The Present Value of Future Market Power[*]

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Abstract

We introduce a novel log-linear identity linking a company's market value to expected future markups, output growth, discount rates, and investments within a present-value framework. By distinguishing between realized and expected markups, we unveil five new empirical facts. (i) *Expected* markups account for one-third of the rise in aggregate firm values of U.S. public firms since 1980. (ii) The rise in aggregate expected markups is driven by a reallocation of market share towards high-expected-markup firms. Mergers have accelerated this trend with expected (but not realized) markups rising post merger. (iii) Expected markups are closely tied to fixed costs and investments, particularly in intangibles. (iv) There is a negative time-series relationship between expected markups and discount rates, but (v) there is a positive cross-sectional link to risk premia after accounting for other risk factors. These five facts can guide the development of macro-finance models.

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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 both in the U.S. and 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),

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

where k, ρ, ϕ_1, and ϕ_2 are constant coefficients and i and t respectively index firm and time. We show that (1) holds tight in the data. Second, we apply the identity (1) to data on U.S. public firms between 1960 and 2020. Existing approaches to documenting and evaluating aggregate trends either rely on specific model assumptions or are limited to backward-looking accounting information. The present-value framework incorporates forward-looking information from asset prices without imposing structural relations among variables. We establish five empirical facts:

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[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.

1. 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 (measured following De Loecker et al. (2020)) net of expected fixed costs and investments, and two-thirds to future markups without the offsetting effects of fixed costs and investments. Lower discount rates and higher expected long-run output growth account for around one-third, each.

2. The upward trend in average markup expectations is largely driven by the reallocation of market share towards firms with higher expected markups. Some of this reallocation is driven by mergers and acquisitions: employing dynamic difference-in-differences, we document a rise in post-acquisition markup expectations for merged firms compared to the pre-acquisition stand-alone quantities.

3. Expectations of long-run markups are closely tied to expectations of long-run fixed costs and investment.

4. Positive shocks to expected markups ("markup news") are associated with negative shocks to discount rates. This 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 the importance of markups in understanding cross-firm differences in market values or time-series variation in aggregate firm valuations. 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 output growth and profitability. As a back-of-the-envelope calculation, our estimates are consistent with a decline in total discount rates between 1980 and 2020 of 1 percentage point.

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This is consistent with Farhi and Gourio's (2018) argument that a rise in the equity premium has partially offset the drop in risk-free interest rates.[3]

The second result echoes a similar finding by De Loecker et al. (2020) in relation to current markups and output share reallocation towards high-markup firms, which we now document for expected markups. We further find that mergers and acquisitions have been an important driver of this reallocation since the Great Recession. Post-merger markup expectations rise relative to the pre-merger sum of the parts. Interestingly, this result only holds for markup expectations and not for the firms' current markups, which remain statistically unchanged within five years from the merger. The discrepancy underscores a major conceptual insight provided by our present-value identity: financial market valuations incorporate forward-looking information about a firm's long-run markup trajectory extending far beyond near-term markup realizations.

The third result highlights not only the importance of markups for valuations but also the tight link between expected markups and expected fixed costs. A strong relationship 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 intangible capital and implies that markups should not be examined as a stand-alone variable with respect to their impact on asset prices.

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 accounts for more than half of the variation in return

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[3]The distinction between cash-flow and discount-rate-driven changes in asset prices also matters for their effect on inequality. Fagereng, Gomez, Gouin-Bonenfant, Holm, Moll, and Natvik (2023), for instance, characterize the redistributive effects of a discount-rate-driven rise in asset prices from net savers to dis-savers. Our results suggest that this channel only applies to one-third of the aggregate rise. Nonetheless, the remaining increase may reflect expectations of other redistributive trends: higher expected markups indicate gains to producers at the cost of consumers, while rising fixed costs may reflect a larger 'cut' of those gains taken by high-skilled labor as providers of intangible capital (Eisfeldt and Papanikolaou, 2014).

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 correlate negatively with discount-rate news, consistent with results from different present-value decompositions by Lochstoer and Tetlock (2020) and Cho, Kremens, Lee, and Polk (2023). Our findings imply that news of higher markups is associated with lower subsequent returns.

At first glance, 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, however, overturns this premature conclusion. We evaluate the relation between expected markups and expected returns through 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 and document that the long-short portfolio earns significantly *positive* excess returns of 4.6% per year. 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 long-run 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 their empirical description to long-run markup *expectations* within the present-value

framework. As such, we also contribute to the long and growing literature on rising market power and its macroeconomic implications.[4]

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 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). We find that several of our empirical findings are consistent with key takeaways from Farhi and Gourio. 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, 2023).

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,

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

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 log-linear 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.

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

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

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

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

where $R_{i,t}$ is the value-weighted return on the firm's equity and debt and $M_{i,t}$ is the market value of the firm's assets. Using equation (2) to rewrite equation (3) and rearranging,

$$1 + R_{i,t} = \frac{M_{i,t}}{M_{i,t-1}} \left(1 + \frac{Y_{i,t} - VC_{i,t} - FCI_{i,t}}{M_{i,t}} \right) \tag{4}$$

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where $FCI_{i,t} \equiv FC_{i,t} + I_{i,t}$ combines fixed cost and investment.[5] That is, the return on the firm comes from either a change in the market value of the firm ($\frac{M_{i,t}}{M_{i,t-1}}$) or the net payout, which equals the part of output not used for variable costs, fixed costs, or investment (the term inside the parenthesis). Any investment adjustment costs are assumed to be absorbed by the fixed cost or the investment term.

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

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

where $\mu_{i,t}$ is (log) markup and $\theta_{i,t}$ 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 the 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.

Log-linearization Plugging equation (5) into equation (4), taking a log of both sides and rearranging,

$$r_{i,t} = m_{i,t} - m_{i,t-1} + \Delta y_{i,t} + \widetilde{s}_{i,t}. \tag{6}$$

where $m_{i,t} = \log(M_{i,t}/Y_{i,t})$ is the market-to-output ratio and $\Delta y_{i,t} = \log(Y_{i,t}/Y_{i,t-1})$ is log output growth. The part of equation (6) that is nonlinear in the underlying variables is

$$\widetilde{s}_{i,t} = \log\left(1 + \exp(-m_{i,t})\left(1 - \theta_{i,t}\exp(-\mu_{i,t}) - \exp(fci_{i,t})\right)\right). \tag{7}$$

[5]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 log-linear framework.

where $fci_{i,t} = \log(\frac{FCI_{i,t}}{Y_{i,t}})$ is log fixed cost and investment scaled by output. Equation (6) stays valid whether we express $\Delta y_{i,t}$ and $r_{i,t}$ in real unit or in nominal unit. For now, we choose to work with the nominal output growth and nominal rate of return.

Approximating $\widetilde{s}_{i,t}$ in equation (7) around the long-run average values of $(m_{i,t}, \theta_{i,t}, \mu_{i,t}, fci_{i,t})$, we obtain its close approximation, denoted $s_{i,t}$ (see Appendix A):

$$\widetilde{s}_{i,t} \approx s_{i,t} = -(1-\rho)m_{i,t} + \phi_1\mu_{i,t} - \phi_2 fci_{i,t}, \tag{8}$$

where ρ is the Campbell and Shiller (1988) coefficient that is close to but less than one and the ϕ terms are constant coefficients.

Plugging the log-linearized quantity in equation (8) into equation (6) and rearranging,

$$m_{i,t-1} \approx \phi_0 + \rho m_{i,t} + \Delta y_{i,t} + \phi_1\mu_{i,t} - \phi_2 fci_{i,t} - r_{i,t}. \tag{9}$$

This approximate present-value relation expresses today's market-to-output ratio as a linear combination of five contributors on the right-hand side (and an intercept) in a tight manner. Figure 1 plots the fit of the firm-level approximation for Apple Inc. and Berkshire Hathaway Inc.. We find that our log-linear decomposition explains around 98% of the variation in the left-hand side on average.

Starting equation (9) 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:

$$m_{i,t} \approx k + \sum_{\tau=1}^{\infty}\rho^{\tau-1}\Delta y_{i,t+\tau} + \phi_1\sum_{\tau=1}^{\infty}\rho^{\tau-1}\mu_{i,t+\tau} - \phi_2\sum_{\tau=1}^{\infty}\rho^{\tau-1}fci_{i,t+\tau} - \sum_{\tau=1}^{\infty}\rho^{\tau-1}r_{i,t+\tau}, \tag{10}$$

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

Since the firm value decomposition in equation (10) holds ex-post, it also holds ex-ante. We obtain an ex-ante version of equation (10) by taking a time-t expectation on both sides:

$$
\begin{aligned}
m_{i,t} \quad \approx \quad & k \;+\; \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \Delta y_{i,t+\tau} \;+\; \phi_1 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t \mu_{i,t+\tau} \;-\; \phi_2 \sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t fci_{i,t+\tau} \\
& -\sum_{\tau=1}^{\infty} \rho^{\tau-1} E_t r_{i,t+\tau},
\end{aligned}
\tag{11}
$$

A firm's market value captures not its current market power (at least not directly) but the *present value* of future market power. Today's market value captures today's expectations of the long-run trajectories of output growth, profit markups on output arising from market power, and investments in intangible and physical capital required to sustain market power in the long run. Importantly, the approximate relation in equation (11) holds with respect to any expectation—rational or irrational—that respects the accounting identity in equation (3). Hence, our empirical findings through the lens of the present-value relation are relevant in any model setting.

3 Empirical results

3.1 Data and Specification

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.

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:

$$M_{i,t} = P_{i,t} N_{i,t} + Z_{i,t},$$

where $P_{i,t}$ is the stock price, $N_{i,t}$ the number of stock shares, and $Z_{i,t}$ 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-bond corporate debt. Since most corporate loans are floating rates, 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 (11). We define the weighted average return on the firm's securities as

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

where $Div_{i,t}$ is the stock's dividend per share and $INT_{i,t}$ is total firm-level interest payments on debt.

We use the accounting information in Compustat to construct other firm-level variables. Output ($Y_{i,t}$) is measured by sales. Fixed cost and investment ($FCI_{i,t}$) is measured as the sum of the

selling, general, and administrative expense (XSGA), advertising 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).

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 (9):

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

Equation (10) 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:

$$z_{i,t+1} = a + B z_{i,t} + u_{i,t+1}. \tag{12}$$

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

Specifically $z_{i,t} = [r_{i,t}, \Delta y_{i,t}, \mu_{i,t}, f c i_{i,t}, m_{i,t}, lev_{i,t}, inv_{i,t}, ag_{i,t}, ms_{i,t}]$, 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 future realizations.

3.2 Firm-level results: Markups, investments, and valuations

An important point of our paper is that asset prices capture expected future markups and investments in intangible and physical capital rather than just their current, realized counterparts. Having obtained the VAR-implied expected values of future markups and fci, $(E_t\mu_{t+1}, E_t\mu_{t+2}, E_t\mu_{t+3}, ...)$, we obtain firm-level estimates of expected future markups and fci, as well as expected output growth and returns.

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

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

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returns, output growth, markups, and fixed costs/investment, that is, the terms on the right-hand side of the present-value identity (10). Taking a covariance of each side of (10) with $m_{i,t}$ and dividing by its variance, we obtain:

$$1 = \frac{cov\left(\sum_{\tau=1}^{\infty}\rho^{\tau-1}E_t\Delta y_{i,t+\tau}, m_{i,t}\right)}{var\left(m_{i,t}\right)} + \frac{cov\left(\phi_1\sum_{\tau=1}^{\infty}\rho^{\tau-1}E_t\mu_{i,t+\tau}, m_{i,t}\right)}{var\left(m_{i,t}\right)}$$
$$- \frac{cov\left(\phi_2\sum_{\tau=1}^{\infty}\rho^{\tau-1}E_t fci_{i,t+\tau}, m_{i,t}\right)}{var\left(m_{i,t}\right)} - \frac{cov\left(\sum_{\tau=1}^{\infty}\rho^{\tau-1}E_t r_{i,t+\tau}, m_{i,t}\right)}{var\left(m_{i,t}\right)} \qquad (13)$$

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

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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.

3.3 Aggregate time-series variation

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 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.

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

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[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 log-linear identity, take the output-weighted average, and then take logs.

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. Output growth is slightly more predictable than dividend growth, but more importantly, markups and fixed costs are highly predictable, 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. Predictable information from the cross-section is particularly relevant for the aggregate decomposition if variation in the aggregate is meaningfully driven by compositional dynamics. 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.

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 dot-com 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 component.

$$\Delta x_t = \underbrace{\sum_i w_{i,t-1} \Delta x_{i,t}}_{\Delta \text{within}} + \underbrace{\underbrace{\sum_i \Delta w_{i,t} \tilde{x}_{i,t-1}}_{\Delta \text{market share}} + \underbrace{\sum_i \Delta w_{i,t} \Delta x_{i,t}}_{\Delta \text{cross term}}}_{\Delta \text{reallocation}} +$$

$$\underbrace{\sum_{i \in \text{Entry}} w_{i,t} \tilde{x}_{i,t} - \sum_{i \in \text{Exit}} w_{i,t-1} \tilde{x}_{i,t-1}}_{\text{net entry}} \tag{14}$$

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 firms 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 occurred predominantly in the late 1990s and early 2000s.[7]

Panel B shows a similar decomposition for the output-weighted, VAR-implied, markup expectations: 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.

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[7]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).

Exit drives up aggregate markup expectations in the late 1990s and early 2000s, when delisting firms had lower-than-average markups, and many delistings occurred in the context of liquidation or bankruptcy. In the years 2015 through 2020, however, exiting firms had higher-than-average markup expectations and were predominantly associated with mergers versus liquidations (71% of delistings between 2010 and 2020 involved mergers, compared to 56% between 1990 and 2009). 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. We explore the impact of M&A in the next section.

3.4 Market Power and M&A

Motivated by the observation that the reallocation of output shares towards firms with high expected markups coincides with the delisting of firms with high expected markups, we examine the M&A channel of reallocation. We collect merger events from SDC Platinum and combine them with our firm-level, VAR-implied markup expectations.

For each acquirer-year observation, we identify all US-listed targets acquired by that acquirer in that year and, for the five years preceding the merger, we compute the pre-merger output-weighted average of markups and VAR-implied markup expectations for target(s) and acquirer. We combine these observations with post-merger markup expectations computed by the VAR for the combined firm in $t+1$ through $t+5$.

We then merge the resulting acquirer-year panel with markups and VAR-implied markup expectations of non-merging firms and regress markups and markup expectations on an acquirer dummy interacted with a post-merger indicator.

$$y_{i,t} = a_i + a_t + b \mathbb{1}_i^{\text{merger}} \times \mathbb{1}_t^{\text{post}} + \varepsilon_{i,t} \tag{15}$$

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where y_t is, respectively, the current markup, μ_t, and the VAR-implied long-run markup expectation, $\sum_{j=1}^{\infty} \rho^j \hat{\phi}_1 \hat{E}_t \left[\mu_{t+j} \right]$. Table 4 reports the results. Realized markups do not rise significantly in the five years post-merger, but long-run expected markups do.

We then disaggregate the post-merger effect by year-since-merger. To this end, we regress markups and markup expectations on an acquirer dummy now interacted with an indicator for each year relative to the merger. Figure 5 plots the coefficients on these interactions. Consistent with the forward-looking nature of asset prices, markup expectations rise substantially in the year after merger completion and the initial jump reverts partially in $t + 2$. Over the subsequent years, the point estimates remain stable and statistically significant through $t + 5$.

In comparison, markups observed year-by-year do not rise significantly at any horizon up to five years, although the point estimates rise almost monotonically over the post-merger years. This comparison highlights once again the strength of the present-value framework in translating the forward-looking information encoded in asset prices into the expectations of long-run markups that arguably drive merger decisions of acquirers and anti-trust considerations of regulators.

Recall that the reallocation component in Panel B of Figure 4 suggests that output weight has gradually risen for firms with higher expected long-run markups. The results from this subsection suggest that mergers and acquisitions play an important role in this trend. Mergers not only mechanically raise the output weight of the combined firm, but are also associated with a rise in markup expectations for those combined firms. This means that the delisting of target firms with high expected markups—captured in the "Exit" component in Figure 4.B—only partially offsets this reallocation component and M&A is a net contributor to the aggregate rise in markup expectations.

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4 Asset Returns and Expected Market Power

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).[8] We address both dimensions of return variation in turn.

4.1 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 (11) into the following news decomposition:

$$r_{i,t+1} - E_t r_{i,t+1} \approx N_{\Delta y,i,t+1} + N_{\mu,i,t+1} - N_{fci,i,t+1} - N_{DR,i,t+1} \tag{16}$$

where the news terms are

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

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

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

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

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

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

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 5 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 is 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, is predominantly driven by the time series and accounts 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 in 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. As the VAR does not extract structural shocks, our results do not distinguish between these different channels or pin down the direction of causality.

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

The negative cross-sectional correlation between markup news and discount-rate news suggests

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that higher markups are, on average, associated with lower risk premia. However, markup news is also associated with news about other characteristics—higher expected output growth and higher fci, 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.

4.2 Expected stock returns and expected future market power

We form quintile portfolios based on VAR-implied markup expectations. 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 and fci 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 (measured using asset growth). Controlling for the latter three is particularly important in this context. Expected market power is 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 6 reports the results: the top quintile portfolio (highest future 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 for quintiles two and four. These results suggest that expectations of long-run market power are *positively* associated with risk premia, thus overturning the naïve interpretation based on the negative news correlation.

For comparison, Panel B reports the same alphas from a portfolio sort based on *current* markups net of fci (scaled by ϕ_1 and ϕ_2, respectively). Markups and fci are persistent so the VAR implied quantities are positively correlated with the current variables. 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 market power 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 market power.

Table 6 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 net of investments and risk premia is not a repackaging of the known profitability premium.

5   Discussion

A number of possible mechanisms connect asset prices, growth, discount rates, markups, and investments. In light of our results, we discuss some key mechanisms proposed in the literature, organize them around four themes, and assess their plausibility as potential explanations.

Secular trends in discount rates and valuations   It is uncontroversial among scholars that real and nominal risk-free interest rates have exhibited a secular decline since the 1980s (Summers, 2015; Bauer and Rudebusch, 2020; Hillenbrand, 2021). Generally speaking, lower interest rates lead to reduced discount rates, subsequently increasing equity valuations. However, the relation between discount rates—the sum of risk-free rates and risk premia—and equity valuations is more

nuanced, as risk premia also fluctuate. A significant challenge lies in accurately estimating the changes in equity risk premia, which, unlike interest rates, lack a clear consensus regarding their direction since the 1980s. While some researchers argue that increased equity risk premia have somewhat counteracted the decline in risk-free rates (Caballero and Farhi, 2018; Farhi and Gourio, 2018), others contend that the equity premium itself has also diminished (Blanchard, Shiller, and Siegel, 1993; Jagannathan, McGrattan, and Scherbina, 2000; Lettau, Ludvigson, and Wachter, 2007; Bianchi, Lettau, and Ludvigson, 2022), further accentuating the impact of lower risk-free rates on equity valuations.

Our VAR decomposition sheds light on the secular relation between discount rates and valuations. As illustrated in Figure 3, the long-horizon sum of aggregate discount rates, $\sum_{j=1}^{\infty} \rho^{t+j} E_t r_{t+j}$, fell by approximately 0.5 from 1982 to 2020. Assuming constant discount rates, this sum simplifies to $r/(1-\rho)$. With ρ estimated at 0.98, this reduction suggests a 1 percentage point drop in r. For comparison, long-term nominal Treasury rates for 10-year and 30-year bonds have fallen by nearly 9 percentage points over the same period. While these 9 percentage points may reflect other forces, such as falling inflation or liquidity premia, in addition to a fall in the true risk-free rate, our results likely imply a compensatory rise in equity risk premia. Our estimated one-percentage-point decline in average (real) discount rates is quantitatively similar to that of Farhi and Gourio (2018).

Firms' investment rates and stock returns Production-based asset pricing models link stock returns to marginal rates of transformation, inferred from data on corporate investments. The general conclusion is that corporate investments are a leading indicator and that firms earning low average stock returns have a high investment rate today (Cochrane, 1991, 1996; Gomes, Kogan, and Zhang, 2003; Zhang, 2005; Liu, Whited, and Zhang, 2009; Kogan and Papanikolaou, 2010; Clementi and Palazzo, 2019). The canonical model in this literature would have the following prediction. If stock prices rise, for instance because of lower discount rates, the price surge

encourages firms to boost their investments.

Our VAR decomposition elucidates the relation between investment rates and discount rates. Table 5 reveals that, both in the cross-section and in the time series, positive news about expected *fci* are linked to lower expected discount rates. Long-run investments and discount rates exhibit a negative correlation of about -50% in the panel and in the time-series. In the cross-section, the correlation is around -25%. In all cases, qualitatively, our findings align with the standard predictions of production-based asset pricing models. Quantitatively, they provide a useful benchmark on the correlation between expected long-run investments and discount rates in the data and they are suggestive about the source of variation. The pervasiveness of the effect both within and across firms as well as the magnitudes of our estimated correlations imply that the observed changes in expected investments are likely a response to changes in both the risk-free rates and excess return components of discount rates.

Investment and markups   Standard Q-theory arguments predict a rise in investment in response to higher returns to capital and corporate valuations. Yet, there has been a shortfall in corporate investments, in notable contrast to the high valuations of companies (Alexander and Eberly, 2018; Gutiérrez and Philippon, 2017). Crouzet and Eberly (2023) find that the widening gap between corporate valuations and investments reflects an increasing gap between the average value of business capital (Tobin's average Q) and its marginal value (Tobin's marginal q), i.e., the shadow value driving investments. Both Crouzet and Eberly (2023) and Corhay et al. (2021) point to market power as a force that reduces investment incentives. Gutiérrez and Philippon (2017) estimate that two-thirds of the 'investment gap'—the shortfall in measured investment relative to the Q-theory prediction—traces back to rising concentration and governance issues arising from common ownership. The remaining one-third of the gap is mismeasured and accounted for by investment in intangibles (see also Crouzet, Eberly, Eisfeldt, and Papanikolaou, 2022). In light of these results, our investment variable *fci* is well-suited to assess the link between investment

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and market power, as it aggregates capital expenditure and expenses often tied to the creation of intangible capital like R&D and SG&A (Eisfeldt and Papanikolaou, 2014).

We find that past markups are positively related to fci and that markup news is positively associated with fci-news. That is, shocks raising long-run markup expectations tend to coincide with shocks raising expected long-run fci. However, this relationship does not clarify the direction of causality. It may reflect the necessity for firms to continually invest, especially in intangible assets, to develop and sustain market power, as suggested by Crouzet and Eberly (2019) and De Ridder (2024).[9]

Our VAR decomposition can also shed light on whether, in our sample, investments in intangibles led to higher productivity, higher markups, or both. This is a key issue of debate in the literature (Syverson, 2019). On one hand, increased concentration is often linked to innovation, more capital investments, and higher productivity in situations involving heterogeneous-cost firms selling differentiated goods (Autor, Dorn, Katz, Patterson, and Van Reenen, 2017). On the other, a rise in concentration can be accompanied by higher market power and markups, as typically seen in standard Cournot oligopoly models. In an aggregate time series, De Loecker et al. (2020) find that the rise in realized markups is driven by increased concentration among high-markup firms. Figure 3 and Figure 4 mirror these results for expected markups.

In the retail sector, Crouzet and Eberly (2018) find that, while concentration (as measured by HHI) has increased substantially since the mid-1990's, markups (as measured by De Loecker et al. (2020)) have not. This finding has been interpreted as indicative that rising concentration in the retail sector merely reflects efficient reallocation towards more productive, intangibles-intensive firms. On the other hand, retail firms may only reap the market-power benefits from concentration

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[9]It is notable that the non-capital expenditure portion of fci jumped from 17.4% of output in 1980 to 30.2% in 2020, contrasting with a decline in capital expenditures from 8.9% to 5.5% over the same period. This shift underscores the growing significance of intangible investments, which outweighed the drop in the capital expenditure-to-output ratio, and accounted for the overall increase in total fci.

and intangible investments with delay (Crouzet et al., 2022), and our VAR decomposition is uniquely positioned to answer the question with respect to forward-looking markup trajectories. Indeed, we observe that realized retail-markups do *not* rise between 1989 and 2015, but *VAR-implied, expected, long-run* markups rise steadily throughout between 1980 and 2020, consistent with the "delayed-benefit" explanation (Figure 7).[10] The years since 2015 corroborate this point: the average realized markup among retail firms in our sample rises almost twofold from 0.177 in 2015 to 0.281 by 2020.

While our decomposition does not feature profitability directly, Figure 7 shows that expectations of output growth and markups have risen by almost exactly the same amount between the early 1980s and 2020, indicating that the rise in concentration documented by Crouzet and Eberly (2018) has been associated with expectations of both productivity gains and markup expansion.

Discount rates and output growth   The secular-stagnation narrative predicts not only a decline in interest rates, but also a decline in output growth (e.g., Summers, 2015; Farhi and Gourio, 2018). In contrast to this narrative, our present-value decomposition indicates that expected output growth among the listed firms has *risen* in lockstep with the fall in discount rates. In fact, Figure 3 shows that our estimates for the discounted sum of expected output growth rates have risen by around 0.6 from the early 1980s to 2020, which implies an increase of around 1.2 percentage points in the expected output growth rate according to a back-of-the envelope calculation as done earlier in our discussion of discount rates and valuations.

What are some potential explanations? One is that the listed firms do not represent the overall economy and that their realized output growth may be uninformative about general economic

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[10]Following Crouzet and Eberly (2018), we include firms with 2-digit NAICS codes 44 and 45. The data requirements for the VAR unfortunately limit direct comparability; our sample contains 3476 firm-year observations between 1989 and 2015, compared to 6259 over the same time frame in Crouzet and Eberly (2018). These sample composition effects lead our sales-weighted average for realized markups to be more volatile between 1989 and 2015 than those in Crouzet and Eberly (2018) but we find a similar level and similarly small total change over that time frame (from $\mu = 0.160$ to 0.177 in 2015).

trends. An alternative explanation is that long-run growth expectations have been disconnected from the lackluster short-run realizations. Our findings support the second explanation. Indeed, since 1982, realized output growth for the firms in our sample has fluctuated without any specific trend around an average value of 4.7%. If indeed the higher long-run expectations are borne out by the future, the temporary decoupling may just reflect a change in production technology toward intangible capital. This could arise from both the "missing" intangible investment understating measured TFP growth (Brynjolfsson, Rock, and Syverson, 2021) and the potential delay in productivity realization owing to 'time-to-build' impeding short-run realized output growth (Greenwood and Jovanovic, 1999; Crouzet et al., 2022).

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 expectations of future markups 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 markup variation in current valuations, such that the difference between markups and investments in physical and intangible capital accounts for around one-third of firm-level variation in valuation ratios. Output growth and discount rates each account for slightly more than one-third of the variation.

Accordingly, market power has been an important driver of the rise in aggregate corporate valuations since the 1980s, largely driven by a reallocation of output towards firms with higher

markups. Shocks to the expected future markups are negatively correlated with discount rates, particularly in the time series, but firms with higher markup expectations earn higher stock returns once accounting for exposures to other risk factors.

A Derivation

Rewrite the markup expression in (5) as $VC_{i,t} = \frac{\theta_{i,t}}{\exp(\mu_{i,t})} Y_{i,t}$ and plug it into equation (4) to get

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

Multiplying and dividing the right-hand side by $Y_{i,t}/Y_{i,t+1}$,

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

Taking a log on both sides,

$$r_{i,t} = m_{i,t} - m_{i,t-1} + \Delta y_{i,t} + \widetilde{s}_{i,t}$$

where

$$\widetilde{s}_{i,t} = \log\left(1 + \exp(-m_{i,t})\left(1 - \theta_{i,t} \exp(-\mu_{i,t}) - fci_{i,t}\right)\right)$$

Approximating $\widetilde{s}_{i,t}$ around $(m_{i,t}, \theta_{i,t}, \mu_{i,t}, fci_{i,t}) = \left(\overline{m}, \overline{\theta}, \overline{\mu}, \overline{fci}\right)$, we get

$$\widetilde{s}_{i,t} = \underbrace{\phi_0 - (1-\rho)m_{i,t} + \phi_1 \mu_{i,t} - \phi_2 fci_{i,t}}_{\equiv s_{i,t}} + \varepsilon_{i,t},$$

where

$$\phi_0 = \log\left(1 + \exp(-\overline{m})\left(1 - \overline{\theta}\exp(-\overline{\mu}) - \overline{fci}\right)\right) + \frac{\exp(-\overline{m})\left[\overline{m} + \overline{fci} - \overline{m}\,\overline{fci} + \exp(-\overline{\mu})\overline{\theta}\left(1 - \overline{m} - \overline{\mu}\right)\right]}{1 + \exp(-\overline{m})\left(1 - \overline{\theta}\exp(-\overline{\mu}) - \overline{fci}\right)}$$

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

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

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

$$\varepsilon_{i,t} = -\frac{\exp(-\overline{m})\exp(-\overline{\mu})}{1+\exp(-\overline{m})(1-\overline{\theta}\exp(-\overline{\mu})-\overline{fci})}(\theta_{i,t}-\overline{\theta})$$

We put the effect of $\theta_{i,t}-\overline{\theta}$ in the approximation error; that is, if the output elasticity of variable input, θ, differs across time and industries, this would create an additional approximation error when using s_t to proxy for $\widetilde{s}_t$. To see why ρ corresponds to the Campbell and Shiller (1988) coefficient of around 0.96–0.98, it suffices to show that the second term in the denominator of ρ is analogous to the long-run dividend-price ratio in Campbell and Shiller. To see this, recognize that

$$\exp(-m_{i,t})(1-\theta_{i,t}\exp(-\mu_{i,t})-fci_{i,t}) = \frac{Y_{i,t}-VC_{i,t}-FCI_{i,t}}{M_{i,t}} = \frac{D_{i,t}-ISS_{i,t}}{M_{i,t}},$$

which shows that the term is analogous to the dividend-price ratio of a conventional stock but applies to a firm-level analysis. ρ captures the long-run average of the ratio of $M_{i,t}$ to $M_{i,t}+D_{i,t}-ISS_{i,t}$.

References

Alexander, L., Eberly, J., 2018. Investment Hollowing Out. IMF Economic Review 66, 5–30.

Autor, D., Dorn, D., Katz, L. F., Patterson, C., Van Reenen, J., 2017. Concentrating on the Fall of the Labor Share. American Economic Review 107, 180–85.

Autor, D., Dorn, D., Katz, L. F., Patterson, C., Van Reenen, J., 2020. The Fall of the Labor Share and the Rise of Superstar Firms. The Quarterly Journal of Economics 135, 645–709.

Avdis, E., Wachter, J. A., 2017. Maximum likelihood estimation of the equity premium. Journal of Financial Economics 125, 589–609.

Barkai, S., 2020. Declining labor and capital shares. The Journal of Finance 75, 2421–2463.

Barrot, J.-N., Loualiche, E., Sauvagnat, J., 2019. The globalization risk premium. The Journal of Finance 74, 2391–2439.

Basu, S., 2019. Are price-cost markups rising in the united states? a discussion of the evidence. Journal of Economic Perspectives 33, 3–22.

Bauer, M. D., Rudebusch, G. D., 2020. Interest rates under falling stars. American Economic Review 110, 1316–54.

Beaudry, P., Portier, F., 2006. Stock prices, news, and economic fluctuations. American Economic Review 96, 1293–1307.

Bianchi, F., Lettau, M., Ludvigson, S. C., 2022. Monetary policy and asset valuation. The Journal of Finance 77, 967–1017.

Blanchard, O. J., Shiller, R., Siegel, J. J., 1993. Movements in the equity premium. Brookings Papers on Economic Activity 1993, 75–138.

Brynjolfsson, E., Rock, D., Syverson, C., 2021. The productivity j-curve: How intangibles complement general purpose technologies. American Economic Journal: Macroeconomics 13, 333–72.

Bustamante, M. C., Donangelo, A., 2017. Product market competition and industry returns. The Review of Financial Studies 30, 4216–4266.

Caballero, R. J., Farhi, E., 2018. The safety trap. The Review of Economic Studies 85, 223–274.

Caballero, R. J., Farhi, E., Gourinchas, P.-O., 2017. The safe assets shortage conundrum. Journal of Economic Perspectives 31, 29–46.

Campbell, J. Y., 1991. A variance decomposition for stock returns. Economic Journal 101, 151–179.

Campbell, J. Y., Shiller, R. J., 1988. The dividend-price ratio and expectations of future dividends and discount factors. The Review of Financial Studies 1, 195–228.

Cho, T., Kremens, L., Lee, D., Polk, C., 2023. Scale or yield? A present-value identity. Working Paper .

Clementi, G. L., Palazzo, B., 2019. Investment and the cross-section of equity returns. The Journal of Finance 74, 281–321.

Cochrane, J. H., 1991. Production-based asset pricing and the link between stock returns and economic fluctuations. The Journal of Finance 46, 209–237.

Cochrane, J. H., 1996. A cross-sectional test of an investment-based asset pricing model. Journal of Political Economy 104, 572–621.

Cohen, R. B., Polk, C., Vuolteenaho, T., 2003. The value spread. Journal of Finance 58, 609–641.

Corhay, A., Kung, H., Schmid, L., 2020. Competition, markups, and predictable returns. The Review of Financial Studies 33, 5906–5939.

Corhay, A., Kung, H., Schmid, L., 2021. Q: Risk, Rents, or Growth? Working paper, University of Toronto.

Corhay, A., Li, J. E., Tong, J., 2022. Markup shocks and asset prices. Working Paper .

Crouzet, N., Eberly, J. C., 2018. Intangibles, investment, and efficiency. AEA Papers and Proceedings 108, 426–31.

Crouzet, N., Eberly, J. C., 2019. Understanding Weak Capital Investment: the Role of Market Concentration and Intangibles. Proceedings of the 2018 Jackson Hole symposium pp. 87–148.

Crouzet, N., Eberly, J. C., 2023. Rents and Intangible Capital: A Q+ Framework. The Journal of Finance 78, 1873–1916.

Crouzet, N., Eberly, J. C., Eisfeldt, A. L., Papanikolaou, D., 2022. The economics of intangible capital. Journal of Economic Perspectives 36, 29–52.

De Loecker, J., Eekhout, J., Unger, G., 2020. The rise of market power and the macroeconomic implications. Quarterly Journal of Economics 135, 561–644.

De Loecker, J., Warzynski, F., 2012. Markups and firm-level export status. American Economic Review 102, 2437–2471.

De Ridder, M., 2024. Market power and innovation in the intangible economy. American Economic Review 114, 199–251.

Donangelo, A., 2021. Untangling the value premium with labor shares. The Review of Financial Studies 34, 451–508.

Dou, W. W., Ji, Y., Wu, W., 2021. Competition, profitability, and discount rates. Journal of Financial Economics 140, 582–620.

Eggertsson, G. B., Robbins, J. A., Wold, E. G., 2018. Kaldor and piketty's facts: The rise of monopoly power in the united states. Tech. rep., National Bureau of Economic Research.

Eisfeldt, A. L., Falato, A., Xiaolan, M. Z., 2021. Human capitalists. Working Paper 28815, National Bureau of Economic Research.

Eisfeldt, A. L., Papanikolaou, D., 2014. The value and ownership of intangible capital. American Economic Review 104, 189–94.

Fagereng, A., Gomez, M., Gouin-Bonenfant, E., Holm, M., Moll, B., Natvik, G., 2023. Asset-price redistribution. Working Paper .

Fama, E. F., French, K. R., 2015. A five-factor asset pricing model. Journal of Financial Economics 116, 1–22.

Farhi, E., Gourio, F., 2018. Accounting for Macro-Finance Trends: Market Power, Intangibles, and Risk Premia. Brookings Papers on Economic Activity 49, 147–250.

Gomes, J., Kogan, L., Zhang, L., 2003. Equilibrium cross section of returns. Journal of Political Economy 111, 693–732.

Greenwald, D. L., Lettau, M., Ludvigson, S. C., 2019. How the wealth was won: Factors shares as market fundamentals. Working Paper 25769, National Bureau of Economic Research.

Greenwood, J., Jovanovic, B., 1999. The information-technology revolution and the stock market. American Economic Review 89, 116–122.

Grotteria, M., 2023. Follow the Money. The Review of Economic Studies forthcoming.

Grullon, G., Larkin, Y., Michaely, R., 2019. Are US Industries Becoming More Concentrated?*. Review of Finance 23, 697–743.

Gutiérrez, G., Jones, C., Philippon, T., 2021. Entry costs and aggregate dynamics. Journal of Monetary Economics 124, 77–91.

Gutiérrez, G., Philippon, T., 2017. Investmentless Growth: An Empirical Investigation. Brookings Papers on Economic Activity 48, 89–190.

Hartman-Glaser, B., Lustig, H., Xiaolan, M. Z., 2019. Capital share dynamics when firms insure workers. The Journal of Finance 74, 1707–1751.

Hillenbrand, S., 2021. The fed and the secular decline in interest rates. Available at SSRN 3550593 .

Jagannathan, R., McGrattan, E. R., Scherbina, A., 2000. The declining U.S. equity premium. Quarterly Review 24, 3–19.

Karabarbounis, L., Neiman, B., 2013. The Global Decline of the Labor Share. The Quarterly Journal of Economics 129, 61–103.

Kogan, L., Papanikolaou, D., 2010. Growth opportunities and technology shocks. American Economic Review 100, 532–36.

Lettau, M., Ludvigson, S. C., Wachter, J. A., 2007. The Declining Equity Premium: What Role Does Macroeconomic Risk Play? The Review of Financial Studies 21, 1653–1687.

Liu, E., Mian, A., Sufi, A., 2022. Low interest rates, market power, and productivity growth. Econometrica 90, 193–221.

Liu, L. X., Whited, T., Zhang, L., 2009. Investment-based expected stock returns. Journal of Political Economy 117, 1105–1139.

Lochstoer, L. A., Tetlock, P. C., 2020. What drives anomaly returns? The Journal of Finance 75, 1417–1455.

Shumway, T., 1997. The delisting bias in crsp data. The Journal of Finance 52, 327–340.

Summers, L. H., 2015. Demand side secular stagnation. American Economic Review 105, 60–65.

Syverson, C., 2019. Macroeconomics and market power: Context, implications, and open questions. Journal of Economic Perspectives 33, 23–43.

Vuolteenaho, T., 2002. What drives firm-level stock returns? The Journal of Finance 57, 233–264.

Zhang, L., 2005. The value premium. The Journal of Finance 60, 67–103.

Figure 1: Approximate identity (firm-level fit)
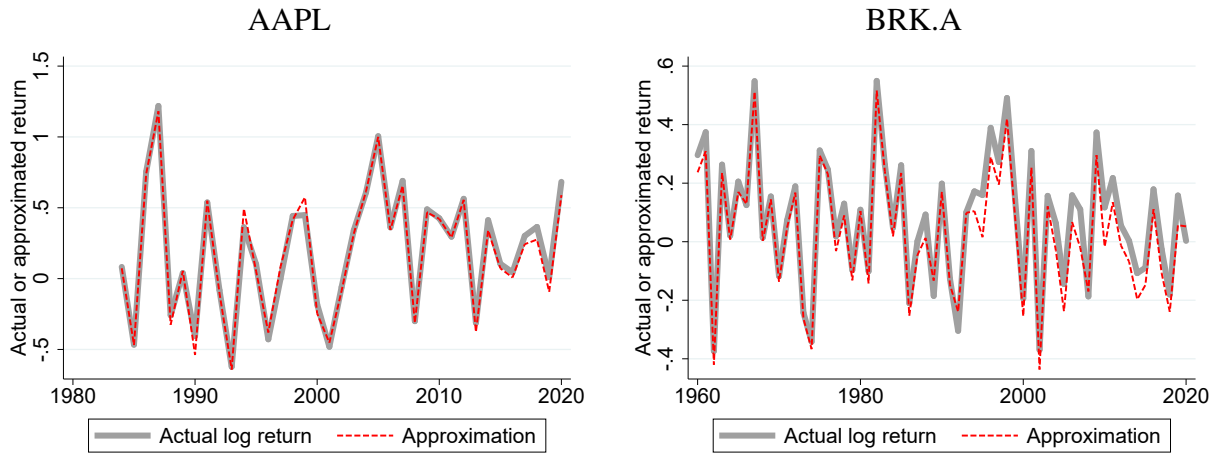

Notes: The two figures plot the realized returns of Apple Inc. and Berkshire Hathaway Inc., $r_{i,t}$, against the respective corresponding returns obtained from the approximate identity (9):

$$r_{i,t}^{approx} = (\rho - 1)m_{i,t} - m_{i,t-1} + \Delta y_{i,t} + \phi_1 \mu_{i,t} + \phi_2 fci_{i,t}.$$

The figures help visualize the tightness of our approximate present-value identity.

Figure 2: Markup- and fci shares in intra-industry price-to-output variation
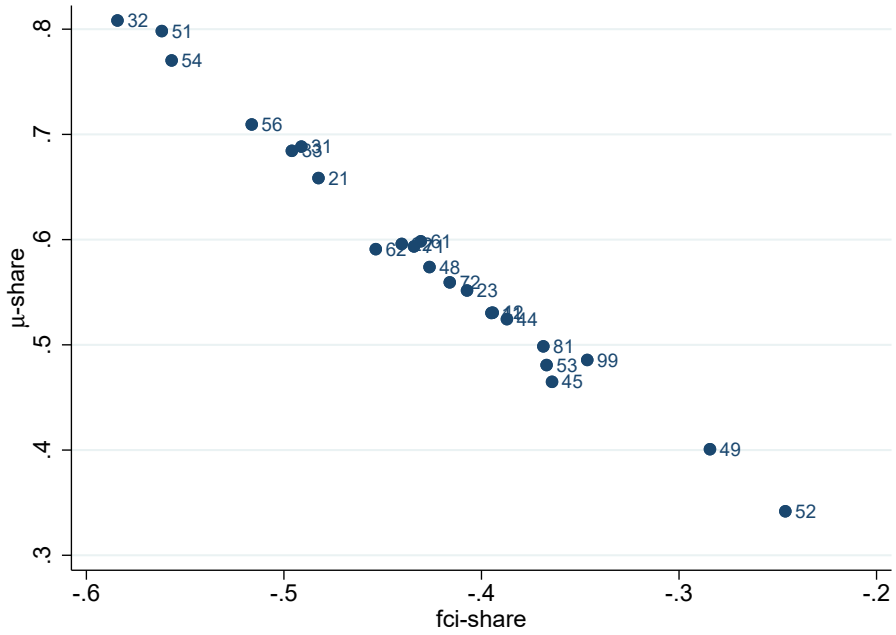
Notes: This figure plots the shares of VAR-implied, long-run fci- and μ-expectations in intra-industry variation in price-to-output ratios. The decomposition follows Equation (13), which we estimate via the following industry-level regression:

$$\Sigma_{j=1}^{\infty} \rho^j E_t \left[x_{i,t+j} \right] = a_{k,t} + b_k \times m_{i,t} + \varepsilon_{i,t}$$

for $x_{i,t} = \{\phi_1 \mu_{i,t}, \phi_2 fci_{i,t}\}$. We plot b_k with markers indicating industry k by its two-digit NAICS code.

Figure 3: Decomposition of aggregate market value-to-output over time
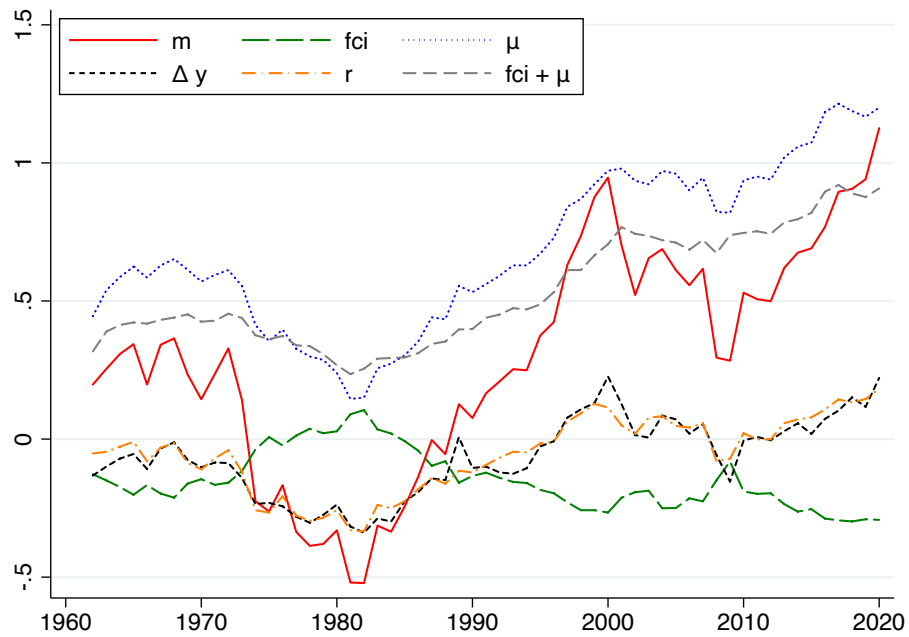
Notes: This figure plots the aggregate log value to output ratio and its VAR-implied decomposition into expected markups, output growth, discount rates, and *fci*. We aggregate by exponentiating the firm-level components of the log-linear identity, then computing an output-weighted average before taking 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 markup expectations
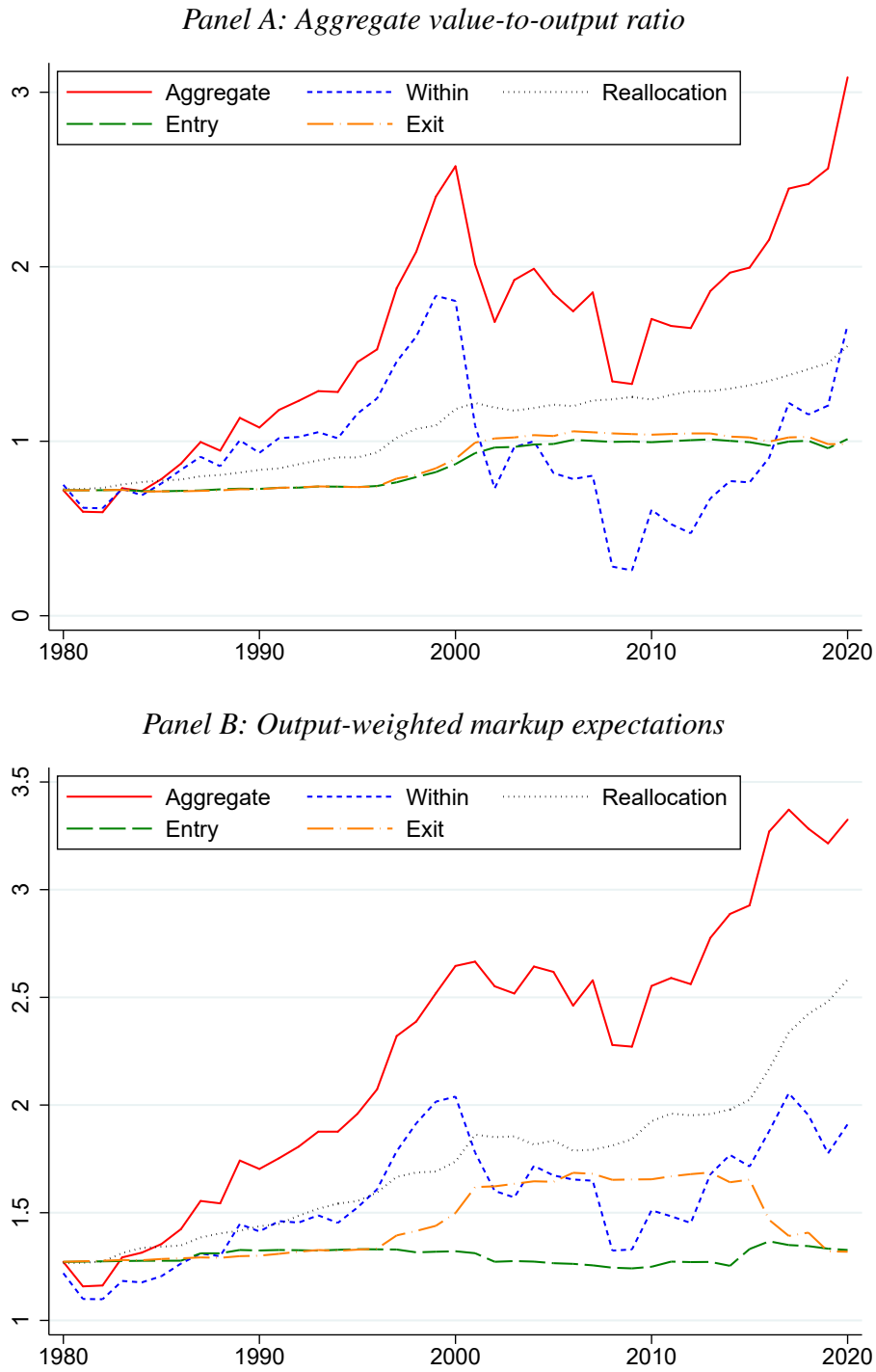
Notes: This figure plots the aggregate value-to-output ratio (Panel A) and the output-weighted average of the exponentiated expected log markup, each decomposed following Equation (14).

Figure 5: M&A and markup expectations
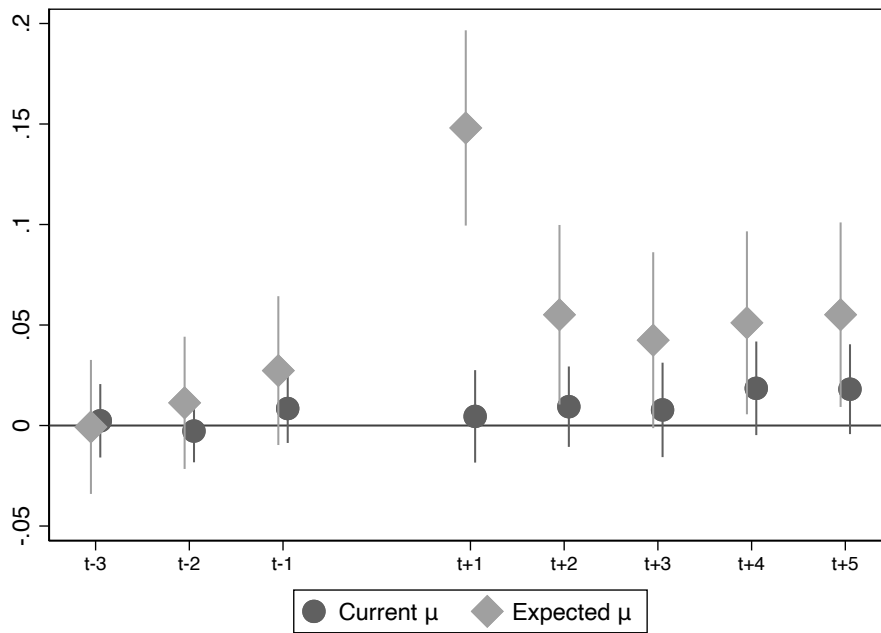
Notes: This figure plots the difference-in-differences estimates in markup expectations around merger events. 95-% confidence intervals are constructed from double-clustered standard errors at the firm and year level. Mergers are completed in year *t* and we compare VAR-implied markup expectations target and acquirer firms with non-merging firms.

Figure 6: Five-factor alphas of markup-sorted portfolios

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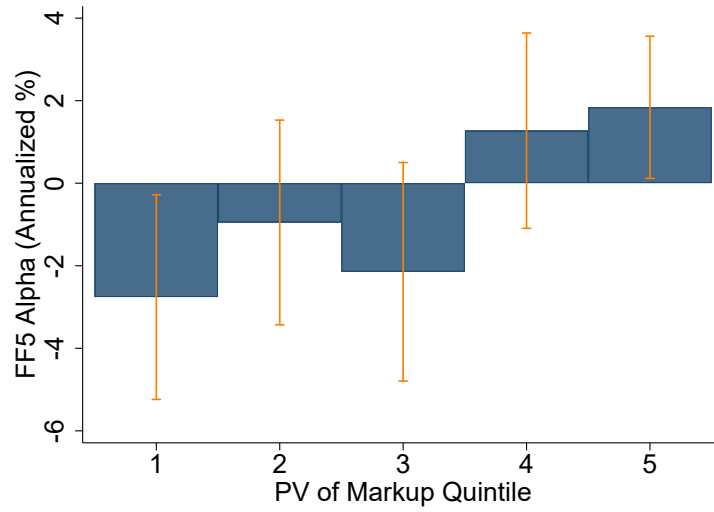
Panel B: Quintiles by current markup (μ)
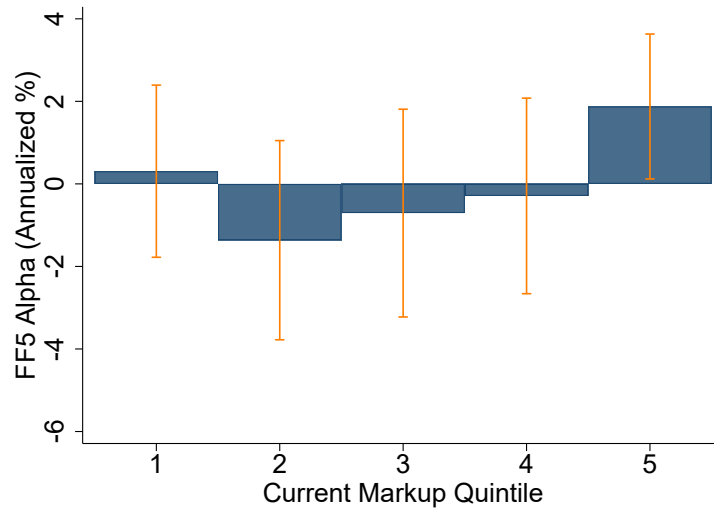
Notes: This figure plots the five-factor (Fama and French, 2015) alphas of quintile portfolios sorted on expected markups (Panel A) and current markups (Panel B). Alphas are estimated between 1990 and 2020, and markup expectations based on a VAR matrix estimated from 1960-1990.

Figure 7: Decomposition of the retail-sector's market value-to-output over time
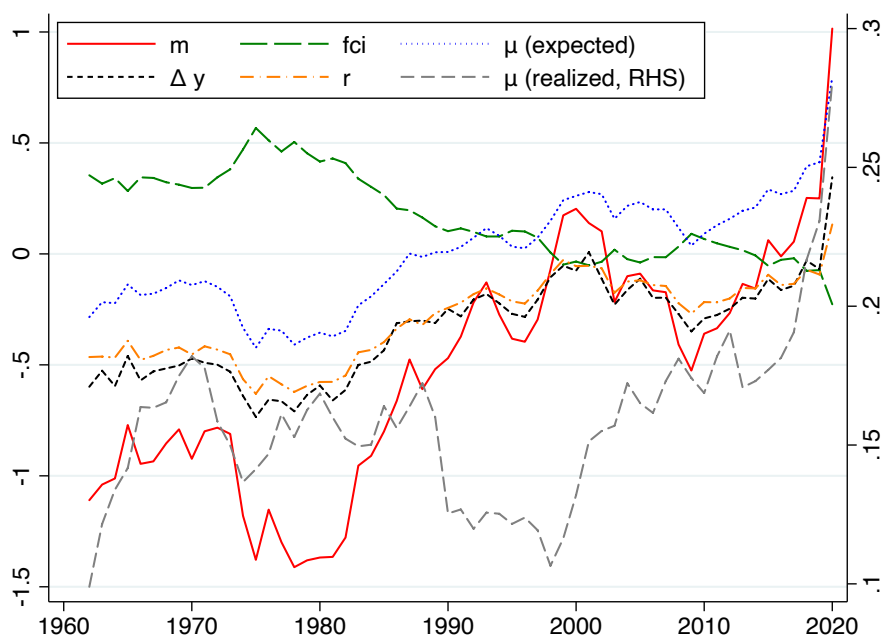
Notes: This figure plots the log value to output ratio and its VAR-implied decomposition into expected future markups, output growth, discount rates, and fci for the retail sector (NAICS codes 44 and 45). We aggregate by exponentiating the firm-level components of the log-linear identity, then computing an output-weighted average before taking logs. The gray, dashed line plots the output-weighted average realized year-by-year markup.

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**

	$\sum_{j=1}^{\infty} \rho^j \hat{E}_t [x_{t+j}]$			
	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 (12). We estimate the following equations:

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

where fixed effects are $f = t$ in Panel B and $f = i$ 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: **M&A, markups, and markup expectations**

	μ_t	$\sum_{j=1}^{\infty} \rho^j \hat{\phi}_1 \hat{E}_t \left[\mu_{t+j} \right]$
Treated $\times$ Post	0.011	0.079
	(0.008)	(0.016)
Observations	80432	80432

Notes: The table reports estimates from the following difference-in-differences specification:

$$y_{i,t} = a_i + a_t + b \mathbb{1}_i^{\text{merger}} \times \mathbb{1}_t^{\text{post}} + \varepsilon_{i,t}$$

where y_t is the current markup, μ_t, and VAR-implied markup expectation, $\sum_{j=1}^{\infty} \rho^j \hat{\phi}_1 \hat{E}_t \left[\mu_{t+j} \right]$. Treated firms are those involved in a merger and we include observations of their outcome variables from $t-5$ to $t+5$, where the pre-merger variables are computed as the output-weighted average of target(s) and acquirer. The panel includes 628 acquirers in mergers closing between 1980 and 2020 and 7840 different non-merging firms in the years $t-5$ to $t+5$ around these merger events. Standard errors (in parentheses) are double-clustered at the year and firm level.

Table 5: **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 6: **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.