-1} I_{is}^H\right) - \sum_{s=0}^{t-1} \delta_{is}^H K_{is}^H$, in which $K_{i0}^H + \sum_{s=0}^{t-1} I_{is}^H$ is the accumulated historical costs of investments (gross PPE), and $\sum_{s=0}^{t-1} \delta_{is}^H K_{is}^H$ is the accumulated depreciation. Clearly, K_{it}^H is net PPE (Goncalves, Xue, and Zhang 2020).

Its standard deviation of 60.91% is also close to the standard deviation of I_{it}^{H}/K_{it}^{H}, 62.9%.

Price adjustment, which is another major component of capital measurement, plays only a secondary role in explaining the differences between $K_{it}^{\$}$ and K_{it}^{H}. When we set both capital and investment price deflators to one (no price adjustment), the ratio of the benchmark $K_{it}^{\$}$ to the alternative $K_{it}^{\$}$ is on average 1.13. The investment rate has a mean of 24.42% and a standard deviation of 36.26%, both of which are close to our benchmark estimates of 23.84 and 37.2%, respectively.

4.2.2 Current-cost Capital, Net PPE, and Gross PPE

More important, if net PPE is more appropriate, at least conceptually, than gross PPE in measuring historical-cost capital, why do many studies use gross PPE to scale investment instead? The crux is that the historical-cost investment rate tends to be much higher than the BEA magnitude. The latter seems more plausible to many. Scaling investment by gross PPE mitigates this discrepancy.[22] With our data infrastructure, this ad hoc adjustment is no longer necessary.

Table 7 shows that gross PPE is much closer to current-cost capital, $K_{it}^{\$}$, than net PPE. The $K_{it}^{\$}$/PPEGT ratio is on average 0.98, with a standard deviation of 0.42 and a skewness of 3.23. However, its median is only 0.88. Intuitively, gross PPE differs from $K_{it}^{\$}$ by setting economic depreciation rates, δ_{it}, to zero and ignoring the inflation rates in capital and investment prices. The former overstates, but the latter understates, the magnitude of gross PPE relative to $K_{it}^{\$}$. Because δ_{it} is generally higher than the inflation rates, the former effect dominates and yields the $K_{it}^{\$}$ estimates that are generally smaller than gross PPE, as in Panel C of Figure 4. Relatedly, gross PPE is also a better proxy for current-cost (fixed) capital than total assets, which include current assets and goodwill. The $K_{it}^{\$}$/AT ratio is on average only 0.53, with a median of 0.43.

[22]In our 1963–2020 working sample with available current-cost investment rates (Table 6), the PPENT/PPEGT ratio is on average 0.56, which is identical to its median. Its 5th percentile is 0.29, and the 95th percentile 0.84.

4.3 Is Firm-level Investment Lumpy?

Despite the tiny fraction of inactive investment rates (2.85%), the large positive investment spike rates in Table 6 indicate that firm-level investment is lumpy. In this subsection, we further quantify the lumpiness via the Doms-Dunne (DD, 1998) style tests. We show that firm-level investment is indeed lumpy, and the lumpiness is only slightly weaker than the plant-level evidence.

For each plant in their balanced panel, DD (1998) calculate the fraction of investment in each year out of the total investment in the time series. About one half of the total investment is completed in just three years (about 20% of the total number of years). To ease comparison, we split our unbalanced Compustat sample by decade. For each decade, we include only firms with complete coverage to obtain a balanced panel. For each firm in a given panel, we rank its current-cost investment rates in the time series in a descending order. We compute the fraction of the ranked investment in each year out of the total absolute value of investments in the time series. Figure 5 shows the fractions averaged across all firms within a given balanced panel.

Firm-level current-cost investment is lumpy. In the 1963–1970 panel, averaged across 768 firms, the top two years account for 41.4% of total investment (Panel A). In the 2011–2020 panel, across 1,281 firms, the top two years account for 43.45% of total investment over the decade (Panel F). Averaged across all six decades, about 39% of total investment is completed in two years (20% of the total number of years). Replacing current-cost investment rates with real investment rates yields largely similar results (Figure S4 in the Internet Appendix). In particular, averaged across the six decades, about 40% of total real investment is completed within two years.

Restricting the analysis on balanced panels might entail selection bias. To mitigate this concern, we also split the sample into 11 groups based on firm age (the number of years in Compustat): 5–9, 10–14, ..., 55–58 years. We drop firms with fewer than five years of investment rates to minimize noise. Each group is an unbalanced panel. For each firm in a given group, we rank its time-series current-cost investment rates in the descending order. We calculate the fraction of the ranked investment in each year out of the total absolute value of investment in the time series. Figure 6 shows the fractions averaged across all the firms within a given group.

Firm-level current-cost investment is again lumpy. From Panel A, in the 5–9 years age group, about 52.1% of total investment is completed within two years. From Panel F, in the 30–34 years group, about 35.9% of total investment is completed within seven years (about 20% of the total number of years). In the 55–58 years group, about 30.9% of total investment is done within 12 years (Panel K). Averaged across all the age groups, about 39% of total investment is done within the top 20% of the years. Replacing current-cost investment rates with real investment rates again yields largely similar results (Figure S5 in the Internet Appendix). In particular, averaged across all the age groups, 42.4% of total real investment is completed within the top 20% of the years.

4.4 The Current-cost Investment Rate Differs from (CAPX−SPPE)/PPEGT

We take the stand that our current-cost investment rate, $I^{\$}_{it}/K^{\$}_{it}$, is the most accurate measure of the (fixed) investment rate. To further quantify how our benchmark measure differs from traditional ones, Table 8 shows the differences between $I^{\$}_{it}/K^{\$}_{it}$ and (CAPX−SPPE)/PPEGT (capital expenditure minus sales of PPE, scaled by gross PPE). The latter variable has appeared only eight times out of 393 appearances (about 2%) in our first meta-study (Table S1). We choose this variable to be conservative because (i) CAPX is the most popular gross investment measure; and (ii) gross PPE is closer to current-cost capital than net PPE and total assets (Section 4.2.2). Other, more popular variables will surely differ even more from our benchmark measure quantitatively.

Table 8 shows that for (CAPX−SPPE)/PPEGT, the mean is 17.13% and the standard deviation 21.65%, which are lower than 23.84% and 37.2% for $I^{\$}_{it}/K^{\$}_{it}$, respectively. Its distribution is right-skewed, with a skewness of 3.18. The negative spike rate is 1.86%, and the positive spike rate 23.47% (untabulated). Its autocorrelation is higher, 0.48 versus 0.34. The difference between the two investment rates has a mean of 6.47%, a standard deviation of 21.45%, and a skewness of 3.12. The difference also varies inversely with firm size, measured as beginning-of-year current-cost capital. In the small-$K_{it}^{\$}$ decile, the difference has a mean of 9.19% and a standard deviation of 25.82%, which are much higher than 0.33% and 7.64%, respectively, in the big-$K_{it}^{\$}$ decile.

The difference varies across NAICS sectors and industries (Table S10 in the Internet Appendix). Across sectors, the average difference ranges from −0.48% for management of companies and enterprises to 16.07% for information. Across industries, the average difference ranges from −0.48%, 0.01%, and 1.21% for management of companies and enterprises, utilities, and oil and gas extraction to 17.22%, 19.39%, and 20.81% for ambulatory health care services, computer systems design and related services, and information and data processing services, respectively. The latter three industries also exhibit volatile differences, with standard deviations of 37.82%, 47.25%, and 54.26%, respectively. Clearly, $I_{it}^{\$}/K_{it}^{\$}$ differs from (CAPX−SPPE)/PPEGT in an economically important way.

4.5 Attempting to Reconcile Macro and Micro Accounting

We motivate our data infrastructure with a burning desire to bridge the macro-micro disconnect in accounting. Table 9 provides a cross-validation of our construction. For firms in Compustat with current-cost investment rates in a given year, we add up their investments in the numerator and beginning-of-year current-cost capital stocks in the denominator. We then compute industry, sector, and aggregate investment rates implied by Compustat and compare their moments with BEA's.

From Panel A, we come close with the Compustat aggregate investment rate. The mean is 11.05%, and volatility 2.62%, which are largely comparable with 9.63% and 1.27%, respectively, for the BEA rate. Aggregation is again at the full power, leaving no trace of asymmetry or lumpiness. The skewness is tiny, 0.24, with zero spike rates (untabulated). This evidence is reassuring because investment flows are entirely micro, yet their aggregate properties mimic those of the BEA rates. In untabulated results, our Compustat universe covers on average 55.78% of the BEA (nonfinancial) universe in terms of aggregate investment and 47.98% in terms of aggregate capital. The time series correlation between Compustat and BEA (nonfinancial) aggregate investment rates is 0.59.

Alas, sector and industry investment rates show more discrepancy. The Compustat-implied sector investment rate has a mean of 15.75%, a standard deviation of 17.77%, and a skewness of 12.55, which are substantially higher than 10.59%, 4.55%, and 1.06 in the BEA sector rate, respectively. Imposing a minimum number of 20 firms within each sector mitigates the discrepancy. The standard deviation drops to 9.02, and the skewness 2.06. The industry evidence is similar. In untabulated results, the time series correlation between Compustat and BEA (nonfinancial) sector investment rates is 0.19, and that between industry investment rates is 0.22. Imposing a minimum number of 20 firms within a sector or an industry raises the correlations to 0.33 and 0.46, respectively.

This discrepancy is not surprising, as the macro-micro disconnect remains severe at the industry level even in national accounting (Becker et al. 2006). The crux is different data sources. As noted, macro accounting uses production data from capital goods producing industries, whereas micro accounting uses investment demand data from micro units. In addition, Compustat covers publicly traded firms only, whereas macro accounting encompasses the entire national economy.

5 Conclusion

Integrating national accounting with financial accounting, we estimate firm-specific current-cost capital stocks and flows for the entire Compustat universe. We provide firm-level estimates of economic depreciation rates, capital and investment price deflators, as well as a meticulous mapping between Compustat firms and NAICS industry classification. Our data infrastructure facilitates empirical investment research and guides the quantification of theoretical investment models.

The firm-level current-cost investment rate distribution is heavily right-skewed, with a small fraction of negative investment rates, 5.51%, versus a huge fraction of positive investment rates, 91.64%. The firm-level asymmetry is striking, as it is even stronger than the CH (2006) plant-level asymmetry. Despite a tiny fraction of inactive investment rates, 2.85%, firm-level investment is also lumpy, featuring a fraction of 32.66% for positive spikes (investment rates higher than 20%). For a typical firm, about 39% of total investment is completed within 20% of the sample years. The latter two estimates on lumpiness are largely comparable with prior plant-level estimates.

Table 1 : The BEA's Current-cost Investment Rates, 1963–2020

From the detailed tables for 63 private NAICS-industries from the BEA's fixed assets accounts, we obtain: (i) current-cost investments in private nonresidential equipment, $I_{jt}^{\mathcal{E}\$}$, and structure, $I_{jt}^{\mathcal{S}\$}$, by industry, millions of dollars, annual, 1947–2020; and (ii) current-cost capital stocks in private nonresidential equipment, $K_{jt}^{\mathcal{E}\$}$, and structure, $K_{jt}^{\mathcal{S}\$}$, by industry, millions of dollars, annual, 1947–2020. For industry j in year t, we calculate its current-cost investment rate as $I_{jt}^{\$}/K_{jt-1}^{\$} = (I_{jt}^{\mathcal{E}\$} + I_{jt}^{\mathcal{S}\$})/(K_{jt-1}^{\mathcal{E}\$} + K_{jt-1}^{\mathcal{S}\$})$. We also calculate current-cost investment rates for the 20 BEA sectors (and the aggregate economy) by summing up investments and capital stocks across all the industries within each sector (and the whole economy). For sector s in year t, its current-cost investment rate is $I_{st}^{\$}/K_{st-1}^{\$} = (\sum_{j\in s} I_{jt}^{\mathcal{E}\$} + \sum_{j\in s} I_{jt}^{\mathcal{S}\$})/(\sum_{j\in s} K_{jt-1}^{\mathcal{E}\$} + \sum_{j\in s} K_{jt-1}^{\mathcal{S}\$})$, and the aggregate current-cost investment rate is $I_{t}^{\$}/K_{t-1}^{\$} = (\sum_{j} I_{jt}^{\mathcal{E}\$} + \sum_{j} I_{jt}^{\mathcal{S}\$})/(\sum_{j} K_{jt-1}^{\mathcal{E}\$} + \sum_{j} K_{jt-1}^{\mathcal{S}\$})$. All moments are in percent, except for skewness (Skew), excess kurtosis (Kurt, relative to the kurtosis of three for the normal distribution), and the first-order autocorrelation (ρ_1).

	mean	std	skew	kurt	min	median	max	ρ_1
Panel A: Time series of aggregate investment rates								
Aggregate	9.63	1.27	−0.09	−0.60	6.56	9.49	12.08	0.83
Panel B: Pooled Panels of sector (industry) investment rates								
Sector	10.59	4.55	1.06	1.04	2.48	9.61	28.31	0.95
Industry	11.39	6.13	1.61	4.39	0.22	10.08	46.36	0.93
Panel C: Time series of sector investment rates								
Agriculture, forestry, fishing, and hunting	9.25	2.51	0.15	−0.85	4.61	8.82	14.03	0.89
Mining	9.42	3.28	1.70	4.06	4.31	8.63	22.52	0.81
Utilities	6.31	1.12	0.47	−0.55	4.34	6.05	8.76	0.82
Construction	16.60	4.69	−0.23	−0.87	7.06	16.94	24.25	0.81
Nondurable goods	9.98	1.89	0.64	−0.16	6.74	9.58	15.32	0.90
Durable goods	10.34	2.48	0.63	−0.09	6.20	9.95	17.47	0.85
Wholesale trade	16.99	5.86	0.20	−1.25	7.25	16.25	28.31	0.92
Retail trade	8.94	1.72	−0.86	−0.30	4.59	9.38	11.39	0.89
Transportation and warehousing	6.61	1.49	0.47	−0.86	4.02	6.26	9.67	0.82
Information	12.23	2.02	0.45	−0.08	8.64	11.83	18.23	0.81
Finance and insurance	15.57	4.46	−0.14	−0.99	5.87	15.58	22.82	0.91
Real estate and rental and leasing	11.14	3.46	0.37	−0.83	4.70	10.02	18.35	0.85
Professional, scientific, and technical services	17.14	3.23	0.96	1.07	12.05	16.83	27.41	0.85
Management of companies and enterprises	7.33	3.34	0.11	−1.44	2.48	6.67	13.28	0.98
Administrative and waste management services	12.72	2.33	1.49	2.81	9.15	12.27	20.25	0.75
Educational services	6.34	1.67	0.39	−1.07	3.71	6.04	9.41	0.93
Health care and social assistance	10.53	1.84	1.37	1.23	8.48	10.08	15.72	0.93
Arts, entertainment, and recreation	9.14	2.36	1.46	3.45	5.59	8.77	18.18	0.83
Accommodation and food services	8.97	2.22	0.69	0.89	4.40	9.03	15.20	0.87
Other services, except government	6.33	1.55	0.38	−0.20	3.71	6.20	10.15	0.91
Panel D: Time series of industry investment rates								
Farms	8.90	2.63	0.13	−0.88	4.05	8.55	14.00	0.89
Forestry, fishing, and related activities	14.20	3.63	0.74	0.65	7.16	13.93	25.39	0.60
Oil and gas extraction	8.71	3.34	2.31	7.22	4.18	7.82	23.71	0.78
Mining, except oil and gas	10.98	4.44	0.75	0.11	4.64	10.95	22.67	0.90
Support activities for mining	13.65	5.54	0.712	0.82	4.03	12.89	31.85	0.79
Utilities	6.31	1.12	0.47	−0.55	4.34	6.05	8.76	0.82
Construction	16.60	4.69	−0.23	−0.87	7.06	16.94	24.25	0.81
Food and beverage and tobacco products	9.06	1.24	0.42	−0.91	6.87	8.73	11.56	0.83
Textile mills and textile product mills	7.09	3.09	0.47	−0.08	2.67	7.53	16.38	0.91
Apparel and leather and allied products	7.96	4.55	0.60	−0.10	1.81	8.19	19.91	0.94
Wood products	10.92	3.51	0.47	−0.43	4.13	10.05	19.54	0.85

	mean	std	skew	kurt	min	median	max	ρ_1
Panel D: Time series of industry investment rates (continued)								
Paper products	10.06	3.02	0.46	−0.23	4.24	9.55	18.18	0.85
Printing and related support activities	11.56	3.71	−0.23	−0.77	4.72	12.13	19.75	0.92
Petroleum and coal products	8.74	2.58	0.47	−0.55	4.70	8.31	15.05	0.72
Chemical products	11.13	2.84	0.90	0.56	6.84	10.80	19.57	0.85
Plastics and rubber products	13.45	3.80	0.64	−0.26	6.26	12.82	21.56	0.87
Nonmetallic mineral products	8.73	2.36	0.41	−0.08	4.39	8.50	15.18	0.73
Primary metals	6.47	2.29	1.14	0.86	3.11	5.76	13.09	0.89
Fabricated metal products	9.60	2.57	0.91	0.32	5.52	9.05	16.72	0.85
Machinery	10.38	3.56	0.35	−0.93	4.86	9.80	18.12	0.89
Computer and electronic products	12.96	4.52	0.23	−0.56	5.62	12.97	24.26	0.86
Electrical equipment, appliances, and components	11.13	4.29	0.43	−0.90	4.87	10.70	21.48	0.89
Motor vehicles, bodies and trailers, and parts	14.46	3.59	−0.01	−0.33	6.27	14.90	22.23	0.66
Other transportation equipment	10.44	3.31	1.48	3.67	5.53	9.73	23.54	0.76
Furniture and related products	11.25	3.34	0.16	−0.37	4.17	11.39	18.70	0.82
Miscellaneous manufacturing	11.77	3.27	0.80	−0.32	6.44	10.80	19.74	0.91
Wholesale trade	16.99	5.86	0.20	−1.25	7.25	16.25	28.31	0.92
Retail trade	8.94	1.72	−0.86	−0.30	4.59	9.38	11.39	0.89
Air transportation	11.16	5.50	1.25	1.02	4.02	9.05	26.61	0.79
Railroad transportation	2.49	0.80	0.91	0.07	1.42	2.21	4.74	0.86
Water transportation	9.19	2.97	0.49	−0.69	4.21	8.63	16.16	0.80
Truck transportation	20.76	5.53	0.26	−0.38	9.41	20.32	34.22	0.55
Transit and ground passenger transportation	5.87	2.08	0.74	0.13	3.05	5.77	12.19	0.71
Pipeline transportation	6.75	3.00	1.04	0.84	2.99	6.43	15.54	0.70
Other transportation and support activities	7.34	2.04	1.00	1.41	3.93	7.01	14.07	0.70
Warehousing and storage	7.21	2.54	0.51	−0.46	2.99	6.71	13.31	0.75
Publishing industries (includes software)	14.02	2.50	0.15	−0.29	9.19	13.95	19.99	0.76
Motion picture and sound recording industries	11.38	4.13	−0.14	−1.47	4.70	11.77	18.09	0.93
Broadcasting and telecommunications	11.55	2.54	0.23	−0.60	7.43	11.32	18.51	0.86
Information and data processing services	27.00	8.01	0.35	−0.76	13.21	25.91	42.54	0.77
Federal Reserve banks	12.02	9.19	1.44	2.05	1.98	10.58	42.45	0.89
Credit intermediation and related activities	16.11	3.72	−0.36	−0.12	5.65	16.03	23.49	0.81
Securities, commodity contracts, and investments	21.73	12.55	0.40	−1.26	5.45	17.85	46.36	0.95
Insurance carriers and related activities	13.14	5.85	0.04	−1.37	4.45	13.78	23.80	0.95
Funds, trusts, and other financial vehicles	9.10	5.59	−0.07	−0.39	0.22	9.92	23.30	0.87
Real estate	8.15	4.11	0.56	−1.15	2.68	6.18	17.36	0.89
Rental and leasing services and lessors of intangible assets	23.13	7.43	0.78	0.50	8.16	21.85	43.19	0.79
Legal services	13.10	3.71	0.35	−1.09	7.95	12.61	21.08	0.79
Miscellaneous professional, scientific, and technical services	17.12	2.96	0.37	−0.42	12.21	17.26	24.59	0.78
Computer systems design and related services	21.53	6.86	1.68	3.47	12.58	20.56	46.07	0.84
Management of companies and enterprises	7.33	3.34	0.11	−1.44	2.48	6.67	13.28	0.98
Administrative and support services	17.34	2.91	0.41	−0.15	11.37	16.90	25.16	0.69
Waste management and remediation services	8.81	3.79	1.31	1.78	3.93	8.16	20.93	0.88
Educational services	6.34	1.67	0.39	−1.07	3.71	6.04	9.41	0.93
Ambulatory health care services	12.88	2.38	0.96	0.39	9.52	11.95	19.58	0.86
Hospitals	9.53	1.97	1.29	0.49	7.26	8.86	14.41	0.95
Nursing and residential care facilities	10.91	2.79	0.65	0.01	6.84	10.82	18.39	0.89
Social assistance	9.37	2.07	0.29	−0.61	5.53	9.30	13.68	0.69
Performing arts, spectator sports, museums, and related activities	8.60	1.92	1.00	2.40	5.21	8.50	15.76	0.73
Amusements, gambling, and recreation industries	9.49	2.79	1.47	2.80	5.83	8.91	19.65	0.84
Accommodation	7.53	2.72	1.33	2.64	3.56	7.18	17.17	0.80
Food services and drinking places	10.78	2.57	−0.38	−0.99	5.20	11.30	15.46	0.91
Other services, except government	6.33	1.55	0.38	−0.20	3.71	6.20	10.15	0.91

Table 2 : Time Series Averages of Cross-sectional Moments for 40 Firm-level Investment Rates in Compustat, 1963–2020

All investment rates are winsorized at the 1%–99% level each year (fiscal years ending in a calendar year). f_- is the fraction of negative investment rates ($< -1\%$), and f_0 is the fraction of inactive investment rates (between -1% and 1%). Both fractions are computed before winsorization (with no visible changes after winsorization). The mean, standard deviation (Std), the percentiles, f_-, and f_0 are all in percent. The investment rates are scaled by 1-year-lagged capital, except for a few with the average of current and 1-year-lagged capital. Appendix A details the variable definitions.

	start	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1	f_-	f_0
CAPX/AT	1963	174,575	7.82	8.41	2.64	8.69	0.19	0.80	2.79	5.25	9.50	24.18	50.16	0.66	0.01	8.92
CAPX/PPENT	1963	174,470	33.22	38.22	3.16	12.82	1.14	4.45	12.59	21.72	38.32	100.80	250.61	0.39	0.01	1.08
dAT/AT	1963	178,300	14.04	33.96	2.58	10.09	−41.84	−21.09	−1.60	7.04	19.15	73.84	196.14	0.20	25.91	4.98
(dPPEGT+dINVT)/AT	1963	174,279	8.70	16.16	1.76	7.12	−31.70	−10.16	1.25	5.90	12.81	37.18	85.91	0.28	16.76	9.60
Inv/AT	1971	140,852	10.73	15.91	2.54	9.39	−19.63	−3.04	2.70	6.50	13.37	40.12	93.16	0.31	6.28	7.63
CAPX/PPEGT	1963	173,939	18.08	21.95	3.23	13.01	0.59	2.32	6.61	11.31	20.25	57.24	143.30	0.50	0.01	2.04
dPPEGT/AT	1963	176,979	6.66	12.52	2.11	9.07	−25.66	−5.96	1.22	4.09	8.99	28.34	70.20	0.34	11.51	13.87
(dPPENT+DP)/PPENT	1963	177,412	40.28	62.90	3.47	15.84	−38.02	−3.95	11.05	22.78	45.33	141.65	423.85	0.25	6.01	1.48
(CAPX−SPPE)/PPEGT	1963	173,939	17.13	21.65	3.18	12.76	−6.20	1.30	6.03	10.71	19.38	55.58	139.87	0.48	1.86	2.64
(CAPX−SPPE)/AT	1963	174,575	7.32	8.12	2.53	8.20	−3.04	0.44	2.50	4.95	9.09	23.03	47.60	0.63	1.53	10.05
dPPENT/AT	1963	178,130	3.96	10.24	2.59	10.79	−17.87	−5.74	−0.53	1.61	5.49	21.73	58.36	0.31	20.61	25.65
(CAPX+AQC)/AT	1971	156,073	10.42	13.35	2.96	10.59	0.09	0.68	2.90	6.08	12.13	36.01	81.14	0.37	0.23	8.51
CAPXV/AT	1963	175,818	8.21	9.02	2.68	8.97	0.20	0.83	2.87	5.46	9.93	25.70	54.13	0.63	0.01	8.78
(CAPX−SPPE)/PPENT	1963	174,470	31.58	37.94	3.10	12.50	−11.09	2.55	11.47	20.54	36.89	98.59	45.99	0.39	2.05	1.42
(CAPX+AQC−SPPE)/AT	1971	156,073	9.80	13.08	2.93	10.62	−4.12	0.27	2.55	5.69	11.57	34.52	79.30	0.35	1.90	9.62
(CAPXV−SPPE)/AT	1963	175,818	7.72	8.73	2.60	8.57	−2.92	0.47	2.59	5.15	9.51	24.55	51.66	0.61	1.49	9.88
dPPEGT/PPEGT	1963	176,979	17.17	34.98	3.02	13.89	−47.23	−13.49	2.81	8.86	20.37	74.01	220.32	0.27	13.77	5.04
dPPENT/PPENT	1963	178,130	18.78	52.54	3.42	15.96	−55.04	−24.56	−3.32	6.23	22.40	101.79	338.91	0.17	30.47	5.43
(dPPENT+DP)/AT	1963	177,412	8.45	11.53	2.68	10.20	−12.22	−0.99	2.46	5.41	10.41	29.42	69.19	0.40	4.71	9.45
(CAPXV−SPPE)/PPEGT	1963	175,189	17.78	22.83	3.23	13.14	−6.00	1.36	6.14	10.96	20.00	58.05	148.78	0.47	1.81	2.57
dBe/Be	1963	173,570	14.61	48.28	3.00	14.66	−67.92	−35.10	−2.93	7.31	18.51	86.90	302.80	0.15	25.30	3.77
(CAPX−SPPE)/avePPENT	1963	174,449	25.67	22.13	1.64	3.52	−12.91	2.67	11.44	19.78	33.52	71.03	115.04	0.51	2.07	1.34
dNoa/AT	1963	173,959	8.61	22.60	2.22	8.43	−35.12	−16.60	−2.12	4.36	13.45	48.13	123.81	0.17	29.15	7.52
dLno/aveAT	1963	156,965	8.47	13.38	1.48	5.02	−27.13	−6.57	1.95	5.80	12.03	34.14	65.70	0.26	11.17	8.23
dNca/AT	1963	174,140	6.71	18.22	2.82	11.63	−26.13	−9.80	−1.07	2.43	8.64	37.77	107.59	0.20	25.06	15.26
dBe/AT	1963	175,214	6.32	20.57	2.27	10.24	−36.25	−17.48	−1.33	3.43	9.22	38.88	117.57	0.22	23.25	9.04
(CAPXV+AQC)/PPENT	1971	156,108	64.03	128.63	4.49	23.53	0.65	4.26	13.86	26.68	55.33	238.47	930.84	0.26	0.27	1.15
CAPXV/PPENT	1963	175,713	34.20	40.19	3.21	13.19	1.17	4.52	12.68	22.07	39.27	104.54	264.92	0.38	0.01	1.05
CAPXV/PPEGT	1963	175,189	18.73	23.13	3.27	13.30	0.62	2.38	6.73	11.57	20.87	59.68	151.73	0.48	0.01	1.98
(CAPX+IVCH−SIV)/(PPENT+IVAEQ+IVAO)	1971	127,812	37.60	61.79	3.61	18.08	−66.15	−0.66	11.15	21.67	41.81	128.45	422.03	0.24	3.53	1.51
(dPPENT+WDP+DPC)/PPEGT	1971	164,132	26.89	46.09	3.67	17.26	−28.67	−2.78	6.55	13.77	28.81	99.47	312.94	0.43	5.94	2.39
dNAT/NAT	1963	171,802	19.60	54.48	3.39	15.87	−50.90	−24.19	−2.48	6.92	22.29	102.58	355.38	0.14	28.63	5.29
CAPX/(AT−INVT)	1963	173,208	9.54	9.50	2.44	7.46	0.24	1.07	3.68	6.78	11.76	28.43	55.61	0.63	0.01	7.19
(CAPX+AQC)/PPEGT	1971	155,471	31.52	59.50	4.29	21.64	0.34	2.12	7.02	13.49	28.44	118.91	419.73	0.33	0.26	2.24
CAPX/(PPENT−CAPX+DP)	1963	174,085	31.72	35.37	3.13	12.59	1.19	4.48	12.40	21.20	36.89	94.50	232.35	0.41	0.01	1.05
(CAPXV−SPPE)/(AT−ACT)	1963	172,457	19.94	24.10	2.95	11.11	−6.62	1.39	6.76	12.76	23.46	64.05	151.41	0.44	1.82	3.29
(CAPXV−SPPE)/PPENT	1963	175,713	32.57	39.90	3.16	12.96	−10.78	2.62	11.57	20.91	37.88	101.99	260.65	0.37	2.00	1.37
(CAPX−DP)/AT	1963	174,403	3.38	7.13	2.64	9.59	−7.51	−3.11	−0.26	1.48	4.56	16.78	40.17	0.56	16.94	30.67
CAPX/(AT−CHE)	1963	174,423	9.80	11.54	2.92	10.65	0.23	0.99	3.29	6.23	11.43	31.59	71.62	0.60	0.00	6.43
dNCAT/NCAT	1963	177,030	17.10	43.08	3.01	13.11	−46.18	−21.97	−1.75	7.38	21.52	87.99	267.13	0.17	27.00	5.01

Table 3 : Annual Growth Rates in the BEA's Capital Price Deflators, 1963–2020

From the detailed tables for 63 private industries from BEA's fixed assets accounts, we obtain: (i) current-cost (current-dollar) capital stocks in private non-residential equipment, $K_{jt}^{\mathcal{E}\$}$, and structure, $K_{jt}^{\mathcal{S}\$}$, by industry, annual, 1947–2020; and (ii) fixed-cost (constant-dollar) capital stocks in private non-residential equipment, $K_{jt}^{\mathcal{E}}$, and structure, $K_{jt}^{\mathcal{S}}$, by industry, annual, 1947–2020. Industry j's capital price deflator is $P_{jt}^K = (K_{jt}^{\mathcal{E}\$} + K_{jt}^{\mathcal{S}\$})/(K_{jt}^{\mathcal{E}} + K_{jt}^{\mathcal{S}})$, and its growth rate is $P_{jt+1}^K/P_{jt}^K - 1$. We calculate capital price deflators for the 20 BEA sectors by aggregating across all the industries within each sector. Sector s's capital price deflator is $P_{st}^K = (\sum_{j\in s} K_{jt}^{\mathcal{E}\$} + \sum_{j\in s} K_{jt}^{\mathcal{S}\$})/(\sum_{j\in s} K_{jt}^{\mathcal{E}} + \sum_{j\in s} K_{jt}^{\mathcal{S}})$. The aggregate capital price deflator is $P_t^K = (\sum_j K_{jt}^{\mathcal{E}\$} + \sum_j K_{jt}^{\mathcal{S}\$})/(\sum_j K_{jt}^{\mathcal{E}} + \sum_j K_{jt}^{\mathcal{S}})$. All moments are in percent, except for skewness (Skew), excess kurtosis (Kurt, relative to three for the normal distribution), and the serial correlation (ρ_1).

	mean	std	skew	kurt	min	median	max	ρ_1
Panel A: Time series of aggregate growth rates of capital price deflators								
Aggregate	4.14	3.40	1.36	3.93	−3.87	3.23	17.95	0.66
Panel B: Pooled Panels of sector (industry) growth rates of capital price deflators								
Sector	4.04	3.69	1.60	7.68	−12.12	3.38	31.28	0.61
Industry	3.98	3.61	1.57	6.96	−14.68	3.30	34.80	0.63
Panel C: Time series of sector growth rates of capital price deflators								
Agriculture, forestry, fishing, and hunting	4.10	3.18	1.65	4.82	−3.57	2.94	17.02	0.68
Mining	5.90	8.48	0.83	1.64	−12.12	5.17	31.28	0.46
Utilities	4.23	3.60	1.34	2.84	−2.96	3.24	18.05	0.62
Construction	3.78	3.29	2.17	6.39	−0.72	3.31	18.43	0.70
Nondurable goods	3.96	3.20	1.64	4.11	−2.17	3.43	16.89	0.70
Durable goods	3.83	3.21	1.57	3.63	−2.44	3.36	16.17	0.69
Wholesale trade	3.60	3.04	1.17	1.64	−2.66	2.92	13.48	0.75
Retail trade	4.26	3.13	0.87	2.12	−4.07	3.42	14.76	0.60
Transportation and warehousing	3.86	3.61	2.58	10.78	−1.81	3.16	22.18	0.62
Information	2.55	3.56	0.73	0.97	−3.11	2.19	14.54	0.64
Finance and insurance	3.91	3.17	1.28	2.81	−2.78	3.10	15.76	0.71
Real estate and rental and leasing	3.93	2.88	0.96	2.80	−3.96	3.42	14.09	0.61
Professional, scientific, and technical services	3.65	2.94	0.75	0.99	−3.05	3.45	11.71	0.68
Management of companies and enterprises	4.35	3.28	0.84	1.57	−4.04	3.67	14.94	0.62
Administrative and waste management services	4.00	3.32	1.44	3.20	−2.46	3.17	16.48	0.67
Educational services	4.53	3.09	1.05	1.37	−1.32	3.85	14.80	0.52
Health care and social assistance	3.89	3.36	0.86	2.21	−5.24	3.09	15.28	0.74
Arts, entertainment, and recreation	4.15	3.23	1.32	5.20	−4.98	3.20	17.64	0.62
Accommodation and food services	4.14	3.12	1.02	4.09	−5.26	3.39	15.99	0.61
Other services, except government	4.25	3.14	0.75	3.04	−5.45	3.40	14.95	0.65
Panel D: Time series of industry growth rates of capital price deflators								
Farms	4.12	3.17	1.57	4.69	−3.83	3.03	16.90	0.68
Forestry, fishing, and related activities	3.94	3.53	2.33	7.15	−0.94	2.92	19.88	0.61
Oil and gas extraction	6.15	9.67	0.85	1.70	−14.68	5.43	34.80	0.41
Mining, except oil and gas	4.33	3.39	1.29	3.60	−4.72	3.28	16.98	0.68
Support activities for mining	5.41	6.48	1.19	1.98	−6.95	4.48	27.08	0.57
Utilities	4.23	3.60	1.34	2.84	−2.96	3.24	18.05	0.62
Construction	3.78	3.29	2.17	6.39	−0.72	3.31	18.43	0.70
Food and beverage and tobacco products	3.99	3.08	1.46	3.37	−2.30	3.47	15.80	0.69
Textile mills and textile product mills	4.16	3.25	1.61	4.62	−2.74	3.59	17.62	0.66
Apparel and leather and allied products	4.21	3.07	1.38	4.20	−3.19	3.59	16.54	0.62
Wood products	4.06	3.21	1.51	3.59	−2.64	3.51	16.33	0.68

	mean	std	skew	kurt	min	median	max	ρ_1
Panel D: Time series of industry growth rates of capital price deflators (continued)								
Paper products	3.86	3.40	1.83	4.51	−1.58	3.22	17.82	0.72
Printing and related support activities	3.93	3.33	1.85	5.18	−1.93	3.23	18.16	0.70
Petroleum and coal products	4.03	3.27	1.56	3.34	−1.80	3.43	16.57	0.72
Chemical products	3.83	3.17	1.63	4.19	−2.48	2.95	16.74	0.69
Plastics and rubber products	3.87	3.32	1.97	5.76	−1.74	3.32	18.32	0.68
Nonmetallic mineral products	3.99	3.24	1.57	3.36	−1.98	3.26	16.33	0.72
Primary metals	3.85	3.19	1.53	3.37	−2.26	3.41	15.95	0.69
Fabricated metal products	3.77	3.28	1.68	3.86	−2.13	3.24	16.43	0.69
Machinery	3.74	3.17	1.55	3.36	−2.26	3.22	15.63	0.71
Computer and electronic products	3.72	3.11	1.53	3.85	−2.73	3.35	15.90	0.69
Electrical equipment, appliances, and components	3.75	3.19	1.52	3.69	−2.73	2.98	16.22	0.67
Motor vehicles, bodies and trailers, and parts	3.72	3.41	1.77	4.07	−1.94	3.19	17.19	0.69
Other transportation equipment	3.99	3.26	1.34	2.99	−3.37	3.19	15.68	0.66
Furniture and related products	3.99	3.09	1.50	3.85	−2.65	3.45	16.07	0.66
Miscellaneous manufacturing	3.70	3.07	1.61	4.36	−2.70	3.18	15.99	0.64
Wholesale trade	3.60	3.04	1.17	1.64	−2.66	2.92	13.48	0.75
Retail trade	4.26	3.13	0.87	2.12	−4.07	3.42	14.76	0.60
Air transportation	3.97	3.17	0.82	0.89	−2.85	3.66	12.76	0.69
Railroad transportation	3.82	4.17	3.39	16.77	−1.23	2.65	27.22	0.55
Water transportation	3.77	3.78	2.04	5.20	−1.11	2.67	19.12	0.63
Truck transportation	3.36	2.95	1.21	0.60	−0.40	2.90	10.64	0.84
Transit and ground passenger transportation	3.75	3.76	2.90	12.58	−0.78	2.68	23.49	0.61
Pipeline transportation	4.45	4.82	0.86	2.11	−6.59	3.20	21.53	0.28
Other transportation and support activities	3.73	3.85	2.78	11.55	−1.39	2.44	23.54	0.65
Warehousing and storage	4.30	3.12	0.76	1.65	−4.18	3.58	14.04	0.61
Publishing industries (includes software)	3.92	3.46	1.22	2.64	−3.77	3.21	16.59	0.73
Motion picture and sound recording industries	3.85	3.01	0.32	1.63	−5.46	3.39	12.90	0.65
Broadcasting and telecommunications	2.36	3.67	0.62	0.61	−3.49	1.91	14.30	0.63
Information and data processing services	3.48	3.96	0.33	−0.53	−4.60	3.16	12.37	0.78
Federal Reserve banks	4.26	3.49	0.51	−0.15	−3.50	3.44	12.97	0.62
Credit intermediation and related activities	3.94	3.28	1.46	3.29	−2.02	3.09	16.76	0.75
Securities, commodity contracts, and investments	3.44	3.90	0.69	0.56	−4.57	2.44	13.51	0.56
Insurance carriers and related activities	3.77	2.94	0.89	2.60	−4.05	3.42	14.00	0.52
Funds, trusts, and other financial vehicles	4.33	3.09	0.73	1.89	−4.38	3.67	14.22	0.51
Real estate	4.09	3.01	0.74	3.21	−5.25	3.51	14.67	0.53
Rental and leasing services and lessors of intangible assets	3.33	3.50	0.85	−0.06	−2.38	2.12	11.67	0.89
Legal services	3.86	2.94	0.77	1.83	−3.24	3.86	13.68	0.51
Miscellaneous professional, scientific, and technical services	3.59	2.86	0.92	1.29	−2.78	3.33	11.47	0.68
Computer systems design and related services	3.78	4.01	0.19	−0.71	−4.30	3.83	12.22	0.76
Management of companies and enterprises	4.35	3.28	0.84	1.57	−4.04	3.67	14.94	0.62
Administrative and support services	3.79	3.14	0.83	0.88	−2.81	3.50	12.39	0.67
Waste management and remediation services	4.16	3.54	1.69	4.25	−2.12	3.21	18.48	0.65
Educational services	4.53	3.09	1.05	1.37	−1.32	3.85	14.80	0.52
Ambulatory health care services	3.81	3.51	1.05	1.86	−4.15	3.13	15.75	0.78
Hospitals	3.88	3.34	0.70	2.23	−5.79	3.24	15.01	0.73
Nursing and residential care facilities	4.10	3.33	0.94	2.34	−4.89	3.32	15.32	0.69
Social assistance	4.17	3.11	1.10	3.10	−4.16	3.45	15.47	0.61
Performing arts, spectator sports, museums, and related activities	4.03	3.24	1.57	5.74	−4.25	3.09	18.11	0.59
Amusements, gambling, and recreation industries	4.22	3.25	1.13	4.80	−5.46	3.38	17.31	0.64
Accommodation	4.38	3.35	0.66	3.69	−6.52	3.65	16.36	0.63
Food services and drinking places	3.83	2.96	1.36	3.98	−3.43	3.18	15.53	0.59
Other services, except government	4.25	3.14	0.75	3.04	−5.45	3.40	14.95	0.65

Table 4 : The BEA's Ratios of Capital-to-investment Price Deflators, 1963–2020

From the detailed tables for 63 private industries from BEA's fixed assets accounts, we obtain: (i) current-cost (current-dollar) capital stocks in private non-residential equipment, $K_{jt}^{\mathcal{E}\$}$, and structure, $K_{jt}^{\mathcal{S}\$}$, by industry, annual, 1947–2020; (ii) fixed-cost (constant-dollar) capital stocks in private non-residential equipment, $K_{jt}^{\mathcal{E}}$, and structure, $K_{jt}^{\mathcal{S}}$, by industry, annual, 1947–2020; (iii) current-cost investments in private non-residential equipment, $I_{jt}^{\mathcal{E}\$}$, and structure, $I_{jt}^{\mathcal{S}\$}$, by industry, annual, 1947–2020; and (iv) fixed-cost investments in private non-residential equipment, $I_{jt}^{\mathcal{E}}$, and structure, $I_{jt}^{\mathcal{S}}$, by industry, annual, 1947–2020. Industry j's capital and investment price deflators are $P_{jt}^K = (K_{jt}^{\mathcal{E}\$} + K_{jt}^{\mathcal{S}\$})/(K_{jt}^{\mathcal{E}} + K_{jt}^{\mathcal{S}})$ and $P_{jt}^I = (I_{jt}^{\mathcal{E}\$} + I_{jt}^{\mathcal{S}\$})/(I_{jt}^{\mathcal{E}} + I_{jt}^{\mathcal{S}})$, respectively. We calculate capital and investment price deflators for the 20 BEA sectors (and the aggregate economy) by summing up fixed-cost depreciations, capital stocks, and investments across all the industries within each sector (and the whole economy). Industry j's ratio of capital-to-investment price deflators is calculated as P_{jt+1}^K/P_{jt}^I. "Std" stands for standard deviation, "Skew" skewness, "Kurt" excess kurtosis relative to three for the normal distribution), and "ρ_1" the serial correlation.

	mean	std	skew	kurt	min	median	max	ρ_1
Panel A: Time series of aggregate ratios of capital-to-investment price deflators								
Aggregate	0.91	0.09	0.78	−0.29	0.79	0.88	1.12	0.972
Panel B: Pooled Panels of sector (industry) ratios of capital-to-investment price deflators								
Sector	0.91	0.11	0.00	0.16	0.61	0.91	1.34	0.966
Industry	0.91	0.12	−0.69	1.27	0.44	0.92	1.38	0.960
Panel C: Time series of sector ratios of capital-to-investment price deflators								
Agriculture, forestry, fishing, and hunting	0.99	0.06	0.53	−0.78	0.90	0.98	1.11	0.939
Mining	0.98	0.07	−0.13	−0.72	0.84	0.98	1.14	0.735
Utilities	0.93	0.06	0.36	−0.78	0.83	0.93	1.06	0.945
Construction	0.96	0.06	−0.57	−0.35	0.82	0.98	1.08	0.935
Nondurable goods	0.94	0.06	0.70	−0.73	0.87	0.92	1.06	0.956
Durable goods	0.92	0.07	0.55	−0.58	0.81	0.91	1.08	0.964
Wholesale trade	0.87	0.10	0.74	−0.62	0.73	0.84	1.09	0.968
Retail trade	0.91	0.09	1.05	0.16	0.79	0.88	1.13	0.967
Transportation and warehousing	0.94	0.08	−0.25	−0.70	0.77	0.94	1.08	0.920
Information	0.82	0.14	1.45	1.23	0.65	0.77	1.21	0.983
Finance and insurance	0.83	0.13	0.98	−0.28	0.68	0.79	1.14	0.972
Real estate and rental and leasing	0.92	0.08	0.24	−0.70	0.76	0.90	1.09	0.934
Professional, scientific, and technical services	0.80	0.15	0.67	−0.80	0.61	0.76	1.12	0.970
Management of companies and enterprises	0.89	0.14	1.66	2.74	0.70	0.85	1.34	0.976
Administrative and waste management services	0.87	0.10	0.63	−0.55	0.71	0.85	1.11	0.946
Educational services	0.92	0.08	0.95	0.75	0.79	0.90	1.13	0.952
Health care and social assistance	0.89	0.10	0.90	−0.11	0.77	0.87	1.13	0.981
Arts, entertainment, and recreation	0.93	0.08	−0.11	−0.81	0.77	0.94	1.08	0.958
Accommodation and food services	0.95	0.06	0.90	−0.20	0.87	0.93	1.11	0.950
Other services, except government	0.95	0.09	1.46	1.57	0.85	0.92	1.21	0.969
Panel D: Time series of industry ratios of capital-to-investment price deflators								
Farms	0.99	0.06	0.56	−0.72	0.90	0.98	1.12	0.943
Forestry, fishing, and related activities	0.98	0.04	0.31	−0.33	0.91	0.98	1.10	0.772
Oil and gas extraction	1.02	0.06	0.19	−0.20	0.90	1.02	1.18	0.548
Mining, except oil and gas	0.99	0.05	0.15	−0.63	0.91	0.99	1.13	0.889
Support activities for mining	0.86	0.11	0.03	−1.24	0.67	0.87	1.04	0.910
Utilities	0.93	0.06	0.36	−0.78	0.83	0.93	1.06	0.945
Construction	0.96	0.06	−0.57	−0.35	0.82	0.98	1.08	0.935
Food and beverage and tobacco products	0.93	0.06	0.59	−1.02	0.85	0.91	1.06	0.962
Textile mills and textile product mills	0.94	0.06	0.89	−0.06	0.87	0.94	1.11	0.950
Apparel and leather and allied products	0.94	0.09	1.19	1.26	0.82	0.92	1.20	0.963
Wood products	0.94	0.07	0.44	−0.89	0.83	0.93	1.08	0.952

	mean	std	skew	kurt	min	median	max	ρ_1
Panel D: Time series of industry ratios of capital-to-investment price deflators (continued)								
Paper products	0.97	0.04	0.38	−0.94	0.91	0.96	1.04	0.887
Printing and related support activities	0.94	0.06	0.76	−0.08	0.86	0.92	1.08	0.951
Petroleum and coal products	0.94	0.06	0.42	−0.93	0.85	0.92	1.07	0.919
Chemical products	0.93	0.07	0.62	−0.89	0.84	0.91	1.07	0.946
Plastics and rubber products	0.97	0.04	0.59	−0.60	0.91	0.96	1.06	0.901
Nonmetallic mineral products	0.92	0.08	0.16	−1.23	0.78	0.92	1.07	0.952
Primary metals	0.93	0.07	0.27	−1.00	0.82	0.92	1.06	0.961
Fabricated metal products	0.94	0.06	0.12	−1.04	0.83	0.94	1.05	0.948
Machinery	0.90	0.08	0.53	−0.98	0.78	0.88	1.06	0.958
Computer and electronic products	0.91	0.08	0.85	0.19	0.77	0.90	1.12	0.947
Electrical equipment, appliances, and components	0.93	0.07	0.72	−0.30	0.82	0.91	1.09	0.929
Motor vehicles, bodies and trailers, and parts	0.94	0.06	−0.02	−0.75	0.82	0.94	1.05	0.893
Other transportation equipment	0.91	0.08	0.55	−0.76	0.79	0.90	1.09	0.940
Furniture and related products	0.93	0.07	0.62	−0.13	0.81	0.92	1.11	0.957
Miscellaneous manufacturing	0.90	0.09	0.83	−0.19	0.77	0.87	1.13	0.973
Wholesale trade	0.87	0.10	0.74	−0.62	0.73	0.84	1.09	0.968
Retail trade	0.91	0.09	1.05	0.16	0.79	0.88	1.13	0.967
Air transportation	0.95	0.10	−1.71	2.52	0.64	1.00	1.06	0.868
Railroad transportation	0.97	0.04	0.39	0.61	0.90	0.98	1.12	0.812
Water transportation	0.89	0.14	−1.00	0.10	0.50	0.92	1.04	0.930
Truck transportation	0.97	0.03	0.18	−1.23	0.91	0.96	1.02	0.903
Transit and ground passenger transportation	0.89	0.11	−0.11	−1.27	0.70	0.90	1.08	0.904
Pipeline transportation	0.81	0.20	−0.51	−1.25	0.46	0.86	1.05	0.955
Other transportation and support activities	0.97	0.06	−0.31	−0.45	0.85	0.98	1.09	0.922
Warehousing and storage	0.89	0.10	0.17	−1.30	0.73	0.89	1.07	0.963
Publishing industries (includes software)	0.87	0.12	0.61	−0.38	0.71	0.87	1.16	0.971
Motion picture and sound recording industries	0.82	0.17	1.00	0.69	0.56	0.79	1.30	0.976
Broadcasting and telecommunications	0.82	0.17	1.80	2.66	0.64	0.76	1.38	0.986
Information and data processing services	0.81	0.15	−0.25	−0.96	0.51	0.83	1.03	0.946
Federal Reserve banks	0.82	0.19	0.76	0.27	0.50	0.79	1.33	0.934
Credit intermediation and related activities	0.83	0.12	0.81	−0.60	0.67	0.79	1.11	0.963
Securities, commodity contracts, and investments	0.74	0.19	0.99	−0.17	0.50	0.68	1.18	0.944
Insurance carriers and related activities	0.87	0.12	0.82	0.36	0.67	0.84	1.20	0.923
Funds, trusts, and other financial vehicles	0.96	0.11	0.16	0.35	0.74	0.98	1.23	0.890
Real estate	0.97	0.06	−0.89	1.10	0.79	0.98	1.07	0.857
Rental and leasing services and lessors of intangible assets	0.88	0.13	−0.94	−0.13	0.59	0.91	1.03	0.962
Legal services	0.82	0.16	0.09	−0.89	0.53	0.82	1.14	0.927
Miscellaneous professional, scientific, and technical services	0.82	0.14	0.57	−0.98	0.64	0.78	1.10	0.966
Computer systems design and related services	0.70	0.21	0.94	−0.33	0.44	0.63	1.19	0.969
Management of companies and enterprises	0.89	0.14	1.66	2.74	0.70	0.85	1.34	0.976
Administrative and support services	0.83	0.13	0.48	−0.83	0.61	0.77	1.10	0.941
Waste management and remediation services	0.94	0.06	0.60	−0.20	0.84	0.93	1.09	0.930
Educational services	0.92	0.08	0.95	0.75	0.79	0.90	1.13	0.952
Ambulatory health care services	0.85	0.12	0.83	−0.40	0.69	0.80	1.12	0.974
Hospitals	0.91	0.09	0.96	0.23	0.79	0.89	1.15	0.979
Nursing and residential care facilities	0.91	0.09	0.05	−1.24	0.78	0.93	1.08	0.955
Social assistance	0.93	0.07	0.76	−0.46	0.83	0.90	1.12	0.921
Performing arts, spectator sports, museums, and related activities	0.92	0.10	−0.14	−0.57	0.70	0.93	1.13	0.952
Amusements, gambling, and recreation industries	0.94	0.07	−0.02	−0.93	0.81	0.94	1.06	0.954
Accommodation	0.98	0.04	0.58	−0.22	0.90	0.97	1.09	0.914
Food services and drinking places	0.93	0.07	0.69	−0.54	0.81	0.90	1.09	0.963
Other services, except government	0.95	0.09	1.46	1.57	0.85	0.92	1.21	0.969

Table 5 : The BEA's Economic Depreciation Rates, 1963–2020

From the detailed tables for 63 private industries from BEA's fixed assets accounts, we obtain: (i) fixed-cost depreciations in private non-residential equipment, $D^{\mathcal{E}}_{jt}$, and structure, $D^{\mathcal{S}}_{jt}$, by industry, annual, 1947–2020; (ii) fixed-cost capital stocks in private non-residential equipment, $K^{\mathcal{E}}_{jt}$, and structure, $K^{\mathcal{S}}_{jt}$, by industry, annual, 1947–2020; and (iii) fixed-cost investments in private non-residential equipment, $I^{\mathcal{E}}_{jt}$, and structure, $I^{\mathcal{S}}_{jt}$, by industry, annual, 1947–2020. For industry j in year t, we calculate its economic depreciation rate as $\delta_{jt} = (D^{\mathcal{E}}_{jt} + D^{\mathcal{S}}_{jt})/((K^{\mathcal{E}}_{jt-1} + K^{\mathcal{S}}_{jt-1}) + 0.5 \times (I^{\mathcal{E}}_{jt} + I^{\mathcal{S}}_{jt}))$. We also calculate economic depreciation rates for the 20 BEA sectors (and the aggregate economy) by summing up fixed-cost depreciations, capital stocks, and investments across all the industries within each sector (and the whole economy). In particular, for sector s in year t, its depreciation rate is $\delta_{st} = (\sum_{j\in s} D^{\mathcal{E}}_{jt} + \sum_{j\in s} D^{\mathcal{S}}_{jt})/((\sum_{j\in s} K^{\mathcal{E}}_{jt-1} + \sum_{j\in s} K^{\mathcal{S}}_{jt-1}) + 0.5 \times (\sum_{j\in s} I^{\mathcal{E}}_{jt} + \sum_{j\in s} I^{\mathcal{S}}_{jt}))$, and the aggregate depreciation rate is $\delta_t = (\sum_j D^{\mathcal{E}}_{jt} + \sum_j D^{\mathcal{S}}_{jt})/((\sum_j K^{\mathcal{E}}_{jt-1} + \sum_j K^{\mathcal{S}}_{jt-1}) + 0.5 \times (\sum_j I^{\mathcal{E}}_{jt} + \sum_j I^{\mathcal{S}}_{jt}))$. All moments are in percent, except for skewness (Skew), excess kurtosis (Kurt, relative to the kurtosis of three for the normal distribution), and the first-order autocorrelation (ρ_1).

	mean	std	skew	kurt	min	median	max	ρ_1
Panel A: Time series of aggregate economic depreciation rates								
Aggregate	5.71	0.48	0.51	−0.25	4.90	5.61	6.79	0.994
Panel B: Pooled Panels of sector (industry) economic depreciation rates								
Sector	5.90	2.21	1.00	1.06	2.36	5.37	14.28	0.999
Industry	6.49	2.51	0.96	1.27	2.36	6.32	15.82	0.999
Panel C: Time series of sector economic depreciation rates								
Agriculture, forestry, fishing, and hunting	7.36	0.47	0.77	−0.21	6.75	7.26	8.39	0.988
Mining	7.20	0.61	−1.64	0.98	5.84	7.42	7.71	0.940
Utilities	3.40	0.26	−1.05	−0.26	2.84	3.52	3.69	0.995
Construction	11.63	1.35	0.06	−0.65	9.18	11.67	14.28	0.990
Nondurable goods	6.86	0.34	0.04	−1.36	6.27	6.85	7.41	0.998
Durable goods	6.86	0.45	0.62	−1.24	6.34	6.64	7.64	0.997
Wholesale trade	9.01	0.63	0.18	−1.37	8.02	8.99	10.07	0.980
Retail trade	4.63	0.64	0.85	−0.66	3.83	4.27	6.04	0.998
Transportation and warehousing	5.01	0.65	−0.18	−0.76	3.72	5.01	6.19	0.997
Information	5.04	0.95	1.85	2.40	4.25	4.61	7.94	0.998
Finance and insurance	6.58	1.33	0.47	−0.92	4.73	6.14	9.22	0.998
Real estate and rental and leasing	5.20	0.74	0.10	−0.51	3.99	5.30	6.73	0.990
Professional, scientific, and technical services	7.65	1.74	0.59	−1.38	5.88	6.82	10.63	0.997
Management of companies and enterprises	3.85	0.41	1.08	0.82	3.26	3.75	5.01	0.998
Administrative and waste management services	6.46	1.62	0.85	−0.67	4.43	5.58	9.91	0.999
Educational services	2.78	0.40	0.84	−0.90	2.36	2.60	3.51	0.998
Health care and social assistance	4.59	1.05	0.70	−0.69	3.38	4.31	6.84	1.000
Arts, entertainment, and recreation	4.94	0.34	−0.20	−1.27	4.34	4.96	5.45	0.986
Accommodation and food services	5.24	0.11	0.22	−1.13	5.08	5.24	5.45	0.954
Other services, except government	3.80	0.40	0.73	−0.09	3.18	3.73	4.73	0.994
Panel D: Time series of industry economic depreciation rates								
Farms	7.22	0.49	0.59	−0.25	6.48	7.18	8.23	0.987
Forestry, fishing, and related activities	9.26	0.76	−0.30	−0.49	7.41	9.26	10.53	0.980
Oil and gas extraction	7.01	0.65	−1.76	1.17	5.59	7.27	7.41	0.939
Mining, except oil and gas	7.87	0.85	0.18	−1.05	6.52	7.79	9.48	0.992
Support activities for mining	9.15	0.69	−0.77	0.03	7.48	9.22	10.25	0.956
Utilities	3.40	0.26	−1.05	−0.26	2.84	3.52	3.69	0.995
Construction	11.63	1.35	0.06	−0.65	9.18	11.67	14.28	0.990
Food and beverage and tobacco products	6.13	0.40	−0.13	−1.18	5.48	6.18	6.78	0.999
Textile mills and textile product mills	6.59	0.22	−0.39	−0.53	6.13	6.63	6.97	0.984
Apparel and leather and allied products	6.03	0.27	0.20	−1.07	5.59	6.02	6.56	0.967
Wood products	8.23	0.43	0.00	−1.44	7.49	8.20	8.87	0.979

	mean	std	skew	kurt	min	median	max	ρ_1
Panel D: Time series of industry economic depreciation rates (continued)								
Paper products	7.74	0.31	−0.56	−1.09	7.11	7.85	8.12	0.994
Printing and related support activities	8.43	0.14	0.36	−0.47	8.20	8.42	8.76	0.955
Petroleum and coal products	5.90	0.51	0.14	−1.18	5.12	5.75	6.78	0.995
Chemical products	6.88	0.45	0.92	−0.19	6.38	6.71	7.89	0.996
Plastics and rubber products	9.14	0.26	−0.13	−0.35	8.60	9.16	9.62	0.985
Nonmetallic mineral products	6.85	0.38	0.59	−1.12	6.36	6.72	7.56	0.987
Primary metals	5.33	0.23	−0.20	−0.15	4.84	5.34	5.74	0.994
Fabricated metal products	6.21	0.42	0.74	−0.95	5.76	5.98	6.98	0.998
Machinery	5.99	0.32	0.49	−1.11	5.59	5.87	6.57	0.993
Computer and electronic products	7.31	0.50	0.34	−1.54	6.64	7.07	8.13	0.992
Electrical equipment, appliances, and components	7.06	0.12	−0.33	0.00	6.76	7.07	7.31	0.922
Motor vehicles, bodies and trailers, and parts	9.77	0.31	−1.11	0.13	9.00	9.89	10.17	0.975
Other transportation equipment	6.27	0.57	0.81	0.21	5.50	6.21	7.73	0.995
Furniture and related products	7.41	0.53	0.36	−1.36	6.73	7.25	8.44	0.993
Miscellaneous manufacturing	7.65	0.53	0.42	−0.48	6.82	7.68	8.71	0.992
Wholesale trade	9.01	0.63	0.18	−1.37	8.02	8.99	10.07	0.980
Retail trade	4.63	0.64	0.85	−0.66	3.83	4.27	6.04	0.998
Air transportation	6.30	0.15	0.66	−0.58	6.08	6.26	6.60	0.934
Railroad transportation	2.73	0.08	0.11	−1.14	2.62	2.74	2.87	0.985
Water transportation	6.74	0.24	0.02	−0.21	6.20	6.72	7.19	0.977
Truck transportation	14.67	0.68	−0.55	−0.97	13.23	14.90	15.49	0.985
Transit and ground passenger transportation	5.22	1.29	0.77	−0.92	3.73	4.52	8.04	0.997
Pipeline transportation	3.31	0.58	0.94	−0.76	2.72	3.00	4.46	0.994
Other transportation and support activities	6.20	0.75	0.55	1.27	4.74	6.37	8.54	0.990
Warehousing and storage	4.43	0.70	−0.14	−0.83	3.35	4.61	5.91	0.992
Publishing industries (includes software)	7.99	0.88	1.39	0.42	7.31	7.56	10.04	0.992
Motion picture and sound recording industries	5.29	0.55	−0.13	−0.47	4.11	5.21	6.20	0.987
Broadcasting and telecommunications	4.54	0.76	1.68	1.98	3.85	4.17	6.84	0.998
Information and data processing services	10.80	2.12	0.84	−0.08	8.13	10.58	15.82	0.985
Federal Reserve banks	5.02	1.09	1.54	1.14	3.95	4.57	7.82	0.975
Credit intermediation and related activities	7.36	1.84	0.17	−1.09	4.51	7.00	10.65	0.998
Securities, commodity contracts, and investments	5.83	1.09	0.62	−0.18	4.35	5.81	8.49	0.990
Insurance carriers and related activities	5.18	0.63	0.36	−1.21	4.41	5.05	6.45	0.993
Funds, trusts, and other financial vehicles	2.80	0.11	0.59	−0.04	2.64	2.80	3.11	0.981
Real estate	3.47	0.30	0.73	−0.72	3.08	3.35	4.05	0.992
Rental and leasing services and lessors of intangible assets	12.44	0.75	−0.18	−1.25	11.17	12.53	13.63	0.965
Legal services	6.36	1.68	0.61	−1.42	4.64	5.43	9.18	0.995
Miscellaneous professional, scientific, and technical services	7.87	1.34	0.43	−1.52	6.31	7.39	10.00	0.996
Computer systems design and related services	7.77	3.72	0.79	−1.08	4.25	5.33	14.61	0.997
Management of companies and enterprises	3.85	0.41	1.08	0.82	3.26	3.75	5.01	0.998
Administrative and support services	7.53	2.47	0.42	−1.54	4.77	6.42	11.48	0.999
Waste management and remediation services	5.23	0.58	0.73	0.87	4.33	5.25	6.91	0.984
Educational services	2.78	0.40	0.84	−0.90	2.36	2.60	3.51	0.998
Ambulatory health care services	6.22	1.49	0.53	−0.95	4.34	5.74	9.12	0.999
Hospitals	3.91	0.99	0.92	−0.31	2.80	3.64	6.22	0.999
Nursing and residential care facilities	4.23	0.58	−0.19	−1.53	3.28	4.20	4.97	0.997
Social assistance	4.34	0.53	0.45	−1.06	3.63	4.17	5.32	0.994
Performing arts, spectator sports, museums, and related activities	4.49	0.36	1.07	0.31	4.05	4.38	5.36	0.988
Amusements, gambling, and recreation industries	5.24	0.39	−0.81	−0.65	4.39	5.38	5.69	0.988
Accommodation	3.84	0.25	0.06	−0.71	3.44	3.89	4.36	0.989
Food services and drinking places	6.97	0.20	−0.75	−0.57	6.55	7.01	7.23	0.970
Other services, except government	3.80	0.40	0.73	−0.09	3.18	3.73	4.73	0.994

Table 6 : Characterizing Investment Rates in Compustat, 1963–2020

In Panel A, $I^{\$}_{it}/K^{\$}_{it}$ is current-cost investment (change of net PPE plus accounting depreciation, item DP minus item AM [zero if missing] scaled by current-cost capital). All moments, including percentiles, are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt, relative to three for the normal distribution), and the serial correlation (ρ_1). f_- is the fraction of negative investment rates (below -1%), and f_0 the fraction of inactive investment rates (between -1% and 1%). $f^-_{.2}$, $f^-_{.3}$, $f^-_{.4}$, and $f^-_{.5}$ are the fractions of negative investment rate spikes below $-.2, -.3, -.4$, and $-.5$, and $f^+_{.2}$, $f^+_{.3}$, $f^+_{.4}$, and $f^+_{.5}$ the fractions of positive investment rate spikes above .2, .3, .4, and .5, respectively. In Panel B, real investment rate, I_{it}/K_{it}, is $(I^{\$}_{it}/K^{\$}_{it})(P^K_{it}/P^I_{it})$, in which P^K_{it} and P^I_{it} are capital and investment price deflators, respectively. The row "CH" shows the plant-level moments reported in CH (2006). The row "All" shows the firm-level moments in our full sample. The subsequent three rows show the moments from three subsamples, 1963–1972, 1973–1988, and 1989–2020. The row "Manuf" shows the moments in manufacturing firms only, and "Non-manuf" non-manufacturing firms. Finally, we examine two balanced panels in 1973–1988, one with 898 firms from all sectors and one with 466 manufacturing firms. Manufacturing firms have a one-digit NAICS code of 3 and are from two NAICS sectors ("Nondurable goods" and "Durable goods").

Panel A: Current-cost investment rates, $I^{\$}_{it}/K^{\$}_{it}$, time series averages of cross-sectional moments

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99
	169,828	23.84	37.20	3.33	14.28	−23.32	−1.97	6.19	13.03	26.70	87.07	241.82
	ρ_1	f_-	f_0	$f^-_{.2}$	$f^-_{.3}$	$f^-_{.4}$	$f^-_{.5}$	$f^+_{.2}$	$f^+_{.3}$	$f^+_{.4}$	$f^+_{.5}$	
	0.34	5.51	2.85	1.26	0.73	0.44	0.28	32.66	20.70	14.49	10.80	

Panel B: Reconciling with CH, real investment rates, I_{it}/K_{it}, panel data moments

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99
CH	112,000	12.20										
All	169,828	21.39	38.11	5.25	43.09	−18.45	−2.01	5.13	11.09	23.02	79.40	198.71
1963–1972	13,672	17.45	22.11	3.84	21.92	−10.18	0.83	6.61	11.51	20.30	54.82	117.16
1973–1988	52,584	18.93	34.32	5.16	37.79	−17.83	−2.46	4.77	10.18	20.37	68.03	188.30
1989–2020	103,572	23.16	41.36	5.11	40.88	−19.39	−2.18	5.11	11.56	25.05	88.40	212.97
Manuf	93,859	19.14	32.76	5.27	44.01	−16.07	−1.25	5.09	10.54	20.71	68.33	165.71
Non-manuf	86,125	23.88	42.81	4.96	37.55	−20.58	−3.11	5.18	11.89	26.02	90.16	229.13
Balanced panel, 1973–1988												
All, 898 firms	14,368	11.57	13.77	5.47	85.94	−10.97	−0.03	4.75	8.87	14.64	32.62	63.48
Manuf, 466 firms	7,456	11.76	11.93	3.59	27.64	−7.66	0.46	5.45	9.54	14.89	31.34	55.83
	ρ_1	f_-	f_0	$f^-_{.2}$	$f^-_{.3}$	$f^-_{.4}$	$f^-_{.5}$	$f^+_{.2}$	$f^+_{.3}$	$f^+_{.4}$	$f^+_{.5}$	
CH	0.06	10.40	8.10	1.80				18.60				
All	0.31	5.73	3.40	1.17	0.64	0.37	0.23	29.16	18.43	12.82	9.53	
1963–1972	0.30	3.45	1.81	0.61	0.28	0.14	0.07	25.55	13.55	8.37	5.92	
1973–1988	0.31	6.02	3.48	1.22	0.68	0.40	0.24	25.58	15.62	10.66	7.79	
1989–2020	0.31	5.88	3.56	1.22	0.67	0.38	0.24	31.45	20.50	14.51	10.90	
Manuf	0.30	5.20	3.50	0.90	0.46	0.25	0.15	26.07	15.87	10.77	7.88	
Non-manuf	0.34	6.39	3.26	1.46	0.82	0.49	0.31	32.72	21.28	15.12	11.37	
Balanced panel, 1973–1988												
All, 898 firms	0.29	4.11	2.87	0.44	0.19	0.10	0.04	14.19	5.96	3.15	1.79	
Manuf, 466 firms	0.32	3.45	2.70	0.17	0.05	0.01	0.01	13.69	5.50	2.62	1.44	

Table 7 : Differences between Current-cost and Historical-cost Investment Rates in Compustat, 1963–2020

This table shows the moments of current-cost investment rates, $I_{it}^{\$}/K_{it}^{\$}$ (same in Table 6), historical-cost investment rates, I_{it}^{H}/K_{it}^{H}, change in net PPE plus accounting depreciation (item DP minus item AM, missing AM set to zero) scaled by net PPE; $K_{it}^{\$}$/PPENT, the ratios of current-cost capital over historical-cost capital (net PPE); δ_{it}, economic depreciation rates; δ_{it}^{H}, accounting depreciation rates (accounting depreciation over net PPE); $K_{it}^{\$}$/alt. $K_{it}^{\$}$ with δ_{it}^{H}, the ratios of current-cost capital over an alternative construction of $K_{it}^{\$}$, in which δ_{it} is replaced with δ_{it}^{H}; $K_{it}^{\$}$/alt. $K_{it}^{\$}$, no price adjustment, the ratios of current-cost capital over an alternative construction of $K_{it}^{\$}$ with no price adjustment, i.e., $P_{it}^{K} = P_{it}^{I} = 1$ (capital and investment price deflators are both one); $I_{it}^{\$}$/alt. $K_{it}^{\$}$ with δ_{it}^{H}, current-cost investment rates with the first alternative construction of $K_{it}^{\$}$; and $I_{it}^{\$}$/alt. $K_{it}^{\$}$, no price adjustment, current-cost investment rates with the second alternative construction of $K_{it}^{\$}$. The table also show the moments of $K_{it}^{\$}$/PPEGT, the ratio of current-cost capital over gross PPE; and $K_{it}^{\$}$/AT, the ratio of current-cost capital over total assets. The investment rate moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt, relative to three for the normal distribution), and the serial correlation (ρ_1). f_{-} is the fraction of negative investment rates (below -1%), and f_0 the fraction of inactive investment rates (between -1% and 1%). $f_{.2}^{-}$, $f_{.3}^{-}$, $f_{.4}^{-}$, and $f_{.5}^{-}$ are the fractions of negative investment rate spikes below $-20\%, -30\%, -40\%$, and -50%, and $f_{.2}^{+}$, $f_{.3}^{+}$, $f_{.4}^{+}$, and $f_{.5}^{+}$ the fractions of positive investment rate spikes above $20\%, 30\%, 40\%$, and 50%, respectively.

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
$I_{it}^{\$}/K_{it}^{\$}$	169,828	23.84	37.20	3.33	14.28	−23.32	−1.97	6.19	13.03	26.70	87.07	241.82	0.34
I_{it}^{H}/K_{it}^{H}	177,412	40.27	62.90	3.47	15.84	−38.02	−3.95	11.05	22.78	45.33	141.65	423.85	0.25
$K_{it}^{\$}/K_{it}^{H}$	169,828	2.11	1.79	3.58	16.82	0.83	1.01	1.29	1.61	2.16	4.85	13.50	0.90
δ_{it}	169,792	6.90	1.96	0.65	1.37	3.27	3.69	5.91	6.86	7.60	10.69	13.25	0.98
δ_{it}^{H}	169,828	20.94	16.65	2.01	6.08	2.86	4.75	10.81	16.10	26.23	50.69	103.19	0.79
$K_{it}^{\$}$/alt. $K_{it}^{\$}$ with δ_{it}^{H}	167,237	1.93	1.54	3.20	13.90	0.85	1.00	1.20	1.48	2.00	4.39	11.47	0.93
$K_{it}^{\$}$/alt. $K_{it}^{\$}$, no price adjustment	169,680	1.13	0.21	1.78	6.25	0.76	0.88	1.00	1.08	1.20	1.51	2.08	0.96
$I_{it}^{\$}$/alt. $K_{it}^{\$}$ with δ_{it}^{H}	167,344	39.33	60.91	3.32	14.27	−33.93	−3.26	9.70	21.37	44.72	142.32	397.84	0.31
$I_{it}^{\$}$/alt. $K_{it}^{\$}$, no price adjustment	169,697	24.42	36.26	3.27	14.09	−25.35	−2.28	7.29	14.43	27.69	85.22	236.05	0.29
$K_{it}^{\$}$/PPEGT	169,509	0.98	0.42	3.23	14.86	0.51	0.64	0.78	0.88	1.03	1.61	3.48	0.91
$K_{it}^{\$}$/AT	169,828	0.53	0.39	1.22	1.48	0.04	0.09	0.24	0.43	0.73	1.30	1.90	0.97

	f_{-}	f_0	$f_{.2}^{-}$	$f_{.3}^{-}$	$f_{.4}^{-}$	$f_{.5}^{-}$	$f_{.2}^{+}$	$f_{.3}^{+}$	$f_{.4}^{+}$	$f_{.5}^{+}$
$I_{it}^{\$}/K_{it}^{\$}$	5.51	2.85	1.26	0.73	0.44	0.28	32.66	20.70	14.49	10.80
I_{it}^{H}/K_{it}^{H}	6.01	1.48	2.18	1.45	0.99	0.66	53.94	37.64	27.53	21.05
$I_{it}^{\$}$/alt. $K_{it}^{\$}$ with δ_{it}^{H}	5.81	1.65	1.92	1.24	0.83	0.56	50.56	35.62	26.57	20.61
$I_{it}^{\$}$/alt. $K_{it}^{\$}$, no price adjustment	5.63	2.42	1.42	0.83	0.50	0.32	35.40	21.75	14.82	10.93

Table 8 : Differences between Current-cost Investment Rates and (CAPX−SPPE)/PPEGT in Compustat, 1963–2020

This table shows current-cost investment rates, $I^{\$}_{it}/K^{\$}_{it}$, (CAPX−SPPE)/PPEGT (capital expenditure minus sales of PPE, scaled by gross PPE), and their differences (Diff, the former minus the latter). The moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt), and autocorrelation (ρ_1). We winsorize the investment rates (and their differences) at the 1%–99% level across all fiscal years ending in a given calendar year. Compustat item SPPE starts in June 1971. We set missing values of item SPPE to zero. The table also shows the differences across deciles formed annually on the NYSE breakpoints of beginning-of-year current-cost capital.

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
$I^{\$}/K^{\$}$	169,828	23.84	37.20	3.33	14.28	−23.32	−1.97	6.19	13.03	26.70	87.07	241.82	0.34
(CAPX−SPPE)/PPEGT	173,939	17.13	21.65	3.18	12.76	−6.20	1.29	6.03	10.71	19.38	55.58	139.87	0.48
Diff	166,576	6.47	21.45	3.12	16.17	−37.42	−11.51	−0.89	1.97	7.33	38.20	137.24	0.21
Diff by deciles formed on the beginning-of-year current-cost capital													
Small $K^{\$}$	86,380	9.19	25.82	2.61	10.76	−37.41	−14.10	−0.51	2.93	10.67	53.83	136.78	0.21
2	16,810	5.02	16.58	3.05	19.81	−29.41	−10.97	−0.76	2.12	6.82	29.75	80.71	0.22
3	12,265	4.94	16.71	3.17	19.83	−25.87	−10.16	−0.85	1.88	6.48	29.93	79.99	0.23
4	10,172	4.23	15.28	3.04	19.97	−27.73	−10.37	−0.97	1.74	5.72	26.01	79.50	0.19
5	8,479	3.97	14.60	3.13	20.81	−25.87	−9.43	−0.91	1.57	5.27	24.63	76.76	0.22
6	7,511	3.28	13.00	2.82	18.68	−23.85	−9.34	−1.06	1.32	4.85	20.88	67.01	0.22
7	6,879	2.81	12.88	2.91	21.63	−22.70	−9.29	−1.27	1.08	4.33	19.13	59.88	0.21
8	6,302	2.12	11.30	2.02	16.25	−22.14	−9.65	−1.55	0.65	3.65	18.49	46.50	0.27
9	5,934	1.10	9.76	1.90	16.87	−20.78	−8.99	−2.10	0.17	2.72	13.14	43.69	0.23
Big $K^{\$}$	5,844	0.33	7.64	1.37	15.52	−18.91	−8.45	−2.00	−0.28	1.75	10.40	30.77	0.23

Table 9 : Aggregate, Sector, and Industry Current-cost Investment Rates, BEA versus Compustat, 1963–2020

For firms with current-cost investment rates in a given year, we add up their investments and beginning-of-year current-cost capital stocks, before computing industry, sector, and aggregate investment rates in Compustat. The aggregate, sector, and industry investment rates from BEA are described in Section 2.1 (see also Table 1). The moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt), and autocorrelation (ρ_1). In Panels B and C, "Compustat (#firms≥1)" means that we impose a minimum of one for the number of firms within a given sector or industry, "Compustat (#firms≥10)" a minimum of ten, and "Compustat (#firms≥20)" a minimum of 20.

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
Panel A: Aggregate, time series moments													
BEA	58	9.63	1.27	−0.09	−0.60	6.56	7.33	8.59	9.49	10.67	11.46	12.08	0.83
BEA (nonfinancial)	58	9.38	1.24	0.10	−0.68	6.61	7.21	8.40	9.18	10.32	11.27	11.97	0.83
Compustat	58	11.05	2.62	0.24	0.39	3.98	7.11	9.44	10.80	12.55	15.77	18.10	0.67
Panel B: 19 nonfinancial sectors, panel data moments													
BEA	1,160	10.59	4.55	1.06	1.04	3.71	4.81	7.32	9.61	12.66	19.94	24.36	0.95
BEA (nonfinancial)	1,102	10.33	4.40	1.16	1.54	3.71	4.72	7.25	9.45	12.29	19.43	24.36	0.95
Compustat (#firms≥1)	1,047	15.75	17.77	12.55	219.37	−0.94	4.91	9.50	13.03	18.33	31.71	58.11	0.32
Compustat (#firms≥10)	972	15.34	14.06	12.91	282.11	−1.51	4.91	9.54	13.10	18.29	31.46	54.49	0.38
Compustat (#firms≥20)	850	14.82	9.02	2.06	12.03	1.06	5.51	9.60	12.98	17.90	30.33	49.33	0.60
Panel C: 58 nonfinancial industries, panel data moments													
BEA	3,654	11.39	6.13	1.61	4.39	2.07	3.96	7.32	10.08	14.20	22.48	33.75	0.93
BEA (nonfinancial)	3,364	11.13	5.74	1.53	4.09	2.22	4.04	7.27	9.89	13.90	21.62	31.11	0.93
Compustat (#firms≥1)	3,186	16.14	19.69	9.62	144.52	−5.54	3.29	8.71	13.05	18.83	36.63	73.39	0.27
Compustat (#firms≥10)	2,567	15.36	12.09	8.88	201.20	−1.27	4.52	9.23	13.20	18.45	32.94	54.13	0.50
Compustat (#firms≥20)	2,019	15.48	10.13	2.82	19.21	1.06	4.97	9.64	13.44	18.53	32.41	52.10	0.62

Figure 1 : Mean versus Standard Deviation and Skewness versus the Serial Correlation Across the 40 Investment Rates in Compustat, 1963–2020

The data of the blue circles are detailed in Table 2 (columns "mean," "std," "skew," and "ρ_1") across the 40 investment rates. The data of the larger red circles are for our baseline current-cost investment rates detailed in Table 6.

Panel A: Mean versus standard deviation

Panel B: Skewness versus serial correlation

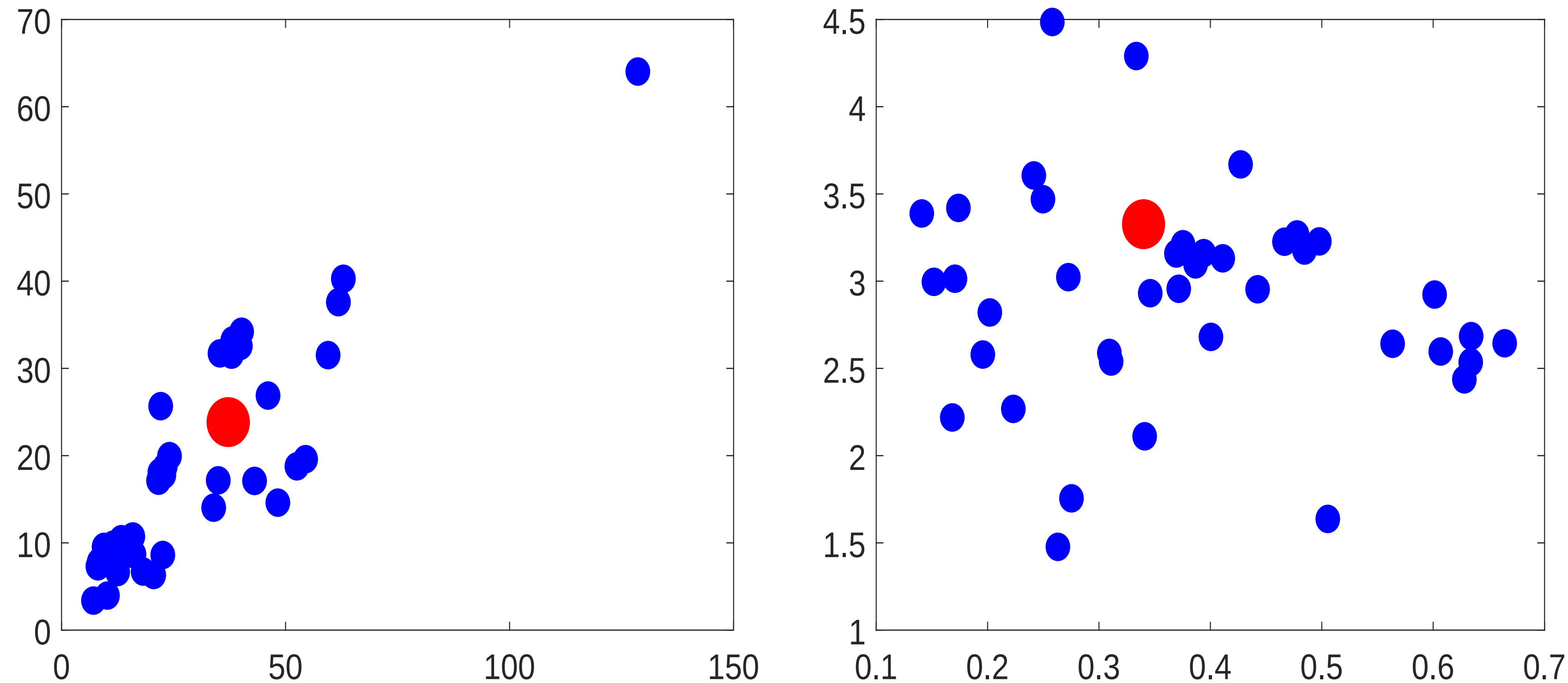


Figure 2 : The Frequency Distribution of 40 Firm-level Investment Rates in the Finance Literature, 2000–2022

Based on Table S1, we present the frequency distribution of the 40 investment rates based on Compustat. For each measure ranked in descending order on the horizontal axis, the vertical axis gives the fraction (in percent) of the number of appearances within the total of 393. The 40 measures are: (1) CAPX/AT; (2) CAPX/PPENT; (3) dAT/AT; (4) (dPPEGT+dINVT)/AT; (5) Inv/AT; (6) CAPX/PPEGT; (7) dPPEGT/AT; (8) (dPPENT+DP)/PPENT; (9) (CAPX−SPPE)/PPEGT; (10) (CAPX−SPPE)/AT; (11) dPPENT/AT; (12) (CAPX+AQC)/AT; (13) CAPXV/AT; (14) (CAPX−SPPE)/PPENT; (15) (CAPX+AQC−SPPE)/AT; (16) (CAPXV−SPPE)/AT; (17) dPPEGT/PPEGT; (18) dPPENT/PPENT; (19) (dPPENT+DP)/AT; (20) (CAPXV−SPPE)/PPEGT; (21) dBe/Be; (22) (CAPX−SPPE)/avePPENT; (23) dNoa/AT; (24) dLno/aveAT; (25) dNca/AT; (26) dBe/AT; (27) (CAPXV+AQC)/PPENT; (28) CAPXV/PPENT; (29) CAPXV/PPEGT; (30) (CAPX+IVCH−SIV)/(PPENT+IVAEQ+IVAO); (31) (dPPENT+WDP+DPC)/PPEGT; (32) dNAT/NAT; (33) CAPX/(AT−INVT); (34) (CAPX+AQC)/PPEGT; (35) CAPX/(PPENT−CAPX+DP); (36) (CAPXV−SPPE)/(AT−ACT); (37) (CAPXV−SPPE)/PPENT; (38) (CAPX−DP)/AT; (39) CAPX/(AT−CHE); and (40) dNCAT/NCAT. Appendix A details the variable definitions.

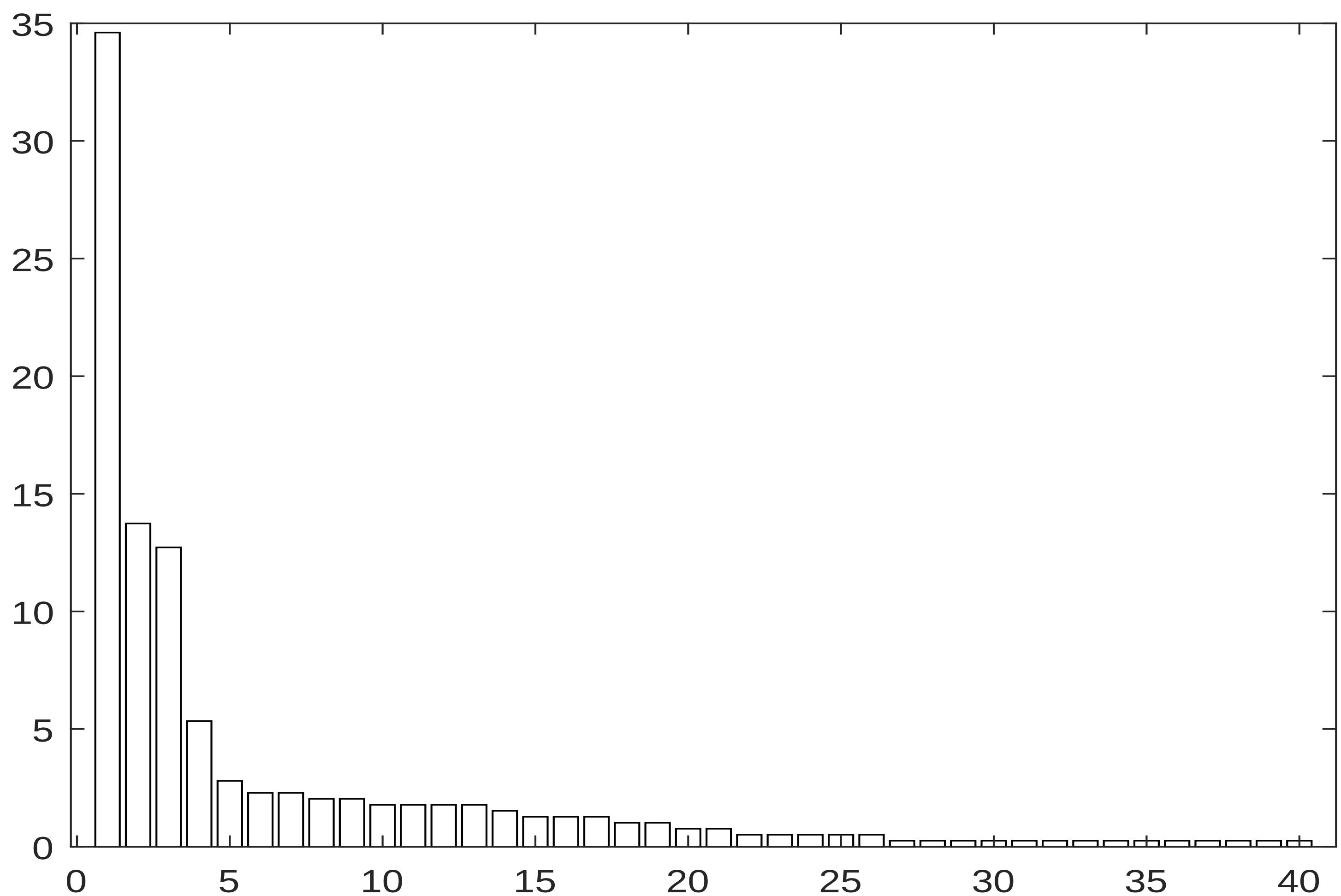


Figure 3 : The Firm-level Current-cost Investment Rate Distribution in Compustat, 169,828 Firm-years, 1963–2020

Section 3 details the measurement of current-cost investment rates, $I_{it}^{\$}/K_{it}^{\$}$. The y-axis is the fraction (in percent) of firm-years.

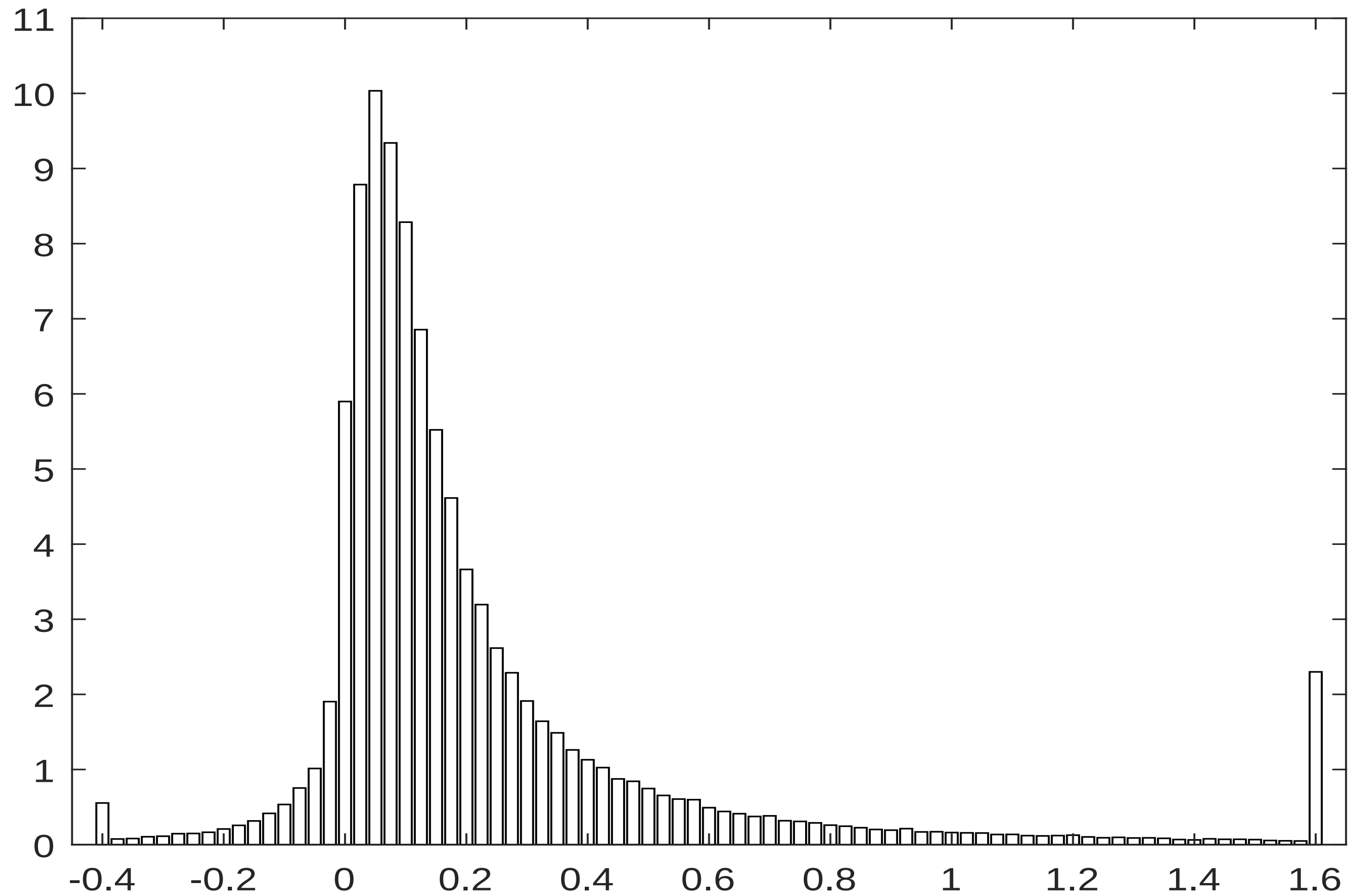
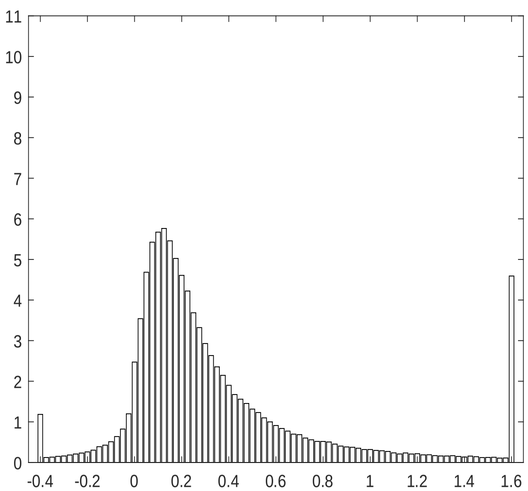


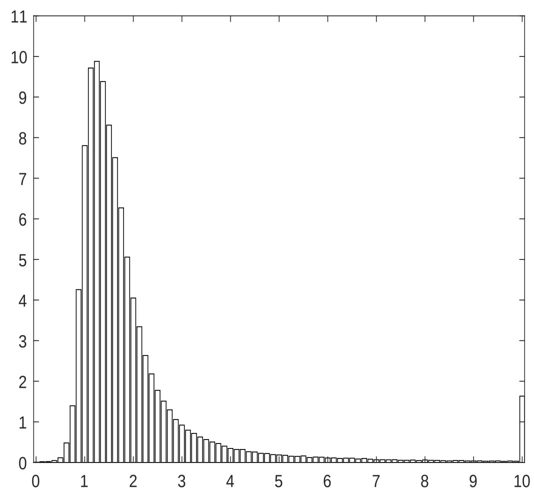
Figure 4 : Differences between Current- and Historical-cost Investment Rates, 1963–2020

I_{it}^{H}/K_{it}^{H} is investment over net PPE; $K_{it}^{\$}$ is current-cost capital; δ_{it} is firm-level economic depreciation rates based on the BEA's depreciation rates; δ_{it}^{H} is accounting depreciation over net PPE; and $K_{it}^{\$}$/PPEGT is $K_{it}^{\$}$ over gross PPE; The y-axis is the fraction (in percent) of firm-years.

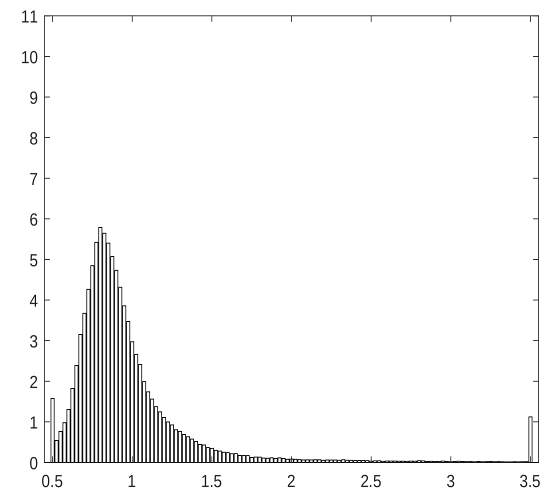
Panel A: I_{it}^{H}/K_{it}^{H} (177,412 firm-years)



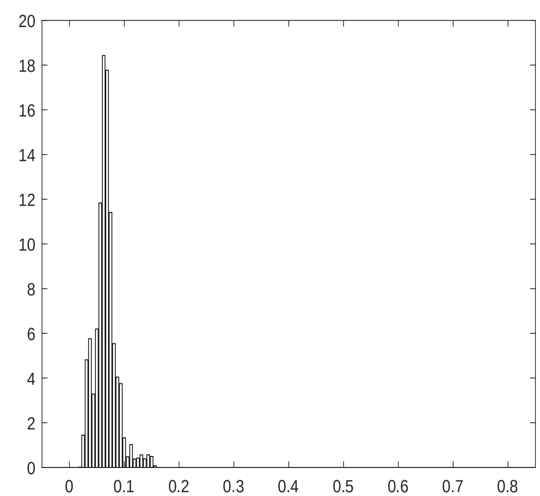
Panel B: $K_{it}^{\$}$/PPENT (169,828 firm-years)



Panel C: $K_{it}^{\$}$/PPEGT (169,509 firm-years)



Panel D: δ_{it} (169,792 firm-years)



Panel E: δ_{it}^{H} (177,412 firm-years)

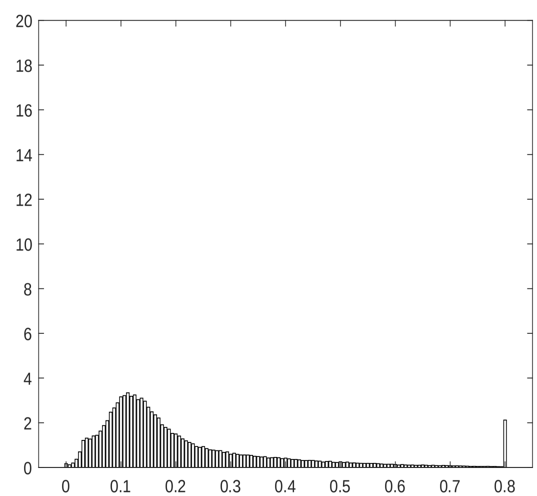


Figure 5 : Average Current-cost Investment Shares by Current-cost Investment Rate Rank by Decade, 1963–2020

For each decade, we include only firms with a complete coverage to obtain a balanced panel. For each firm in a given panel, we rank its current-cost investment rates in the time series in the descending order. We calculate the fraction of the ranked investment made in each year out of the sum of the absolute values of investments in the time series. The figure shows the fractions averaged across all the firms in a given balanced panel. In each panel title, the first number is the number of firms, and the second number is the total investment share covered by the top two years.

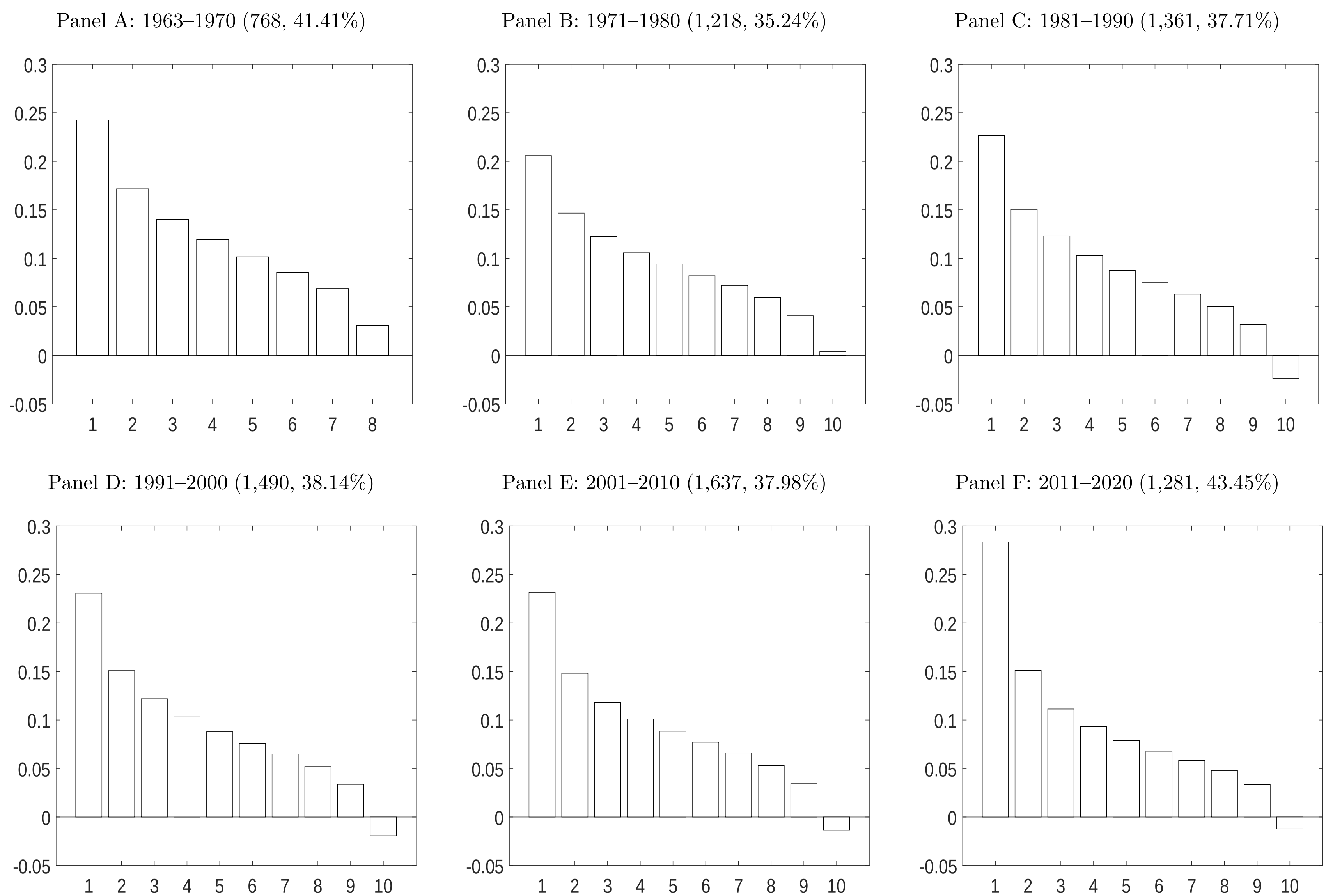
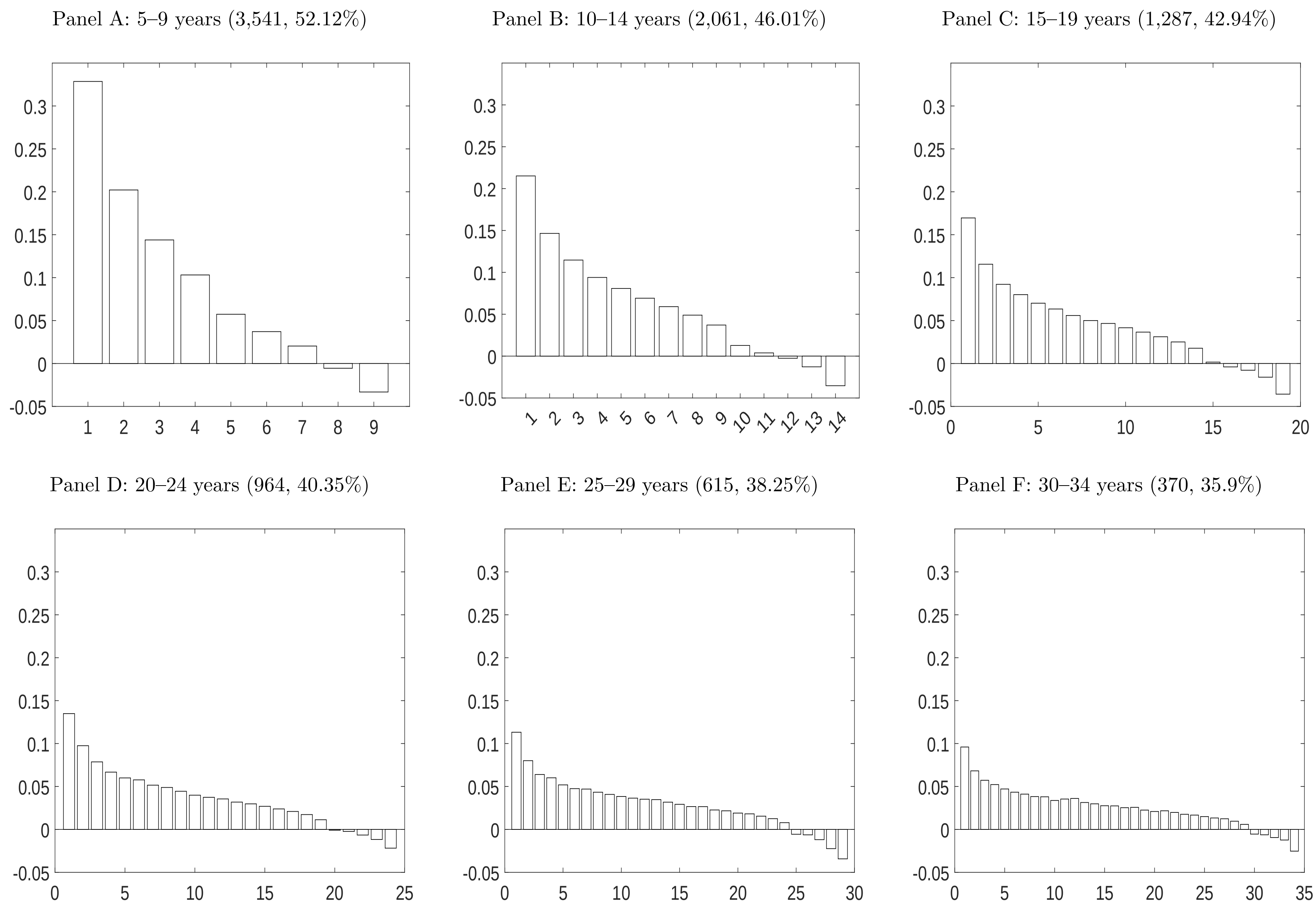
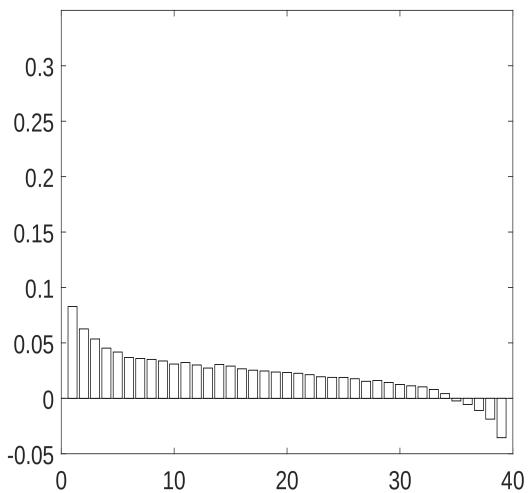


Figure 6 : Average Current-cost Investment Shares by Current-cost Investment Rate Rank by Firm Age, 1963–2020

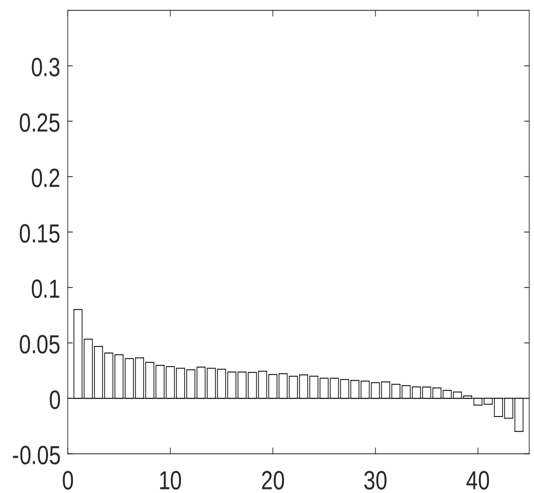
We split the sample into 11 groups based on firm age (the number of years for a given firm in Compustat): 5–9, 10–14, . . ., 55–58. We drop firms with fewer than five years of current-cost investment rates. For each firm in a given group, we rank its current-cost investment rates in the time series in the descending order. We calculate the fraction of the ranked investment in each year out of the sum of the absolute values of investments in the time series. The figure shows the fractions averaged across all the firms in a given group. In each panel title, the first number is the maximum number of firms, and the second number is the total investment share covered by the top two years.



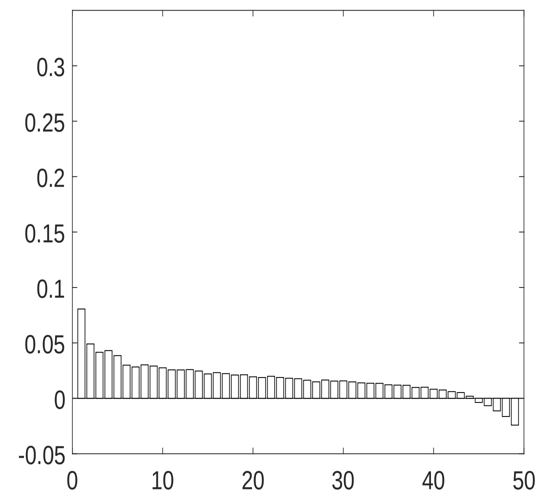
Panel G: 35–39 years (251, 34.22%)



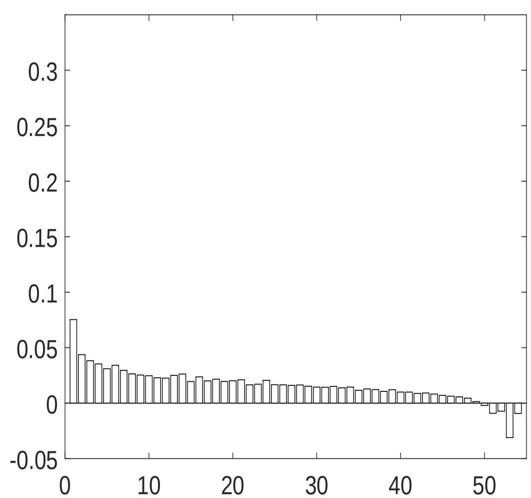
Panel H: 40–44 years (136, 33.89%)



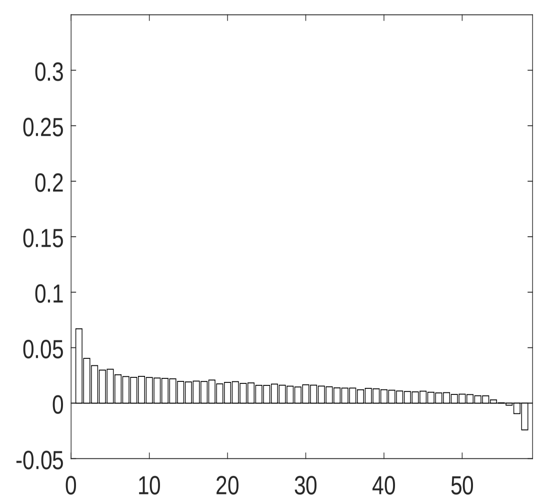
Panel I: 45–49 years (197, 35.2%)



Panel J: 50–54 years (90, 34.67%)



Panel K: 55–58 years (154, 30.89%)



A The 40 Firm Investment Rates in the Finance Literature

The 40 investment rates are measured as follows: (1) CAPX/AT is capital expenditures (Compustat annual item CAPX) over total assets (item AT). (2) CAPX/PPENT is item CAPX over net PPE (item PPENT). (3) dAT/AT is the growth rate of item AT. (4) (dPPEGT+dINVT)/AT is change in gross PPE (item PPEGT) plus change in total inventories (item INVT), scaled by item AT. (5) Inv/AT is for firms reporting format codes 1–3 item CAPX plus increase in investments (item IVCH) plus acquisitions (item AQC) plus other uses of funds (item FUSEO) minus sales of PPE (item SPPE) minus sale of investments (item SIV), all scaled by item AT, and for firms reporting format code 7 item CAPX plus item IVCH plus acquisitions (item AQC) minus item SPPE minus item SIV minus other investing activities (item IVACO), all scaled by item AT.

(6) CAPX/PPEGT is item CAPX over item PPEGT. (7) dPPEGT/AT is the change of item PPEGT scaled by item AT. (8) (dPPENT+DP)/PPENT is the change of item PPENT plus depreciation and amortization (item DP) minus the amortization of intangibles (item AM, zero if missing), scaled by item PPENT. (9) (CAPX−SPPE)/PPEGT is item CAPX minus item SPPE, scaled by item PPEGT. (10) (CAPX−SPPE)/AT is item CAPX minus item SPPE, scaled by item AT. (11) dPPENT/AT is change in item PPENT over item AT. (12) (CAPX+AQC)/AT is item CAPX plus item AQC, scaled by item AT. (13) CAPXV/AT is item CAPXV over item AT. (14) (CAPX−SPPE)/PPENT is item CAPX minus item SPPE, scaled by item PPENT. (15) (CAPX+AQC−SPPE)/AT is item CAPX plus item AQC minus item SPPE, scaled by item AT. (16) (CAPXV−SPPE)/AT is item CAPXV minus item SPPE, scaled by item AT.

(17) dPPEGT/PPEGT is the growth rate of item PPEGT. (18) dPPENT/PPENT is the growth rate of item PPENT. (19) (dPPENT+DP)/AT is the change in item PPENT plus item DP, scaled by item AT. (20) (CAPXV−SPPE)/PPEGT is item CAPXV minus item SPPE, scaled by item PPEGT. (21) dBe/Be is the growth rate of total common equity (item CEQ). (22) (CAPX−SPPE)/avePPENT is item CAPX minus item SPPE, scaled by the average of current and 1-year-lagged item PPENT. (23) dNoa/AT is change in net operating assets over item AT; net operating assets = operating assets (item AT minus cash and short-term investments, item CHE) minus operating liabilities (item AT minus debt in current liabilities, item DLC, minus total

long-term debt, item DLTT, minus minority interest, item MIB, minus preferred stock—carrying value, item PSTK, minus item CEQ). We set missing items DLC, DLTT, MIB, and PSTK to zero.

(24) dLno/aveAT is the change in net PPE plus change in intangibles (item INTAN) plus change in other long-term assets (item AO) minus change in other long-term liabilities (item LO) plus item DP, scaled by the average of current and 1-year-lagged item AT. (25) dNca/AT is the change in noncurrent operating assets (item AT minus item ACT minus item IVAO), scaled by item AT. (26) dBe/AT is the change in item CEQ over item AT. (27) (CAPXV+AQC)/PPENT is capital expenditures on PPE (item CAPXV) plus item AQC, scaled by item PPENT. (28) CAPXV/PPENT is item CAPXV over item PPENT. (29) CAPXV/PPEGT is item CAPXV over item PPEGT.

(30) (CAPX+IVCH−SIV)/(PPENT+IVAEQ+IVAO) is item CAPX plus item IVCH minus item SIV, scaled by item PPENT plus investment and advances—equity method (item IVAEQ) and investments and advances—other (item IVAO). (31) (dPPENT+WDP+DPC)/PPEGT is change in net PPE plus pretax writedown (item WDP, zero if missing) plus depreciation and amortization from statement of cash flow (item DPC), scaled by item PPEGT. (32) dNAT/NAT is the growth rate of nonfinancial assets (item AT minus item ACT plus item INVT).

(33) CAPX/(AT−INVT) is item CAPX scaled by item AT minus item INVT. (34) (CAPX+AQC)/PPEGT is item CAPX plus item AQC, scaled by item PPEGT. (35) CAPX/(PPENT−CAPX+DP) is item CAPX scaled by item PPENT minus item CAPX plus item DP. (36) (CAPXV−SPPE)/(AT−ACT) is item CAPXV minus item SPPE, scaled by item AT minus item ACT. (37) (CAPXV−SPPE)/PPENT is item CAPXV minus item SPPE, scaled by item PPENT. (38) (CAPX−DP)/AT is item CAPX minus item DP, scaled by item AT. (39) CAPX/(AT−CHE) is item CAPX scaled by item AT minus item CHE. (40) dNCAT/NCAT is the growth rate of noncash total assets (item AT minus item CHE).

B Assigning Firms to BEA's NAICS Industries

The NAICS was established in 1997 by the Office of Management and Budget (OMB) to replace the SIC. The NAICS is erected on a production-oriented conceptual framework, which groups establishments into industries with similar production processes. NAICS emphasizes the classification of new and emerging industries, service industries, and industries that produce advanced technologies.

NAICS is a hierarchical coding system that contains up to six digits. The first two fields, NAICS sectors, designate general categories of economic activity; the third field, subsector, further defines the sector; the fourth field is the industry group; the fifth field is the NAICS industry; and the sixth field represents the national industry (a zero indicates that the country industry is identical to the NAICS industry). The 6-digit NAICS codes offer a finer classification than the 4-digit SIC codes.

There have been five editions of NAICS: 1997, 2002, 2007, 2012, and 2017. Compustat and CRSP include all five editions, whereas the BEA has used the first four. The current BEA industry classifications, which are released with the comprehensive update of the Industry Economic Accounts in November 2018, are based on the 2012 NAICS.[23] The BEA provides the mapping from the 2012 NAICS to its industry codes in its fixed assets accounts. The fixed assets accounts contain 63 private industries in 20 sectors.[24] Because of the time series continuity of the NAICS editions, the current BEA industry classification can be applied to older NAICS editions after adjusting for two industries in the "Information" sector.[25] The current BEA classification can be applied without adjustments to the new 2017 NAICS codes, which appear in Compustat and CRSP.

To assign a firm in Compustat to a BEA industry or sector in a given fiscal year, we use the firm's historical NAICS code (item NAICSH). Compustat contains 1,557 unique values of historical NAICS. Only 17 cannot be directly assigned to BEA industries. Among the 17, 11 values are 2-digit sector-level codes (11, 21, 33, 48, 49, 51, 53, 54, 56, 62, and 71) and two are 3-digit subsector-level codes (336 and 541). We assign these codes to matching BEA sectors. Four out of the 17 values are unclassified (NAICS starting with 9999). We discard the firm-years in question. We also drop firms that have ever been classified as non-private (NAICS starting with 92 or 491). Finally, there is no industry classified as "Federal Reserve Banks" (NAICS starting with 5210) in Compustat. As such, we have in total 62 private industries in our sample. The coverage of NAICSH starts in June

[23]The Industry Economic Accounts cover 71 industries in 21 sectors from 1997 onward. Excluding five industries from the "Government" sector yields 66 private industries in 20 sectors.

[24]Compared with the main economic accounts, the differences in the fixed assets accounts are: (i) The "Retail" sector is not broken down into four industries; (ii) "Federal reserve banks, credit intermediation, and related activities" is separated into two industries: "Federal Reserve banks" and "Credit intermediation and related activities;" and (iii) The "Real Estate" industry is not broken down into "Housing" and "Other industries."

[25]For "Broadcasting and Telecommunications", we add the 3-digit code of 513 from the 1997 edition. For "Information and Data Processing Services", we add 514 from the 1997 edition and 516 from the 2002 edition.

1985. Although historical NAICS is also available in CRSP, its coverage starts only in June 2004 and adds little beyond Compustat. As such, we do not use the CRSP data on NAICS.

Prior to June 1985, because firm-level NAICS codes are not available in Compustat, we use SIC codes to assign firms to industries. Because historical SIC codes are not available in Compustat until June 1987, we obtain SIC codes from CRSP (item SICCD) at a firm's fiscal year end. SIC codes are 4-digit integers between 100 and 9999. The first two digits indicate a major group, the first three denote an industry group, and all four refer to an industry.

In CRSP, there exist 1,613 unique values of historical SIC. Among them 321 codes cannot be directly assigned to BEA industries: (i) 165 are from the 1972 SIC edition (but not in the 1987 edition); (ii) 15 are for public entities (9199–9661); (iii) 1 is "postal service" (4310); (iv) 2 are missing codes (0 and 9999); (v) 2 are for unclassified entities (9910 and 9990); and (vi) the remaining 156 codes are from editions older than 1972 or are simply data errors.

To handle the complexities, we convert the 1972 SIC codes to the 1987 codes using concordance tables from the 1987 SIC manual. We drop firms that have ever been classified as non-private (SIC starting with 91–97 or 43). We discard the firm-years with unclassified or missing SIC codes (starting with 99 or equal to 0). Finally, we discard the codes from the pre-1972 SIC editions in CRSP for two reasons. SIC has experienced significant changes over time. As such, converting pre-1972 editions to the 1987 edition is likely to produce unreliable industry assignments. More important, random checks show that it is difficult to distinguish the pre-1972 SIC codes from data errors.

The next step is to convert SIC codes into NAICS codes via the 1987 SIC to 1997 NAICS concordance table from the U.S. Census Bureau and to use the converted NAICS codes to assign firms to the BEA industries. Because the conversion from SIC to NAICS is not one-to-one, one SIC code can be matched into multiple BEA industries. In particular, in our 1950–2020 sample, 81.76% of the 1987 SIC codes are assigned to a unique BEA industry, 15.27% to two industries, 2.05% to three industries, and 0.92% to four or more industries. In addition, the SIC codes can have only two or three significant digits, while ending with 0s. We match such a SIC code to all BEA industries into which the 4-digit SIC codes that start with the same two or three digits have been mapped. Doing so increases non-unique industry assignments. If we include all possible 2- or

3-digit SIC codes, 74.29% of the 1987 SIC codes are assigned to a unique BEA industry, 16.98% to two industries, 4.71% to three industries, and 4.02% to four or more industries.

Finally, to maximize the coverage of firm history, which is important for computing the initial values of current-cost capital stocks, we use the Compustat sample that includes (typically two or three) years prior to a firm's initial public offerings. To deal with missing industry classifications in a firm's history, we apply the first available classification to earlier years. For missing observations after the first classification, we use the most recent classification from the past.

C Adjusting for Calendar-Fiscal Year Differences When Assigning Industry Information to Firms

C.1 Applying Industry-level Price Deflators to Specific Firms

The capital and investment price deflators from the BEA are computed for calendar years. However, the fiscal years of firms do not always end in December. As such, we need to adjust for the differences. For the capital price deflator, we use linear interpolation to impute its level for all the possible fiscal year ending months. For example, the price deflator for the fiscal year ending in March 1998 (three months away from December 1997 and nine months from December 1998) is calculated as $(12-3)/12 = 75\%$ of the 1997 deflator plus $(12-9)/12 = 25\%$ of the 1998 deflator.

The adjustment for the investment price deflator is more involved. Investment is a flow variable over a time interval, which is mostly 12 months. However, firms can change the ending month of fiscal years and cause the intervals to differ from 12 months.[26] We identify the midpoint of an interval and calculate its relative distance from the midpoints (June) of the two adjacent calendar years. The distance then determines the weights in linear interpolation. The closer the interval midpoint is to the June of a given calendar year, the higher the weight assigned to the price deflator of that calendar

[26]The interval can range from one to 23 months. If a firm changes its fiscal year ending month from November to December immediately after the latest annual report, the gap between the last and next fiscal years would be one month. If a firm changes its fiscal year ending month from December to November immediately before the upcoming report, the gap between the two fiscal years would be 23 months. We exclude investments over intervals longer than 24 months, which are most likely due to missing data or errors. About 1% of firms have investment intervals that differ from 12 months. However, dropping these firms would reduce the sample size for current-cost capital stocks by about 9% because we need the full histories of these firms to implement the PIM.

year.[27] For instance, for the 6-month investment interval ending in June 1998, the midpoint is March 1998, which is nine months away from June 1997 and three months from June 1998. Accordingly, we set the investment price deflator to be 25% of the 1997 deflator plus 75% of the 1998 deflator.

C.2 Applying Industry-level Economic Depreciation Rates to Specific Firms

To convert calendar- to fiscal-year depreciation rates, we compute monthly depreciation rates as their matching annual rates divided by 12. We then sum up the 12 monthly rates during a fiscal year. For example, the depreciation rate for the fiscal year ending in March 1998 is 9/12 of the 1997 rate plus 3/12 of the 1998 rate. When calculating a depreciation rate over an interval that is not 12 months, we add up the monthly rates over the calendar months within the interval. When the investment interval is not 12 months, we also need to adjust the depreciation amount when measuring investment: $I_{it}^H = \text{PPENT}_{t+1} - \text{PPENT}_t + \text{DP}_t \times L_{it}/12$, in which L_{it} is the number of months within the interval. We use this adjustment only for calculating current-cost capital stocks. When studying (annual) investment rates, we include only investments over a 12-month interval.

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[27] The BEA assumes that investment occurs in the middle of a calendar year. Accordingly, the investment price deflator is also measured at the mid-year. We make the same assumption that firm-level investment occurs in the midpoint of its applicable fiscal interval in Compustat. As such, we implement the linear interpolation via the relative distance of the midpoint to the midpoints (June) of the two nearest calendar years.

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The Internet Appendix (for Online Publication Only)
"Asymmetric Investment Rates"

This Internet Appendix contains supplementary materials for our manuscript. It also provides the complete list of references for the meta-study of 40 firm-level investment rates.

A A Primer on National Accounts

In the U.S. national accounts, aggregate capital is based on a top-down supply-side approach (BEA 2003; Becker et al. 2006). BEA obtains the domestic supply of each capital good from production data of capital goods producing industries. Capital purchases by government and consumers are deducted to obtain gross investment flows by asset class. To form capital stocks by asset class, BEA applies the perpetual inventory method (PIM) on gross investment series, depreciation profiles, and investment price deflators (mostly Producer Price Indexes from Bureau of Labor Statistics, BLS).

BEA derives investment flows from five major data sources: (i) economic censuses from the Census Bureau, which provide establishment-level capital expenditures; (ii) the BEA's capital flow tables as part of the input-output accounts, which provide distributions of industry investment flows by asset class; (iii) the Census Bureau's Annual Survey of Manufactures (ASM), which provides equipment and structure investments for manufacturing establishments; (iv) the Census Bureau's plant and equipment expenditures (P&E) survey, which provides nonresidential investment data for nonfarm businesses (discontinued in 1993); and (v) the Census Bureau's Annual Capital Expenditures Survey (ACES), which provides data on equipment and structure investments for private nonfarm businesses (from 1994 onward). While the top-down approach works well for aggregates, it is more challenging at the industry-asset level. Distributing investment totals by asset type across industries is based on strong assumptions on the employment-capital relation, especially for equipment investment (Meade, Rzeznik, and Robinson-Smith 2003; Becker et al. 2006).

For most asset types, BEA uses geometric depreciation rates because geometric, rather than straight-line, patterns more closely approximate actual profiles of used capital price declines in the data (Hulten and Wykoff 1981a, 1981b; Fraumeni 1997). The geometric depreciation rates are determined by dividing the declining-balance rate for each asset by its estimated service life. The declining-balance rate is estimated on average to be significantly less than the double declining-balance rate. In contrast, the double declining-balance rate is often assumed in empirical studies that apply the PIM to measure firm-level capital stocks (Salinger and Summers 1983).

BEA provides current-cost and real-cost estimates of investment, depreciation, and capital stock. Current-cost capital is the replacement cost of capital stock, which is the market value of its assets to be bought or sold in a given year. Constant-dollar investments are obtained by deflating current-dollar investments with appropriate price indexes for the assets for each year. Depreciation is estimated by applying assumed depreciation rates to constant-dollar investment series. Constant-dollar capital stocks are derived by deducting depreciation from the constant-dollar investment series, both summed over all years. The constant-dollar estimates are then multiplied by the appropriate price indexes of the current year to obtain current-dollar estimates.

The detailed constant-dollar estimates for each asset type are exactly the real-cost estimates. Aggregating real-cost estimates of net stocks of different asset types within a given industry requires the weighting of the detailed constant-dollar estimates. BEA provides two real-cost estimates. The standard tables contain chain-type quantity indexes, which apply a Fisher formula with the price weights from adjacent years to pin down the annual growth rates in quantities. The detailed tables contain fix-weighted constant-dollar estimates. In the Fisher index, the weights reflect the composition of prices in adjacent years, rather than the weights of a single base year as in the fix-weighted constant-dollar estimates. When the base year is updated, the levels of chain-type quantities change, but their growth rates remain unchanged. In contrast, the growth rates of fix-weighted estimates change with the base year (Landefeld, Moulton, and Vojtech 2003).

BEA also provides historical-cost estimates of capital stock. The historical-cost net stock is analogous to net PPE on company financial statements. Assets are valued at the prevailing prices when first purchased. BEA derives historical-cost net stocks by subtracting historical-cost depreciation from the historical-cost investment series, summed over all years. However, differing from financial accounting, BEA has adopted geometric (rather than straight-line) depreciation patterns in its historical-cost estimates since 1997 (Fraumeni 1997).

B Estimating Asset Age

In Section 3.4 we estimate average asset age as accumulated depreciation (Compustat annual item DPACT) divided by depreciation (item DP minus AM, zero if missing) and the asset age (since acquiring its oldest asset) as two times the average asset age. In this appendix, we use three numerical examples to show that our asset age approximation seems to work well.

Panel A of Table S4 shows the example with a constant, annual investment of \$1 for ten years. Asset is homogeneous with a service life of five years, implying a straight-line depreciation rate of 20% per year. At the end of the service life, an asset is retired immediately. As such, the stream of retirement equals zero from year 0 to year 4 but \$1 from year 5 onward. The end-of-period PPEGT rises steadily from \$1 at year 0 to \$5 at year 4, but remains at \$5 from year 5 onward because retirement takes effect in year 5. Accordingly, annual depreciation, which equals prior PPEGT times 20%, rises steadily from \$0.2 at year 1 to \$0.8 at year 4, but remains at \$1 from year 5 onward. The reason is that retired assets, which are taken off the balance sheet, no longer depreciate. The end-of-period DPACT then rises from \$0.2 at year 1 to \$2 in year 4 but remains at \$2 afterward as retired assets no longer add to the account. PPENT is PPEGT minus DPACT.

For gross PPE, its average asset age is the weighted average of asset age with the weights given by the investment amounts of the assets. For instance, year 1's average asset age, 0.5, equals year 0's investment, \$1, times its age in year 1, which is one, plus year 1's investment, \$1, times its age in year 1, which is zero, all scaled by the total investments across the two years, \$2. Analogously, year 2's average asset age equals $(\$1 \times 2 + \$1 \times 1 + \$1 \times 0)/\$3 = 1$, and so on. For year 5, the average asset age equals $(\$1 \times 4 + \$1 \times 3 + \$1 \times 2 + \$1 \times 1 + \$1 \times 0)/\$5 = 2$. The \$1 investment in year 0, which has been fully depreciated, no longer enters the calculation. The oldest asset age rises steadily from one in year 1 to four in year 4 but remains at four in year 5 onward. The reason is that retired assets from the \$1 investment in year 0 are removed from PPEGT at the end of year 5, capping the oldest asset age at four.

While we can work out the precise average and oldest asset age within this example, such detailed vintage-investment data are not available in Compustat. We can only estimate asset age based on the available data. As noted, we estimate average asset age as DPACT divided by depreciation and oldest asset age as average asset age times two. Panel A shows that our estimation is accurate once a firm reaches its "steady state," in which investment equals retirement. The remaining panels in Table S4 show that our approximation remains accurate even if investment growth rates are non-zero.

C A Meta-study on Firm-level Current-cost Capital

In this appendix, we conduct another meta-study, consisting of 33 studies that apply the PIM at the firm level. Only ten out of the 33 are published from 2000 onward in the top-five finance journals. Overall, despite their efforts, the prior studies fall short in many details and fail to realize the full potential of the data. Table S5 summarizes the basic elements of their methods.

First, most prior studies implement the PIM on relatively small samples that consist mostly of manufacturing firms. Salinger and Summers (1983) use 30 Dow Jones companies. Whited (1992) draws 325 manufacturing firms in Compustat. Barnett and Sakellaris (1998) draw a sample of manufacturing firms from Hall (1990) from 1960 to 1987 with about 23,200 firm-years (averaging about 829 firms per year).[1] Abel and Eberly (2001) construct a sample about 12,000 firm-years from 1974 to 1993 (averaging 600 firms per year) in Compustat. Eberly, Rebelo, and Vincent (2012) draw a balanced panel of 776 firms that are in the top quartile of capital stocks in 1981.

Second, prior studies use a diverse set of investment flows, with no clear consensus. The most popular measure seems to be capital expenditure (Whited 1992), but several studies also take into account sales of PPE (Abel and Eberly 2001; Bloom 2009). Although our benchmark measure (change in net PPE plus accounting depreciation) first appears in Hayashi and Inoue (1991) and subsequently in Lewellen and Badrinath (1997) and Tang (2009), its usage is by no means standard.

Third, to convert current dollar to constant dollar for capital and investment, most prior studies use a single, aggregate-level series, which is typically the implicit price deflator for fixed nonresidential investment. Among a few exceptions, Hayashi and Inoue (1991) exploit the availability of detailed firm-asset data in Japan and form price deflators per asset type from different components of Wholesale Price Index from the Bank of Japan. Unfortunately, detailed firm-asset data are

[1] Barnett and Sakellaris (1998) do not describe how capital is measured. We verify via private correspondence that their paper uses Hall's (1990) inflation-adjusted net PPE as capital.

not available in Compustat. Bloom (2009) uses industry-level investment price deflators from the NBER-CES database, but it covers only manufacturing industries.

Fourth, many prior studies estimate economic depreciation rates with the Salinger-Summers (1983) double declining-balance method. Firm i's economic depreciation rate, δ_i, is firm-specific but constant over time, with δ_i estimated to be $2/L_i$, in which L_i is the firm's average useful life of assets (the time series average of the gross PPE-to-depreciation ratio). Several studies attempt to mitigate firm-specific noise by implementing the Salinger-Summers method at the SIC industry level (Eberly, Rebelo, and Vincent 2012). However, as noted, BEA (2003, Table C) estimates the declining-balance rate to be significantly lower than two. In particular, the average declining-balance rate for equipment is 1.65 and that for private nonresidential structures is 0.91 (p. M-29).

Chirinko and Schaller (2009) use the BEA data to compute sector investment price deflators by dividing current-cost investments by chained-dollar investments (based on chain-type quantities of investments) and calculate sector-specific economic depreciation rates by dividing chained-dollar depreciation by chained-dollar capital. However, the resulting quantities are in chained dollars, which, due to their nonadditivity (Landefeld, Moulton, and Vojtech 2003), violate the capital accumulation equation. Chirinko and Schaller construct sector (not industry) price deflators and depreciation rates and do not distinguish price deflators between capital and investment.

To initialize capital stocks, the most popular approach is to use the first available net PPE. Gross PPE is also often used. Net PPE only works when the firm's assets are relatively new, meaning that their historical costs are close to current costs. This approach also ignores the differences between accounting and economic depreciation. Some studies adjust the first net PPE with the industry-level current-to-historical-cost capital ratio. This procedure assumes that the same ratio applies to all firms within an industry in a given year. Also, the BEA constructs historical-cost capital with geometric, not straight-line, depreciation. Finally, while Compustat contains only publicly traded firms, the BEA samples from virtually all establishments, most of which belong to private firms.

D Robustness

In this subsection we document how our key results in, for example, Table 6 and Figure 3, respond to changes in our baseline empirical design. In accordance with Mitton (2002), we view robustness as a matter of degree and focus "less on defending the robustness of a result and more on understanding why a result is robust in some specifications and not in others (p. 532)." In all experiments, we continue to winsorize each year at the 1–99% level in the full sample to ensure that subsample results are not affected by differences in winsorization. Overall, we find that the distributional asymmetry of current-cost investment rates is quite robust, but some key moments, such as mean and standard deviation, do change in economically significant ways.

D.1 Sub-samples, Mergers and Acquisitions (M&As), Firm Age, and Firm Size

In the first perturbation to our baseline design, we halve the sample into two in the time dimension, 1963–1991 and 1992–2020. From Table S7, the investment rate moments are largely comparable across the two subsamples. The latter sample has a slightly higher mean, 25.38% versus 22.31%, a higher standard deviation, 40.79% versus 33.6%, a higher skewness, 3.4 versus 3.25, and a higher fraction of negative investment rates, 5.86% versus 5.16%. Panels A and B in Figure S2 confirm that the current-cost investment rate distribution is heavily right-skewed in both subsamples.

In the second experiment we quantify the impact of large M&As by excluding the firm-years with the difference between investment and capital expenditure higher than 15% of current-cost capital, i.e., $(I-\text{CAPX})/K^{\$} > 15\%$. This screen drops about 9.41% of firm-years. The 15% cutoff is commonly used in the investment literature (Whited 1992).[2] From Table S7, imposing the screen drops the mean investment rate from 23.8% to 17.6% and the standard deviation from 37.2% to 25.7%. However, the skewness (as the standardized third moment) rises from 3.33 to 3.83, and kurtosis from 14.28 to 24.55. The autocorrelation also increases from 0.34 to 0.43.

[2]More precisely, prior studies exclude observations with the target's assets at least 15% of the acquirer's total assets. For example, Gonçalves, Xue, and Zhang (2020) identify M&As by taking the maximum of acquisitions (item AQC) in Compustat and the total value of acquisitions from the Securities Data Company (SDC) dataset (zero if missing in both databases). The 15% cutoff screens out about 5.9% of their firm-years. We view our new screen of $(I-\text{CAPX})/K^{\$} > 15\%$ as more accurate and effective. First, Compustat item AQC only accounts for cash acquisitions, which include non-PPE assets but exclude noncash acquisitions. Second, the SDC data start in 1978 but have meaningful coverage only from 1981 onward. Third, given our focus on current-cost investment rates, scaling by current-cost capital is more relevant than scaling by book assets. Finally, because current-cost capital is in general smaller than book assets (Table 7), our new screen is more stringent, dropping 9.41% of the firm-years.

Because the screen drops positive investment rates, the fraction of negative rates rises from 5.51% to 6%, but the fraction of positive investment spikes falls from 32.7% to 26.7%. Imposing a deeper cutoff of 5% on the M&A screen excludes about 18.5% of the firm-years, but the results largely go in the same direction. The skewness goes up further to 4.09. Finally, the histograms in Panels C and D of Figure S2 confirm the distributional asymmetry without large M&As.

In the third experiment we exclude the first three years of observations for a given firm (Age > 3). This screen removes about 11.46% of firm-years. Because firms that have recently experienced initial public offerings tend to invest more (Lyandres, Sun, and Zhang 2008), the mean investment rate falls to 19.8%, and the standard deviation to 29.7%. However, the skewness rises to 3.8, and kurtosis to 21.6. The fraction of negative investment rates goes up slightly to 5.57%, but the fraction of positive investment spikes falls slightly to 29.2%. The impact of excluding the first five years of data for any firm is larger, but going in the same direction. Finally, Panels E and F of Figure S2 confirm the distributional asymmetry with the firm age screens.

In the fourth experiment, for each fiscal year, we split the full sample into two, small and big, based on the NYSE median of the beginning-of-fiscal year market equity (ME). The small-ME sample has in total 130,892 firm-years, and the big-ME sample 36,954. The mean investment rate is higher in small firms, 24.75% versus 20.32%, and the cross-sectional standard deviation is also higher, 38.9% versus 27%. Because of aggregation over more plants and more heterogeneous capital goods, big firms have a higher autocorrelation of investment rates, 0.44 versus 0.32, but a lower fraction of negative investment rates, 2.87% versus 6.31%. Big firms also have higher skewness, 3.98 versus 3.14, and higher excess kurtosis, 24.2 versus 12.6, than small firms.

Splitting the sample around the NYSE median current-cost capital has a larger impact on the investment rate moments. The mean is 26.56% in small firms but only 12.91% in big firms. The standard deviation is also higher in small firms, 40.3% versus 15.54%. However, the big-$K^{\$}$ sample has a higher skewness, 3.79 versus 3.02, a higher kurtosis, 30 versus 11.5, and a substantially lower fraction of positive investment spikes, 16.3% versus 37.08%. Finally, the last four panels of Figure S2 shows the distributional asymmetry in the subsamples split by two measures of firm size.

D.2 NAICS Sectors and Industries

We next study how the firm-level investment rate distribution varies across the 19 nonfinancial NAICS sectors and 58 industries. Table S8 in the Internet Appendix shows the number of Compustat firms per year across the sectors and industries from 1963 to 2020. Across the sectors, the average number of firms ranges from 11 for agriculture, forestry, fishing, and hunting to 1,038 for durable goods. The minimum number of firms in a given year varies from only one for health care and social assistance to 347 for durable goods. In fact, the minimum number of firms is below ten for ten out of the 19 sectors. Across the industries, the average number of firms varies from only two for two industries to 402 for computer and electronic products. The minimum number of firms goes from only one in 14 different industries to 91 in machinery.

Because the number of firms in a given year can be small in some sectors and industries, cross-sectional moments are unreliable, even after averaging over time. As such, we opt to calculate the investment rate moments by pooling all the firm-years within a given sector or industry. To set the background, Table S9 first shows the panel data moments for the entire sample. Relative to the time series averages of cross-sectional moments in Table 6, the panel mean is slightly higher, 25.4% versus 23.8%. The panel standard deviation is much higher, 46.7% versus 37.2%. So are the skewness, 5.52 versus 3.33, and kurtosis, 47.4 versus 14.3. However, the median, serial correlation, and fractions of negative investment rates and positive spikes are largely comparable.

Across the 19 sectors, the mean investment rate ranges from 8.93% for utilities to 41.84% for the information sector, and the standard deviation varies from 18.34% for utilities to 72.5% for information. More important, the investment rate distributions are all right-skewed, with the skewness varying from 2.27 in management of companies and enterprises to 14.66 in utilities. The latter sector is an outlier, as the second highest skewness is only 5.92 for retail trade. The fraction of negative investment rates is the lowest in utilities, 2.77%, the second lowest in retail trade, 4.25%, and the highest in management of companies and enterprises, 11.85%.

Across the 58 nonfinancial industries, the mean investment rate ranges from 8.93% for utilities to 49.74% for information and data processing services, and the standard deviation varies from 18.34% for utilities to 100.27% for real estate. The investment rate distributions are again all right-skewed, with the skewness varying from 2.27 in management of companies and enterprises to 14.66 in utilities. The second lowest skewness is 2.62 for real estate, and the second highest is 9.15 for railroad transportation. The fraction of negative investment rates remains the lowest in utilities, 2.77%, and the highest in real estate, 24.24%. The fraction of 3.57% in railroad transportation is the second lowest, and 11.85% for management of companies and enterprises the second highest.

Figure S3 shows the histogram of the firm-level investment rate distribution for each sector. The histograms are all heavily right-skewed in a similar way as in the histogram of the full sample in Figure 3. Sector 22 (utilities) stands out in that despite its long right tail, has most of its probability mass concentrated around its median, giving rise to an extremely high excess kurtosis of 297.35 (Panel C). This feature likely reflects the regulated nature of this sector, which limits competition.

Table S1 : A Meta-analysis of 40 Firm-level Investment Rates in Compustat

We systematically search the articles published from 2000 onward at Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Financial and Quantitative Analysis, and Review of Finance. Outside this scope, we also include three articles (Gilchrist and Himmelberg 1998; Gutierrez and Philippon 2017; Alexander and Eberly 2018), each of which contributes a unique investment rate measure. Appendix A details the variable definitions. The number in parentheses behind each investment rate symbol is the number of times the measure has appeared in our data set. In total, there are 393 appearances within 347 articles.

1. CAPX/AT (136)		
Rajan, Servaes, and Zingales (2000)	Allen and Phillips (2000)	Whited (2001)
Gertner, Powers, and Scharfstein (2002)	Goyal, Lehn, and Racic (2002)	Baker, Stein, and Wurgler (2003)
Denis and Mihov (2003)	Almeida, Campello, and Weisbach (2004)	Korkeamaki and Moore (2004)
Alti (2006)	Anderson and Garcia-Feijoo (2006)	Rauh (2006)
Campello (2006)	Hovakimian (2006)	Chen, Goldstein, and Jiang (2007)
Gaspar and Massa (2007)	Foley, Hartzell, Titman, and Twite (2007)	Akdogu and MacKay (2008)
Cheng (2008)	Claessens, Feijen, and Laeven (2008)	Laeven and Levine (2008)
Zia (2008)	Brav (2009)	Chemmanur, Paeglis, and Simonyan (2009)
Fee, Hadlock, and Pierce (2009)	Jiang, Xu, and Yao (2009)	Ovtchinnikov and McConnell (2009)
Sufi (2009)	Almazan, de Motta, Titman, and Uysal (2010)	Bakke and Whited (2010)
Campbell, Polk, and Vuolteenaho (2010)	Demiroglu and James (2010)	Duchin, Ozbas, and Sensoy (2010)
Dittmann, Maug, and Schneider (2010)	Hovakimian and Hutton (2010)	Morellec and Schurhoff (2010)
Babenko, Lemmon, and TserLukevich (2011)	Becker, Ivkovic, and Weisbenner (2011)	Dharmapala, Foley, and Forbes (2011)
Gormley and Matsa (2011)	Campello, Lin, Ma, and Zou (2011)	Alti and Sulaeman (2012)
Bakke and Whited (2012)	Becker and Strömberg (2012)	Campbell, Dhaliwal, and Schwartz (2012)
Erickson and Whited (2012)	Foucault and Frésard (2012)	Gopalan, Kadan, and Pevzner (2012)
Julio and Yook (2012)	Kini and Williams (2012)	McLean, Zhang, and Zhao (2012)
Nini, Smith, and Sufi (2012)	Becker, Jacob, and Jacob (2013)	Derrien and Kecskés (2013)
Derrien, Kecskes, and Thesmar (2013)	Duchin and Sosyura (2013)	Kahle and Stulz (2013)
Lins, Volpin, and Wagner (2013)	Pérez-González and Yun (2013)	Adelino and Dinc (2014)
Coles, Daniel, and Naveen (2014)	Custodio and Metzger (2014)	Danis, Rettl, and Whited (2014)
Denis and Wang (2014)	Elsas, Flannery, and Garfinkel (2014)	Falato, Kadyrzhanova, and Lel (2014)
Matvos and Seru (2014)	Arena and Kutner (2015)	Banerjee, Humphery-Jenner, and Nanda (2015)
Benmelech and Frydman (2015)	Bliss, Cheng, and Denis (2015)	Carvalho, Ferreira, and Matos (2015)
Doidge and Dyck (2015)	Dougal, Parsons, and Titman (2015)	Grullon, Michenaud, and Weston (2015)
Hanlon, Lester, and Verdi (2015)	Kruger, Landier, and Thresmar (2015)	Murfin and Njoroge (2015)
Bai, Philippon, and Savov (2016)	Cingano, Manaresi, and Sette (2016)	Dittmar and Duchin (2016)
Ellul, Jappelli, Pagano, and Panunzi (2016)	Falato and Liang (2016)	Francis, Hasan, Mani, and Ye (2016)
Gulen and Ion (2016)	Malmendier, Opp, and Saidi (2016)	Reboul and Toldra-Simats (2016)
Schneider and Spalt (2016)	Warusawitharana and Whited (2016)	Almeida, Hankins, and Williams (2017)
Bena, Ferreira, Matos, and Pires (2017)	Boyson, Gantchev, and Shivdasani (2017)	Edmans, Fang, and Lewellen (2017)
Edmans, Jayaraman, and Schneemeier (2017)	Favara, Morellec, Schroth, and Valta (2017)	Ghaly, Dang, and Stathopoulos (2017)
Gilje and Taillard (2017)	Gustafson and Iliev (2017)	Graham, Hanlon, Shevlin, and Shroff (2017)
Harford, Wang, and Zhang (2017)	Jang (2017)	Jens (2017)
Kim and Kung (2017)	Schoar and Zuo (2017)	Tuzel and Zhang (2017)
Bazdresch, Kahn, and Whited (2018)	von Beschwitz (2018)	Bernile, Bhagwat, and Yonker (2018)
Coles, Li, and Wang (2018)	Gu, Hackbarth, and Johnson (2018)	Hirshleifer, Hsu, and Li (2018)

Karolyi (2018)	Lou and Wang (2018)	Mian and Santos (2018)
Parise (2018)	Purnanandam and Rajan (2018)	Alnahedh, Bhagat, and Obreja (2019)
Dessaint, Foucault, Fresard, and Matray (2019)	Faulkender, Hankins, and Petersen (2019)	Grieser and Liu (2019)
Qiu (2019)	Li, Lu, and Phillips (2019)	Bai, Fairhurst, and Serfling (2020)
Chava, Danis, and Hsu (2020)	Chava and Hsu (2020)	Cunha and Pollet (2020)
Chen, Halford, Hsu, and Lin (2020)	Kim and Nguyen (2020)	Benmelech, Bergman, and Seru (2021)
Chu (2021)	Fahlenbrach, Rageth, and Stulz (2021)	Gao (2021)
Gao, Whited, and Zhang (2021)	Lee, Shin, and Stulz (2021)	Nikolov, Schmid, and Steri (2021)
Wang and Zhang (2021)		
2. CAPX/PPENT (54)		
Lamont and Polk (2002)	Love (2003)	Moyen (2004)
Malmendier and Tate (2005)	Almeida and Campello (2007)	Cleary, Povel, and Raith (2007)
Chava and Roberts (2008)	Desai, Foley, and Forbes (2008)	Xing (2008)
Eisdorfer (2008)	Güner, Malmendier, and Tate (2008)	Polk and Sapienza (2009)
Cronqvist and Fahlenbrach (2009)	Hahn and Lee (2009)	Adam (2009)
Hilary and Hui (2009)	Almeida, Campello, and Galvao (2010)	Hadlock and Pierce (2010)
Hoberg and Phillips (2010)	Kim and Lu (2011)	Yu and Yu (2011)
Chen and Chen (2012)	Chernenko and Sunderam (2012)	Foucault and Frésard (2012)
Gande and Saunders (2012)	Campello and Graham (2013)	Bolton, Chen, and Wang (2013)
Hau and Lai (2013)	Foucault and Fresard (2014)	Leary and Roberts (2014)
Hutton, Jiang, and Kumar (2014)	Carvalho (2015)	Bustamante (2015)
Tsoutsoura (2015)	Arena and Julio (2015)	Kuehn, Simutin, and Wang (2017)
Light, Maslov, and Rytchkov (2017)	Almeida, Cunha, Ferreira, and Restrepo (2017)	Gutierrez and Philippon (2017)
Gustafson and Iliev (2017)	Glover and Levine (2017)	Agca and Mozumdar (2017)
Chakraborty, Goldstein, and MacKinlay (2018)	Hombert and Matray (2018)	Lin, Wang, Wang, and Yang (2018)
Ferreira, Ferreira, and Mariano (2018)	Carvalho (2018)	Arnold, Hackbarth, and Puhan (2018)
Dessaint, Foucault, Fresard, and Matray (2019)	Nikolov, Schmid, and Steri (2019)	Ai, Li, Li, and Schlag (2020)
Chava and Hsu (2020)	Garlappi and Song (2020)	Donangelo (2021)
3. dAT/AT (50)		
Fama and French (2001)	Fama and French (2002)	Fama and French (2006)
Hovakimian (2006)	Chen, Goldstein, and Jiang (2007)	Gopalan, Nanda, and Seru (2007)
Cooper, Gulen, and Schill (2008)	Tsyplakov (2008)	Sufi (2009)
Tang (2009)	Giroud and Mueller (2010)	Li and Zhang (2010)
Cooper and Priestley (2011)	McLean, Zhang, and Zhao (2012)	Foucault and Frésard (2012)
Aharoni, Grundy, and Zeng (2013)	Pérez-González and Yun (2013)	Titman, Wei, and Xie (2013)
Alti and Tetlock (2014)	Gopalan, Nanda, and Seru (2014)	McLean and Zhao (2014)
Nyberg and Pöyry (2014)	Fama and French (2015)	Hou, Xue, and Zhang (2015)
Fama and French (2016)	Kumar and Li (2016)	Fama and French (2017)
Aretz and Pope (2018)	Berg (2018)	Fama and French (2018)
Karpoff and Wittry (2018)	Huang and Kang (2018)	Linnainmaa and Roberts (2018)

Bessembinder, Cooper, and Zhang (2019)	van Binsbergen and Opp (2019)	Golubov and Konstantinidi (2019)
Hou, Mo, Xue, and Zhang (2019)	Wahal (2019)	Daniel, Hirshleifer, and Sun (2020)
Freyberger, Neuhierl, and Weber (2020)	Gofman, Segal, and Wu (2020)	Goncalves, Xue, and Zhang (2020)
Hou, Xue, and Zhang (2020)	Benneden, Perez-Gonzalez, and Wolfenzon (2020)	Lochstoer and Tetlock (2020)
Brandon and Wang (2020)	Cao, Gempesaw, and Simin (2021)	Tian (2021)
Hou, Mo, Xue, and Zhang (2021)	Clarke (2022)	
4. (dPPEGT+dINVT)/AT (21)		
Lyandres, Sun, and Zhang (2008)	Li and Zhang (2010)	Hirshleifer and Jiang (2010)
Cooper and Priestley (2011)	Novy-Marx (2011)	Bessembinder and Zhang (2013)
Tang, Wu, and Zhang (2014)	Graham, Leary, and Roberts (2015)	Novy-Marx and Velikov (2016)
Light, Maslov, and Rytchkov (2017)	Stambaugh and Yuan (2017)	Green, Hand, and Zhang (2017)
Muller (2019)	Chu, Hirshleifer, and Ma (2020)	Daniel, Hirshleifer, and Sun (2020)
Freyberger, Neuhierl, and Weber (2020)	Hou, Xue, and Zhang (2020)	Li, Lin, and Xu (2020)
Aretz, Campello, and Marchica (2020)	Tian (2021)	Hou, Mo, Xue, and Zhang (2021)
5. Inv/AT (11)		
Frank and Goyal (2003)	Vijh (2006)	Lemmon and Roberts (2010)
Malmendier, Tate, and Yan (2011)	Dasgupta, Noe, and Wang (2011)	Denis and McKeon (2012)
Chang, Dasgupta, Wong, and Yao (2014)	Huang, Ritter, and Zhang (2016)	Eckbo and Kisser (2021a)
Eckbo and Kisser (2021b)	Huang and Ritter (2021)	
6. CAPX/PPEGT (9)		
Erickson and Whited (2012)	Mitton (2006)	Kogan and Papanikolaou (2013)
Eisfeldt and Papanikolaou (2013)	Kogan and Papanikolaou (2014)	Peters and Taylor (2017)
Andrei, Mann, and Moyen (2019)	Makaew and Maksimovic (2020)	Ai, Kiku, Li, and Tong (2021)
7. dPPEGT/AT (9)		
McLean, Zhang, and Zhao (2012)	Badertscher, Shroff, and White (2013)	Asker, Farre-Mensa, and Ljungqvist (2015)
Farre-Mensa and Ljungqvist (2016)	Amore and Minichilli (2018)	Jacob, Michaely, and Muller (2019)
Lyandres, Marchica, Michaely, and Mura (2019)	Lyandres, Matveyev and Zhdanov (2020)	Li, Lin, and Xu (2020)
8. (dPPENT+DP)/PPENT (8)		
Jacob and Michaely (2017)	Mortal and Reisel (2013)	O'Toole and Newman (2017)
Tsoukalas, Tsoukas and Guariglia (2017)	Acharya, Eisert, Eufinger, and Hirsch (2018)	Beck, Degryse, De Haas, and van Horen (2018)
Goncalves, Xue, and Zhang (2020)	Belo, Gala, Salomao, and Vitorino (2022)	
9. (CAPX−SPPE)/PPEGT (8)		
Nikolov and Whited (2014)	Kuehn and Schmid (2014)	Lemmon, Liu, Mao, and Nini (2014)
Bustamante (2016)	Dangl and Wu (2016)	Wu (2018)
Begenau and Salomao (2019)	Gomes, Grotteria, and Wachter (2019)	

10. (CAPX−SPPE)/AT (7)		
Bates (2005) Brockman, Martin, and Unlu (2010) Hennessy and Radnaev (2018)	Coles, Daniel, and Naveen (2006) Bakke and Gu (2017)	Kang, Liu and Qi (2010) Gu (2017)
11. dPPENT/AT (7)		
Aslan and Kumar (2011) Buchuk, Larrain, Muñoz, and Urzúa (2014) Begenau and Palazzo (2021)	Lin and Paravisini (2012) Edmans, Fang and Lewellen (2017)	Badertscher, Shroff, and White (2013) Graham and Leary (2018)
12. (CAPX+AQC)/AT (7)		
Chernenko and Faulkender (2011) Kim and Purnanandam (2014) Kahle and Stulz (2021)	Song and Lee (2012) Pan, Wang, and Weisbach (2016)	Derrien and Kecskes (2013) Bretscher, Schmid, and Vedolin (2018)
13. CAPXV/AT (7)		
Hennessy and Whited (2005) Giroud and Mueller (2010) Karpoff and Wittry (2018)	Lins, Strickland, and Zenner (2005) Giroud and Mueller (2011)	Whited and Wu (2006) Alexander and Eberly (2018)
14. (CAPX−SPPE)/PPENT (6)		
Belo and Lin (2012) George, Hwang, and Li (2018)	Belo, Xue, and Zhang (2013) Grennan (2018)	Frank and Shen (2016) Michaels, Page, and Whited (2019)
15. (CAPX+AQC−SPPE)/AT (5)		
Li, Whited, and Wu (2016) Lyandres and Palazzo (2016)	Carlson, Fisher, and Giammarino (2010) Li and Luo (2017)	Palazzo (2012)
16. (CAPXV−SPPE)/AT (5)		
Whited (2006) Billett, Garfinkel, and Jiang (2011)	Hennessy and Whited (2007) Fresard (2012)	Kang, Liu, and Qi (2010)
17. dPPEGT/PPEGT (5)		
Michaely and Roberts (2012) Adams, Keloharju, and Knüpfer (2018)	Fresard (2010) Li, Lin, and Xu (2020)	Liljeblom, Pasternack, and Rosenberg (2011)
18. dPPENT/PPENT (4)		
Warusawitharana (2008) Karpoff and Wittry (2018)	Giroud and Mueller (2010)	Campello and Larrain (2016)
19. (dPPENT+DP)/AT (4)		
Tang (2009) Geng, Huang, Lin, and Liu (2021)	Erel, Jang, and Weisbach (2015)	Bedendo, Garcia-Appendini, and Siming (2020)

20. (CAPXV−SPPE)/PPEGT (3)		
Hennessy, Levy, and Whited (2007)	Hennessy and Whited (2007)	Danis and Gamba (2018)
21. dBe/Be (3)		
Aharoni, Grundy, and Zeng (2013)	Wahal (2019)	Freyberger, Neuhierl, and Weber (2020)
22. (CAPX−SPPE)/avePPENT (2)		
Belo, Li, Lin, and Zhao (2017)	Belo, Lin, and Yang (2019)	
23. dNoa/AT (2)		
Hou, Xue, and Zhang (2020)	Hou, Mo, Xue, and Zhang (2021)	
24. dLno/aveAT (2)		
Hou, Xue, and Zhang (2020)	Hou, Mo, Xue, and Zhang (2021)	
25. dNca/AT (2)		
Hou, Xue, and Zhang (2020)	Hou, Mo, Xue, and Zhang (2021)	
26. dBe/AT (2)		
Hou, Xue, and Zhang (2020)	Hou, Mo, Xue, and Zhang (2021)	
27. (CAPXV+AQC)/PPENT (1)		28. CAPXV/PPENT (1)
Dessaint and Matray (2017)		Gilchrist and Himmelberg (1998)
29. CAPXV/PPEGT (1)		30. (CAPX+IVCH−SIV)/(PPENT+IVAEQ+IVAO) (1)
Alexander and Eberly (2018)		Gutierrez and Philippon (2017)
31. (dPPENT+WDP+DPC)/PPEGT (1)		32. dNAT/NAT (1)
Livdan and Nezlobin (2021)		Frank and Sanati (2021)
33. CAPX/(AT−INVT) (1)		34. (CAPX+AQC)/PPEGT (1)
Dasgupta, Li, and Yan (2019)		DeAngelo, DeAngelo, and Whited (2011)
35. CAPX/(PPENT−CAPX+DP) (1)		36. (CAPXV−SPPE)/(AT−ACT) (1)
Lin, Ma, and Xuan (2011)		Ai and Li (2015)
37. (CAPXV−SPPE)/PPENT (1)		38. (CAPX−DP)/AT (1)
Bernard, Blackburne, and Thornock (2020)		Denis and Sibilkov (2010)
39. CAPX/(AT−CHE) (1)		40. dNCAT/NCAT (1)
Chen, Chen, Schipper, Xu, and Xue (2012)		Berg (2018)

Table S2 : The Correlation Matrix of the 40 Firm-level Investment Rates in Compustat, 1963–2020

The Pearson correlations are in the upper right triangle and the Spearman rank correlations in the lower left triangle. The 40 investment rates are ordered in Table 2 and Figure 2 based on the frequencies of appearances in the finance literature.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1		0.48	0.37	0.60	0.59	0.57	0.70	0.34	0.55	0.98	0.69	0.71	0.96	0.46	0.68	0.94	0.42	0.41	0.77	0.53
2	0.53		0.42	0.43	0.39	0.91	0.41	0.80	0.90	0.48	0.47	0.40	0.45	0.99	0.40	0.45	0.69	0.77	0.43	0.87
3	0.39	0.44		0.66	0.60	0.43	0.57	0.55	0.43	0.38	0.59	0.56	0.40	0.42	0.57	0.41	0.58	0.57	0.57	0.46
4	0.61	0.48	0.66		0.60	0.49	0.90	0.58	0.49	0.62	0.85	0.64	0.63	0.43	0.65	0.64	0.71	0.64	0.84	0.52
5	0.68	0.48	0.54	0.60		0.44	0.64	0.45	0.45	0.61	0.64	0.85	0.61	0.40	0.86	0.62	0.50	0.49	0.66	0.46
6	0.62	0.91	0.47	0.55	0.55		0.48	0.72	0.99	0.56	0.53	0.46	0.54	0.89	0.46	0.53	0.76	0.73	0.49	0.95
7	0.73	0.49	0.55	0.86	0.68	0.58		0.56	0.49	0.71	0.93	0.68	0.72	0.42	0.69	0.74	0.71	0.64	0.93	0.51
8	0.42	0.84	0.55	0.63	0.51	0.77	0.64		0.72	0.36	0.61	0.44	0.36	0.80	0.46	0.37	0.86	0.94	0.57	0.74
9	0.60	0.89	0.47	0.57	0.56	0.97	0.59	0.78		0.57	0.53	0.44	0.52	0.91	0.46	0.54	0.77	0.73	0.49	0.97
10	0.97	0.53	0.40	0.63	0.70	0.62	0.75	0.45	0.65		0.71	0.69	0.94	0.49	0.70	0.96	0.44	0.42	0.78	0.55
11	0.66	0.60	0.59	0.79	0.65	0.66	0.88	0.74	0.67	0.69		0.70	0.72	0.47	0.71	0.74	0.70	0.69	0.95	0.55
12	0.85	0.51	0.49	0.63	0.82	0.59	0.72	0.48	0.56	0.81	0.68		0.72	0.38	0.98	0.70	0.50	0.50	0.74	0.46
13	0.98	0.51	0.40	0.62	0.68	0.60	0.74	0.41	0.58	0.95	0.68	0.85		0.44	0.70	0.98	0.44	0.43	0.80	0.56
14	0.51	0.97	0.44	0.50	0.50	0.89	0.51	0.85	0.92	0.57	0.61	0.48	0.49		0.40	0.46	0.70	0.77	0.43	0.88
15	0.81	0.51	0.51	0.65	0.84	0.59	0.74	0.52	0.61	0.85	0.70	0.97	0.82	0.54		0.71	0.52	0.51	0.74	0.48
16	0.95	0.51	0.41	0.64	0.71	0.60	0.76	0.44	0.63	0.98	0.70	0.82	0.97	0.54	0.85		0.45	0.44	0.81	0.58
17	0.49	0.68	0.58	0.77	0.56	0.76	0.84	0.84	0.77	0.52	0.81	0.54	0.50	0.70	0.58	0.53		0.90	0.65	0.79
18	0.55	0.70	0.60	0.73	0.58	0.73	0.78	0.86	0.74	0.57	0.91	0.60	0.56	0.71	0.63	0.58	0.88		0.63	0.75
19	0.83	0.51	0.54	0.78	0.72	0.57	0.91	0.66	0.58	0.84	0.87	0.79	0.84	0.52	0.80	0.85	0.71	0.76		0.51
20	0.58	0.87	0.48	0.58	0.57	0.95	0.60	0.79	0.98	0.63	0.68	0.57	0.60	0.90	0.62	0.65	0.78	0.75	0.59	
21	0.24	0.29	0.64	0.39	0.31	0.31	0.33	0.35	0.31	0.25	0.36	0.29	0.24	0.29	0.29	0.25	0.37	0.37	0.33	0.32
22	0.49	0.96	0.39	0.43	0.46	0.86	0.44	0.79	0.90	0.54	0.53	0.44	0.47	0.99	0.50	0.52	0.63	0.63	0.45	0.87
23	0.41	0.46	0.70	0.70	0.59	0.49	0.59	0.57	0.49	0.42	0.65	0.53	0.42	0.46	0.55	0.43	0.61	0.64	0.57	0.51
24	0.67	0.46	0.57	0.68	0.73	0.51	0.77	0.60	0.52	0.68	0.76	0.76	0.68	0.47	0.77	0.69	0.64	0.67	0.83	0.53
25	0.56	0.52	0.68	0.69	0.70	0.57	0.75	0.65	0.58	0.57	0.83	0.69	0.57	0.53	0.71	0.59	0.70	0.77	0.74	0.59
26	0.25	0.31	0.67	0.40	0.31	0.32	0.33	0.38	0.33	0.25	0.36	0.29	0.24	0.32	0.30	0.25	0.38	0.38	0.32	0.33
27	0.40	0.86	0.49	0.48	0.58	0.79	0.48	0.83	0.77	0.41	0.61	0.63	0.43	0.83	0.63	0.44	0.68	0.70	0.49	0.79
28	0.52	0.98	0.45	0.50	0.49	0.89	0.49	0.85	0.87	0.52	0.60	0.51	0.52	0.95	0.52	0.53	0.69	0.71	0.51	0.89
29	0.60	0.89	0.48	0.57	0.56	0.98	0.58	0.78	0.95	0.60	0.67	0.60	0.62	0.87	0.60	0.62	0.77	0.74	0.58	0.97
30	0.50	0.83	0.45	0.46	0.59	0.77	0.48	0.73	0.75	0.50	0.57	0.49	0.52	0.80	0.49	0.52	0.62	0.63	0.51	0.77
31	0.36	0.75	0.53	0.60	0.53	0.79	0.63	0.89	0.80	0.40	0.73	0.48	0.37	0.76	0.51	0.41	0.85	0.80	0.61	0.80
32	0.44	0.53	0.75	0.78	0.62	0.56	0.63	0.65	0.56	0.45	0.70	0.57	0.45	0.53	0.59	0.47	0.68	0.72	0.61	0.57
33	0.97	0.56	0.40	0.62	0.65	0.64	0.72	0.44	0.61	0.94	0.66	0.82	0.95	0.54	0.79	0.92	0.50	0.56	0.81	0.60
34	0.49	0.80	0.52	0.54	0.65	0.88	0.55	0.76	0.84	0.49	0.66	0.71	0.49	0.77	0.71	0.49	0.75	0.73	0.55	0.85
35	0.53	0.96	0.35	0.38	0.43	0.88	0.38	0.71	0.85	0.52	0.48	0.46	0.50	0.92	0.46	0.50	0.56	0.58	0.40	0.82
36	0.73	0.74	0.44	0.60	0.57	0.73	0.63	0.66	0.76	0.77	0.63	0.61	0.74	0.77	0.66	0.78	0.62	0.65	0.68	0.78
37	0.50	0.95	0.46	0.51	0.51	0.87	0.51	0.86	0.90	0.55	0.61	0.49	0.51	0.98	0.54	0.56	0.71	0.72	0.52	0.92
38	0.80	0.64	0.42	0.57	0.59	0.73	0.65	0.48	0.71	0.78	0.76	0.69	0.77	0.62	0.67	0.76	0.57	0.67	0.65	0.69
39	0.95	0.61	0.38	0.60	0.66	0.67	0.71	0.48	0.65	0.92	0.66	0.79	0.93	0.59	0.76	0.90	0.53	0.57	0.79	0.64
40	0.42	0.51	0.83	0.74	0.60	0.54	0.61	0.63	0.54	0.43	0.67	0.54	0.43	0.51	0.56	0.45	0.66	0.68	0.58	0.56

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	0.21	0.46	0.41	0.60	0.51	0.24	0.20	0.46	0.54	0.35	0.31	0.35	0.97	0.28	0.48	0.63	0.44	0.92	0.90	0.36
2	0.24	0.91	0.42	0.38	0.42	0.30	0.61	0.97	0.88	0.72	0.69	0.53	0.51	0.62	0.90	0.76	0.95	0.54	0.61	0.50
3	0.62	0.35	0.79	0.62	0.75	0.73	0.48	0.44	0.45	0.41	0.50	0.75	0.39	0.50	0.30	0.44	0.44	0.37	0.38	0.82
4	0.35	0.38	0.71	0.69	0.70	0.39	0.37	0.45	0.51	0.36	0.52	0.64	0.62	0.41	0.31	0.55	0.46	0.57	0.57	0.67
5	0.28	0.37	0.67	0.70	0.73	0.33	0.54	0.40	0.46	0.50	0.45	0.60	0.57	0.59	0.32	0.46	0.41	0.55	0.56	0.62
6	0.25	0.82	0.44	0.42	0.46	0.30	0.55	0.87	0.97	0.66	0.73	0.52	0.59	0.65	0.83	0.75	0.86	0.63	0.68	0.51
7	0.30	0.36	0.63	0.76	0.74	0.33	0.33	0.43	0.50	0.35	0.52	0.54	0.68	0.37	0.29	0.55	0.44	0.65	0.65	0.57
8	0.30	0.66	0.56	0.54	0.59	0.35	0.69	0.82	0.74	0.64	0.84	0.66	0.37	0.67	0.59	0.63	0.82	0.36	0.45	0.64
9	0.25	0.84	0.44	0.43	0.46	0.30	0.54	0.87	0.95	0.66	0.74	0.53	0.57	0.64	0.81	0.76	0.88	0.61	0.66	0.52
10	0.21	0.50	0.42	0.61	0.52	0.24	0.20	0.46	0.54	0.35	0.32	0.36	0.94	0.28	0.47	0.65	0.47	0.90	0.89	0.37
11	0.31	0.40	0.66	0.77	0.78	0.34	0.38	0.49	0.55	0.40	0.56	0.57	0.68	0.42	0.35	0.57	0.49	0.71	0.66	0.60
12	0.25	0.34	0.64	0.76	0.76	0.29	0.60	0.41	0.48	0.34	0.44	0.55	0.68	0.65	0.34	0.48	0.40	0.65	0.65	0.57
13	0.21	0.43	0.44	0.62	0.55	0.24	0.26	0.48	0.57	0.38	0.33	0.37	0.92	0.29	0.44	0.66	0.47	0.87	0.87	0.39
14	0.24	0.93	0.42	0.39	0.43	0.30	0.60	0.95	0.86	0.71	0.69	0.53	0.49	0.60	0.88	0.77	0.97	0.53	0.59	0.50
15	0.25	0.37	0.66	0.77	0.77	0.29	0.60	0.41	0.47	0.34	0.45	0.56	0.66	0.65	0.33	0.50	0.42	0.63	0.63	0.58
16	0.21	0.46	0.45	0.63	0.56	0.24	0.26	0.49	0.57	0.39	0.34	0.38	0.90	0.29	0.43	0.68	0.50	0.85	0.85	0.40
17	0.31	0.56	0.60	0.59	0.64	0.36	0.60	0.71	0.78	0.57	0.85	0.66	0.44	0.67	0.50	0.61	0.71	0.45	0.50	0.66
18	0.31	0.59	0.60	0.58	0.64	0.36	0.66	0.79	0.75	0.62	0.81	0.67	0.43	0.65	0.56	0.64	0.79	0.46	0.50	0.66
19	0.30	0.37	0.63	0.80	0.76	0.33	0.33	0.45	0.51	0.36	0.51	0.54	0.75	0.37	0.31	0.58	0.45	0.68	0.72	0.56
20	0.26	0.80	0.47	0.45	0.49	0.31	0.59	0.90	0.99	0.69	0.75	0.55	0.55	0.65	0.77	0.79	0.91	0.59	0.64	0.54
21		0.21	0.48	0.35	0.40	0.85	0.22	0.25	0.26	0.24	0.27	0.42	0.21	0.23	0.18	0.25	0.25	0.20	0.21	0.45
22	0.26		0.35	0.34	0.35	0.27	0.49	0.87	0.78	0.63	0.57	0.43	0.50	0.50	0.90	0.74	0.89	0.52	0.57	0.42
23	0.48	0.41		0.76	0.84	0.55	0.53	0.44	0.46	0.40	0.53	0.80	0.42	0.56	0.29	0.45	0.44	0.42	0.41	0.85
24	0.36	0.41	0.69		0.89	0.39	0.48	0.41	0.44	0.31	0.49	0.66	0.58	0.51	0.27	0.47	0.41	0.53	0.57	0.66
25	0.40	0.46	0.75	0.87		0.45	0.57	0.45	0.49	0.38	0.57	0.77	0.50	0.59	0.29	0.47	0.45	0.52	0.51	0.78
26	0.95	0.29	0.50	0.37	0.40		0.26	0.31	0.31	0.30	0.31	0.49	0.25	0.27	0.23	0.31	0.31	0.23	0.25	0.52
27	0.29	0.80	0.53	0.54	0.62	0.31		0.66	0.60	0.52	0.65	0.61	0.21	0.93	0.46	0.44	0.65	0.24	0.28	0.58
28	0.29	0.93	0.47	0.48	0.52	0.33	0.89		0.91	0.75	0.71	0.55	0.48	0.62	0.86	0.79	0.99	0.51	0.58	0.53
29	0.32	0.84	0.50	0.52	0.58	0.33	0.82	0.91		0.70	0.75	0.55	0.56	0.66	0.79	0.78	0.89	0.60	0.65	0.54
30	0.30	0.79	0.47	0.44	0.51	0.32	0.76	0.85	0.79		0.57	0.54	0.37	0.50	0.64	0.66	0.74	0.39	0.48	0.51
31	0.33	0.70	0.55	0.56	0.64	0.35	0.77	0.76	0.80	0.66		0.60	0.32	0.71	0.51	0.52	0.71	0.35	0.41	0.59
32	0.45	0.47	0.83	0.70	0.83	0.47	0.60	0.54	0.57	0.55	0.63		0.35	0.61	0.38	0.55	0.55	0.37	0.45	0.93
33	0.25	0.52	0.42	0.65	0.55	0.26	0.41	0.55	0.62	0.51	0.37	0.44		0.28	0.51	0.67	0.47	0.90	0.86	0.37
34	0.31	0.74	0.56	0.58	0.66	0.32	0.92	0.80	0.88	0.70	0.80	0.63	0.49		0.48	0.44	0.61	0.33	0.35	0.60
35	0.24	0.94	0.36	0.36	0.41	0.26	0.78	0.93	0.85	0.79	0.62	0.43	0.56	0.74		0.70	0.84	0.56	0.59	0.36
36	0.28	0.75	0.48	0.58	0.55	0.31	0.61	0.76	0.75	0.71	0.53	0.55	0.77	0.58	0.71		0.80	0.64	0.76	0.53
37	0.29	0.96	0.48	0.48	0.53	0.33	0.86	0.97	0.89	0.83	0.77	0.55	0.53	0.78	0.89	0.79		0.50	0.57	0.53
38	0.27	0.60	0.46	0.56	0.62	0.27	0.52	0.62	0.71	0.58	0.48	0.51	0.79	0.61	0.66	0.67	0.61		0.86	0.38
39	0.23	0.57	0.42	0.65	0.56	0.25	0.47	0.59	0.66	0.57	0.42	0.48	0.90	0.54	0.60	0.80	0.58	0.78		0.47
40	0.48	0.46	0.87	0.65	0.77	0.50	0.58	0.52	0.55	0.52	0.61	0.91	0.42	0.61	0.41	0.52	0.53	0.48	0.46	

Table S3 : Annual Growth Rates in the BEA's Investment Price Deflators, 1963–2020

From the detailed tables for 63 private industries from BEA's fixed assets accounts, we obtain: (i) current-cost investments in private non-residential equipment, $I_{jt}^{\mathcal{E}\$}$, and structure, $I_{jt}^{\mathcal{S}\$}$, by industry, annual, 1947–2020; and (ii) fixed-cost investments in private non-residential equipment, $I_{jt}^{\mathcal{E}}$, and structure, $I_{jt}^{\mathcal{S}}$, by industry, annual, 1947–2020. Industry j's investment price deflator is $P_{jt}^I = (I_{jt}^{\mathcal{E}\$} + I_{jt}^{\mathcal{S}\$})/(I_{jt}^{\mathcal{E}} + I_{jt}^{\mathcal{S}})$, and its growth rate is $P_{jt+1}^I/P_{jt}^I - 1$. We calculate investment price deflators for the 20 BEA sectors by aggregating across all the industries within each sector. For sector s, its investment price deflator is $P_{st}^I = (\sum_{j\in s} I_{jt}^{\mathcal{E}\$} + \sum_{j\in s} I_{jt}^{\mathcal{S}\$})/(\sum_{j\in s} I_{jt}^{\mathcal{E}} + \sum_{j\in s} I_{jt}^{\mathcal{S}})$. The aggregate investment price deflator is $P_t^I = (\sum_j I_{jt}^{\mathcal{E}\$} + \sum_j I_{jt}^{\mathcal{S}\$})/(\sum_j I_{jt}^{\mathcal{E}} + \sum_j I_{jt}^{\mathcal{S}})$. All moments are in percent, except for skewness (Skew), excess kurtosis (Kurt, relative to three for the normal distribution), and the serial correlation (ρ_1).

	Mean	Std	Skew	Kurt	Min	Median	Max	ρ_1
Panel A: Time series of aggregate growth rates of investment price deflators								
Aggregate	3.67	3.23	0.59	−0.29	−1.60	3.03	11.72	0.71
Panel B: Pooled Panels of sector (industry) growth rates of investment price deflators								
Sector	3.58	4.44	0.96	2.75	−14.68	2.73	28.47	0.54
Industry	3.58	5.49	0.91	5.05	−32.60	2.61	42.90	0.36
Panel C: Time series of sector growth rates of investment price deflators								
Agriculture, forestry, fishing, and hunting	3.72	3.24	1.55	1.78	−0.08	2.90	13.54	0.75
Mining	5.74	8.69	0.43	0.67	−14.68	4.98	28.47	0.34
Utilities	3.89	3.87	1.05	1.25	−3.26	2.74	16.10	0.67
Construction	3.61	3.80	1.60	2.84	−1.32	2.21	18.13	0.71
Nondurable goods	3.63	3.41	1.84	4.36	−0.49	3.01	17.57	0.75
Durable goods	3.46	3.73	1.58	2.42	−0.62	2.25	16.77	0.72
Wholesale trade	3.13	4.23	1.01	0.51	−3.93	1.69	15.13	0.59
Retail trade	3.79	3.45	1.18	1.00	−1.14	2.75	14.84	0.76
Transportation and warehousing	3.62	4.54	0.18	0.37	−7.21	3.03	14.48	0.59
Information	1.56	4.92	0.51	−0.09	−5.76	1.60	14.43	0.61
Finance and insurance	3.07	4.37	0.54	−0.35	−6.20	2.20	12.74	0.37
Real estate and rental and leasing	3.57	4.01	0.02	1.73	−9.38	3.07	14.76	0.22
Professional, scientific, and technical services	3.12	5.68	1.06	0.39	−5.02	1.40	19.40	0.53
Management of companies and enterprises	3.67	4.23	0.62	0.47	−2.52	3.21	16.80	0.60
Administrative and waste management services	3.41	4.80	0.45	−0.27	−7.57	1.96	14.49	0.20
Educational services	4.16	3.59	1.64	4.20	−0.65	3.58	19.02	0.66
Health care and social assistance	3.50	4.06	1.06	0.77	−2.50	2.56	15.05	0.79
Arts, entertainment, and recreation	3.65	3.63	1.25	3.88	−5.51	3.15	16.22	0.44
Accommodation and food services	3.68	3.16	0.68	1.39	−3.05	2.97	13.80	0.76
Other services, except government	3.72	3.73	1.05	1.06	−2.00	3.14	14.52	0.54
Panel D: Time series of industry growth rates of investment price deflators								
Farms	3.73	3.21	1.53	1.76	−0.16	2.88	13.43	0.78
Forestry, fishing, and related activities	3.75	4.10	0.99	0.87	−3.97	2.67	15.23	0.42
Oil and gas extraction	6.13	10.18	0.48	0.55	−17.54	5.22	33.17	0.38
Mining, except oil and gas	4.05	3.81	1.68	3.65	−2.14	2.81	18.74	0.69
Support activities for mining	4.96	6.83	0.70	0.31	−8.15	3.00	23.25	0.26
Utilities	3.89	3.87	1.05	1.25	−3.26	2.74	16.10	0.67
Construction	3.61	3.80	1.60	2.84	−1.32	2.21	18.13	0.71
Food and beverage and tobacco products	3.66	3.24	1.55	2.55	−0.16	2.90	15.58	0.70
Textile mills and textile product mills	3.77	3.66	1.52	2.05	−0.81	2.74	16.38	0.80
Apparel and leather and allied products	3.70	3.87	1.18	1.03	−2.78	3.15	14.04	0.55
Wood products	3.79	3.92	2.16	5.86	−1.05	2.93	20.02	0.65

	Mean	Std	Skew	Kurt	Min	Median	Max	ρ_1
Panel D: Time series of industry growth rates of investment price deflators (continued)								
Paper products	3.70	3.62	1.72	3.80	−0.47	2.61	18.18	0.74
Printing and related support activities	3.63	3.70	1.51	2.13	−1.14	2.57	16.27	0.73
Petroleum and coal products	3.69	4.00	1.00	1.15	−4.24	2.75	15.59	0.44
Chemical products	3.43	3.71	1.63	4.11	−2.69	3.07	18.44	0.63
Plastics and rubber products	3.66	3.63	1.96	4.42	−0.31	2.82	18.35	0.76
Nonmetallic mineral products	3.69	4.66	1.15	2.58	−8.34	2.53	20.10	0.50
Primary metals	3.55	3.66	1.32	1.91	−2.61	2.52	16.17	0.72
Fabricated metal products	3.53	3.74	1.62	2.49	−0.37	2.39	16.22	0.72
Machinery	3.41	3.88	1.34	1.68	−2.69	2.09	16.09	0.51
Computer and electronic products	3.20	4.26	1.13	0.94	−2.28	1.78	17.23	0.57
Electrical equipment, appliances, and components	3.44	4.36	1.72	5.97	−6.88	2.32	22.63	0.56
Motor vehicles, bodies and trailers, and parts	3.51	4.46	1.62	2.73	−2.03	2.25	19.45	0.54
Other transportation equipment	3.57	4.34	0.78	−0.06	−3.70	2.18	14.59	0.45
Furniture and related products	3.65	3.78	1.67	2.95	−0.63	2.82	17.40	0.71
Miscellaneous manufacturing	3.11	3.83	0.87	0.81	−5.55	2.15	12.67	0.52
Wholesale trade	3.13	4.23	1.01	0.51	−3.93	1.69	15.13	0.59
Retail trade	3.79	3.45	1.18	1.00	−1.14	2.75	14.84	0.76
Air transportation	4.13	7.58	−0.41	2.19	−18.94	3.39	27.21	0.22
Railroad transportation	3.66	4.23	1.94	4.10	−1.14	2.01	19.53	0.59
Water transportation	3.79	8.31	0.18	1.05	−19.18	2.39	23.57	0.46
Truck transportation	3.18	3.40	1.47	1.83	−1.35	2.48	13.90	0.71
Transit and ground passenger transportation	3.11	6.45	0.50	0.08	−9.36	1.66	19.72	0.13
Pipeline transportation	4.48	10.17	1.18	2.98	−13.14	3.63	42.90	0.36
Other transportation and support activities	3.42	3.86	1.19	2.03	−3.18	2.60	17.74	0.73
Warehousing and storage	4.06	4.61	0.53	−0.38	−4.12	3.05	15.68	0.55
Publishing industries (includes software)	3.56	5.04	0.52	−0.45	−6.86	2.08	15.90	0.64
Motion picture and sound recording industries	2.84	5.59	0.32	1.56	−13.01	2.56	20.19	0.22
Broadcasting and telecommunications	1.08	5.41	0.25	−0.53	−7.89	1.44	13.89	0.60
Information and data processing services	3.32	8.88	1.11	1.24	−11.36	0.63	33.52	0.43
Federal Reserve banks	2.59	10.95	0.53	1.24	−22.71	1.18	35.84	0.09
Credit intermediation and related activities	3.13	4.95	0.38	0.09	−10.50	1.42	13.94	0.23
Securities, commodity contracts, and investments	2.69	10.28	−0.37	2.71	−32.60	1.37	29.25	−0.10
Insurance carriers and related activities	3.24	6.66	1.31	3.95	−11.87	0.87	26.71	−0.15
Funds, trusts, and other financial vehicles	4.02	6.57	0.32	0.99	−14.54	3.51	19.74	0.18
Real estate	3.82	4.10	−0.04	5.59	−12.38	3.15	18.14	−0.03
Rental and leasing services and lessors of intangible assets	3.24	7.08	1.30	1.95	−8.64	0.93	28.45	0.63
Legal services	3.55	9.32	1.24	2.85	−16.55	1.39	36.97	−0.01
Miscellaneous professional, scientific, and technical services	3.16	5.71	1.16	0.73	−7.00	0.74	19.82	0.54
Computer systems design and related services	2.83	9.76	0.93	0.14	−13.09	−0.67	28.23	0.18
Management of companies and enterprises	3.67	4.23	0.62	0.47	−2.52	3.21	16.80	0.60
Administrative and support services	3.21	7.05	0.47	0.56	−15.11	1.15	21.31	−0.09
Waste management and remediation services	3.64	3.68	1.20	1.16	−1.71	2.75	14.00	0.51
Educational services	4.16	3.59	1.64	4.20	−0.65	3.58	19.02	0.66
Ambulatory health care services	3.50	5.05	1.46	2.12	−2.54	2.55	20.11	0.64
Hospitals	3.45	3.83	0.88	0.35	−2.68	2.74	14.15	0.83
Nursing and residential care facilities	3.92	4.93	1.53	2.41	−2.78	2.79	18.88	0.53
Social assistance	3.88	4.28	1.48	2.80	−3.71	2.65	18.78	0.42
Performing arts, spectator sports, museums, and related activities	3.31	4.69	0.93	3.15	−9.43	2.94	18.27	0.22
Amusements, gambling, and recreation industries	3.84	3.37	1.28	3.66	−3.39	3.39	15.35	0.55
Accommodation	4.10	3.32	0.41	1.18	−4.18	3.37	13.71	0.76
Food services and drinking places	3.27	2.99	1.41	2.64	−1.45	2.98	14.47	0.75
Other services, except government	3.72	3.73	1.05	1.06	−2.00	3.14	14.52	0.54

Table S4 : Examples of Estimating Asset Age

This table presents examples with investment growth rates of zero, 10%, and −10%, respectively. The straight-line depreciation rate is 20%. Asset is homogeneous with a service life of five years. At the end of its service life, an asset is retired immediately. PPEGT, PPENT, and DPACT are gross PPE, net PPE, and accumulated depreciation at the end of a period, respectively. Average asset age is the weighted average of asset age weighted by the investment amounts of the assets. Oldest asset age is the oldest vintage of assets. DPACT/DP is our estimate of average asset age. $A_i = 2 \times \text{DPACT/DP}$ is our estimate of oldest asset age.

Year	0	1	2	3	4	5	6	7	8	9	10
Panel A: Constant investment, 20% straight-line depreciation (5 years service life)											
Investment	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Retirement	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PPEGT	1.00	2.00	3.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Depreciation	0.00	0.20	0.40	0.60	0.80	1.00	1.00	1.00	1.00	1.00	1.00
DPACT	0.00	0.20	0.60	1.20	2.00	2.00	2.00	2.00	2.00	2.00	2.00
PPENT	1.00	1.80	2.40	2.80	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Average asset age	0.00	0.50	1.00	1.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Oldest asset age	0.00	1.00	2.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DPACT/DP		1.00	1.50	2.00	2.50	2.00	2.00	2.00	2.00	2.00	2.00
A_i		2.00	3.00	4.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00
Panel B: 10% investment growth, 20% straight-line depreciation (5 years service life)											
Investment	1.00	1.10	1.21	1.33	1.46	1.61	1.77	1.95	2.14	2.36	2.59
Retirement	0.00	0.00	0.00	0.00	0.00	1.00	1.10	1.21	1.33	1.46	1.61
PPEGT	1.00	2.10	3.31	4.64	6.11	6.72	7.39	8.13	8.94	9.83	10.82
Depreciation	0.00	0.20	0.42	0.66	0.93	1.22	1.34	1.48	1.63	1.79	1.97
DPACT	0.00	0.20	0.62	1.28	2.21	2.43	2.67	2.94	3.24	3.56	3.92
PPENT	1.00	1.90	2.69	3.36	3.89	4.28	4.71	5.18	5.70	6.27	6.90
Average asset age	0.00	0.48	0.94	1.38	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Oldest asset age	0.00	1.00	2.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DPACT/DP		1.00	1.48	1.94	2.38	1.99	1.99	1.99	1.99	1.99	1.99
A_i		2.00	2.95	3.87	4.76	3.98	3.98	3.98	3.98	3.98	3.98
Panel C: −10% investment growth, 20% straight-line depreciation (5 years service life)											
Investment	1.00	0.90	0.81	0.73	0.66	0.59	0.53	0.48	0.43	0.39	0.35
Retirement	0.00	0.00	0.00	0.00	0.00	1.00	0.90	0.81	0.73	0.66	0.59
PPEGT	1.00	1.90	2.71	3.44	4.10	3.69	3.32	2.99	2.69	2.42	2.18
Depreciation	0.00	0.20	0.38	0.54	0.69	0.82	0.74	0.66	0.60	0.54	0.48
DPACT	0.00	0.20	0.58	1.12	1.81	1.63	1.47	1.32	1.19	1.07	0.96
PPENT	1.00	1.70	2.13	2.32	2.29	2.06	1.85	1.67	1.50	1.35	1.21
Average asset age	0.00	0.53	1.07	1.63	2.21	2.21	2.21	2.21	2.21	2.21	2.21
Oldest asset age	0.00	1.00	2.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DPACT/DP		1.00	1.53	2.07	2.63	1.99	1.99	1.99	1.99	1.99	1.99
A_i		2.00	3.05	4.14	5.26	3.98	3.98	3.98	3.98	3.98	3.98

Table S5 : A Meta-study of Prior Firm-level Studies with the Perpetual Inventory Method

This table reviews 33 prior studies that apply the perpetual inventory method to construct firm-specific current-cost capital stocks. We only highlight their key elements, while leaving the full technical details of implementation to the original sources.

Paper	Sample	Investment flows	Price deflators	Depreciation rates	Initial capital stock
Lindenberg and Ross (1981)	246 firms in Compustat, 1960–1977	"gross investment (book) in plant and equipment" (p. 10)	Nonresidential fixed investment price deflator	Accounting depreciation rate, DP/PPENT; also estimate the rate of technological progress	PPENT
Salinger and Summers (1983)	30 Dow Jones companies, 1959–1978	"Investment for years 1959$-L$+1 to 1978 proportional to aggregate investment and consistent with gross property, plant, and equipment in 1959" (p. 279)	Consumer Price Index (CPI)	double declining: 2/the average PPEGT/DP	Determined jointly with investment
Smirlock, Gilligan, and Marshall (1984)	231 manufacturing firms	change in gross PPE	GNP implicit price deflator	constant, 5%	book value in 1961
Fazzari, Hubbard, and Petersen (1988)	Manufacturing firms, 1970–1984, Value Line	"capital spending" (p. 193)	Implicit price deflator for fixed nonresidential investment	single declining: 1/the average PPEGT/DP	"the value of net plant (adjusted to market value with aggregate data)" (p. 193)
Hall (1990)	mostly Compustat firms 1979–1987	not specified	GNP deflator for fixed nonresidential investment	Accounting depreciation rate	PPENT
Hoshi and Kashyap (1990)	580 Japanese manufacturing firms	change in book value of capital plus depreciation	the wholesale price index for investment goods	firm-specific but constant δ, either average exponential rate, $1-\alpha^{1/L_i}$, L_i: average life	not specified
Hayashi and Inoue (1991)	687 Japanese manufacturing firms, 1977–1986	change in net PPE plus accounting depreciation	Price of nonresidential buildings and structures as the construction material component of Wholesale Price Index (WPI) from Bank of Japan; price of machinery and instruments and tools as weighted averages of subcomponents in WPI; price of transportation equipment as the matching component of WPI; price of land as the urban land prices index	4.7% for nonresidential buildings; 5.64% for structures; 9.489% for machinery; 14.7% for transportation equipments; 8.838% for instruments and tools; 0% for land	"the book value of capital for the 1962 fiscal year" (p. 738)
Blundell, Bond, and Devereux (1992)	532 U.K. manufacturing firms from Datastream	total new fixed assets	"implicit price deflator for gross fixed investment by manufacturing industry" (p. 254)	8.19% for plant and machinery; 2.5% for buildings	"historic cost valuations of the capital stock in the first year of data, usually 1968" (p. 254)
Whited (1992)	325 manufacturing firms in Compustat, 1972–1986	capital expenditure on PPE	GNP price deflator for nonresidential investment, tax-adjusted	double declining: 2/the average PPEGT/DP	PPEGT
Lang and Stulz (1994)	1,449 Compustat firms in 1984	change in gross PPE	implicit GNP price deflator	constant, 5% or first observation	book value of PPE in 1970

Paper	Sample	Investment flows	Price deflators	Depreciation rates	Initial capital stock
Bond and Meghir (1994)	626 U.K. manufacturing firms from Datastream	total new fixed assets	"implicit price deflator for gross fixed investment by manufacturing industry" (p. 218)	8.19% for plant and machinery; 2.5% for land and buildings	"historic cost valuations of capital stock for the first year of data available (usually 1968)" (p. 218)
Hubbard, Kashyap, and Whited (1995)	428 manufacturing firms in Compustat, 1976–1987	capital expenditure on PPE	GNP price deflator for nonresidential investment	double declining: 2/the average PPEGT/DP	PPEGT
Leahy and Whited (1996)	772 manufacturing firms in Compustat, 1981–1987	capital expenditure on PPE	GNP price deflator for nonresidential investment	double declining: 2/the average PPEGT/DP	PPEGT
Eberly (1997)	Global Vantage industrial database, 1981–1994	capital expenditure	implicit price deflator for nonresidential investment/ the producer price index	2-digit SIC-industry, double declining: 2/the average PPEGT/DP	not specified
Lewellen and Badrinath (1997)	678 Compustat firms, 1975–1991	change in PPENT plus accounting depreciation	GNP deflator for fixed nonresidential investment	straight-line depreciation	missing values
Barnett and Sakellaris (1998)	manufacturing firms from Hall (1990)	capital expenditure on PPE	GNP deflator for fixed nonresidential investment	accounting depreciation rate	PPENT
Erickson and Whited (2000)	737 manufacturing firms in Compustat, 1992–1995	capital expenditure on PPE	nonresidential investment price deflator, tax-adjusted	double declining: 2/the average PPEGT/DP	PPEGT
Abel and Eberly (2001)	Compustat, 1974–1993, 604 firms on average per year	capital expenditure on PPE minus sales of PPE	implicit price deflator for nonresidential investment from Economic Report of the President	2-digit SIC-industry, double declining: 2/the average PPEGT/DP	net PPE
Gomes (2001)	Compustat, 1979–1988	spending on PPE minus capital retirements	deflator for nonresidential fixed investment from DRI	double declining: 2/the average PPEGT/DP	PPEGT
Chirinko and Schaller (2004)	193 Canadian firms, 1973–1986	capital expenditure on PPE	implicit price index for business investment in machinery and equipment	double declining: 2/the average PPEGT/DP	net PPE
Hennessy (2004)	278 manufacturing firms in Compustat, 1992–1995	capital expenditure on PPE	nonresidential investment price deflator, tax-adjusted	double declining: 2/the average PPEGT/DP	PPEGT
Bloom, Bond, and Reenen (2007)	U.K. manufacturing firms from Datastream	total new fixed assets minus sales of fixed assets	"an aggregate series for investment goods prices" (p. 413)	a constant rate of 8%	inflation-adjusted net book value of tangible fixed assets
Gan (2007a)	847 Japanese manufacturing firms	change in net PPE plus accounting depreciation	same in Hayashi and Inoue (1991)	same in Hayashi and Inoue (1991)	book value of assets in 1960

Paper	Sample	Investment flows	Price deflators	Depreciation rates	Initial capital stock
Gan (2007b)	420 Japanese manufacturing firms	change in net PPE plus accounting depreciation	same in Hayashi and Inoue (1991)	same in Hayashi and Inoue (1991)	book value of assets
Gaspar and Massa (2007)	About 847 firms per year, Compustat	change in net PPE	consumer price index	a constant rate of 5%	first available net PPE
Benfratello, Schiantarelli, and Sembenelli (2008)	Italian manufacturing firms	investment in plants and machinery	the aggregate business investment price index	a constant rate of 5%	"the accounting value" (p. 216)
Bloom (2009)	Compustat, 1981–2000	capital expenditure on PPE minus sales of PPE	industry-level investment price deflators, from NBER-CES manufacturing database	industry-level depreciation rates from NBER-CES manufacturing database	PPENT
Chirinko and Schaller (2009)	Compustat, 1980–2001	CAPX; for substantial acquisition, change in PPEGT plus PPE retirements (item PPEVR); for substantial disinvestment, change in PPENT plus economic depreciation	BEA sector-specific investment price deflators based on chain-type quantities, tax-adjusted	BEA sector-specific current-cost depreciation rates based on chain-type quantities	PPENT deflated with industry-specific investment price, adjusted for industry-specific current-cost/PPENT ratios
Eberly, Rebelo, and Vincent (2012)	776 Compustat firms, 1981–2003, top quartile on capital stock in 1981	capital expenditure on PPE	implicit price deflator for nonresidential investment from Economic Report of the President	2-digit SIC industry, double declining: 2/the average PPEGT/DP	net PPE
Panousi and Papanikolaou (2012)	Compustat, 1970–2005	CAPX	price deflator for fixed nonresidential investment	3-digit SIC industry, double declining	gross PPE
Moyen and Platikanov (2013)	Compustat, 1988–2009	CAPX	producer price index for finished goods: capital equipment	double declining: 2/the average PPEGT/DP	gross PPE
Bustamante (2016)	Compustat, 1980–2014	CAPX minus SPPE	nonresidential investment deflator	accounting depreciation	gross PPE
Belo, Gala, Salomao, and Vitorino (2022)	Compustat, 1975–2016	change in PPENT plus accounting depreciation	equipment and structure deflators	accounting depreciation	net PPE

Table S6 : Alternative Constructions of Current-cost Investment Rates in Compustat, 1963–2020

This table shows the moments of current-cost investment rates with several alternative constructions of current-cost capital. "Benchmark" is our benchmark described in Section 3. "PPENT as $K^{\$}_{i0}$" uses the first available net PPE as the initial current-cost capital. "Adjusted PPENT as $K^{\$}_{i0}$" uses the first available net PPE adjusted for the industry ratio of current-cost to historical-cost capital as the initial current-cost capital. "Adjusted PPENT as $K^{\$}_{it}$" adjusts all observations of net PPE for the industry ratio of current-cost to historical-cost capital without the PIM. "No change in fiscal year end" means no change in fiscal year ending month, i.e., we maintain a fixed 12-month window in accumulating capital. "No backfilled industry classification" means we do not apply industry classification to earlier years when the classification is not available. All moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt, relative to the kurtosis of three for the normal distribution), and the serial correlation (ρ_1). f_- is the fraction of negative investment rates (below -1%), and f_0 the fraction of inactive investment rates (between -1% and 1%). $f^-_{.2}$, $f^-_{.3}$, $f^-_{.4}$, and $f^-_{.5}$ are the fractions of negative investment rate spikes below $-20\%, -30\%, -40\%$, and -50%, and $f^+_{.2}$, $f^+_{.3}$, $f^+_{.4}$, and $f^+_{.5}$ the fractions of positive investment rate spikes above $20\%, 30\%, 40\%$, and 50%, respectively.

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
Benchmark	169,828	23.84	37.20	3.33	14.28	−23.32	−1.97	6.19	13.03	26.70	87.07	241.82	0.34
PPENT as $K^{\$}_{i0}$	169,840	25.02	39.01	3.34	14.30	−24.18	−2.05	6.51	13.59	27.96	91.59	252.71	0.33
Adjusted PPENT as $K^{\$}_{i0}$	169,878	22.88	34.96	3.25	13.68	−22.12	−1.91	5.99	12.71	25.97	82.96	225.40	0.35
Adjusted PPENT as $K^{\$}_{it}$	176,965	29.21	46.28	3.48	15.77	−26.61	−2.68	7.48	16.04	32.79	104.47	309.86	0.27
No change in fiscal year end	153,067	24.46	38.42	3.35	14.42	−23.11	−1.88	6.28	13.22	27.27	89.32	249.94	0.34
No backfilled industry classification	166,765	23.60	36.65	3.31	14.17	−23.10	−1.93	6.18	12.97	26.50	85.88	238.17	0.34

	f_-	f_0	$f^-_{.2}$	$f^-_{.3}$	$f^-_{.4}$	$f^-_{.5}$	$f^+_{.2}$	$f^+_{.3}$	$f^+_{.4}$	$f^+_{.5}$
Benchmark	5.51	2.85	1.26	0.73	0.44	0.28	32.66	20.70	14.49	10.80
PPENT as $K^{\$}_{i0}$	5.55	2.72	1.31	0.77	0.47	0.29	34.22	21.90	15.49	11.58
Adjusted PPENT as $K^{\$}_{i0}$	5.49	2.96	1.20	0.66	0.38	0.23	31.92	20.03	13.90	10.29
Adjusted PPENT as $K^{\$}_{it}$	5.80	2.10	1.51	0.87	0.50	0.28	39.87	26.17	18.54	13.99
No change in fiscal year end	5.45	2.80	1.26	0.74	0.44	0.28	33.21	21.17	14.87	11.13
No backfilled industry classification	5.49	2.86	1.24	0.72	0.43	0.27	32.37	20.45	14.27	10.62

Table S7 : Robustness, Properties of Firm-level Current-cost Investment Rates in Compustat, 1963–2020

Current-cost investment rate, $I^{\$}_{it}/K^{\$}_{it}$, is current-cost investment (change of net PPE plus accounting depreciation, item DP minus item AM, missing AM set to zero) scaled by current-cost capital. All moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt, relative to the kurtosis of three for the normal distribution), and the serial correlation (ρ_1). f_- is the fraction of negative investment rates (below -1%), and f_0 the fraction of inactive investment rates (between -1% and 1%). $f^-_{.2}$, $f^-_{.3}$, $f^-_{.4}$, and $f^-_{.5}$ are the fractions of negative investment rate spikes below $-20\%, -30\%, -40\%$, and -50%, and $f^+_{.2}$, $f^+_{.3}$, $f^+_{.4}$, and $f^+_{.5}$ the fractions of positive investment rate spikes above $20\%, 30\%, 40\%$, and 50%, respectively. $(I-\text{CAPX})/K^{\$} \leq 15\%$ excludes firm-years in which the difference between current-cost investment and capital expenditures (item CAPX) is higher than 15% of current-cost capital, $K^{\$}$. $(I-\text{CAPX})/K^{\$} \leq 5\%$ excludes firm-years in which $I-\text{CAPX}$ is higher than 5% of $K^{\$}$. Age> 3 excludes the first three years of observations for a given firm, and Age> 5 drops the first five years of observations. For each calendar year, we also split the sample around the median NYSE market equity at the beginning of fiscal year into two subsamples (Small ME and Big ME), and we split around the median NYSE $K^{\$}$ at the beginning of fiscal year into two subsamples (Small $K^{\$}$ and Big $K^{\$}$).

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
Benchmark	169,828	23.84	37.20	3.33	14.28	−23.32	−1.97	6.19	13.03	26.70	87.07	241.82	0.34
1963–1991	76,971	22.31	33.60	3.25	13.78	−22.82	−1.67	6.52	12.86	24.95	79.53	218.09	0.34
1992–2020	92,857	25.38	40.79	3.40	14.78	−23.83	−2.26	5.86	13.19	28.45	94.61	265.55	0.34
$(I-\text{CAPX})/K^{\$} \leq 15\%$	153,841	17.58	25.68	3.83	24.55	−23.25	−2.71	5.63	11.52	21.40	56.62	131.97	0.43
$(I-\text{CAPX})/K^{\$} \leq 5\%$	138,331	16.09	24.95	4.09	28.36	−23.31	−3.54	5.10	10.40	19.23	52.68	128.26	0.42
Age> 3	150,349	19.76	29.71	3.80	21.60	−22.24	−1.98	5.87	12.02	23.22	66.38	163.98	0.31
Age> 5	132,253	17.79	26.29	4.13	27.42	−20.44	−1.73	5.68	11.35	21.18	57.23	137.14	0.30
Small ME	130,892	24.75	38.93	3.14	12.62	−23.31	−3.20	5.73	13.12	28.23	93.25	235.28	0.32
Big ME	36,954	20.32	27.06	3.98	24.20	−8.92	1.64	7.47	12.85	22.65	65.63	149.28	0.44
Small $K^{\$}$	136,107	26.56	40.30	3.02	11.50	−23.26	−2.57	6.44	14.51	30.50	98.71	241.94	0.33
Big $K^{\$}$	33,721	12.91	15.54	3.79	30.00	−13.10	−0.72	5.63	9.77	16.03	35.82	75.81	0.32

	f_-	f_0	$f^-_{.2}$	$f^-_{.3}$	$f^-_{.4}$	$f^-_{.5}$	$f^+_{.2}$	$f^+_{.3}$	$f^+_{.4}$	$f^+_{.5}$
Benchmark	5.51	2.85	1.26	0.73	0.44	0.28	32.66	20.70	14.49	10.80
1963–1991	5.16	2.34	1.27	0.74	0.44	0.27	31.81	19.23	13.05	9.50
1992–2020	5.86	3.35	1.26	0.73	0.43	0.29	33.51	22.18	15.93	12.10
$(I-\text{CAPX})/K^{\$} \leq 15\%$	6.01	3.12	1.37	0.80	0.48	0.30	26.73	14.59	9.05	6.15
$(I-\text{CAPX})/K^{\$} \leq 5\%$	6.60	3.44	1.51	0.89	0.53	0.33	23.10	12.60	7.86	5.38
Age> 3	5.57	3.00	1.20	0.68	0.40	0.26	29.22	17.26	11.35	8.02
Age> 5	5.45	3.09	1.08	0.60	0.33	0.20	26.42	14.70	9.27	6.37
Small ME	6.31	3.33	1.49	0.88	0.52	0.33	34.20	22.31	15.89	11.92
Big ME	2.87	1.20	0.41	0.18	0.09	0.06	27.52	15.17	9.61	6.80
Small $K^{\$}$	5.85	3.10	1.42	0.85	0.51	0.32	37.08	24.30	17.25	12.94
Big $K^{\$}$	4.50	2.06	0.66	0.29	0.13	0.08	16.30	7.21	3.92	2.49

Table S8 : The Number of Compustat Firms by NAICS Sectors and Industries, 1963–2020

	Sample period		#Firms per year		#Years with	
	First	Last	Mean	Min	#Firms< 10	#Firms< 20
Aggregate	1,963	2,020	2,928	833	0	0
Panel A: 19 nonfinancial NAICS sectors						
Agriculture, forestry, fishing, and hunting	1,963	2,020	11	3	29	48
Mining	1,963	2,020	158	49	0	0
Utilities	1,963	2,020	133	70	0	0
Construction	1,963	2,020	48	7	3	7
Nondurable goods	1,963	2,020	581	275	0	0
Durable goods	1,963	2,020	1,038	347	0	0
Wholesale trade	1,963	2,020	130	10	0	2
Retail trade	1,963	2,020	197	51	0	0
Transportation and warehousing	1,963	2,020	92	32	0	0
Information	1,963	2,020	251	24	0	0
Real estate and rental and leasing	1,963	2,020	27	2	5	12
Professional, scientific, and technical services	1,963	2,020	153	23	0	0
Management of companies and enterprises	1,973	1,983	12	3	51	58
Administrative and waste management services	1,963	2,020	78	3	4	6
Educational services	1,966	2,020	16	2	9	45
Health care and social assistance	1,968	2,020	60	1	9	11
Arts, entertainment, and recreation	1,963	2,020	34	4	3	25
Accommodation and food services	1,963	2,020	68	7	3	7
Other services, except government	1,963	2,020	22	3	14	31
Panel B: 58 nonfinancial NAICS industries						
Farms	1,963	2,020	10	2	33	56
Forestry, fishing, and related activities	1,963	2,005	2	1	58	58
Oil and gas extraction	1,963	2,020	94	23	0	0
Mining, except oil and gas	1,963	2,020	32	16	0	6
Support activities for mining	1,963	2,020	32	4	7	10
Utilities	1,963	2,020	133	70	0	0
Construction	1,963	2,020	48	7	3	7
Food and beverage and tobacco products	1,963	2,020	102	52	0	0
Textile mills and textile product mills	1,963	2,020	44	7	14	20
Apparel and leather and allied products	1,963	2,020	72	26	0	0
Wood products	1,963	2,020	21	5	11	29

	Sample period		#Firms per year		#Years with	
	First	Last	Mean	Min	#Firms< 10	#Firms< 20
Panel B: 58 nonfinancial NAICS industries, continued						
Paper products	1,963	2,020	41	17	0	5
Printing and related support activities	1,963	2,020	21	3	14	28
Petroleum and coal products	1,963	2,020	37	14	0	19
Chemical products	1,963	2,020	253	81	0	0
Plastics and rubber products	1,963	2,020	45	16	0	11
Nonmetallic mineral products	1,963	2,020	34	11	0	19
Primary metals	1,963	2,020	59	19	0	1
Fabricated metal products	1,963	2,020	114	45	0	0
Machinery	1,963	2,020	194	91	0	0
Computer and electronic products	1,963	2,020	402	54	0	0
Electrical equipment, appliances, and components	1,963	2,020	88	39	0	0
Motor vehicles, bodies and trailers, and parts	1,963	2,020	69	33	0	0
Other transportation equipment	1,963	2,020	47	27	0	0
Furniture and related products	1,963	2,020	43	14	0	15
Miscellaneous manufacturing	1,963	2,020	141	34	0	0
Wholesale trade	1,963	2,020	130	10	0	2
Retail trade	1,963	2,020	197	51	0	0
Air transportation	1,963	2,020	20	10	0	31
Railroad transportation	1,963	2,020	8	2	40	58
Water transportation	1,963	2,020	7	1	43	58
Truck transportation	1,963	2,020	23	2	4	24
Transit and ground passenger transportation	1,963	2,020	4	1	48	57
Pipeline transportation	1,963	2,020	13	2	33	44
Other transportation and support activities	1,963	2,020	25	8	4	31
Warehousing and storage	1,967	2,013	2	1	58	58
Publishing industries (includes software)	1,963	2,020	110	5	3	8
Motion picture and sound recording industries	1,963	2,020	28	4	10	24
Broadcasting and telecommunications	1,963	2,020	66	10	0	5
Information and data processing services	1,963	2,020	56	1	9	18
Real estate	1,974	2,013	4	1	56	58
Rental and leasing services and lessors of intangible assets	1,963	2,020	26	2	5	12
Legal services	1,963	2,020	5	1	47	56
Miscellaneous professional, scientific, and technical services	1,963	2,020	97	23	0	0
Computer systems design and related services	1,969	2,020	61	1	12	19
Management of companies and enterprises	1,973	1,983	12	3	51	58
Administrative and support services	1,963	2,020	57	2	4	7
Waste management and remediation services	1,963	2,020	22	1	9	31
Educational services	1,966	2,020	16	2	9	45
Ambulatory health care services	1,968	2,020	38	1	17	20
Hospitals	1,970	2,020	10	1	33	58
Nursing and residential care facilities	1,970	2,020	12	1	29	53
Social assistance	1,975	2,012	3	1	58	58
Performing arts, spectator sports, museums, and related activities	1,963	2,020	23	4	33	44
Amusements, gambling, and recreation industries	1,965	2,020	12	1	14	52
Accommodation	1,963	2,020	19	4	8	31
Food services and drinking places	1,963	2,020	49	3	6	10
Other services, except government	1,963	2,020	22	3	14	31

Table S9 : Panel Data Moments of Firm-level Current-cost Investment Rates by NAICS Sectors and Industries, 1963–2020

All moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt), and autocorrelation (ρ_1). f_- is the fraction of negative investment rates (below −1%), f_0 the fraction of inactive investment rates (between −1% and 1%), $f^-_{.2}$ the fractions of negative investment rate spikes below −20%, and $f^+_{.2}$ the fractions of positive investment rate spikes above 20%.

	#obs.	mean	std	skew	kurt	p1	p5	p50	p95	p99	ρ_1	f_-	f_0	$f^-_{.2}$	$f^+_{.2}$
All	169,828	25.39	46.70	5.52	47.42	−20.89	−2.28	12.78	94.45	242.52	0.34	5.84	2.93	1.38	33.89
Panel A: 19 nonfinancial NAICS sectors															
Agriculture, forestry, fishing, and hunting	629	19.94	36.89	3.99	20.07	−28.04	−9.03	11.48	71.68	201.40	0.15	8.74	3.02	3.50	25.91
Mining	9,156	25.60	45.48	3.94	22.66	−29.64	−11.81	13.72	101.58	249.64	0.23	11.62	3.91	3.13	37.65
Utilities	7,721	8.93	18.34	14.66	297.35	−9.46	1.64	6.62	19.47	52.41	0.38	2.77	1.26	0.41	4.84
Construction	2,810	29.81	52.75	4.03	22.77	−32.39	−14.69	16.14	119.80	274.64	0.24	10.75	2.46	4.23	42.31
Nondurable goods	33,672	20.77	38.09	5.76	50.34	−17.37	−1.30	11.31	74.13	186.58	0.25	5.26	3.23	1.05	26.91
Durable goods	60,187	22.75	38.43	5.34	47.03	−18.19	−1.46	12.49	80.99	191.58	0.32	5.32	2.94	1.07	32.35
Wholesale trade	7,537	30.74	53.01	4.34	25.13	−26.25	−3.90	15.71	117.50	302.05	0.30	6.36	2.63	2.00	41.46
Retail trade	11,450	23.59	38.74	5.92	56.11	−16.20	−0.06	13.46	79.37	182.81	0.42	4.25	2.38	0.79	34.04
Transportation and warehousing	5,343	21.03	35.30	5.39	42.90	−19.59	−2.47	12.47	65.94	179.42	0.32	5.91	3.43	1.35	33.09
Information	14,534	41.84	72.50	4.60	30.54	−20.61	−0.98	19.25	159.73	376.04	0.39	4.98	2.35	1.27	48.60
Real estate and rental and leasing	1,581	36.88	66.36	4.27	25.08	−28.22	−9.93	19.19	144.27	372.56	0.44	8.92	4.36	3.10	49.08
Professional, scientific, and technical services	8,851	37.01	63.38	4.75	33.54	−25.23	−2.15	19.02	139.53	336.57	0.37	5.68	2.96	1.75	48.24
Management of companies and enterprises	135	23.31	34.99	2.27	5.77	−17.64	−9.12	11.23	96.39	165.52	0.41	11.85	1.48	2.96	31.85
Administrative and waste management services	4,505	33.48	57.84	4.72	33.56	−24.80	−3.45	16.82	126.85	312.56	0.38	6.24	2.26	1.71	44.31
Educational services	888	28.46	47.72	3.65	17.53	−26.42	−2.96	14.87	115.98	259.54	0.33	6.87	3.83	1.69	40.09
Health care and social assistance	3,188	38.92	60.77	3.38	14.76	−29.61	−5.32	19.57	146.34	339.11	0.35	7.18	2.10	2.60	49.44
Arts, entertainment, and recreation	1,971	29.94	56.68	4.26	23.15	−23.40	−6.43	13.54	116.02	339.11	0.29	8.02	3.70	2.03	37.85
Accommodation and food services	3,943	24.28	45.77	4.52	27.80	−26.87	−9.73	12.59	94.22	240.78	0.28	10.98	3.75	2.18	35.28
Other services, except government	1,250	23.51	48.77	5.19	34.35	−24.75	−3.78	10.46	90.23	274.64	0.17	7.44	4.16	1.60	29.28
Panel B: 58 nonfinancial NAICS industries															
Farms	554	18.48	31.27	3.70	17.57	−28.53	−7.58	11.57	62.48	179.88	0.03	8.12	2.71	3.07	25.09
Forestry, fishing, and related activities	75	30.74	64.11	2.92	8.66	−28.04	−21.75	9.36	231.39	303.86	0.31	13.33	5.33	6.67	32.00
Oil and gas extraction	5,424	25.20	45.94	3.88	20.97	−32.39	−12.59	13.60	100.09	259.54	0.23	12.44	3.50	3.28	36.69
Mining, except oil and gas	1,879	21.21	42.36	4.97	37.78	−28.13	−11.20	10.56	86.16	200.01	0.13	11.02	5.48	3.19	29.32
Support activities for mining	1,859	31.12	46.59	3.39	17.72	−29.05	−9.57	19.30	114.68	256.25	0.29	9.84	3.50	2.64	48.74
Utilities	7,721	8.93	18.34	14.66	297.35	−9.46	1.64	6.62	19.47	52.41	0.38	2.77	1.26	0.41	4.84
Construction	2,810	29.81	52.75	4.03	22.77	−32.39	−14.69	16.14	119.80	274.64	0.24	10.75	2.46	4.23	42.31
Food and beverage and tobacco products	5,909	16.73	30.32	6.89	65.74	−16.83	−1.25	10.56	49.93	142.56	0.29	5.13	2.62	1.02	21.75
Textile mills and textile product mills	2,563	15.73	27.85	5.89	52.09	−17.54	−3.18	9.47	53.10	129.77	0.27	6.83	3.75	1.09	20.99
Apparel and leather and allied products	4,187	18.95	35.68	7.13	87.95	−15.72	−1.91	10.20	66.85	171.55	0.31	5.83	3.68	0.81	26.34
Wood products	1,191	19.65	35.10	5.62	55.57	−21.00	−6.93	11.31	72.56	159.78	0.22	10.75	5.12	1.60	31.23
Paper products	2,394	16.69	25.10	6.03	56.99	−14.81	−0.36	11.24	51.19	123.74	0.24	4.34	1.84	0.75	22.22
Printing and related support activities	1,231	18.11	24.50	5.71	56.17	−11.42	0.42	13.07	53.18	120.69	0.31	4.06	1.87	0.49	27.70
Petroleum and coal products	2,125	14.11	23.73	6.99	77.41	−11.76	0.02	9.29	44.14	120.04	0.23	4.19	2.45	0.66	15.34
Chemical products	14,665	25.73	46.14	4.80	33.91	−18.70	−1.17	12.64	101.92	243.56	0.23	5.20	3.83	1.25	32.62
Plastics and rubber products	2,594	19.02	32.86	5.53	44.16	−23.81	−3.07	11.91	62.86	165.52	0.16	6.48	1.89	1.50	26.56
Nonmetallic mineral products	1,984	13.93	22.53	6.24	70.18	−17.51	−1.48	9.48	43.29	116.70	0.23	5.59	2.92	0.96	17.59
Primary metals	3,407	14.13	25.28	6.79	75.96	−15.27	−1.31	8.08	46.85	125.81	0.27	5.34	4.05	0.82	18.14
Fabricated metal products	6,638	17.22	28.29	5.93	57.35	−18.99	−1.84	10.80	53.71	131.76	0.27	5.56	2.67	1.19	24.90

	#obs.	mean	std	skew	kurt	p1	p5	p50	p95	p99	ρ_1	f_-	f_0	$f_{.2}^-$	$f_{.2}^+$
Panel B: 58 nonfinancial NAICS industries, continued															
Machinery	11,252	20.09	34.31	5.32	41.39	−19.30	−1.70	11.67	68.70	166.47	0.30	5.40	3.24	1.17	28.40
Computer and electronic products	23,297	28.26	45.17	4.88	40.81	−18.68	−0.81	15.24	102.53	228.32	0.34	4.85	2.78	1.11	40.31
Electrical equipment, appliances, and components	5,127	21.71	35.82	5.05	36.49	−17.54	−1.81	12.48	75.64	187.08	0.29	5.54	2.05	1.05	30.29
Motor vehicles, bodies and trailers, and parts	4,021	20.89	30.59	5.42	46.90	−15.22	−0.93	13.83	66.44	158.73	0.29	4.97	1.72	0.72	31.73
Other transportation equipment	2,707	16.60	25.63	6.90	82.12	−17.06	−1.01	11.14	50.12	112.98	0.29	5.02	3.44	1.15	24.79
Furniture and related products	2,507	17.01	25.60	5.14	46.36	−16.29	−1.27	10.61	53.58	130.15	0.28	5.19	3.11	0.84	25.61
Miscellaneous manufacturing	8,163	27.33	42.79	4.35	26.38	−19.96	−1.01	15.71	95.85	226.19	0.29	5.02	2.21	1.25	40.06
Wholesale trade	7,537	30.74	53.01	4.34	25.13	−26.25	−3.90	15.71	117.50	302.05	0.30	6.36	2.63	2.00	41.46
Retail trade	11,450	23.59	38.74	5.92	56.11	−16.20	−0.06	13.46	79.37	182.81	0.42	4.25	2.38	0.79	34.04
Air transportation	1,147	26.04	46.86	4.82	30.93	−20.53	−2.57	14.20	90.91	260.22	0.31	6.63	3.14	1.13	35.48
Railroad transportation	448	8.38	21.76	9.15	105.79	−16.46	−0.03	4.28	30.16	59.62	0.48	3.57	6.03	0.67	8.26
Water transportation	425	16.37	35.56	5.64	43.05	−23.39	−8.28	9.22	58.08	186.58	0.38	8.94	7.29	2.82	20.94
Truck transportation	1,351	23.54	23.95	3.42	23.94	−15.96	−1.58	19.81	62.48	110.24	0.21	5.63	2.29	1.11	49.37
Transit and ground passenger transportation	222	37.84	53.99	3.63	16.00	−18.89	0.66	24.83	102.39	303.87	0.51	4.05	1.80	1.35	57.21
Pipeline transportation	728	13.54	29.75	6.37	53.87	−23.70	−3.12	7.58	43.64	167.26	0.19	5.36	2.61	1.51	13.60
Other transportation and support activities	1,466	22.06	34.88	5.20	39.86	−19.33	−1.60	13.68	69.42	175.35	0.29	5.25	3.75	1.09	34.24
Warehousing and storage	75	16.21	36.00	4.58	27.51	−25.50	−13.28	7.13	72.25	257.16	0.33	10.67	4.00	4.00	20.00
Publishing industries (includes software)	6,393	39.68	67.47	4.94	37.51	−20.15	−0.18	18.81	146.27	344.73	0.41	4.52	2.53	1.14	47.65
Motion picture and sound recording industries	1,639	36.11	64.60	4.41	27.61	−24.32	−4.80	16.88	144.52	372.56	0.37	6.83	2.50	1.89	44.48
Broadcasting and telecommunications	3,810	38.67	70.94	4.09	21.04	−20.58	−1.18	15.61	154.63	399.15	0.44	5.14	1.68	1.26	41.15
Information and data processing services	3,251	49.74	82.04	4.63	30.02	−20.58	−1.11	26.41	175.14	414.35	0.30	5.08	2.61	1.20	59.21
Real estate	66	44.16	100.27	2.62	6.86	−49.77	−22.03	7.02	274.64	478.68	0.19	24.24	13.64	12.12	33.33
Rental and leasing services and lessors of intangible assets	1,515	36.56	64.51	4.43	27.42	−26.39	−8.04	19.56	137.70	372.56	0.44	8.25	3.96	2.71	49.77
Legal services	271	30.62	50.01	2.94	10.45	−25.98	−9.67	13.48	121.46	267.67	0.24	8.49	3.32	2.21	40.22
Miscellaneous professional, scientific, and technical services	5,628	32.86	55.78	4.64	31.91	−25.98	−2.68	17.22	123.23	288.46	0.36	6.08	2.83	2.01	44.55
Computer systems design and related services	3,168	44.27	74.52	4.55	29.84	−22.47	−1.04	22.74	167.21	386.75	0.39	5.02	3.19	1.26	54.67
Management of companies and enterprises	135	23.31	34.99	2.27	5.77	−17.64	−9.12	11.23	96.39	165.52	0.41	11.85	1.48	2.96	31.85
Administrative and support services	3,323	33.70	57.87	4.67	32.52	−24.75	−2.75	17.11	128.87	297.35	0.43	5.81	2.29	1.59	44.93
Waste management and remediation services	1,265	32.90	57.30	4.78	35.78	−26.28	−5.66	15.81	121.75	329.12	0.27	7.67	2.21	2.06	42.92
Educational services	888	28.46	47.72	3.65	17.53	−26.42	−2.96	14.87	115.98	259.54	0.33	6.87	3.83	1.69	40.09
Ambulatory health care services	2,005	42.21	60.93	3.25	14.04	−29.05	−3.52	23.47	151.31	336.76	0.39	5.79	1.85	2.24	54.86
Hospitals	485	28.65	47.52	4.28	26.47	−29.84	−8.97	15.54	117.14	285.54	0.42	8.87	1.86	3.51	39.59
Nursing and residential care facilities	587	37.46	70.43	3.26	11.80	−33.72	−7.32	13.53	166.48	374.67	0.20	10.05	2.56	2.73	38.50
Social assistance	111	32.23	47.80	3.30	17.71	−31.02	−17.32	20.99	119.38	171.56	0.06	9.91	5.41	4.50	52.25
Performing arts, spectator sports, museums, and related activities	1,330	29.21	53.44	4.42	25.40	−21.80	−6.30	14.58	103.37	339.11	0.41	7.74	3.16	1.95	39.77
Amusements, gambling, and recreation industries	673	31.63	63.34	3.98	19.57	−26.28	−7.34	12.01	134.55	374.67	0.15	8.17	5.20	2.08	34.18
Accommodation	1,085	19.44	46.75	5.51	37.67	−26.01	−9.77	7.84	78.91	272.44	0.22	12.17	5.44	1.94	25.25
Food services and drinking places	2,858	26.12	45.27	4.16	24.23	−27.78	−9.73	14.42	97.83	237.18	0.30	10.53	3.11	2.27	39.08
Other services, except government	1,250	23.51	48.77	5.19	34.35	−24.75	−3.78	10.46	90.23	274.64	0.17	7.44	4.16	1.60	29.28

Table S10 : Differences between Current-cost Investment Rates and (CAPX−SPPE)/PPEGT in Compustat, Panel Data Moments, by NAICS Sectors and Industries 1963–2020

This table shows current-cost investment rates, $I^{\$}_{it}/K^{\$}_{it}$, (CAPX−SPPE)/PPEGT, and their differences (Diff, the former minus the latter). The moments are in percent, except for the number of firm-years (#obs.), skewness (skew), excess kurtosis (kurt), and autocorrelation (ρ_1).

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
$I^{\$}/K^{\$}$	169,828	25.39	46.70	5.52	47.42	−20.89	−2.28	5.89	12.78	26.89	94.45	242.52	0.34
(CAPX−SPPE)/PPEGT	173,939	18.03	26.11	4.64	31.19	−4.61	1.06	5.77	10.66	19.90	59.53	137.88	0.44
Diff	166,576	7.01	27.91	6.43	68.71	−35.59	−12.23	−1.20	1.52	6.88	42.24	131.28	0.24
	Panel A: Differences by 19 nonfinancial NAICS sectors												
Agriculture, forestry, fishing, and hunting	621	5.39	23.15	4.43	26.19	−31.07	−12.82	−1.43	0.74	4.67	33.59	132.47	0.10
Mining	9,010	3.58	26.55	4.07	29.23	−44.54	−26.61	−4.66	0.53	5.47	43.49	115.45	0.16
Utilities	6,670	0.01	11.87	10.66	193.00	−19.64	−5.97	−2.28	−1.01	0.16	7.27	40.69	0.24
Construction	2,638	9.39	32.27	4.27	28.06	−45.73	−20.68	−0.86	2.89	10.47	60.99	160.19	0.19
Nondurable goods	33,229	4.86	22.48	7.00	80.65	−30.94	−10.15	−1.06	1.17	4.84	28.93	100.01	0.12
Durable goods	59,445	5.45	21.02	6.49	76.35	−29.34	−10.00	−0.75	1.62	6.14	31.26	90.72	0.18
Wholesale trade	7,395	11.03	33.48	4.82	33.71	−40.79	−15.24	−0.05	3.64	11.40	58.36	180.62	0.24
Retail trade	11,307	3.81	21.07	7.10	89.13	−28.39	−10.19	−1.91	0.25	3.51	27.79	90.72	0.27
Transportation and warehousing	5,215	4.92	20.48	4.92	39.69	−30.74	−12.01	−1.78	1.14	6.44	32.48	96.47	0.27
Information	14,294	16.07	45.43	5.31	41.52	−40.09	−13.92	−0.20	4.23	16.29	82.66	238.65	0.30
Real estate and rental and leasing	1,547	10.70	37.86	4.71	37.75	−46.53	−24.76	−1.34	3.38	11.72	69.93	180.62	0.34
Professional, scientific, and technical services	8,750	13.55	38.61	5.31	45.28	−39.94	−14.01	−0.23	4.09	14.65	69.55	192.75	0.33
Management of companies and enterprises	134	−0.48	17.35	1.36	4.80	−41.63	−27.98	−5.30	−1.57	0.26	36.46	56.33	0.28
Administrative and waste management services	4,459	10.78	36.40	5.03	39.10	−39.41	−15.67	−1.38	2.45	10.17	66.30	185.03	0.35
Educational services	879	3.77	23.02	3.56	18.57	−39.41	−18.10	−3.13	−0.12	4.25	38.00	114.09	0.23
Health care and social assistance	3,160	15.65	38.14	3.32	15.75	−42.44	−15.58	−0.44	4.54	18.54	84.17	191.10	0.30
Arts, entertainment, and recreation	1,927	6.90	29.32	4.96	34.49	−39.41	−16.55	−0.84	0.97	5.72	45.76	146.62	0.21
Accommodation and food services	3,903	4.68	26.13	5.85	50.17	−38.30	−17.53	−2.22	0.90	5.09	33.83	115.08	0.09
Other services, except government	1,238	5.27	30.56	5.94	44.00	−35.76	−13.41	−2.75	−0.14	3.97	36.99	166.34	0.13
	Panel B: Differences by 58 nonfinancial NAICS industries												
Farms	546	4.63	20.83	4.79	32.32	−30.79	−11.68	−1.56	0.69	4.40	28.41	106.05	0.06
Forestry, fishing, and related activities	75	11.00	35.49	2.93	9.89	−38.16	−20.90	−1.10	1.46	7.49	86.05	180.62	0.15
Oil and gas extraction	5,338	1.21	26.41	4.14	30.43	−46.51	−30.14	−6.79	−0.71	3.72	36.66	114.73	0.15
Mining, except oil and gas	1,831	5.67	25.15	4.00	26.59	−41.81	−20.59	−1.46	1.37	5.74	49.12	106.34	0.05
Support activities for mining	1,847	8.36	27.44	4.24	30.83	−41.29	−17.33	−0.91	3.07	10.07	53.55	126.08	0.24
Utilities	6,670	0.01	11.87	10.66	193.00	−19.64	−5.97	−2.28	−1.01	0.16	7.27	40.69	0.24
Construction	2,638	9.39	32.27	4.27	28.06	−45.73	−20.68	−0.86	2.89	10.47	60.99	160.19	0.19
Food and beverage and tobacco products	5,858	3.40	18.01	7.54	86.17	−25.56	−8.92	−1.05	0.92	3.87	19.75	73.65	0.19
Textile mills and textile product mills	2,532	2.38	16.36	7.17	88.67	−27.47	−10.67	−1.40	0.39	3.12	19.20	62.11	0.16
Apparel and leather and allied products	4,102	2.31	20.14	9.92	176.12	−29.62	−13.09	−2.35	0.06	3.08	19.56	77.59	0.14
Wood products	1,175	5.32	20.79	5.41	48.04	−27.98	−12.22	−0.83	1.15	5.96	33.89	99.64	0.07
Paper products	2,374	4.28	15.82	6.75	70.83	−21.26	−7.03	−0.21	1.71	4.43	22.90	73.98	0.10
Printing and related support activities	1,220	5.12	17.09	6.78	75.89	−22.21	−6.52	−0.04	2.18	5.76	25.82	70.24	0.22
Petroleum and coal products	2,078	2.52	15.73	7.54	93.52	−21.23	−8.14	−1.78	0.17	2.41	21.64	70.21	0.09
Chemical products	14,469	6.65	26.60	6.03	58.91	−35.59	−11.50	−0.88	1.59	6.22	40.66	126.03	0.10
Plastics and rubber products	2,538	4.74	21.06	6.57	65.34	−35.76	−9.44	−0.50	1.82	5.72	26.03	88.09	0.06
Nonmetallic mineral products	1,956	2.60	12.93	4.86	50.29	−29.17	−8.21	−0.61	1.15	3.63	17.02	57.41	0.09
Primary metals	3,342	2.79	15.64	7.74	102.33	−22.38	−8.63	−1.31	0.45	2.88	21.18	65.27	0.13
Fabricated metal products	6,542	2.90	15.94	6.30	68.87	−30.12	−8.73	−1.23	0.65	3.55	20.86	69.55	0.14

	#obs.	mean	std	skew	kurt	p1	p5	p25	p50	p75	p95	p99	ρ_1
Panel B: Differences by 58 nonfinancial NAICS industries, continued													
Machinery	11,137	4.32	18.86	5.86	55.76	−29.52	−10.26	−0.92	1.18	4.98	26.93	82.18	0.20
Computer and electronic products	23,075	6.51	22.89	6.64	85.53	−30.79	−10.92	−0.65	2.11	7.55	36.63	98.70	0.18
Electrical equipment, appliances, and components	5,029	4.19	18.71	5.74	57.82	−30.14	−11.63	−1.00	1.22	5.15	27.96	82.05	0.23
Motor vehicles, bodies and trailers, and parts	3,942	6.54	20.15	6.24	61.60	−21.57	−7.86	−0.03	2.83	7.28	30.63	94.87	0.23
Other transportation equipment	2,668	3.42	17.57	7.89	97.72	−28.60	−9.12	−1.02	1.08	4.41	20.36	69.55	0.20
Furniture and related products	2,452	3.12	14.53	4.89	44.27	−28.37	−8.38	−0.86	0.85	3.68	22.02	69.07	0.15
Miscellaneous manufacturing	8,035	6.09	22.52	5.67	51.91	−35.12	−11.25	−0.49	1.88	6.91	34.07	104.17	0.13
Wholesale trade	7,395	11.03	33.48	4.82	33.71	−40.79	−15.24	−0.05	3.64	11.40	58.37	180.62	0.24
Retail trade	11,307	3.81	21.07	7.10	89.13	−28.39	−10.19	−1.91	0.25	3.51	27.79	90.72	0.27
Air transportation	1,138	3.15	23.34	5.72	45.43	−32.89	−14.87	−2.98	−0.07	3.21	28.40	125.17	0.25
Railroad transportation	438	1.36	15.54	9.24	125.82	−20.94	−7.01	−1.83	−0.97	0.40	22.43	45.46	0.39
Water transportation	411	5.67	22.14	3.72	19.84	−33.53	−11.87	−0.59	1.69	5.64	39.77	101.29	0.30
Truck transportation	1,343	9.38	17.32	4.50	38.05	−22.22	−3.62	2.65	6.19	11.30	35.25	76.31	0.20
Transit and ground passenger transportation	217	8.49	22.27	2.35	10.49	−33.56	−12.63	−1.15	3.15	11.14	46.63	89.21	0.38
Pipeline transportation	656	2.17	21.64	4.98	33.31	−35.29	−13.48	−3.31	−1.10	1.37	28.72	130.37	0.21
Other transportation and support activities	1,450	1.68	17.77	5.36	53.02	−35.21	−15.59	−3.00	−0.20	2.92	22.06	76.86	0.25
Warehousing and storage	72	4.09	16.58	2.41	7.16	−27.34	−11.08	−2.31	−0.35	3.42	45.84	79.85	0.42
Publishing industries (includes software)	6,319	13.53	39.26	6.31	62.63	−37.30	−12.98	−0.18	3.82	14.74	65.84	182.17	0.33
Motion picture and sound recording industries	1,567	11.32	39.52	4.47	32.80	−46.51	−22.13	−1.47	1.71	10.47	77.94	191.10	0.26
Broadcasting and telecommunications	3,756	16.42	46.17	4.37	24.72	−40.63	−12.09	−0.49	3.54	14.36	88.09	274.54	0.37
Information and data processing services	3,205	20.81	54.26	5.15	36.58	−38.84	−15.06	0.42	7.13	20.20	100.51	274.54	0.21
Real estate	60	6.12	39.01	2.45	8.34	−56.18	−42.61	−10.12	0.81	8.90	85.80	165.25	0.11
Rental and leasing services and lessors of intangible assets	1,487	10.89	37.82	4.82	39.09	−46.51	−24.35	−1.08	3.49	11.75	68.87	188.63	0.34
Legal services	267	5.23	27.83	4.21	27.07	−44.45	−25.40	−2.78	0.63	6.50	38.74	140.27	0.30
Miscellaneous professional, scientific, and technical services	5,561	10.24	32.22	5.60	54.20	−39.41	−13.93	−0.36	3.05	11.21	55.95	148.01	0.28
Computer systems design and related services	3,135	19.39	47.25	4.68	33.44	−42.63	−14.36	0.17	7.04	20.95	94.03	239.84	0.36
Management of companies and enterprises	134	−0.48	17.35	1.36	4.80	−41.63	−27.98	−5.30	−1.57	0.26	36.46	56.33	0.28
Administrative and support services	3,282	10.37	34.87	4.90	37.80	−42.91	−16.10	−1.46	2.51	10.58	62.93	176.69	0.41
Waste management and remediation services	1,260	11.54	39.52	5.18	40.07	−37.54	−13.47	−1.27	2.12	9.08	70.66	203.39	0.27
Educational services	879	3.77	23.02	3.56	18.57	−39.41	−18.10	−3.13	−0.12	4.25	38.00	114.09	0.23
Ambulatory health care services	1,991	17.22	37.82	3.17	14.43	−42.44	−13.57	0.59	6.40	20.90	87.09	180.64	0.34
Hospitals	477	9.76	29.86	3.17	15.52	−48.12	−17.48	−1.58	1.47	11.09	62.60	140.27	0.42
Nursing and residential care facilities	581	17.14	45.99	3.39	14.41	−46.53	−13.69	−1.59	1.75	17.29	101.33	231.11	0.19
Social assistance	111	5.06	23.92	1.05	3.12	−40.94	−34.01	−2.17	2.14	11.29	52.51	78.71	0.11
Performing arts, spectator sports, museums, and related activities	1,298	5.85	26.73	5.70	46.04	−38.61	−16.55	−0.67	1.18	5.27	37.23	140.27	0.34
Amusements, gambling, and recreation industries	661	8.84	33.43	4.05	22.45	−45.67	−16.19	−0.98	0.59	6.05	61.41	148.61	0.09
Accommodation	1,063	3.75	30.13	6.11	48.68	−37.60	−18.63	−3.82	−0.53	2.37	32.05	147.25	0.10
Food services and drinking places	2,840	5.03	24.46	5.55	48.18	−38.61	−17.31	−1.46	1.55	5.87	34.31	113.24	0.09
Other services, except government	1,238	5.27	30.56	5.94	44.00	−35.76	−13.41	−2.75	−0.14	3.97	36.99	166.34	0.13

Figure S1 : The BEA's Current-cost Investment Rates, 1963–2020

From the detailed tables for 63 private NAICS-industries from the BEA's fixed assets accounts, we obtain: (i) current-cost investments in private nonresidential equipment, $I_{jt}^{\mathcal{E}\$}$, and structure, $I_{jt}^{\mathcal{S}\$}$, by industry; and (ii) current-cost capital stocks in private nonresidential equipment, $K_{jt}^{\mathcal{E}\$}$, and structure, $K_{jt}^{\mathcal{S}\$}$, by industry. For industry j in year t, we calculate its current-cost investment rate as $I_{jt}^{\$}/K_{jt-1}^{\$} = (I_{jt}^{\mathcal{E}\$} + I_{jt}^{\mathcal{S}\$})/(K_{jt-1}^{\mathcal{E}\$} + K_{jt-1}^{\mathcal{S}\$})$. We also calculate current-cost investment rates for the 20 BEA sectors (the aggregate economy) by summing up investments and capital stocks across all the industries within each sector (the whole economy). Panel A shows the time series of aggregate investment rates in percent. Panel B plots the times series means of investment rates against standard deviations both in percent across the 63 industries. Panel C is the histogram of the pooled sector investment rates (58×20 sector-years). Finally, Panel D is the histgram of the pooled industry investment rates (58×63 industry-years). The y-axis is the fraction (in percent) of firm-years in the histograms.

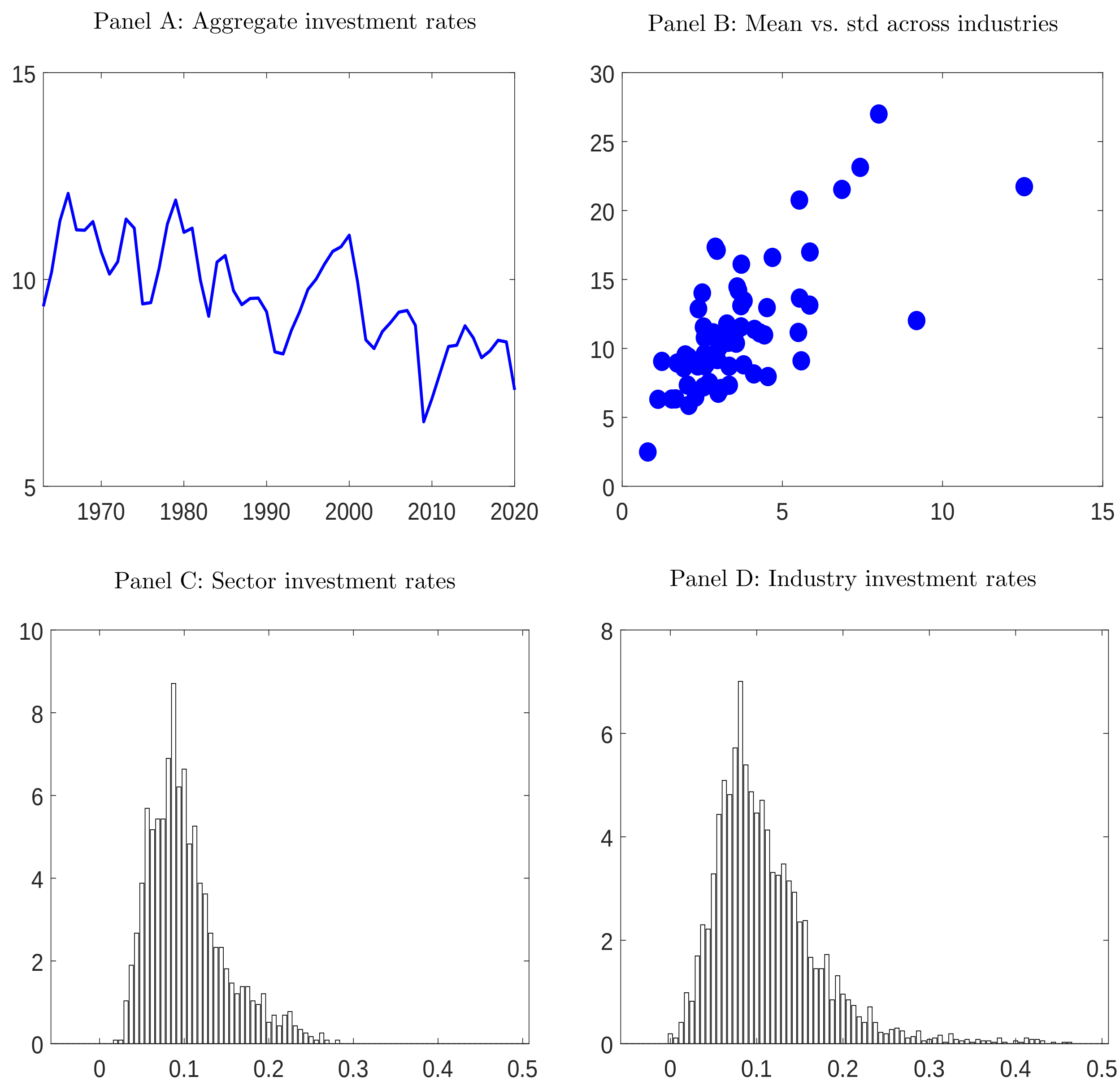
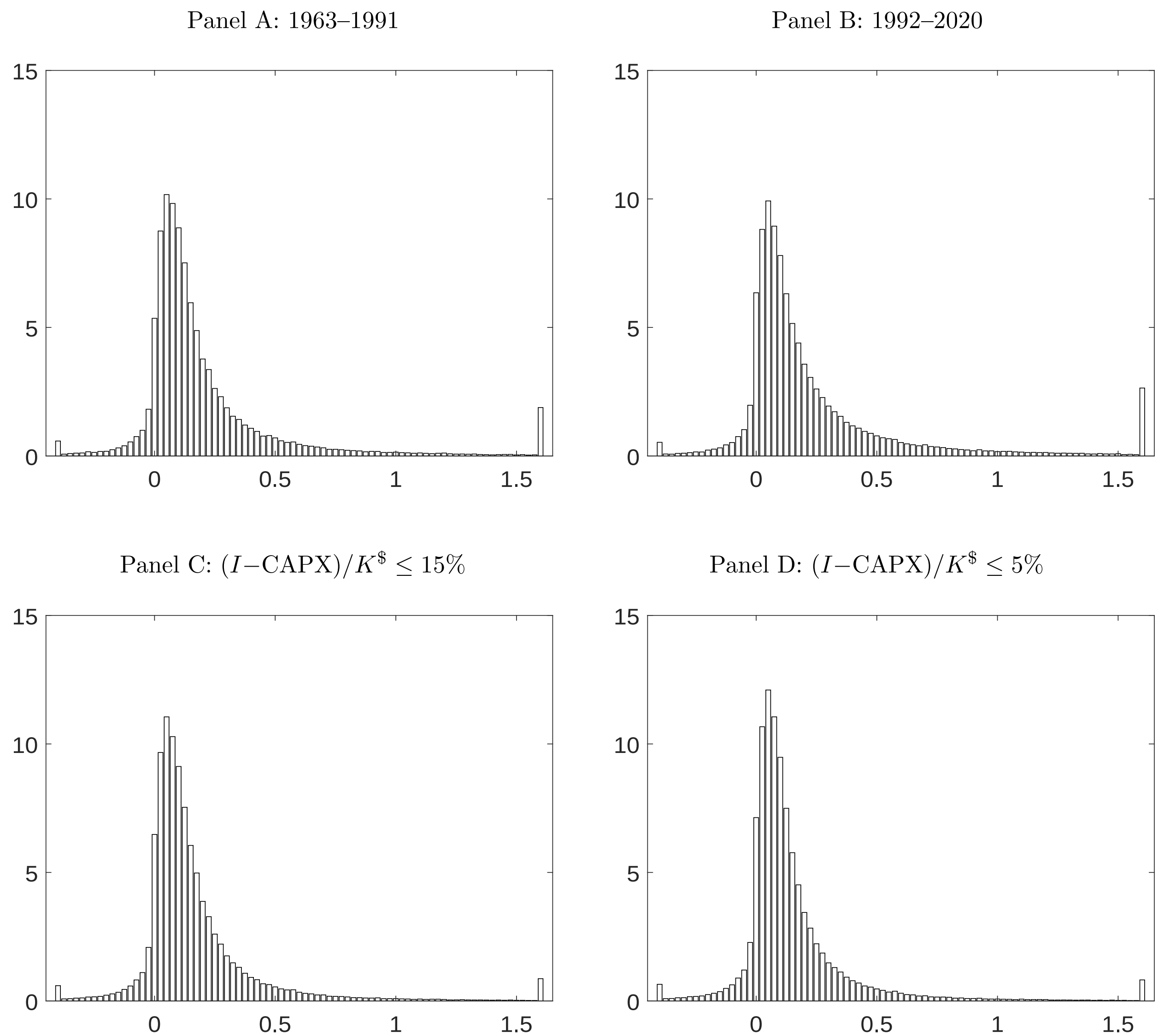
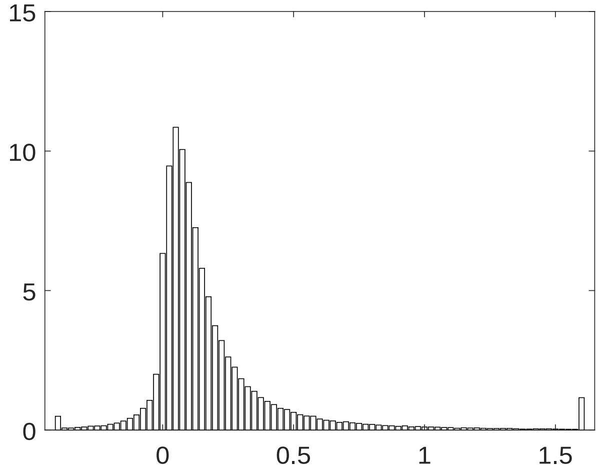


Figure S2 : Robustness, the Firm-level Current-cost Investment Rate Distribution in Compustat, 1963–2020

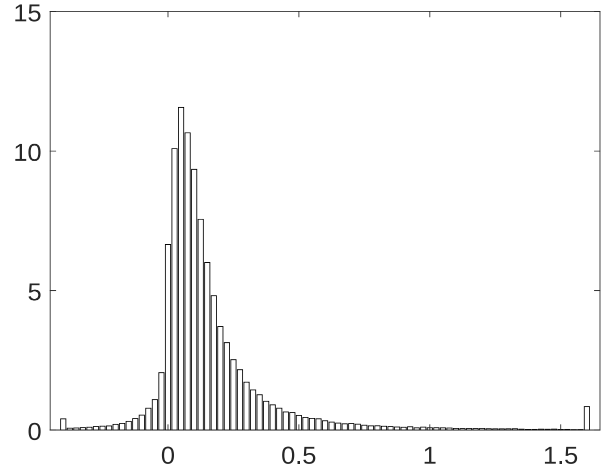
This figure shows the investment rate distribution for ten comparative statics: (i) the first half sample, 1963–1991; (ii) the second half sample, 1992–2020; (iii) $(I-\text{CAPX})/K^{\$} \leq 15\%$, no firm-years with the difference between current-cost investment and capital expenditures (item CAPX) higher than 15% of current-cost capital, $K^{\$}$; (iv) $(I-\text{CAPX})/K^{\$} \leq 5\%$, no firm-years firm-years with $I-$CAPX higher than 5% of $K^{\$}$; (v) Age> 3, no first three years of observations for a given firm; (vi) Age> 5, no first five years of observations; (vii) Small ME, the small market equity sample; (viii) Big ME, the big market equity sample; (ix) Small $K^{\$}$, the small current-cost capital sample; and (x) Big $K^{\$}$, the big current-cost capital sample.



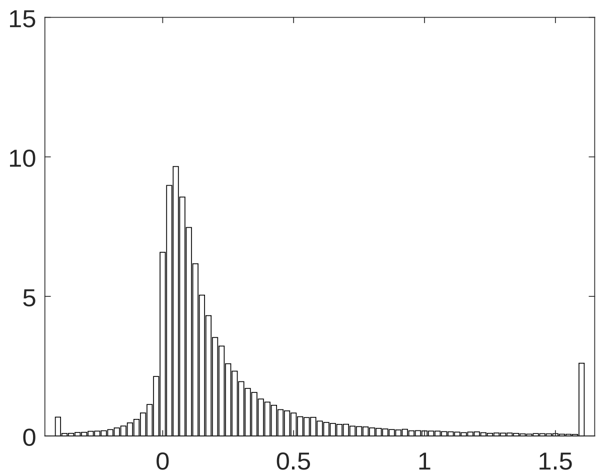
Panel E: Age > 3



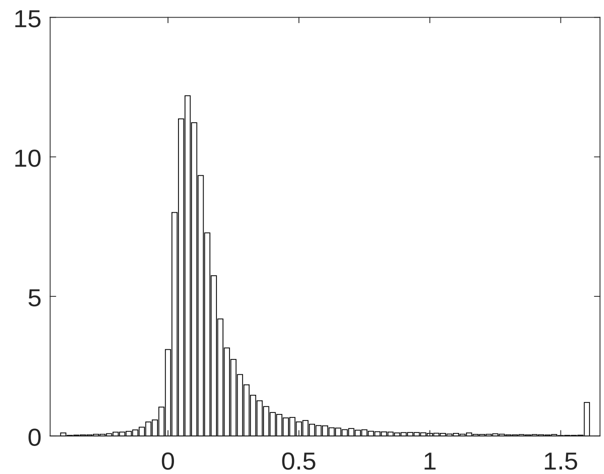
Panel F: Age > 5



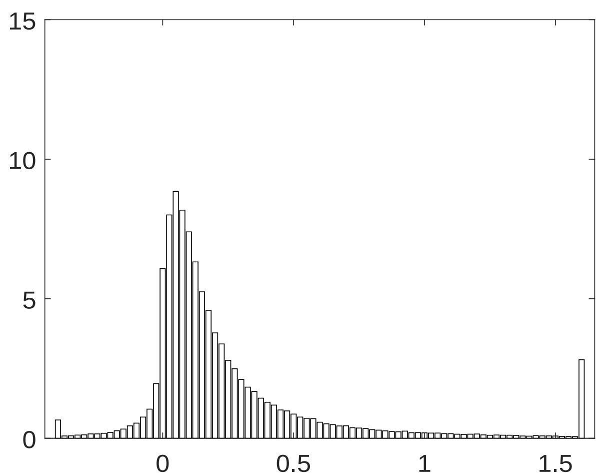
Panel G: Small ME



Panel H: Big ME



Panel I: Small $K^{\$}$



Panel J: Big $K^{\$}$

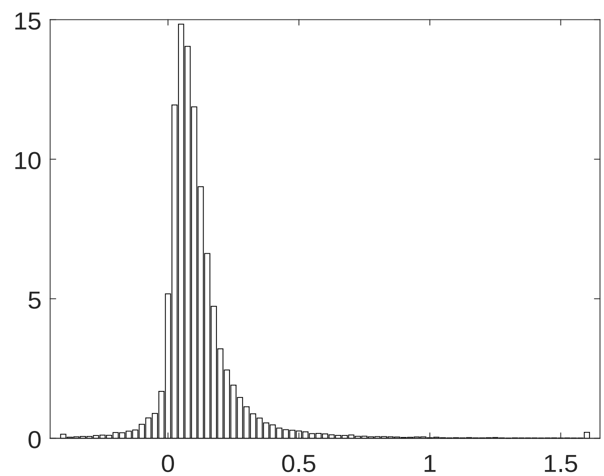
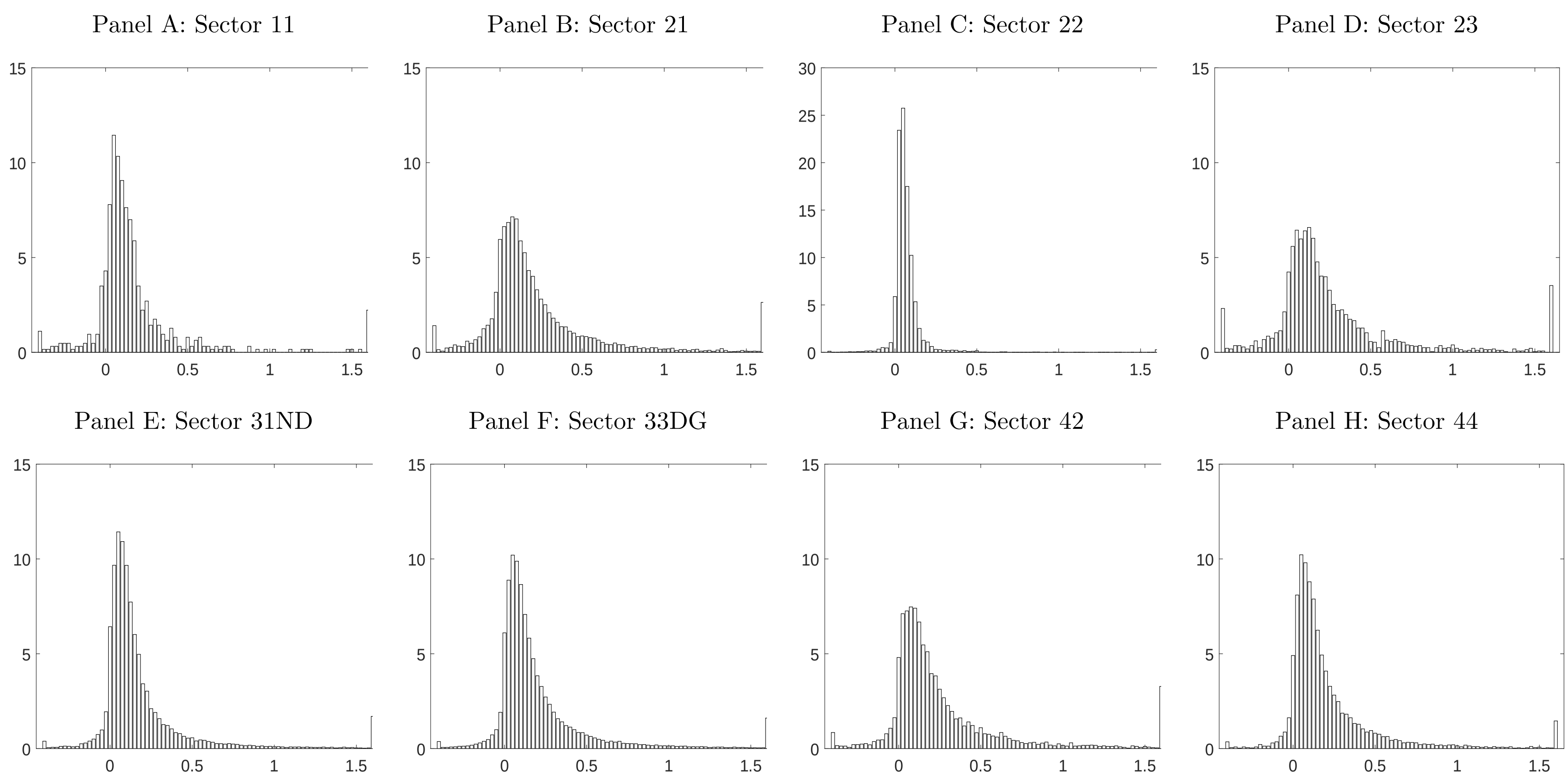


Figure S3 : The Firm-level Current-cost Investment Rate Distribution in Compustat, 19 NAICS Nonfinancial Sectors, 1963–2020

This figure shows the investment rate distribution in each of the 19 NAICS nonfinancial sectors: Sector 11, Agriculture, forestry, fishing, and hunting; 21, Mining; 22, Utilities; 23, Construction; 31ND, Nondurable goods; 33DG, Durable goods; 42, Wholesale trade; 44, Retail trade; 48TW, Transportation and warehousing; 51, Information; 53, Real estate and rental and leasing; 54, Professional, scientific, and technical services; 55, Management of companies and enterprises; 56, Administrative and waste management services; 61, Educational services; 62, Health care and social assistance; 71, Arts, entertainment, and recreation; 72, Accommodation and food services; 81, Other services, except government.



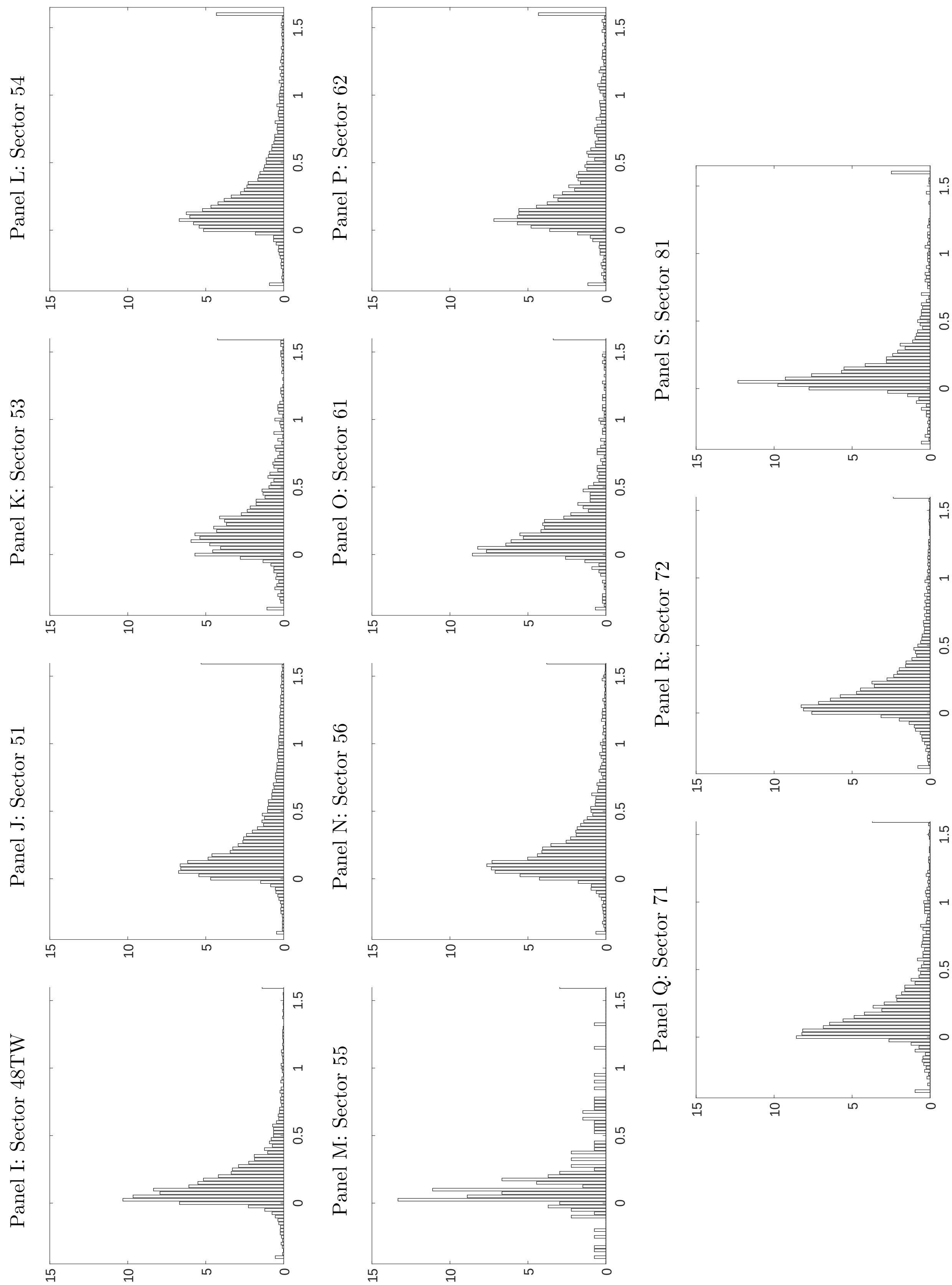

Panel I: Sector 48TW
Panel J: Sector 51
Panel K: Sector 53
Panel L: Sector 54
Panel M: Sector 55
Panel N: Sector 56
Panel O: Sector 61
Panel P: Sector 62
Panel Q: Sector 71
Panel R: Sector 72
Panel S: Sector 81
15
10
5
0
0
0.5
1
1.5

Figure S4 : Average Real Investment Shares by Real Investment Rate Rank by Decade, 1963–2020

For each decade, we include only firms with a complete coverage to obtain a balanced panel. For each firm in a given panel, we rank its real investment rates in the time series in the descending order. We calculate the fraction of the ranked real investment made in each year out of the sum of the absolute values of real investments. The figure shows the fractions averaged across all the firms in a given balanced panel. In each panel title, the first number is the number of firms, and the second number is the total investment share covered by the top two years.

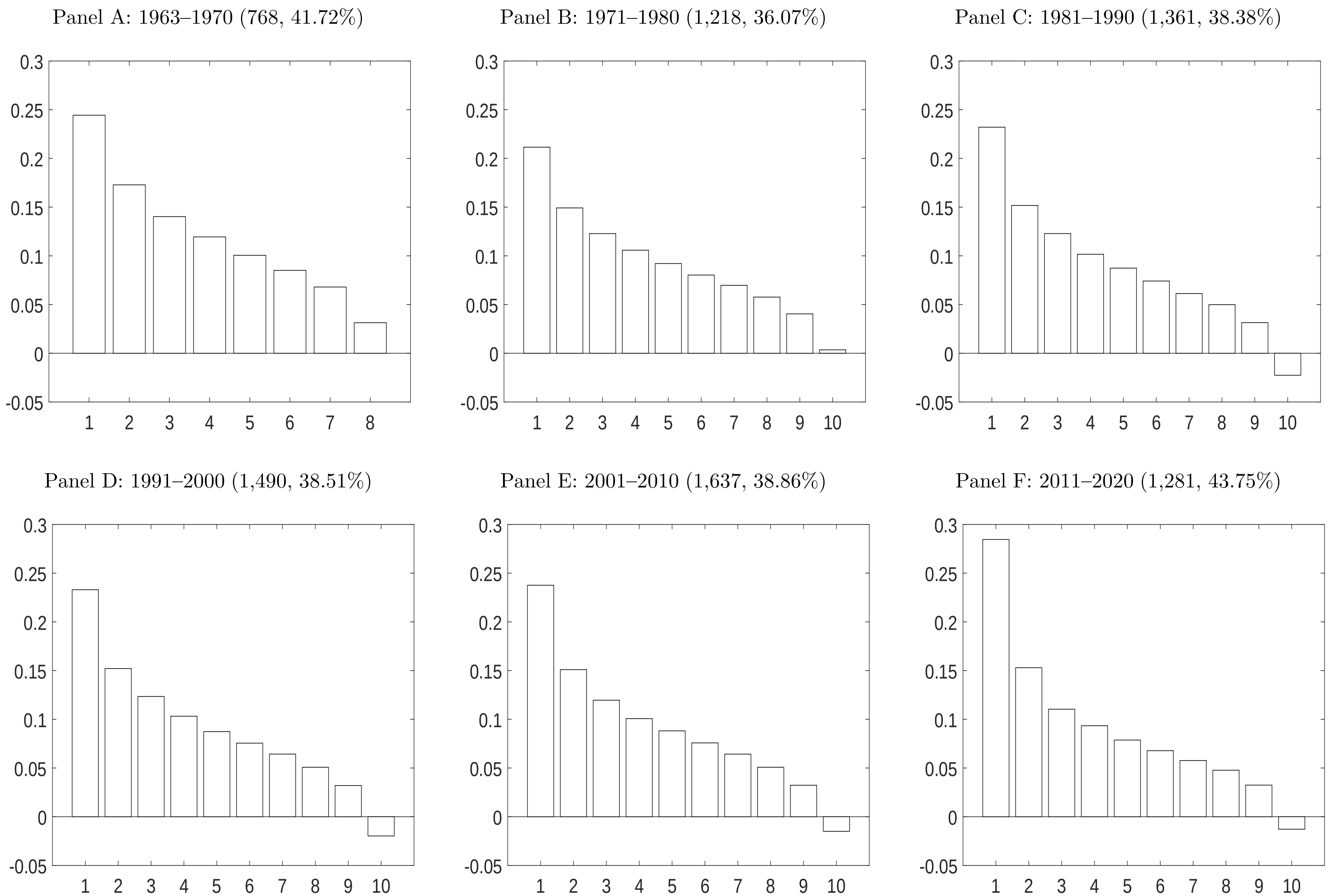
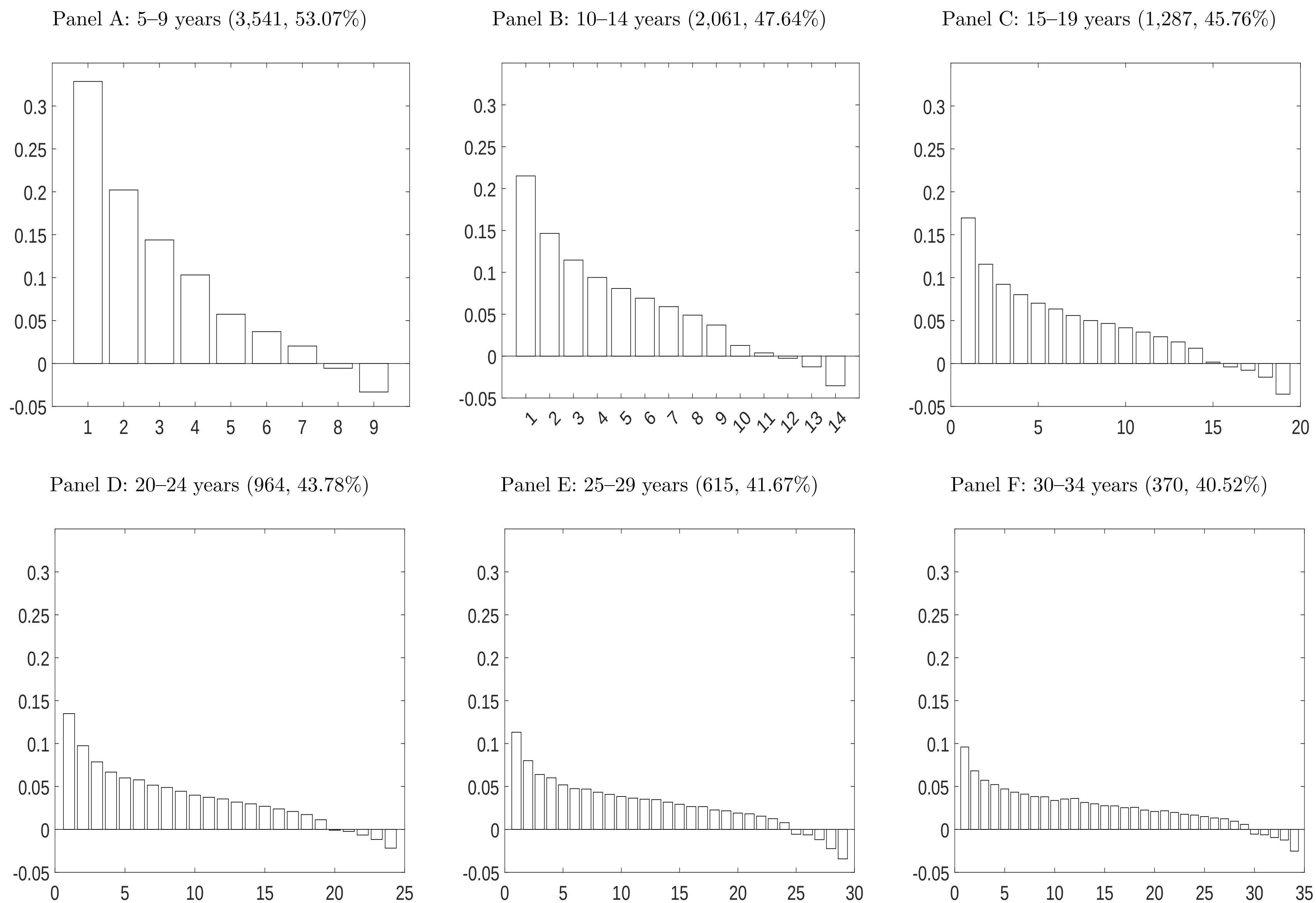
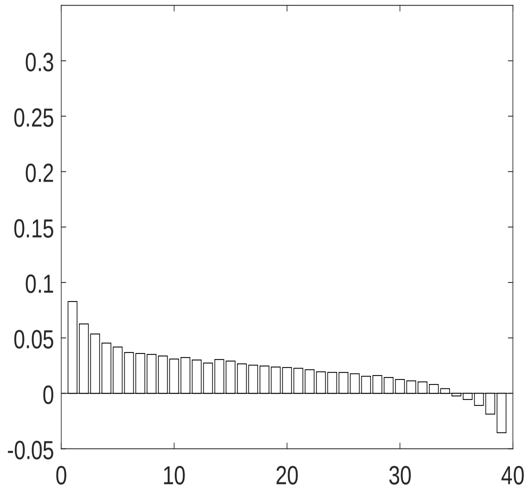


Figure S5 : Average Real Investment Shares by Real Investment Rate Rank by Firm Age, 1963–2020

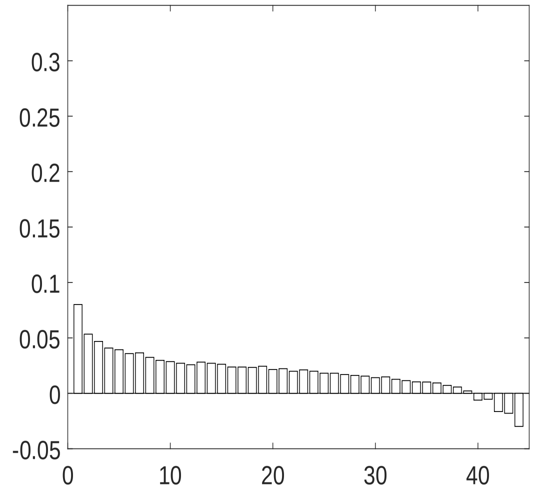
We split the sample into 11 groups based on firm age (the number of years for a given firm in Compustat): 5–9, 10–14, . . ., 55–58. We drop firms with fewer than five years of real investment rates. For each firm in a given group, we rank its real investment rates in the time series in the descending order. We calculate the fraction of the ranked real investment in each year out of the sum of the absolute values of investments in the time series. The figure shows the fractions averaged across all the firms in a given group. In each panel title, the first number is the maximum number of firms, and the second number is the total investment share covered by the top two years.



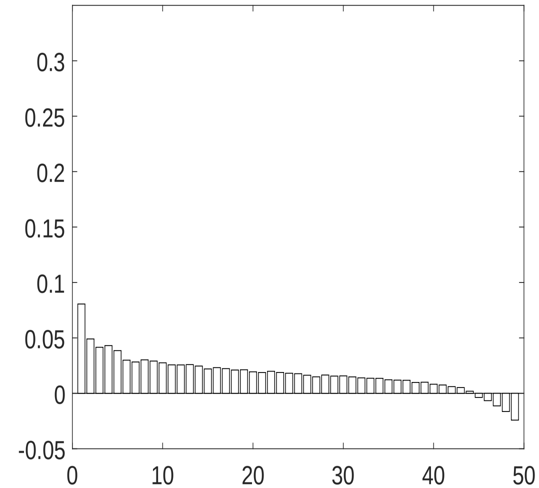
Panel G: 35–39 years (251, 39.39%)



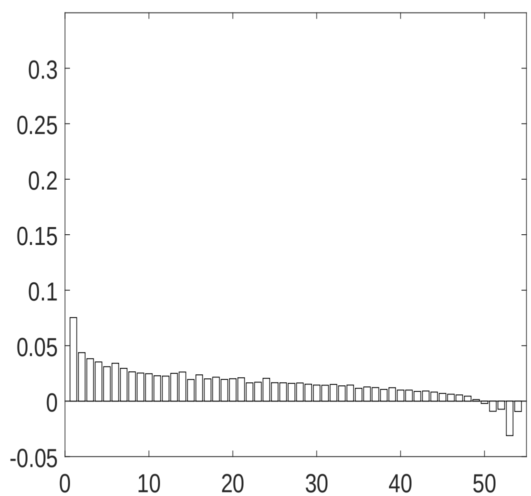
Panel H: 40–44 years (136, 39.5%)



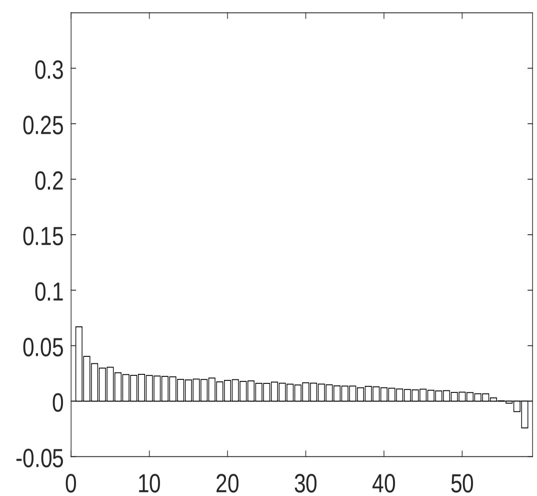
Panel I: 45–49 years (197, 39.78%)



Panel J: 50–54 years (90, 38.66%)



Panel K: 55–58 years (154, 36.65%)



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