Equity Duration and Monetary Policy

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Abstract

Equity duration plays a central role in the transmission of monetary policy to equity markets. Using dividend futures and empirical estimates of aggregate equity duration, I show that stock market reactions to monetary policy are stronger when equity duration is high. In the cross-section, variation in equity duration explains the heterogeneous sensitivity of U.S. stock returns to monetary policy across a broad set of firm characteristics, including dividend yield, market-to-book ratio, cash flow-to-price ratio, profitability, investment growth, and payout ratio. In contrast, differences in betas, size, or financial constraints do not account for this heterogeneity. An asset-pricing model in which heterogeneity stems solely from differences in cash flow maturity can reproduce these new empirical findings and clarifies the underlying duration channel.

Keywords: monetary policy, stock market, equity duration, cash flow maturity, cross-section of stock returns
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1 Introduction

Understanding how monetary policy affects equity prices is critical for evaluating its broader impact on the real economy. Substantial heterogeneity among firms suggests that firm characteristics drive disparate responses to monetary policy, affecting financing conditions, private investment, and firm-level inequality. Identifying the fundamental channels through which monetary policy transmits to equity markets is therefore of first-order importance. In fixed-income markets, duration is a well-established channel of policy sensitivity. In contrast, the role of duration in equity markets remains largely unexplored. This study presents new empirical evidence that equity duration is central in determining the sensitivity of both aggregate and cross-sectional equity returns to monetary policy. An asset pricing model formalizes this duration channel, reproduces the empirical evidence, and clarifies the main economic mechanisms.

Duration represents the weighted average maturity of an asset's payoffs, where weights reflect risk-adjusted expected cash flows. It quantifies the sensitivity of an asset's price to changes in discount rates, determined by the maturity profile of its cash flows. Because monetary policy operates through changes in current and expected future discount rates, a natural hypothesis is that its transmission mechanism depends on asset duration, including that of equities. To test this hypothesis, I examine how the response of equity prices to monetary policy varies with cash flow maturity. I construct dividend strip returns from dividend futures on the S&P 500 with maturities ranging from one to nine years. Exogeneous monetary policy surprises are identified using the high-frequency approach of Acosta et al. (2025), which measures unexpected changes in federal funds and Eurodollar futures rates around Federal Open Market Committee (FOMC) announcements. Unlike earlier measures, this approach incorporates movements around FOMC press conferences—events that have become a major source of asset price sensitivity since 2020 (Narain and Sangani, 2024). A time-series regression of dividend strip returns on monetary policy surprises reveals a pronounced maturity pattern: the longer the maturity of the dividend strip, the greater its sensitivity to monetary policy. A two-year dividend strip declines by roughly 2 percentage points following a tightening surprise, whereas a nine-year strip falls by more than 15 percentage points. Consistent with its longer implied duration, the aggregate equity market exhibits an even stronger reaction to monetary policy surprises.

To establish the link between aggregate equity market duration and monetary policy transmission, I construct multiple proxies for equity duration using both dividend futures and empirical measures. Under no-arbitrage condition, I derive the relative weights of short- and long-maturity dividend strips in the total market value. Fluctuations in these weights reflect variation in equity duration. I complement these market-implied measures with empirical proxies, including the S&P 500 dividend yield, payout ratio, and value-weighted average of long-term dividend growth.[1] Time-series regressions of daily stock market returns on monetary policy surprises, interacted with duration, show that higher equity duration is associated with increased market sensitivity to monetary policy with substantial economic significance. Specifically, a one standard deviation increase in duration increases the equity market sensitivity to monetary policy surprises by around 5 percentage points. Given that these long-maturity weights rose by ten percentage points over the past eight year—and supported by evidence of a secular increase in equity duration (Golez and Koudijs, 2023)—these results indicate a substantial rise in the strength of monetary policy transmission to equity markets over time.

While the aggregate evidence suggests that market-level equity duration amplifies the effect of monetary policy, aggregate measures evolve slowly and may reflect concurrent shifts in macroeconomic fundamentals. Because duration ultimately depends on firm-level cash flow maturity, cross-sectional variation provides a cleaner setting to test this channel. Firms with longer-duration cash flow should be more sensitive to policy-induced changes in discount rates, even within the same macroeconomic environment. This prediction allows for sharper identification of the duration channel in the data. Following Gormsen and Lazarus (2023), I measure firm-level equity duration using the median long-term earnings growth expectations from IBES, which provides a forward-looking, ex-ante measure of cash-flow duration. Firm-level regressions show that higher equity duration significantly amplifies the sensitivity of stock returns to monetary policy surprises, increasing the response of stock returns by approximately one-third if duration is one standard deviation higher. The result holds in specifications with firm, time, and industry fixed effects and controlling for size and beta. In addition, they are driven by monetary policy information released during both FOMC statements and press conferences and robust to alternative measures of monetary policy surprises that account for information effects and the Federal Reserve's response to news (Jarociński and Karadi, 2020; Bauer and Swanson, 2023).

In asset pricing, cross-sectional differences in stock returns are commonly summarized by factor such as the Fama–French market, size, and value factors, which capture systematic variation in cash-flow profiles and expected returns. While higher market betas are associated with greater monetary policy sensitivity (Savor and Wilson, 2014) and firm size typically dampens it (Ehrmann and Fratzscher, 2004; Maio, 2014), evidence on other factors remains

[1] All these measures are arguably linked to duration. Dividend yield is the inverse of duration in the Gordon growth model. Golez and Koudijs (2023) argue that aggregate payout ratio is directly linked to duration. Gormsen and Lazarus (2023) use long-term growth earnings expectations as a duration measure.

limited and conflicting. Core variables in modern factor models—market-to-book equity, profitability, investment growth, and the payout ratio—have unclear or conflicting results on the sensitivity to monetary policy. Economically, many firm characteristics are linked to cash flow duration, indicating that such firms concentrate most of their cash flows in the near or distant future. For example, growth stocks—characterized by high market to book equity, price dividend ratio or price-cash flow ratio—typically exhibit higher cash flow duration, because firms with fewer growth opportunities tend to save and invest less, paying a greater share of their resources in the short term, thereby becoming short-duration companies (Gonçalves, 2021). This logic extends to other firm characteristics: firms that pay out a larger share of earnings, invest less, and earn higher profits tend to have shorter duration, whereas firms with low payout ratios, high investment growth, and low profitability exhibit longer duration.

Because empirical evidence on the monetary policy sensitivity of these stock characteristics is limited, I begin by examining how they influence firms' return responses to monetary policy surprises. I find that firms with low dividend yields, high market-to-book ratios, low cash-flow-to-price ratios, low profitability, high investment growth, and low payout ratios are significantly more sensitive to monetary policy. The magnitudes are economically meaningful and comparable across characteristics. For instance, firm-level regressions show that a one–standard deviation increase in the market-to-book ratio corresponds to roughly a 2-percentage-point decline in returns following a 1-percentage-point monetary policy tightening.

Given the central role of duration in monetary policy transmission, I test whether differences in cash-flow duration account for the heterogeneous sensitivity of stock returns to policy shocks. I estimate firm-level regressions that control for each characteristic and individual firms' cash-flow duration. Once duration is included, the sensitivities of all firm characteristics to monetary policy become statistically insignificant, and the corresponding coefficients decline to roughly half of their original magnitudes. Previous research has documented that the effects of monetary policy across firms vary with characteristics such as size, CAPM beta, liquidity, and financial constraints. Financial constraints, popularized by the financial accelerator model of Bernanke et al. (1999), have often been invoked to explain why growth and value stocks react differently to policy shocks (Ehrmann and Fratzscher, 2004; Maio, 2014). Following this literature, I test whether financial frictions or other firm characteristics explain the sensitivity of the six duration-linked characteristics to monetary policy. I construct standard proxies for financial constraints, including the Kaplan–Zingales, Whited–Wu, and Hadlock–Pierce indexes (Kaplan and Zingales, 1997; Whited and Wu, 2006; Hadlock and Pierce, 2010) and complement the set of controls with leverage, liquidity, and age, following studies showing their effects on firm-level investment (Ottonello and Winberry, 2020; Cloyne et al., 2023; Jeenas, 2023). I find no evidence that financial constraints, or other balance-sheet indicators account for the heterogeneous responses to monetary policy. When these controls are included—either individually or jointly—the coefficients of the six characteristics remain significant. Only when duration is added to the set of controls does the cross-sectional sensitivity of the six characteristics become insignificant.

The evidence of the importance of equity duration in the monetary policy transmission is a novel contribution to the asset pricing and monetary economics literature: Fundamental factors play a more decisive role than financial conditions in explaining the equity sensitivity to monetary policy. In particular, the central factor is how growth opportunities shape the timing of future cash flow payments, which is ultimately reflected in the sensitivity of the stock price to monetary policy. While the duration mechanism might be intuitive in fixed-income markets, duration operates differently in equities. Prior studies document that investors demand a premium for holding short-duration equities (Gonçalves, 2021; Gormsen, 2021). Moreover, the result that long-duration stocks respond more strongly to monetary policy may appear to contradict the conventional view of long-run monetary neutrality.

To better understand the propagation of the duration channel, I present a no-arbitrage asset-pricing model in which firm heterogeneity arises solely from differences in the timing of cash flow payments. This structure provides a clean setting to analyze how monetary policy affects equity valuations through duration. The model builds on Lettau and Wachter (2011) and incorporates high-frequency monetary policy shocks within a quarterly framework, with policy surprises occurring at the end of each quarter following the approach of Pflueger and Rinaldi (2022). Calibrated on quarterly data as in Lettau and Wachter (2011), the model reproduces the empirical effects of high-frequency monetary policy on nominal and real yields, remaining consistent with long-run monetary neutrality. The model also matches the empirical responses of dividend strips and aggregate stock market returns to monetary policy shocks. Using model-implied returns, I form portfolios sorted by dividend yield, market-to-book ratio, profitability, and investment growth, and find that the simulated sensitivities to monetary policy closely mirror the empirical estimates. In addition, the model replicates the key unconditional moments of the aggregate market, the expected returns of each portfolio sort, and their corresponding CAPM alphas and betas.

Because the model replicates the empirical data closely, I use it to examine two mechanisms that cannot be directly observed in the data. First, I decompose the effect of monetary policy on stock returns into contributions from the risk-free rate, expected cash flows, and the risk premium. Within the model calibration, all three channels contribute to the duration effect, with their relative importance determined by the contemporaneous response of each component to policy shocks and by their persistence parameters. Second, the model implies that shifts in economic fundamentals—such as long-run growth rates, risk-free rates, and the price of risk—can materially alter the strength of the duration channel. In particular, higher risk-free rate, and price of risk dampen the sensitivity of the equity market to monetary policy, while higher expected growth rates increase it. Quantitatively, a two–standard deviations decline in the risk-free rate raises the sensitivity of the equity market to monetary policy by roughly three percentage points.

This paper primarily contributes to the literature on the effects of monetary policy on equity markets (Bernanke and Kuttner, 2005; Ozdagli and Velikov, 2020; Nagel and Xu, 2024) and to studies examining its heterogeneous impact across firms (Ehrmann and Fratzscher, 2004; Maio, 2014; Ozdagli, 2018; Chava and Hsu, 2020). A small but growing set of papers relates monetary policy transmission to the cross-section of stock returns through equity duration. Ozdagli (2018) provides early evidence that high-duration stocks are more sensitive to monetary policy, but does not link this finding to other firm characteristics. Golez and Matthies (2022) analyze the term structure of equity using European option prices on the S&P 500 index and find, consistent with my results, that long-maturity equities rise more than short-maturity equities following expansionary policy shocks. Acosta et al. (2025) use a larger sample of dividend strips and find results consistent with mine on dividend strip returns. Chen (2022) use high-frequency identification to construct an effective measure of equity duration that incorporates both discount-rate and cash-flow effects.

This paper also contributes to the growing literature on equity duration (Dechow et al., 2004; Da, 2009; Weber, 2018; Gonçalves, 2021; Gormsen and Lazarus, 2023, 2025). Following Gormsen and Lazarus (2023), I use IBES long-term earnings growth expectations as a measure of firms' cash-flow duration. Gormsen and Lazarus (2023) show that duration drives the alphas of several prominent factors, including value, profitability, investment, and payout. Weber (2018) and Gonçalves (2021) also propose duration measures, estimating firm-level growth rates through a VAR and inferring duration from these dynamics. The advantage of using long-term earnings growth expectations is that they provide a forward-looking measure of cash-flow duration. Conceptually, the paper builds on Lettau and Wachter (2011), who develop a model that jointly explains the term structure of equity and interest rates. I extend their framework to incorporate monetary policy shocks following Pflueger and Rinaldi (2022). Numerous models have been proposed to explain the equity term structure and equity duration; for a comprehensive overview, see Van Binsbergen and Koijen (2017).

2 Data and Methodology

2.1 High-Frequency Monetary Policy Surprises

My analysis begins with a dataset of Federal Open Market Committee (FOMC) announcements from December 1994 to December 2024, covering 266 meetings. To identify causal effects of monetary policy on stock returns, I follow the high-frequency event-study literature (Kuttner, 2001; Gürkaynak et al., 2005; Nakamura and Steinsson, 2018). In the baseline specification, I measure monetary policy surprises using intraday changes in interest rates within narrow windows around FOMC statements and press conferences, following Acosta et al. (2025).[2] These discrete changes in rates can be associated with a monetary policy surprise, because the prices will only move provided the FOMC released unexpected information. My primary monetary policy surprise is the first principal component of changes in interest rates implied by the current-month and three-month federal funds futures, as well as eurodollar futures with maturities up to one year. The use of interest rates instruments with longer maturities is crucial for the analysis during the zero lower bound. Despite the stagnant target rate in the U.S., monetary policy efficacy was preserved through forward guidance. Thus, my monetary policy surprise accounts for both, target and forward guidance shocks.

For robustness, I consider several alternative measures of monetary policy surprises. First, I compute the first principal component of the same set of interest rate changes but separately around FOMC statement releases and press conferences. Second, to address the presence of information effects, I use the surprises from Jarociński and Karadi (2020), who use a Bayesian VAR to decompose high-frequency movements into monetary policy and information shocks. I also orthogonalize monetary policy surprises with respect to macroeconomic variables observed prior to FOMC announcements, thereby mitigating concerns about ex ante correlations (Bauer and Swanson, 2023).[3]

2.2 Firm-Level Data

I define equity duration analogously to bond duration as introduced by Macaulay (1938). This definition captures the average maturity of cash flows at time t:

$$Dur_t = \sum_{n=1}^{\infty} \omega_t^{(n)} \cdot n \tag{1}$$

with

[2] I thank the authors for providing the data.

[3] I download the monetary policy surprises without information effect from Marek Jarocinski's website and the daily macroeconomic variables from Michael Bauer's website.

$$\omega_t^{(n)} = \frac{E_t[CF_{t+n}]/(1+r)^n}{P_t} \tag{2}$$

r is the discount rate, CF the cash flow, and P the price. I measure equity duration following Gormsen and Lazarus (2023), using monthly long-term earnings growth expectations from the Institutional Brokers' Estimate System (I/B/E/S). This measure captures variation in expected cash-flow growth and is model-free, relying directly on analysts' forward-looking forecasts rather than on structural or valuation assumptions. Its key advantage is that it reflects market expectations of future earnings growth when the monetary policy surprise takes place, providing a transparent and forward-looking proxy for firms' cash-flow duration.

For the remaining firm characteristics, I construct an unbalanced panel using lagged quarterly accounting data from Compustat and stock prices from CRSP from January 1990 to December 2023. Dividend yield is defined as cash dividends divided by market capitalization. Market-to-book equity is defined as book equity divided by market capitalization following the definition in Daniel and Titman (2006). The cash-flow-to-price ratio is measured as operating income before depreciation divided by the firm's fiscal-year closing price. Profitability is defined as operating income before depreciation scaled by total revenue, and investment growth is the annual growth rate of total assets, following Fama and French (1995). Payout ratio is defined as total payouts over the past five years divided by total profits over the same period, as in Asness et al. (2019).

For robustness, I include several control variables. Size is measured as the logarithm of total assets; leverage as total debt divided by total assets; sales growth as the annual change in sales; beta as the estimated CAPM beta around FOMC announcements; liquidity as cash holdings divided by total assets; and firm age as the number of years since incorporation. I also construct three financial constraint indexes: the Kaplan–Zingales, Whited–Wu (WW), and Hadlock–Pierce (HP) indexes. Finally, I include momentum as the cumulative return over the past 12 months excluding the most recent month; short-term reversal as the monthly return of the previous month and long-term reversal as the returns of the past 36 months (De Bondt and Thaler, 1985; Jegadeesh and Titman, 1993). To reduce the influence of outliers, all variables are winsorized at the 5th and 95th percentiles. Prior to estimation, all firm-level variables other than returns are standardized to have zero mean and unit variance.

The dependent variable is the simple return computed using the closing prices of the FOMC announcement day and the closing price of the preceding day. Consistent with Fama and French (1993) I include stocks exchanged in the NYSE, AMEX, or NASDAQ that have a CRSP share code of 10 or 11. To ensure liquidity, stocks with a price less than \$5 or a market capitalization less than \$10 million are dropped (Daniel and Titman, 2006; Chava and Hsu, 2020). This yields a total of 672,682 data points with 12,331 different firms. Table B.2 in appendix shows the summary statistics of all firm-level variables.

2.3 Aggregate Data

For the time-series analysis, I use daily S&P 500 returns and dividend future prices obtained from Refinitiv. Dividend futures are available from November 2015 to December 2024. I collect prices of dividend futures contracts and interpolate them to obtain constant-maturity prices, analogous to Van Binsbergen and Koijen (2017). To construct dividend strips from the constant-maturity prices, I download U.S. Treasury yields from the Federal Reserve Board, using the Gürkaynak et al. (2007) dataset, which provides zero-coupon yields with maturities from one to nine years.

To estimate aggregate equity duration, I compute the market-capitalization–weighted average of monthly long-term earnings growth expectations for S&P 500 firms, using market values obtained from CRSP. I also rely on dividend yields—which are the inverse of duration under the Gordon growth model[4]—and payout ratios, which are directly linked to duration as shown by Golez and Koudijs (2023). Both variables are constructed following Goyal et al. (2024), using the monthly series available on Amit Goyal's website. Table B.1 shows the summary statistics of the returns and duration measures.

3 Aggregate Equity Duration and Monetary Policy

I begin by examining whether the maturity of cash flows is related to the transmission of monetary policy to equity valuations. Dividend strips provide an ideal setting for this analysis because all maturities are claims on the same underlying cash-flow process; their heterogeneity arises solely from differences in payoff horizons. For each maturity n, I estimate the following time-series regression:

$$r_t^n = \alpha^n + \beta^n \times mps_t + \varepsilon_t^n \tag{3}$$

Table 1 reports the response of dividend strip returns of different maturities to monetary policy surprises. The estimated coefficients are negative and increase in magnitude with maturity, indicating that longer-horizon cash flows are more sensitive to monetary policy. A one–standard deviation monetary tightening lowers one-year dividend strip returns by about 2 percentage points, while nine-year strips decline by nearly 16 percentage points. The overall market, which embeds even longer-duration cash flows, falls by roughly 18 percentage

[4] This follows from the definition of Macaulay duration in a constant-growth dividend discount model.

points. These effects are highly statistically and economically significant beyond the two-year horizon, with R^2 rising from near zero for short maturities to almost 0.1 for the market return. The monotonic pattern across maturities provides direct evidence that duration of equity matters for monetary policy and that larger maturity is linked to a stronger effect of monetary policy.

I next examine how the aggregate stock market's response to monetary policy varies with its overall duration, allowing the analysis to extend beyond the nine-year horizon covered by dividend strips. To do so, I construct several proxies for aggregate equity duration. The first proxy is derived from dividend strip prices. In the absence of arbitrage opportunities and because a dividend strip represents the price of a future aggregate dividend, the stock market price can be expressed as the sum of all dividend strip prices across maturities:

$$P_t = \sum_{n=1}^{\infty} P_t^n \tag{4}$$

This expression can equivalently be written in terms of weights that capture each maturity's contribution to the total market value: Let the sum of short-term dividend strip prices be defined as $P_t^S = \sum_{n=1}^{9} P_t^n$, and the sum of longer-term strip prices as $P_t^L = \sum_{n=10}^{\infty} P_t^n$. Equation 4 can then be expressed as $P_t = P_t^S + P_t^L$. Defining the weight of the short-term asset as $w_t^S = P_t^S / P_t$, the weight of the long-term asset follows as $w_t^L = 1 - w_t^S$. Variation in the long-term weight, w_t^L, captures changes in the aggregate duration of the equity market. When the prices of long-term dividend strips rise relative to short-term strips, the implied equity duration increases, reflecting a higher share of market value attributed to distant cash flows.

Figure 1, Panel A, plots the long-term weight w_t^L constructed using dividend strips up to six- and nine-year maturities. The long-term component accounts for roughly 80% to 95% of total market value, underscoring the very long duration of the aggregate equity market. Only a small fraction of market value is captured by dividend strips with maturities below ten years. The figure also shows a clear upward trend in w_t^L over time: the share of market value attributed to cash flows beyond nine years has risen from about 80% in 2017 to roughly 90% in 2024, indicating that the duration of the equity market has increased substantially.[5]

I complement this analysis with additional aggregate proxies for equity duration that allow for a larger sample period. First, I compute the monthly market-capitalization—weighted median LTG across all S&P 500 firms. Second, I use monthly dividend yields and payout ratios as alternative proxies for aggregate duration. Using these measures, I estimate

[5]Because the weights are bounded between 0 and 1, on population they should not have a trend, but in small sample this is possible. Regressions are therefore run after detrending the weights. Although the results remain in any case the same.

the following time-series regression of daily S&P 500 returns on monetary policy surprises interacted with lagged duration:

$$r_t = \alpha + \beta \times mps_t \times Dur_{t-1} + \varepsilon_t, \tag{5}$$

where r_t denotes the daily S&P 500 return, mps_t is the monetary policy surprise, and Dur_{t-1} represents lagged duration.

Table 2 reports how the sensitivity of the aggregate stock market to monetary policy varies with measures of equity duration. Column (1) shows that a one percentage point monetary tightening reduces market returns by 16.4 basis points, and this effect becomes significantly stronger when interacted with the long-term weight W_6^L. The interaction coefficient of -21.16 in Column (1) indicates that a higher share of long-maturity cash flows exhibit larger stock market declines following policy tightening. Using a longer maturity horizon, Column (2) shows that the coefficient on $MPS \times W_9^L$ is also negative and highly significant, confirming that the duration effect strengthens as the share of long-term cash flows increases. Columns (3)–(5) replace the dividend-strip–based measures with alternative proxies for duration, increasing the sample substantially. Consistent with the duration channel, higher payout ratios and dividend yields—which correspond to shorter-duration equities—dampen the response to monetary policy surprises. Column (5) uses the aggregate LTG and also finds a significant negative interaction coefficient of -4.93. Table 3 repeats the analysis using the orthogonalized monetary policy surprises from Bauer and Swanson (2023). Across all specifications, the interaction terms remain statistically significant and confirm that higher equity duration amplifies the stock market's response to monetary policy shocks. If anything, the estimated effects are stronger when using the orthogonalized surprises, reinforcing that the documented duration channel is not driven by information effects or correlations with macroeconomic news.

Although the preceding analysis relies on a relatively short sample due to the limited availability of high-frequency monetary policy surprises, additional insights can be drawn from longer time-series of duration proxies. The monthly dividend yield series from Goyal et al. (2024) spans more than 100 years. Figure 1, Panel B, plots dividend yields from 1871 to 2024. Consistent with the evidence from dividend strip weights, dividend yields have declined markedly in recent years, indicating an increase in equity duration over the past decade. Notably, current dividend yields are well below their historical averages. Taken together with the finding that higher duration amplifies the stock market's response to monetary policy, this suggests that equity markets may now be more sensitive to monetary policy shocks than at any point in the past century.

4 Duration and the Cross-Section Response to Monetary Policy

In this section, I examine the effect of monetary policy on the cross-section of stock returns. The main variable of interest is cash-flow duration, measured as the median LTG expectation from IBES. I begin by constructing quintile portfolios sorted by duration. At each FOMC announcement, firms are assigned to portfolios based on their lagged duration, and the portfolio return is computed as the market-capitalization–weighted average of individual stock returns.

Figure 6 plots portfolio returns against monetary policy surprises for firms in the highest (Panel A) and lowest (Panel B) duration quintiles. The negative slope in Panel A shows that stocks with long cash-flow durations experience large declines in response to monetary policy tightening. In contrast, the relationship in Panel B is much weaker, indicating that short-duration portfolios are relatively insensitive to monetary policy shocks. The blue line shows the slope of both figures. Long duration portfolios have a slope of -17 and a R^2 of 0.14, while the short duration assets have a slope of -6 and R^2 of 0.04. This difference in slopes highlights that the sensitivity of equity returns to monetary policy increases with firms' cash-flow duration, consistent with the duration channel documented in the aggregate analysis.

I next conduct a more rigorous test by estimating firm-level regressions of daily returns on monetary policy surprises interacted with equity duration under several model specifications. To ensure that time- and cross-sectional heterogeneity does not confound the results, I include firm, industry, and time fixed effects in the regression. I also estimate an extended specification that controls for firm-level characteristics—specifically, market beta and size—and their interactions with monetary policy surprises. The estimated model is given by:

$$\begin{aligned} r_{i,t} = \beta_0 + \beta_1 \times mps_t + \beta_2 \times Dur_{i,t-1} + \beta_3 \times (mps_t \times Dur_{i,t-1}) \\ + \beta_4 \times X_{i,t-1} + \beta_5 \times (mps_t \times X_{i,t-1}) + \delta_s + \gamma_i + \alpha_t + \varepsilon_{i,t}, \end{aligned} \tag{6}$$

where i denotes the firm, t the FOMC announcement day, $r_{i,t}$ is the firm-level stock return, mps_t represents the monetary policy surprise, $Dur_{i,t-1}$ is the lagged equity duration, $X_{i,t-1}$ is a vector of control variables, and γ_i, α_t, and δ_s denote firm, time, and industry fixed effects, respectively.

Panel A of Table 4 presents firm-level regressions of stock returns on monetary policy surprises, equity duration, and their interaction, under different econometric specifications. Across all models, the interaction term between monetary policy surprises and duration is negative and statistically significant, indicating that firms with longer cash-flow durations are more sensitive to monetary policy. In the baseline specification without fixed effects (Column 1), a one percentage point tightening in monetary policy lowers stock returns by approximately 9.6 percentage points, and this effect is amplified for high-duration firms. The return of a firm with one standard deviation higher duration falls additionally 3.4 percentage points after a one percentage point increase in monetary policy surprise. The inclusion of firm and time fixed effects in Column 2 raises explanatory power while leaving the main results unchanged. Columns 3 to 5 further add industry fixed effects and controls for size and beta interacted with monetary policy surprises. The magnitude of the interaction term remains stable, ranging between −3.4 and −1.91, and retains statistical significance throughout.

Panel B of Table 4 examines the robustness of the duration effect across alternative definitions of monetary policy surprises. The estimated coefficients on duration remain negative and statistically significant, confirming that longer-duration firms exhibit stronger sensitivity to monetary policy. In Column (1), the baseline specification using the benchmark monetary event measure yields a coefficient of −3.4. Columns (2)–(3) separate monetary policy surprises associated with FOMC statements and press conferences. Both coefficients are negative and significant, with magnitudes of −3.70 and −1.27, respectively, indicating that duration amplifies the stock market response to unexpected policy news released through either communication channel. Columns (4)–(5) replace the baseline shocks with the Bauer and Swanson (2023) and Jarociński and Karadi (2020) surprise measures. The interaction coefficients remain negative and highly significant, confirming that the documented duration effect is robust to alternative high-frequency identification strategies. Overall, the results show that the sensitivity of long-duration firms to monetary policy shocks is not specific to a particular econometric specification, control variable, event type or measurement of policy surprises.

5 Monetary Policy and Stocks' Characteristics

Among the various dimensions of stock heterogeneity, the distinction between value and growth stocks stands out as particularly important. This dichotomy lies at the heart of the asset pricing literature, supported by an extensive body of research on the value premium and value investing that continues to this day (Fama and French, 2021, 2025; Campbell et al., 2025). Moreover, the importance of the value-growth distinction extends beyond academia: financial commentators and market participants routinely frame discussions of monetary policy in terms of its asymmetric impact on high-valuation firms, particularly in the technology sector. I include three different types of valuation to fundamental ratios:

dividend yields, market-to-book equity, and cash-flow-price ratio. In addition, I consider profitability and investment growth—which, together with market, size, and value, comprise the Fama–French five-factor model—as well as the payout ratio, following Gormsen and Lazarus (2023), who link payout policy to equity duration. Each variable is defined so that higher values correspond to firms that are more growth-oriented and, therefore, exhibit longer cash-flow duration.

Following the approach in the previous section, I begin with a portfolio analysis. At each FOMC announcement, firms are sorted into quintiles based on the lagged value of each characteristic. For each quintile, I compute the value–weighted average of firms' daily returns. I then estimate a time-series regression of each portfolio's return on monetary policy surprises to assess how sensitivity to monetary policy varies across the distribution of firm characteristics.

Figure 3 plots the estimated sensitivity of portfolio returns to monetary policy surprises across quintiles of firm characteristics. Across all panels, portfolios associated with growth-oriented firms—those with low dividend yields, high market-to-book ratios, low cash-flow-to-price ratios, low profitability, high investment growth, and low payout ratios—exhibit substantially stronger negative responses to monetary policy tightening. In all cases, the sensitivity of returns to monetary policy surprises decreases monotonically across quintiles. The differences between the extreme quintiles are economically significant: for example, the policy response in the highest growth quintile is roughly 6 percentage points more negative than in the lowest quintile across most characteristics.

To further examine this pattern under alternative econometric specifications, I estimate firm-level fixed effects regressions analogous to those used in the duration analysis, but replacing duration with each firm characteristic individually. The specification follows Equation 6, where the interaction between monetary policy surprises and the lagged value of the characteristic captures how sensitivity to policy surprises varies across firms. This approach allows to isolate the contribution of each characteristic to monetary policy sensitivity while controlling for firm, time, and industry fixed effects, as well as other firm-level controls.

Table 5 reports firm-level fixed effects regressions of stock returns on monetary policy surprises interacted with individual firm characteristics. The columns correspond to alternative econometric specifications, analogous to those used in the duration analysis, progressively adding firm, time, and industry fixed effects as well as controls for size and beta. Across all characteristics, the coefficients on the interaction terms are negative and statistically significant, indicating that firms with higher values of these characteristics—which correspond to more growth-oriented and longer-duration profiles—are more sensitive to monetary policy shocks. Quantitatively, the marginal effect of monetary policy is similar across each characteristic. For example, a one percentage point monetary policy tightening reduces returns of high-growth-oriented firms by roughly 1.0 to 2.7 percentage points more than those of their counterparts. This pattern holds consistently across all specifications. Among individual characteristics, the strongest sensitivities appear for dividend yield and profitability, followed closely by market-to-book equity and investment growth.

Overall, these results suggest substantial heterogeneity in the response of stock returns to monetary policy. Stocks with high valuations, low profitability, high investment growth, and low payout ratios are significantly more sensitive to monetary policy. These findings provide an important contribution to the asset-pricing literature by linking well-established cross-sectional return patterns to monetary policy transmission. They demonstrate that the characteristics underlying major factor premiums also govern the degree of exposure to monetary policy.

6 The Hidden Effects of Duration

The results of the previous section reveal substantial heterogeneity in the response of stock returns to monetary policy across firm characteristics. A common feature of these characteristics is that they are closely related to firms' cash-flow duration. This raises the question of whether the observed cross-sectional differences in policy sensitivity can be explained by variation in firms' cash-flow maturity. To address this question, I estimate panel fixed effects regressions of daily stock returns on monetary policy surprises interacted with firm characteristics, while controlling for firms' cash-flow duration. This specification can be interpreted as a double sort on the firm characteristic and cash-flow duration. In other words, it addresses the question whether firms that are similar in cash-flow duration but differ strongly in the other characteristic respond differently to monetary policy.

Table 6 reports the results from regressions of stock returns on monetary policy surprises interacted with firm characteristics, controlling for firms' cash-flow duration. Once duration is included, the interaction coefficients between monetary policy and firm characteristics become substantially smaller in magnitude and, in most cases, lose statistical significance. For example, the sensitivity of dividend yields, cash flow to price ratio, and profitability to monetary policy declines to less than half of its baseline estimates. Similarly, the previously significant effects associated with market-to-book equity, investment growth, and payout ratio are largely attenuated after controlling for duration. The interaction coefficient between monetary policy surprises and cash-flow duration, by contrast, remains highly statistically significant in all cases, with magnitudes similar to those of the regressions without the six characteristics. These findings indicate that differences in firms' cash-flow maturity account for most of the cross-sectional heterogeneity in monetary policy sensitivity. In other words, once duration is held constant, firm characteristics such as valuation, profitability, investment, and payout no longer explain differential responses to policy shocks, consistent with the interpretation that equity duration is the primary mechanism linking monetary policy to stock returns.

Including duration in the regression substantially reduces the sample size, since long-term growth expectations are not available for all firms in the CRSP/Compustat universe. To verify that the attenuation of coefficients is not driven by sample selection, Appendix A, Table C.1, re-estimates the regressions using only the subsample of firms for which duration data are available, but without explicitly controlling for duration. In this restricted sample, the coefficients on firm characteristics remain statistically significant and economically large, consistent with the baseline results. This confirms that the loss of significance observed when controlling for duration is not due to differences in sample composition, but rather to the fact that duration itself explains the heterogeneous response of firm characteristics to monetary policy surprises. Table C.2 in the appendix repeats the analysis using orthogonalized monetary policy surprises following Bauer and Swanson (2023). The results remain both economically and statistically significant, and if anything, the attenuating effect of duration becomes more visible.

The monetary economics literature offers several explanations for heterogeneity in the effects of monetary policy across firms. In the context of growth versus value stocks, one prominent hypothesis attributes these differences to financial frictions, suggesting that variation in firms' responses arises from differences in financial constraints. However, the link between financial constraints and monetary policy sensitivity is theoretically ambiguous and empirically unsettled. Both empirical and theoretical studies reach conflicting conclusions regarding whether financially constrained firms should respond more or less to monetary policy (Ozdagli, 2018; Chava and Hsu, 2020).[6] Moreover, while growth firms may be more financially constrained due to their greater reliance on external finance, they could simultaneously benefit from improved borrowing conditions as a result of their higher asset valuations (Ehrmann and Fratzscher, 2004).

To assess whether other firm characteristics can account for the cross-sectional variation in monetary policy sensitivity observed across dividend yields, market-to-book equity, cash-flow-to-price ratio, profitability, investment growth, and payout ratio, I estimate a panel regression that controls for a broader set of firm characteristics. In addition to size and

[6]Ozdagli (2018) show that the financial accelerator framework of Bernanke et al. (1999) implies that constrained firms should be less responsive to monetary policy, while models with binding credit constraints, such as Kiyotaki and Moore (1997), predict that an easing of monetary policy relaxes borrowing constraints, making financially constrained firms more responsive.

beta, which are included in the baseline specification, I add leverage, sales growth, liquidity, and firm age as controls. Each of these variables has been shown to contribute to heterogeneous firm responses to monetary policy in prior work. Furthermore, I include a financial constraints measure following Whited and Wu (2006).[7]

Table 7 reports firm-level regressions of daily stock returns on monetary policy surprises interacted with firm characteristics, controlling for a comprehensive set of variables that could otherwise account for cross-sectional heterogeneity. Across both panels, the inclusion of additional controls—leverage, sales growth, liquidity, firm age, and financial constraints—does not materially alter the main findings. The coefficients on the interactions between MPS and all firm characteristics remain negative and statistically significant in most specifications. This indicates that firms with growth-oriented profiles, characterized by high valuations, low profitability, high investment, and low payouts, continue to exhibit stronger sensitivity to monetary policy even after controlling for other potential channels. However, when cash-flow duration is included in the regression, the coefficients on all firm characteristics lose statistical significance and become much smaller in magnitude. This attenuation confirms that duration subsumes the explanatory power of these characteristics for monetary policy sensitivity, consistent with the view that differences in firms' cash-flow maturity are the fundamental source of cross-sectional heterogeneity.

Figures C.1 and C.2 in appendix report the coefficients from interacting each characteristic with monetary policy while controlling for different sets of variables. Figure C.1 controls separately for each of the commonly used financial-constraint indices in the literature, KZ-, SA-, SEB-, and WW-index (Kaplan and Zingales, 1997; Whited and Wu, 2006; Hadlock and Pierce, 2010; Schauer et al., 2019). It shows that these indices do not drive the relationship between the characteristics and the returns sensitivity to monetary policy. Figure C.2 repeats the analysis while controlling for momentum, short-term reversal, and long-term reversal. In all cases, the interaction coefficients for dividend yield, market-to-book equity, cash-flow-to-price ratio, profitability, investment growth, and payout ratio remain economically and statistically significant.

7 The Model

In this section, I provide a model to better understand the empirical findings on the duration channel. The model serves three main purposes. First, it demonstrates that a framework featuring only heterogeneity in firms' cash-flow duration can replicate the key empirical re-

[7] I also estimate regressions using the financial constraints indexes from Kaplan and Zingales (1997) and Hadlock and Pierce (2010), obtaining similar results.

sults on the effect of monetary policy in the stock market. Second, it shows that introducing monetary policy shocks does not affect the model's ability to match standard quarterly moments of the stock market, including the value premium and CAPM alphas and betas. Third, since the model successfully reproduces the empirical patterns, I use it to understand the duration channel better. I analyse the underlying drivers of the duration channel, breaking down the effect in risk-free rate, cash flow expectations, and risk premium effects. I also conduct sensitivity analyses with respect to the unconditional means and persistency of the economy's state variables.

The model builds on Lettau and Wachter (2011), which is a dynamic risk-based model, whose underlying dynamics originate from dividend strips. The economy has an aggregate equity claim with dividends at time t denoted by D_t, where $d_t = log(D_t)$ evolves according to

$$\begin{aligned} \Delta d_{t+1} &= z_t + \sigma_d \epsilon_{d,t+1} \\ z_{t+1} &= (1-\phi_z)g + \phi_z z_t + \sigma_z \epsilon_{z,t+1} \end{aligned} \tag{7}$$

ϵ_t are normally distributed mean-zero shocks with unit variance and σ_d, σ_z are their volatilities. g is the unconditional mean of dividend growth.

To model nominal bonds, the model specifies a process for inflation. Let P_t denote the price level and $\Pi = log(P_t)$, the inflation process is:

$$\begin{aligned} \Delta \pi_{t+1} &= q_t + \sigma_\pi \epsilon_{\pi,t+1} \\ q_{t+1} &= (1-\phi_q)\bar{q} + \phi_q q_t + \sigma_q \epsilon_{q,t+1} \end{aligned} \tag{8}$$

where $\bar{q}$ is the unconditional mean of inflation and σ_π, σ_q are their volatilities.

The model also specifies similar processes for the risk-free rate and price of risk:

$$\begin{aligned} r^f_{t+1} &= (1-\phi_r)\bar{r}^f + \phi_r r^f_t + \sigma_r \epsilon_{r,t} \\ x_{t+1} &= (1-\phi_x)\bar{x} + \phi_x x_t + \sigma_x \epsilon_{x,t+1} \end{aligned} \tag{9}$$

where $\bar{r}^f$ and $\bar{x}$ denote the unconditional mean of the risk-free rate and price of risk respectively, and σ_r, σ_x are their standard deviation. $\rho_{i,j}$ denotes the correlation of variable i and j. Following Lettau and Wachter (2011) I assume that realized dividend and expected dividend are negatively correlated, $\rho_{dz} < 0$ and realized dividend is uncorrelated with price of risk, $\rho_{dx} = 0$. The stochastic discount factor is given by

$$M_{t+1} = \exp\left(-r^f_{t+1} - \frac{1}{2}x_t^2 - x_t\epsilon_{d,t+1}\right)$$

The stochastic discount factor has the property that only fundamental dividend risk is priced. Let $P_t^{(n)}$ denote the time-t price of the asset that pays the aggregate dividend at time $t+n$. Then, the log price-dividend ratio of a dividend claim is affine on the state variables (see Appendix A for complete derivation):

$$\frac{P_t^{(n)}}{D_t} = \exp\left(A^{(n)} + B_z^{(n)}(z_t - g) + B_r^{(n)}(r^f_{t+1} - \bar{r}^f) + B_x^{(n)}(x_t - \bar{x})\right) \tag{10}$$

with coefficients

$$B_z^{(n)} = \frac{1-\phi_z^n}{1-\phi_z} \qquad\qquad B_r^{(n)} = -\frac{1-\phi_r^n}{1-\phi_r}$$

and

$$B_x^{(n)} = B_x^{(n-1)}\phi_x - \sigma_d - B_z^{(n-1)}\sigma_z\rho_{zd} - B_r^{(n-1)}\sigma_r\rho_{rd}$$

$$A^{(n)} = A^{(n-1)} + g - \bar{r}^f + \tfrac{1}{2}\left[(B_z^{(n-1)})^2\sigma_z^2 + (B_r^{(n-1)})^2\sigma_r^2 + (B_x^{(n-1)})^2\sigma_x^2 + \sigma_d^2\right] + B_z^{(n-1)}\sigma_z\sigma_d\rho_{zd}$$
$$+B_r^{(n-1)}\sigma_r\sigma_d\rho_{rd} + B_x^{(n-1)}B_z^{(n-1)}\sigma_x\sigma_d\rho_{xz} - \bar{x}\sigma_d - \bar{x}B_z^{(n-1)}\sigma_z\rho_{zd} - \bar{x}B_r^{(n-1)}\sigma_r\rho_{rd}$$

with boundary conditions $B_x^{(0)} = A^{(0)} = 0$.

The aggregate market portfolio is the claim to all future dividends. Therefore, under certain parametric conditions, the price dividend ratio of the market is

$$\frac{P_t}{D_t} = \sum_{n=1}^{\infty}\frac{P_t^{(n)}}{D_t} = \sum_{n=1}^{\infty}\exp\left(A^{(n)} + B_z^{(n)}(z_t - g) + B_r^{(n)}(r^f_{t+1} - \bar{r}^f) + B_x^{(n)}(x_t - \bar{x})\right) \tag{11}$$

The risk premium of a dividend claim depends on the loadings of the equity term structure. Because the correlation between dividend growth and the price of risk is assumed to be zero, the equity premium is

$$E_t(R_{t+1}^{(n)} - R_{t+1}^f) \approx [\sigma_d + B_z^{(n-1)}\rho_{dz}\sigma_z + B_r^{(n-1)}\rho_{dr}\sigma_r]x_t$$

Where ρ_{dz} and ρ_{dr} denote the correlations of dividend growth with expected dividend growth and risk-free rate, respectively. The expression in parentheses can be interpreted as the quantity of risk, whereas x_t is the price risk. To understand how the model generates a higher risk premium for short-term assets, notice that the condition $\rho_{dx} = 0$ implies that agents are indifferent about holding assets which only differ in their exposure to discount rate risks. This aspect is important, because in consumption-based models, such as the habits model from Campbell and Cochrane (1999) and the long-run risk model from Bansal and Yaron (2004), agents display aversion to discount rate risks. In such models, securities with longer-dated payouts are more vulnerable to discount rate risks, prompting agents to seek a substantial risk premium for holding these securities. Consequently, a negative correlation between the stochastic discount factor and discount rate risk results in higher risk-premium for long-term assets.

The second important condition in the model is $\rho_{dz} < 0$, implying that shocks to expected dividend growth serve as a hedge against actual dividend growth shocks. In this framework, long-duration assets, which load more on dividend growth due to positive growth rates, become less risky and agents require a smaller risk premium to hold them. This condition ultimately gives rise to a short-duration premium.

All parameters of the model are calibrated according to Lettau and Wachter (2011) and adjusted to quarterly frequency. Table C.3 in Appendix provides an overview of all parameter values.

7.1 Identification of Monetary Policy

To include a high-frequency monetary policy shock, I follow the modeling approach of Pflueger and Rinaldi (2022) and differentiate between low- and high-frequency variables. Specifically, I assume that at the conclusion of each quarter, there is a FOMC meeting that potentially yields a monetary policy shock. To analyze the effects of these meetings, I distinguish between shocks before and after FOMC announcements. Variables prior to the FOMC announcement at time t are different from those post-FOMC at time $t-1$, as they encompass information from the shock at the period t excluding the FOMC decisions.[8] The shock is defined as:

$$\epsilon_{i,t} = \epsilon_{i,t}^{pre} + \psi_i \epsilon_t^{MP} \tag{12}$$

where $i \in \{d, r, z, x, q, \pi\}$. ϵ_t^{MP} is a monetary policy shock with mean 0 and standard deviation σ_{MP}. The high-frequency returns around monetary policy news are calculated using post- and pre-FOMC prices. I calibrate ψ_i based on a number of empirical studies.

[8] Other studies that incorporate monetary policy into asset pricing models, such as Kekre et al. (2024), also separate monetary policy shocks from other shocks affecting the risk-free rate, with non-monetary shocks accounting for the overwhelming share of variation in the short-rate fundamental. In a similar spirit, the quarterly shocks in my framework can be interpreted as shocks to underlying fundamentals, such as productivity or credit conditions.

I calibrate the effect of monetary policy shocks on one-year breakeven inflation using the estimates in Acosta et al. (2025). I then set the impact on real rates so that a one-unit monetary policy shock generates a one-unit response in the one-year nominal yield, consistent with the construction of the monetary policy surprises. To identify the effect of monetary policy on expected dividend-growth shocks, I construct an empirical proxy for z_t using the consumption–dividend ratio, following Lettau and Wachter (2007), and regress this measure on monetary policy surprises. The estimates indicate that a one-unit monetary policy tightening reduces z_t by 88 basis points. After accounting for this effect on expected cash flows, I use dividend futures to isolate the impact of monetary policy on the risk premium. Based on one-year risk-adjusted expected cash flows, I find that a one-unit tightening surprise lowers these risk-adjusted expectations by roughly 80 percent of their standard deviation. Given that the effect of monetary policy on dividend growth is already calibrated, the remaining impact must be attributed to changes in the price of risk. I therefore calibrate the model so that the response of the price of risk matches the empirical response of risk-adjusted expected cash flows, which corresponds to one standard deviation.

I assume that the dividend payment and inflation in the current quarter are not impacted by the FOMC decisions, making the post- and pre-FOMC dividend growth and inflation equal: $\Delta d_{t+1}^{pos} = \Delta d_{t+1}^{pre}$ and $\Delta \pi_{t+1}^{pos} = \Delta \pi_{t+1}^{pre}$.[9] Finally, I match the standard deviation of the monetary policy shock to the empirical standard deviation of monetary policy surprise of 0.04.

7.2 Portfolio Sorts

The construction of growth and value portfolios based on price-dividend rations follows the methodology of Lettau and Wachter (2011), using a deterministic process for cash flow shares. Specifically, a firm produces a portion s_t^i of the aggregate dividend, increasing at a steady quarterly rate of g_s — which is set to 5% — for the initial 100 quarters and then decreasing at the same rate for the subsequent 100 quarters. The maximum value of a share is $\bar{s} = \underline{s}(1 + g_s)^{N/2}$ with $\underline{s}$ adjusted so the sum of all shares equals one. This modelling approach reflects the varying dividend contributions of firms at different stages of their life cycle. I simulate 200 firms over a 50-year span, which represents a full firm life cycle.

No-arbitrage implies that the price of each firm is its share of the aggregate dividend times its present value:

[9] This assumption is analogous to Pflueger and Rinaldi (2022)'s assumption regarding no immediate effect of monetary policy on the consumption and output in their model.

$$P_t^i = \sum_{n=1}^{\infty} s_{t+n}^i P_t^{(n)} \tag{13}$$

In this model, firms are categorized as value or growth based on their lagged price-to-dividend ratios. Value firms are defined by their low price-to-dividend ratios, indicating a higher proportion of dividends in the short term. Consequently, value firms represent assets with shorter duration. I simulate 50.000 quarters of data and create 10 decile portfolios averaging the firm returns within each portfolio.

To sort firms by additional characteristics, I follow the approach of Gormsen and Lazarus (2023). To construct market-to-book equity, profitability, and investment growth, I compute the book value of equity as a measure of fundamental value that abstracts from time-varying discount rates. Specifically, the book value is defined as the present value of future dividends discounted using the unconditional average market risk premium. Market-to-book equity is then the ratio of the market value of equity to this book value. Firm-level profitability is calculated as dividends divided by the lagged book value of equity, and investment growth is measured as the one-period change in the book value.

7.3 Monetary Policy and the Duration Channel

The stock market's duration is nonlinear because prices are nonlinear functions of expected cash flows and discount rates (see Equation 11). The model, however, allows us to work with dividend claims and zero-coupon bonds, which are linear in the state variables, to gain analytical insight into the duration channel. To build intuition, it is useful to begin by examining the effect of monetary policy on bond yields. Panel A of Figure 6 shows the model-implied responses of real and nominal yields to a monetary policy shock. A positive shock raises yields across all maturities, with an effect of approximately one percentage point on short-term yields. Consistent with the empirical evidence (Nakamura and Steinsson, 2018; Acosta et al., 2025), the impact diminishes with maturity. The mechanism is straightforward to see from the expression for the effect of monetary policy on real yields:

$$y^{(n)}{}_{t+1}^{hf} = -\frac{1}{n}[B_r^{(n)}\sigma_r\psi_r + B_{r,x}^{(n)}\sigma_x\psi_x]\varepsilon_{t+1}^{MP} \tag{14}$$

According to Equation 14, a tightening surprise raises both the risk-free rate and the risk premium, generating an unambiguous increase in yields. To see why the effect diminishes with maturity, consider the simplified case in which monetary policy affects only the risk-free rate and not the risk premium. Recall that the impact of a monetary policy shock on the risk-free rate is given by

$$\frac{1}{n}\frac{1-\phi_r^n}{1-\phi_r}\sigma_r\psi_r > 0$$

This expression is positive, strictly decreasing in n, and converges to zero as $n \to \infty$. Hence, monetary policy has no effect on long-term yields, and the model is consistent with long-run monetary neutrality.[10]

Next, I analyze the effect of monetary policy on dividend-claim returns. Panel B of Figure 6 shows the model-implied responses of dividend claims to a monetary policy shock. Consistent with the empirical evidence, the impact strengthens with maturity: longer-maturity dividend strips react more strongly to monetary policy. To understand the source of this pattern, it is useful to derive the effect of monetary policy on dividend-claim returns analytically:

$$r^{(n)}{}_{t+1}^{hf} = [B_z^{(n)}\sigma_z\psi_z + B_r^{(n)}\sigma_r\psi_r + B_x^{(n)}\sigma_x\psi_x]\varepsilon_{t+1}^{MP} \tag{15}$$

The effects at longer maturities in the model are driven by the loadings on expected cash flows, the risk-free rate, and the price of risk, all of which are determined by the quarterly calibration. Multiplying these loadings by $\sigma\psi$ yields the sign and magnitude of the return response to a monetary policy shock. Because the product $B\sigma\psi$ is negative in all cases, a tightening surprise generates an unambiguous decline in returns. Unlike the case of bond yields, however, the magnitude of the effect increases with maturity. To see why, consider again the simplified case in which monetary policy affects only the risk-free rate. In this setting, it is straightforward to show that the impact of monetary policy converges to a constant,

$$-\frac{\sigma_r\psi_r}{1-\phi_r} < 0.$$

Hence, longer-duration equity claims are more sensitive to monetary policy.

Equation 15 offers a natural way of decomposing the effect of monetary policy on the stock market, in effects on risk-free rate, expected cash flow, and risk premium, a topic which is still highly debated up to today (Bernanke and Kuttner, 2005; Nagel and Xu, 2024). This decomposition helps to understand which of the three components drives the response of monetary policy. Figure 5 shows that under the chosen parameterization, all three components contribute materially to the stock market's response to monetary policy, with the risk premium playing a slightly larger role for short maturity and the risk free rate playing

[10] If monetary policy affects only the risk premium, the impact on yields is positive and increasing with maturity, converging to a constant. However, this effect is small, and the risk-free rate channel dominates.

a stronger role for longer maturities. In the model, each variable follows an AR(1) process with monetary policy shocks entering directly into the innovation term. As a result, the effects of a monetary policy shock persist into subsequent periods and are amplified through the duration channel. Notice, however, that in this model the duration channel weakens at very long maturities when considering shocks to x_t. The reason is that the sensitivity of prices to x_t (captured by B_x) is jointly determined with the sensitivity to expected dividend growth. Because expected dividend growth becomes increasingly important for valuing far-future dividends and because it is negatively correlated with realized dividend shocks, the impact of higher discounting on distant cash flows is dampened (Lettau and Wachter, 2007). As a result, B_x is strongly convex and begins to rise again at very long maturities. This does not alter the main result that monetary policy sensitivity increases with duration, but it does imply that the duration channel cannot be attributed to the risk-premium for very long maturities.

7.4 Simulated Results and Discussion

The model replicates the data closely, producing an equity risk premium of 7.8% and a standard deviation of 19.1%. The simulated response of the aggregate stock market to a monetary policy shock is 19 percentage points, closely matching the empirical estimates reported in Table 1. Figure 5 illustrates the response of quintile portfolios sorted by price dividend ratio, market-to-book equity, profitability, and investment growth to monetary policy based on 50,000 quarters of simulated data. All portfolio responses align with the decreasing pattern observed in the empirical data, with high duration portfolios reacting more to monetary policy. While the average response of the value portfolio—sorted by price-dividend ratio—to monetary policy is approximately 16 percentage points, the growth portfolio responds by over 23 percentage points. Portfolios sorted by market-to-book equity, profitability, and investment growth show very similar patterns. Although these simulated responses are slightly higher than the empirical findings, the model produces a spread return between the first and fifth deciles of roughly 7 percentage points, closely matching the empirical results.

The observation that long-duration stocks—particularly growth stocks—decline more than value stocks raises the question of whether the introduction of monetary policy shocks affects the value premium and the risk premia of other equity factors. In this model, the answer is yes, but the effect is minimal. To understand this, first note that the expectation of monetary policy shocks is zero. Consequently, high-frequency log returns will, on average, also be zero. However, when calculating the equity risk premium, both the expectation and the variance of log returns play a role due to Jensen's inequality. As a result, the expected value of high-frequency returns will be nonzero, albeit small, because the standard deviation of high-frequency monetary policy shocks is very low. In other words, while the inclusion of monetary policy shocks slightly alters the quantity of risk in the model, the change is so minor that the equity premium and the value premium remain virtually unaffected.

To evaluate the performance of the model relative to quarterly data, Table 8 presents the expected returns, standard deviations, and betas for portfolio deciles sorted on price-dividend ratio, as produced by the model and observed in the data. Panel A presents the results from the model simulation without monetary policy shocks, Panel B incorporates monetary policy shocks into the model, and Panel C displays the corresponding statistics from the data, which are estimated using Fama and French portfolios sorted by market-to-book equity from 1952 to 2018. The table confirms that the value premium produced by the model without monetary policy shocks—4.6, as highlighted in Lettau and Wachter (2011)—is very similar to the value premium generated when monetary policy shocks are included, which is 5.3. This is also fairly close to the empirical estimate of 3.87. Finally, the decisive factor for the value premium is not only that growth stocks exhibit lower expected returns, but that their lower expected returns are not fully explained by higher betas. As Table 8 shows, this empirical result is also reproduced successfully in the model.

As a final exercise, I conduct a sensitivity analysis to examine how the duration channel changes when underlying parameters of the economy vary. Table 9 reports the response of the stock market to monetary policy shocks when altering the unconditional means and persistence parameters of the model's state variables. Holding all other parameters constant, these variations affect the implied duration of the equity market, thereby altering its sensitivity to monetary policy. Higher discount rates shorten duration, weakening the response of the market to policy shocks. For instance, when the unconditional mean of the risk-free rate is two standard deviations above its baseline value, the magnitude of the sensitivity of the stock market to monetary policy declines to 18.9. Similarly, an increase in the price of risk reduces the magnitude of the sensitivity to 16.1. The reason is that higher discount rates reduce duration, making the market less sensitive to monetary policy. In contrast, when the unconditional mean of expected cash-flow growth rises by two standard deviations, the stock market becomes more sensitive to monetary policy. I also vary the persistence parameters of the risk-free rate and the price of risk between 0.5 and 0.99. Lower persistence in the risk-free rate and price of risk substantially dampens the transmission of monetary policy, reducing stock market sensitivity to 9 and 14 percentage points, respectively. This occurs because persistence governs the propagation of monetary policy shocks to long-horizon expectations: when persistence falls, current shocks are less transmitted to distant cash flows. Overall, while the effect of monetary policy on the stock market remains unconditionally negative, the strength of the duration channel depends critically on the structural parameters governing discount rates, risk premia, and cash-flow expectations.

8 Conclusion

This paper documents that equity duration is central in the transmission of monetary policy to the stock market. Using a combination of dividend futures, aggregate time-series data, and firm-level data, I show that the sensitivity of stock returns to monetary policy depends systematically on the duration of firms' cash flows. At the aggregate level, equity duration amplifies the stock market response to monetary policy. At the firm level, duration explains much of the heterogeneity in monetary policy sensitivity across key characteristics such as valuation to fundamental ratios, profitability, investment growth, and payout ratio. That is, equity duration drives out the heterogeneous effects of monetary policy originally determined by these characteristics. The empirical results bridge the asset-pricing and monetary economics literature. Traditional explanations for cross-sectional heterogeneity which are related to financial frictions, fail to account for the observed differences in policy sensitivity. Instead, fundamental factors shaping the timing of future cash flow payments explain the sensitivity to monetary policy.

To interpret these results, I present a model in which heterogeneity across firms arises solely from differences in cash-flow maturity. The model replicates the main empirical patterns: long-duration assets exhibit stronger sensitivity to monetary policy shocks, the aggregate market response aligns with observed data, and the decomposition of dividend claims returns reveals that all three channels—risk-free rate, expected cash flows, and risk premium—contribute to policy transmission. Sensitivity analysis further shows that the strength of the duration channel depends critically on the persistence and unconditional means of macroeconomic state variables. Overall, the results highlight that the equity market's sensitivity to monetary policy is not fixed but varies with the maturity structure of expected cash flows. Periods of low discount rates and elevated growth expectations imply unusually long equity duration and might have consequences for the sensitivity of the stock market to monetary policy.

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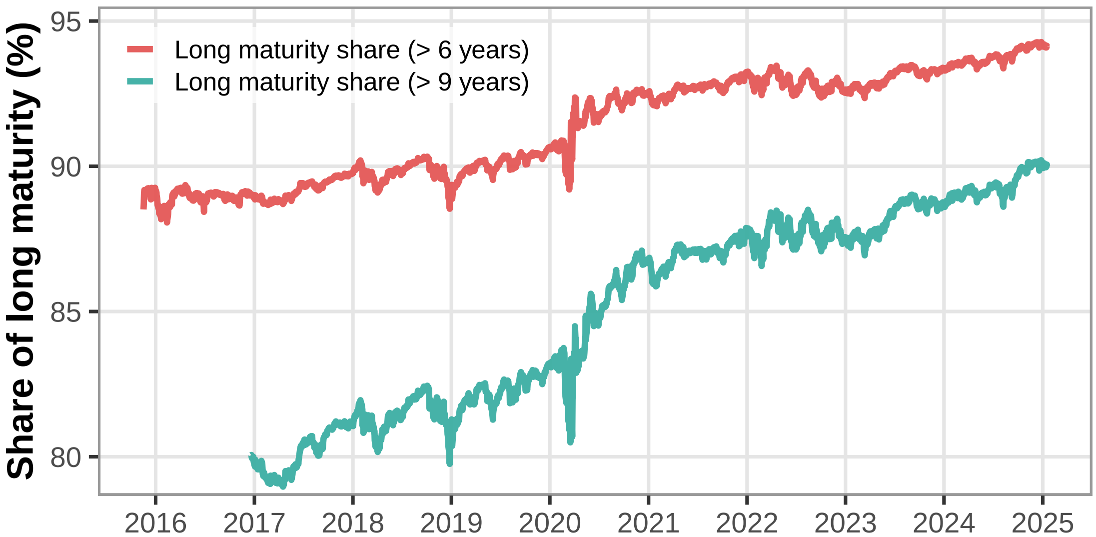
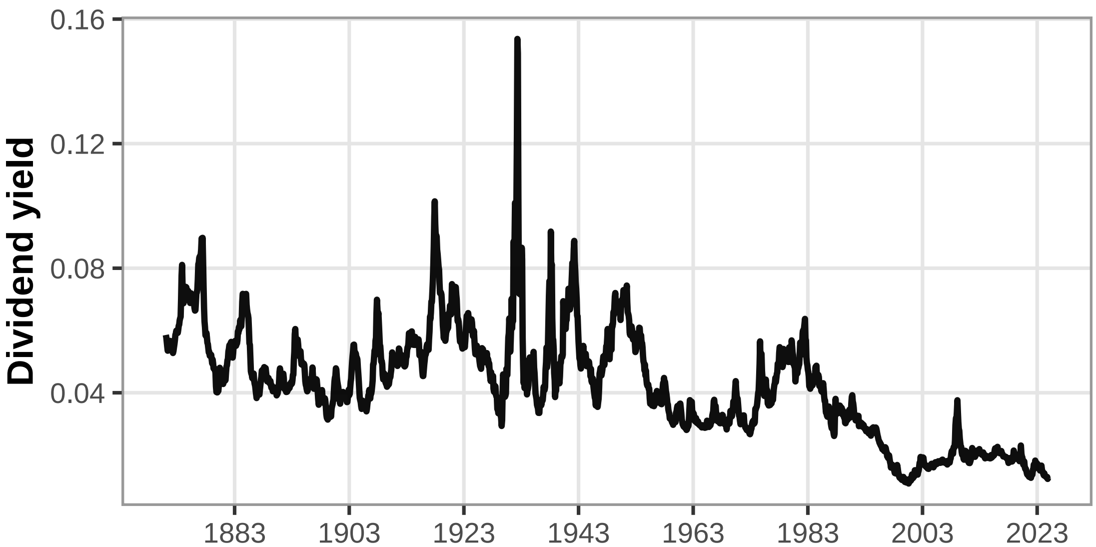
Figure 1: **Development of Aggregate Equity Duration over Time**

(a) Long-Maturity Weights

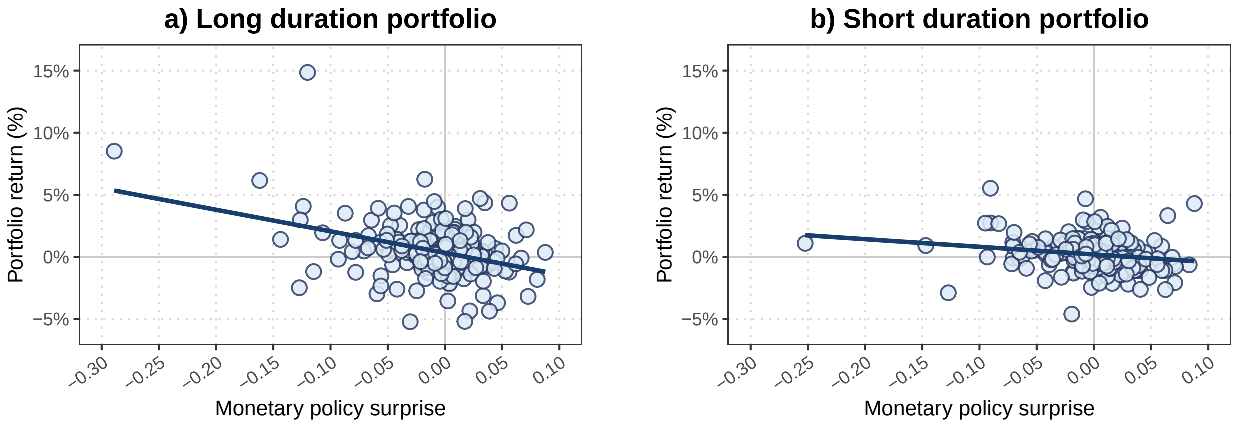


(b) Dividend Yield



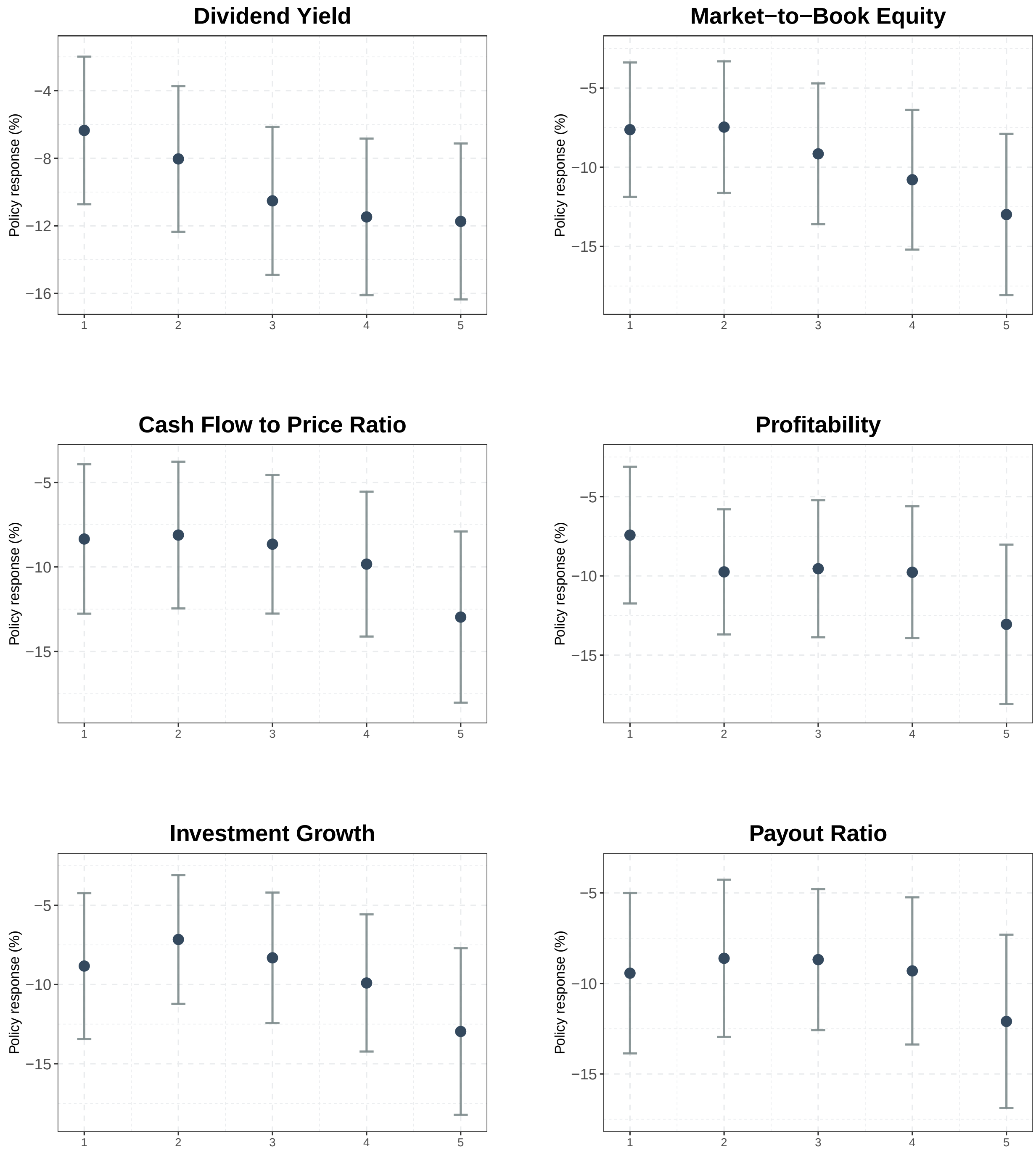
The figure shows the time-series of two different measures of duration for the S&P 500. Panel A shows the long maturity weights on the S&P 500 constructed with prices on dividend strips. The red line uses all dividend strips with maturity up to 6 years, while the blue line uses all dividend strips with maturity up to 9 years. Panel B shows the development of S&P 500 dividend yield constructed by Goyal et al. (2024).

Figure 2: **Portfolio Returns and Monetary Policy Surprises by Cash-Flow Duration**



This figure plots the relationship between portfolio returns and monetary policy surprises for portfolios sorted on cash-flow duration. Panel (a) shows firms in the highest duration quintile, and Panel (b) shows firms in the lowest duration quintile. The fitted lines represent the estimated slope coefficient of a regression of portfolio returns on monetary policy surprises.

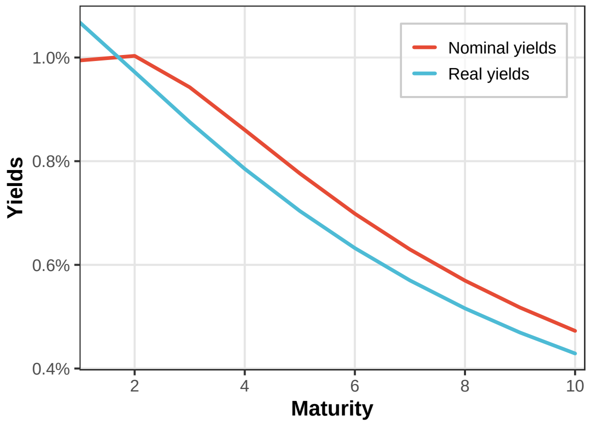
Figure 3: **Monetary Policy Sensitivity Across Firm Characteristics**



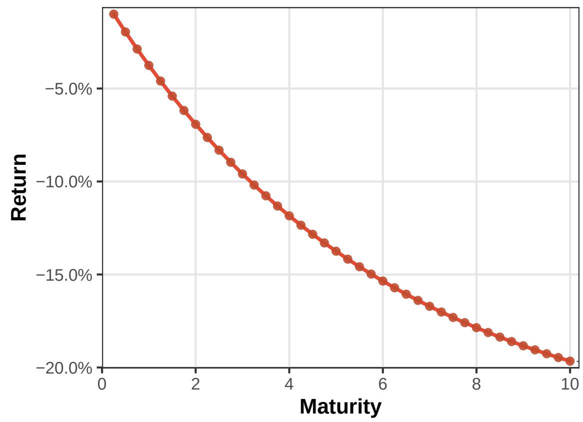
This figure plots the estimated response of portfolio returns to monetary policy surprises across quintiles of firm characteristics. The sample spans from December 1994 to December 2023. Portfolio returns are computed as value-weighted averages, and each portfolio's sensitivity to monetary policy is estimated from a time-series regression of portfolio returns on monetary policy surprises. Across all characteristics, higher quintiles—corresponding to more growth-oriented firms. The vertical bars represent 90% confidence intervals constructed with White standard errors.

Figure 4: **Model-implied Sensitivity of Treasury Yields and Dividend Strips**

(a) Model-implied Treasury Yields Sensitivity

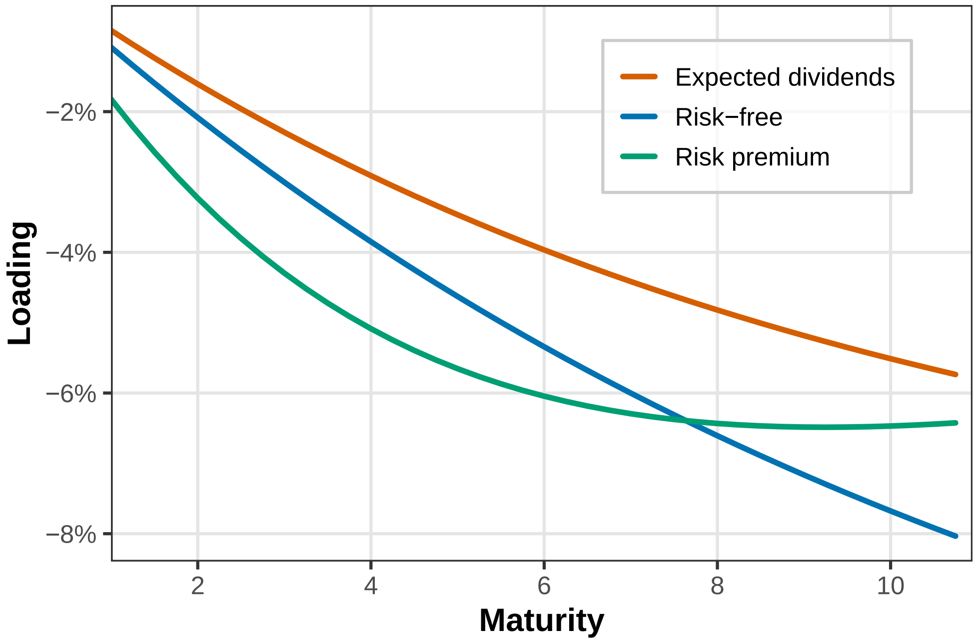


(b) Model-implied Dividend Strips Sensitivity



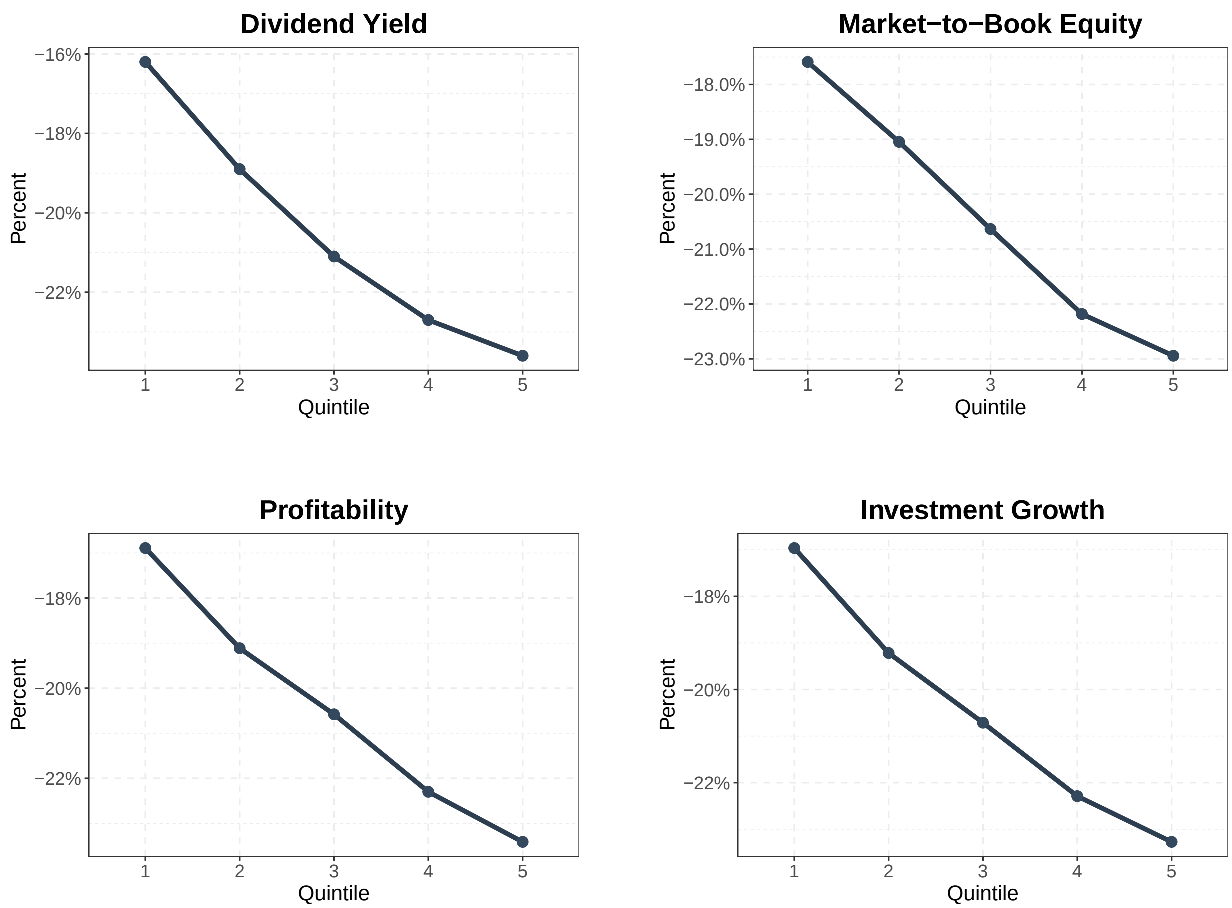
This figure plots the effect of monetary policy on nominal and real yields on the left-hand side and on dividend strips on the right-hand side implied by the model. Maturity is in years.

Figure 5: **Model-Implied Monetary Policy Decomposition**



The figure shows the decomposition of the effects of monetary policy on dividend claims in risk-free rate, risk-premium, and expected cash flow implied by the model. Maturity is in years.

Figure 6: **Model-implied Sensitivity of Sorted Portfolios**



This figure plots the effect of monetary policy on quintile portfolios sorted by dividend yield, market-to-book equity, profitability, and investment growth. The results are produce by simulating 50.000 quarters of data and regressing portfolio returns on monetary policy shocks.

Table 1: **Dividend Strip Returns and Monetary Policy Surprises**

	1y	2y	5y	7y	9y	Market
MPS	-2.00^{*}	-6.69^{***}	-12.90^{***}	-13.37^{***}	-15.90^{***}	-17.60^{***}
	(1.10)	(1.62)	(4.09)	(4.40)	(5.31)	(5.23)
Constant	−0.12	−0.02	0.24	0.10	0.12	−0.20
	(0.13)	(0.10)	(0.22)	(0.20)	(0.21)	(0.21)
Observations	78	78	78	69	69	78
R^2	0.004	0.07	0.05	0.07	0.09	0.10

This table reports the sensitivity of S&P 500 dividend strip returns to monetary policy surprises. The dependent variable is the 2-days return on dividend strips with maturities of 1, 2, 5, 7, and 9 years, as well as the aggregate market return. Dividend strips with maturities of 1–5 years are available from December 2015 to December 2024, while 7-year and 9-year strips are available from January 2017 to December 2024. Monetary policy surprises are measured using high-frequency changes in federal funds and eurodollar futures rates around the monetary event. White standard errors are reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 2: **Equity Duration and the Stock Market Sensitivity to Monetary Policy**

	(1)	(2)	(3)	(4)	(5)
MPS	-16.36^{***}	-18.40^{***}	-8.18^{***}	-7.53^{**}	-7.30^{**}
	(3.94)	(3.65)	(2.69)	(2.95)	(3.12)
MPS $\times$ W_6^L	-21.16^{***}				
	(8.16)				
MPS $\times$ W_9^L		-16.84^{***}			
		(4.44)			
MPS $\times$ Payout			9.80^{***}		
			(3.80)		
MPS $\times$ DivYield				5.05^{*}	
				(2.87)	
MPS $\times$ LTG					-4.93^{*}
					(2.71)
Observations	78	69	253	253	235
R^2	0.25	0.34	0.13	0.12	0.12

This table reports regressions of daily S&P 500 returns on monetary policy surprises (MPS) interacted with alternative measures of aggregate equity duration. Columns (1)–(2) use duration proxies based on the relative weights of long-maturity dividend strips, W_6^L and W_9^L, constructed from dividend futures with maturities up to six and nine years, respectively. Columns (3)–(5) use aggregate proxies derived from fundamentals: the payout ratio, dividend yield, and long-term earnings growth (LTG) expectations. All specifications include a constant, which is omitted. The sample starts in December 2015 for W_6^L, in January 2017 for W_9^L, in December 1994 for dividend yields and payout ratio, and January 1996 for LTG. All samples end in December 2024. Following Acosta et al. (2025) I exclude the financial crisis period. White standard errors are reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 3: **Equity Duration and the Stock Market Sensitivity to Monetary Policy**

	(1)	(2)	(3)	(4)	(5)
MPSorth	-16.32^{***}	-18.21^{***}	-8.84^{***}	-7.33^{**}	-6.96^{**}
	(4.04)	(3.65)	(2.96)	(3.34)	(3.44)
MPSorth × W_6^L	-22.51^{***}				
	(8.17)				
MPSorth × W_9^L		-17.26^{***}			
		(4.71)			
MPSorth × Payout			8.33^{***}		
			(3.00)		
MPSorth × DivYield				6.94^{**}	
				(3.14)	
MPSorth × LTG					-7.01^{**}
					(2.86)
Observations	78	69	253	253	235
R^2	0.24	0.32	0.12	0.12	0.13

This table reports regressions of daily S&P 500 returns on monetary policy surprises (MPS) interacted with alternative measures of aggregate equity duration. Monetary policy is the first principal component of federal funds rates and Eurodollar futures around the monetary event and orthogonalized with respect to macroeconomic variables following Bauer and Swanson (2023). Columns (1)–(2) use duration proxies based on the relative weights of long-maturity dividend strips, W_6^L and W_9^L, constructed from dividend futures with maturities up to six and nine years, respectively. Columns (3)–(5) employ aggregate proxies derived from fundamentals: the payout ratio, dividend yield, and long-term earnings growth (LTG) expectations. All specifications include a constant, which is omitted. The sample starts in December 2015 for W_6^L, in February 2017 for W_9^L, in December 1994 for dividend yields and payout ratio, and January 1996 for LTG. All samples end in December 2024. Following Acosta et al. (2025) I exclude the financial crisis period. White standard errors are reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 4: **Cross-Sectional Sensitivity of Stock Returns to Monetary Policy and Equity Duration**

	(1)	(2)	(3)	(4)	(5)
Panel A: Econometric specifications					
MPS	-9.63^{***}				
	(2.61)				
MPS × Dur	-3.35^{**}	-3.40^{***}	-2.19^{***}	-2.17^{***}	-1.91^{***}
	(1.41)	(1.22)	(0.81)	(0.80)	(0.68)
Observations	354,629	354,629	354,569	354,515	349,441
R^2	0.02	0.20	0.21	0.18	0.22
Time and firm FE	N	Y	N	Y	Y
Time and industry FE	N	N	Y	N	N
Controls	N	N	N	Y	Y
Panel B: Monetary policy surprises					
Dur	-0.05^{*}	-0.03	-0.03	-0.03	-0.03
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Monetary event	-3.40^{***}				
	(1.22)				
Statement		-3.70^{***}			
		(1.39)			
Press conference			-1.27^{**}		
			(0.64)		
B&S - Surprise				-3.96^{***}	
				(1.23)	
J&K - Surprise					-2.66^{***}
					(0.78)
Observations	354,629	354,629	65,922	354,629	425,508
R^2	0.20	0.20	0.32	0.20	0.19

This table reports firm-level regressions of daily stock returns around FOMC announcements on monetary policy surprises, equity duration, and their interaction. Panel A presents results under alternative econometric specifications. Control variables include firm size, beta, leverage, liquidity, and age, along with their interactions with monetary policy surprises. All firm-level variables other than returns are standardized to have zero mean and unit variance. Panel B examines robustness across alternative definitions of monetary policy surprises, including those based on FOMC statements, press conferences, and the high-frequency measures from Bauer and Swanson (2023) and Jarociński and Karadi (2020). All regressions contain time and firm fixed effects. The samples for regressions using surprises from monetary event and statement span from December 1994 to December 2024. Press conference surprises start in February 2011 and J&K - surprises start in January 1990. Standard errors are clustered at the firm level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 5: **Cross-Sectional Sensitivity of Stock Returns to Monetary Policy**

	(1)	(2)	(3)	(4)	(5)
Dividend Yield					
MPS	-9.20^{***}				
	(2.41)				
MPS*DivY	-2.37^{**}	-2.34^{***}	-2.06^{***}	-2.08^{***}	-2.35^{***}
	(0.97)	(0.80)	(0.66)	(0.66)	(0.74)
Observations	564,225	564,225	564,041	563,818	564,041
R^2	0.01	0.18	0.18	0.15	0.18
Market-to-Book Equity					
MPS	-9.24^{***}				
	(2.40)				
MPS*MBE	-2.39^{**}	-2.08^{**}	-1.57^{**}	-1.58^{**}	-1.92^{**}
	(1.12)	(0.91)	(0.74)	(0.75)	(0.80)
Observations	563,174	563,174	562,997	562,776	562,997
R^2	0.01	0.18	0.18	0.15	0.18
Cash-Flow Price Ratio					
MPS	-9.33^{***}				
	(2.43)				
MPS*CFP	-1.65^{**}	-1.72^{***}	-1.32^{***}	-1.32^{***}	-1.61^{***}
	(0.65)	(0.55)	(0.44)	(0.45)	(0.49)
Observations	521,725	521,725	521,558	521,337	521,558
R^2	0.01	0.18	0.18	0.15	0.18

Continued on next page

Table 5 – *continued from previous page*

	(1)	(2)	(3)	(4)	(5)
Profitability					
MPS	-9.55^{***}				
	(2.49)				
MPS*Prof	-2.38^{***}	-2.37^{***}	-2.09^{***}	-1.97^{***}	-2.73^{***}
	(0.71)	(0.49)	(0.45)	(0.47)	(0.54)
Observations	465,545	465,545	465,405	465,186	465,405
R^2	0.01	0.18	0.19	0.15	0.18
Investment Growth					
MPS	-9.14^{***}				
	(2.43)				
MPS*inv growth	-2.08^{**}	-1.93^{***}	-1.48^{**}	-1.49^{**}	-1.80^{***}
	(0.85)	(0.74)	(0.60)	(0.60)	(0.64)
Observations	544,969	544,969	544,855	544,680	544,855
R^2	0.01	0.18	0.19	0.16	0.19
Payout Ratio					
MPS	-9.36^{***}				
	(2.41)				
MPS*payout	-1.26^{***}	-1.19^{***}	-0.94^{***}	-0.94^{***}	-1.24^{***}
	(0.46)	(0.36)	(0.36)	(0.36)	(0.40)
Observations	564,216	564,216	564,032	563,809	564,032
R^2	0.01	0.18	0.18	0.15	0.18
Time and firm FE	N	Y	N	Y	Y
Time and industry FE	N	N	Y	N	N
Controls	N	N	N	Y	Y

This table reports firm-level regressions of daily stock returns around FOMC announcements on monetary policy surprises, different firm-level characteristics, and their interaction. The sample spans from December 1994 to December 2023. Control variables include firm size and beta, along with their interactions with monetary policy surprises. All firm-level variables other than returns are standardized to have zero mean and unit variance. Standard errors are clustered at the firm and time level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 6: **Firm Characteristics, Monetary Policy Sensitivity, and the Role of Equity Duration**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
MPS×DivY	−2.06***	−0.66										
	(0.66)	(0.50)										
MPS×MBE			−1.57**	−0.75								
			(0.74)	(0.53)								
MPS×CFP					−1.32***	−0.25						
					(0.44)	(0.34)						
MPS×Prof							−2.09***	−0.93				
							(0.45)	(0.77)				
MPS×InvA									−1.48**	−0.99*		
									(0.60)	(0.54)		
MPS×Payout											−0.94***	−0.49
											(0.36)	(0.42)
MPS×Dur		−1.98***		−1.98***		−1.90**		−1.71**		−1.82***		−2.11**
		(0.75)		(0.70)		(0.77)		(0.85)		(0.69)		(0.83)
MPS×Beta	−5.15**	−9.84***	−5.19**	−9.84***	−5.24**	−10.26***	−4.80**	−10.18***	−7.13***	−10.29***	−5.31**	−9.85***
	(2.06)	(2.94)	(2.06)	(2.92)	(2.09)	(2.91)	(2.05)	(2.91)	(2.32)	(2.98)	(2.13)	(2.96)
MPS×Size	−0.39	−0.42**	−0.08	−0.32*	−0.13	−0.33*	−0.53*	−0.50***	−0.02	−0.35*	−0.09	−0.36**
	(0.25)	(0.19)	(0.26)	(0.18)	(0.26)	(0.18)	(0.28)	(0.18)	(0.25)	(0.18)	(0.29)	(0.17)
Observations	564,041	354,567	562,997	354,202	521,558	327,546	465,405	288,305	544,855	345,477	564,032	354,569
R^2	0.18	0.21	0.18	0.21	0.18	0.21	0.19	0.21	0.19	0.22	0.18	0.21

This table reports panel fixed effects regressions of daily firm-level stock returns on monetary policy surprises interacted with firm characteristics, controlling for firms' cash-flow duration and its interaction with monetary policy surprises. All firm-level variables other than returns are standardized to have zero mean and unit variance. All regressions include time and firm fixed effects and control for interaction of monetary policy with size and betas. Standard errors are clustered at the firm and time level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 7: **Panel Regression with Further Controls**

	Firm-level daily returns					
	(1)	(2)	(3)	(4)	(5)	(6)
MPS×DivY	−1.33***	−0.47				
	(0.46)	(0.46)				
MPS×MBE			−1.10**	−0.63		
			(0.54)	(0.46)		
MPS×CFP					−0.78***	−0.16
					(0.30)	(0.39)
MPS×Dur		−1.59***		−1.59***		−1.68***
		(0.59)		(0.56)		(0.64)
MPS×Beta	−6.97***	−10.85***	−7.03***	−10.91***	−7.07***	−10.88***
	(2.15)	(2.88)	(2.16)	(2.88)	(2.18)	(2.89)
MPS×Size	−0.59**	−0.37	−0.59**	−0.34	−0.56**	−0.35
	(0.28)	(0.32)	(0.28)	(0.31)	(0.27)	(0.32)
MPS×Lev	−0.01	−0.02	−0.003	−0.02	−0.02	−0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
MPS×SalesG	−4.28***	−2.03	−4.39***	−1.88	−5.41***	−2.20
	(1.12)	(1.29)	(1.12)	(1.31)	(1.30)	(1.40)
MPS×Liq	−6.57*	−2.27	−5.72*	−1.34	−6.19*	−2.17
	(3.56)	(3.33)	(3.09)	(3.04)	(3.72)	(3.46)
MPS×Age	0.003	−0.004	0.005	−0.003	0.002	−0.004
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
MPS×FC	−0.99	−0.005	−2.02**	−0.31	−1.85**	−0.26
	(0.62)	(0.65)	(0.86)	(0.77)	(0.84)	(0.78)
Observations	499,943	315,776	499,073	315,476	499,943	315,776
R^2	0.19	0.22	0.19	0.22	0.19	0.22

Table 7: **Panel Regression with Further Controls (continued)**

	Firm-level daily returns					
	(1)	(2)	(3)	(4)	(5)	(6)
MPS×Prof	-1.53^{***}	-0.73				
	(0.47)	(0.83)				
MPS×InvA			-1.25^{**}	-1.03^{*}		
			(0.54)	(0.54)		
MPS×Payout					0.91^{***}	0.58
					(0.33)	(0.39)
MPS×Dur		-1.50^{**}		-1.51^{***}		-1.62^{**}
		(0.68)		(0.54)		(0.63)
MPS×Beta	-6.70^{***}	-10.72^{***}	-7.05^{***}	-10.95^{***}	-7.02^{***}	-10.82^{***}
	(2.25)	(2.90)	(2.31)	(2.90)	(2.18)	(2.90)
MPS×Size	-0.82^{***}	-0.48	-0.60^{**}	-0.38	-0.62^{**}	-0.37
	(0.30)	(0.32)	(0.28)	(0.30)	(0.28)	(0.30)
MPS×Age	0.003	-0.004	0.002	-0.005	0.003	-0.004
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
MPS×FC	-1.59	-0.19	-1.86^{**}	-0.24	-1.68^{*}	-0.15
	(0.97)	(0.92)	(0.79)	(0.74)	(0.87)	(0.82)
MPS×Liq	-4.81	-1.67	-6.55^{*}	-1.33	-8.11^{**}	-2.50
	(4.09)	(3.82)	(3.57)	(3.23)	(3.91)	(3.38)
MPS×SalesG	-5.39^{***}	-2.76	-1.98	0.14	-4.64^{***}	-2.01
	(1.69)	(1.75)	(1.32)	(1.90)	(1.18)	(1.30)
MPS×Lev	-0.004	-0.02	-0.01	-0.01	-0.01	-0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	448,934	225,311	499,758	253,401	491,236	250,075
R^2	0.19	0.23	0.19	0.23	0.19	0.23

This table reports firm-level regressions of daily stock returns on monetary policy surprises interacted with firm characteristics and control variables. Each column includes firm and time, fixed effects, as well as controls for size, leverage, sales growth, liquidity, age, and financial constraints (FC). The top panel includes dividend yield, market-to-book equity, and cash-flow-to-price ratio , while the bottom panel includes profitability, investment growth, and payout ratio. All characteristics are lagged and interacted with monetary policy. Duration, measured as the median long-term earnings growth expectations, is included in every second column. All firm-level variables other than returns are standardized to have zero mean and unit variance. Standard errors are clustered at the firm and time level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table 8: **Risk Premium of decile portfolios sorted by price-dividend ratio**

	Value to Growth									
Portfolio	V	2	3	4	5	6	7	8	9	G
Panel A: Model without monetary policy										
$E(R^i - R^f)$	10.35	9.45	8.92	8.33	7.69	7.09	6.57	6.18	5.90	5.72
$\sigma(R^i - R^f)$	17.86	17.85	18.50	19.45	20.30	20.84	21.05	21.03	20.90	20.72
β_i	0.87	0.88	0.92	0.97	1.01	1.04	1.04	1.04	1.03	1.02
Panel B: Model with monetary policy										
$E(R^i - R^f)$	10.63	9.66	9.02	8.27	7.47	6.74	6.17	5.74	5.43	5.26
$\sigma(R^i - R^f)$	17.22	17.11	17.66	18.44	19.11	19.49	19.62	19.58	19.43	19.27
β_i	0.89	0.89	0.93	0.98	1.01	1.03	1.03	1.03	1.01	1.00
Panel B: Data										
$E(R^i - R^f)$	8.79	8.87	8.26	6.29	7.39	6.98	5.80	6.42	6.11	4.92
$\sigma(R^i - R^f)$	20.00	16.54	16.08	15.43	14.83	14.61	15.35	15.40	15.57	16.95
β_i	1.13	0.98	0.95	0.93	0.90	0.91	0.97	0.99	1.01	1.07

The table shows the risk premium, standard deviation and the betas of growth and value stocks implied by the model without monetary policy (Panel A), the model with monetary policy (Panel B), and estimated from the data. The moments in the model are estimated by simulating 50.000 quarters of data. The empirical statistics are estimated using annual Fama and French portfolio returns sorted by market-to-book equity. The data spans from 1952 to 2018.

Table 9: **Duration-Channel and Underlying Parameters**

	$\bar{r}_f$	$\bar{x}$	g
mean $+2\sigma$	-18.9	-16.1	-22.0
mean -2σ	-21.0	-23.8	-18.1
	ϕ_r	ϕ_x	ϕ_z
$\phi = 0.5$	-8.9	-13.8	-22.4
$\phi = 0.99$	-23.7	-34.7	-20.7

The table shows the sensitivity of the equity market to monetary policy in percent for different parameters of the model. The table on the top shows results for variations in the unconditional mean, while the table on the bottom shows the results for different values of the persistence parameter.

Appendix

A Model Derivation

Start with the Euler equation:

$$E[M_{t+1}R^{(n)}_{t+1}] = 1$$

Because dividend strips pay dividend only at maturity, a one-period return of a dividend strip is given by:

$$R^{(n)}_{t+1} = \frac{P^{(n-1)}_t}{P^{(n)}_t}$$

With $P^{(0)}_t = D_t$. Inserting the return on the Euler equations and re-writing in terms of price dividend ratio yields:

$$E\left[M_{t+1}\frac{D_{t+1}}{D_t}\frac{P^{(n)}_{t+1}}{D_{t+1}}\right] = \frac{P^{(n)}_t}{D_t} \tag{A.1}$$

The model is solved by conjecturing that the log price-dividend ratio is affine on the state variables. Formally:

$$\frac{P^{(n)}_t}{D_t} = \exp\Big(A^{(n)}_t + B^{(n)}_t(z_t - g) + B^{(n)}_t(r^f_{t+1} - \bar{r}^f) + B^{(n)}_t(x_t - \bar{x})\Big)$$

Inserting the price-dividend ratio back in Equation A.1 results in:

$$\Rightarrow E_t\left[\exp\Big(\Delta g_{t+1} - r^f_{t+1} - \tfrac{1}{2}x^2_t - x_t\varepsilon_{d,t+1} + A^{(n-1)} + B^{(n-1)}_z(z_{t+1} - g) + B^{(n-1)}_r(r^f_{t+2} - \bar{r}^f) + B^{(n-1)}_x(x_{t+1} - \bar{x})\Big)\right]$$

$$= \exp\Big(A^{(n)}_t + B^{(n)}_z(z_t - g) + B^{(n)}_r(r^f_{t+1} - \bar{r}^f) + B^{(n)}_x(x_t - \bar{x})\Big)$$

$$\Rightarrow E_t\Bigg[\exp\Big(z_t + \sigma_d\varepsilon_{d,t+1} - r^f_{t+1} - \tfrac{1}{2}x^2_t - x_t\varepsilon_{d,t+1} + A^{(n-1)} + B^{(n-1)}_z\big((1-\phi_z)g + \phi_z z_t + \sigma_z\varepsilon_{z,t+1} - g\big)$$
$$+B^{(n-1)}_r\big((1-\phi_r)\bar{r}^f + \phi_r r^f_{t+1} + \sigma_r\varepsilon_{r,t+1} - \bar{r}^f\big) + B^{(n-1)}_x\big((1-\phi_x)\bar{x}\phi_x x_t + \sigma_x\varepsilon_{x,t+1} - \bar{x}\big)\Big)\Bigg]$$
$$= \exp\Big(A^{(n)}_t + B^{(n)}_z(z_t - g) + B^{(n)}_r(r^f_{t+1} - \bar{r}^f) + B^{(n)}_x(x_t - \bar{x})\Big) \tag{A.2}$$

To simplify, I use the calibration results that: $\rho_{xd} = \rho_{xr} = \rho_{zr} = 0$

$$\Rightarrow \exp\Big((z_t - g) - (r^f_{t+1} - \bar{r}^f) + g - \bar{r}^f - \tfrac{1}{2}x_t^2 + A^{(n-1)} + B_z^{(n-1)}(z_t - g) + B_r^{(n-1)}(r^f_{t+1} - \bar{r}^f) + B_x^{(n-1)}(x_t - \bar{x})\Big)$$

$$\times \exp\Bigg(\tfrac{1}{2}\Big(x_t^2 + (B_z^{(n-1)})^2\sigma_z^2 + (B_r^{(n-1)})^2\sigma_r^2 + (B_x^{(n-1)})^2\sigma_x^2 + \sigma_d^2\Big) - (x_t - \bar{x})\sigma_d - \bar{x}\sigma_d$$

$$+B_z^{(n-1)}\sigma_d\sigma_z\rho_{dz} + B_r^{(n-1)}\sigma_d\sigma_r\rho_{dr} - (x_t - \bar{x})B_z^{(n-1)}\sigma_z\rho_{dz} - \bar{x}B_z^{(n-1)}\sigma_z\rho_{dz} - (x_t - \bar{x})B_r^{(n-1)}\sigma_r\rho_{dr} - \bar{x}B_r^{(n-1)}\sigma_r\rho_{dr}$$

$$+B_x^{(n-1)}B_z^{(n-1)}\sigma_x\sigma_z\rho_{xz}\Bigg)$$

$$= A_t^{(n)} + B_z^{(n)}(z_t - g) + B_r^{(n)}(r^f_{t+1} - r^f) + B_x^{(n)}(x_t - \bar{x})$$

Finally, we can match the coefficients for z_t, r_t^f and x_t

For z_t:

$$(z_t - g) + B_z^{(n-1)}\phi_z(z_t - g) = B_z^{(n)}(z_t - g)$$

$$\Rightarrow 1 + B_z^{(n-1)}\phi_z = B_z^{(n)}, \qquad B_z^{(0)} = 0$$

$$\Rightarrow B_z^{(n)} = 1 + \phi_z + \phi_z^2 + \phi_z^3 + \cdots = \frac{1 - \phi_z^n}{1 - \phi_z}$$

—

For r_t^f:

$$-(r^f_{t+1} - \bar{r}^f) + B_r^{(n-1)}\phi_r(r^f_{t+1} - \bar{r}^f) = B_r^{(n)}(r^f_{t+1} - \bar{r}^f)$$

$$\Rightarrow -1 + B_r^{(n-1)}\phi_r = B_r^{(n)}, \qquad B_r^{(0)} = 0$$

$$\Rightarrow B_r^{(n)} = -(1 + \phi_r + \phi_r^2 + \cdots) = -\frac{1 - \phi_r^n}{1 - \phi_r}$$

—

For x_t:

$$B_x^{(n-1)}\phi_x(x_t - \bar{x}) - (x_t - \bar{x})\sigma_d - B_z^{(n-1)}\sigma_z\rho_{zd} - B_r^{(n-1)}\sigma_r\rho_{rd} = B_x^{(n)}(x_t - \bar{x})$$

$$\Rightarrow B_x^{(n)} = B_x^{(n-1)}\phi_x - \sigma_d - B_z^{(n-1)}\sigma_z\rho_{zd} - B_r^{(n-1)}\sigma_r\rho_{rd}$$

—

For the rest:

$$A^{(n)} = A^{(n-1)} + g - \bar{r}^f + \tfrac{1}{2}\Big[(B_z^{(n-1)})^2\sigma_z^2 + (B_r^{(n-1)})^2\sigma_r^2 + (B_x^{(n-1)})^2\sigma_x^2 + \sigma_d^2\Big] + B_z^{(n-1)}\sigma_z\sigma_d\rho_{zd}$$

$$+B_r^{(n-1)}\sigma_r\sigma_d\rho_{rd} + B_x^{(n-1)}B_z^{(n-1)}\sigma_x\sigma_d\rho_{xz} - \bar{x}\sigma_d - \bar{x}B_z^{(n-1)}\sigma_z\rho_{zd} - \bar{x}B_r^{(n-1)}\sigma_r\rho_{rd}$$

$$\text{where} \quad B_z^{(0)} = 0, \quad A^{(0)} = 0$$

Similarly, using the same logic, we can derive the solution for real and nominal yields. Conjecture that for a given maturity, n, the price of a real bond, $P_{r,t}^{(n)}$ and of a nominal bond, $P_{\pi,t}^{(n)}$, are:

$$P_{r,t}^{(n)} = \exp\Big(A_r^{(n)} + B_r^n(r_{t+1}^f - \bar{r}^f) + B_{r,x}^n(x_t - \bar{x})\Big)$$

$$P_{\pi,t}^{(n)}\Pi_t = \exp\Big(A_\pi^{(n)} + B_q(q_t - \bar{q}) + B_{\pi,r}^{(n)}(r_{t+1}^f - \bar{r}^f) + B_{\pi,x}^{(n)}(x_t - \bar{x})\Big)$$

Insert it in the Euler equation and match the coefficients to get the solution:

$$\Rightarrow B_{r,x}^{(n)} = B_{r,x}^{(n-1)}\phi_x - B_r^{(n-1)}\sigma_r\rho_{rd}$$

$$\Rightarrow A_r^{(n)} = A_r^{(n-1)} - \bar{r}^f + \tfrac{1}{2}\Big[(B_r^{(n-1)})^2\sigma_r^2 + (B_{r,x}^{(n-1)})^2\sigma_x^2\Big] - \bar{x}B_r^{(n-1)}\sigma_r\rho_{rd}$$

$$\Rightarrow B_q^{(n)} = -\frac{1-\phi_q^n}{1-\phi_q}$$

$$\Rightarrow B_{\pi,x}^{(n)} = B_{\pi,x}^{(n-1)}\phi_x + \sigma_\pi\rho_{d\pi} - B_r^{(n-1)}\sigma_r\rho_{rd} - B_q^{(n-1)}\sigma_q\rho_{qd}$$

$$\Rightarrow A_\pi^{(n)} = A_\pi^{(n-1)} - \bar{r}^f - \bar{q} + \tfrac{1}{2}\Big[\sigma_\pi^2 + (B_r^{(n-1)})^2\sigma_r^2 + (B_{\pi,x}^{(n-1)})^2\sigma_x^2\Big] + B_q^{(n-1)}\sigma_\pi\sigma_q\rho_{q\pi}$$

$$+\bar{x}\sigma_\pi\rho_{d\pi} - \bar{x}B_r^{(n-1)}\sigma_r\rho_{rd} - \bar{x}B_q^{(n-1)}\sigma_q\rho_{qd}$$

B Summary Statistics

Table B.1: **Summary Statistics – Time-Series Data**

	Mean	**SD**	**N**	**Period**
Panel A: Monetary policy (daily)				
Monetary window	−0.008	0.041	266	Feb-1994–Dec-2024
Statement window	−0.006	0.037	266	Feb-1994–Dec-2024
Conference window	−0.006	0.028	82	Apr-2011–Dec-2024
B&S	−0.001	0.038	266	Feb-1994–Dec-2024
J&K	−0.006	0.060	251	Jan-1990–Dec-2024
Panel B: S&P 500 returns (daily)				
1y	0.022	0.494	2,310	Nov-2015–Dec-2024
2y	0.022	0.726	2,310	Nov-2015–Dec-2024
5y	0.016	0.906	2,310	Nov-2015–Dec-2024
7y	0.015	0.979	2,035	Dec-2016–Dec-2024
9y	0.013	1.103	2,035	Dec-2016–Dec-2024
Market	0.040	1.174	7,801	Jan-1994–Dec-2024
Panel C: S&P 500 duration measures (monthly)				
Dividend yield	0.04	0.017	1,848	Jan-1871–Dec-2024
Payout ratio	0.60	0.26	1,848	Jan-1871–Dec-2024
LTG	12.64	2.41	347	Jan-1996–Dec-2024

This table presents the mean and standard deviation of the time-series data. Panel A reports statistics for different monetary policy surprises. The monetary policy surprises around the monetary window, statement release, and press conference are constructed according to Acosta et al. (2025). B&S stands for the surprises from Bauer and Swanson (2023) and J&K for the surprises from Jarociński and Karadi (2020). Panel B shows daily returns for 1-, 2-, 5-, 7-, and 9-years dividend strips as well as the returns of the S&P 500. Panel C shows the statistics of the S&P 500 dividend yields and payout ratio from Goyal et al. (2024) as well as the median long-term earnings growth expectations.

Table B.2: **Summary Statistics – Firm-Level Data**

Var	Mean	SD	Median	q25	q75	N
Return	0.28	3.48	0.00	−1.15	1.51	672,682
Duration	14.82	8.38	13.00	10.00	19.00	189,888
Dividend yield	0.31	0.41	0.00	0.00	0.56	297,857
Market-book equity	2.76	2.56	1.89	1.23	3.23	297,296
Cash flow price ratio	2.32	2.23	2.18	1.22	3.44	272,396
Profitability	8.61	21.74	9.23	3.40	18.22	241,217
Investment growth	6.72	13.63	3.33	−0.72	9.63	287,292
Payout ratio	14.87	22.99	16.00	5.66	26.50	297,653
Beta	0.88	1.98	0.88	0.51	1.23	297,696
Size	2.48	1.82	2.40	1.11	3.78	297,867
Leverage	16.63	14.61	13.43	4.21	25.06	297,867
Liquidity	12.46	17.46	5.42	2.03	14.83	297,394
Sales growth	3.92	15.41	2.48	−3.63	9.86	291,582
Momentum	0.16	0.42	0.10	−0.11	0.34	279,941
Short-term reversal	0.01	0.10	0.01	−0.05	0.07	295,759
Long-term reversal	0.56	0.89	0.36	−0.04	0.90	248,356
Age	29.50	24.57	23.00	12.00	39.00	297,851
WW-index	−0.14	0.11	−0.14	−0.21	−0.06	259,419
KZ-index	−1297.30	3928.58	−21.24	−512.26	0.45	239,895
HP-index	−2.58	1.50	−2.46	−3.58	−1.48	297,851
SEB-index	−1.40	0.76	−1.23	−1.59	−0.96	203,358

The table reports the mean, standard deviation, median, and the 25th and 75th percentiles for each firm-level variable. The column N indicates the number of available observations. All variables are monthly, except for returns, which are daily. All variables are winsorized. The sample covers the period from January 1990 to December 2023.

Table B.3: **Correlation Matrix**

	Duration	DY	MBE	CFP	Prof.	Inv. g	Payout
Duration	1.00	−0.42	0.27	−0.23	−0.24	0.31	−0.17
DY	−0.42	1.00	−0.15	0.17	0.16	−0.19	0.15
MBE	0.27	−0.15	1.00	−0.32	−0.00	0.15	0.02
CFP	−0.23	0.17	−0.32	1.00	0.20	−0.05	0.14
Prof.	−0.24	0.16	−0.00	0.20	1.00	−0.04	0.31
Inv. g	0.31	−0.19	0.15	−0.05	−0.04	1.00	0.02
Payout	−0.17	0.15	0.02	0.14	0.31	0.02	1.00

The table reports the correlation of duration, measured median long-term earnings growth expectations, and dividend yields (DY), market-book equity (MBE), cash flow price ratio (CFP), Profitability (Prof.), Investment growth (Inv g.), and payout ratio (Payout). The sample covers the period from January 1990 to December 2023.

C Further empirical results

Table C.1: **Firm Characteristics, Monetary Policy Sensitivity, and the Role of Equity Duration - Robustness**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
MPS×DivY	-1.48^{**}	-0.66										
	(0.70)	(0.50)										
MPS×MBE			-1.35^{*}	-0.75								
			(0.71)	(0.53)								
MPS×CFP					-0.81^{**}	-0.25						
					(0.41)	(0.34)						
MPS×Prof							-1.38^{**}	-0.93				
							(0.65)	(0.77)				
MPS×InvestA									-1.39^{**}	-0.99^{*}		
									(0.67)	(0.54)		
MPS×Payout											-0.89^{***}	-0.49
											(0.34)	(0.42)
MPS×Dur		-1.98^{***}		-1.98^{***}		-1.90^{**}		-1.71^{**}		-1.82^{***}		-2.11^{**}
		(0.75)		(0.70)		(0.77)		(0.85)		(0.69)		(0.83)
MPS×Beta	-10.37^{***}	-9.84^{***}	-10.43^{***}	-9.84^{***}	-10.82^{***}	-10.26^{***}	-10.64^{***}	-10.18^{***}	-10.92^{***}	-10.29^{***}	-10.53^{***}	-9.85^{***}
	(3.24)	(3.07)	(3.21)	(3.04)	(3.19)	(3.01)	(3.22)	(3.04)	(3.29)	(3.12)	(3.31)	(3.08)
MPS*Size	-0.08	-0.42^{**}	0.19	-0.32^{*}	0.15	-0.33^{*}	-0.10	-0.50^{***}	0.11	-0.35^{*}	0.17	-0.36^{**}
	(0.17)	(0.19)	(0.21)	(0.18)	(0.21)	(0.18)	(0.22)	(0.18)	(0.20)	(0.18)	(0.23)	(0.17)
Observations	354,567	354,567	354,202	354,202	327,546	327,546	288,305	288,305	345,477	345,477	354,569	354,569
R^2	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.21	0.21

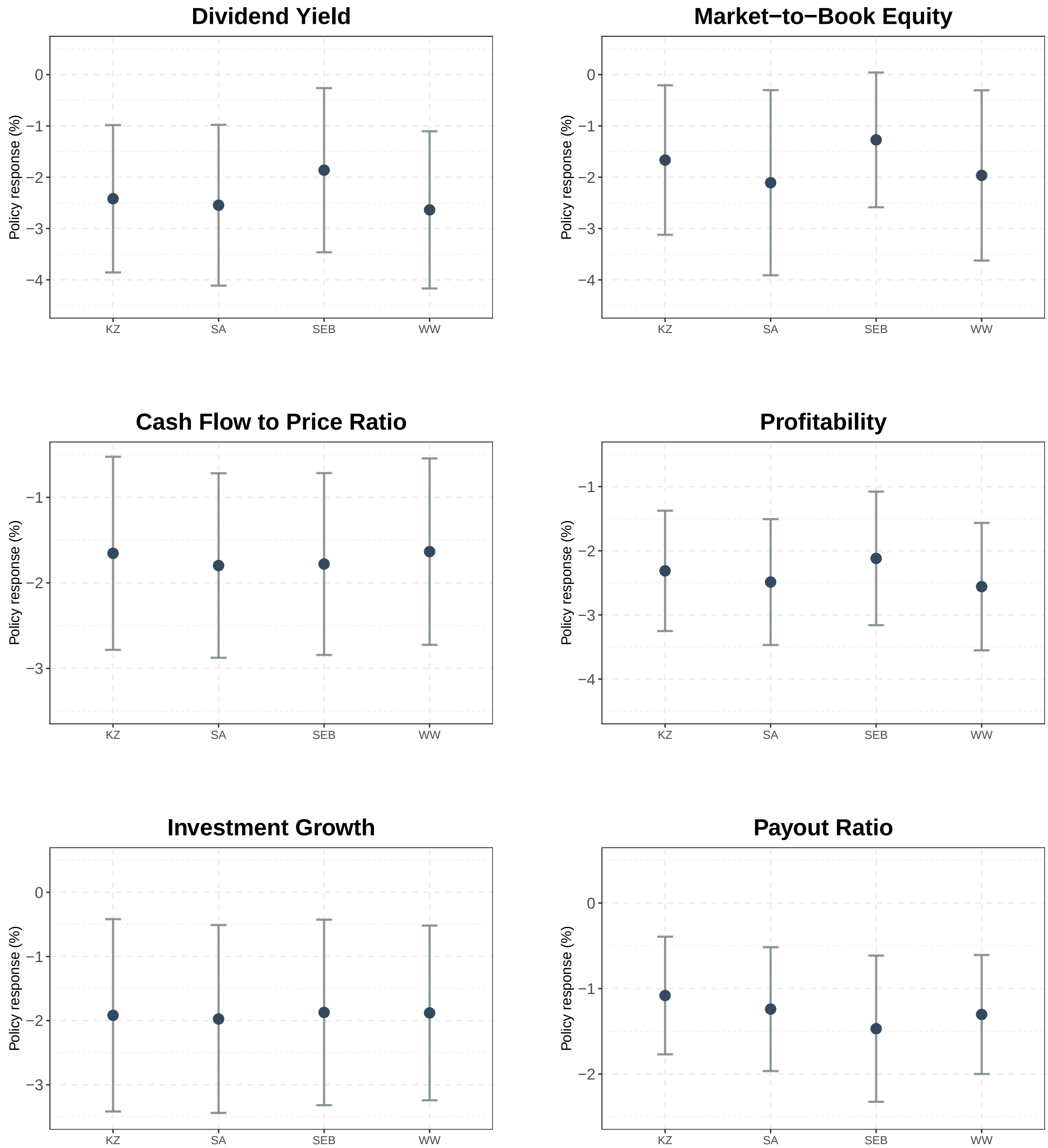
This table reports panel fixed effects regressions of daily firm-level stock returns on monetary policy surprises interacted with firm characteristics, controlling for firms' cash-flow duration and its interaction with monetary policy surprises. The sample is restricted to non-missing observations of duration. All firm-level variables other than returns are standardized to have zero mean and unit variance. All regressions include time and firm fixed effects and control for interaction of monetary policy with size and betas. Standard errors are clustered at the firm and time level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table C.2: **Firm Characteristics and Duration with Orthogonalized Monetary Policy Surprises**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
MPS×DivY	−2.35***	−0.77										
	(0.74)	(0.51)										
MPS×MBE			−1.92**	−1.02*								
			(0.80)	(0.53)								
MPS×CFP					−1.61***	−0.41						
					(0.49)	(0.37)						
MPS×Prof							−2.73***	−1.61				
							(0.54)	(1.01)				
MPS×InvA									−0.94***	−0.29		
									(0.35)	(0.29)		
MPS×Payout											−1.24***	−0.79
											(0.40)	(0.49)
MPS×Dur		−2.70***		−2.67***		−2.52***		−2.22**		−2.84***		−2.82***
		(0.81)		(0.76)		(0.82)		(0.88)		(0.84)		(0.88)
MPS×Beta	−4.42**	−9.05***	−4.44**	−9.04***	−4.51**	−9.71***	−4.12**	−9.68***	−6.62***	−9.33***	−4.55**	−9.05***
	(1.97)	(2.99)	(1.97)	(2.97)	(2.01)	(2.96)	(1.94)	(2.97)	(2.34)	(3.12)	(2.04)	(3.00)
MPS×Size	−0.26	−0.55**	0.09	−0.42*	0.01	−0.43*	−0.46	−0.63***	0.27	−0.43*	0.07	−0.49**
	(0.29)	(0.24)	(0.28)	(0.22)	(0.27)	(0.22)	(0.30)	(0.22)	(0.28)	(0.23)	(0.29)	(0.21)
Observations	564,041	354,567	562,997	354,202	521,558	327,546	465,405	288,305	554,274	350,248	564,032	354,569
R^2	0.18	0.21	0.18	0.21	0.18	0.21	0.18	0.21	0.19	0.21	0.18	0.21

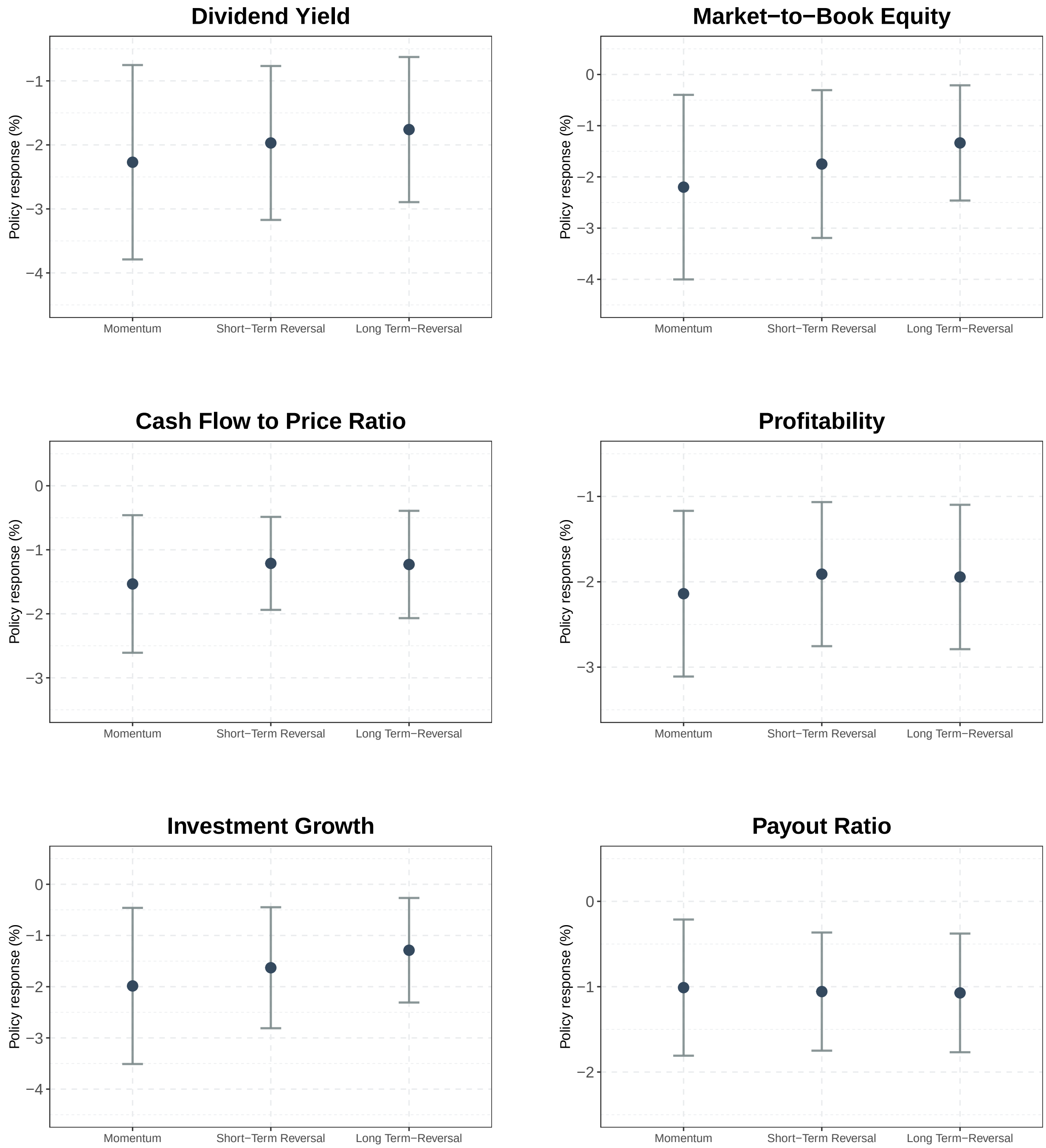
This table reports panel fixed effects regressions of daily firm-level stock returns on monetary policy surprises interacted with firm characteristics, controlling for firms' cash-flow duration and its interaction with monetary policy surprises. The monetary policy surprise is orthogonalize with respect to macroeconomic variables observed prior to FOMC announcements following Bauer and Swanson (2023). All firm-level variables other than returns are standardized to have zero mean and unit variance. All regressions include time and firm fixed effects and control for interaction of monetary policy with size and betas. Standard errors are clustered at the firm and time level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Figure C.1: **Monetary Policy Sensitivity Controlling for Financial Constraints**



This figure reports results of a panel fixed effects regressions of daily firm-level stock returns on monetary policy surprises interacted with firm characteristics, controlling for interaction of monetary policy surprises with four different financial constraints indexes: KZ-index, SA-index, SEB-index, and WW-index. All firm-level variables other than returns are standardized to have zero mean and unit variance. The blue dot is the coefficient of the interaction of monetary policy and the firm characteristics. The vertical bars represent 90% confidence intervals constructed with White standard errors.

Figure C.2: **Monetary Policy Sensitivity Controlling for Momentum and Reversal**



This figure reports results of a panel fixed effects regressions of daily firm-level stock returns on monetary policy surprises interacted with firm characteristics, controlling for interaction of monetary policy surprises with momentum, short-term reversal, and long-term reversal. All firm-level variables other than returns are standardized to have zero mean and unit variance. The blue dot is the coefficient of the interaction of monetary policy and the firm characteristics. The vertical bars represent 90% confidence intervals constructed with White standard errors.

Table C.3: **Model Calibration**

Description	Variable	Value
Uncond. mean of div. growth	g	1.29%
Uncond. mean of risk-free rate	$\bar{r}_f$	0.96%
Uncond. mean of price of risk	$\bar{x}$	0.85
Uncond. mean of inflation	$\bar{q}$	3.68%
Persistence of mean div. growth	ϕ_z	0.90
Persistence of risk-free rate	ϕ_r	0.92
Persistence of price of risk	ϕ_x	0.87
Persistence of inflation	ϕ_q	0.78
Std. deviation div. growth	σ_d	10%
Std. deviation mean div. growth	σ_z	0.32%
Std. deviation risk-free rate	σ_r	0.19%
Std. deviation price of risk	σ_x	40%
Std. deviation inflation	σ_π	1.18%
Std. deviation expected inflation	σ_q	0.35%
Std. deviation monetary policy shock	σ_{MP}	4%
Correlation of div. growth and expected dividend growth	ρ_{dz}	-0.83
Correlation of div. growth and risk-free rate	ρ_{dz}	-0.30
Correlation of div. growth and expected inflation	ρ_{dq}	-0.30
Correlation of inflation and expected inflation	$\rho_{q\pi}$	1
Correlation of price of risk and expected dividend growth	ρ_{xz}	0.35
Effect of monetary policy on expected dividend growth	$\sigma_z\psi_z$	0.88%
Effect of monetary policy on risk-free rate	$\sigma_r\psi_r$	1%
Effect of monetary policy on price of risk	$\sigma_x\psi_x$	40%
Effect of monetary policy on expected inflation	$\sigma_q\psi_q$	0.25%

The table shows the model parameters based on annualized empirical moments following Lettau and Wachter (2011). The model is simulated at a quarterly frequency. Parameters not included are set to zero. Effects of monetary policy on risk-free rate and inflation are calibrated according to empirical evidence from Acosta et al. (2025). Calibration of expected dividend growth and price of risk is based on empirical evidence constructed using the approach from to Lettau and Wachter (2007).