The Present Value of Future Market Power*

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Abstract

We present a new log-linear identity that relates a firm's market value to future markups, output growth, discount rates, and investment in a present-value framework. Expected markups are a dominant contributor to variation in firm values and to the rise in the aggregate market value of U.S. public firms since the 1980s. The rise in aggregate *expected* markups is driven by reallocation of market share towards higher-markup firms, echoing results for *realized* markups. Expressing markups in terms of a forward-looking value component rather than realized markups reveals that this reallocation has recently been accelerated by mergers involving highly-valued, high-markup target firms. Expected markups are closely tied to expected fixed costs and investments, including investments in intangibles. We find a a negative time-series relationship between expected markups and discount rates rates, but a positive cross-sectional link to risk premia after accounting for other risk factors, thus reconciling risk-based arguments with theories tying the rise in market power to the fall in interest rates.

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1 Introduction

In recent decades, there has been a notable upsurge in firms' market power and valuations, accompanied by a decline in investors' required returns (i.e., firms' cost of capital), output growth, and corporate investments not only in the United States (U.S.) but also in other major economies.[1] Several economic theories proposing different mechanisms have been put forward to explain various combinations of these "secular" trends. However, we lack a unique explanation that integrates all five trends in a holistic manner. In this paper we show how the relation among these five trends can be explained in an empirical framework that exploits the forward-looking nature of asset prices.[2]

Our contribution is twofold. First, we derive a novel present-value identity that linearly decomposes firm value into four determinants: any variation in the log of market value over output (m) reflects changes in expected future log output growth (Δy), markups (μ), fixed costs and investments over output (fci), or returns (r),

$$m_{i,t} \approx k + \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \Delta y_{i,t+\tau} + \phi_1 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \mu_{i,t+\tau} - \phi_2 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t fci_{i,t+\tau} - \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t r_{i,t+\tau}, \quad (1)$$

where k, ρ, ϕ_1, and ϕ_2 are constant coefficients and i and t respectively index firm and time. We show the relation in (1) holds tight in the data. Second, we apply the identity (1) to data on U.S. public firms between 1960 and 2020 and establish five new empirical findings:

1. Expectations of long-run markups (measured following De Loecker et al. (2020)) are closely tied to long-run expectations of fixed costs and investment.

[1] De Loecker, Eekhout, and Unger (2020) and Autor, Dorn, Katz, Patterson, and Van Reenen (2020) document the rise in average market power measured by markup and product market concentration, respectively. Avdis and Wachter (2017) and Barkai (2020) document the decline in discount rates. The pattern in asset prices, output, and investment are documented in Gutiérrez and Philippon (2017) and Farhi and Gourio (2018) among several others.

[2] For instance, Caballero, Farhi, and Gourinchas (2017), Farhi and Gourio (2018), Liu, Mian, and Sufi (2022), and Gutiérrez, Jones, and Philippon (2021), among others.

2. Around one third of the rise in the aggregate market value of U.S. public firms between 1982 and 2020 can be attributed to the rise in expected future markups net of expected fixed costs and investments, and two-thirds to future markups when the offsetting effect of fixed costs or investments are ignored. Lower discount rates and higher expected long-run output growth account for around one third, each.

3. The upward trend in average markup expectations is largely driven by reallocation of market share towards firms with higher expected markups.

4. Shocks to expected markups ("markup news") are associated with lower subsequent discount rates. This negative correlation is particularly pronounced in the firm-level time series.

5. Firms with higher expected future markups earn higher average returns accounting for exposures to other potentially related drivers of risk premia.

The first result highlights not only the importance of markups for valuations but also the tight link between expected markups and expected fixed costs. When examining various industries, we uncover that a strong relation between expected markups and valuation ratios is closely associated with an offsetting relationship between valuation ratios and investments. This result is consistent with market power arising from and relying on investments in physical and/or intangible capital and implies that markups cannot be examined as a stand-alone variable when examining its impact on asset prices.

The second result highlight the importance of markups for understanding cross-firm differences in market values or time-series variation in aggregate stock prices. A common interpretation of the seminal findings by Campbell and Shiller (1988) is that asset price variation is predominantly driven by discount rates. Instead we find that the low-frequency trend in price-to-output ratios since the early 1980s has been predominantly cash-flow driven, with roughly equal shares attributable to topline growth and profitability.

The third result echoes a similar finding by De Loecker et al. (2020) in relation to current markups, rather than expected markup trajectories. Additionally, our results suggest that "exit" via mergers and acquisitions has been an important driver of this reallocation since the Great Recession. Compared to earlier merger waves, recent mergers have involved firms with higher-than-average expected markups. Firms exiting the market in the late 2010s exhibited above-average expected long-run markups, but their current markups were indistinguishable from that of the average firm in the same year. This discrepancy underscores a major conceptual insight provided by our present-value identity: financial market valuation ratios incorporate forward-looking information about a firm's trajectory of markups, which is not fully captured by the level of its current markup alone.

Our fourth result emerges from a decomposition of unexpected returns ("return news") following Campbell (1991) into news about future discount rates, markups, output growth, and fixed costs and investments. Markup news account for more than half of the variation in return news, almost purely via the cross section: some firms receive positive markup news and their valuations rise, while others are left behind. On the contrary, *within-firm* variation in unexpected returns has a negligible markup share and is predominantly driven by news about discount rates (60%) and output growth (34%). In general, we find that all cash-flow news components are negatively correlated with discount-rate news, consistent with results from different present-value decomposition analyses by Lochstoer and Tetlock (2020) and Cho, Kremens, Lee, and Polk (2023). For markups, this means that news of higher markups are associated with lower subsequent returns.

Taken at face value, the fourth finding appears to contradict theoretical and empirical arguments suggesting a positive relationship between market power and risk premia (e.g., Bustamante and Donangelo, 2017; Barrot, Loualiche, and Sauvagnat, 2019; Corhay, Kung, and Schmid, 2020;

Grotteria, 2023). Our fifth result overturns this naive conclusion. We evaluate the relation between expected markups and expected returns via more standard asset pricing tests that allow us to control for other well-established risk factors. We sort firms into quintile portfolios based on their VAR-implied, long-run markup expectations and compute the portfolio returns. We then regress the portfolio returns on commonly used risk factors. The long-short portfolio earns significantly *positive* excess returns after accounting for its exposure to other risk factors, including value, profitability, and investment factors. We conclude that markups are indeed positively associated with risk premia as predicted by the aforementioned theoretical work. More importantly, the same positive relation between markups and returns does not hold when we construct portfolios based on the *current* rather than *expected* markups, which again emphasizes that current markups fail to reflect predictable variation in markup trajectories.

Related literature. Our empirical exercise is closely related to the work of De Loecker et al. (2020), which documents the evolution of the firm-level markup distribution and notes that the rise in average markups is predominantly driven by market-share reallocation towards high-markup firms. In order to rigorously tie markups to asset prices, discount rates, growth, and investment, we extend the empirical description to long-run markup *expectations*. As such, we also contribute to the long and growing literature on rising market power and its macroeconomic implications.[3]

In spirit, our paper is related to the news-driven business cycle theories (e.g., Beaudry and Portier (2006)) that leverage the forward-looking information in stock prices to describe the shocks driving real business cycles and their lead-lag relationships with productivity, consumption, and investment. Similarly to Grullon, Larkin, and Michaely (2019), our focus on asset prices is aimed at studying market power and markups. In comparison to both papers, we embed our empirical exercise in a rigorous present-value framework. Our methodology builds on a long literature on

[3] See, e.g., Syverson (2019) and Basu (2019) and references therein.

present-value decompositions (e.g., Campbell and Shiller (1988), Campbell (1991), Vuolteenaho (2002), Cohen, Polk, and Vuolteenaho (2003)). Cho et al. (2023) further refine the Vuolteenaho-expression to distinguish between profitability and expansion as drivers of cash flows. Donangelo (2021) extends the present-value framework to labor-induced operating leverage.

Another strand of the macrofinance literature uses structural restrictions to relate asset prices to markups and discount rates (Farhi and Gourio, 2018; Crouzet and Eberly, 2019; Corhay, Kung, and Schmid, 2021). Other strands focus on factor shares (e.g., Karabarbounis and Neiman, 2013; Eggertsson, Robbins, and Wold, 2018; Greenwald, Lettau, and Ludvigson, 2019; Hartman-Glaser, Lustig, and Xiaolan, 2019; Barkai, 2020), concentration, and/or investment (Eisfeldt, Falato, and Xiaolan, 2021; Gutiérrez et al., 2021). Our decomposition features a term that aggregates fixed costs and capital expenditure, and thus neatly nests investments in physical capital and intangibles (Eisfeldt and Papanikolaou, 2014; Crouzet and Eberly, 2019, 2021).

Closer to the asset pricing literature, we use our forward-looking expressions of markups to assess the role of markups in firm-level risk premia. We find a positive cross-sectional relationship, consistent with theoretical arguments in Bustamante and Donangelo (2017), Barrot et al. (2019), Corhay et al. (2020), and Grotteria (2023). Our news decomposition instead points to a negative time-series relationship between overall discount rates and markups, consistent with Liu et al. (2022) and Dou, Ji, and Wu (2021).

2 Future Market Power in a Present-Value Relation

This section develops a loglinear decomposition of a firm's market value normalized by output (sales) into long-run expectations of its (i) future firm-level returns, (ii) firm-level output growth, (iii) markups, and (iv) fixed costs and investments in both physical and intangible capital. In particular, the relation implies a natural expression for the *present value* of future market power.

2.1 The firm

Without loss of generality, firm i at time t incurs variable cost VC_{it} and fixed cost FC_{it} to produce output (sales) Y_{it}. The firm uses operating profits (that is, $Y_{it} - VC_{it} - FC_{it}$) and net issuance of debt or equity ISS_{it} to finance investment I_{it} and cash distributions D_{it} to equity and debt holders:

$$I_{it} + D_{it} = (Y_{it} - VC_{it} - FC_{it}) + ISS_{it} \tag{2}$$

On the other hand, the time-t return to investors who owned a fraction of the firm's equity and debt at the end of time $t-1$ equals

$$1 + R_{it} = \frac{M_{it} - ISS_{it} + D_{it}}{M_{i,t-1}}, \tag{3}$$

where R_{it} is the value-weighted return on the firm's equity and debt and M_{it} is the market value of the firm's assets. Using equation (2) to rewrite equation (3) and rearranging,

$$M_{i,t-1} = \frac{M_{it} + Y_{it} - VC_{it} - FC_{it} - I_{it}}{1 + R_{it}}. \tag{4}$$

That is, the market value of the firm at time $t-1$ is the return-discounted value of time-t market value of the firm plus operating profits that are not used for investment. Any investment adjustment costs are assumed to be absorbed by the fixed cost or the investment term.

2.2 Variable cost and markup

To introduce markup, defined as the ratio of sales (output) price to marginal cost, we use the variable-cost-to-markup relation implied by firm's cost minimization (De Loecker and Warzynski (2012)):

$$\mu_{it} = \log\left(\theta_{it}\frac{Y_{it}}{VC_{it}}\right), \tag{5}$$

where μ_{it} is (log) markup and θ_{it} is the output elasticity of variable input. This relationship holds regardless of the firm's production technology, so long as the firm engages in cost minimization. Intuitively, holding sales price (Y/Q for quantity Q) fixed, markup is high if average variable cost (VC/Q) is low so that marginal cost is low for a fixed level of output or the elasticity θ is high so that a small increase in variable input generates a large increase in the quantity of output, which also implies a low marginal cost. Plugging equation (5) into equation (4), dividing both sides by output at time $t-1$, and rearranging,

$$\frac{M_{i,t-1}}{Y_{i,t-1}} = \frac{Y_{it}}{Y_{i,t-1}}\left(1+\frac{M_{it}}{Y_{it}}+\theta_{it}\exp\left(-\mu_{it}\right)+\frac{FCI_{it}}{Y_{it}}\right)\frac{1}{1+R_{it}}, \tag{6}$$

where $FCI_{it} \equiv FC_{it} + I_{it}$ combines fixed cost and investment.[4] The relation holds as an ex-post accounting identity.

2.3 Loglinear decomposition

Rewrite the exact nonlinear identity in equation (6) as

$$m_{i,t-1} = \Delta y_{it} + \log(1+\exp(m_{it})+\theta_{it}\exp(-\mu_{it})+\exp(fci_{it})) - r_{it}, \tag{7}$$

where $m_{it} \equiv \log\left(\frac{M_{it}}{Y_{it}}\right)$ is the log market value of the firm's assets scaled by output ("market-to-output"), $r_{it} = \log\left(1+R_{it}\right)$ is the log value-weighted return on the firm's equity and debt, Δy_{it} is the log growth rate of the firm's output, and $fci_{it} \equiv \log\left(\frac{FCI_{it}}{Y_{it}}\right)$ is log fixed cost and investment scaled by output. Equation (7) is equally valid whether we express Δy_{it} and r_{it} in real unit or nominal unit. For now, we choose to work with the nominal output growth and nominal rate of return.

[4]The fixed cost term includes expenses like R&D, advertising, and SG&A, which are often linked to investment in intangibles. Combining fixed costs and physical investments therefore has the interpretational benefit of treating investments in intangible and physical assets symmetrically. The combination further ensures that the *FCI* term is rarely negative, which delivers an additional practical benefit in the loglinear framework.

A multivariate first-order Taylor approximation of the nonlinear component of equation (7) around the long-run average values of the variables implies

$$m_{i,t-1} \approx \phi_0 + \rho m_{it} + \Delta y_{it} + \phi_1 \mu_{it} - \phi_2 fci_{it} - r_{it}, \tag{8}$$

where ρ is the Campbell and Shiller (1988) coefficient that is close to but less than one and the ϕ terms are coefficients that depend on the long-run average values of the variables.[5] Starting equation (8) at time t (rather than at $t-1$), iterating it forward, and imposing the transversality condition $\lim_{\tau\to\infty} \rho^{\tau} m_{i,\tau} = 0$ yields the long-run expression for a firm's log market-to-output ratio:

$$m_{i,t} \approx k + \sum_{\tau=1}^{\infty} \rho^{\tau-1} \Delta y_{i,t+\tau} + \phi_1 \sum_{\tau=1}^{\infty} \rho^{\tau-1} \mu_{i,t+\tau} - \phi_2 \sum_{\tau=1}^{\infty} \rho^{\tau-1} fci_{i,t+\tau} - \sum_{\tau=1}^{\infty} \rho^{\tau-1} r_{i,t+\tau}, \tag{9}$$

where k is a constant. A high market value compared to output means that one or more of the following is true about the firm: (i) future output growth is high; (ii) future markup is high; (iii) future fixed costs and investments are low; or (iv) future returns are low.

Since the firm value decomposition in equation (9) holds ex post, it also holds ex ante. We obtain an ex-ante version of equation (9) by taking a time-t expectation on both sides:

$$\begin{aligned} m_{i,t} \approx\ & k + \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \Delta y_{i,t+\tau} + \underbrace{\phi_1 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \mu_{i,t+\tau}}_{\text{“PV of future market power” (PVMP)}} - \phi_2 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t fci_{i,t+\tau} \\ & - \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t r_{i,t+\tau}, \end{aligned} \tag{10}$$

A firm's market value captures not its current market power (at least not directly) but the *present value* of future market power (PVMP). We define this term as the ρ-discounted sum of future log markups scaled by the ϕ_1 coefficient, which depends on the long-run average value of the

[5]See Appendix A for the exact derivation and the analytical expression for the coefficients.

output elasticity of variable input θ among other things. Importantly, the approximate relation in equation (10) holds with respect to any expectation—rational or irrational—that respects the accounting identity in equation (6).

3 Data and Specification

3.1 Data sources

We use data on U.S. firms whose stock is publicly traded between 1960 and 2020 from Compustat and the Center for Research in Security Prices (CRSP). We convert the monthly data from CRSP to annual frequency and merge them with annual accounting data from Compustat. When doing so, we aggregate the CRSP market equity variables at the firm level when firms issue multiple shares and correct for delisting using the approach suggested by Shumway (1997). All stocks are required to be domestically incorporated (CRSP share code of 10 or 11) and listed on one of the three major exchanges, exchange code 1 through 3 (i.e., NYSE, Nasdaq or AMEX). We exclude firms with missing market equity data in the current or previous month and with missing data for property, plant and equipment or selling, general and administrative expenses, as well as firms in the bottom decile of book asset value. We exclude financial firms defined as those with SIC codes between 6000 and 6999.

3.2 Variable construction

The market value of assets of firm i at time t is computed as the sum of the market value of equity and the book value of debt:

$$M_{it} = P_{it}N_{it} + Z_{it},$$

where P_{it} is the stock price, N_{it} the number of stock shares, and Z_{it} the book value of debt. This definition assumes that debt is issued and trades at par. While this omits variation in market prices of corporate debt, this assumption avoids difficulties in measuring firm market values of debt, particularly for non-bonds corporate debt. Since most corporate loans are floating rate, the par-assumption is relatively innocuous with respect to the effect of interest rate variation on debt values. For both floating- and fixed-rate debt, the effect of variation in firm-level credit spreads on returns is likely tamed by within-firm mean-reversion when considering long-run expected returns as we do in the last term in Equation (10). We define the weighted average return on the firm's securities as

$$1+R_{it} = \frac{(P_{it}+Div_{it})N_{i,t-1}+Z_{i,t-1}+INT_{it}}{P_{i,t-1}N_{i,t-1}+Z_{i,t-1}},$$

where Div_{it} is the stock's dividend per share and INT_{it} is total firm-level interest payments on debt.

We use the accounting information in Compustat to construct other firm-level variables. Output (Y_{it}) is measured by sales. Fixed cost and investment (FCI_{it}) is measured as the sum of the selling, general, and administrative expense (XSGA), avertising expense (XAD), research and development expense (XRD), depreciation and amortization (DP), and the change in property, plant, and equipment (PPEGT) from the previous year. The first four variables are assumed to be zero whenever they are missing in Compustat. We exclude observations with missing PPEGT.

We use markup estimated by De Loecker et al. (2020) using the firm-level production approach De Loecker and Warzynski (2012). This approach measures starts from the firm's first-order condition from conditional cost minimization to arrive at Equation (5). To measure the output elasticity θ, the baseline approach in De Loecker et al. (2020) estimates a parametric production function at the industry-year level. That is, the elasticity is potentially time-varying and allowed to differ by industry (two-digit NAICS).

3.3 The coefficients

We estimate the parameters $\rho = 0.98$, $\phi_1 = 0.05$, and $\phi_2 = 0.04$ from a WLS panel regression motivated by the approximate identity in equation (8):

$$m_{i,t-1} - \Delta y_{i,t} + r_{i,t} = \phi_0 + \rho m_{i,t} + \phi_1 \mu_{i,t} - \phi_2 fci_{i,t} + \varepsilon_{i,t}.$$

Figure 1 plots the fit of the firm-level approximation for Apple Inc. and Berkshire Hathaway Inc.. We find that our loglinear decomposition explains around 98% of the variation in the left-hand side on average.

3.4 The vector autoregression (VAR) model

Equation (9) is an accounting identity that decomposes the market-to-output ratio of the firm's total assets into its future average cost of capital, output growth, markup, and fixed cost and investment. We estimate the following parsimonious linear law of motion for the state vector at the individual firm level:

$$z_{i,t+1} = a + Bz_{i,t} + u_{i,t+1}. \tag{11}$$

Along with the variables featured in the identity, the state vector z_t includes additional state variables that help predict the identity variables.

Specifically $z_{i,t} = [r_{i,t}, \Delta y_{i,t}, \mu_{i,t}, fci_{i,t}, m_{i,t}, lev_{i,t}, inv_{i,t}, ag_{i,t}, ms_{i,t}]$, where the latter four variables denote, respectively, leverage, net investment, asset growth, and market share. We estimate the system using weighted-least-squares regressions that place equal weight on all years and weight according to the firms' market values within each year. The estimated coefficient matrix B is reported in Table 1.

As a sense check of the VAR-implied long-run expectations, we report regressions of ten-year ahead output growth, markups, and fci in Table 2. For the persistent variables μ and fci, we use their respective implied sums to predict their ten-year ahead realizations (μ_{t+10} and fci_{t+10}). For the more transitory cash-flow component output growth, we predict the ten-year log growth between t and $t+10$. In each case, the VAR-implied long-run expectations strongly predict the future realizations.

4 The Present Value of Future Market Power

4.1 Realized markups and expected future markups

An important point of our paper is that asset prices relate to expected future markups (i.e., present value of future market power or "PVMP") rather than realized markups. Having obtained the VAR-implied expected values of future markups, $(E_t\mu_{t+1}, E_t\mu_{t+2}, E_t\mu_{t+3}, \ldots)$, we obtain firm-level estimates of PVMP:

$$PVMP_{i,t} = \phi_1 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \mu_{i,t+\tau} \tag{12}$$

In the rest of the paper, we use expected future markups, present value of future market power, and PVMP interchangeably to refer to the same quantity in equation (12). We also obtain from the VAR the expected future values of fixed costs and investments (FCI), output growth, and returns.

We find that current markup is a strong predictor of both future markups and future FCIs such that PVMP and the discounted sum of future log FCIs are highly correlated (above 90%). This is high even considering that realized markup and realized log FCI have a contemporaneous correlation of 72%. Hence, market power and FCI must be considered jointly when analyzing how they relate to asset prices and returns. We return to this point at the end of the next subsection with an industry-level analysis.

4.2 Firm-level panel variation in market values and expected markups

Next, we use the VAR results from the previous section for a variance decomposition of firm-level market value-to-output ratios. The VAR estimates the discounted, infinite-horizon sums of returns, output growth, markups, and fixed costs/investment, that is, the terms on the right-hand side of the present-value identity (9). Taking a covariance of each side of (9) with $m_{i,t}$ and dividing by its variance, we obtain:

$$
\begin{aligned}
1 = & \frac{cov\left(\sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \Delta y_{i,t+\tau}, m_{i,t}\right)}{var\left(m_{i,t}\right)} + \frac{cov\left(\phi_1 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \mu_{i,t+\tau}\right)}{var\left(m_{i,t}\right)} \\
& - \frac{cov\left(\phi_2 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t fci_{i,t+\tau}\right)}{var\left(m_{i,t}\right)} - \frac{cov\left(\sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t r_{i,t+\tau}\right)}{var\left(m_{i,t}\right)}
\end{aligned}
$$

Each of the right-hand side terms is an OLS-coefficient from a univariate regression on $m_{i,t}$ that attributes fractions of market value-to-output variation across firms and years to expected long-run (i) output growth, (ii) markups, (iii) fixed costs, and (iv) discount rates. Table 3 reports the results.

Variation in expected markups accounts for around 70% of market value-to-output variation. Sales growth and fixed costs/investment each account for around half, but in offsetting directions. Discount rates account for slightly more than one fifth, with the rest attributed to the cumulative approximation error.

Panel B reports the same decomposition for cross-sectional variation, with almost identical results. That is, most of the panel variation in firm-level valuations is driven by differences across firms. This cross-sectional variation is largely intra- rather than inter-industry: Panel C reports the results with industry-year fixed effects and reaches broadly the same results as the year fixed effects in Panel B.

Focusing instead on time-series variation within firm (Panel D), the discount rate share rises to

39% while the markup share falls to 51% and the FCI-share shrinks to −37%. The smaller share of expected future markups in within-firm variation is reminiscent of the finding by De Loecker et al. (2020) that *current* markups have barely changed for the median firm and the rise in aggregate markups is driven by the interaction of widening cross-firm dispersion and reallocation of market share towards high-markup firms.

We repeat the cross-sectional decomposition by industry, using two-digit NAICS codes. Figure 2 plots the markup share against the fci share by industry: industries in which expected markups drive a large share of variation are also those in which fixed costs account for a larger, offsetting share. Valuation differences in industries like manufacturing (NAICS code 32, including chemicals and pharmaceuticals), Information (51, including software and media), or Professional Services (54) are predominantly driven by the markup-fci trade-off; valuations in industries like Transportation and Warehousing (49) and Finance & Insurance (52) are less correlated with these two components and accordingly driven more by differences in topline output growth and firm-level discount rates. Expected markups are highly correlated across both time and firms with expected fixed costs. The core result from the exercises in Table 3 and Figure 2 is that valuations are highly sensitive to the firm-level trade-off between markups and investments.

4.3 Aggregate time-series variation in asset prices and expected markups

We now translate the firm-level results into a decomposition of the aggregate time series. To this end, we decompose the output-weighted market value-to-output ratio into output-weighted expected markups, expected output growth, expected fci, and expected discount rates.[6] Figure 3 plots this decomposition year-by-year.

The aggregate market value-to-output has risen sharply between 1982 and 2000, and then again

[6]The aggregate M/Y ratio is the output-weighted average of firm-level M/Y. Since the linear decomposition is in logs, we exponentiate the variables in the loglinear identity, take the output-weighted average, and then take logs.

between 2010 and 2020. The concurrent fall in discount rates accounts for around one third of the 1982-2020 rise, an increase in expected output growth contributes another third.[7] The markup-fixed cost trade-off accounts for the remaining third with a rise in expected markups around twice as large as the partially offsetting rise in expected fixed costs.

Valuations positively predict markups, so it is no surprise that the upward trend in market value-to-output is associated with an upward trend in not only current markups (De Loecker et al., 2020) but also expected long-run markups. Compared to long-run output growth, FCI, and discount rates, however, expected markups are less cyclical. VAR-implied markup expectations fall only modestly between the height of the dotcom bubble and the end of the Great Recession, compared to the fall in output growth and FCI (which includes capital expenditure) and the rise in discount rates.

Given the concurrent rise in valuations and markup expectations, and the finding in De Loecker et al. (2020) that the aggregate markup has risen predominantly due to a reallocation of market share to high-markup firms, we conduct a similar time-series decomposition of the aggregate market value-to-output ratio, and the output-weighted long-run markup expectations into (i) a within-firm component, (ii) a reallocation component, (iii) and entry component, and (iv) an exit compo-

[7] The contribution of discount rates to variation in aggregate valuations appears low in comparison to previous findings and received wisdom (e.g., Campbell and Shiller, 1988). We note three potential reasons for this: (i) Frequency: the VAR is estimated on annual data and therefore excludes intra-year variation compared to the monthly estimation in Campbell and Shiller (1988). The cited numbers further refer to the trough-to-peak variation from 1982 to 2020 and therefore also exclude inter-year variation around the global financial crisis and Great Recession. (ii) Choice of valuation ratio: using market value-to-output implies that the cash-flow component is made up of output growth and markups net of fixed costs. Like dividend growth, output growth is largely unpredictable; markups and fixed costs are not, leading to better predictability of variation in overall cash flows. (iii) Firm-level VAR: we estimate the VAR at the firm-level and then aggregate, thus using additional information from the cross section to predict the relevant state variables. Lochstoer and Tetlock (2020) point out that the results for portfolios may differ depending on whether the underlying VAR is estimated at the firm- or portfolio level.

nent.

$$\Delta x_t = \underbrace{\sum_i w_{i,t-1}\Delta x_{i,t}}_{\Delta\text{within}} + \underbrace{\underbrace{\sum_i \Delta w_{i,t}\tilde{x}_{i,t}}_{\Delta\text{market share}} + \underbrace{\sum_i \Delta w_{i,t}\Delta x_{i,t}}_{\Delta\text{cross term}}}_{\Delta\text{reallocation}} + \underbrace{\sum_{i\in\text{Entry}} w_{i,t}\tilde{x}_{i,t} - \sum_{i\in\text{Exit}} w_{i,t-1}\tilde{x}_{i,t-1}}_{\text{net entry}} \tag{13}$$

where $\tilde{x}_{i,t} = x_{i,t} - x_{t-1}$, $\tilde{x}_{i,t-1} = x_{i,t-1} - x_{t-1}$, and $x = \{M/Y, \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \mu_{i,t+\tau}\}$. Figure 4 plots this decomposition, mirroring the decomposition of aggregate *current* markups in Figure IV of De Loecker et al. (2020), but separating the net-entry component into entry and exit.

Panel A shows that within-firm increases in market value-to-output and reallocation of market share towards higher market value-to-output firm have contributed evenly to the rise in aggregate market value-to-output since 1980, with reallocation occurring steadily in contrast to the cyclical within-firm movements in valuation. Entry and exit both contribute positively, meaning newly listed firms tend to have higher-than-average valuations and vice versa for delisted firms. We note, however, that the effect of entry and exit occur predominantly in the late 1990s and early 2000s.[8]

Panel B shows a similar decomposition for the output-weighted, VAR-implied, long-run markups: most of the rise in the aggregate is driven by reallocation. Within-firm markup expectations rise more modestly. Entry plays close to no role despite newly listed firms having higher-than-average markup expectations, as their output-share in the aggregate is negligible. Exit drives up aggregate markup expectations in the late 1990s and early 2000s, when delisting firms have lower-than-average markup expectations. During that time, their average output-weight is around half that of non-exiting firms. In the years 2014 through 2020, however, exiting firms were slightly larger by

[8] Some of the most valuable firms by market cap as of 2023 have IPOed in that time frame, including Amazon (1997), NVIDIA (1999), Salesforce (2004), and Google (2004).

sales than during the earlier period ($>80\%$ of the sales of non-exiting firms), and had substantially higher-than-average markup expectations. The latter observation is consistent with more than 70% of delistings since 2014 occurring in the context of mergers rather than liquidations, versus a more even split (57% mergers) during the years of the dotcom bubble. The large merger-share of the exit component is also mirrored in the steep rise in the reallocation component: acquiring firms with high markup expectations see a rise in their output weight as a result of acquiring relatively large target firms.

5 Asset Returns and Expected Future Markups

Following the decomposition of valuation levels, we now turn to returns. The present-value framework implies a decomposition of "return news" (i.e., unexpected returns) à la Campbell (1991) and Vuolteenaho (2002). Additionally, a growing literature in asset pricing has sought to link competition and market power to differences in risk premia (i.e., expected returns).[9] We address both dimensions of return variation in turn.

5.1 Sources of asset return shocks

To analyze the sources of unexpected asset return shocks or "news," we follow Campbell (1991) to transform the identity in equation (10) into the following news decomposition:

$$r_{i,t+1} - E_t r_{i,t+1} \approx N_{\Delta y,i,t+1} + N_{\mu,i,t+1} - N_{fci,i,t+1} - N_{DR,i,t+1} \tag{14}$$

where

$$N_{\Delta y,i,t+1} \equiv (E_{t+1} - E_t) \sum_{\tau=1}^{\infty} \rho^{\tau-1} \Delta y_{i,t+\tau}$$

[9] See, e.g., Bustamante and Donangelo (2017); Barrot et al. (2019); Corhay et al. (2020); Corhay, Li, and Tong (2022); Grotteria (2023).

$$N_{\mu,i,t+1} \equiv \phi_1 \left(E_{t+1} - E_t\right) \sum_{\tau=1}^{\infty} \rho^{\tau-1} \mu_{i,t+\tau}$$

$$N_{fci,i,t+1} \equiv \phi_2 \left(E_{t+1} - E_t\right) \sum_{\tau=1}^{\infty} \rho^{\tau-1} fci_{i,t+\tau}$$

$$N_{DR,i,t+1} \equiv \left(E_{t+1} - E_t\right) \sum_{\tau=0}^{\infty} \rho^{\tau} r_{i,t+\tau}$$

are the news terms. A positive asset return shock today implies a combination of (i) positive news about expected output growth ($N_{\Delta y}$), (ii) positive news about expected markups (N_{μ}), (iii) news about lower expected future fixed costs and investments (N_{fci}), and (iv) news about lower future discount rates (N_{DR}). Like the expected discounted sums of infinite horizon variables, their news can be extracted directly from the VAR.

Table 4 reports their covariance matrix as well as their contribution to overall return news. All four news terms are similarly volatile with annual standard deviations between 10% and 15%, which translate into contributions of around 25% (N_{fci}) to 50% (N_{μ}) to total return-news variance, meaning markup news are the largest contributor to unexpected returns. Most of this contribution comes from cross-sectional variation. Within-firm variation in markup news is much less volatile and accounts for under 3% of within-firm return news. Discount-rate news, on the other hand, are predominantly driven by the time series and account for 60% of within-firm return news.

All three cash-flow news components are negatively correlated with discount-rate news, that is, a rise in discount rates is associated with a fall in expected markups, expected output growth, and expected fixed costs and investments. These correlations are negative in the cross section and the time series, but more pronounced in the time series for markups and fixed costs. This finding supports arguments that link the rise market power and the fall in interest rates. Liu et al. (2022), for instance argue that lower interest rates lead to an asymmetric investment response that favors large firms and leads to increases in concentration. Dou et al. (2021) argue that lower discount rates raise the benefits of long-term gains from collusion and generate market power in this way. Gutiérrez et al. (2021) argue instead that market power lowers investment incentives and thereby contributes to a fall in equilibrium interest rates. Since the VAR does not extract structural shocks, our results are ill-suited to distinguish between these different channels.

Instead, the time-series correlation of sales-growth news and discount-rate news is close to zero, meaning a fall in economy-wide discount rates is not strongly associated with firm-by-firm output growth.

The negative cross-sectional correlation between markup news and discount-rate news suggests that higher markups are, on average, associated with lower risk premia. However, markup news are also associated with news about other characteristics—higher expected output growth and higher fixed cost and investment, for instance—which may be associated with risk premia. We therefore turn to more targeted asset pricing tests to assess the empirical link between expected markups and expected returns.

5.2 Expected stock returns and expected future market power

We form quintile portfolios based on VAR-implied expected markups. To avoid look-ahead bias, we estimate the VAR over the first half of our sample (1960-1990) and use the estimated coefficients to compute expected markups at the firm-level over the second half (1990-2020). We then compute abnormal returns of the five markup portfolios relative to the five-factor model of Fama and French (2015). The resulting alphas are therefore net of exposures to market risk and risk premia related to size, book-to-market, profitability, and investment. Controlling for the latter three is particularly important in this context. Expected markups are a function of the VAR state variables and these include a valuation ratio (market value-to-output) and variables closely related to profitability (μ) and investment (fci).

Panel A of Figure 5 reports the results: the top quintile portfolio (highest expected markups) has significantly higher average returns than can be explained by its exposure to the other factors. The bottom quintile, instead, has significantly lower returns compared to both the prediction of the five-factor model and to the alphas of the top quintile. Alphas are negative for quintiles two and three and positive for quintile four, but not statistically distinguishable from zero. These results suggest that expectations of long-run markups are *positively* associated with risk premia, thus overturning the na ive interpretation based on the negative news correlation.

For comparison, Panel B reports the same alphas from a portfolio sort based on *current* markups. Markups are persistent so the VAR implied markups are positively correlated with current markups. This manifests itself in a substantial overlap in the top quintiles by expected and current markups respectively. The top quintile portfolios have almost identical alphas. The other end of the distribution, however, looks decidedly different. The point estimate for the alpha of the bottom quintile by current markups is positive, such that the returns of a long-short portfolio based on current markups do not significantly deviate from the predictions of the five-factor model. This discrepancy highlights the value of considering markups through a more forward-looking lens that makes use of information in asset prices and other state variables to assess the predictable long-run development of firm-level markups.

Table 5 further reports the factor loadings of the markup-sorted portfolios. It is particularly interesting to note that the long-short portfolio sorted on VAR-implied long-run markups does *not* load positively on the profitability factor (RMW). A common criticism of the markup estimation by De Loecker et al. (2020) is that the resulting markups are highly correlated with various measures of profitability. Our test shows that the positive association of markup expectations and risk premia is not a repackaging of the known profitability premium.

6 Conclusion

We derive a present-value identity in the spirit of Campbell and Shiller (1988) that linearly decomposes firm-level market value relative to output into long-run expectations about future (i) output growth, (ii) markups, (iii) fixed cost and investments, and (iv) discount rates. The present-value framework allows us to study the empirical relationships of secular trends in these variables in a holistic and model-free way.

We find that markup expectations (which we term the present value of future market power, or PVMP) account for more than two thirds of variation in valuation ratios. Markup expectations are strongly correlated with expected fixed costs and investments, but these only partially offset the PVMP in current valuations. Output growth and discount rates each account for slightly more than one third of the variation.

Accordingly, the PVMP has been the leading driver of the rise in aggregate corporate valuations since the 1980s, largely driven by a reallocation of output towards firms with a higher PVMP. Shocks to the PVMP are negatively correlated with discount rates, particularly in the time series, but firms with higher PVMP earn higher stock returns once accounting for exposures to other risk factors.

A Derivation

A multivariate Taylor approximation of equation (7) around the long-run average values implies

$$m_{i,t-1} \approx \phi_0 + \rho m_{it} + \phi_1 \mu_{it} - \phi_2 fci_{it} + \Delta y_{it} - r_{it} + \phi_3 \theta_{it}$$

where

$$\phi_0 = 1 + \exp\left(\overline{m}\right) + \left(1 - \overline{\theta}\right)\exp\left(-\overline{\mu}\right) + \exp\left(\overline{fci}\right) - \rho\overline{m} - \phi_1\overline{\mu} + \phi_2\overline{fci} - \phi_3\overline{\theta}$$

$$\rho = \frac{\exp\left(\overline{m}\right)}{1 + \exp\left(\overline{m}\right) + \left(1 - \overline{\theta}\right)\exp\left(-\overline{\mu}\right) + \exp\left(\overline{fci}\right)}$$

$$\phi_1 = \frac{\overline{\theta}\exp\left(-\overline{\mu}\right)}{1 + \exp\left(\overline{m}\right) + \left(1 - \overline{\theta}\right)\exp\left(-\overline{\mu}\right) + \exp\left(\overline{fci}\right)}$$

$$\implies \rho^{-1}\phi_1 = \frac{\overline{\theta}\exp\left(-\overline{\mu}\right)}{\exp\left(\overline{m}\right)}$$

$$\phi_2 = \frac{\exp\left(\overline{fci}\right)}{1 + \exp\left(\overline{m}\right) + \left(1 - \overline{\theta}\right)\exp\left(-\overline{\mu}\right) + \exp\left(\overline{fci}\right)}$$

$$\implies \rho^{-1}\phi_2 = \frac{\exp\left(\overline{fci}\right)}{\exp\left(\overline{m}\right)}$$

$$\phi_3 = \frac{\exp\left(-\overline{\mu}\right)}{1 + \exp\left(\overline{m}\right) + \left(1 - \overline{\theta}\right)\exp\left(-\overline{\mu}\right) + \exp\left(\overline{fci}\right)}$$

$$\implies \phi_1^{-1}\phi_3 = \frac{1}{\overline{\theta}}$$

We then drop $\phi_3\left(\theta_{it} - \overline{\theta}\right)$ into the approximation error to obtain equation (8).

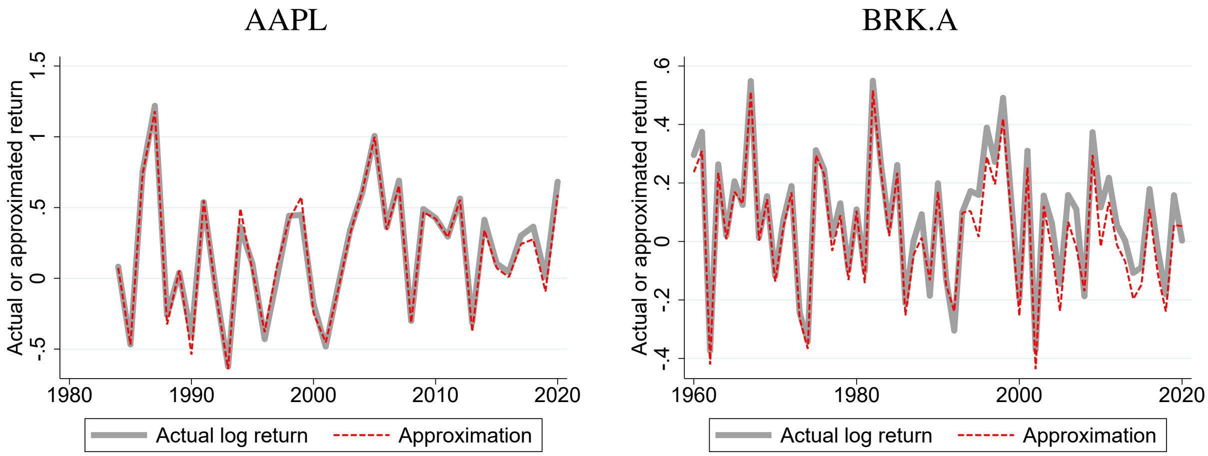
We verify that ρ is the Campbell-Shiller parameter of around 0.96–0.98:

$$\rho = \frac{\exp\left(\overline{m}\right)}{1+\exp\left(\overline{m}\right)+\left(1-\overline{\theta}\right)\exp\left(-\overline{\mu}\right)+\exp\left(\overline{fci}\right)} = \overline{\frac{M_{it}}{M_{it}+D_{it}}}$$

But our ρ is probably slightly larger than one in Campbell-Shiller because it is for the firm's assets rather than equity only. Furthermore, ordinary ρ is for the ratio $\frac{P_t}{P_t+DPS_t}$ but ours is like the ratio $\frac{N_tP_t}{N_tP_t+N_{t-1}DPS_t} = \frac{P_t}{P_t+\frac{N_{t-1}}{N_t}DPS_t}$. Hence, if the number of shares rises in the steady state, this would tend to raise the value of ρ.

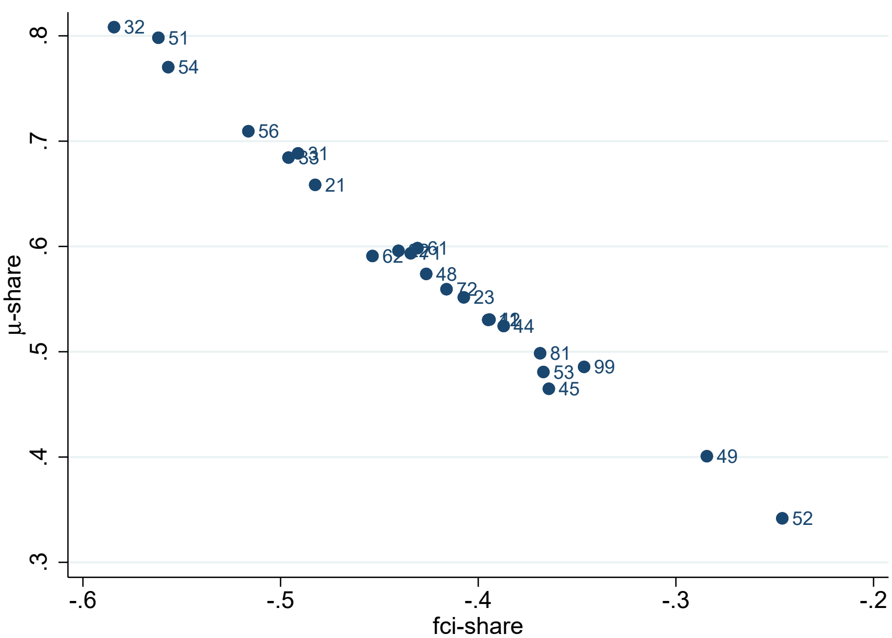
B Tables and Figures

Figure 1: Approximate identity (firm-level fit)



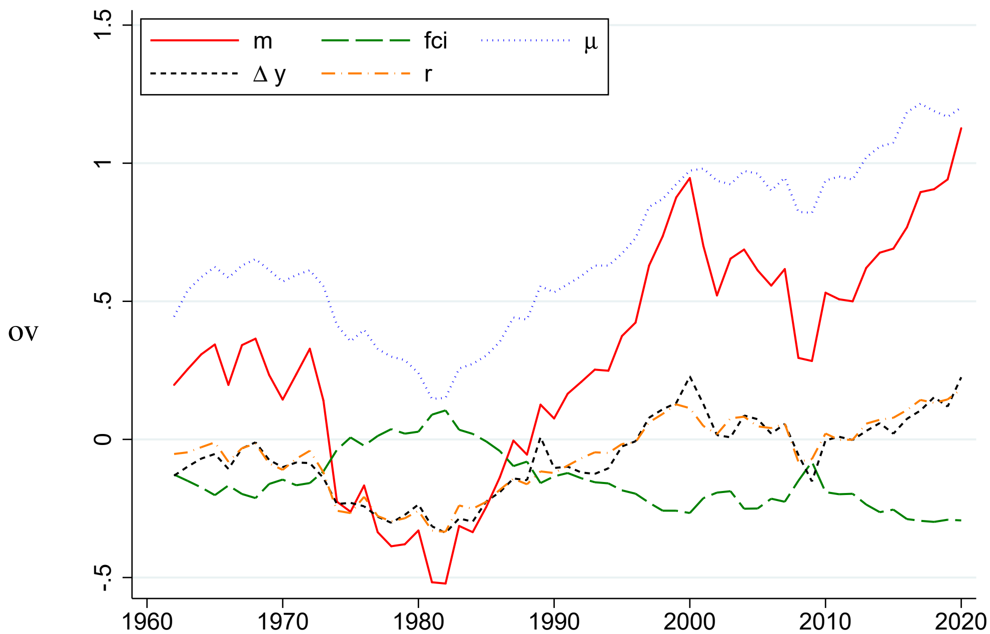
Notes: This figure plots the realized returns of Apple Inc. and Berkshire Hathaway Inc. against returns obtained from the approximate identity (8).

Figure 2: Markup- and fci shares in intra-industry PY variation (by 2-digit NAICS)



Notes: This figure plots the shares of VAR-implied fci- and μ-expectations in cross-sectional intra-industry variation in market value-to-output ratios. Markers indicated two-digit NAICS codes.

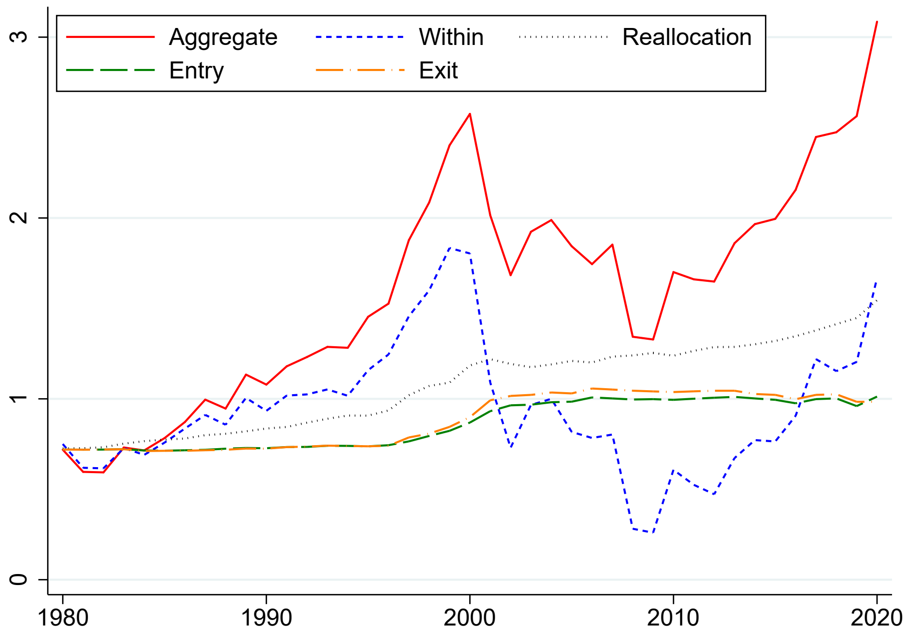
Figure 3: Decomposition of aggregate market value-to-output over time



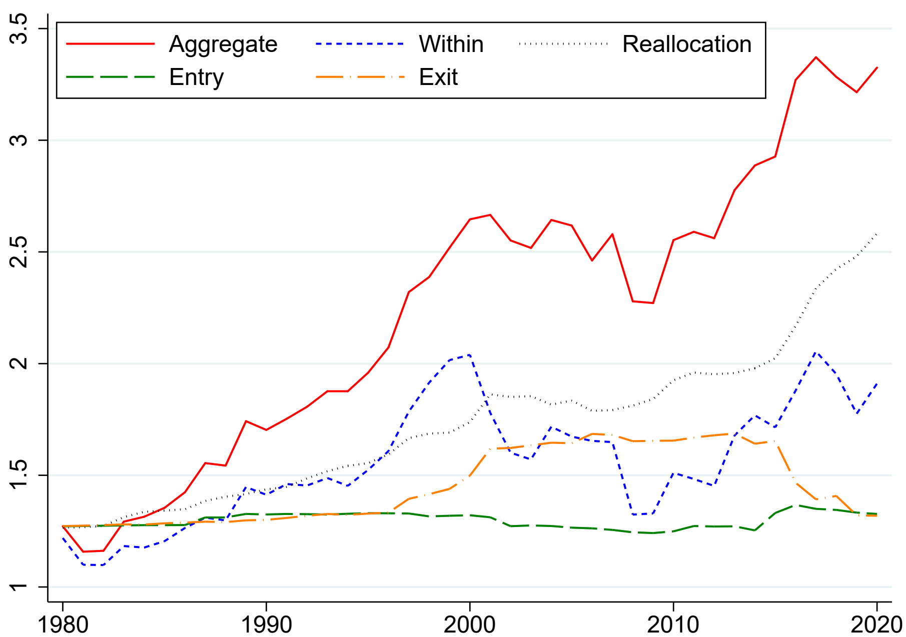
Notes: This figure plots the aggregate log value to output ratio and its VAR-implied decomposition into expected markups, output growth, discount rates, and fci. We aggregate by exponentiating the firm-level components of the loglinear identity, then computing an output-weighted average before taking logs.

Figure 4: Drivers of aggregate market value-to-output and sales-weighted expected markups over time

Panel A: Aggregate value-to-output ratio



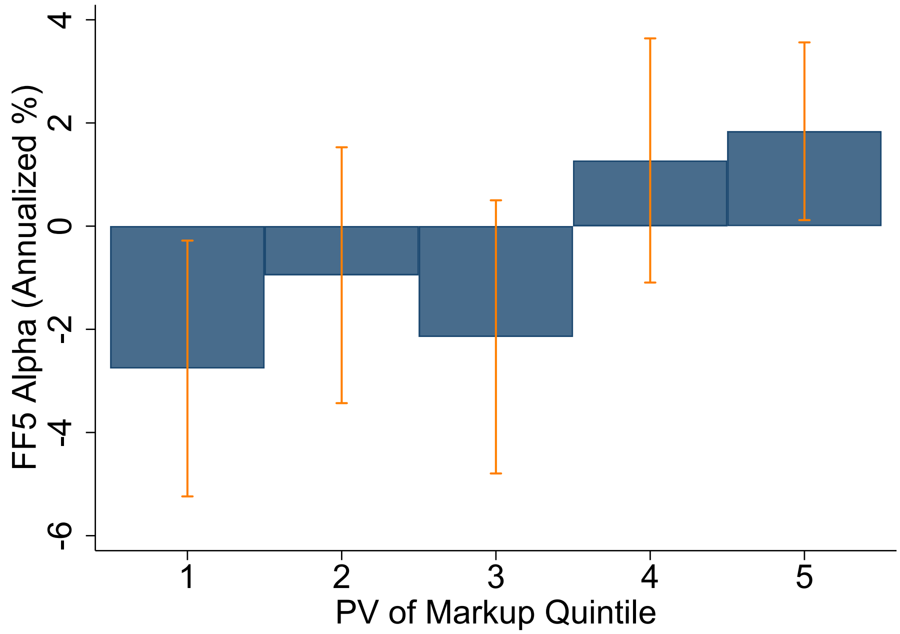
Panel B: Output-weighted PVMP



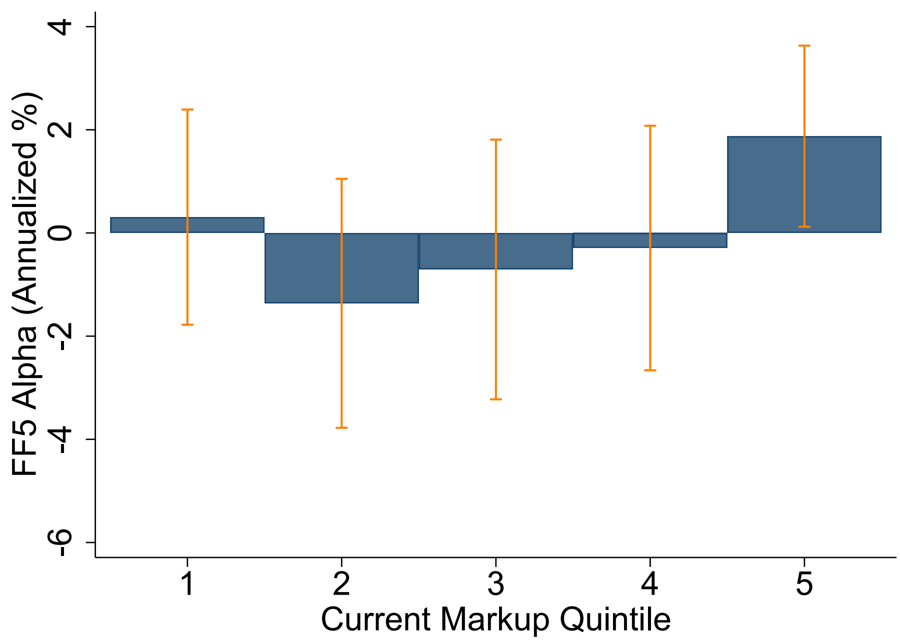
Notes: This figure plots the aggregate value-to-output ratio (Panel A) and the output-weighted average of the exponentiated PVMP, each decomposed following Equation (13).

Figure 5: Five-factor alphas of markup-sorted portfolios

Panel A: Quintiles by VAR-implied long-run markup expectations (PVMP)



Panel B: Quintiles by current markup (μ)



Notes: This figure plots the five-factor (Fama and French, 2015) alphas of quintile portfolios sorted on PVMP (Panel A) and current markups (Panel B). Alphas are estimated between 1990 and 2020, and PVMP based on a VAR matrix estimated from 1960-2020.

Table 1: **Baseline VAR: Coefficient matrix B.**

	r_{t-1}	Δy_{t-1}	fci_{t-1}	m_{t-1}	μ_{t-1}	lev_{t-1}	inv_{t-1}	ag_{t-1}	ms_{t-1}	R^2
r_t	-0.039	-0.026	-0.026	-0.040	0.071	-0.001	-0.058	-0.062	-0.006	0.035
	(0.056)	(0.056)	(0.013)	(0.014)	(0.031)	(0.062)	(0.154)	(0.024)	(0.023)	
Δy_t	0.069	0.174	0.063	0.021	-0.074	-0.045	0.197	0.022	-0.041	0.202
	(0.022)	(0.037)	(0.009)	(0.006)	(0.013)	(0.020)	(0.059)	(0.026)	(0.005)	
fci_t	-0.089	-0.248	0.461	0.029	0.537	-0.031	1.096	-0.235	-0.154	0.657
	(0.041)	(0.072)	(0.030)	(0.022)	(0.055)	(0.096)	(0.305)	(0.123)	(0.065)	
m_t	-0.105	-0.141	-0.062	0.942	0.117	0.048	-0.134	-0.091	0.031	0.907
	(0.056)	(0.060)	(0.018)	(0.016)	(0.037)	(0.058)	(0.207)	(0.037)	(0.025)	
μ_t	-0.006	-0.021	-0.007	0.027	0.955	0.004	0.174	-0.013	0.001	0.947
	(0.036)	(0.009)	(0.006)	(0.009)	(0.011)	(0.008)	(0.172)	(0.008)	(0.007)	
lev_t	-0.012	-0.004	-0.003	-0.003	0.005	0.910	0.038	0.003	0.006	0.861
	(0.010)	(0.005)	(0.004)	(0.003)	(0.004)	(0.034)	(0.049)	(0.005)	(0.004)	
inv_t	0.002	0.045	0.002	0.008	-0.015	-0.020	0.634	-0.022	0.006	0.466
	(0.004)	(0.011)	(0.003)	(0.006)	(0.006)	(0.005)	(0.039)	(0.013)	(0.012)	
ag_t	0.061	0.159	0.073	0.017	-0.062	0.114	0.194	-0.034	-0.048	0.070
	(0.028)	(0.023)	(0.015)	(0.007)	(0.025)	(0.175)	(0.092)	(0.016)	(0.023)	
ms_t	0.013	0.011	0.001	0.001	0.002	0.004	-0.043	0.004	0.989	0.984
	(0.010)	(0.003)	(0.001)	(0.002)	(0.004)	(0.004)	(0.026)	(0.004)	(0.009)	

Notes: The table reports the parameter estimates for the baseline VAR. The state vector is $z_{i,t} = [r_{i,t}, \Delta y_{i,t}, \mu_{i,t}, fci_{i,t}, m_{i,t}, lev_{i,t}, inv_{i,t}, ag_{i,t}, ms_{i,t}]$, denoting, respectively, the firm's weighted average return, output growth, markup, fixed cost and investment scaled by sales, leverage $\log(1 + Z_{i,t}/A_t)$, net investment over assets $\log\left(1 + \frac{capx_{i,t} - dep_{i,t}}{A_{i,t-1}}\right)$, asset growth $\log(A_{i,t}/A_{i,t-1})$, and market share (firm sales relative to industry sales). For each coefficient estimate, we report standard errors in parentheses, double-clustered at the year-firm level. Data are from 1960 through 2020.

Table 2: **Long-run predictions**

	$\Delta y_{t \to t+10}$	μ_{t+10}	fci_{t+10}
$\sum_{j=1}^{\infty} \rho^j \hat{E}_t \left[x_{t+j}\right]$	0.450	0.748	1.398
	(0.078)	(0.024)	(0.082)
m_t	-0.005	-0.270	-0.327
	(0.033)	(0.017)	(0.042)
Observations	18064	18064	18064
R^2	0.072	0.690	0.394

Notes: This table reports the results from forecasting regressions of 10-year output growth and ten-year ahead markups and fci on the VAR-implied long-run expectations of output growth, markups, and fci. Standard errors in parentheses are double-clusterd by firm and year.

Table 3: **Variance decomposition of the valuation ratio**

	$\sum_{j=1}^{\infty} \rho^j \hat{E}_t \left[x_{t+j}\right]$			
	r	$\hat{\phi}_1 \mu$	Δy	$\hat{\phi}_2 fci$
Panel A: Panel variation (no fixed effects)				
m_t	0.341	0.713	0.371	-0.512
	(0.007)	(0.024)	(0.007)	(0.017)
Panel B: Cross-sectional variation (year fixed effects)				
m_t	0.339	0.729	0.372	-0.524
	(0.007)	(0.030)	(0.008)	(0.020)
Panel C: Intra-industry variation (industry-year fixed effects)				
m_t	0.334	0.739	0.379	-0.532
	(0.008)	(0.031)	(0.007)	(0.022)
Panel D: Time-series variation (firm fixed effects)				
m_t	0.387	0.510	0.374	-0.371
	(0.010)	(0.037)	(0.008)	(0.026)

Notes: The table decomposes the variance of firms' market value-to-output ratios into long-run expected returns and long-run expected cash flows, made up of markups (μ), output growth (Δy), and fixed costs/investment (fci), as implied by the VAR model of equation 11. We estimate the following equations:

$$\sum_{j=1}^{\infty} \rho^j E_t \left[x_{i,t+j}\right] = a_x + b \times m_{i,t} + \varepsilon_{i,t}$$

where $x = t$ in Panel B and $x = i$ in Panel C. The discount coefficient (ρ) equals 0.98. The slope coefficients approximately sum up to one, up to the cumulative approximation error. Standard errors (in parentheses) are double-clustered at the year and firm level. Data are from 1960 through 2020.

Table 4: **Variance decomposition of return news**

	σ (diag), ρ (off-diag)				Contribution to $\sigma^2_{N_r}$			
	N_{DR}	N_μ	$N_{\Delta y}$	N_{fci}	$-N_{DR}$	N_μ	$N_{\Delta y}$	$-N_{fci}$
Panel A: Panel variation								
N_{DR}	0.105				0.264			
N_μ	-0.520	0.146			0.381	0.508		
$N_{\Delta y}$	-0.219	0.072	0.136		0.149	0.068	0.440	
N_{fci}	-0.546	0.962	0.143	0.102	-0.280	-0.684	-0.095	0.249
Panel B: Cross-sectional variation								
N_{DR}	0.054				0.107			
N_μ	-0.189	0.125			0.094	0.583		
$N_{\Delta y}$	-0.363	0.346	0.121		0.175	0.390	0.546	
N_{fci}	-0.245	0.964	0.372	0.090	-0.088	-0.808	-0.302	0.301
Panel C: Time-series variation								
N_{DR}	0.157				0.600			
N_μ	-0.617	0.034			0.162	0.029		
$N_{\Delta y}$	-0.040	-0.073	0.118		0.037	-0.014	0.339	
N_{fci}	-0.452	0.792	0.093	0.034	-0.116	-0.045	-0.018	0.028

Notes: This table reports the decomposition of return news following Campbell (1991). Alongside the familiar discount-rate news, cash-flow news split into news about future markups (N_μ), future output growth ($N_{\Delta y}$), and future fixed costs (N_{fci}). Panels B and C report these decompositions for cross-sectional and time-series variation, respectively, by adding year and, respectively, firm fixed effects to the VAR.

Table 5: **Factor loadings and alphas of portfolios sorted on expected future markup**

	Low	2	3	4	High
α	-0.028	-0.010	-0.021	0.013	0.018
	0.013	0.013	0.014	0.012	0.009
Market	-0.048	-0.108	0.102	0.051	-0.034
	0.028	0.031	0.036	0.030	0.018
SMB	0.170	0.030	0.007	-0.050	-0.193
	0.046	0.039	0.058	0.043	0.031
HML	0.134	0.159	0.127	-0.176	-0.299
	0.051	0.051	0.058	0.049	0.033
RMW	0.266	0.267	0.316	0.276	0.001
	0.058	0.056	0.061	0.052	0.050
CMA	0.079	-0.044	0.051	0.136	0.176
	0.070	0.077	0.089	0.082	0.057

Notes: This table reports the returns of quintile portfolios sorted on VAR-implied expected markups assessed against the five-factor model of Fama and French (2015). We report annualized alphas in the first row and standard errors in parentheses throughout. To obtain VAR-implied long-run markup expectations without introducing look-ahead bias, we estimate the VAR matrix over the first half of the sample (1960-1990) and then construct markup expectations and portfolio sorts for the second half.

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