Monetary Policy and Investment Plans

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Abstract

We explore how monetary policy affects corporate investment decisions, and why there are long and variable lags in transmission. To do so, we hand-collect a firm-level dataset of U.S. investment plans and link it to managers' cash-flow expectations. We first document new facts about investment plans. Firms' investment plans are persistent, and the initial plan explains most of the variation in realized investment. However, firms immediately update investment plans and earnings expectations in response to monetary policy shocks. We find a stronger effect on long-horizon plans than short-horizon plans. Plans for new and expansionary projects respond more to monetary policy than plans related to ongoing projects. These results help to explain the "long and variable" lags in monetary policy transmission. Regarding transmission mechanisms, we document a financing-cost channel, where policy-driven increases in borrowing costs reduce planned investment.

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How does monetary policy affect corporate investment decisions, and why does it do so with long and variable lags [Friedman, 1968]? Classic explanations for lags include production frictions, such as time to build, investment irreversibility, and investment adjustment costs [Kydland and Prescott, 1982, Abel and Eberly, 1994], financial frictions [Bernanke and Gertler, 1995], or information frictions that delay firms' acquisition and analysis of news [Lucas, 1973, Mankiw and Reis, 2002, Coibion et al., 2018]. However, evidence to disentangle these narratives is limited. Without directly observing corporate expectations and decision making, the business investment response to monetary policy remains a black box.

We construct a novel dataset of hand-collected quarterly forward-looking firm-level investment plans and managerial earnings expectations for the largest U.S. non-financial corporations to directly observe how firms adjust their expectations and investment decisions in response to monetary policy shocks. The data provides a unique perspective into the decision-making of corporate managers in real time. We observe which investment plans adjust, and when they are adjusted. We first document three new facts about investment plans: (i) plans predict actual investment; (ii) once set, investment plans are persistent; and (iii) the initial plan explains the majority of variation in actual investment.

Building on these new facts, we study how monetary policy affects firms' investment decisions. We show that firms update investment plans and net income expectations within a quarter of a monetary shock, implying that slow information acquisition or processing cannot fully explain the delayed investment response. We document a pronounced term structure of planned investment responsiveness: plans for investment more than two years into the future respond more than near-term plans, and this responsiveness increases with the plan horizon. This implies greater flexibility in investment spending planned for further out in the future. We provide novel evidence of the irreversibility of investment: plans for new projects are most responsive to monetary policy, but plans for ongoing projects are comparatively inert — even for distant-horizon spending. Across plan types, contractionary long-term shocks disproportionately curtail more disruptive projects: expansions and environmental- and R&D- related investments.

Finally, we investigate the mechanisms through which monetary policy impacts firm investment decisions. We find evidence of a cost of debt channel. Firms immediately adjust their investment plans in response to changes in their cost of debt around monetary policy events, in particular those firms with more tangible assets and higher interest expense. Consistent with this, we also find that bond issuance responds negatively to monetary policy shocks. In addition, we find suggestive evidence of a cash flow expectations channel: firms immediately adjust their earnings expectations following a monetary policy shock, and adjustments in

cash flow expectations are correlated with adjustments in planned investment.

Overall, we interpret these results as novel evidence of capital production frictions that dampen and delay the transmission of monetary policy to real activity. Importantly, this channel is distinct from slow updating of expectations (Lucas [1973], Mankiw and Reis [2002]), as we find that companies do incorporate monetary policy changes into their investment plans and cash flow expectations within the quarter. In addition, as we observe that costs of debt respond immediately to monetary policy shocks, and firms' planned investments adjust accordingly, the financial frictions channel does not seem be the primary driver of the lagged response. While the focus of our paper is on monetary policy, our findings provide important insights into how firms respond to shocks and policies in general.

One key contribution of our paper is our data collection effort, which aggregates hand-collected publicly available information from various company disclosures, including regulatory filings, earnings call presentations, and investor presentations, to create a novel panel dataset of firm investment plans for multiple plan horizons up to five years in the future. We hand-collect 46,871 firm-quarter-projection year observations covering 881 of the largest non-financial U.S. corporations. We merge this with company guidance data on investment and cash flows from IBES and Refinitiv LSEG, yielding over 124,000 observations of management capital expenditure plans for nearly four thousand U.S. firms. Our data on investment plans spans 2000-2024 and accounts for nearly 80% of the total capital expenditure and roughly 60% of total assets of all U.S. non-financial corporations reported in Compustat since 2008. The vast majority of firms update plans on a quarterly basis, providing a high-frequency view into decision making. To compare the effects of monetary policy on different types of investment, roughly half of our investment plans data include qualitative comments about the kind of investment, such as research and development, environmental projects, and maintenance, allowing us to measure how plans for these different kinds of investment respond to shocks.

We first document new facts about investment plans themselves. Investment plans strongly predict actual investment with a predictability coefficient of around 0.8, confirming that plans are informative about a firm's intentions. We find that investment plans are persistent once set, with a quarter-to-quarter autocorrelation for the same future projection year within a firm of over 90%. Plans are less persistent during times of heightened uncertainty regarding economic policy, financial conditions, and macroeconomic conditions. We also find that the initial capital expenditure plan made for a given future year explains over half of the variation in final capital expenditures in that year within firm.

To investigate this further, we use standard monetary policy shocks constructed using high-frequency

changes in interest rate futures around FOMC announcements. As our baseline measure of monetary policy shocks, we employ the first principal component of changes in the current and next three quarters ahead Eurodollar futures contracts around FOMC announcements, as constructed by Bauer and Swanson [2023]. To capture changes to the longer end of the yield curve, we also use the high frequency changes in 2- and 10-year US Treasury bond futures around FOMC announcements. To investigate the cost of debt channel of monetary policy, we use changes in the firm-level cost of debt in the 2-day window around FOMC announcements (similar to Hanson and Stein [2015]). These provide market changes in the cost of debt that we can reasonably attribute to monetary policy surprises.

As our main outcome variable of interest, we investigate planned real capital expenditure relative to prior period actual capital expenditure, adjusting for time-varying and horizon-specific inflation expectations from the Cleveland Federal Reserve Bank. We normalize by prior year assets and regress this measure on the sum of all monetary policy shocks that occur in the fiscal quarter prior to the announcement. We control for prior quarter cash to assets, leverage, log assets, return on assets, tangibility, and Tobin's Q; we also control for prior quarter changes and levels of the CFNAI index, and 2-year UST yields and term spread, as well as four lags of GDP growth, unemployment rate, and inflation rate.

First, we show that firms update their planned investment and net income expectations in response to monetary policy shocks, and do so within a quarter of the shock taking place. We show that firms do not continue to update their plans and cash flow expectations in response to monetary policy shocks that occurred more than a quarter ago. This suggests that slow updating and processing do not completely explain the long lags of monetary policy transmission to investment.

Next, we find evidence of a term structure of planned investment responsiveness: plans about investment expected to take place three or more years into the future are more responsive than plans about investment expected to occur in the next year or two. Moreover, there is some evidence that there is duration matching along the term structure: long-term investment plans are more responsive to shocks to long-term yields than short-term plans are. We also find significant variation in responsiveness across types of investment: in response to contractionary monetary policy shocks, firms reduce more plans for investment that are potentially more disruptive, such as investment related to expansion, research and development, and environmental projects. We show that plans regarding new investment projects are more responsive to monetary policy; plans regarding ongoing investment projects are less responsive. This is the case even when holding fixed the horizon of the plan. This provides novel evidence of the partial irreversibility of investment [Arrow,

1968, Bernanke, 1983, Abel and Eberly, 1994], which poses a friction for monetary policy transmission to investment.

We next directly test mechanisms of monetary policy transmission, and how they vary across firms. Firms may adjust their investment plans downward in response to a contractionary monetary policy shock for many reasons, including more expensive external financing and tighter financial constraints, or reduced cash flow expectations. We first investigate the cost of debt channel. We estimate the responsiveness of firms' investment plans to changes in firms' cost of debt due to monetary policy, as measured by high-frequency changes in their outstanding bond yields around monetary policy events. We find that firms reduce their planned investment in response to increases in their cost of debt. Firms with more tangible assets and higher interest expense ratios are more responsive to changes in their cost of debt induced by monetary policy. Consistent with this, we find similar heterogeneity across firms in their net issuance response to monetary policy.

Finally, to investigate the cash flow expectations channel, we estimate the responsiveness of firms' expectations regarding net income to monetary policy shocks, and how changes in firms' forecasts regarding net income co-move with changes in firms' investment plans. We find that firms reduce their expectations of net income in response to contractionary monetary policy, and that there is a strong correlation between reductions in net income expectations and reductions in investment expectations. We find that these effects are stronger for smaller firms.

Our results help explain the well-documented pattern that realized business investment lags monetary policy shocks. Explanations include nominal rigidities [Christiano et al., 2005], financial accelerator models [Bernanke and Gertler, 1995, Bernanke et al., 1996], information rigidities [Lucas, 1973, Mankiw and Reis, 2002, Coibion et al., 2018], and production frictions such as time to build and partial irreversibility [Kydland and Prescott, 1982, Abel and Eberly, 1994]. With our new data, we show that production frictions are the primary channel that leads to lagged responsiveness.[1] We find that time-to-build and the irreversibility of investment contribute to the delayed response of business investment to monetary policy. For the large corporations in our study, these production frictions outweigh other explanations including information rigidities in driving long transmission lags. While this paper focuses on the transmission of monetary shocks, similar frictions likely characterize firms' responses to tax changes, regulatory shifts, and other

[1] In a similar vein, Siani and Zhang [2025] show that institutional frictions in state budgeting processes create long lags in spending responses to monetary policy shocks.

demand or supply shocks.

We contribute to a long literature of how monetary policy affects firms going back to Keynes [1937], Friedman [1968], Cochrane [1998], Bernanke et al. [1999], by introducing new data on investment plans. Recent empirical advances in understanding how monetary policy affects real outcomes improve the exogeneity of the monetary policy shocks (MPS) on the right hand side of the regression equation. Romer and Romer [2004] propose a narrative approach using data on FOMC meeting accounts, which Aruoba and Drechsel [2024] build upon. Kuttner [2001] and Bernanke and Kuttner [2005] use price changes in the fed funds futures contract in the days around a policy action to extract the change in market expectations of the Fed funds target rate. Similar high-frequency responses to nominal rates are used by Hanson and Stein [2015], Nakamura and Steinsson [2018], Gertler and Karadi [2015], Miranda-Agrippino and Ricco [2021], Gurkaynak et al. [2005], and van Binsbergen and Grotteria [2024] (see Ramey [2016] for a survey). There is significant heterogeneity documented among firms in their responsiveness to monetary policy.[2] Small firms [Gertler and Gilchrist, 1994], less levered firms [Ottonello and Winberry, 2020], and younger firms [Cloyne et al., 2023] exhibit the largest investment responses to monetary policy. The transmission mechanism of monetary policy via firms may differ in the context of a declining share of loan borrowing [Crouzet et al., 2019] and if policy targets bond markets [Darmouni and Siani, 2022]. Longer-term real effects of monetary policy can occur via innovation [Ma, 2023] or hysteresis of TFP and the capital stock [Jordà et al., 2024]. We build on this literature by sharpening the left hand side of the classic monetary policy effects regression. Specifically, we use investment plans as the outcome variable of interest, which reflects firms' current plans for future investment based on all information available at that point in time. By doing so, we are able to remove much of the noise associated with implementation lags, and map changes in planned investment to contemporaneous changes in market cost of debt and cash flow expectations.

Our work builds on a large literature on investment determinants (Jorgenson and Stephenson [1967], Tobin [1969], Keynes [1937], Fisher [1930], Kuh [1963], Greenwood and Hanson [2015] Lamont [2000], Fazzari et al. [1988], Barro [1990], Kaplan and Zingales [1997], Gennaioli et al. [2016b]), by analyzing how investment responds to changes in the cost of financing versus cash flow expectations. Modern macro models predict a nearly infinite investment response to interest rates. Empirical results thus far are mixed. For example, Gilchrist and Zakrajšek [2012] show that higher credit spreads predict lower growth; meanwhile

[2] In more recent theoretical work, Liu et al. [2022] show that market leaders respond more so to expansionary monetary policy when rates are low.

Kothari et al. [2014] show that while a decline in credit spreads predicts higher aggregate investment growth, the effects are weak and short-lived. Recent empirical work has addressed the problem of simultaneity by using monetary policy shocks to show that in aggregate, investment is affected by changes in interest rates (see for example Gertler and Karadi [2015]). However, micro data on firms suggest that managers are relatively insensitive to changes in their cost of capital when it comes to determining hurdle rates and thus investment (Graham [2022], Gormsen and Huber [2022]). Our data allows us to trace with more detail the effects of monetary policy, adding to a recent literature that uses micro data to better understand the transmission channels (Selgrad [2023]). This line of work is particularly important as the largest firms rely less so on banks and more so on capital markets.

Finally, our paper adds to a growing set of papers on firm expectations and forecasting and their real effects. Manski [2004] makes the case for studying expectations of economic agents to better analyze decision-making, and many studies have since used surveys to understand firm expectations of macro and firm-level outcomes. Early papers to use firm investment expectations data include Lamont et al. [2000], which uses aggregated firm-level survey data of investment from 1948-1993 to show that planned future investment forecasts low stock returns, and Guiso and Parigi [1999], which uses survey data from the Bank of Italy in 1993 to show that uncertainty weakens the responsiveness of investment to demand. In more recent years, Coibion et al. [2018] and Coibion et al. [2020] use survey data to explore how firms respond to expectations of macroeconomic conditions and Gennaioli et al. [2016a] and Ma et al. [2020] use survey data to map manager expectations of earnings growth to planned or actual investment. Graham [2022] provides an overview of management plans from CFO surveys, finding that CFOs make scenario-specific, multi-year plans. A closely related paper Sharpe and Suarez [2021] analyzes these CFO surveys and finds that according to CFOs, investment plans are insensitive to interest rates; we build on this using a longer panel that includes many more firms to allows us to explore heterogeneity and mechanisms. Barry et al. [2022] uses the CFO survey data on investment and hiring plans around the onset of the COVID pandemic to show that investment and financial flexibility was valuable to firms during the COVID emergency. Dessaint et al. [2023] collect data on company investment horizons to show how the quality of investor information affects investment differentially for firms with long- versus short-term projects. A related strand of literature in macroeconomics studies the forecasts and forecast errors of professional forecasters [Farmer et al., 2024], and their responses to monetary policy [Campbell et al., 2012, Bauer and Swanson, 2023, Nakamura and Steinsson, 2018]. In addition, a large and growing literature in accounting studies the strategic considerations

associated with managers disclosing guidance (see Call et al. [2024] and Roychowdhury et al. [2019] for surveys). We build on this literature by constructing and analyzing the most comprehensive micro-data on investment plans and cash flow expectations to date. While the focus in this paper is on monetary policy, our data open up a host of new opportunities for understanding corporate behavior by directly observing management decisions.[3]

The remainder of the paper is organized as follows. We first discuss the new data on investment plans in Section 1. We present novel facts about investment plans in Section 2. Motivated by these facts, we present a conceptual framework based on existing models in the literature in Section 3. Section 4 presents findings about the effects of monetary policy on investment plans and Section 5 shows evidence of transmission mechanisms. Section 6 discusses implications and Section 7 concludes.

1 Data

Investment plans. Our core dataset is compiled using novel, hand-collected data on investment plans and merging this with corporate expectations data from LSEG and IBES. First, we construct a new, manually collected dataset containing 46,871 company investment plans for 881 U.S. publicly traded non-financial companies. To do this, we sort U.S. non-financial firms in Compustat by total assets, and check 58,392 files including quarterly and annual reports, earnings reports, and other investor disclosures on company websites for the largest 1,387 U.S. non-financial firms. Because firms are not required to disclose their investment plans, there is significant heterogeneity in how these data are reported. In our final sample, 80.7% of the observations come from the footnotes of SEC filings, 18.3% from earnings call presentations, and the remainder come from other investor presentations.[4]

As an example, Ford Motor Company reported in the footnotes of their 2023 Q4 10-K the following: "Capital spending was $8.2 billion in 2023, $1.6 billion higher than a year ago, and is expected to be in the range of $8 billion to $9.5 billion in 2024."[5] As another example, American Airlines wrote in its June 2024 10-Q "We estimate that, based on our commitments as of June 30, 2024, our planned aggregate expenditures for aircraft purchase commitments and certain engines on a consolidated basis for the remainder

[3] We explore these questions further in our companion paper Selgrad and Siani [2025].

[4] Figure C.3 in Appendix C shows the sources of data over time.

[5] See the SEC filing at link `https://www.sec.gov/ix?doc=/Archives/edgar/data/0000037996/000003799624000009/f-20231231.htm`.

of 2024 through 2028 would be approximately $14.0 billion".[6] See Figure C.2 for further examples of how firms report their capital spending plans in earnings presentations. When the planned capital expenditure is reported as a range, as in the Ford example, we take the midpoint of the range. If the plans are spread out over many years, as in the American Airlines example, we assume the total amount is equally distributed across all years.

While artificial intelligence programs can help aggregate qualitative observations about company investment plans (Jha et al. [2024]), the heterogeneity in ways that companies report this information makes the task more suitable for manual entry. Thus, we train a team of research assistants to parse through SEC filings, earnings call reports, and investor day presentations to collect the data. Research assistants search for the terms "capital planning", "planned capital expenditures", "capital budgeting", and variations, and collect the amounts, time horizon, and any qualitative information surrounding the forecast. We describe the data collection and cleaning process in Appendix B.

We supplement our manually collected company investment plans with additional investment projections obtained from IBES (company guidance) and LSEG Guidance Reports (see Mayew et al. [2024]). The dataset is at the firm, date of announcement, year of projection level, and covers between 70-80% of capital expenditures and 60% of total assets of the universe of non-financial U.S. firms in Compustat from 2008-2023 (see Figure 1 for the time series of data coverage). Table C.2 reports the summary statistics of firms that are in our sample, compared to non-financial U.S. firms in Compustat. Firms in our sample are significantly larger than the universe of Compustat firms, with a median firm of 2.4 billion in total assets versus the median Compustat firm of 300 million in assets. Table C.2 further compares the firms from each data source. Firms in our manually collected data are larger than the firms in the LSEG or IBES data, as measured by assets. Along other dimensions, the median firm looks similar across the three sources of data.

Across these three sources of investment plans, we observe forward-looking investment plans for 3,734 firms made in 1999-2025 for projected investment occurring in the years 2000-2033. Figure 2 shows the distribution of projection years across the three sources; there is fairly even coverage over the years. We observe plans for firms across a variety of industries, as shown in Figure 3. The plan horizon varies significantly by industry, as summarized in Figure 4; firms in the utilities and transportation sectors tend to have much longer projection horizons on average, from 3-5 years on average, while construction and

[6] See the SEC filing at link `https://americanairlines.gcs-web.com/static-files/ce8cb2f0-7c8f-4324-be01-b8e559b626e4`.

healthcare companies have on average 15-18 months between announcement and end of investment plan horizon. Firms frequently update their projected investment for a given fiscal year. Figure 5 shows the modal number of revisions to a given investment plan is three. Further, Figure 6 shows that these revisions are most often made quarterly, providing helpful high-frequency variation to study the investment decision responses to shocks.

Because we aggregate the stated investment plans from public disclosures, we consider them the managers' carefully considered plans of future investment given available information. Managers are strongly incentivized to provide guidance honestly and avoid "cheap talk". The 1934 Securities Exchange Act, Section 10b-5 makes it unlawful for anyone to "make any untrue statement of a material fact or to omit to state a material fact... in connection with the purchase or sale of any security." (U.S. Congress [1934]). Managers are thus constantly under the threat of litigation when making public disclosures (Francis et al. [1994], Rogers et al. [2011]). Moreover, the passage of the Sarbanes-Oxley Act in 2002 following the Enron and Worldcom scandals put considerable pressure on executive officers to ensure the quality and veracity of disclosures. By contrast, survey-based measures of managerial expectations often used in the literature, while informative, typically rely on voluntary responses with fewer direct consequences for misstatement. As a result, our data offers a uniquely accountable and transparent lens on firms' forward investment intentions.

Expected Net Income. We obtain firms' projections for net income from LSEG Guidance Reports (see Mayew et al. [2024]). LSEG sources these projections from public disclosures, such as conference calls, press releases, analyst days, and industry conferences. We focus on projections for net income as these are well populated. Firms provide projections for this cash flow variable in a similar way to their projections for investment, specifying a dollar amount expected for a given projection period. For an investment plan announced in a particular fiscal quarter and for a given future projection period, we also observe projected net income in 23,735 cases. There are 1,800 unique firms that provide projected net income alongside an investment plan. LSEG Guidance Reports provides projections for cash flow variables made between 2004-2021.

Hiring. For hiring data, we use Workforce Dynamics data from Revelio. The coverage in Revelio is from January 2008 to June 2024. There are 7361 unique firms in Revelio that we are able to match to Compustat, and 603 that we can match with our investment plans data. There are 7 unique job categories (including engineering, finance, marketing, operations, sales, scientist, and administration).

Monetary policy surprises. We use high-frequency changes in interest rate futures around FOMC

announcements constructed by Bauer and Swanson [2023]. For the front-end of the yield curve (short-term, or "ST Shock"), we use the first principal component of the changes in the current-quarter Eurodollar (ED) futures contract, next-quarter ED futures contract, and the two- and three-quarter-ahead ED futures contracts from 10 minutes before the announcement until 20 minutes after the announcement, scaled so that the impact on the latter contract is one. To measure changes to the longer-end in the yield curve, we use changes in the prices of the 2-year, 5-year, and 10-year Treasury bond futures from 10 minutes before the announcement until 20 minutes after the announcement.

We further compute changes in firm-specific cost of debt using changes in amount-outstanding weighted average bond yields from TRACE in the two-day window around each FOMC announcement, in a similar spirit as Hanson and Stein [2015]. Not all firms have bonds outstanding, but we can compute these high-frequency cost of debt shocks for 1,663 firms in our sample. We aggregate these shocks over a 90-day rolling window and merge them at the fiscal quarter end prior to each investment plan announcement.

Other data. We supplement our data with macro variables including the CFNAI index for monthly economic activity from the Chicago Federal Reserve, and U.S. Treasury spot rates, GDP growth, inflation and unemployment rates from FRED. To adjust the investment plans in real terms, we obtain data on inflation expectations from the Cleveland Federal Reserve. We combine the data with realized capital expenditures and other firm characteristics in Compsutat. We use Mergent FISD for data on corporate bond debt outstanding, employing the merge with Compustat as described in Mota and Siani [2023], and use Capital IQ to gather the share of bond debt for each firm. We obtain a measure of asset specificity from Kermani and Ma [2023].

2 New Facts about Firm Investment Plans

2.1 Plans are Informative about Actual Investment

First, we establish that the plans are informative about actual investment. In aggregate, planned capital expenditures closely track actual capital expenditures. In Figures 7a and 7b, we show the total planned 1-year (3-year) forward capital expenditure change, normalized by lagged assets, relative to the actual capital expenditure changes for the subset of firms in our sample. Realized investment tends to be lumpier than planned investment (Doms and Dunne [1998], Caballero and Engel [1999]), particularly when considering longer horizons. For example, capital expenditures were planned to stay roughly constant as a share of assets

in 2020 based on 1-year plans made in 2019; but instead dropped significantly, likely due to the COVID-19 pandemic.

We can further show that individual firm-level plans are informative about realized investment. To test this, we regress firm i's *actual* change in investment in year $t+h$ relative to year t on its *planned* change in investment over this horizon, planned as of the end of year t, including firm fixed effects:

$$\frac{I_{i,t+h} - I_{i,t}}{I_{i,t}} = \beta_h \frac{\mathbf{F}_{i,t}[I_{i,t+h}] - I_{i,t}}{I_{i,t}} + \alpha_i^h + \varepsilon_{i,t}^h \tag{1}$$

We plot the estimated coefficients across all horizons $h \in [1,5]$ in Figure 8. We condition on plans that are announced at least three months prior to the end of the projection period; for example, we include AT&T's 2011 capital expenditure plan announced in September 2011, but not the one announced in October 2011. For all of the projection horizons, the coefficients are around 0.8 and statistically significant. This suggests that plans are significantly better than random noise, and are informative about actual investment. We report the regression results of predictiveness of one-year and longer-horizon plans in Table C.4, and find that medium and longer horizon plans (greater than two years) are generally slightly less predictive.[7]

2.2 Plans are Persistent

We next investigate how persistent firms' investment plans are by measuring auto-correlations of the investment plans normalized by lagged assets. We estimate the following specification, for $\ell = 1,2,3,4$:

$$\frac{F_t[I_{i,t+h}]}{A_{i,t-\ell-1}} = \beta \frac{F_{t-\ell}[I_{i,t+h}]}{A_{i,t-\ell-1}} + \alpha_i + \epsilon_{i,t,h} \tag{2}$$

The results are shown in Table 2. We find evidence that investment plans tend to be quite persistent, with a firms' plans in a given quarter for some future period being strongly correlated with the firms' plans in the previous quarter for the same future period. This persistence reduces slightly as we compare plans for the same future period that are two, three, or four quarters apart, but is still high, as evidenced by columns (2), (3), and (4).

We also investigate whether this persistence is affected by the uncertainty in which firms make plans. The results are shown in Table 3, showing the effect of a one standard deviation increase in uncertainty on plan persistence for different measure of uncertainty. We find evidence that investment plans become less

[7] Forecast errors are roughly mean zero and do not demonstrate a clear bias; see Figure C.4 for the distribution.

persistent during periods of elevated uncertainty. This is the case for indices that measure economic policy uncertainty (from Baker et al. [2016]), financial uncertainty, and macroeconomic uncertainty (from Jurado et al. [2015]).

Finally, we compute the quarterly plan revisions for a given firm-projection year pair, normalized by assets, and plot the distribution in Figure C.5. Plan revisions are centered around zero with a large mass at zero and a standard deviation of around 0.6 percentage points of assets.

2.3 Initial Plans Explain Most of the Variation in Realized Investment

We find that the initial capital expenditure plan explains the majority of the variation in final capital expenditures. To show this, we decompose the variance of a firm's realized capital expenditures into the following components: (1) the very first plan projected for a future year, (2) revisions made to this plan, and (3) surprises between the final plan and the realization. Suppose the initial plan for year t is made in year $t-S$. We can then write the realized capital expenditure as a function of the initial plan, subsequent revisions, and a final surprise, where we normalize all variables by prior quarter assets:

$$I_{i,t} = \mathrm{F}_{i,t-S}[I_{i,t}] + \sum_{s=1}^{S-1} \Delta_{i,t-s} + surprise_{i,t}, \tag{3}$$

where $\Delta_{i,t-s} = \mathrm{F}_{i,t-s}[I_{i,t}] - \mathrm{F}_{i,t-s-1}[I_{i,t}]$ are quarterly plan revisions and $surprise_{i,t} = (I_{i,t} - \mathrm{F}_{i,t-1}[I_{i,t}])$ is the surprise between the final plan and the realization. Notice that we can then take the covariance of both sides with realized investment $I_{i,t}$:

$$\mathrm{var}(I_{i,t}) = \mathrm{cov}(\mathrm{F}_{i,t-S}[I_{i,t}], I_{i,t}) + \sum_{s=1}^{S-1} \mathrm{cov}(\Delta_{i,t-s}, I_{i,t}) + \mathrm{cov}(surprise_{i,t}, I_{i,t}) \tag{4}$$

Equation 4 show that the variance of realized investment can be decomposed into a covariance with (1) the baseline forecast S quarters in advance, (2) the quarterly planned revisions, and (3) the final surprise relative to the plan. Dividing both sides by the variance of realized $I_{i,t}$ yields a simple variance decomposition:

$$1 = \frac{\mathrm{cov}(\mathrm{F}_{i,t-S}[I_{i,t}], I_{i,t})}{\mathrm{var}(I_{i,t})} + \sum_{s=1}^{S-1} \frac{\mathrm{cov}(\Delta_{i,t-s}, I_{i,t})}{\mathrm{var}(I_{i,t})} + \frac{\mathrm{cov}(surprise_{i,t}, I_{i,t})}{\mathrm{var}(I_{i,t})} \tag{5}$$

Each component on the right hand side maps to coefficient estimates of the following set of regressions:

$$\begin{aligned}
&\mathbf{F}_{i,t-S}[I_{i,t}], = \alpha_{\text{base}} + \beta_{\text{base}} I_{i,t} + e_{it,\text{base}}, \\
&\Delta_{i,t-s} = \alpha_s + \beta_s I_{i,t} + e_{it,s} \ \forall s, \\
&surprise_{i,t} = \alpha_{\text{surprise}} + \beta_{\text{surprise}} I_{i,t} + e_{it,\text{surprise}}.
\end{aligned} \tag{6}$$

When estimating these regressions, we normalize both sides by prior period total assets and include firm fixed effects so the interpretation is within firm. We winsorize all variables and condition on only the balanced panel of firms that have full 8 (4) quarters of projections. Panel (a) of Figure 9 reports the results for the 28 firms with 8 quarters of projections, and Panel (b) reports the results for the 525 firms with 4 quarters of projections. About 41% (67%) of the variation in realized capital expenditures within firm is explained by the initial plan made 8 (4) quarters in advance. Quarterly plan revisions explain a relatively small share of the variation in final plans, and the final surprise explains about 0% (18%) of final variation in investment. For firms with 8 quarters of plans, the 4-quarter ahead plan revision explains a larger share of the variance (33%) in realized capital expenditures than the other quarterly revisions.

Our results represent striking evidence of rigidity in investment plans, once they are made. Firms appear to commit to a level of investment up to 2 years in advance, and intermediate revisions do not explain nearly as much variation as the initial plan. This is consistent with earlier studies of surveys of industrial firms on the planning process of major capital projects (Christiano and Todd [1996], Jorgenson and Stephenson [1967], Krainer [1968]), where the planning phase includes preparing architectural plans, financing, permits, and more. It also suggests that the ability for the central bank to affect investment is by construction limited by investment plans prepared under economic conditions from several quarters ago.

3 Conceptual Framework

Neoclassical models (Jorgenson and Stephenson [1967], Jorgenson [1963]) posit an immediate response of investment to changes in the cost of capital. However, firms' realized investment responses to monetary policy shocks occur with significant delays [Bernanke and Gertler, 1995, Christiano et al., 2005], posing a challenge to the frictionless neoclassical models. So far, we have shown that firm investment plans are relatively persistent once set, and explain a large portion of realized investment. We outline two prominent theoretical frameworks that rationalize delayed reactions in realized investment and align with the presence

of persistent investment plans: (1) information stickiness and (2) frictions in the production of capital. Each provides distinct empirical predictions about how firms' forward-looking investment plans and expectations adjust in response to monetary policy shocks.

One set of models explaining delayed investment responses incorporates information rigidity or inattention [Lucas, 1973, Reis, 2006, Mankiw and Reis, 2002, Coibion and Gorodnichenko, 2015]. Firms may be slow to update their expectations regarding monetary policy and macroeconomic conditions, particularly if information acquisition is costly and policy signals are noisy. This friction implies realized investment responds slowly to monetary policy shocks, as firms take time to revise their expectations and investment plans over several periods following a shock. These models yield a clear prediction: we should see firms update both investment plans and earnings expectations with a lag to monetary policy shocks, if at all. On the other hand, if firms do not face information rigidities and instead update their expectations immediately, then investment plans and cash flow expectations should only respond to monetary policy shocks in the current quarter, if at all, and they should not respond further to monetary policy shocks that occurred in previous quarters.

A second set of models explaining the delayed response of investment do so using capital production frictions such as investment adjustment costs. Classically these costs are modeled as convex adjustment costs of the form:

$$C(I,K) = \frac{\gamma}{2}\left(\frac{I}{K}\right)^2 K \tag{7}$$

where γ is a parameter specifying how costly adjustment is. In such models, it is much costlier to make a large one-period investment than to spread the same total amount of investment over multiple periods. As a result, models with convex adjustment costs predict a smooth response over multiple periods of realized investment to shocks. In our context, they would predict that firms' investment plans respond immediately even to small shocks, and that they do so by equally adjusting their plans for investment for several horizons, rather than just adjusting their plan for investment for the next period by a large amount.

Within the investment adjustment costs literature, others have analyzed the implications of fixed costs of adjustment that are independent of the level of investment (see for example Rothschild [1971], Abel and Eberly [1994], Caballero and Engel [1999]). The presence of fixed costs predict lumpy investment: occasional bursts in investment activity together with periods of inaction. Such models predict that monetary policy shocks may not drive some firms to update their investment plans if they already planned to invest

nothing previously, and are deep within their range of inaction. The models predict large adjustments to plans for other firms as they exit their range of inaction. In our data, most investment plans are non-zero, but they often aggregate across multiple projects. If fixed costs apply to individual projects rather than to total investment, this generates the analogous prediction that firms may not update their investment plan for a given project if they already planned to invest nothing in the project previously, and are deep within their range of inaction. This would predict lumpy changes in total planned investment, reflecting that investment in individual projects is lumpy in the presence of project-specific fixed costs.

Related theories also provide predictions regarding heterogeneity in the sensitivity of investment across firms and types of investment. Abel and Eberly [1994] study the implications of the partial irreversibility of investment, through the introduction of a wedge between the purchase price and resale price of capital, $p_K^+ > p_K^-$. The larger this wedge, the less easily reversible investment is, and so the wider the range of inaction is. This predicts a lower average elasticity of investment with respect to interest rates for firms with less reversible investment projects. This could include firms with greater asset specificity, for whom the wedge is larger.

McDonald and Siegel [1986], Dixit and Pindyck [1994] show that when investment is (partly) irreversible, uncertainty creates an option value of waiting before starting a project. This implies that new projects could be more sensitive to interest rates than ongoing projects: interest rates affect the option value of starting a new project, whereas for ongoing projects that option has already been exercised and so this channel no longer applies.

The above forms of adjustment costs all assume that capital becomes productive within one period. The time-to-build literature [Kydland and Prescott, 1982] introduces the friction that multiple periods are required to build capital goods, and only finished capital goods are part of the productive capital stock. Casares [2006] shows that in the case of a one period time-to-build, the peak effect of a monetary policy shock on realized investment will occur immediately in the period that the shock occurs. In the case of a multiple period time-to-build, the peak effect of a monetary policy shock on realized investment is delayed and occurs several periods later. In the context of our data, with a multiple year time-to-build, firms should adjust near-term investment plans relatively little and make larger adjustments to long-term plans regarding investment several years out.

Our empirical analysis leverages detailed data on firms' investment plans and earnings expectations to distinguish among these theoretical frameworks, thereby contributing to our understanding of the precise

frictions governing lagged monetary transmission to firm-level investment.

4 The Relationship between Firm Investment Decisions and Monetary Policy

In this section, we lay out our empirical strategy for using plans data to understand the interaction between monetary policy and corporate investment decisions, and describe the results.

4.1 Monetary Policy Affects Investment Plans Immediately

We first explore how quickly firm decisions respond to monetary policy shocks, and whether they take time to learn, analyze, and change decisions (Lucas [1973], Mankiw and Reis [2002]). Our main outcome variable of interest is planned investment for firm i, for investment h years into the future, planned at quarter t, relative to prior period actual investment and normalized by prior period assets:

$$\text{Planned Investment}_{i,t,h} = \frac{F_{i,t}[I_{i,t+h}] - I_{i,t-1}}{Assets_{i,t-1}}. \tag{8}$$

Using this outcome variable improves upon the significant signal-to-noise ratio that typically plagues empirical analyses of the investment response to monetary policy shocks (Nakamura and Steinsson [2018]) by isolating the investment decision immediately following a given policy shock. We discuss this econometric improvement in detail in Appendix A. We further separate out the effects of contractionary and expansionary shocks, motivated by the literature that the real effects of monetary policy are asymmetric: that is, agents seem more responsive to contractionary shocks than to expansionary shocks (e.g., Angrist et al. [2018], Tenreyro and Thwaites [2016]).

We run the following regression for $s = 0, 1, 2, 3$:

$$\text{Planned Investment}_{i,t,h} = \beta_1^s MPS_{t-s} + \beta_2^s MPS_{t-s} \times \mathbb{1}\{MPS_{t-s} \leq 0\} + X_{i,t-s-1} + \alpha_i^s + \alpha_h^s + \varepsilon_{i,t,h}^s, \tag{9}$$

where MPS_t is the monetary policy shock, $X_{i,t-1}$ are lagged firm- and macro-level controls, and α_i and α_h are firm and projection horizon fixed effects. Firm controls include cash-to-assets, leverage, log assets, return on assets, tangibility and Tobin's Q. Macro controls include the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of GDP growth, inflation rate, and unemployment rate. The coefficient β_1 measures the change in planned

investment in response to contractionary monetary policy shocks. We two-way cluster standard errors by firm and quarter throughout to account for potential serial correlation within firm and cross-sectional correlation in responsiveness to shocks.

We run regression (9) for monetary policy shocks that occurred $s = 0, 1, 2, 3$ quarters before quarter t, the quarter in which the investment plan is made (prior to its announcement). We condition on investment plans for time periods ending at least nine months after the announcement. We also further further lag the firm and macro controls to correspond to the timing of these shocks. Figure 10 reports the coefficient on the contractionary shock β_1^s for each value of s, along with 95% confidence intervals. Contractionary monetary policy shocks that occur within the quarter when the investment plan is determined immediately impact investment plans, while shocks that occur in the previous quarters do not appear to have any significant impact on planned investment. Firms also appear to immediately respond to changes in their cost of debt induced by monetary policy.

Next, we explore whether companies update their earnings expectations by running the same regression specification but replacing Planned Investment$_{i,t,h}$ with E[Net Income]$_{i,t,h}$. Figure 11 reports the coefficient estimates along with 95% confidence intervals. We find a similar pattern of immediate updating: as soon as the shock occurs, companies update their net income expectations for future periods. Again, lagged shocks do not impact earnings expectations.

Taken together, these results show that firms incorporate new information from monetary policy, and changes in their cost of debt induced by monetary policy, into their expectations and investment plans within one quarter.

4.2 The Effect of Monetary Policy on Investment Plans Across Different Horizons

Next, we explore whether the responsiveness of investment plans to monetary policy differs depending on the plan's horizon. To do so, we estimate the following specification for different projection horizons $h = 1, 2, 3, 4, 5$:

$$\text{Planned Investment}_{i,t,h} = \beta_h \, \text{MPS}_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h} \tag{10}$$

The projection horizon h refers to the number of years between the date when the plan is announced and when the investment is to be undertaken. As before, we include all plans ending at least nine months after announcement. MPS_t is the sum of monetary policy shocks that occur during quarter t, during which the

investment plan is made and at the end of which the plan is announced. $X_{i,t-1}$ are the same macro and firm controls as before. Figure 12 shows the effects on planned investment for different horizons, for monetary policy shocks to different points of the curve. Plans for investment that is to occur over the next year seem relatively unresponsive to monetary policy shocks. Plans for investment that are to occur several years into the future are more responsive. For example, Panel B suggests that a ten basis point monetary policy shock to the two-year yield leads to no reduction today in planned investment that is to occur over the next year ($h = 1$). However, it leads to a 0.15% reduction today in planned investment that is to occur in two ($h = 2$) and three ($h = 3$) years, relative to prior realized investment, scaled by prior period assets. Furthermore, it leads to an even larger 0.35% reduction today in planned investment that is to occur in four ($h = 4$) years, relative to prior realized investment, scaled by prior period assets. Generally, shocks to the longer end of the yield curve also have larger effects on planned investment. To ensure our results are not being driven by the definition of the monetary policy shocks, we re-run these baseline regressions with a variety of different shocks in Appendix Figure C.10 and find similar qualitative results, with longer-dated shocks having larger effects on investment and longer-horizon plans being more affected overall.

As before, we are also interested in any potential asymmetry between contractionary and expansionary monetary policy shocks, so we estimate the following alternative specification, again for plan horizons $h = 1, 2, 3, 4, 5$:

$$\begin{aligned}\text{Planned Investment}_{i,t,h} = {} & \beta_h^{Contr.} MPS_t \times \mathbb{1}\{MPS_t \leq 0 = 0\} + \beta_h^{Expan.} MPS_t \times \mathbb{1}\{MPS_t \leq 0 = 1\} \\ & + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h}\end{aligned} \tag{11}$$

A monetary policy shock is defined to be contractionary if it is strictly positive, and expansionary otherwise. Figures 13 and 14 show the effects of contractionary and expansionary monetary policy shocks respectively on investment plans. Especially for longer maturity shocks, it appears that the magnitudes of the effects of contractionary monetary policy shocks on investment plans are larger than the effects of expansionary monetary policy shocks. For example, comparing Panel C in Figures 13 and 14 suggest that a ten basis point hike leads to a 1.5% reduction in planned investment that is to occur in five years ($h = 5$), relative to prior realized investment, scaled by prior period assets, while a ten basis point cut leads only to a 0.45% increase in planned investment for the same horizon. However, in response to both contractionary

and expansionary monetary policy shocks, longer horizon plans for investment are adjusted by more than short horizon plans.

Next, we formally test the statistical significance of the result that long-horizon plans appear to respond more so than short-horizon plans. We again include all plans ending at least nine months after announcement, and report robustness conditioning on at least three months after announcement in the Appendix.[8] Figure C.7 shows the distribution of projection horizons. We estimate the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{\text{LT Plan}_{i,t,h} = 1\} + \beta_3 \mathbb{1}\{\text{LT Plan}_{i,t,h} = 1\} + \alpha_i + X_{i,t-1} + \varepsilon_{i,t,h} \tag{12}$$

where MPS_t is the sum of monetary policy shocks that occurred during the fiscal quarter t in which the investment plan was made. We define an investment plan as long-term ($\mathbb{1}\{\text{LT Plan}_{i,t,h} = 1\}$) if the plan is for a year that ends more than 24 months after the announcement of the plan. We include the same set of controls as before.

The results for this estimation are in Table 4. The omitted category is short-term (up to 24 months ahead) plans, so we interpret the first coefficient on the yield change as the impact on near-term plans. We find that a ten basis point 2-year U.S. Treasury contractionary shock lowers short-term planned capital expenditure (as a share of assets) by 0.016 percentage points while reducing long-term planned capital expenditures by around 0.25 percentage points (the sum of the base and the interaction coefficients). Overall, the results suggest that long-term plans decline by relatively more following an increase in interest rates, and that this holds for increases in interest rates across the term structure.

To test how robust our result is, we run a simple OLS regression of investment plans on quarterly changes in U.S. Treasury yields. Table C.7 reports the results, which are qualitatively very similar to our baseline results in Table 4, providing us confidence in our results despite the small magnitude of the measured MPS from Bauer and Swanson [2023]. Next, to ensure the monetary policy shocks are properly accounting for the potential bias in a simple OLS setting, we report the IV version of Table C.7 in Table C.9, where we instrument for the quarterly change in each U.S. Treasury yield with the sum of 30-minute event window shocks of the duration-matched U.S. Treasury future in each MP event as defined by Bauer and Swanson [2023].[9] The first-order concern for bias in regressing investment plans on interest rate changes is that

[8] See Tables C.6 and C.10; the results are similar with smaller magnitudes.

[9] Table C.8 reports that the first stage of high-frequency MP-driven changes in U.S. Treasury futures is a relevant instrument for quarterly changes in interest rates.

an increase in nominal interest rates may reflect a growing economy, thus rates and plans may co-move positively, biasing the OLS coefficient towards zero. Indeed, the instrumented version shows a more negative impact of positive interest rate shocks on long-term investment plans, confirming our prior of the direction of the bias.

We next test the statistical differences in each plan horizon relative to plans for investment over the next year by estimating the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 MPS_t + \sum_{x=2}^{5} \beta_h MPS_t \times \mathbb{1}\{h = x\} + \alpha_i + \alpha_h + X_{i,t-1} + \varepsilon_{i,t,h} \tag{13}$$

Table 5 reports the results. Again, we see that plans regarding investment further into the future are more responsive to changes in interest rates. For example, for changes in the 5-year US Treasury yield, there is a statistically significant and negative response to plans with horizons from three to five years out, with the coefficient generally growing in magnitude as the horizon increases. Notably, the responsiveness of investment plans appears aligned with the maturity of the interest rate shocks: 10-year yield shocks affect the longest-horizon five year plans the most, while shorter maturity shocks do not seem to significantly affect these plans. De Fraisse [2023] documents that secular changes in the term premium impact the duration of corporate investment; in a similar vein, our results provide suggestive micro-evidence that longer term investment plans are more responsive to shocks to the long end of the yield curve.

Overall, these results underscore a clear relationship: the longer the planning horizon, the greater the sensitivity of investment plans to monetary policy shocks. We call this the "term structure of planned investment responsiveness". This helps explain why monetary policy takes time to impact realized investment: it impacts long-horizon plans the most, which are still often years away from realization. In addition, these results suggest that any costs firms face when adjusting their level of capital are not convex. Under convex adjustment costs, it would be optimal for the firm to spread any investment induced by monetary policy evenly across multiple periods, which would predict an equal response of investment plans to monetary policy shocks across all horizons, which we do not observe.

4.3 New versus Ongoing Plans

Next, we test whether plans for new projects are more responsive than those for ongoing projects by using the qualitative information firms provide about their investment plans. First, we categorize whether a firm's

investment plan describes a new or ongoing project based on the words it uses to describe the project. We classify investment plans as referring to new projects when the firm signals the initiation of projects. For example, if the text about an investment plan includes the word "new" in combination with an asset, or references openings, the plan is categorized as referring to a new project. We classify investment plans as referring to ongoing projects when firms indicate the continuation or status of an existing project using words such as continue, ongoing, existing, or complete. The complete classifications are provided in Table C.5.

We then estimate the following specification for plans that are categorized as being exclusively about new or about ongoing projects:

$$\begin{aligned}\text{Planned Investment}_{i,t,h} = &\sum_j \sum_k \beta_{j,k} \text{MPS}_t \times \mathbb{1}\{LTPlan_{i,t,h} = j\} \times \mathbb{1}\{NewPlan_{i,t,h} = k\} \\ &+ \sum_j \sum_k \gamma_{j,k} \mathbb{1}\{LTPlan_{i,t,h} = j\} \times \mathbb{1}\{NewPlan_{i,t,h} = k\} \\ &+ X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h} \end{aligned} \tag{14}$$

$\mathbb{1}\{NewPlan_{i,t,h} = 1\}$ if the investment plan is categorized as being exclusively about new projects, and $\mathbb{1}\{NewPlan_{i,t,h} = 0\}$ if the investment plan is categorized as being exclusively about ongoing projects. As before, $\mathbb{1}\{LTPlan_{i,t,h} = 1\}$ if the plan is for year that ends more than 24 months after the announcement date of the plan. In this way, we compare differences between new and existing plans within a planning horizon, in order to separate out the differences in sensitivity of new and ongoing projects from the differences in sensitivity of plans of short and long horizons.

The results are shown in Figure 15. Long-term plans for new projects are significantly more responsive to monetary policy shocks than long-term plans for existing projects. This suggests that once an investment project is ongoing, firms have considerably less flexibility in terms of adjusting it in response to monetary policy, i.e., investment appear irreversible once underway. Interestingly, the coefficient on ongoing projects are close to zero, suggesting a high degree of irreversibility once investment has begun. This suggests that monetary policy is more effective at reducing investment on the extensive margin of new starts. Thus, in a world where most of firms' investment projects are already ongoing, monetary policy is likely to be less effective at changing the level of investment.

4.4 What Types of Investment are Cut?

We next investigate which types of investment decisions are particularly sensitive to monetary policy shocks. We observe a qualitative discussion of the kind of investment planned for roughly one-half of observations. We use these descriptions to classify investments into the following, non-mutually exclusive categories: maintenance, acquisitions, physical infrastructure, environmental, expansion, and research and development. Table C.5 presents the primary keywords utilized in our classification process to systematically identify investment types.

As an example, consider the second quarter of 2022, when the Fed Funds rate increased by 100 basis points and more than two-thirds of firms scaled back their planned investments. One such firm is Ingles Markets, a grocery store chain with approximately $1 billion in market capitalization as of March 2025. In its fiscal year 2021 10-K (ending September 25, 2021), Ingles planned capital expenditures ranging from $120 to $160 million for the fiscal year of 2022. This spending was initially designated for store openings in the fiscal year of 2023, technology enhancements, equipment upgrades and replacements for existing stores, warehouse and transportation improvements, and upgrades to its milk processing facility, alongside considerations for property acquisitions aimed at future store development. However, in its subsequent 2022 Q2 10-Q filing, following the rapid rise in interest rates, Ingles revised these plans downward to a range of $100 to $120 million, notably excluding property acquisitions intended for future store development from their planned expenditures.

To test which types of investment are most likely to be cut on average in response to monetary policy, we run the following regression on plans for projection horizons that end at least 9 months after announcement:

$$\mathbb{1}\{\text{Investment Type}\}_{i,t} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t}, \tag{15}$$

where the outcome variable is a dummy variable that equals one if the qualitative description of the investment plan mentions words in a given category of investment and zero otherwise. Note that one investment plan can mention multiple types of investment. Figure 16 shows the results. Panel (a) indicates that there is not a statistically significant effect of contractionary short-term MPS on the likelihood of investment types appearing in firms' plans, consistent with our findings earlier that the short-term shock has a smaller effect on long-term investment plans. However, Panels (b) and (c) indicate that certain investments

are cut in response to contractionary shocks to the 2- and 10-year UST yields. Investments related to R&D and expansionary projects respond significantly to contractionary shocks in both the 2- and 10-year yields. Investments related to environmental projects also respond negatively to contractionary shocks, though the effect is statistically weaker. Physical infrastructure related investments also respond negatively to the 10-year yield shocks. These results underscore the heterogeneity of investment responses to monetary policy, highlighting stronger effects on more disruptive, potentially longer-term and growth-oriented investments compared to shorter-term or routine expenditures. This is also consistent with the results on long-term investment plans being more responsive to monetary policy.

Studying the nature of hiring after a shock can further shed light on the kinds of investment companies may be adjusting in response to monetary policy. We run a similar analysis by using job changes in different employment categories from the Revelio data:

$$\text{Hiring}_{i,t}^{\text{Job Type}} = \beta_1 \text{MPS}_t + \beta_2 \text{MPS}_t \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t},$$

Figure 17 presents the estimated impact of monetary policy shocks on hiring across seven job categories: Operations, Sales, Administration, Engineering, Finance, Marketing, and Scientist. We find that all categories experience a decline in hiring following a contractionary short-term shock, with Scientist and Marketing exhibiting the largest negative responses, though the difference is not statistically significant. The hiring response to contractionary shocks in longer-term yields is weaker. This suggests that in general, hiring is more responsive to shocks to the short end of the curve, with hiring that supports growth-oriented and longer-term activities being more sensitive. In the next section, we will further explore mechanisms for the transmission of monetary policy to firm decisions.

5 Transmission Channels of Monetary Policy to Investment

Next, we explore the transmission channels of monetary policy to firm investment decisions. Monetary policy may affect firms' investment decisions via many channels, including through a cost of debt channel, or changes in cash flow expectations[10].

[10]For example, shortly after liftoff from the ZLB, Williams and Williams Partners in January 2016 justify their reduced capital expenditure plans through lower expected net income and higher costs of financing: "Reduced growth in production areas, combined with lower commodity margins and a higher cost of capital, will drive both lower capital and lower ongoing expenses that we expect to be significant." Following further rate hikes in late 2018, Uniti Group, in its earnings call in early 2019, stated that higher costs of

The more commonly studied channel is the cost of debt channel: if firms finance investment with debt, then increases in the cost of debt associated with tightening monetary policy may reduce planned investment as debt servicing costs increase. In additional, this may also reduce investment through a tightening of financial constraints.

Changes in firms' cash flow expectations can also affect investment in various ways. First, in the presence of capital market frictions that make internal funds less costly than external funds, a decrease in a firm's cash flows will result in an decrease in that firm's investment (Fazzari et al. [1988]). Second, in the presence of cash-flow based lending (Lian and Ma [2021]), a decrease in a firm's cash flows may cause financial constraints to become more binding, which may lead to an decrease in that firm's investment. Third, a decrease in firm's cash flow expectations due to lower anticipated aggregate demand may decrease the expected future payoff of investment projects, which may also lead to a decrease in investment. It follows that if an increase in interest rates dampens a firm's expectations of future cash flows, via an aggregate demand channel, then the firm may reduce its planned investment.

We test these transmission channels and their relative importance for different types of firms. The key advantage of our approach is that by using investment plans and cash flow expectations data, we observe firms' investment decisions in real time, allowing us to tie discrete adjustments in planned investment directly to contemporaneous changes in firms' expectations about cash flows and costs of debt. This allows us to avoid the timing mismatches and noise inherent in realized data and better pinpoint the transmission mechanisms.

5.1 Cost of Debt and Borrowing Channel

A common transmission mechanism for monetary policy to firm investment is via a borrowing channel (e.g., Bernanke and Gertler [1995]). In this section, we first demonstrate that firms' investment plans respond to monetary-policy-driven shocks to their cost of debt. We then present direct evidence on the borrowing mechanism by examining firms' net debt issuance in response to monetary policy shocks. In both sets of results, we show significant heterogeneity in the cross-section of firms.

debt lowered its planned capital expenditure: "With the cost of capital in the public markets being elevated right now, we've chosen to kind of go slow on larger transactions." Consol Energy, in its 10-K for 2009, describes how easy monetary policy raised its cash flow expectations: "Due to the relaxed monetary policy in the United States, a modest recovery appears likely to continue in the U.S. ... This should lead to an increase in demand for energy products."

5.1.1 Investment Plans and Cost of Debt Shocks

To measure the relationship between a firms' investment plans and the cost of debt, we construct shocks to each firm i's cost of debt due to monetary policy changes, $\Delta^{MP} r^D_{i,t}$, as the two-day window change in the firm's cost of debt around each FOMC announcement. We proxy for the firm's cost of debt using the amount-outstanding weighted average yield of bonds issued by the firm. The assumption we make is that within the two-day window around monetary policy announcements, there is no other significant news about the market or firm fundamentals that affects the firm's costs of debt. Ideally, we would construct similar 30-minute high-frequency changes as in Nakamura and Steinsson [2018], Bauer and Swanson [2023], and others, but corporate bond markets are not as liquid as Treasury markets (e.g., Bao et al. [2011]), so we would have too few trade observations at such high frequency. Thus we use a 2-day window in the spirit of Hanson and Stein [2015]. To ensure we are indeed capturing changes in firm costs of debt arising from monetary policy changes, we first validate that these two-day changes in cost of debt are in fact monetary-policy driven. We estimate the relationship between a firms' cost of debt and monetary policy shocks by running the following regression:

$$\Delta^{MP} r^D_{i,t} = \beta MPS_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t} \tag{16}$$

Standard errors are clustered at the firm and quarter level. To investigate potential heterogeneity in this relationship, we also estimate the following specification:

$$\Delta^{MP} r^D_{i,t} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{\text{Top Tercile}\} + \beta_3 \mathbb{1}\{\text{Top Tercile}\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t} \tag{17}$$

The results of the estimation are shown in Table 6. Overall, there is an approximately one-to-one relationship between monetary policy shocks and the cost of debt. There is also heterogeneity in the strength of the pass-through of monetary policy shocks to the cost of debt along several dimensions: the pass-through is higher for large firms (Column 4) and weaker for more financially constrained firms (Column 7) [11]. There is no significant heterogeneity in the strength of the pass-through along the dimensions of tangibility, leverage, profitability, and asset specificity. Overall, the results suggest that our measure $\Delta^{MP} r^D_{i,t}$ is indeed capturing monetary-policy-driven changes in firms' costs of debt.

[11] This stems from a weaker pass-through of expansionary shocks for more financially constrained firms

Equipped with this measure, we then estimate the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 \Delta^{MP} r^D_{i,t} + \beta_2 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h}, \tag{18}$$

where controls $X_{i,t-1}$ are the same as before, and α_i and α_h are firm and projection horizon fixed effects, respectively. As before, we are interested in potential heterogeneity in the effects of contractionary and expansionary changes in the cost of debt on investment, so we also include an interaction term with an indicator variable that equals one when the change is negative. As before, standard errors are clustered at the firm and quarter level. The β_1 coefficient shows how projected investment changes with an increase in the firm's cost of debt. The sum of the β_1 and β_2 coefficients indicate how projected investment changes with a decrease in the firm's cost of debt.

To investigate potential heterogeneity in the strength of the response of planned investment to monetary-policy-induced changes in firms' cost of debt, we also estimate the following specification:

$$\begin{aligned}\text{Investment Plans}_{i,t,h} = {} & \beta_1 \Delta^{MP} r^D_{i,t} + \beta_2 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} + \beta_3 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\text{Top Tercile}\} \\ & + \beta_4 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\text{Top Tercile}\} \times \mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h}\end{aligned} \tag{19}$$

Here, we interact the monetary-policy-induced changes in firms' cost of debt with dummy variables for firms in the top terciles of size, leverage, tangibility, interest expense, profitability, and asset specificity.

The results of the estimation are shown in Table 7. Overall, when a firm faces an increase in the cost of debt induced by monetary policy, they reduce their planned future investment within one quarter. The effect is stronger for larger firms, which may be likelier to finance their investment through corporate bond issuance. The effect is also significantly more pronounced for firms with greater interest expense to debt ratios, which are likely closer to their financial constraints.

Firms with more tangible assets are also significantly more responsive, in line with previous findings that tangible investment is less responsive to monetary policy [David and Gourio, 2023]. Firms with greater asset specificity are less responsive, likely because investment is more irreversible for such firms [Kermani and Ma, 2023] and so they are less likely to cut back on projects that already underway.

5.1.2 Borrowing Channel

Next, we directly test for the borrowing channel: that is, do firms change their borrowing behavior in response to monetary policy shocks? To trace out the borrowing channel, we estimate how a one-period policy shock alters firms' debt-issuing behavior over multiple horizons. Concretely, for each month horizon $h = 0, 1, \ldots, 24$, we run regressions of the form:

$$\frac{\sum_{\tau=0}^{h} \text{NetIss}_{i,t+\tau}}{A_{i,t-1}} = \beta_h MPS_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h},$$

where $\text{NetIss}_{i,t+\tau}$ is firm i's net debt issuance in quarter $t+\tau$ deflated to time t dollars using PPI, and we include the same controls and fixed effects as before. Figure 18 shows the average results across all firms, using different monetary policy shocks. There is a statistically significant decline in net issuance in response to contractionary monetary policy shocks, and this is consistent across different kinds of shocks, though it is slightly more pronounced for shocks to the 2-year yield. The effect persists for up to one year after a given shock. The cumulative response pattern implies that tighter policy raises firms' cost of debt, leading them to cut back planned borrowing over time. In turn, this reduction in credit supply could dampen their ability to execute longer-horizon investment projects. The effect is not as strong for shocks in the 10-year yield, shown in Panel (c).

We next explore heterogeneity in the borrowing response to monetary policy by running the same specification for subsamples of firms, split by top tercile and bottom two terciles. The results are in Figure 19. The most pronounced dimensions of heterogeneity are that firms with higher interest expense ratios and lower profitability face larger contractions in response to positive shocks to their costs of debt, consistent with a financing constraints story. More levered and larger firms respond with slightly larger magnitudes, but the differences are small and insignificant. Figure C.11 in the Appendix shows similar heterogeneous responses to shocks to the 2-year UST yield. Collectively, these findings highlight the significant role firm-specific financial characteristics play in shaping the heterogeneous transmission of monetary policy to firm-level investment outcomes.

The coefficient plots in Figure 18 indicate notably shorter response lags for borrowing compared to realized investment. Borrowing responses peak between 9 and 12 months following a monetary policy shock (consistent with, for example, Christiano et al. [1994]), whereas realized investment responses typically peak

between 2 to 3 years, as documented in existing literature (Cloyne et al. [2023]). Supporting evidence from recent studies also suggests near-immediate borrowing responses to shifts in issuance costs (Boyarchenko et al. [2022], Darmouni and Siani [2022], Mota and Siani [2023], Selgrad [2023], Siani [2021]), likely facilitated by frequent issuers and firms holding shelf registrations. Thus, bond market borrowing responds quickly to monetary policy shocks.

Collectively, these results strongly indicate that the borrowing channel is operative, with firms adjusting their debt issuance behavior significantly in response to monetary policy-induced shifts in borrowing costs. The immediate response of plans to monetary policy-driven increases in costs of debt likely reflects firms anticipating reducing bond issuance in the future and thus reduced funds for future investments. Moreover, the considerable cross-sectional variation underscores that financial constraints materially shape firms' investment sensitivity to monetary policy.

5.2 Cash-Flow Expectations Channel

To study the relationship between a firm's investment plans and projected cash flows, we estimate the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta \text{E[Net Income]}_{i,t,h} + X_{i,t-1} + \alpha_i + \alpha_t + \varepsilon_{i,t,h}, \tag{20}$$

where $\text{E[Net Income]}_{i,t,h}$ is firm i's projected real net income for a future year $t+h$, projected in quarter t, compared to actual net income in quarter $t-1$, scaled by the firms' assets as of quarter $t-1$. $\text{Planned Investment}_{i,t,h}$ is the analogous term for projected investment. This specification is similar to Gennaioli et al. [2016b], which uses CFO survey responses to test how increased earnings expectations impact investment plans. Controls $X_{i,t-1}$ include the same firm controls and macro controls as before. α_i and α_t are firm and quarter fixed effects, respectively. Standard errors are clustered at the firm and quarter level.

The β coefficient shows how projected investment for a given future period changes with projected net income for the same future period. To investigate potential heterogeneity in this relationship across firms with different characteristics, we also estimate the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 \text{E[Net Income]}_{i,t,h} + \beta_2 \text{E[Net Income]}_{i,t,h} \times \mathbb{1}\{\text{Top Tercile}\}$$

$$+\beta_3 \mathbb{1}\{\text{Top Tercile}\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h} \tag{21}$$

where $\mathbb{1}\{\text{Top Tercile}\}$ equals one when a firm is in the top tercile for a given characteristic as of the end of quarter $t-1$. We investigate heterogeneity along the dimensions of size, leverage, tangibility, interest expense ratio, profitability, and asset specificity. The β_2 coefficient shows whether the relationship between projected cash flows and projected investment changes conditional on a firm being in the top tercile of these characteristics.

The results of the estimation are shown in Table 8. Overall, there is a positive relationship between projected cash flows and planned investment, as shown in the second column. When firms project greater net income for a future year, they also adjust their planned investment for that future year upwards. Columns 4-8 suggest that there is not significant heterogeneity in the relationship between projected cash flows and projected investment along the dimensions considered.

Next, we study the relationship between a firm's expected future cash flows and monetary policy. We estimate the following specification:

$$\text{E[Net Income]}_{i,t,h} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h} \tag{22}$$

where MPS_t is the sum of quarter t monetary policy shocks. β_1 represents the effect of a contractionary monetary policy shock on cash flow projections. The sum of β_1 and β_2 represent the effect of an expansionary monetary policy shock on cash flow projections. Controls $X_{i,t-1}$ are as above, and α_i and α_h are firm and projection horizon fixed effects. Standard errors are clustered at the firm and quarter level. To investigate potential heterogeneity in this relationship, we also estimate the following specification:

$$\begin{aligned}\text{E[Net Income]}_{i,t,h} = {} & \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{MPS_t \leq 0\} + \beta_3 MPS_t \times \mathbb{1}\{\text{Top Tercile}\} \\ & + \beta_4 MPS_t \times \mathbb{1}\{\text{Top Tercile}\} \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h}\end{aligned} \tag{23}$$

The results of these estimations are shown in Table 9. Overall, there is a negative relationship between projected cash flows and contractionary monetary policy shocks, as shown in Column (3). In the face of a contractionary monetary policy shock, firms adjust their projected cash flows downwards. There is heterogeneity in this relationship along the size dimension, with firms in the largest size tercile adjusting

their projected cash flows downwards by less in response to contractionary shocks. This may be because smaller firms face greater demand cyclicality, have weaker pricing power, or are less diversified across customers and sectors. Net income expectations of firms with greater interest expense to debt ratios, and lower profitability, also adjust downwards by less in response to contractionary shocks, maybe because they are less elevated to begin with. Furthermore, similarly to investment plans, there appears to be some asymmetry between contractionary and expansionary monetary policy, with cash flow expectations adjusting upwards relatively less in response to expansionary monetary policy shocks.

6 Discussion

We document that investment plans and earnings expectations respond within a quarter following a monetary policy shock. This suggests that the long and variable lags documented in the transmission of monetary policy to realized investment are not entirely explained by models of rational inattention or sticky information (Mankiw and Reis [2006], Reis [2006]), in which agents incur costs when acquiring and processing information and thus act upon outdated news. Our results demonstrate that firms begin updating their expectations –such as anticipated changes in net income– quickly in response to monetary policy shocks. Moreover, firms adjust their investment plans within a quarter in response to changes in their secondary market bond yields, again implying that firms' information sets update quickly.

Note that there is an alternative explanation for long and variable lags that arises from financial accelerator models [Bernanke et al., 1996, Gilchrist and Zakrajšek, 2012]. These models emphasize the amplification of credit market frictions that could contribute to lags in peak responses to monetary policy. Given asymmetric information between firms and lenders, the external financing premium is positive and increasing in downturns, particularly for lower net worth firms. If a contractionary shock reduces a firm's net worth, this increases the external financing premium just as they may need to raise more capital [Kiyotaki and Moore, 1997], further reducing the firm's production. However, our findings that firms adjust planned investment immediately to policy-driven changes in costs of borrowing suggests that the financial accelerator channel is unlikely to be driving the lag in the response of investment in our subset of firms. Indeed, we show that firm costs of bond debt update immediately in response to monetary policy shocks. To do this, we regress quarterly changes in firms' amount-outstanding weighted bond yields on the monetary-policy driven changes in costs of debt. The results, reported in Figure C.13, show that costs of bond debt immediately update in

response to contemporaneous monetary-event window changes in bond yields.

Instead, we find evidence consistent with theories of capital production frictions. The term structure of investment plan responsiveness illustrates that capital outlays planned for the near future are harder to adjust. This is in line with time-to-build models (such as Kydland and Prescott [1982]), which would suggest that investment plans for long-term horizons respond more than investment plans for short-term horizons in response to monetary policy shocks in the presence of a long time-to-build. This result also suggests limited support for convex adjustment costs, as in such a world one would expect firms to adjust their investment plans across all horizons evenly.

We document new evidence of the irreversibility of investment, and how this can dampen the transmission of monetary policy. Once a project is initiated, firms behave as though the investment decision is largely committed, with further changes in monetary policy having limited effects. Plans regarding new projects are more responsive to monetary policy shocks than plans regarding ongoing projects. These findings align with frameworks where firms treat investment decisions as exercising real options (Dixit and Pindyck [1994], Abel and Eberly [1994]). Specifically, investment plans for new projects not yet underway, for which the option value of waiting still exists, display greater flexibility in adjusting to policy shocks.

7 Conclusion

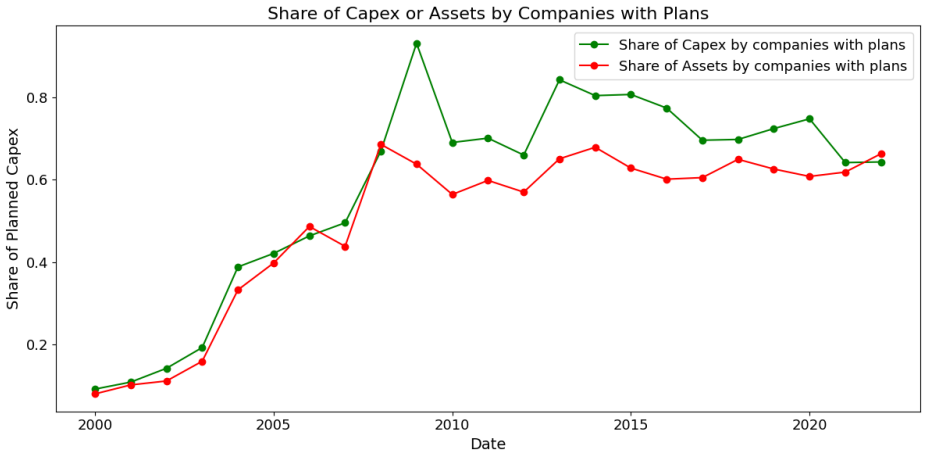
We hand-collect and construct a novel dataset on company investment plans and expectations that provides a unique window into corporate decision-making and how it relates to monetary policy transmission. We document that investment responses differ by horizon: short-term plans react less strongly overall compared to long-term plans, consistent with time-to-build [Kydland and Prescott, 1982]. Relatedly, the stage of the project matters – new investments are more responsive to contractionary monetary policy shocks, whereas ongoing projects are largely insulated – further evidence of the variation in flexibility across investment projects within a firm's portfolio. Our results are broadly consistent with a view of investment implementation with partial irreversibility and real options [Abel and Eberly, 1994, Dixit and Pindyck, 1994].

Our results provide new evidence explaining the well-documented empirical lag between monetary policy changes and realized output. We find that information frictions are unlikely to be significant drivers of the long lags in policy response for large, U.S. non-financial firms. Instead, we find that monetary policy immediately impacts the formation of new investment plans, with actual investment spending adjustments

materializing only when projects begin execution with lags, given time to build and partial irreversibility of existing projects.

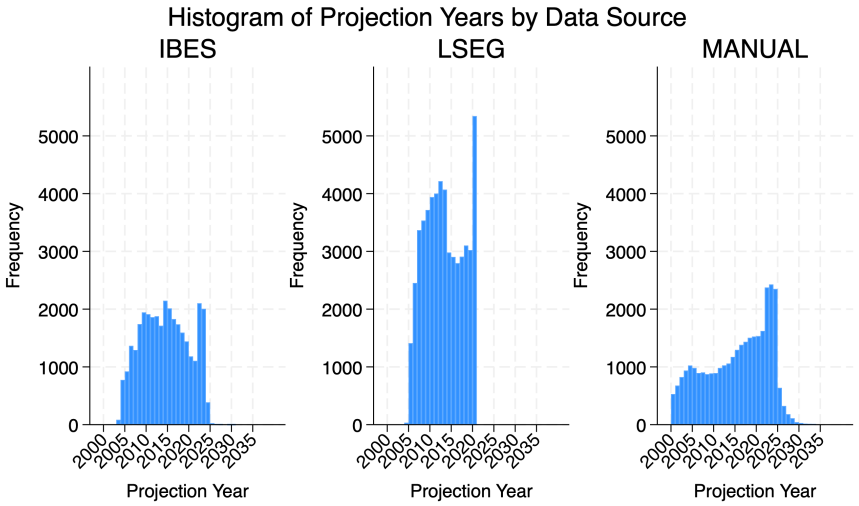
Overall, our evidence shows that analyzing corporate decision making is crucial for understanding the transmission of policy to the aggregate economy. Our findings imply that the composition of planned investment projects can affect how quickly and flexibly the corporate sector can respond to monetary policy through actual investment spending. While the focus of our paper is on monetary policy, our results provide important insights into firm responses to shocks and policies in general, and our new data provides many opportunities to better understand corporate decision-making.

Figure 1: Share of Capex and Assets by Companies with Plans



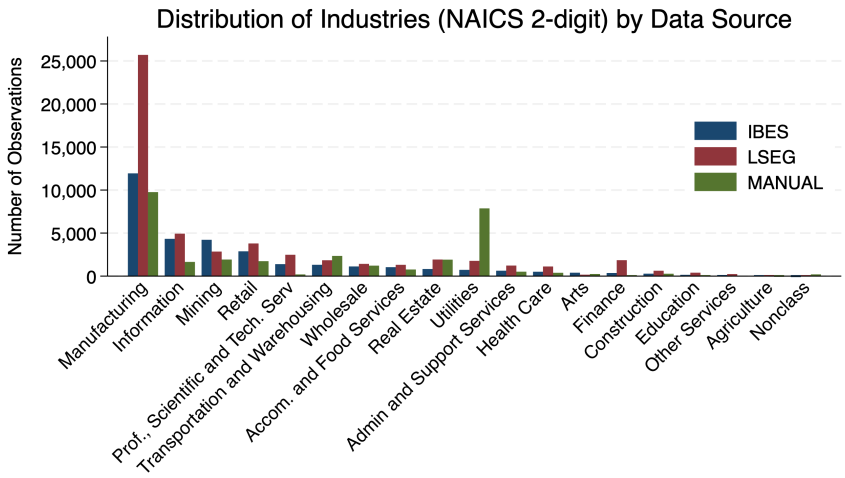
Notes: This figure plots the share of total assets (total capex) across all U.S. Compustat non-financial companies in red (green) that are covered by firms with investment plans in our sample.

Figure 2: Coverage of Projected Years Across Sources



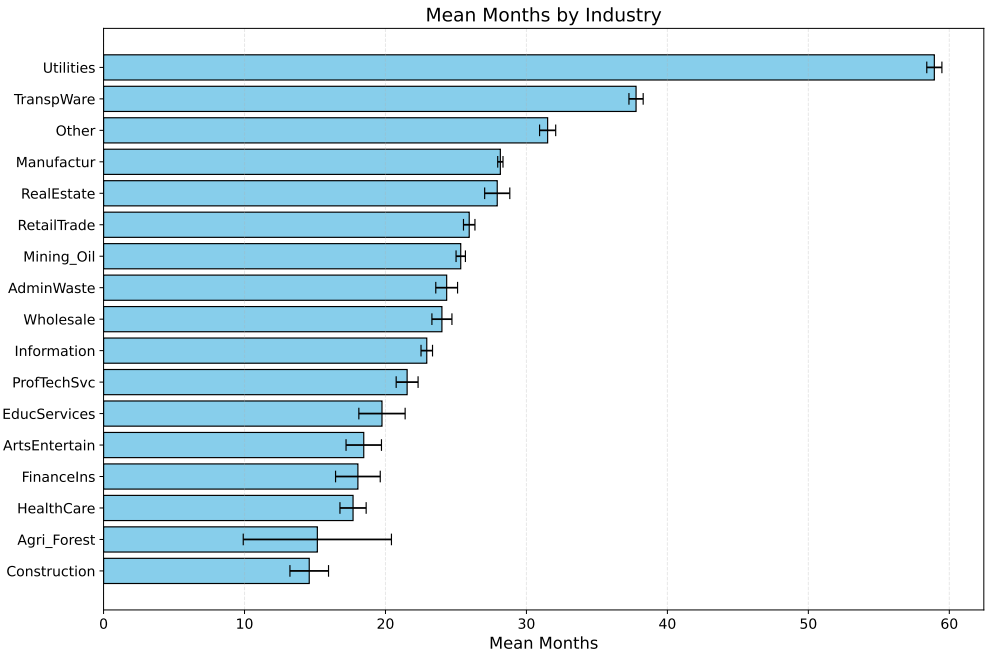
Notes: These three histograms each show the distribution of firm-announcement date observations for a given source.

Figure 3: Coverage of Industries Across Sources



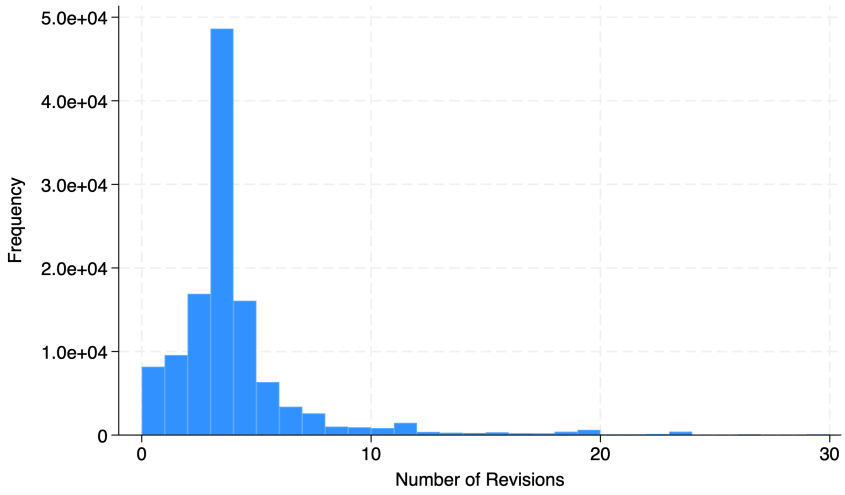
Notes: This histogram shows the distribution of investment plans (firm-announcement date-projection year observations) present for across industries in the dataset, indicating the source of the data.

Figure 4: Industry-level mean months to end of plan



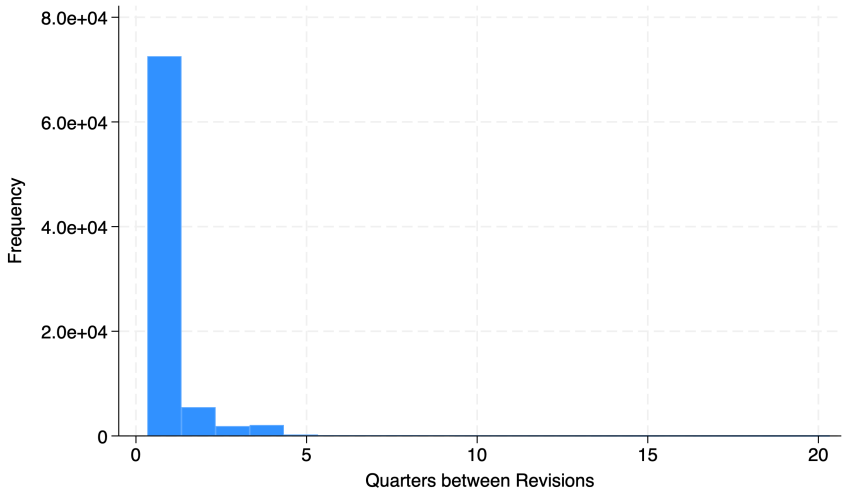
Notes: This figure summarizes the average projection period by industry across all firm quarters, conditional on the firm-quarter having an investment projection. Standard error bars are reported in black.

Figure 5: Number of Revisions to a Given Plan



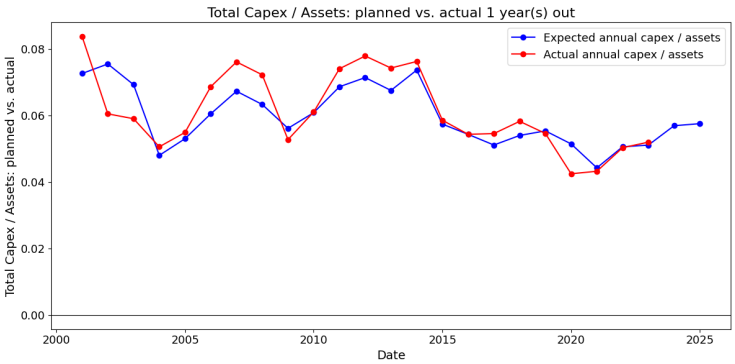
Notes: This histogram shows the distribution of the number of revisions to a given plan (for a given firm and projection period) in the dataset, including IBES, LSEG and the manually collected data.

Figure 6: Quarters between Revisions to a Given Plan

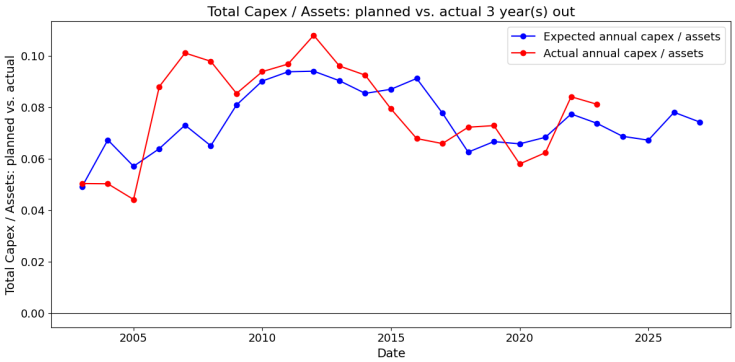


Notes: This histogram shows the distribution of the quarters between revisions to a plan (for a given firm and projection period) in the dataset, including IBES, LSEG and the manually collected data.

Figure 7: Comparing Planned vs. Actual Investment



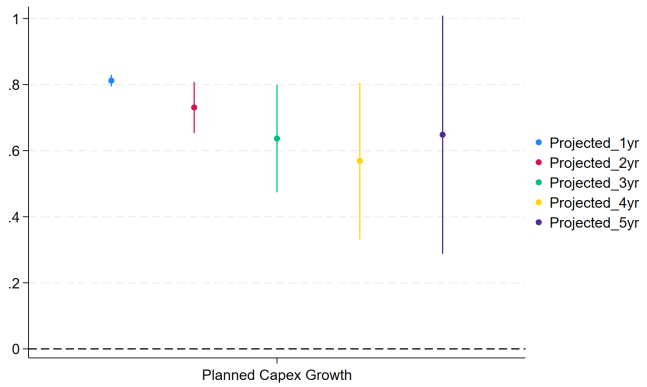
(a) Planned vs. Actual Capex / Assets: 1 Year Out



(b) Planned vs. Actual Capex / Assets: 3 Years Out

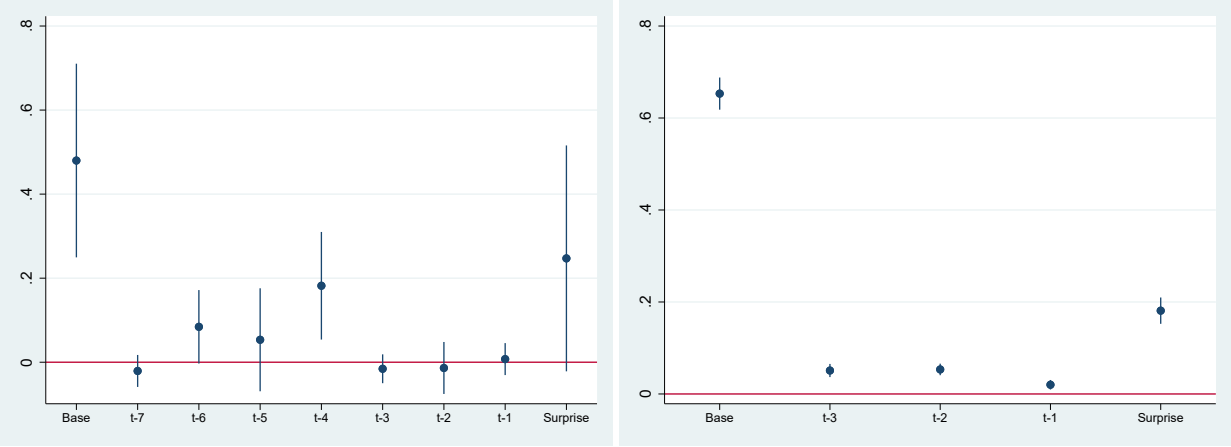
Notes: This figure compares total realized and planned capex as a share of lagged total assets. In Panel (a), the blue line shows the change in aggregate planned capex relative to one year earlier, while the red line shows the realized capex change over the same period. In Panel (b), the blue line plots planned capex / assets relative to three years prior, and the red line plots capex / assets relative to three years prior.

Figure 8: Predictiveness of Investment Plans at Different Projection Horizons



Notes: This figure shows the coefficient of a regression of $\frac{I_{i,t+h}-I_{i,t-1}}{I_{i,t-1}} = \beta_h \frac{\mathbf{F}_{i,t}[I_{i,t+h}]-I_{i,t-1}}{I_{i,t-1}} + \alpha_i^h + \varepsilon_{i,t}^h$, with standard errors clustered at the firm and quarter level. We winsorize realized capital expenditure growth at 1%.

Figure 9: Variance Decomposition

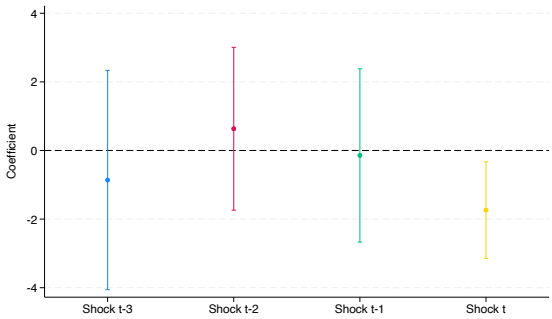


(a) Eight quarters

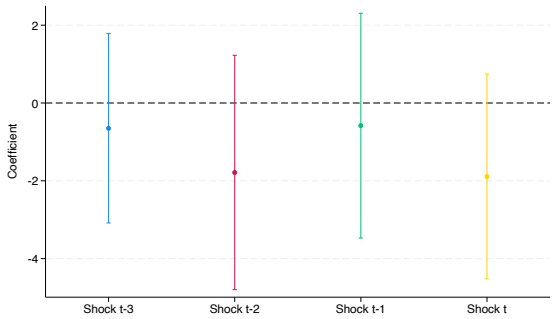
(b) Four quarters

Note: This figure shows the coefficients of a regression: $Y_{i,t-s} = \beta_s I_{i,t} + \alpha_i + e_{sit}$. The sample is a balanced panel at the firm (i)-projection year (t)-quarter prior to projection year (s) level from 2000 to 2024 (projection year), condition on the firm-projection year pairs with all S-quarters of projection. The independent variable is realized capital expenditure as reported in Compustat, and the dependent variable is defined as $Y_{i,t-s} = \Delta_{i,t-s}\ \forall s$, $Y_{i,t-s} = \mathbf{F}_{i,t-s}[I_{i,t}]$ when $s = S$, and $Y_{i,t-s} = surprise_{i,t}$ when $s = 0$. Firm fixed effects are included. Standard errors are clustered at the firm level. All variables are winsorized at 1st and 99th percentiles.

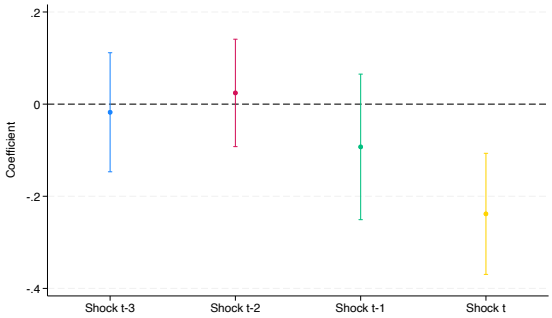
Figure 10: Contemporaneous vs. Lagged Shocks Effect on Investment Plans



(a) ST Shock



(b) 2y Shock



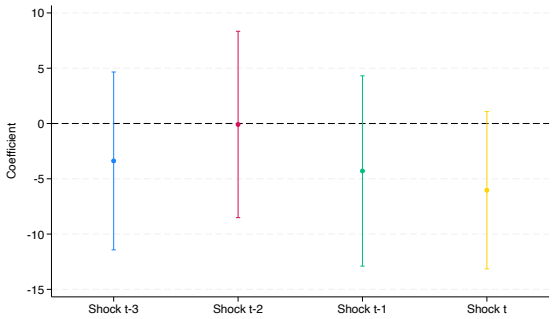
(c) Cost of Debt Shock

Notes: This figure displays coefficient estimates and 95% confidence intervals for the specification:

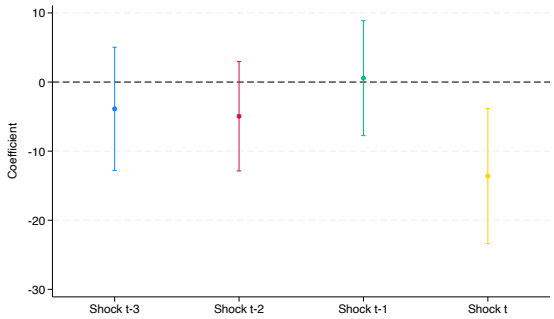
$$\text{Planned Investment}_{i,t,h} = \beta_1^s MPS_{t-s} + \beta_2^s MPS_{t-s} \times \mathbb{1}\{MPS_{t-s} \leq 0\} + X_{i,t-s-1} + \alpha_i^s + \alpha_h^s + \varepsilon_{i,t,h}^s$$

where $\text{Planned Investment}_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets, and MPS_{t-s} is the monetary policy shock that occurred s quarters prior to the plan decision. Includes all investment plans for 12-month periods ending at least 9 months after announcement. Each plot reports the coefficient β_1^s on four separate regressions corresponding to $s = 0, 1, 2, 3$, with 95% confidence intervals. $X_{i,t-s-1}$ include firm controls (size (log Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q), macro controls (the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of the unemployment rate, delta log GDP, and CPI). Standard errors are clustered at the firm and quarter level. The outcome variable is trimmed at the 2nd and 98th percentiles; all firm controls are winsorized at 1% and 99%.

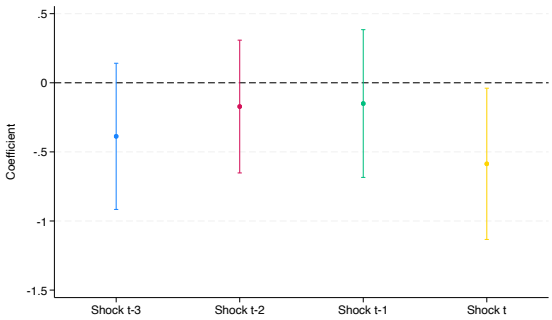
Figure 11: Contemporaneous vs. Lagged Shocks on Cash Flow Expectations



(a) ST Shock



(b) 2y Shock



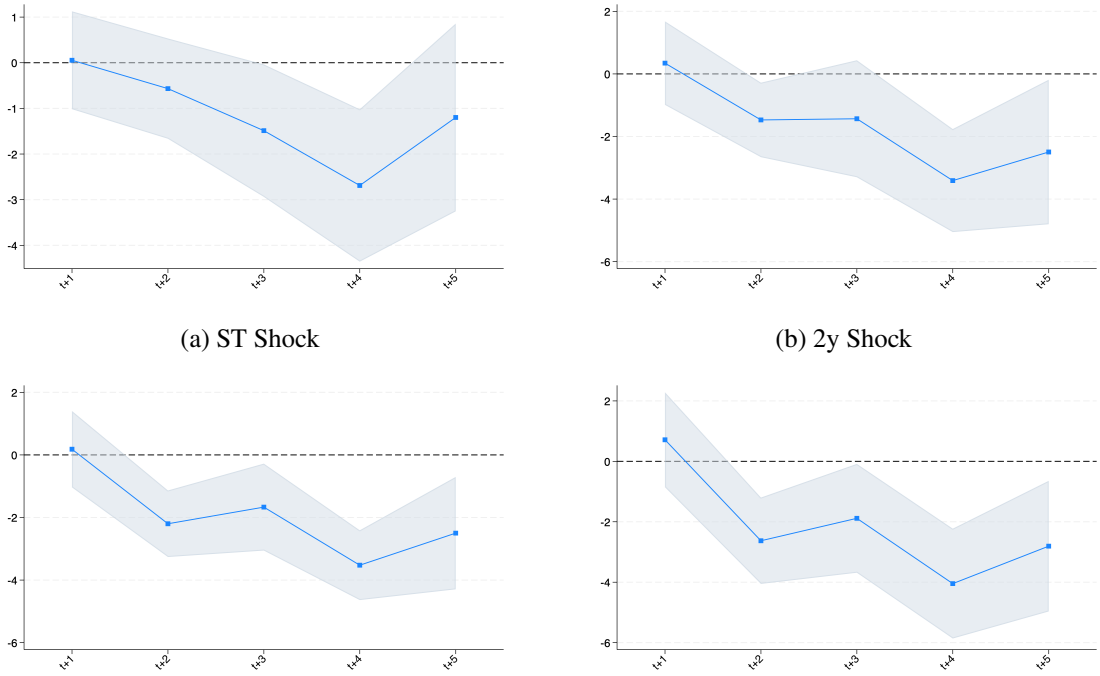
(c) Cost of Debt Shock

Notes: This figure displays coefficient estimates and 95% confidence intervals for the specification:

$$\text{E[Net Income]}_{i,t,h} = \beta_1^s MPS_{t-s} + \beta_2^s MPS_{t-s} \times \mathbb{1}\{MPS_{t-s} \leq 0\} + X_{i,t-s-1} + \alpha_i^s + \alpha_h^s + \varepsilon_{i,t,h}^s$$

where $\text{E[Net Income]}_{i,t,h}$ is expected real net income for firm i in future year $t+h$ relative to the rolling sum of the net income over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets, and MPS_{t-s} is the sum of the monetary policy surprises s quarters prior to the announcement of the plan. Includes observations of expected net income for 12-month periods ending at least 9 months after announcement. Each plot reports the coefficient β_1^s on four separate regressions corresponding to $s = 0, 1, 2, 3$, with 95% confidence intervals. $X_{i,t-s-1}$ include firm controls (size (log Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q), macro controls (the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of the unemployment rate, delta log GDP, and CPI). Standard errors are clustered at the firm and quarter level. The outcome variable is trimmed at the 2nd and 98th percentiles; all firm controls are winsorized at 1% and 99%.

Figure 12: Impact of Monetary Policy on Investment Across Horizons



(a) ST Shock

(b) 2y Shock

(c) 5y Shock

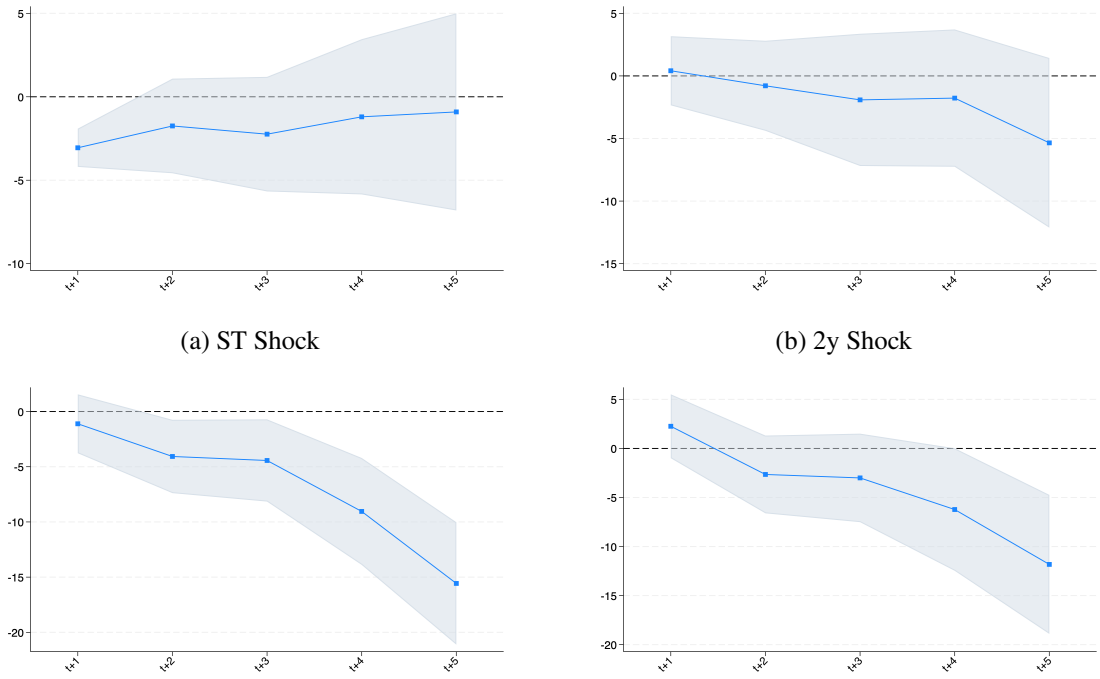
(d) 10y Shock

Notes: This figure depicts β_h and 90% confidence intervals for the following specification, for $h = 1, 2, 3, 4, 5$:

$$\text{Planned Investment}_{i,t,h} = \beta_h \, \text{MPS}_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h}$$

$\text{Planned Investment}_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. h denotes the years from today that the plan is for. Here, $h = 1$ if the difference between the projection date and the end of the projection horizon is between 9-12 months, $h = 2$ if the difference is between 13-24 months, $h = 3$ if the difference is between 25-36 months, $h = 4$ if the difference is between 37-48 months, and $h = 5$ if the difference is between 49-60 months. MPS_t is the sum of monetary policy shocks that occur during quarter t, during which the investment plan is made and at the end of which the plan is announced. Panel (a) uses the Bauer and Swanson [2023] unorthogonalized shock, Panel (b) uses the high frequency change in the 2-year UST yield, Panel (c) uses the high frequency change in the 5-year UST yield, and Panel (d) uses the high frequency change in the 10-year UST yield. The regression controls $X_{i,t-1}$ include firm-level characteristics (cash-to-assets, leverage, log assets, return on assets, tangibility, and Tobin's Q), the quarter change in the CFNAI index, the level of the CFNAI index, the 2-, 5-, and 10-year U.S. Treasury yields, all as of quarter $t-1$, as well as four lags of GDP growth, the inflation rate and the unemployment rate. The outcome variable is trimmed at the 2nd and 98th percentiles. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level.

Figure 13: Impact of Contractionary Monetary Policy on Investment Across Horizons



(a) ST Shock

(b) 2y Shock

(c) 5y Shock

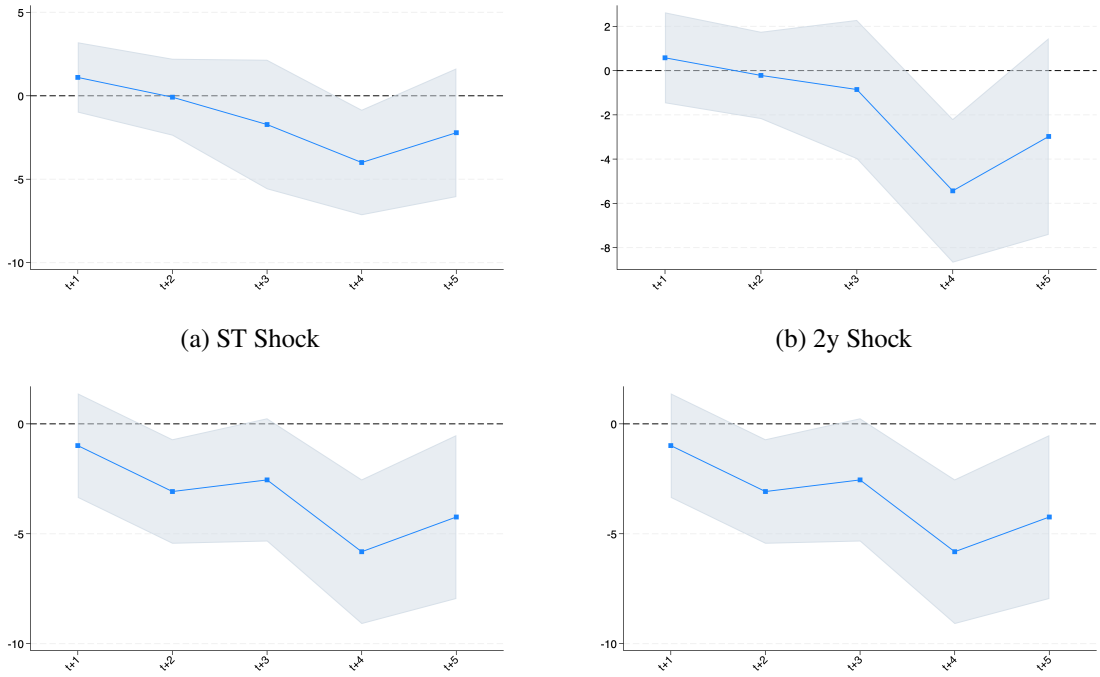
(d) 10y Shock

Notes: This figure depicts $\beta_h^{Contr.}$ and 90% confidence intervals for the following specification, for $h = 1,2,3,4,5$:

$$\text{Planned Investment}_{i,t,h} = \beta_h^{Contr.} \text{MPS}_t \times \mathbb{1}\{MPS_t \leq 0 = 0\} + \beta_h^{Expan.} \text{MPS}_t \times \mathbb{1}\{MPS_t \leq 0 = 1\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h}$$

$\text{Planned Investment}_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. h denotes the years from today that the plan is for. Here, $h = 1$ if the difference between the projection date and the end of the projection horizon is between 9-12 months, $h = 2$ if the difference is between 13-24 months, $h = 3$ if the difference is between 25-36 months, $h = 4$ if the difference is between 37-48 months, and $h = 5$ if the difference is between 49-60 months. MPS_t is the sum of monetary policy shocks that occur during quarter t, during which the investment plan is made and at the end of which the plan is announced. Panel (a) uses the Bauer and Swanson [2023] unorthogonalized shock, Panel (b) uses the high frequency change in the 2-year UST yield, Panel (c) uses the high frequency change in the 5-year UST yield, and Panel (d) uses the high frequency change in the 10-year UST yield. The regression controls $X_{i,t-1}$ include firm-level characteristics (cash-to-assets, leverage, log assets, return on assets, tangibility, and Tobin's Q), the quarter change in the CFNAI index, the level of the CFNAI index, the 2-, 5-, and 10-year U.S. Treasury yields, all as of quarter $t-1$, as well as four lags of GDP growth, the inflation rate and the unemployment rate. The outcome variable is trimmed at the 2nd and 98th percentiles. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level.

Figure 14: Impact of Expansionary Monetary Policy on Investment Across Horizons



(a) ST Shock

(b) 2y Shock

(c) 5y Shock

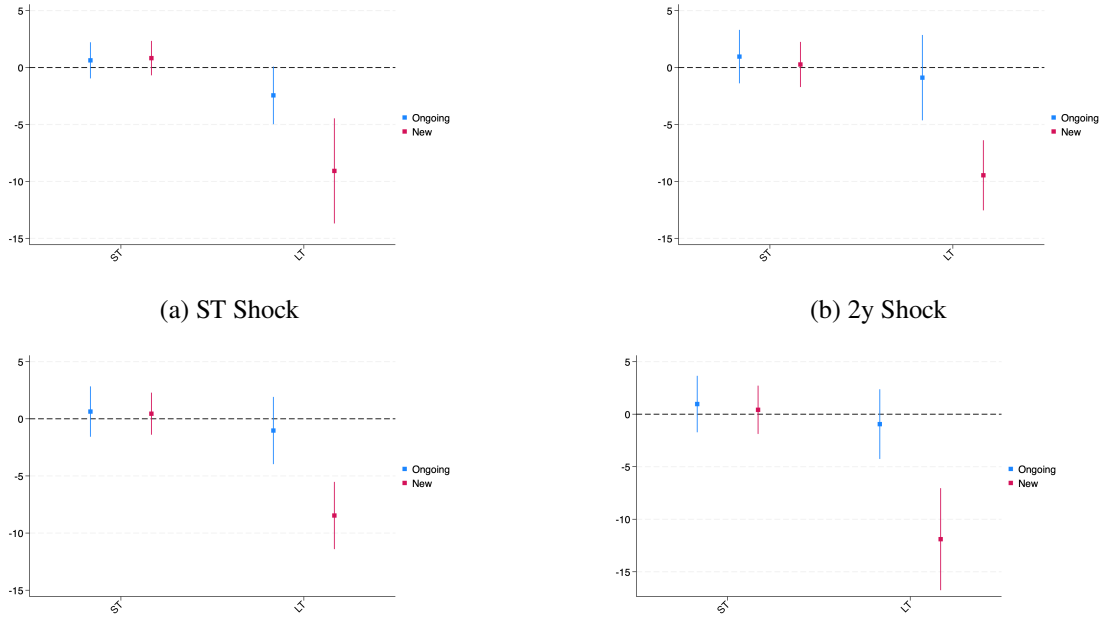
(d) 10y Shock

Notes: This figure depicts $\beta_h^{Expan.}$ and 90% confidence intervals for the following specification, for $h = 1, 2, 3, 4, 5$:

$$\text{Planned Investment}_{i,t,h} = \beta_h^{Contr.} \text{MPS}_t \times \mathbb{1}\{MPS_t \leq 0 = 0\} + \beta_h^{Expan.} \text{MPS}_t \times \mathbb{1}\{MPS_t \leq 0 = 1\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h}$$

$\text{Planned Investment}_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. h denotes the years from today that the plan is for. Here, $h = 1$ if the difference between the projection date and the end of the projection horizon is between 9-12 months, $h = 2$ if the difference is between 13-24 months, $h = 3$ if the difference is between 25-36 months, $h = 4$ if the difference is between 37-48 months, and $h = 5$ if the difference is between 49-60 months. MPS_t is the sum of monetary policy shocks that occur during quarter t, during which the investment plan is made and at the end of which the plan is announced. Panel (a) uses the Bauer and Swanson [2023] unorthogonalized shock, Panel (b) uses the high frequency change in the 2-year UST yield, Panel (c) uses the high frequency change in the 5-year UST yield, and Panel (d) uses the high frequency change in the 10-year UST yield. The regression controls $X_{i,t-1}$ include firm-level characteristics (cash-to-assets, leverage, log assets, return on assets, tangibility, and Tobin's Q), the quarter change in the CFNAI index, the level of the CFNAI index, the 2-, 5-, and 10-year U.S. Treasury yields, all as of quarter $t-1$, as well as four lags of GDP growth, the inflation rate and the unemployment rate. The outcome variable is trimmed at the 2nd and 98th percentiles. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level.

Figure 15: Effect of Monetary Policy on New versus Ongoing Investment Projects



(a) ST Shock

(b) 2y Shock

(c) 5y Shock

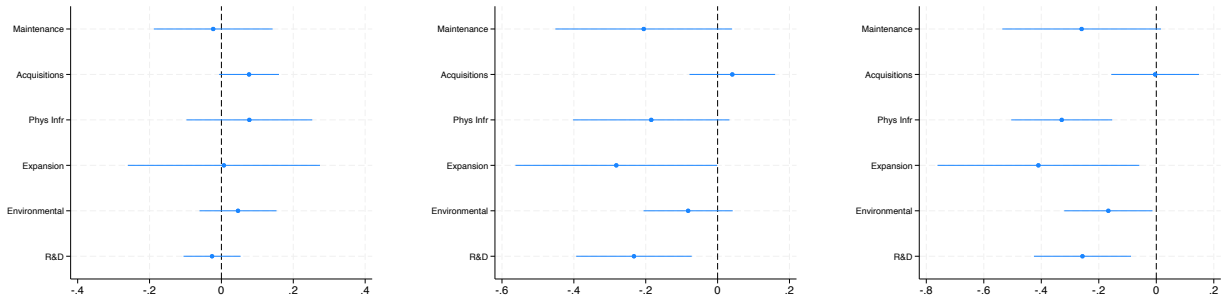
(d) 10y Shock

Notes: This figure depicts $\beta_{j,k}$, for $j = 0, 1$ and $k = 0, 1$, and 90% confidence intervals for the following specification:

$$\begin{aligned}\text{Planned Investment}_{i,t,h} = &\sum_j \sum_k \beta_{j,k} \text{MPS}_t \times \mathbb{1}\{LTPlan_{i,t,h} = j\} \times \mathbb{1}\{NewPlan_{i,t,h} = k\} \\ &+ \sum_j \sum_k \gamma_{j,k} \mathbb{1}\{LTPlan_{i,t,h} = j\} \times \mathbb{1}\{NewPlan_{i,t,h} = k\} \\ &+ X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h}\end{aligned}$$

Planned Investment$_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. $\mathbb{1}\{NewPlan_{i,t}\} = 1$ if the investment plan exclusively concerns a new project, and = 0 if the investment plan exclusively concerns an ongoing project. $\mathbb{1}\{LTPlan_{i,t}\} = 0$ if the difference between the projection date and the end of the projection year is between 9-24 months, and equals one otherwise. The regression controls $X_{i,t-1}$ include firm-level characteristics except the one used to construct the tercile (cash-to-assets, leverage, log assets, return on assets, tangibility, and Tobin's Q), the quarter change in the CFNAI index, the level of the CFNAI index, the 2-, 5-, and 10-year U.S. Treasury yields, all as of quarter $t-1$, as well as four lags of GDP growth, the inflation rate and the unemployment rate. The outcome variable is trimmed at the 2nd and 98th percentiles. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level.

Figure 16: Investment Type Responses to Contractionary Monetary Policy



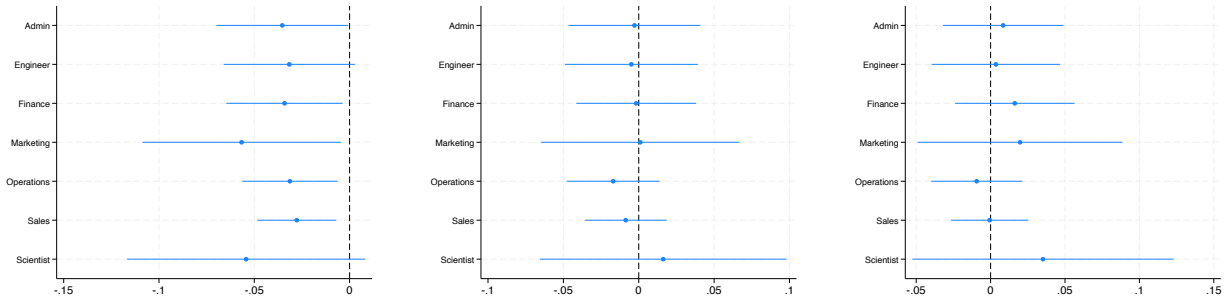
(a) ST Shock (b) 2y Shock (c) 10y Shock

Notes: These figures report the estimated coefficients and 95% confidence intervals from the regression:

$$\mathbb{1}\{\text{Investment Type}\}_{i,t} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t}$$

$\mathbb{1}\{\text{Investment Type}\}_{i,t}$ equals 1 if an investment plan discusses a project of the type considered, and 0 otherwise. MPS_t is the sum of monetary policy shocks that occur during quarter t, during which the investment plan is made and at the end of which the plan is announced. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of GDP growth, the inflation rate, and the unemployment rate. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level.

Figure 17: Effect of Contractionary Monetary Policy on Hiring by Job Category



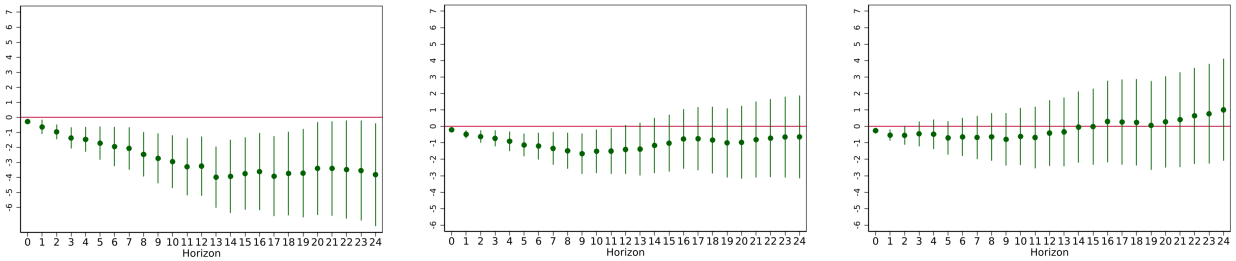
(a) ST Shock (b) 2y Shock (c) 10y Shock

Note: This figure shows coefficient estimates and 95% confidence intervals from the regression

$$\text{Hiring}_{i,t}^{\text{Job Type}} = \beta_1 \text{MPS}_t + \beta_2 \text{MPS}_t \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t},$$

where $\text{Hiring}_{i,t}^{\text{Job Type}}$ is the change in hiring for job category (e.g., Operations, Sales, etc.) at firm i in period t, and $\text{MPS}_{i,t}$ denotes monetary policy shocks. $X_{i,t-1}$ denote firm-level controls and macro controls, and α_i are firm fixed effects. Panel (a) shows the effect of a positive short-term monetary policy shock; panel (b) of a positive 2-year Treasury shock; panel (c) of a positive 10-year Treasury shock. Standard errors are clustered at the firm and quarter level.

Figure 18: Cumulative Net Issuance Response to Monetary Policy



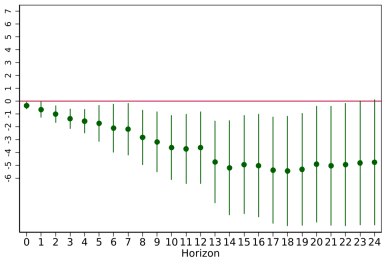
(a) ST shock (b) 2y Shock (c) 10y Shock

Note: The figure plots the coefficients and 95% confidence intervals from the regressions

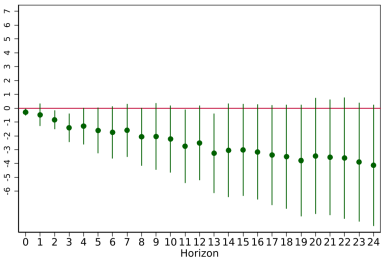
$$\frac{\sum_{\tau=0}^{h} \text{NetIss}_{i,t+\tau}}{A_{i,t-1}} = \beta_h MPS_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h}$$

for $h = 0, 1, ..., 24$. Firm fixed effects are included, and standard errors are clustered at the firm and month level. Cumulative net issuance is winsorized at the 1st and 99th percentiles. Panels (a) use the short-term shock, while Panels (b) and (c) use the high-frequency change in the 2- and 10-year UST yield, respectively. The sample is monthly, covering the period from 2000 to 2024. Standard errors are clustered by firm and month.

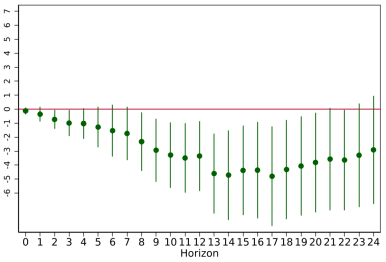
Figure 19: Heterogeneity in Cumulative Net Issuance Response to Monetary Policy



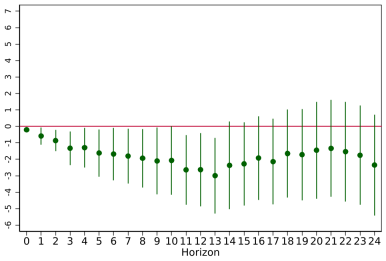
(a) Top 1/3, Asset



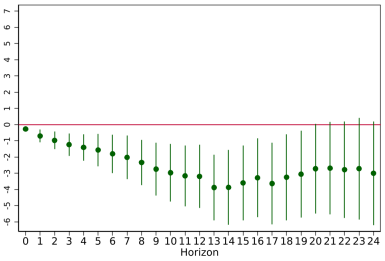
(b) Top 1/3, Leverage



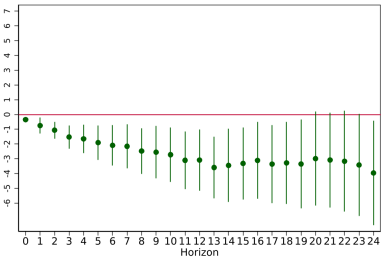
(c) Top 1/3, Tangibility



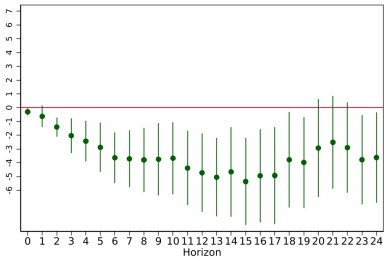
(d) Bottom 2/3, Asset



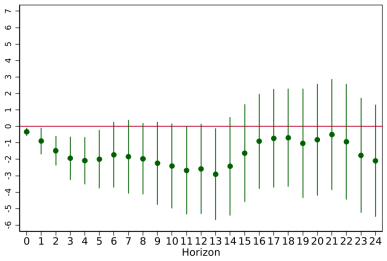
(e) Bottom 2/3, Leverage



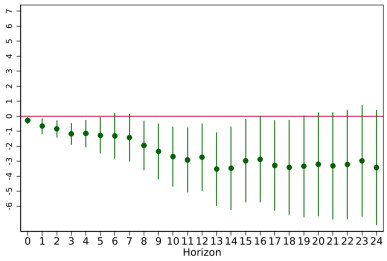
(f) Bottom 2/3, Tangibility



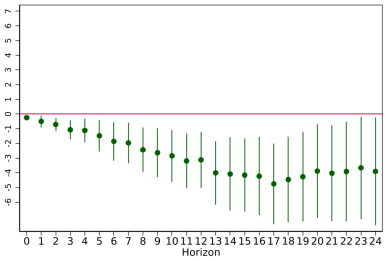
(g) Top 1/3, Int Exp/Debt



(h) Top 1/3, ROA



(i) Bottom 2/3, Int Exp/Debt



(j) Bottom 2/3, ROA

Note: The figure plots the coefficients and 95% confidence intervals from the regressions

$$\frac{\sum_{\tau=0}^{h} \text{NetIss}_{i,t+\tau}}{A_{i,t-1}} = \beta_h MPS_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t,h}$$

with $h = 0, 1, ..., 24$. Firm fixed effects are included, and standard errors are clustered at the firm and month level. Cumulative net issuance is winsorized at the 1st and 99th percentiles. MPS_t is short-term monetary policy shock in quarter t. The sample is monthly, covering the period from 2000 to 2024. Subsamples (top 1/3 or bottom 2/3) are split by the relevant characteristics variable. The firm characteristics are size (ln Assets), leverage (Total Debt/Assets), tangibility (PPE/Assets), interest expense to debt (Interest Expense/Total Debt), and profitability (NI/Assets). Standard errors are clustered by firm and month.

Table 1: Summary Statistics for Firm Characteristics: All Plans vs Compustat

	Plans				Compustat			
Variable	Mean	25th	Median	75th	Mean	25th	Median	75th
Number of Firms	4,136				44,047			
Number of Quarters	49.43	30.00	52.00	69.00	61.23	33.00	61.00	97.00
Total Assets	10992.72	856.96	2405.75	7527.49	4476.73	41.06	365.38	2001.22
Return on Equity	0.05	0.01	0.03	0.05	-0.06	-0.03	0.02	0.04
Tobin's Q	3.71	1.36	2.20	3.73	5.39	1.06	1.80	3.63
Investment Rate	-0.01	-0.02	-0.00	0.02	-0.06	-0.05	-0.01	0.01
Asset Tangibility	0.32	0.11	0.24	0.49	0.21	0.02	0.11	0.32
Z-Score	3.78	1.34	2.40	4.28	-6.82	0.18	1.92	4.65
Leverage	0.29	0.13	0.28	0.41	0.54	0.03	0.19	0.41
Cash/Assets	0.12	0.02	0.07	0.17	0.20	0.03	0.08	0.28

Notes: This table presents summary statistics comparing firms in our investment plans sample to the broader Compustat universe from 2000-2023. The plans sample includes all firms with at least one investment plan announcement. Total assets are in billions of dollars. ROE is net income divided by book equity. Tobin's Q is market value of assets divided by book value of assets. Investment rate is capital expenditures divided by lagged assets. Tangibility is net PP&E divided by total assets. Z-score is Altman's Z-score. Leverage is total debt divided by total assets. Cash/Assets is cash and short-term investments divided by total assets.

Table 2: Persistence of Investment Plans

	(1)	(2)	(3)	(4)
	$\mathrm{F}_{i,t}[I_{i,t+h}]$	$\mathrm{F}_{i,t}[I_{i,t+h}]$	$\mathrm{F}_{i,t}[I_{i,t+h}]$	$\mathrm{F}_{i,t}[I_{i,t+h}]$
$\mathrm{F}_{i,t-1}[I_{i,t+h}]$	0.928***			
	(0.008)			
$\mathrm{F}_{i,t-2}[I_{i,t+h}]$		0.914***		
		(0.012)		
$\mathrm{F}_{i,t-3}[I_{i,t+h}]$			0.840***	
			(0.026)	
$\mathrm{F}_{i,t-4}[I_{i,t+h}]$				0.793***
				(0.051)
Firm FEs	Y	Y	Y	Y
R^2	0.903	0.866	0.785	0.746
N	37,768	19,414	6,204	3,795

Notes: This shows results for the following specification:

$$\frac{F_t[I_{i,t+h}]}{A_{i,t-\ell-1}} = \beta \frac{F_{t-\ell}[I_{i,t+h}]}{A_{i,t-\ell-1}} + \alpha_i + \varepsilon_{i,t,h}$$

$F_t[I_{i,t+h}]$ is firm i's investment plan for a given year $t+h$ made in quarter t, and $F_{t-\ell}[I_{i,t+h}]$ is firm i's investment plan for the same future year $t+h$, made in quarter $t-\ell$.

Table 3: Persistence of Investment Plans under Uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)
	$F_{i,t}[I_{i,t+h}]$	$F_{i,t}[I_{i,t+h}]$	$F_{i,t}[I_{i,t+h}]$	$F_{i,t}[I_{i,t+h}]$	$F_{i,t}[I_{i,t+h}]$	$F_{i,t}[I_{i,t+h}]$
$F_{i,t-1}[I_{i,t+h}]$	0.929***		0.926***		0.937***	
	(0.007)		(0.008)		(0.010)	
$F_{i,t-1}[I_{i,t+h}]\times$ Uncertainty	-0.009**		-0.017**		-0.009	
	(0.004)		(0.007)		(0.006)	
$F_{i,t-2}[I_{i,t+h}]$		0.915***		0.913***		0.945***
		(0.013)		(0.013)		(0.017)
$F_{i,t-2}[I_{i,t+h}]\times$ Uncertainty		-0.016*		-0.033***		-0.025***
		(0.009)		(0.011)		(0.009)
Uncertainty	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Uncertainty Type	Policy	Policy	Financial	Financial	Macro	Macro
Firm FEs	Y	Y	Y	Y	Y	Y
R^2	0.903	0.867	0.904	0.868	0.904	0.868
N	37,768	19,414	37,748	19,400	37,748	19,400

Notes: This shows results for the following specification, for $\ell = 1, 2$ and three different measures of uncertainty:

$$\frac{F_t[I_{i,t+h}]}{A_{i,t-\ell-1}} = \beta_1 \frac{F_{t-\ell}[I_{i,t+h}]}{A_{i,t-\ell-1}} + \beta_2 \frac{F_{t-\ell}[I_{i,t+h}]}{A_{i,t-\ell-1}} \times Uncertainty_{t-1} + \beta_3 Uncertainty_{t-1} + \alpha_i + \varepsilon_{i,t,h}$$

$F_t[I_{i,t+h}]$ is firm i's investment plan for a given year $t+h$ made in quarter t. $Uncertainty_{t-1}$ is the level of the uncertainty index at the end of the month before the plan is updated. The policy uncertainty index is the Economic Policy Uncertainty measure from Baker et al. [2016]. Financial and macro uncertainty indices are from Jurado et al. [2015]. The coefficients on the uncertainty indices are scaled to represent the effects of a one standard deviation increase in each of the indices.

Table 4: Response of Short-Term versus Long-Term Investment Plans to Monetary Policy

	LHS: Planned Investment				
	(1) RHS: ST MPS	(2) RHS: 2y UST Shocks	(3) RHS: 5y UST Shocks	(4) RHS: 10y UST Shocks	(5) RHS: 2-10y UST Shocks
MPS	0.134	-0.163	-0.461	-0.0835	0.314
	(0.502)	(0.670)	(0.621)	(0.817)	(1.057)
LT Plan = 1×MPS	-1.777*	-2.338*	-2.372**	-3.141**	0.305
	(1.049)	(1.310)	(1.179)	(1.500)	(2.294)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	32660	32660	32660	32660	32660
R-squared	0.282	0.282	0.283	0.282	0.282

Note: This table reports the results for the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{\text{LT Plan}_{i,t,h} = 1\} + \beta_3 \mathbb{1}\{\text{LT Plan}_{i,t,h} = 1\} + \alpha_i + X_{i,t-1} + \varepsilon_{i,t,h}$$

$\mathbb{1}\{\text{LT Plan}_{i,t,h} = 1\}$ for investment plans that extend 24 or more months ahead. The regression is estimated using all investment plans where the projection year ends at least 9 months after the plan announcement. $\text{Planned Investment}_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. Column (1) uses the ST shock. Columns (2)-(5) use the high-frequency change in the 2-, 5-, and 10-year UST yield. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of GDP growth, the inflation rate, and the unemployment rate. Firm fixed effects are included, and standard errors are clustered at both the firm and fiscal quarter levels. The outcome variable is trimmed at the 2nd and 98th percentiles.

Table 5: Response of Different Horizon Investment Plans to Monetary Policy

	LHS: Planned Investment				
	(1) RHS: ST MPS	(2) RHS: 2y UST Shocks	(3) RHS: 5y UST Shocks	(4) RHS: 10y UST Shocks	(5) RHS: 2-10y UST Shocks
MPS	0.322	0.354	0.277	0.846	0.817
	(0.611)	(0.838)	(0.808)	(1.072)	(1.311)
Projection horizon (yrs)=2×MPS	-0.643	-0.930	-1.402	-2.053*	-1.525
	(0.752)	(1.027)	(0.869)	(1.215)	(1.586)
Projection horizon (yrs)=3×MPS	-1.762	-2.113	-2.282*	-3.024*	-0.365
	(1.143)	(1.435)	(1.232)	(1.575)	(2.171)
Projection horizon (yrs)=4×MPS	-2.280*	-3.761**	-3.678**	-4.562*	1.277
	(1.272)	(1.765)	(1.801)	(2.350)	(3.407)
Projection horizon (yrs)=5×MPS	-0.927	-2.218	-3.352*	-5.078**	-3.004
	(1.521)	(2.004)	(1.727)	(1.990)	(4.087)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Projection Horizon FE	Yes	Yes	Yes	Yes	Yes
Observations	32490	32490	32490	32490	32490
R-squared	0.286	0.286	0.286	0.286	0.286

Note: This table reports the results of the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 MPS_t + \sum_{x=2}^{5} \beta_h MPS_t \times \mathbb{1}\{h = x\} + \alpha_i + \alpha_h + X_{i,t-1} + \varepsilon_{i,t,h}$$

We include dummy variables for investment plans extending 2, 3, 4, and ≥ 5 years ahead; the excluded category consists of plans for the subsequent fiscal year, conditional on the projected year ending at least 9 months after the plan announcement. Planned Investment$_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. Column (1) uses the short-term shock. Columns (2)-(5) use the high-frequency change in the 2-, 5-, and 10-year UST yield. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of GDP growth, the inflation rate, and the unemployment rate. Firm fixed effects and projection horizon fixed effects are included, and standard errors are clustered at both the firm and fiscal quarter levels. The outcome variable is trimmed at the 2nd and 98th percentiles.

Table 6: Relationship between Cost of Debt and Monetary Policy

	$\Delta^{MP} r^D_{i,t}$								
	(1) All	(2) All	(3) All	(4) Size	(5) Leverage	(6) Tangibility	(7) Int Exp / Debt	(8) Profitability	(9) Asset Sp
ST Shock	1.043***	1.018***	0.609*	-0.319	0.562	0.678*	0.851**	0.701*	0.570
	(0.100)	(0.288)	(0.359)	(0.201)	(0.412)	(0.390)	(0.406)	(0.374)	(0.386)
Top Tercile = 1 × ST Shock				1.693***	0.108	-0.144	-0.816*	-0.293	0.0681
				(0.437)	(0.276)	(0.373)	(0.423)	(0.234)	(0.327)
Top Tercile = 1				-0.0280	-0.0218	0.0536	0.0222	0.00361	-0.0833
				(0.0430)	(0.0351)	(0.0529)	(0.0321)	(0.0272)	(0.122)
Firm Controls			✓	✓	✓	✓	✓	✓	✓
Macro Controls			✓	✓	✓	✓	✓	✓	✓
Firm FE		✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.006	0.080	0.105	0.109	0.105	0.105	0.106	0.105	0.105
N	17,000	16,855	15,010	15,010	15,010	15,010	15,010	15,010	15,010

Panel A: ST Shock

	$\Delta^{MP} r^D_{i,t}$								
	(1) All	(2) All	(3) All	(4) Size	(5) Leverage	(6) Tangibility	(7) Int Exp / Debt	(8) Profitability	(9) Asset Sp
2y Shock	1.357***	1.324***	0.939***	-0.518*	1.019***	1.182***	1.339***	1.015**	0.681
	(0.140)	(0.407)	(0.339)	(0.307)	(0.340)	(0.358)	(0.367)	(0.395)	(0.410)
Top Tercile = 1 × 2y Shock				2.658***	-0.192	-0.520	-1.333*	-0.233	0.505
				(0.530)	(0.360)	(0.537)	(0.670)	(0.338)	(0.457)
Top Tercile = 1				0.0164	-0.0233	0.0444	-0.000232	-0.000343	-0.0703
				(0.0434)	(0.0343)	(0.0521)	(0.0368)	(0.0288)	(0.124)
Firm Controls			✓	✓	✓	✓	✓	✓	✓
Macro Controls			✓	✓	✓	✓	✓	✓	✓
Firm FE		✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.005	0.079	0.105	0.110	0.105	0.106	0.106	0.105	0.106
N	17,000	16,855	15,010	15,010	15,010	15,010	15,010	15,010	15,010

Panel B: 2y Shock

Notes: This shows results for the following specification:

$$\Delta^{MP} r^D_{i,t} = \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{\text{Top Tercile}\} + \beta_3 \mathbb{1}\{\text{Top Tercile}\} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t}$$

where $\Delta^{MP} r^D_{i,t}$ is the total change in firm i's cost of debt in two day windows around FOMC announcements during quarter t, and MPS_t is the monetary policy shock during quarter t. $X_{i,t-1}$ include firm controls (size (ln Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q) and macro controls (the level of and quarterly change in CFNAI, the lagged two-year yield level $2y$ and the yield curve slope $2-10y$, and four lags of GDP growth, unemployment rate, and inflation rate). Standard errors are clustered at the firm and quarter level.

Table 7: Relationship between Investment Plans and Cost of Debt

	Planned Investment								
	(1) All	(2) All	(3) All	(4) Size	(5) Lev	(6) Tangibility	(7) Int/Debt	(8) Profit	(9) Asset Sp
$\Delta^{MP} r^D_{i,t}$	-0.0700***	-0.154***	-0.230***	-0.0343	-0.219***	0.0218	-0.188***	-0.284***	-0.470***
	(0.0239)	(0.0428)	(0.0644)	(0.129)	(0.0800)	(0.0521)	(0.0722)	(0.0698)	(0.106)
$\mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} \times \Delta^{MP} r^D_{i,t}$		0.156**	0.311***	-0.00806	0.377***	-0.0460	0.225**	0.407***	0.658***
		(0.0649)	(0.0913)	(0.183)	(0.121)	(0.0996)	(0.112)	(0.0986)	(0.143)
Top Tercile = $1 \times \Delta^{MP} r^D_{i,t}$				-0.255*	-0.0253	-0.448***	-0.178**	0.221	0.525***
				(0.153)	(0.0861)	(0.112)	(0.0898)	(0.158)	(0.119)
$\mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} \times$ Top Tercile = $1 \times \Delta^{MP} r^D_{i,t}$				0.424*	-0.121	0.636***	0.345*	-0.398*	-0.750***
				(0.223)	(0.155)	(0.190)	(0.176)	(0.220)	(0.177)
Top Tercile = 1				0.261	-0.503***	0.232	0.387***	-0.000473	0.428
				(0.176)	(0.157)	(0.181)	(0.107)	(0.117)	(0.523)
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE			✓	✓	✓	✓	✓	✓	✓
Projection Year			✓	✓	✓	✓	✓	✓	✓
R-squared	0.037	0.038	0.265	0.266	0.267	0.266	0.267	0.266	0.267
N	19,193	19,193	18,967	18,967	18,967	18,967	18,967	18,967	18,967

Notes: This shows results for the following specification:

$$\begin{aligned}\text{Investment Plans}_{i,t,h} = {} & \beta_1 \Delta^{MP} r^D_{i,t} + \beta_2 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} + \beta_3 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\text{Top Tercile}\} \\ & + \beta_4 \Delta^{MP} r^D_{i,t} \times \mathbb{1}\{\text{Top Tercile}\} \times \mathbb{1}\{\Delta^{MP} r^D_{i,t} \leq 0\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{i,t,h}\end{aligned}$$

where Planned Investment$_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. $\Delta^{MP} r^D_{i,t}$ is the change in a firm's cost of debt around FOMC announcements in quarter t. We condition on plans ending at least 9 months after announcement. The top tercile dummy is included for columns (4)-(9) and indicates whether a firm belongs to the top tercile for the relevant characteristic. The characteristics are size (ln Assets), leverage (Total Debt/Assets), tangibility (PPE/Assets), interest expense to debt (Interest Expense/Total Debt), and profitability (NI/Assets), and asset specificity. $X_{i,t-1}$ include firm controls (lagged size (ln Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash to assets, and Tobins's Q) and macro controls (the prior-quarter change in the CFNAI index, the prior-quarter level of the CFNAI index, the two-year yield level $2y_{t-1}$ and the yield curve slope $2-10y_{t-1}$, and four lags of GDP growth, inflation rate, and unemployment rate). Standard errors are clustered at the firm and quarter level. Firm fixed effects and projection horizon fixed effects are included. The outcome variable is trimmed at the 2nd and 98th percentiles.

Table 8: Relationship between Investment Plans and Cash Flow Expectations

	Planned Investment							
	(1) All	(2) All	(3) Size	(4) Leverage	(5) Tangibility	(6) Int Exp / Debt	(7) Profitability	(8) Asset Sp
E[Net Income]	0.00421	0.00990***	0.0117***	0.0106***	0.0111***	0.00940**	0.00419	0.0132***
	(0.00352)	(0.00341)	(0.00420)	(0.00340)	(0.00274)	(0.00358)	(0.00427)	(0.00434)
Top Tercile = 1 × E[Net Income]			-0.00704	-0.00341	-0.00441	0.00210	0.00892	-0.00717
			(0.00586)	(0.00811)	(0.00859)	(0.00677)	(0.00551)	(0.00512)
Top Tercile = 1			0.0813	-0.216*	0.119	0.108	0.0395	0.975
			(0.163)	(0.115)	(0.213)	(0.104)	(0.0949)	(0.821)
Firm Controls		✓	✓	✓	✓	✓	✓	✓
Macro Controls		✓	✓	✓	✓	✓	✓	✓
Projection horizon FE		✓	✓	✓	✓	✓	✓	✓
Firm FE		✓	✓	✓	✓	✓	✓	✓
Time FE		✓	✓	✓	✓	✓	✓	✓
R-squared	0.000	0.329	0.329	0.329	0.329	0.329	0.329	0.330
N	9,762	8,733	8,733	8,733	8,733	8,733	8,733	8,733

Notes: This shows results for the following specification:

$$\text{Planned Investment}_{i,t,h} = \beta_1 \text{E[Net Income]}_{i,t,h} + \beta_2 \text{E[Net Income]}_{i,t,h} \times \mathbb{1}\{\text{Top Tercile}\} + \beta_3 \mathbb{1}\{\text{Top Tercile}\} + X_{i,t-1} + \alpha_i + \alpha_h + \alpha_t + \varepsilon_{i,t,h}$$

where $\text{Planned Investment}_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets, and $\text{E[Net Income]}_{i,t,h}$ is the analogous measure for projected net income. The top tercile dummy is included for columns (3)-(8) and indicates whether a firm belongs to the top tercile for the relevant characteristic. The firm characteristics are size (ln Assets), leverage (Total Debt/Assets), tangibility (PPE/Assets), interest expense to debt (Interest Expense/Total Debt), profitability (NI/Assets), and asset specificity. $X_{i,t-1}$ include firm controls and macro controls. Firm, time, and projection horizon fixed effects are included. $\text{E[Net Income]}_{i,t,h}$ is winsorized at the 1% and 99% level. Standard errors are clustered at the firm and quarter level.

Table 9: Relationship between Cash Flow Expectations and Monetary Policy

	Expected Net Income								
	(1) All	(2) All	(3) All	(4) Size	(5) Lev	(6) Tangibility	(7) Int/Debt	(8) Profit	(9) Asset Sp
ST Shock	-1.706	-5.714	-6.096	-11.03**	-6.570	-6.431	-8.946**	0.778	-11.23**
	(2.385)	(4.317)	(3.879)	(4.784)	(5.642)	(4.840)	(3.856)	(3.138)	(4.933)
$\mathbb{1}\{MPS \leq 0\} \times$ ST Shock		8.040	4.284	14.17**	7.204	3.372	8.617	-1.178	9.337
		(7.705)	(6.038)	(6.970)	(7.775)	(7.683)	(6.233)	(5.390)	(6.609)
Top Tercile = 1 × ST Shock				10.86**	1.589	1.176	14.47***	-16.99***	8.864
				(4.708)	(6.589)	(5.561)	(5.474)	(5.548)	(5.964)
$\mathbb{1}\{MPS \leq 0\} \times$ Top Tercile = 1 × ST Shock				-21.82***	-9.325	2.818	-22.16**	12.49*	-8.635
				(5.922)	(8.327)	(9.254)	(9.031)	(7.350)	(7.072)
Top Tercile = 1				0.201	-0.216	0.293	-0.330	1.273***	-1.577
				(0.671)	(0.430)	(1.101)	(0.551)	(0.427)	(2.714)
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE			✓	✓	✓	✓	✓	✓	✓
Projection Year			✓	✓	✓	✓	✓	✓	✓
R-squared	0.037	0.037	0.450	0.451	0.451	0.450	0.451	0.451	0.451
N	9,177	9,177	8,822	8,822	8,822	8,822	8,822	8,822	8,822

Panel A: ST Shock

	Expected Net Income								
	(1) All	(2) All	(3) All	(4) Size	(5) Lev	(6) Tangibility	(7) Int/Debt	(8) Profit	(9) Asset Sp
Shock 2y	-2.000	-11.11**	-13.97***	-17.89***	-16.19***	-13.45**	-17.98***	-6.765	-12.08*
	(2.890)	(4.990)	(4.971)	(6.856)	(5.449)	(5.776)	(5.183)	(6.203)	(6.731)
$\mathbb{1}\{MPS \leq 0\} \times$ Shock 2y		16.10*	15.10*	22.93**	19.96**	11.86	20.22**	10.70	9.801
		(9.571)	(9.146)	(11.63)	(9.342)	(10.87)	(9.770)	(9.518)	(11.23)
Top Tercile = 1 × Shock 2y				9.875	8.560	-0.993	21.39**	-15.18*	-3.694
				(8.180)	(8.767)	(9.490)	(9.888)	(8.832)	(7.923)
$\mathbb{1}\{MPS \leq 0\} \times$ Top Tercile = 1 × Shock 2y				-19.69	-17.56	9.293	-26.64*	7.448	10.12
				(13.08)	(11.88)	(14.78)	(15.32)	(14.45)	(12.25)
Top Tercile = 1				0.278	-0.376	0.429	-0.207	0.871*	-1.073
				(0.713)	(0.434)	(1.086)	(0.603)	(0.517)	(2.723)
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE			✓	✓	✓	✓	✓	✓	✓
Projection Year			✓	✓	✓	✓	✓	✓	✓
R-squared	0.037	0.037	0.451	0.451	0.451	0.451	0.451	0.451	0.451
N	9,177	9,177	8,822	8,822	8,822	8,822	8,822	8,822	8,822

Panel B: 2y Shock

Notes: This shows results for the following specification:

$$\begin{aligned}\text{E[Net Income]}_{i,t,h} = {} & \beta_1 MPS_t + \beta_2 MPS_t \times \mathbb{1}\{MPS_t \leq 0\} + \beta_3 MPS_t \times \mathbb{1}\{\text{Top Tercile}\} \\ & + \beta_4 MPS_t \times \mathbb{1}\{\text{Top Tercile}\} \times \mathbb{1}\{MPS_t \leq 0\} + X_{i,t-1} + \alpha_i + \alpha_h + \varepsilon_{iht}\end{aligned}$$

where $\text{E[Net Income]}_{i,t,h}$ is expected net income for firm i in future year $t+h$ relative to the rolling sum of the real net income over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. We include all expectations for periods ending at least 9 months after announcement. MPS_t is the sum of monetary policy shocks occurring in quarter t. The top tercile dummy is included for columns (4)-(9) and indicates whether a firm belongs to the top tercile for the relevant characteristic. The firm characteristics are size (ln Assets), leverage (Total Debt/Assets), tangibility (PPE/Assets), interest expense to debt (Interest Expense/Total Debt), and profitability (NI/Assets), and asset specificity. $X_{i,t-1}$ include firm controls (lagged size (ln Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash to assets, and Tobins's Q). The macro controls are the prior-quarter change in the CFNAI index, the prior-quarter level of the CFNAI index, the two-year yield level $2y_{t-1}$ and the yield curve slope $2-10y_{t-1}$, and four lags of GDP growth, inflation rate, and unemployment rate. Standard errors are clustered at the firm and quarter level. Firm fixed effects and projection horizon fixed effects are included. We winsorize the outcome variable at the 1% and 99% level.

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A Why Use Data on Plans?

Estimating the causal effects of monetary policy on firm-level investment poses significant econometric challenges. In this section, we show that using revisions of company investment plans, rather than data on ex-post realized investment, greatly mitigates these concerns. The conventional empirical approach employs local-projection impulse-response functions (IRFs), regressing realized capital growth (e.g., $\Delta \ln K_{i,t+h}$) on monetary policy shocks (MPS) at time t. However, IRFs constructed from realized investment data can suffer from three problems: bias and estimation noise due to omitted variables, multiple intervening shocks, and firms' time-to-build lags, all of which may be exacerbated at longer horizons.

Consider the common regression equation to estimate β_h^R, the impact of monetary policy on horizon h investment, denoted R because it is estimated using data on realized investment:

$$\Delta \ln K_{i,t+h} = \beta_h^R \mathrm{MPS}_t + X_{i,t-1} + \nu_{i,t+h}^R \tag{24}$$

A substantial literature has already attempted to overcome the potential omitted variable bias in the estimator $\hat{\beta}_h^R$ by improving the exogeneity of the monetary policy shocks on the right-hand side of the equation. For example, unobserved demand shocks or trends may simultaneously raise realized investment and prompt the central bank to tighten monetary policy. Such correlation biases the coefficient towards zero, understating the contractionary effect of tighter monetary conditions. Conversely, unobserved input-price or overheating shocks could simultaneously decrease realized investment and prompt monetary tightening, thus biasing the IRF downward, overstating the contractionary effects. These potential biases put significant pressure on the exogeneity of the monetary policy shocks, though recent papers have made substantial progress on this front (see, e.g., Romer and Romer [2004], Gurkaynak et al. [2005], Kuttner [2001], Nakamura and Steinsson [2018], Jarociński and Karadi [2020], Bauer and Swanson [2023]).

Even if the monetary policy shocks are truly exogenous, two important issues remain, as illustrated in the following equation:

$$\Delta \ln K_{i,t+h} = \beta_h^R \,\mathrm{MPS}_t + X_{i,t-1} + \sum_{s=1}^{h} \psi_{h,s}\, u_{t+s} + \sum_{s=1}^{\tau_{i,t}} \phi_{h,s} v_{t-s} + \eta_{i,t+h}^R \tag{25}$$

First, realized investment observed at time $t+h$ may respond not only to the original monetary shock at time t, but also to additional shocks occurring between t and $t+h$, where u_{t+s} represent any intervening

demand shocks, cost shocks, or additional policy shocks. If these shocks are correlated with the initial shock, this creates additional bias. Even when $Cov\left(u_{t+s}, \text{MPS}_t\right) = 0 \; \forall s$, the cumulative variance of u_{t+s} increases the residual of the regression and thus the noise of the estimator.

Second, unknown planning and time-to-build lags $\tau_{i,t}$ imply that even a purely exogenous monetary shock at t generates systematically attenuated responses at shorter horizons. Thus, investment in time $t+h$ could reflect shocks v that occurred in time $t-s$, via long time-to-build lags. Consider a firm that in time $t-1$ began building a nuclear plant which has 10 years' time to build, and has plans to begin building a solar energy farm in time $t+1$. Given a large contractionary shock in time t, it is unlikely to change course and stop building the first plant; however, it may scale down plans for the solar project it had intended to begin building in time $t+1$. Using only realized data, the econometrician would miss the reduction in investment in the solar plant, thus underestimate the impact of the shock.

Using forward-looking investment plans alleviates all three problems. We define revisions as changes in a given firm's investment plan about a specific projection year:[12]

$$Revision_{i,t,h} = \frac{F_{i,t}\left[I_{i,t+h}\right] - F_{i,t-1}\left[I_{i,t+h}\right]}{K_{i,t-1}}. \tag{26}$$

This explicitly isolates firms' contemporaneous responses to new information at time t. By construction, revisions to investment plans are unaffected by previously known demand shocks or trends at time $t-1$, since firms already incorporate these into prior expectations; this substantially reduces omitted variable bias arising from an imperfectly exogenous monetary policy shock, leaving only a minor residual bias from other variables evolving within the quarter from $t-1$ to t. Secondly, intervening shocks that occur between time t and $t+h$ are by construction excluded from the measure, reducing the noise of the estimator. Finally, since plan revisions are measured precisely when firms adjust their expectations rather than when investment is physically realized, they do not suffer from the mechanical attenuation caused by unknown construction lags.

Our baseline regression is therefore:

$$Revision_{i,t,h} = \beta_h^P \, \text{MPS}_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t}, \tag{27}$$

[12]This normalized forecast difference, $\frac{\Delta F_{i,t}\left[I_{i,t+1}\right]}{K_{i,t-1}}$, maps (up to the first order) to the log-change in capital $\Delta \ln K_{i,t}$ used as the left-hand-side variable in standard empirical tests of investment response to monetary policy in the literature (e.g. Ottonello and Winberry [2020], Crouzet [2021]).

where MPS_t is the monetary policy shock, $X_{i,t-1}$ are lagged firm- and macro-level controls, and α_i are firm fixed effects. Firm controls include cash-to-assets, leverage, log assets, return on assets, tangibility and Tobin's Q. Macro controls include the quarterly change in the Chicago Fed National Activity Index (CFNAI) as well as its level, the 2- year U.S. Treasury yield level, the 2-to-10 year U.S. Treasury yield slope, and four lags of GDP growth, inflation rate, and unemployment rate. Coefficient β measures the change in planned investment per dollar of capital in response to monetary policy shocks.

In practice, some firms do not issue updated forecasts in consecutive periods. For those observations, we replace the missing prior forecast $F_{i,t-1}[I_{i,t+1}]/K_{i,t-1}$ with the last observed realization $I_{i,t-1}/K_{i,t-1}$. This substitution rests on a simple assumption: in the absence of a new plan, the firm's own most recent investment serves as the best unbiased predictor of its planned future investment. Crucially, the key advantages of using investment plans–explicitly isolating responses to monetary policy shocks at time t, unaffected by future intervening shocks occurring between t and realization at $t+h$, and addressing potential time-to-build concerns–remain fully preserved under this substitution.

To empirically evaluate this assumption, we perform a series of tests on projected and realized investment. Figure C.1 shows a strong positive relationship between prior-period investment and prior-period planned investment. Table C.1 shows the results of more tests, which are discussed in Appendix A.1. These results collectively validate the assumption that prior-period investment serves as a reasonable proxy for missing prior-period investment plans, preserving our ability to explicitly isolate firm responses to contemporaneous monetary policy shocks while allowing us to use a larger portion of the data.

Despite the benefits of the plans data, we still face a tradeoff: only a subset of firms for which we observe realized investment disclose planned investment. While plans data benefit from potentially lower bias and variance, they are typically reported by a smaller subset of firms which could increase noise. If the total number of firms in the realized investment dataset is N_R, and only $N_P = rN_R$ firms report plans, the empirical variance terms of the coefficient from Equations 25 and **??** can be written, respectively:

$$\text{var}(\widehat{\beta}_h^R \mid X) = \frac{\sigma_R^2}{N_R V (1-R^2)}, \qquad \text{var}(\widehat{\beta}_h^P \mid X) = \frac{\sigma_P^2}{N_P V (1-R^2)}. \tag{28}$$

where $V = \text{var}(\text{MPS}_t), R^2 = R^2_{\text{MPS}|X}$, and $\sigma_R^2 \equiv \text{var}(\eta^R) = \sum_{s=1}^{h} \psi_{h,s}^2 \sigma_u^2 + \sigma_v^2$ is the variance of aggregate shocks between t and $t+h$. As the projection horizon h lengthens, the variance from intervening shocks accumulates, worsening the signal-to-noise ratio of the estimate. Note that the intervening shocks could also

create additional bias in the realized estimate if the MPS are serially correlated.

To evaluate clearly whether forward-looking plans improve the empirical IRF estimation, we compare the mean-squared errors (MSE) of the two estimators. Denote the bias in the realizations regression 25 as $\text{Bias}_R = \mathbb{E}[\widehat{\beta}_h^R] - \beta_h^R$. Then we can define:

$$\text{MSE}_R = \text{B}ias_R^2 + \text{var}\big(\widehat{\beta}_h^R\big), \qquad \text{MSE}_P = \text{var}\big(\widehat{\beta}_h^P\big). \tag{29}$$

The plans-based estimator dominates if and only if:

$$\text{MSE}_P < \text{MSE}_R \quad \Longleftrightarrow \quad r > \frac{\sigma_P^2}{\sigma_R^2 + N_R\, V\,(1-R^2)\,(\text{Bias}_R^2)}. \tag{30}$$

This defines the upper bound on the ratio of observations in the plans data to the realizations data that makes the estimator from plans data more informative than that from the realizations data. The greater the bias in the realized estimator β_h^R, the fewer observations are needed in the plans data to ensure that the plans estimator is superior. Moreover, if we assume that the MPS are truly exogenous, the R^2 term (which represents the share of the MPS variation that is explained by the controls $X_{i,t-1}$) goes to 0.

In practice, we observe N_R and can estimate the variances $\sigma_P^2, \sigma_R^2, V$. We do not have a way of estimating the Bias term directly. To establish reasonable bounds on the bias in typical IRFs estimated using data on realizations, we draw from the existing literature. Bauer and Swanson [2023] find that their improved identified MPS increases the magnitude of the industrial production response to MPS by a factor of four, from a biased estimate of -0.35% to an improved estimate of -1.4%. The methods in Romer and Romer [2004] change the same responsiveness from a biased estimate of -2.4% to -4.3% in response to 100 basis increase in the Fed Funds Rate. These are large biases that range from 50% to 400%, providing an upper bound for the bias at around four times our coefficient estimate. A reasonable lower bound is 0.

We then plot the minimum r, or ratio of plans data to realizations data, required for the plans estimator to be more useful than the realizations estimator. Figure C.8 plots, for two horizons $h = 1$ and $h = 5$, the minimum fraction of firms $r = \frac{N_P}{N_R}$ required for the plan revisions-based estimator to dominate the realized-data estimator as a function of an assumed upper bound bias term. To be conservative, we allow imperfectly exogeneous monetary-policy shocks by using the empirical R^2 term in the regression of the MPS on controls, which is under 9% and raises the threshold slightly relative to a baseline with a perfect exogeneity assumption. In either case, plans data produces lower MSE estimates for even reasonably low

assumed bias. If the realized-estimator bias were 0.5, the threshold indicates that the plans data would need at least one observation per 1,200 observations in the realizations data to improve the $h = 1$ impulse-response estimate; the threshold is even lower for longer horizons and larger biases. These results underscore that even a modest subsample of forward-looking plans suffices to outperform realized investments, even for medium and long horizons, given the improvement in the signal to noise ratio relative to using solely realizations data.

In summary, we find that for reasonable levels of bias, we have more than sufficient plans data in the universe of U.S. non-financial corporations in Compustat for the plans-based estimator in Equation **??** to perform better than the realizations-based estimator in Equation 25. Importantly for our purposes, the improved precision arising from removing the noise of intermittent shocks between a monetary policy shock and investment realization allows us to better pinpoint heterogeneity in responses and mechanisms.

Firms may self-select into reporting future capital expenditure plans in a way that correlates with unobserved determinants of investment, potentially biasing our estimated policy effects. We test if firms selectively disclose investment plans or cash flow expectations in Table C.3, and find no significant difference in investment opportunities (as measured by Tobin's Q) when firms disclose investment plans within firm. However, firms tend to be larger, have higher investment rates and tangibility, and more cash on hand when they disclose planned investment, suggesting they may be more likely to disclose when they are investing more. That being said, the median firm in our sample reports investment plans 44 quarters over the full sample, allowing sufficient within-firm variation for our analysis.

A.1 Is Lagged Investment is a Reasonable Proxy for Prior Planned Investment?

We perform a series of tests on projected and realized investment to verify the assumption that in the absence of a new plan, the firm's own most recent investment serves as the best unbiased predictor of its planned future investment. The results are shown in Table C.1. Columns (1) and (2) demonstrate a strong correlation between lagged investment and the lagged investment plan, robust to firm fixed effects. Column (3) indicates no significant correlation between the residual "news" (the component of the prior-period plan unexplained by lagged investment and controls, recovered from the residual in Column (2)) and MPS, validating the substitution's robustness for our particular purposes. Columns (4) and (5) show that lagged investment alone explains nearly 90 percent of the variation in future investment, and the predictive power of the actual plan is similar to that for lagged plans. Columns (6) and (7) confirms that there is no systematic selection bias in

issuing updated forecasts: we regress future actual investment on lagged investment interacted with a dummy for whether a plan is available, and find no significance in the interacted term. These results collectively validate the assumption that prior-period investment serves as a reasonable proxy for missing prior-period investment plans.

B Data Collection and Cleaning

We provide standardized instructions for our research assistants on how to collect the data. We created a protocol by first asking two MIT undergraduates to look through the websites and filings of publicly traded companies to identify the location of the data. Through this experience, we created a video and document with step-by-step instructions on how to collect this data that we shared with all subsequent research assistants. The instructions are below.

Goal

We are interested in every plan the company has published in its entire history, and every year that they project capital expenditures (also known as "investment plans", "capital spending", "capital investment plan", "capital program"). The goal is to collect for every company, every quarter, what it plans for investing every year. So each line in the spreadsheet should be a unique company, quarter, and projected plan year.

Instructions

We collect the data from two potential sources: (1) the company's Earnings Call Presentations (available on the Investor Relations portion of their website), and (2) their 10-K or 10-Q filing at the sec.gov.

1. Check if there is anything in their 10-K or 10-Q on the capital expenditure plans. This may be available by searching "Capital plan", "Capital expenditure", "Capital spending plan", etc.
   (a) If so, then enter in the numbers and surrounding text into the file provided.
   (b) If not, then search their earnings call presentations (also called "investor day presentations", "earnings presentations", "earnings announcements", etc).
      i. Google "[Company] Investor Relations"
      ii. Find "Earnings Call Presentations" or “Investor Day Presentations”, click
      iii. Click on the presentation PDF
      iv. Search for the term "Capital expenditure" or "capital spending plan" or "Capital plan"
      v. Record the amount (in US billions) and any notes in the spreadsheet
      vi. Repeat for every Earnings Call Presentation that is listed in the company's website.
2. The columns are as follows:

(a) **Date of transcript**: the date in which the document was published on the website. If there is no date, then put the last date in the quarter that the document refers.

(b) **Year of projection**: this is the year that the investment plan is for.

(c) **Source of information**: Include the year, quarter, and name of document. For example, "Q4 2018 News Release", "Q3 2022 Earnings Conference Call Presentation"

(d) **Investment Plans**: copy and paste the text associated with the investment plan: for example, "Estimates Capex for FY22 will be between $5.5 billion"

(e) **Estimated Yearly Investment Amount**: Total amount for the year (or remainder of year), in billions of dollars. If the estimated Capex is a range of numbers (eg, 1.1-1.3bn), please report the midpoint (i.e., average). For example, for 1.1-1.3bn, you should report 1.2.

(f) **Years**: indicates for how many years does the projection include. For example, if the earnings presentation says "3 billion dollars over the next 4 years", then the "years" variable is 4.

(g) **Total investment amount**: the total amount that is projected. So the columns "Estimated yearly amount" x "Years" should equal "Total Investment Amount". If they publish a range of years, please use the midpoint of the range.

(h) **Lowpoint of Range**: If the estimated Capex is a range of numbers (eg, 1.1-1.3bn), please report the low point, i.e., 1.1. If there is no range, then set this equal to Estimated Yearly Investment Amount.

(i) **Highpoint of Range**: If the estimated Capex is a range of numbers (eg, 1.1-1.3bn), please report the high point, i.e., 1.3. If there is no range, then set this equal to Estimated Yearly Investment Amount.

(j) **Do They Mention an Investment / Capital Expenditure Plan**: this equals 1 if there is a plan, 0 if not.

(k) **Rest of year projection? 1 if yes, 0 if this is for a full year**: if the plan is for the remainder of the year, then set to 1; if it is for a full year, then set to 0.

(l) **If available on the 10K or 10Q, what text should we search for to find**: please make sure to add detail if possible so that I do not have to search so many times to find it.

(m) **If available on the 10K or 10Q, what text should we search for to find**: please make sure to add detail if possible so that I do not have to search so many times to find it.

(n) **Notes**: If anything was unclear, please mark it here

We have included two examples in the spreadsheet. The highlighted fields are the ones that need to be filled in for each quarter (or year, if the company only reports the data every year). Please let me know if anything is unclear.

B.1 Data Cleaning

One shortcoming of the exercise is that companies that no longer exist due to acquisition or bankruptcy no longer have company earnings call transcripts, investor day presentations available on their websites. As such, our data is a snapshot of all companies that still exist as of the collection of our data, which begins in March 2024 and ends in February 2025.

To determine the period for which the company is intending to project a plan, we use the date of announcement and the company's fiscal year end. We set the projection period end date to be the fiscal year end of the year of the announcement. If the fiscal year ended before the announcement, then we set the projection period end date to the following fiscal year end.[13] For 0.4% of observations, the projection period is only for one quarter, so we fix the projection period end date to the next fiscal quarter end following the date of announcement. Then, we compute the start of the projection period. For those projections that are either for one quarter or the remainder of the fiscal year, we set the start of the projection period to be the start of the fiscal quarter in which the announcement occurs.[14] For all others, we have the project start date as one year prior to the projection end date. We the compute the projection period in months by subtracting the project end date from the project start date.

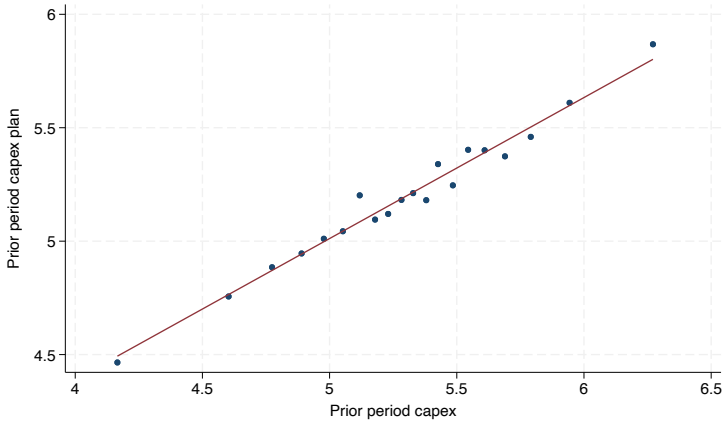
For all of our regressions except for the projection horizon analyses, we exclude those plans that are clearly not for the full capital expenditure for the year. For example, U-Haul Holding Co stated in their 2008Q3 Form 10-Q that "The company has allocated $70.0 million to new acquisitions." Because this is likely a subset of company capex, we exclude this datapoint and the other similar datapoints in analyses that has total planned capital expenditure growth as an outcome variable; this accounts for 2.8% of the total data. We further exclude the 12.9% of observations where the projection horizon is less than one year, for example if a firm projects its next quarter capex.

C Additional Tables and Figures

[13] For example, Albertson's Companies Inc has a fiscal year that ends in February, and on April 28, 2021 it announced that it estimates Capex to be 1.9–2 billion for fiscal year 2021, so we set the projection end period to be February 2022.

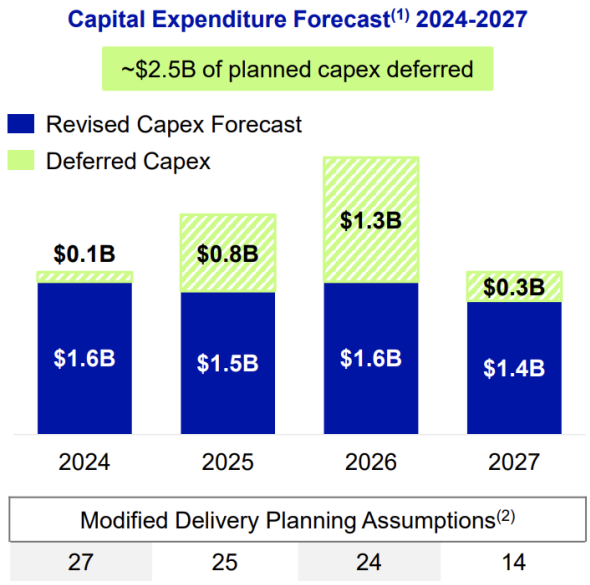
[14] Across all observations, 0.7% are for remainder of the year.

Figure C.1: Binscatter of $\log F_{t-1}$ Against $\log I_{t-1}$.

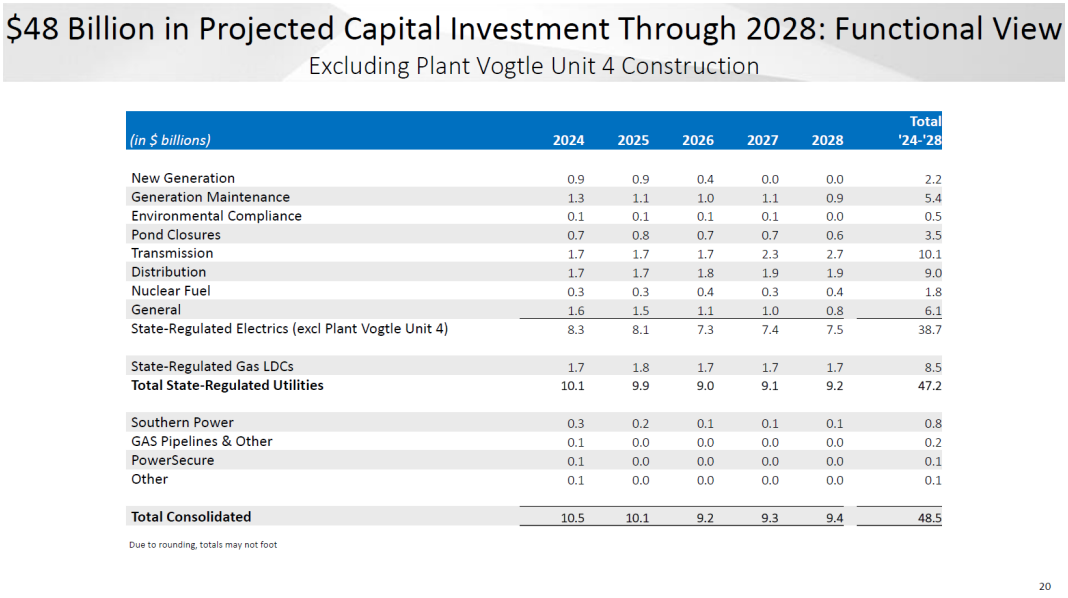


Notes: This figure shows a binned scatter plot of lagged realized investment (on the x-axis) and investment plans (on the y-axis). Includes firm fixed effects.

Figure C.2: Examples of Investment Plan Disclosures



(a) Jetblue 2023 Q4 Earnings presentation



$48 Billion in Projected Capital Investment Through 2028: Functional View

Excluding Plant Vogtle Unit 4 Construction

(in $ billions)	2024	2025	2026	2027	2028	Total '24-'28
New Generation	0.9	0.9	0.4	0.0	0.0	2.2
Generation Maintenance	1.3	1.1	1.0	1.1	0.9	5.4
Environmental Compliance	0.1	0.1	0.1	0.1	0.0	0.5
Pond Closures	0.7	0.8	0.7	0.7	0.6	3.5
Transmission	1.7	1.7	1.7	2.3	2.7	10.1
Distribution	1.7	1.7	1.8	1.9	1.9	9.0
Nuclear Fuel	0.3	0.3	0.4	0.3	0.4	1.8
General	1.6	1.5	1.1	1.0	0.8	6.1
State-Regulated Electrics (excl Plant Vogtle Unit 4)	8.3	8.1	7.3	7.4	7.5	38.7
State-Regulated Gas LDCs	1.7	1.8	1.7	1.7	1.7	8.5
Total State-Regulated Utilities	10.1	9.9	9.0	9.1	9.2	47.2
Southern Power	0.3	0.2	0.1	0.1	0.1	0.8
GAS Pipelines & Other	0.1	0.0	0.0	0.0	0.0	0.2
PowerSecure	0.1	0.0	0.0	0.0	0.0	0.1
Other	0.1	0.0	0.0	0.0	0.0	0.1
Total Consolidated	10.5	10.1	9.2	9.3	9.4	48.5

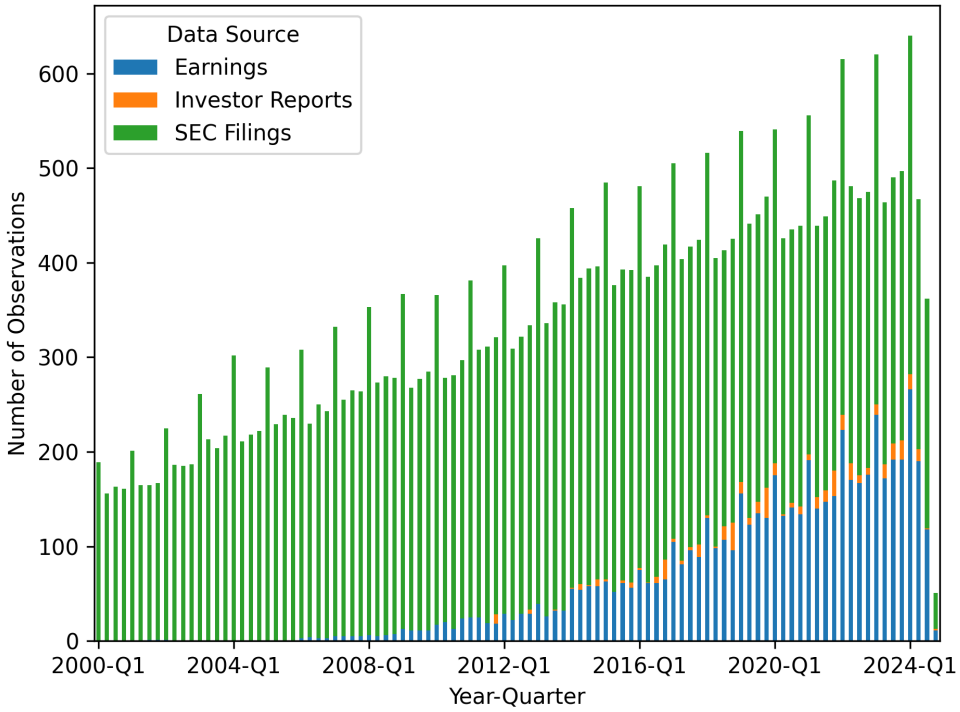
Due to rounding, totals may not foot

20

(b) Southern Company's 2023Q4 Earnings Call

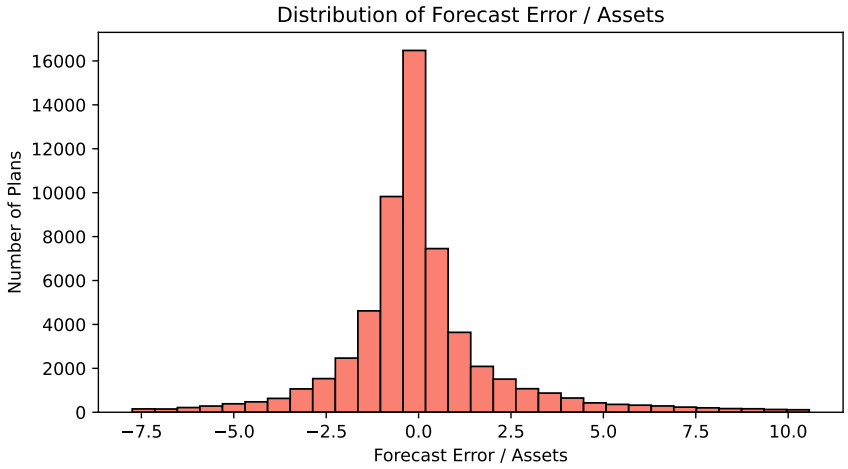
Source: The top image is from page 9 of the Jetblue 2013 Q4 Earnings presentation. The bottom image is from page 20 of Southern Company's 2023Q4 Earnings Call.

Figure C.3: Sources of Data



Note: This graph shows the number of data sources, aggregated quarterly, and sorted by source type. SEC filings refer to relevant forms and filings such as 10-K, etc. Earnings reports, annual and quarterly reports posted by the firm, and press releases are included in Earnings. Data collected from presentations for analyst meetings, shareholder or investor reports are included in Investor Reports.

Figure C.4: Histogram: 1-year Projection Period Investment Forecast Errors



Notes: This figure plots the distribution of 1-year projection period capex forecast errors. Capex forecast errors in year t are computed as the difference between realized capex in fiscal year t and capex plans for year t announced within 3 to 12 months of the end of the year, normalized by lagged total assets. Forecast errors are trimmed at the 2nd and 98th percentiles.

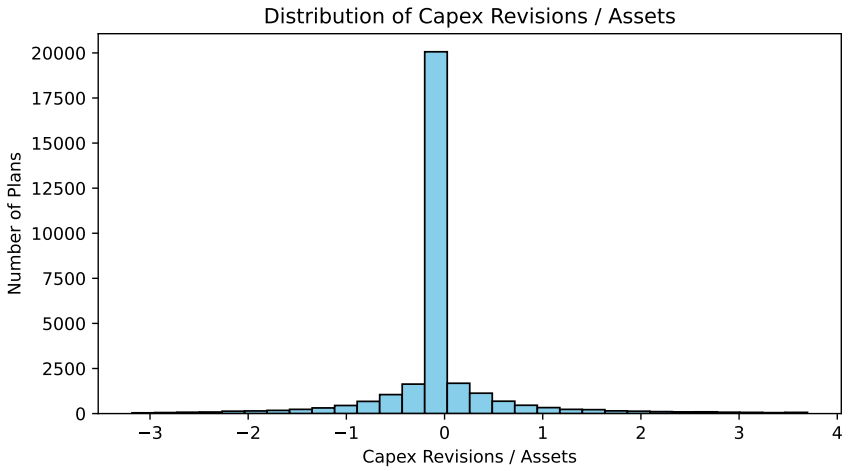
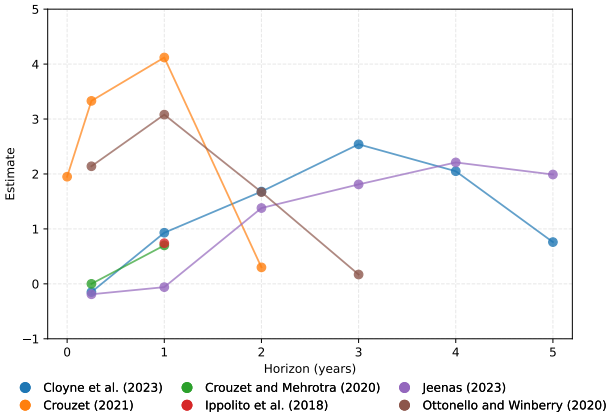


Figure C.5: Distribution of Capex Revisions / Assets

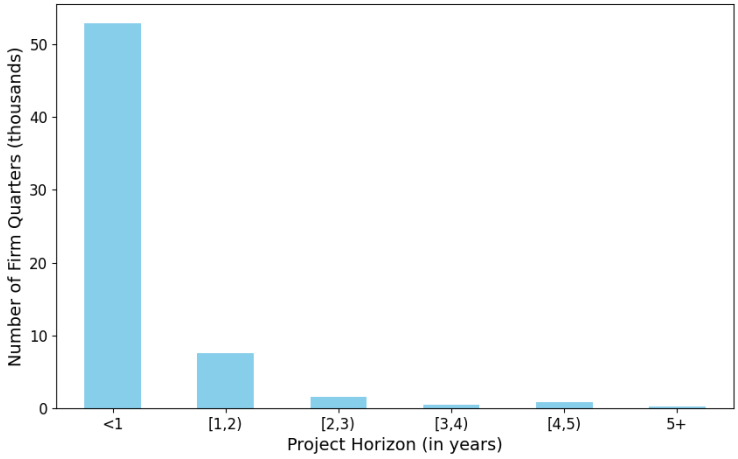
Note: This histogram shows the distribution of capex revisions calculated as the change in projected capital expenditures between consecutive planned announcements, scaled by lagged assets, in percentage points. The sample is limited to project periods of 12 months ending in 3 and 12 months, and only includes revisions where the gap between updates is approximately one quarter ($80 < gap < 100$ days). Revisions are trimmed at 2% and 98%.

Figure C.6: Summary of Estimates of the Responsiveness of Capital Expenditures to Interest Rates



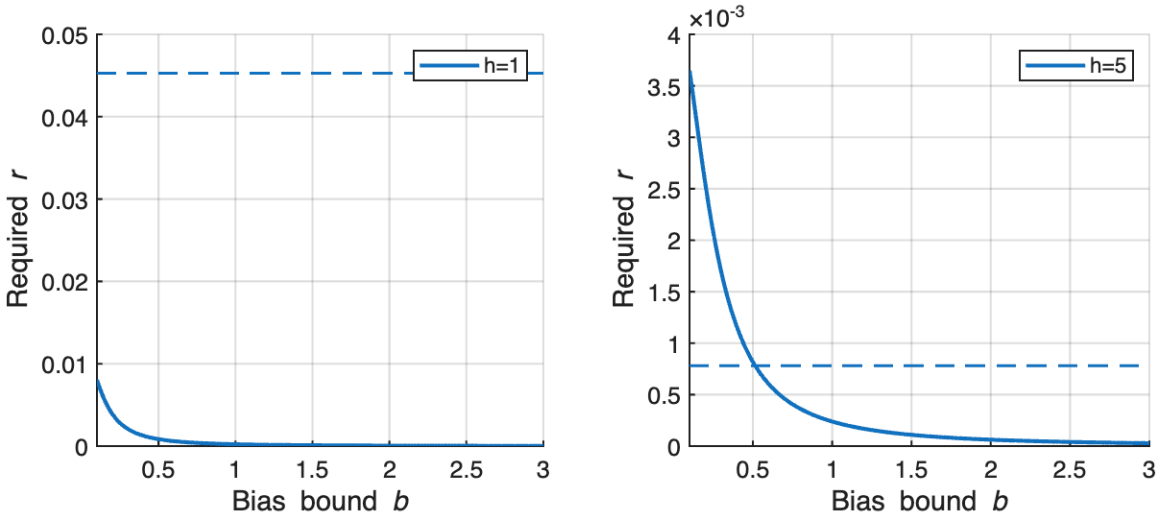
Notes: This figure plots existing estimates from the literature of the cumulative effect of a monetary policy shock on capital expenditures over different horizons. The figure is scaled to show the effect of a 1pp monetary policy shock on the change in capital stock, as a percentage of prior capital stock.

Figure C.7: Distribution of Project Horizon Across Firm Quarters



Notes: This figure shows the distribution of Project Horizon across firm quarters that have projections. Project Horizon is computed as the difference in months between the announcement of the projection and the end of the projection period, and rounded to the nearest year.

Figure C.8: Required r Across Bias Levels

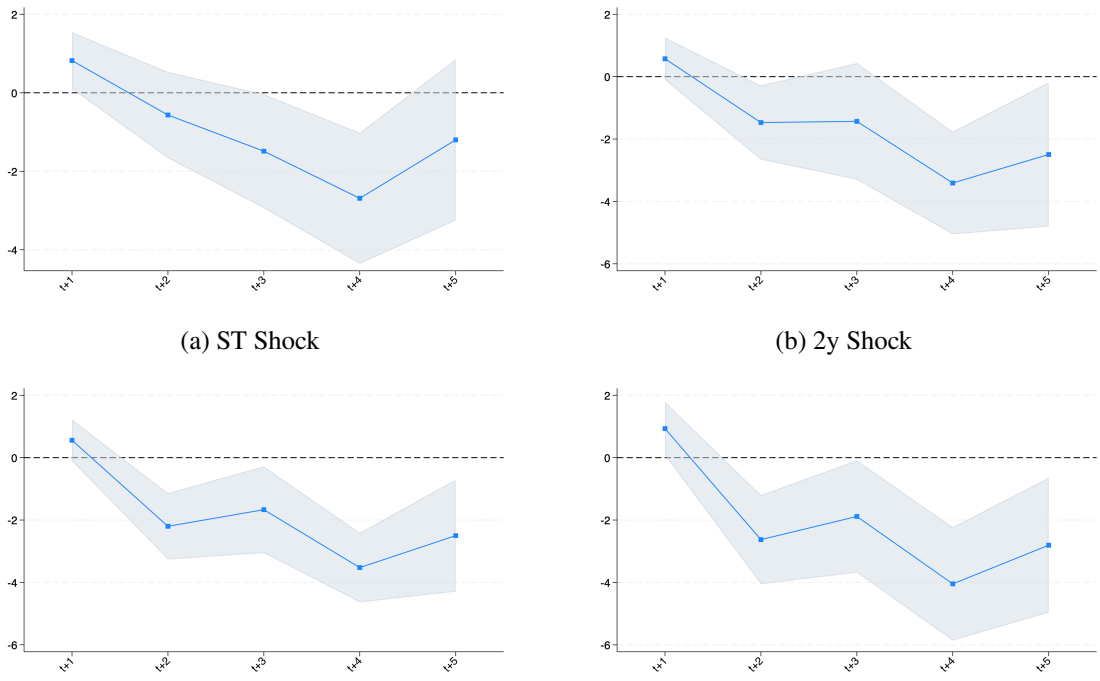


(a) Plan horizon: 1 Year

(b) Plan horizon: 5 Years

Notes: This figure plots the minimum $r = N_P/N_R$ required for plans data to have a lower MSE than realized investment data for each horizon h. The dotted line represents the actual ratio r in the data for that horizon.

Figure C.9: Impact of Monetary Policy Shocks on Investment - Including Shorter Term Plans



(a) ST Shock

(b) 2y Shock

(c) 5y Shock

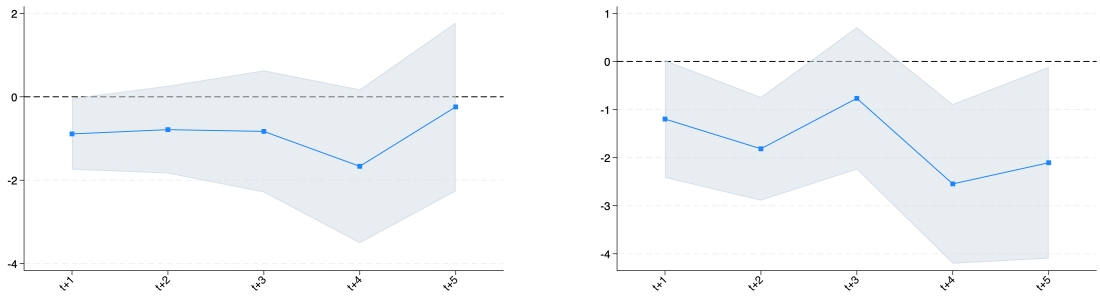
(d) Shock 10y

Notes: This figure depicts β_h for the following specification, for $h = 1, 2, 3, 4, 5$:

$$\text{Planned Investment}_{i,t,h} = \beta_h \, \text{MPS}_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t},$$

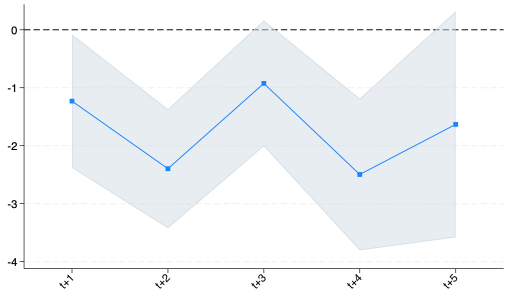
Planned Investment$_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. h denotes the years from today that the plan is for. Here, $h = 1$ if the difference between the projection date and the end of the projection horizon is between 3-12 months, $h = 2$ if the difference is between 13-24 months, $h = 3$ if the difference is between 25-36 months, $h = 4$ if the difference is between 37-48 months, and $h = 5$ if the difference is between 49-60 months. The regression controls $X_{i,t-1}$ include firm-level characteristics (cash-to-assets, leverage, log assets, return on assets, tangibility, and Tobin's Q), the quarter change in the CFNAI index, the level of the CFNAI index, the 2-, 5-, and 10-year U.S. Treasury yields, all as of quarter $t-1$, as well as four lags of GDP growth, the inflation rate and the unemployment rate. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level. The shaded area represents 90% confidence intervals.

Figure C.10: Impact of Monetary Policy Shocks on Investment - Other MPS

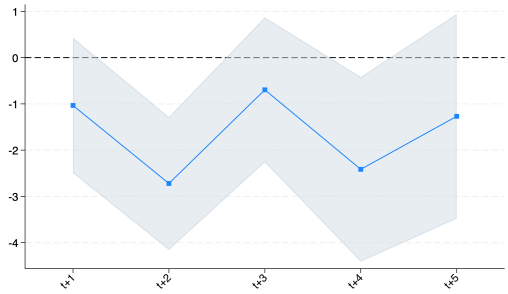


(a) BS Shock

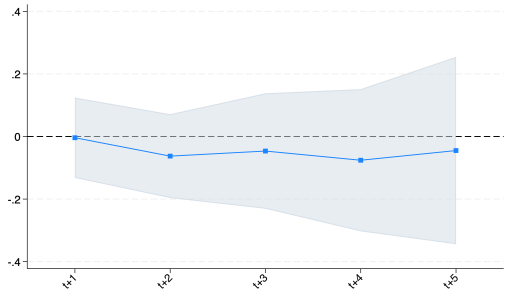
(b) Residualized Shock 2y



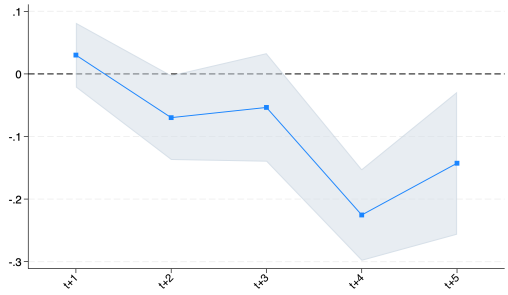
(c) Residualized Shock 5y



(d) Residualized Shock 10y



(e) FFR Shock



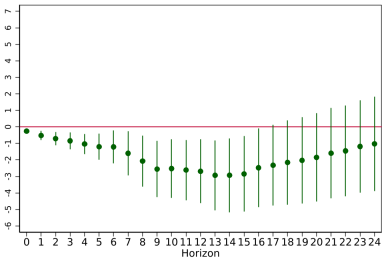
(f) Forward Guidance Shock

Notes: This figure depicts β_h for the following specification, for $h = 1, 2, 3, 4, 5$:

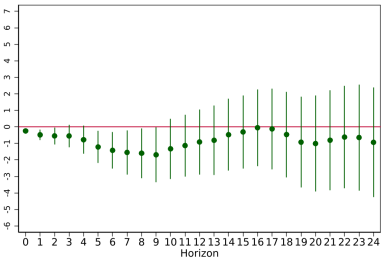
$$\text{Planned Investment}_{i,t,h} = \beta_h \, \text{MPS}_t + X_{i,t-1} + \alpha_i + \varepsilon_{i,t},$$

Planned Investment$_{i,t,h}$ is planned real investment for firm i in future year $t+h$ relative to the rolling sum of the real investment over the prior 4 quarters ($t-4$ to $t-1$), divided by time $t-1$ assets. h denotes the years from today that the plan is for. Here, $h = 1$ if the difference between the projection date and the end of the projection horizon is between 9-12 months, $h = 2$ if the difference is between 13-24 months, $h = 3$ if the difference is between 25-36 months, $h = 4$ if the difference is between 37-48 months, and $h = 5$ if the difference is between 49-60 months. Panel (a) uses the residualized ST shock from Bauer and Swanson [2023]. Panels (b)-(d) use shocks constructed from 30-minute high frequency changes in the 2-, 5-year, and 10-year UST yield futures, residualized with controls using the same method as in Bauer and Swanson [2023]. Panels (e) and (f) use the Fed Funds Rate shocks and Forward Guidance shocks extracted from using a principal components analysis from Swanson [2021]. The regression controls $X_{i,t-1}$ include firm-level characteristics (cash-to-assets, leverage, log assets, return on assets, tangibility, and Tobin's Q), the quarter change in the CFNAI index, the level of the CFNAI index, the 2-, 5-, and 10-year U.S. Treasury yields, all as of quarter $t-1$, as well as four lags of GDP growth, the inflation rate and the unemployment rate. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level. The shaded area represents 90% confidence intervals.

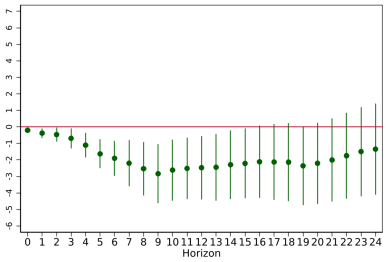
Figure C.11: Heterogeneity in Cumulative Net Issuance Response to 2Y UST Shock



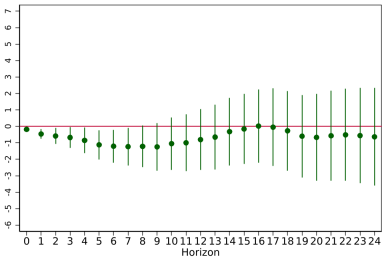
(a) Top 1/3, Asset



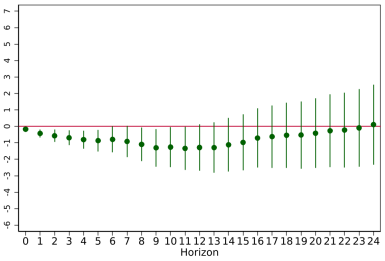
(b) Top 1/3, Leverage



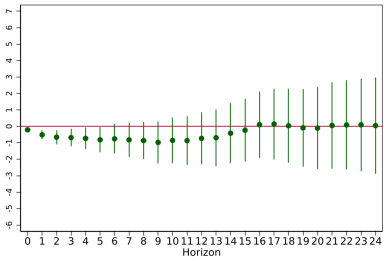
(c) Top 1/3, Tangibility



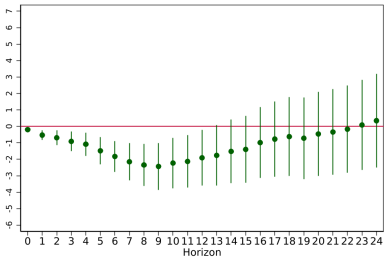
(d) Bottom 2/3, Asset



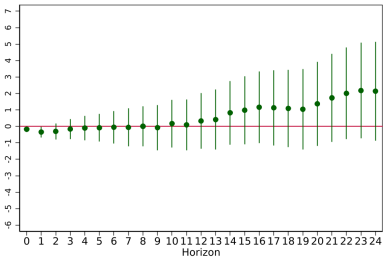
(e) Bottom 2/3, Leverage



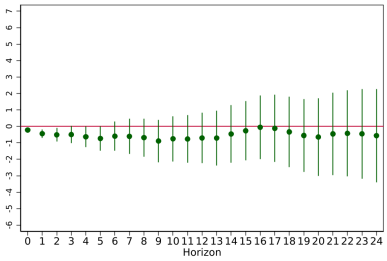
(f) Bottom 2/3, Tangibility



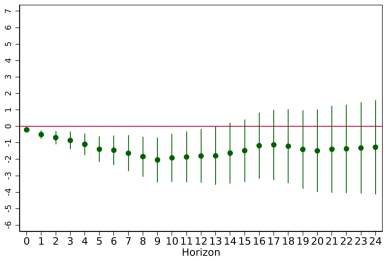
(g) Top 1/3, Int Exp/Debt



(h) Top 1/3, ROA



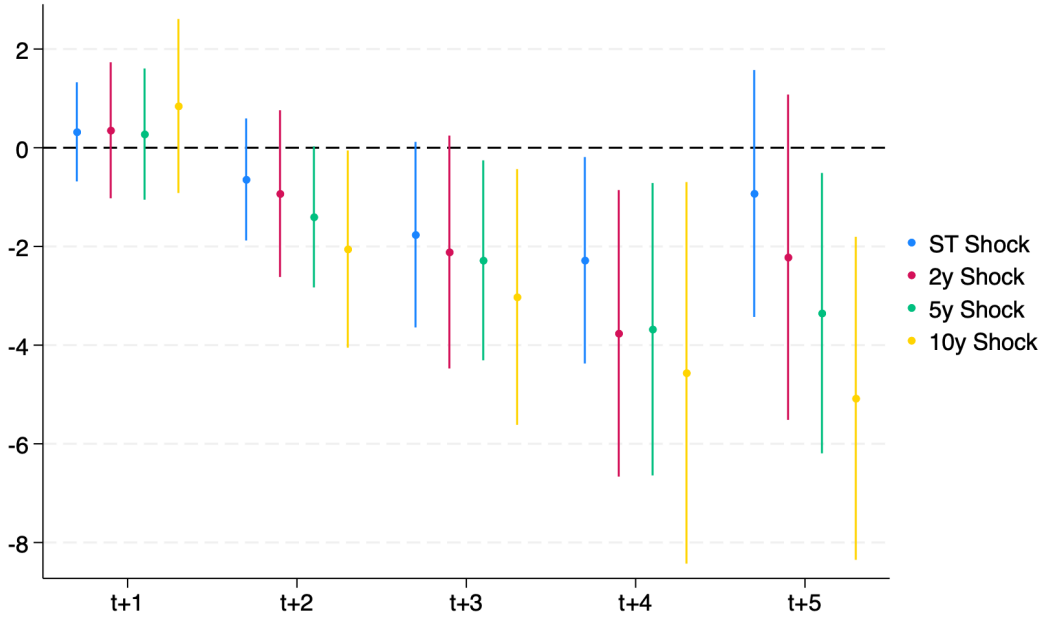
(i) Bottom 2/3, Int Exp/Debt



(j) Bottom 2/3, ROA

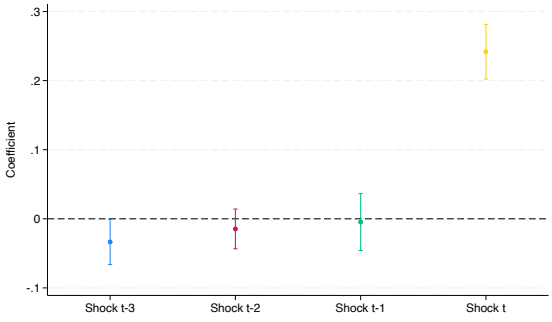
Note: The figure plots the coefficients and 95% confidence intervals from the regressions $\sum_0^h NetIss_{i,t+h}/Asset_{t-1} = \beta_h MPS_{t-1} + X_{i,t-1} + \alpha_i + \varepsilon_{i,t}$ with h running from 0 to 24. Firm fixed effects are included, and standard errors are clustered at the firm and month level. The cumulative net issuance is normalized by the previous-quarter asset and winsorized at the 1st and 99th percentiles. MPS_t is the sum of the high-frequency change in the 10-year UST yield occurring in quarter t. The sample is monthly, covering the period from 2000 to 2024. Subsamples (top 1/3 or bottom 2/3) are used for the relevant characteristics variable. The firm characteristics are size (ln Assets), leverage (Total Debt/Assets), tangibility (PPE/Assets), interest expense to debt (Interest Expense/Total Debt), and profitability (NI/Assets). Standard errors are clustered by firm and month.

Figure C.12: Planned Investment Response to Monetary Policy by Horizon



Note: This figure plots the coefficients and 95% confidence intervals from the OLS regressions reported in Table 5. The horizons are shown as $t+1$ to $t+5$ on the x-axis.

Figure C.13: Contemporaneous vs. Lagged Shocks Effect on Cost of Debt



(a) ST Shock

Notes: This figure displays coefficient estimates from the baseline specification:

$$\Delta\text{Cost of Debt}_{i,t} = \beta_1^s \Delta^{MP} r^D_{i,t-s} + \gamma^s X_{i,t-s-1} + \alpha_i^s + \varepsilon^s_{i,t}$$

where $\Delta\text{Cost of Debt}_{i,t}$ is 3-month changes in a firm's cost of bond debt as measured by the amount-outstanding weighted average bond yields across all outstanding bonds, and $\Delta^{MP} r^D_{i,t}$ is the sum of changes in a firm's cost of debt around monetary policy events in quarter t. Each plot reports the coefficient β_1 on four separate regressions corresponding to $s = 1,2,3,4$, with 95% confidence intervals. $X_{i,t}$ include firm controls (size (log Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q), macro controls (the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of the unemployment rate, delta log GDP, and CPI). Standard errors are clustered at the firm and quarter level. The outcome variable is trimmed at the 2nd and 98th percentiles; all firm controls are winsorized at 1% and 99%.

Table C.1: Testing if Lagged Investment is a Reasonable Proxy for Prior Plan

	Correlation		Residual and MPS	Predictive Power for I_i,t+1		Selection	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Lagged capex plan	Lagged capex plan	Residuals	Future capex	Future capex	Future capex	Future capex
Lagged capex	0.909***	0.408***			0.946***	0.948***	0.344***
	(0.0107)	(0.0721)			(0.00850)	(0.00288)	(0.0192)
Lagged capex plan				0.820***			
				(0.0166)			
MPS			-0.0429				
			(0.274)				
Plan available=1 × Lagged capex						-0.00262	0.00157
						(0.00770)	(0.00378)
Plan available						0.0276	-0.00872
						(0.0448)	(0.0243)
Macro Controls		✓	✓				✓
Firm Controls		✓	✓				✓
Firm FE		✓	✓				✓
Observations	2310	1630	1630	2274	2246	24133	21466
R-squared	0.735	0.920	0.0000159	0.749	0.883	0.891	0.944

Notes:

Column (1), "Correlation," shows the raw correlation between lagged investment and the investment plan; Column (2), "Correlation," repeats (1) including firm fixed effects; Column (3), "Residual and MPS," regresses the plan-news residual on the MPS shock with controls. Includes only annual plans and realizations for investment in time periods ending in 9-13 months from announcement;. Column (4), "Predictive Power for $I_{i,t+1}$ (actual)," reports the coefficient from OLS of future investment on lagged investment plan; Column (5) repeats this regression using the lagged actual investment, conditional on there being a plan; Column (6), "Selection (OLS)," tests whether plan availability is correlated with lagged investment via an interaction term; Column (7), "Selection (FE&Controls)," repeats (6) adding firm and quarter fixed effects plus controls. Includes only annual plans and realizations for investment in time periods ending in 9-13 months from announcement.

Table C.2: Summary Statistics for Firm Characteristics by Data Source

	IBES				LSEG				MANUAL			
	Mean	25th pct	Median	75th pct	Mean	25th pct	Median	75th pct	Mean	25th pct	Median	75th pct
# of firms	3131				1357				881			
Projection periods	7.26	4.00	7.00	10.00	7.74	4.00	8.00	10.00	12.36	6.00	9.00	11.00
# quarters w/capex plans	20.55	9.00	17.00	29.00	32.30	20.00	33.00	44.00	42.90	25.00	39.00	59.00
Assets	5266.45	508.81	1385.08	3930.99	10557.42	1091.75	2802.15	8299.05	15844.13	1620.84	3799.32	11507.22
Return on equity	0.01	-0.01	0.02	0.04	0.04	0.01	0.03	0.05	0.03	0.01	0.03	0.05
Tobin's Q	3.50	1.16	1.94	3.40	3.51	1.44	2.27	3.65	3.44	1.28	1.98	3.48
Investment rate	-0.01	-0.02	-0.00	0.02	-0.00	-0.02	-0.00	0.02	-0.00	-0.01	0.00	0.02
Physical capital to assets	0.36	0.14	0.29	0.55	0.33	0.14	0.27	0.48	0.40	0.17	0.35	0.62
Z-score	2.82	0.78	1.78	3.36	3.69	1.53	2.54	4.17	2.91	1.02	1.85	3.28
Leverage	0.32	0.14	0.30	0.46	0.26	0.13	0.25	0.37	0.34	0.21	0.32	0.45
Cash/assets	0.12	0.02	0.07	0.17	0.11	0.02	0.07	0.16	0.09	0.02	0.05	0.12
Planned capex growth (%)	-0.49	-1.36	0.05	1.12	-0.08	-0.85	0.16	1.11	0.06	-0.89	0.15	1.24
Planned net income growth (%)	3.06	-0.39	0.49	1.91	3.36	-0.50	0.55	2.19	1.95	-0.57	0.33	1.74
Capex growth (%)	0.35	-1.11	0.14	1.59	0.52	-0.73	0.22	1.49	0.72	-0.51	0.22	1.56
Net income growth (%)	0.29	-3.67	0.44	4.25	1.09	-1.65	0.83	3.66	1.07	-1.54	0.65	3.23

Notes: This table reports characteristics of firms for three sources: firms listed in IBES, firms listed in LSEG, and firms listed in our manual plans table. Z-score is measured as Altman Z-score. Projection periods are presented in months. Nominal net income growth and nominal capex growth are calculated as the difference between planned and realized values, normalized by prior-period assets. Planned capex growth is defined as the planned real capex for firm i in future period h, relative to the rolling sum of real capex over the prior four quarters, divided by prior-period assets, and the same definition applies to planned net income growth. The full sample is quarterly with projection release dates spanning from 2000 Q1 to 2024 Q3. Within the sample, IBES data spans from 2002 Q4 to 2023 Q4, LSEG data covers 2004 Q1 to 2021 Q4, and our manually collected plans table covers the full range from 2000 Q1 to 2024 Q3. All measures are winsorized at 1% and 99%.

Table C.3: Within-Firm Variation in Characteristics and Timing of Disclosure

	Planned investment disclosed		E[Net Income] disclosed	
	(1)	(2)	(3)	(4)
Tobin's Q	0.0000574*	0.000111	0.0000844	0.000203
	(0.0000338)	(0.0000957)	(0.0000521)	(0.000156)
Investment rate	0.0129***	0.0523***	0.0110***	0.0399**
	(0.00269)	(0.0102)	(0.00310)	(0.0167)
Cash/Assets	0.0155***	0.0437***	-0.0136**	-0.0233
	(0.00524)	(0.0113)	(0.00680)	(0.0180)
Leverage	0.000702	-0.0205**	-0.00198	-0.0434***
	(0.00116)	(0.00856)	(0.00165)	(0.0144)
Size	0.0111***	0.0203***	0.0147***	0.0243***
	(0.00172)	(0.00275)	(0.00185)	(0.00359)
Return on assets	-0.000954	-0.0267***	-0.00487***	0.0221
	(0.000717)	(0.00980)	(0.000923)	(0.0139)
Tangibility	0.0409***	0.101***	-0.0282**	-0.0641**
	(0.00843)	(0.0182)	(0.0114)	(0.0259)
Firm FE	✓	✓	✓	✓
Fiscal Quarter FE	✓	✓	✓	✓
Sample	Full sample	Ever has plan = 1	Full sample	Ever has plan = 1
Observations	354209	187507	354209	187507
R-squared	0.293	0.307	0.453	0.417

Notes: This table reports firm-level panel regressions using a dataset at the firm-quarter level. The dependent variable is a binary indicator equal to 1 if the firm announces investment plans or net income expectations of at least 9 months before the end of the plan period in a given quarter. The sample covers 2000-2024, and "Full sample" includes all non-financial U.S. firms in Compustat with at least four quarters of data, while "Ever has plan =1" includes all non-financial U.S. firms in Compustat with at least one plan in our data. All regressions include firm and fiscal quarter end fixed effects, and standard errors are clustered at both the firm and fiscal quarter levels. All independent variables are winsorized at the 1st and 99th percentiles.

Table C.4: Predictiveness of Investment Plans

	Capex Growth Rate			Capex Growth/ Assets		Capex (log)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Planned Capex Growth	0.812***	0.783***	0.773***				
	(65.10)	(65.43)	(63.59)				
Over 1yr plan=1 × Planned Capex Growth			-0.125***				
			(-4.00)				
Over 1yr plan			15.55***		0.823***		
			(7.75)		(7.35)		
Planned Capex / Assets				0.804***	0.786***		
				(70.44)	(67.04)		
Over 1yr plan=1 × Planned Capex / Assets					-0.158***		
					(-4.91)		
Log(Planned Capex)						0.919***	0.488***
						(170.55)	(24.25)
Year FE		✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓		✓
Observations	18537	18533	24048	18786	24414	20551	19940
Rsquared	0.626	0.639	0.581	0.645	0.570	0.858	0.944

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: This table presents OLS estimates relating planned to realized capital expenditure outcomes. Columns labeled "Capex growth rate" report coefficients from regressions of realized capital expenditure growth on planned capital expenditure growth; columns labeled "Capex / Assets" report coefficients from regressions of realized capital expenditure growth on planned capital expenditure growth scaled by lagged total assets; columns labeled "Capex (log)" report coefficients from regressions of log actual capital expenditure on log planned capex. Regressions 1, 2, 4, 6, and 7 focus on the one-year projection horizon, while Regressions 3 and 5 include all plans. We winsorize realized growth at the 1st and 99th percentiles. We include firm and year fixed effects, and cluster standard errors at the firm and quarter level.

Table C.5: Classification of Investment Plan Types

Category	Words
Environmental	environmental, environment, clean, emissions, renewable, solar, wind, green, carbon, sustainability, sustainable
Research_Development	research, development, new product, innovation, innovative, exploration, ai, technology, artificial, machine learning, research and development
Expansion_Growth	expansion, expand, grow, growth, new stores, new, expanding
Acquisitions	acquisitions, redevelopment, acquisition
Physical_Infrastructure	property, equipment, manufacturing, nuclear, aircraft, ppe, infrastructure, operating assets, drilling, oil, coal, refining, mining
Maintenance	maintenance, maintain, repair, replacement, renovations, renovation, existing, upgrades, ongoing, reliability, cost reduction, modernize, operations, routine

Category	Words
New	establish, establishing, greenfield, open, new, expanding, openings, growth opportunities, brand-new, construct, acquisition of sites, expand, acquire, build, growth, buy, purchase, additional, addition, acquisition, buying
Ongoing	maintain, continue, upgrade, maintenance, renovation, remodel, redevelopment, improvement, renovate, existing, completion, continue to, redevelop, drilling & completion, improve, rehab, restructuring, continuing, complete, ongoing, capacity expansion, enhance, pipeline upgrades, increase, recurring, replace, modernize, improving

Note: These tables list the categories of investment plan types and the corresponding words within investment plans that map to each category. Categories are not mutually exclusive.

Table C.6: Response of Investment Plans to Monetary Policy (conditioning on $\geq 3m$)

	LHS: Normalized Planned Capex				
	(1) RHS: ST MPS	(2) RHS: 2y UST Shocks	(3) RHS: 5y UST Shocks	(4) RHS: 10y UST Shocks	(5) RHS: 2-10y UST Shocks
MPS	0.746*	0.506	0.445	0.744	0.0994
	(0.406)	(0.433)	(0.393)	(0.491)	(0.670)
Over 2yr plan×MPS	-1.823*	-2.489*	-2.764**	-3.283**	0.224
	(1.075)	(1.282)	(1.107)	(1.426)	(2.170)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	66054	66054	66054	66054	66054
R-squared	0.267	0.267	0.267	0.267	0.267

Note: This table reports regressions of planned changes in capital expenditure on MPS over the prior fiscal quarter. We include dummy variables for investment plans that extend more than 24 months ahead; the excluded category consists of plans for the subsequent fiscal year, conditional on the projected year ending at least 3 months after the plan announcement. Planned capital expenditure is computed relative to the rolling sum of the firm's real investment over the prior four quarters ($t4$ to $t1$), normalized for inflation, and divided by the rolling sum of assets at time $t1$. Column (1) uses the ST shock. Columns (2)-(5) use the high-frequency change in the 2-, 5-, and 10-year UST yield. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of GDP growth, the inflation rate, and the unemployment rate. Firm fixed effects are included, and standard errors are clustered at both the firm and fiscal quarter levels. The outcome variable is trimmed at the 2nd and 98th percentiles.

Table C.7: Naive OLS: Response of Investment Plans to Changes in Treasury Yields

	LHS: Normalized Planned Capex			
	(1) RHS:$\Delta UST2y$	(2) RHS:$\Delta UST5y$	(3) RHS:$\Delta UST10y$	(4) RHS:$\Delta UST2-10y$
Δ UST	0.212***	0.143*	0.0959	-0.150
	(0.0683)	(0.0743)	(0.0863)	(0.147)
Over 2yr plan×Δ UST	-0.363	-0.415**	-0.413**	-0.208
	(0.227)	(0.194)	(0.185)	(0.281)
Firm Controls	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Projection horizon FE	Yes	Yes	Yes	Yes
Observations	32490	32490	32490	32490
R-squared	0.286	0.286	0.286	0.286

Note: This table reports OLS regressions of real planned capital expenditure growth on changes in U.S. Treasury yields over the prior fiscal quarter. We include dummy variables for investment plans that extend more than 24 months ahead; the excluded category consists of plans for the subsequent fiscal year, conditional on the projected year ending at least 9 months after the plan announcement. Planned capital expenditure growth is computed relative to the realized capital expenditure of four quarters ending one (two) fiscal quarter before the announcement, normalized for inflation. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the prior-quarter change in the CFNAI index, the prior-quarter level of the CFNAI index, as well as the prior-quarter-end two-year yield level $2y_{t-1}$ and the prior-quarter-end yield curve slope $2-10y_{t-1}$, both measured on the day of the announcement. Four lags of GDP growth, the inflation rate, and the unemployment rate are also included. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level. The outcome variable is trimmed at the 2nd and 98th percentiles.

Table C.8: First Stage: Changes in Treasury Yields on Monetary Policy Shocks

	(1) $\Delta UST2y$	(2) $\Delta UST5y$	(3) $\Delta UST10y$	(4) $\Delta UST10-2y$	(5) $\Delta UST2y$
Shock 2y	1.942***				
	(0.423)				
Shock 5y		1.600***			
		(0.436)			
Shock 10y			1.805***		
			(0.523)		
Shock 2-10y				1.804***	
				(0.421)	
ST Shock					1.784***
					(0.452)
Constant	0.291**	0.390**	0.383**	0.105	0.239*
	(0.136)	(0.163)	(0.158)	(0.0984)	(0.134)
Macro Controls	Yes	Yes	Yes	Yes	Yes
Observations	313	313	313	313	313
R-squared	0.246	0.168	0.170	0.282	0.234

Note: This table reports the first-stage results from IV regressions of planned capital expenditure growth on changes in U.S. Treasury yields over the prior fiscal quarter. In the first stage, we instrument the changes in yields using high-frequency monetary policy-driven shocks to a duration-matched U.S. Treasury future. Macro controls include the prior-quarter change in the CFNAI index, the prior-quarter level of the CFNAI index, as well as the prior-quarter-end two-year yield level $2y_{t-1}$ and the prior-quarter-end yield curve slope $2-10y_{t-1}$, both measured on the day of the announcement. Four lags of GDP growth, the inflation rate, and the unemployment rate are also included.

Table C.9: IV: Response of Investment Plans to Changes in Treasury Yields

	LHS: Normalized Planned Capex			
	(1) IV RHS: $\Delta UST2y$	(2) IV RHS: $\Delta UST5y$	(3) IV RHS: $\Delta UST10y$	(4) IV RHS: $\Delta UST2-10y$
Δ UST	-0.0511	-0.156	-0.0229	0.0266
	(0.298)	(0.249)	(0.207)	(0.560)
LT Plan = 1 $\times\Delta$ UST	-0.679*	-0.747**	-0.858***	0.390
	(0.380)	(0.360)	(0.319)	(1.490)
Firm Controls	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Projection horizon FE	Yes	Yes	Yes	Yes
Observations	32490	32490	32490	32490
R-squared	0.0650	0.0642	0.0654	0.0653

Note: This table reports IV regressions of real planned capital expenditure growth on changes in U.S. Treasury yields over the prior fiscal quarter, where yields are instrumented using high-frequency MP-driven shocks to a duration-matched U.S. Treasury future. We include dummy variables for investment plans that extend more than 24 months ahead; the excluded category consists of plans for the subsequent fiscal year, conditional on the projected year ending at least 9 months after the plan announcement. Planned capital expenditure growth is computed relative to the realized capital expenditure of four quarters ending one (two) fiscal quarter before the announcement, normalized for inflation. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the prior-quarter change in the CFNAI index, the prior-quarter level of the CFNAI index, as well as the prior-quarter-end two-year yield level $2y_{t-1}$ and the prior-quarter-end yield curve slope $2-10y_{t-1}$, both measured on the day of the announcement. Four lags of GDP growth, the inflation rate, and the unemployment rate are also included. Firm fixed effects are included, and standard errors are clustered at the firm and quarter level. The outcome variable is trimmed at the 2nd and 98th percentiles.

Table C.10: Planned Investment Response to Monetary Policy by Horizon (conditioning on $\geq 3m$)

	LHS: Normalized Planned Capex				
	(1) RHS: ST MPS	(2) RHS: 2y UST Shocks	(3) RHS: 5y UST Shocks	(4) RHS: 10y UST Shocks	(5) RHS: 2-10y UST Shocks
MPS	0.875**	0.655	0.648	0.933*	0.140
	(0.415)	(0.434)	(0.409)	(0.521)	(0.658)
Projection horizon (yrs)=2×MPS	-0.839	-1.034	-1.641***	-1.874**	-1.060
	(0.586)	(0.770)	(0.630)	(0.942)	(1.123)
Projection horizon (yrs)=3×MPS	-1.714	-1.899	-2.216**	-2.549*	-0.205
	(1.058)	(1.255)	(1.025)	(1.308)	(1.760)
Projection horizon (yrs)=4×MPS	-2.289*	-3.555**	-3.569**	-4.004*	1.598
	(1.277)	(1.621)	(1.613)	(2.088)	(3.010)
Projection horizon (yrs)=5×MPS	-1.045	-2.130	-3.281**	-4.517***	-2.491
	(1.405)	(1.643)	(1.396)	(1.698)	(3.798)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Projection horizon FE	Yes	Yes	Yes	Yes	Yes
Observations	65884	65884	65884	65884	65884
R-squared	0.269	0.269	0.269	0.270	0.269

Note: This table reports OLS regressions of planned capital expenditure growth on MPS over the prior fiscal quarter. We include dummy variables for investment plans extending 2, 3, 4, and ≥ 5 years ahead; the excluded category consists of plans for the subsequent fiscal year, conditional on the projected year ending at least three months after the plan announcement. Planned capital expenditure change is computed relative to the realized capital expenditure of four quarters ending one (two) fiscal quarter before the announcement, normalized for inflation and divided by the rolling sum of the real assets over the prior 4 quarters ($t-4$ to $t-1$). Column (1) uses the short-term shock. Columns (2)-(5) use the high-frequency change in the 2-, 5-, and 10-year UST yield. The regressions also control for quarterly firm-level characteristics, including lagged size (ln(Assets)), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash-to-assets, and Tobin's Q. Macro controls include the lagged quarter change and level of the CFNAI index, the lagged 2-year U.S. Treasury yield and 2-10 year Treasury yield curve, four lags of GDP growth, the inflation rate, and the unemployment rate. Firm fixed effects and projection horizon fixed effects are included, and standard errors are clustered at both the firm and fiscal quarter levels. The outcome variable is trimmed at the 2nd and 98th percentiles.