Monetary Policy and Investment Plans

Julia Selgrad and Kerry Siani*

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Abstract

How does monetary policy affect corporate investment? Using novel, hand-collected data on corporate investment plans for up to 5 years in the future for the largest U.S. non-financial firms, we pinpoint where and when monetary policy is effective. We find that firms largely adhere to investment plans formulated one to two years in advance, which delays the impact of monetary policy shocks on investment. In line with this fact, new investment plans are far more responsive to monetary policy than existing, pre-committed plans. We find evidence of a term structure of investment: long-horizon plans are more sensitive to interest rate shocks that shorter term plans. Our findings are consistent with an investment-under-uncertainty framework and help explain the "long and variable" lags in monetary policy transmission to real economic activity.

*Julia Selgrad (julia.selgrad@chicagobooth.edu) is at Chicago Booth, Chicago, IL. Kerry Y. Siani (ksiani@mit.edu) is at MIT Sloan, Cambridge, MA. Julia acknowledges funding support from Chicago Booth, and Kerry acknowledges funding support from MIT Sloan. For helpful comments we thank Janice Eberly, John Graham, Nemit Shroff, David Thesmar, and Christian Wolf. For excellent research assistance, we thank Ruiquan Chang, Carlo Geat, and Ziqi Li. All errors are our own.

How does monetary policy affect corporate investment? What kinds of investment are affected, and what are the mechanisms? Decades of research have shown a lagged response of business investment to monetary policy shocks (Friedman [1968], Bernanke and Gertler [1995]). Whether these delays are due to time to build (Kydland and Prescott [1982]), time to plan (Christiano and Todd [1996]), or simply unresponsiveness, they make it challenging to empirically attribute a change in investment to a specific monetary policy shock with precision, given the unfavorable signal-to-noise ratio (Nakamura and Steinsson [2018]). Ideally, we would observe a credible counterfactual path of investment that would have prevailed absent a policy shock as a comparison. These counterfactual investment paths are hard to observe; the closest in the literature include manager surveys that provide forward-looking information; however these data are typically qualitative or short in horizon (Graham [2022],Gennaioli et al. [2016b]).

We overcome this challenge by hand-collecting and analyzing a novel panel dataset of firm investment plans for up to 5 years into the future, with 46,871 firm-quarter-projection year observations covering 864 of the largest non-financial U.S. corporations. Our data accounts for over 40% of the total capital expenditure and total assets of all U.S. non-financial corporations reported in Compustat. To our knowledge, this dataset is the most comprehensive coverage of firm-level investment plans in the literature. The data allows us to observe how companies respond to monetary policy shocks at a much higher frequency, helping to more tightly link real outcomes to policy changes.

We find that companies tend to stick to their investment plans, with the majority of the variation in realized capital expenditures explained by plans made at least one to two years ahead of time. This makes monetary policy far less effective in adjusting a company's investment trajectory if a plan is already laid out. For firms that do adjust their investment plans, we find evidence consistent with a model of investment under uncertainty (Dixit and Pindyck [1994]): long-term plans are more responsive to policy changes than short-term plans, and a policy-driven positive shock to uncertainty leads to a decline in near-term plans but an increase in long-term plans. Companies thus "wait and see" in response to increased uncertainty, delaying capital expenditures to the future. We find that new investment plans respond much more so to monetary policy than existing plans, indicating an inertia in pre-committed plans that can help explain the "long and variable" lags in investment response to monetary policy. Taken together, our results suggest that corporate investment is much like a massive ship that is slow to alter its course even after the helm has been adjusted.

Our data collection effort aggregates publicly available information from various company disclosures, including regulatory filings, earnings call presentations, and investor presentations. We construct a panel

dataset of forward-looking investment at the firm-announcement date-projection year level from 2000-2024. The dataset documents quarterly changes to the intended trajectory of capital expenditures over the same horizon, revealing an early indicator of the real effects to come. We can observe initial reactions to shocks in short- versus long-term investment plans that would otherwise be impossible to disentangle and attribute to specific shocks using data on realizations. Moreover, 54% of stated investment plans 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 show that plans are predictive of realized investment (Selgrad and Siani [2025]). Plans tend to be smoother than realizations, as realized investment is known to be lumpy (Doms and Dunne [1998], Caballero and Engel [1999], Winberry [2021]). We find that investment plans are quite sticky as well; about 52% of the variation in realized investment comes from plans made two years prior to the end of the projection horizon. This leaves limited space for monetary policy to affect firm decisions in the near term.

Next, we document new facts about how monetary policy affects firm investment plans. First, we show that firms are more responsive to monetary policy when initiating a new investment plan; revisions of existing plans are far less responsive. This is an important new feature of MP transmission: if firms already have plans in place, they will be less likely to adjust those plans in the face of any shock.

Second, we find a differential impact on short-run and long-run plans. In response to positive monetary policy shocks, firms' investment plan horizons shorten and long-term plans reduce more so than short-term plans. We document a *term structure of investment*: investment plans further out in the future (three to four years) are more affected by monetary policy shocks than near-term plans (up to two years in the future). We find that firms' short term plans respond more so to contractionary shocks than to expansionary ones. Firms are quick to cut back on plans, but slow to expand. This is in contrast to realized investment, which, once implemented, can be costly to reverse (Bernanke [1983], Abel and Eberly [1999]). Because *plans* can be reversed, firms act conservatively by adjusting downward more freely their investment plans than increasing investment plans.

We explore mechanisms for how monetary policy affects firm decisions. Economy-wide, monetary policy shocks can affect uncertainty and inflation expectations. At the firm level, these shocks can differentially affect firms' cost of capital and cash flow expectations. We can directly test the cost of capital channel using event-window changes in firms' cost of debt using bond trades in TRACE. We find that on average, monetary policy driven changes in cost of capital do not affect plans significantly; however, *positive* shocks to cost

of debt do negatively affect near-term plans. At the market level, heightened uncertainty stemming from monetary policy reduces near-term investment plans while bolstering long-term plans, consistent with the notion that increased uncertainty enhances the option value of waiting. Change in inflation expectations act in a similar way: an increase in expected inflation reduces short-term plans and increases long-term plans.

There is significant variation in responsiveness across plan types. We show that employment associated with longer horizon project types, such as scientists, are most sensitive to monetary policy shocks. Moreover, plans that are potentially more disruptive, such as plans for expansion and new projects, respond to monetary policy shocks with a delay, suggesting more significant time to plan (Christiano and Todd [1996]). This pattern implies that larger, more irreversible investments are characterized by a substantial option value of waiting, as firms need additional time to coordinate, secure financing, and assess long-run prospects before committing to a project in writing. In contrast, more incremental or routine investments adjust more immediately. Overall, our findings suggest that the heterogeneity in investment responsiveness plays a critical role in explaining the delayed transmission of monetary policy to real economic activity.

We employ standard monetary policy shocks around FOMC announcements and other guidance dates. As our baseline measure of monetary policy shocks, we use the high frequency changes in 2-year US Treasury yields around FOMC announcements and Fed chair speeches, following the dates in Bauer et al. [2023]. We also employ the pure Bauer et al. [2023] shocks that residualize macro variables and are thus closer to a pure MP "surprise". To disentangle the differential mechanisms of monetary surprises, we use changes around the 2-day monetary policy event window in the VIX, inflation expectations, and firm-level cost of debt (similar to Hanson and Stein [2015]). These provide market changes that we can reasonably attribute to monetary policy surprises. The identifying assumption, as is common in the high frequency identification (HFI) literature, is that within the 2-day event window of a Fed announcement, there is little other news about the economy that could be driving these market securities.

As our main outcome variable of interest, we compute planned real capex growth relative to the prior period capex, adjusting for time-varying and horizon-specific inflation expectations from the Cleveland Federal Reserve bank. We regress this measure on the sum of all pure MPS and monetary policy-event window changes in term spread, credit spreads, and firm-specific cost of debt that occur in the fiscal quarter prior to each announcement plan. To account for differential firm trends, 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 contemporaneous 2-year UST yields and term spread. Because

underlying economic conditions can affect firms differentially, we also control for interactions of the firm characteristics with changes in the CFNAI and levels of U.S. Treasury yields.

Our results help explain the well-documented pattern that business investment lags monetary policy shocks by six months to two years (Bernanke and Gertler [1995], Christiano et al. [2005], Jeenas [2018]). These lags can be due to financial constraints, time to plan, time to build, or heightened uncertainty that postpones the initiation of investment. Lags could also reflect firm investment only responding to ex-post shifts in aggregate demand as a general equilibrium effect. We show evidence in line with a model of investment under uncertainty (Dixit and Pindyck [1994]): planned investment does not revise significantly, but new plans are much more responsive. Since at any point in time, many companies may already have many years of plans laid out, the responsiveness to a given shock will take time to peak.

Moreover, these lags render it challenging to pinpoint a causal effect of a given monetary policy shock on realized investment. For one, there can be multiple monetary policy shocks in a year, so the lag in realizations render it nearly impossible to attribute investment adjustments to a specific shock. Secondly, realized investment includes ongoing projects and plans made prior to the shock, so identifying the component that adjusts in response to a shock requires comparing to a previously unobserved counterfactual. A firm's investment plan prior to a shock is the best proxy for the counterfactual investment path absent the policy change. Thus, by observing quarterly changes in investment plans, we can more precisely pinpoint the causal relation between monetary policy shocks and firm investment. With the improved precision, we can attribute changes in investment to different mechanisms of monetary policy: changes in a firm's cost of capital or market expectations inflation or uncertainty.

We build on a large literature of how monetary policy affects firms by introducing new data on investment plans, going back to Cochrane [1998], Bernanke et al. [1999]. Gertler and Karadi [2015] use high-frequency identification and a VAR on data from 1979-2012 to show the effects of surprise monetary policy on bond rates, inflation, industrial production, and the excess bond premium. There is significant heterogeneity documented among firms in their responsiveness to monetary policy. In more recent theoretical work, Liu et al. [2022] show that market leaders respond more so to expansionary monetary policy when rates are low. Gertler and Gilchrist [1994] show that small firms account for a larger share of the decline in real activity following a monetary tightening. Ottonello and Winberry [2020] find that in the data, firms with low default risk are more responsive to monetary policy shocks, while Cloyne et al. [2023] find that younger firms paying no dividends exhibit the largest changes in investment. While much of the empirical literature focuses on the

short-term effects of monetary policy, recent papers have focused more so on the longer-term real effects of monetary policy, for example via innovation (see Ma [2023] for a recent survey and discussion) or hysteresis of TFP and the capital stock (Jordà et al. [2024]).

Recent empirical advances in understanding how monetary policy affects real outcomes arise from improving the right hand side of the regression equation. Many papers sharpen and improve on measuring true monetary policy surprises, and regress various ex-post outcome variables on these plausibly exogenous shocks. Romer and Romer [2004] propose a narrative approach using data on FOMC meeting accounts. 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). While some of these shocks can be attributed to information revelation (Nakamura and Steinsson [2018], Bauer et al. [2023], Romer and Romer [2000],Cieslak and Schrimpf [2019]), recent work extracts the pure interest rate shock from the information component (Jarociński and Karadi [2020]). We build on this literature by focusing on sharpening the *left hand side* of the classic monetary policy effects regression. Specifically, we use investment plans (and changes in 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.

Our work helps quantify how investment responds to changes in the cost of capital. This is first order for monetary policy transmission to the real economy. Neoclassical models formally incorporate the cost of capital into models of optimal investment beginning in the 1960s (Jorgenson and Stephenson [1967]), but performed poorly in the data. A weakly positive correlation between interest rates and investment was often attributed to lags in actual investment (Clark et al. [1979]) or long lead times to build capital (Kydland and Prescott [1982], Shapiro et al. [1986]). Modern macro models predict a nearly infinite investment response to interest rates. Empirical results are mixed, however. For example, Gilchrist and Zakrajšek [2012] show that higher credit spreads predict lower growth; meanwhile 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]). Darmouni and Siani [2022] use firm-level data to show that unconventional monetary easing increases borrowing and cash reserves, but not investment. We help resolve this debate by incorporating data on firms' expectations of investment. Our data allows us to trace with more detail the effects of both conventional and unconventional 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.

Our work builds on a rapidly growing set of papers on firm expectations and forecasting and their real effects (Ma et al. [2020]). Other papers that use firm expectations data include Lamont et al. [2000], which uses aggregated firm-level expectations from 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 on firms' planned investment and the perceived distribution of future product demand to show that uncertainty weakens the responsiveness of investment to demand. Firm-level survey data in more recent years has been used by Gennaioli et al. [2016a], which uses CFO survey data to show that manager expectations of earnings growth are important predictors of planned and actual investment. John Graham's Presidential Address provides an overview of management plans from CFO surveys, including how CFOs make scenario-specific plans, indicating that revenue forecasting are most consequential for firms, and capital spending plans behaves as if it follows a multi-year plan (Graham [2022]). 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. 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 et al. [2023],Nakamura and Steinsson [2018]), finding forecasters make revisions in response to Fed information and the Fed's response to macro news. 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 excellent surveys). We build on this growing literature by constructing and analyzing the most comprehensive micro-data on investment plans to date.

The remainder of the paper is organized as follows. We first describe the data in Section 1. Section

2 describes the new facts about investment planning and comparisons to realizations. Section 3 presents empirical findings about the effects of monetary policy on plans and mechanisms, Section 4 discusses implications and Section 5 concludes.

1 Data

Investment plans. We construct a new, manually collected dataset containing 46,871 company investment plans for 864 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. We train a team of research professionals and undergraduates to search for capital spending plans in company earnings call transcripts, investor day presentations, and company filings (10-K and 10-Q). 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.[1] For 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."[2] 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 of 2024 through 2028 would be approximately $14.0 billion".[3] See Figure 9 for examples of how firms report their capital spending plans in earnings presentations.

We consider these stated plans as the managers' best guess at actual investment plans. Managers of publicly traded companies are typically cautious when disclosing information to investors and the public. Public disclosures can be used against companies in securities lawsuits (Rogers et al. [2011]), thus it is in the managers' best interest to be as honest as possible. In Section 2 we show that plans are reasonably predictive of actual capital expenditures.

[1] Figure 10 in Appendix A shows the sources of data over time.

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

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

We combine these data with realized capital expenditures to Compsutat. Because companies report the data in various formats, we check all available public filings for each company in Compustat, going back to 2000. The dataset we collect is at the firm (*gvkey*), date of announcement, year of projection level. See Table 1 for summary statistics of firms that are in our sample versus all non-financial U.S. publicly traded companies in Compustat. Firms in our dataset are much larger than the typical Compustat firm, with higher valuations, return on equity, and rates of investment. We are able to capture a significant share of the U.S. non-financial corporate sector: over 40% of total assets and capex as of 2023. In the average quarter, about 37% of firms increase their 1-year forward investment plans and 37% of firms decrease their plans.

Table 1: Summary statistics for manual plans and Compustat data

	Manual Plans Firms				All Compustat Non-financial Firms			
	Mean	25th Percentile	Median	75th Percentile	Mean	25th Percentile	Median	75th Percentile
# unique firms	864				16565			
% firms ever issued bonds	76.5%				24.41%			
# firms per quarter	366.98	286	379	443	5574.81	4450.0	5396.0	6742.0
# firms per year	463.08	387	501	546	5995.49	4895.0	5677.0	7494.0
Assets (millions)	12545.5	1605.59	4033	11550.9	2298.39	24.5	172.68	1162.92
Return on Equity	0.04	0.01	0.03	0.06	-0.07	-0.05	0.01	0.04
Book to market	0.48	0.24	0.41	0.64	0.39	0.16	0.4	0.73
Investment rate	0	-0.01	0	0.02	-0.04	-0.05	-0.01	0.02
Physical capital to assets	0.39	0.17	0.34	0.59	0.27	0.06	0.17	0.41
Z-score	3.09	1.13	2.03	3.58	-1.45	0.48	1.99	4.94
Leverage	0.33	0.19	0.31	0.44	0.4	0.03	0.22	0.42
Financial constraints	-0.27	-0.93	0.82	1.8	-17.63	-6.01	-0.38	1.37
Bond debt to total debt	0.64	0.41	0.67	0.9	0.59	0.38	0.62	0.83
Months to end of projection	7.11	4	8	10	-	-	-	-
# announcement dates	60.49	40	65	82	-	-	-	-

Note: This table presents summary statistics of the firm-level characteristics on the announcement date, comparing manual plans data with Compustat quarterly data. The sample is quarterly from 2000 Q1 to 2025 Q1, conditional on non-financial firms with a 2-digit NAICS code other than 52, firms headquartered in the U.S., and firms that have appeared in the dataset for at least one year. All characteristics are computed based on Compustat variables: assets (ATQ), return on equity (ROE), book-to-market (BEQ / (PRCDQ $\times$ CSHOQ)), investment rate ((CAPXQ - DPQ) / PPENTQ), tangibility (PPENTQ / ATQ), and leverage ((DLTTQ + DLCQ) / ATQ). The Z-score is measured using the Altman Z-score, and financial constraints is computed based on KZ index. All variables are winsorized at 1st and 99th percentiles.

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 merge these data with Compustat and truncate any outliers that suggest planned capex growth greater than 400% or greater than 100% of assets.

Hiring. For hiring data, we use work force 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 our Compustat, and 603 that we can match with our investment plans data. There are 7 unique job categories (including engineer, finance, marketing, operations, sales, scientist, and admin).

Monetary policy surprises. We construct monetary policy event-window shocks around FOMC announcements from 2000 to 2024 using data from Bauer et al. [2023] and Jarociński and Karadi [2020]. Following Hanson and Stein [2015], we compute changes in key market variables—including the VIX, BBB-rated, A-rated, and high-yield bond yield indices—in a two-day window around each announcement, thereby addressing the simultaneity issue between price movements and policy actions. In addition, we generate firm-specific event-window shocks by measuring daily changes in equity returns (from CRSP) and cost of debt (from TRACE) during the announcement period. We then merge these data with high-frequency monetary policy shocks—defined as 30-minute changes in 2-, 5-, and 10-year U.S. Treasury Futures around announcements and Fed speeches as constructed in Bauer et al. [2023], and orthogonalized with respect to predictable macro news (e.g., nonfarm payrolls, employment growth, and S&P returns)—and, for robustness, with an information-free shock to the 3-month Fed Funds rate following Jarociński and Karadi [2020]. Each central bank announcement is assumed to contain two structural shocks: a negative co-movement shock (i.e., an increase in interest rates coupled with a decline in stock prices), which constitutes the standard MP shock, and a positive co-movement shock capturing other news. Finally, 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, U.S. Treasury spot rates and VIX from FRED, and forecasts of real GDP growth and forecast disperion in real GDP growth and Baa corporate bond yields from the Philadelphia Federal Reserve. We use Mergent FISD to measure the amount of debt firms have coming due and their typical bond maturity, 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. Finally, daily stock prices are from CRSP and daily bond prices are from TRACE.

2 Facts about investment and plans

We first document several new facts from merging the novel, manually collected data on investment plans with realized capex in Compustat. We show that plans are informative about realized capex, both in aggregate and at the firm level. Importantly for our study of monetary policy, the majority of the within-firm variation in investment realizations is explained by plans made at least 1-2 years in advance. These facts could help explain the empirical observation that business investment responds slowly to monetary policy, as highlighted by Bernanke and Gertler [1995] and Christiano et al. [2005], among others.

2.1 Plans are informative about actual capex, but smoother

First, we establish that the plans are informative about actual investment. In aggregate, planned capex closely track actual capex. In Figures 1a and 1b, we show the total planned 1-year (3-year) forward capex growth relative to the actual capex growth for the subset of firms in our sample. Realized investment tend to be lumpier than planned (Doms and Dunne [1998], Caballero and Engel [1999]), particularly when considering longer horizons. For example, capital expenditures were planned to rise modestly in 2020 based on 1-year plans made in 2019; but instead dropped by 20% for our subsample.

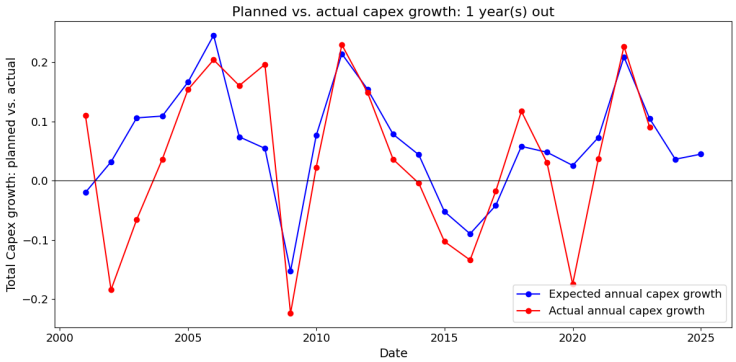
The plots also show serial correlation in forecast errors. For example, in the years 2002-2006 and 2011-2015, firms in aggregate persistently expected higher capital expenditure growth than was realized. Corporate forecast errors in 2011-2015 are consistent with the persistently overly optimistic errors of GDP growth by professional forecasters in the same period (Antolin-Diaz et al. [2017]). This suggests that in the corporate sector, at least in aggregate, use similar data as forecasters as inputs into investment decisions.

We can further show that individual firm-level plans are informative about realized capex. To test this, we regress firm i's *actual* capital expenditure growth in year $t+p$ on *planned* capex growth at the end of year t, including firm fixed effects:

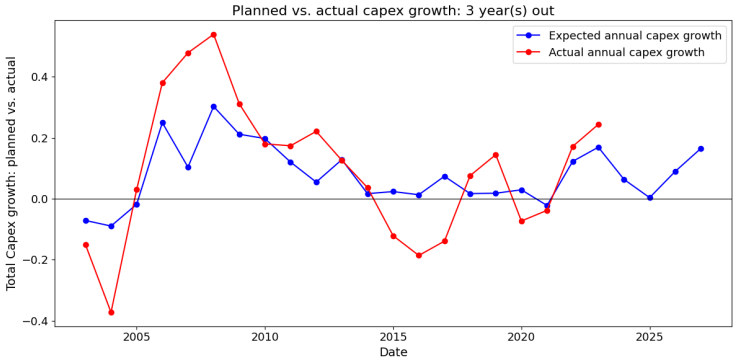
$$g_{it}^{p} = \beta_p \frac{\mathrm{F}_{it}[capx_{i,t+p}] - capx_{it}}{capx_{it}} + \alpha_i^p + \epsilon_{it}^p \tag{1}$$

where $g_{it}^{p} = \frac{capx_{i,t+p} - capx_{it}}{capx_{it}}$ is realized capital expenditure growth. We plot the estimated coefficients across all horizons $p \in [1,5]$ in Figure 2. 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 capex plan announced in March

Figure 1: Comparing planned vs. actual investment growth



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



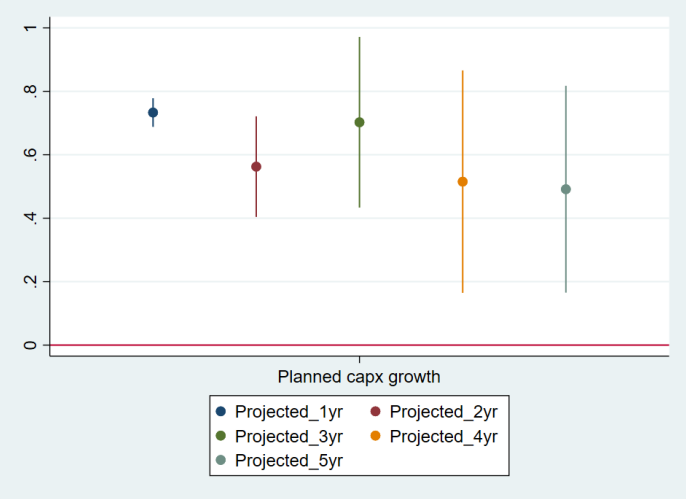
(b) Planned vs. Actual Capex Growth: 3 Years Out

2011, but not the one announced in April 2011. The coefficient for the one-year forward prediction is the highest, at around 0.75; as projection horizons lengthen to five years, the predictability declines to around 0.5 and the estimate becomes noisier, but the coefficients remain positive and statistically significant. This suggests that plans are significantly better than random noise, and are informative about actual investment.

2.2 The first plan explains most of the variation in realized capex

We find that the initial plan explains the majority of the variation in final capital expenditures. To show this, we decompose the variance of a firm's realized capital expenditure into the following components: (1) the very first plan projected for that year, (2) revisions made to the firm's capex plans at different horizons, 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 capex as a function of the initial plan, subsequent revisions, and a final

Figure 2: Coefficient Plot: Different Projection Horizons of Capex Growth



Notes: This figure shows the coefficient of a regression of $g_{it}^{p} = \beta_p \frac{\mathrm{F}_{it}[capx_{i,t+p}] - capx_{it}}{capx_{it}} + \alpha_i^p + \epsilon_{it}^p$, with standard errors clustered at the firm level. We remove expected capex growth values greater than 200% from the sample, and winsorize realized capex growth at 1%.

surprise, where we normalize all variables by prior quarter assets:

$$I_{it} = \mathrm{F}_{i,t-S}[I_{it}] + \sum_{s=1}^{S-1} \Delta_{i,t-s} + surprise_{it}, \tag{2}$$

where $\Delta_{i,t-s} = \mathrm{F}_{i,t-s}[I_{it}] - \mathrm{F}_{i,t-s-1}[I_{it}]$ are quarterly plan revisions and $surprise_{it} = (I_{it} - \mathrm{F}_{i,t-1}[I_{it}]))$ 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_{it}:

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

The equation 3 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_{it} yields a simple variance decomposition:

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

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

$$\begin{aligned}
\mathbf{F}_{i,t-S}[I_{it}], &= \alpha_{\text{base}} + \beta_{\text{base}} I_{it} + e_{it,\text{base}}, \\
\Delta_{i,t-s} &= \alpha_s + \beta_s I_{it} + e_{it,s} \; \forall s, \\
surprise_{it} &= \alpha_{\text{surprise}} + \beta_{\text{surprise}} I_{it} + e_{it,\text{surprise}}.
\end{aligned} \tag{5}$$

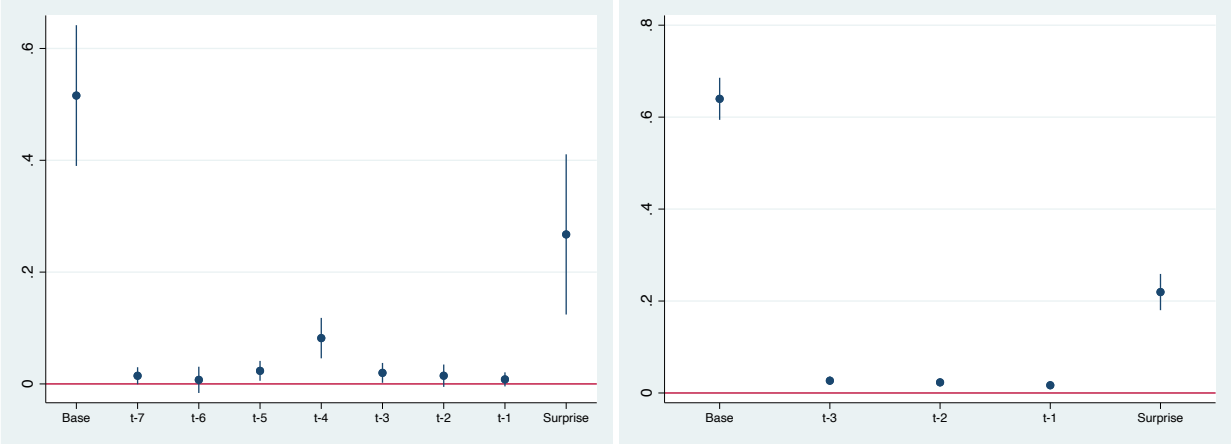
When estimating these regressions, we normalize both sides by prior period total assets and include firm fixed effects so the interpretation is within firm. We winsorize all variables and condition on firms that have at least 8 (4) quarters of projections. If a firm misses a quarterly plan revision, we fill in a zero for the change in projection $\Delta_{i,t-s}$. Panel (a) of Figure 3 reports the results for the 155 firms with 8 quarters of projections, and Panel (b) reports the results for the 722 firms with 4 quarters of projections. About 52% (64%) of the variation in realized capex within firm is explained by plans 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 27% (22%) 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 (8%) in realized capital expenditures than the other quarterly revisions, suggesting that annual reports or 10-Ks hold more comprehensive information than quarterly reports or earnings calls.

Our results represent striking evidence of rigidity in investment plans. 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 economic conditions from several quarters ago.

These results help illuminate why business spending may lag monetary policy shocks: companies tend to have investment plans in place that are rarely revised, if at all. Indeed, we show that across all firms and plan horizons, planned capex growth does not change significantly across. To show this, we first define our primary outcome variable of interest, the planned capex growth at horizon p at time t for firm i, adjusted for inflation:

$$\hat{g}_{it}^{p} = \frac{\mathbf{F}_{it}[capx_{i,t+p}^{real}] - capx_{i,t-1}^{real}}{capx_{i,t-1}^{real}}, \tag{6}$$

Figure 3: Variance decomposition



(a) Eight quarters

(b) Four quarters

Note: This figure shows the coefficients of a regression: $Y_{i,t-s} = \beta_s I_{it} + \alpha_i + e_{sit}$. 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), conditional on the existence of firm-projection year pairs. The independent variable is realized capital expenditure as reported in Compustat, and the dependent variable is defined as $Y_{i,t-s} = \Delta_{i,t-s}\ \forall s$, $Y_{i,t-s} = \mathrm{F}_{i,t-s}[I_{it}]$ when $s = S$, and $Y_{i,t-s} = surprise_{it}$ 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.

where $\mathbf{F}_{it}[capx^{real}_{i,t+p}] = \frac{\mathbf{F}_{it}[capx_{i,t+p}]}{(1+\pi_{t,p})^p}$ normalizes the announced plan $capx_{i,t+p}$ by expected inflation as of time t, $\pi_{t,p}$, and $capx^{real}_{i,t-1}$ is deflated to time t dollars using PPI. We regress this variable on the Bauer et al. [2023] high-frequency MPS, summed up across each of 5 quarters prior to the announcement. Table 2 shows that on average, there is little effect of MPS on investment plans. However, this masks significant heterogeneity across investment plans and across firms, which we delve into in the next section.

3 Effects of monetary policy

In this section, we look at how investment plans respond to monetary policy shocks, both plan horizons and actual plans. Because we observe quarterly revisions in investment plans, we can more precisely identify which firms and what kinds of investment plans respond to monetary policy shocks by attributing changes in plans to the policy changes in the months leading up the plan announcement. In doing so, we can pinpoint the mechanism through which the MPS affects firm investment with a more favorable signal to noise ratio (Nakamura and Steinsson [2018]).

Table 2: Baseline Effects of Monetary Policy on Investment Plans

	(1) $\hat{g}$	(2) $\hat{g}$	(3) $\hat{g}$	(4) $\hat{g}$	(5) $\hat{g}$
IR Shock$_t$	1.270				
	(1.079)				
IR Shock$_{t-1}$		1.744			
		(1.222)			
IR Shock$_{t-2}$			-2.006		
			(2.459)		
IR Shock$_{t-3}$				-0.902	
				(1.348)	
IR Shock$_{t-4}$					1.644
					(1.275)
Firm FEs	Y	Y	Y	Y	Y
Macro Controls	Y	Y	Y	Y	Y
Yield Controls	Y	Y	Y	Y	Y
Firm Controls	Y	Y	Y	Y	Y
Firm x Yield Controls	Y	Y	Y	Y	Y
Firm x Macro Controls	Y	Y	Y	Y	Y
N	20,996	20,996	20,996	20,996	20,996

Notes: This shows results for the following specification for our collected data:

$$\hat{g}_{ipt} = \beta IRShock_t + \gamma_1 X_{it} + \gamma_2 X_t + \gamma_3 y_t + \gamma_4 X_{it} \times X_t + \gamma_5 X_{it} \times y_t + \alpha_i + \epsilon_{ipt} \tag{7}$$

where $\hat{g}_{ipt}$ is projected real CAPX for firm i in future period p relative to real realized CAPX today at time t, divided by the rolling sum of the real CAPX in the prior 4 quarters (t-4 to t-1). Firm-level controls $X_{i,t}$ are size (ln Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash to assets, and Tobins's Q. Yield controls y_t are the two-year yield level $2y_t$ and the yield curve slope $10-2y_t$. Macro controls X_t are $\Delta CFNAI_t$, changes in CFNAI relative to three months ago. $IRShock_t$ is the sum of all Bauer et al. (2023) monetary policy shocks over the last 90 days leading up to announcement date t.

3.1 New plans are more affected

Our facts show that firms' investment plans are relatively slow-moving and may not be revised frequently in response to each new piece of monetary policy information. This notion aligns with the real-options perspective of Dixit and Pindyck [1994], where once a firm has incurred the cost of planning or committed to a project, it retains an option to adjust or delay but may be reluctant to significantly adjust or abandon established plans.

In line with this hypothesis, we document a sharp contrast between new and existing investment plans in their sensitivity to monetary policy. We define new plans as investment guidance for a new projection period for which the firm has not previously given guidance. Consistent with the idea of sticky investment plans, we find that new plans are far more responsive to MPS than existing plans.

Specifically, we estimate on our firm-announcement quarter-projection year panel the following model of firm-level planned investment growth responsiveness to MPS:

$$\begin{aligned}\hat{g}_{ipt} = \beta_1 MPS_t + \beta_2 \mathbf{1}\{FirstTime\}_{i,t} + \beta_3 MPS_t \times \mathbf{1}\{FirstTime\}_{i,t} \\ + \gamma_1 X_{it} + \gamma_2 X_t + \gamma_3 y_t + \gamma_4 X_{it} \times X_t + \gamma_5 X_{it} \times y_t + \alpha_i + \epsilon_{ipt}\end{aligned} \tag{8}$$

Our main regressors include (i) the Bauer–Swanson shock, which is constructed to capture a pure monetary policy surprise, and (ii) a 2-year UST yield shock, which may incorporate news about the Federal Reserve's perceived outlook on the economy and the market learning about the Fed rule. To examine whether firms behave differently when they are first making a plan, we introduce a dummy variable, *First_time*, that equals one the first time a given firm announces a plan for a given projection horizon in our sample, and zero otherwise. We then interact this dummy with each shock measure to test whether new plan announcements are more sensitive to policy surprises than plan revisions. Our controls include the following firm characteristics: prior quarter cash to assets, leverage, log assets, return on assets, tangibility (PPE divided by assets), and Tobin's Q; the following macro controls: the prior quarter change in the CFNAI index, the prior quarter end level of the CFNAI index, and the levels of the 2-year U.S. Treasury yield and the term spread between the 2- and 5-year U.S. Treasury yields and the 5- and 10-year U.S. Treasury yields; as well as the change in the CFNAI and the U.S. Treasury yields and term spreads interacted with all firm controls.

Table 3 shows the results. The excluded category is existing plans, which do not respond significantly to the pure BS shock; while they seem to increase in response to an increase in the 2-year US Treasury yield. This presents a puzzle of how baseline plans appear to respond negatively on impact of a negative MPS, which we will see again and discuss later on. However, there is a clear asymmetry: while a negative shock to interest rates will reduce existing plans, a positive shock will decrease existing plans further. First-time plans are affected the most, with a significant decline within firm in response to a positive shock. The magnitude implied by the estimates in Column (2) of Table 3b is that a 10 basis point positive shock to the 2-year UST yield will decrease existing plans by 1.4 percentage points, and decrease new plans by 4 percentage points.

Having a plan reduces significantly the impact of monetary policy on a company's realized capital expenditure growth. To show this, we regress realized capital expenditure growth at horizons of 1 to 5 years on the cumulative monetary policy shock from the prior fiscal quarter, interacted with a dummy variable

Table 3: First time vs. existing plans response to MPS

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$
Pure MPS (BS)	-0.0271	0.302
	(0.0732)	(0.189)
First time	0.110***	0.129***
	(0.0102)	(0.0137)
First time×Pure MPS (BS)	-0.250*	0.399
	(0.144)	(0.353)
Pos shock×Pure MPS (BS)		-0.562**
		(0.273)
Pos shock×First time×Pure MPS (BS)		-0.905*
		(0.467)
Firm Controls	Yes	Yes
Macro Controls	Yes	Yes
Macro × Firm Controls	Yes	Yes
Firm FE	Yes	Yes
Observations	31759	31759
Rsquared	0.453	0.453

(a) Bauer-Swanson shock

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$
Shock 2y	0.125*	0.269**
	(0.0747)	(0.120)
First time	0.115***	0.134***
	(0.00994)	(0.0130)
First time×Shock 2y	0.477***	0.796***
	(0.128)	(0.175)
Pos shock×Shock 2y		-0.412**
		(0.201)
Pos shock×First time×Shock 2y		-1.059***
		(0.369)
Firm Controls	Yes	Yes
Macro Controls	Yes	Yes
Macro × Firm Controls	Yes	Yes
Firm FE	Yes	Yes
Observations	31759	31759
Rsquared	0.453	0.454

(b) US 2y UST shock

Note: This table presents regressions of planned investment growth on monetary policy shocks, focusing on the difference between a pure surprise measure (the Bauer–Swanson or "BS" shock) and a 2-year U.S. Treasury (UST) yield shock. We also include a dummy variable for the first time a given firm announces a plan, along with an interaction term between that dummy and the shock. Firm-level and macro-level controls (and their interactions) are included, as are firm fixed effects. Standard errors are clustered at the firm level. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and *** respectively. *Source:* Compustat, manually collected data.

indicating whether the firm already has a plan for that specific projection horizon. Formally, we estimate:

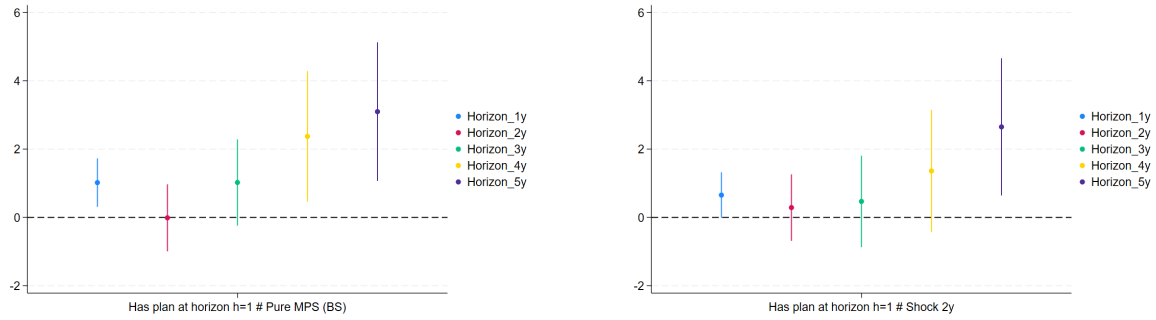
$$\Delta\text{CapEx}_{i,t+h} = \alpha + \beta_1 \text{MPS}_t + \beta_2 \mathbf{1}\{\text{HasPlan}_{i,t,h}\} + \beta_3 \Big(\text{MPS}_t \times \mathbf{1}\{\text{HasPlan}_{i,t,h}\}\Big) + \gamma X_{i,t} + \alpha_i + \varepsilon_{i,t}.$$

where $\mathbf{1}\{\text{HasPlan}_{i,h}\} = 1$ if firm i already has an investment plan at horizon h, $\Delta\text{CapEx}_{i,t+h}$ is the growth rate of quarterly capex for firm i from quarter t to the corresponding quarter $t+h$, where h years have elapsed between these two quarters. We include the same set of controls as above. We include only the sample the largest 1,387 non-financial U.S. corporations for which we verified the presence (or absence) of horizon-specific investment plans.

Figure 4 plots the coefficient β_3 on this interaction term. A positive coefficient means that in response to an expansionary shock, firms with existing plans increase their investment by less than firms without such plans. This effect is statistically significant for nearly all horizons (except for the second year), and becomes more significant at 4-5 year horizons. We find that once a firm has an investment plan in place for a

given horizon, its realized capital expenditures become significantly less responsive to new monetary policy shocks. This pattern is consistent with a real options perspective: once the option to invest is exercised via a formal plan, near-term re-optimization is limited, explaining why the immediate transmission of monetary policy to actual investment can be muted when plans are already in place.

Figure 4: Incremental Impact of MPS on Realized Investment with Plans



Notes: This figure depicts the coefficient estimates (β) on the interaction term between monetary policy shocks (MPS) over the prior quarter and a dummy indicating whether a firm has a pre-existing plan at horizon h. Panel (a) uses the Bauer et al. [2023] shock, while Panel (b) uses the high frequency change in the 2-year UST yield. A positive coefficient indicates that an expansionary MPS leads to a smaller increase in realized investment among firms that already have an investment plan in place, relative to firms that do not have such a plan. The regressions control for quarterly firm-level characteristics (including lagged cash-to-assets, leverage, log assets, return on assets, tangibility [PPE divided by assets], and Tobin's Q), the prior quarter change in the CFNAI index, and the interaction of the CFNAI change with all firm controls, as well as for the 2-, 5-, and 10-year U.S. Treasury yields on the day of the announcement. Firm fixed effects are included, and standard errors are clustered at the firm level. The bars represent 95% confidence intervals.

3.2 Long-term plans are more affected by monetary policy

Our next result is that long-term (LT) investment plans respond more strongly to monetary policy shocks than short-term (ST) plans, and that ST plans exhibit an asymmetric response to tightening vs. loosening. We first show that there is a reduction in projection horizon in response to MPS, before analyzing the impacts on the plans themselves. Next, we document a "term structure of investment", where longer horizon plans are more responsive to MPS.

We run the following model with monetary policy shocks (MPS) on the right hand side:

$$\text{ProjectHorizon}_{it} = \beta_1 MPS_t + \gamma X_{it} + \alpha_i + \epsilon_{it}, \tag{9}$$

where we include the same controls as before and summarize them in X_{it} for brevity. We include firm fixed

effects and cluster standard errors at the firm level. The MPS include the pure, information-free monetary policy shocks constructed in Jarociński and Karadi [2020] and Bauer et al. [2023], as well as event-window shocks to U.S. Treasury futures around monetary policy announcements.

Table 4: Projection period and interest rates

	(1) MaxProjHorizon	(2) MaxProjHorizon	(3) MaxProjHorizon	(4) MaxProjHorizon
Pure MPS (JK)	-2.211***			
	(0.370)			
Pure MPS (BS)		-1.627***		
		(0.452)		
BS 2y			-3.202***	
			(0.457)	
BS 2-10y				5.965***
				(0.655)
Firm Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Macro × Firm Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Observations	32533	32533	32533	32533
Rsquared	0.661	0.661	0.661	0.662

Notes: Reports regressions of maximum projection period from announcement (in months) on market characteristics, controls and fixed effects. Observations are at the firm-announcement quarter level, keeping the observations for the longest projection period within firm-quarter. MPS 2y UST are high-frequency changes in 2-year US Treasury futures contracts around monetary policy announcements from Bauer et al. [2023]. MPS 2-10y UST curve are the high-frequency changes in 2-10 year US Treasury futures contracts around monetary policy announcements. Our controls include the following firm characteristics: prior quarter cash to assets, leverage, log assets, return on assets, tangibility (PPE divided by assets), and Tobin's Q; the following macro controls: the prior quarter change in the CFNAI index, the prior quarter end level of the CFNAI index, and the levels of the 2-year U.S. Treasury yield and the term spread between the 2- and 5-year U.S. Treasury yields and the 5- and 10-year U.S. Treasury yields; as well as the change in the CFNAI and the U.S. Treasury yields and term spreads interacted with all firm controls. Firm characteristics are from the prior fiscal quarter end and are winsorized at the 1% and 99% levels. All regressions include firm fixed effects. Standard errors are clustered at the firm level.

The results are reported in Table 4. We find a significant response to the pure MPS in the prior quarter. A 10-basis point positive pure MPS leads to a 0.2 month decline in the maximum projection horizon. A surprise 10-basis point increase in the 2-year U.S. Treasury future around monetary policy events decreases the maximum projection horizon by 0.3 months. Surprise increases to the term spread actually extend the projection horizon. This could be due to the positive correlation between the term spread and growth expectations.[4]

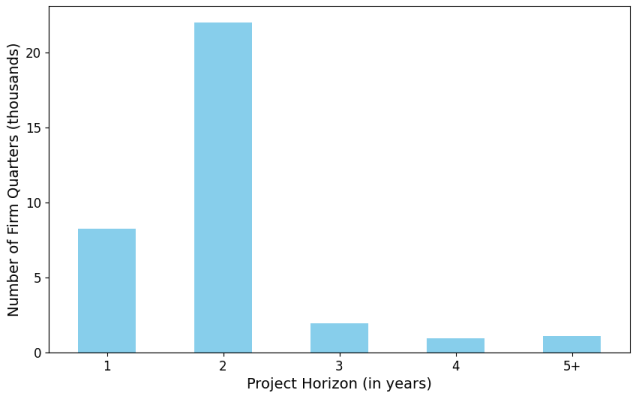
Next, we shift focus to within-firm heterogeneity in MP responsiveness in LT vs. ST investment plans.

[4]Term spreads are also known to move in the opposite direction as short-rate shocks, see Gilchrist et al. [2015] for example.

Recent papers have explored the long-run effects of monetary policy through the lens of innovation (Ma [2023], Stadler [1990]). We can take a slightly different perspective and focus on how changes in interest rates and the term structure today affect the firm's planned path of investment. Our data can directly speak to this because we can observe quarterly changes in firms' long-run investment plans up to several years in advance, allowing us to more precisely attribute investment adjustments to specific shocks. Moreover, we can identify the mechanisms through which monetary policy impacts firm investment.

For this analysis, we use the subset of the data for which investment projection horizons end at least three months following the announcement. For example, a capex projection for the fiscal year ending December 2024 can be projected as late as September 2024. We then define a LT investment plan as any plan that is for a projection horizon that ends at least 18 months after the announcement of the plan. We round to the nearest year and consider these plans to be at the 2-year or more projection horizon. Figure 5 shows that a significant share of observations include plans for 2+ years in the future. Our results are robust to different definitions of "LT plans".

Figure 5: 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. *Source:* manually collected data

The main idea is to understand how investment plans respond to changes in interest rates. Our model is thus:

$$Y_{it} = \beta_1 LT_{it} + \delta \Delta \text{UST}_{m,it} + \delta_{LT} \left(LT_{it} \times \Delta \text{UST}_{m,it} \right) + \gamma X_{it} + u_{it}.$$

For $\Delta \text{UST}_{m,it}$ (at maturity m), we will first run an OLS version using the quarterly changes in Treasury yields as a baseline. Because this is endogenous, our baseline specification uses the sum of high-frequency changes in the U.S. Treasury future for maturity m over the prior fiscal quarter t. Under the assumption that high-frequency changes in U.S. Treasury yields around monetary policy announcements are exogenous, we can directly estimate the impact of these shocks on investment plans (Nakamura and Steinsson [2018]). Similarly, we estimate a second regression using lagged versions of the MPS and capex growth relative to the capex in the four quarters ending six months prior to the announcement. We include the same set of controls as before.

We first present the effects of total quarterly changes in yields in Table 14. An increase in the 2-year U.S. Treasury yield during the fiscal quarter immediately preceding a firm's announcement is associated with a statistically significant increase in near-term investment plans and a decrease in long-term plans. In contrast, yield changes in the quarter prior to that have no significant effect on either type of plan. For example, consider a firm with a December 31 fiscal year end that announces its investment plans in January 2010. On average, yield increases in October, November, and December 2009 are linked to higher short-term planned capital expenditures (capex) and lower long-term planned capex, whereas yield changes in July, August, and September 2009 do not appear to affect these plans. Similar patterns emerge when using the 5- and 10-year U.S. Treasury yields, albeit with smaller magnitudes.

Our baseline results using the high-frequency MP driven changes in yields are in Table 5. The omitted category is the 1-year 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 shock raises short-term planned capex growth by 3.6 percentage points while reducing long-term planned capex growth by 5.8 percentage points. The positive coefficient on ST plans is counterintuitive in the context of standard macro models that would assume a negative interest rate shock should be met with an increase in investment. However, it is consistent with a real options framework as in Dixit and Pindyck [1994], where a decline in interest rates will increase the future value of an investment, incentivizing firms to wait and invest later.

We can disentangle the differential effects of contractionary and expansionary shocks by adding in a dummy variable for a positive MPS. Table 6 reports regression results showing how firm investment plans respond to MP-driven shocks to Treasury yields. The dependent variables in the first six columns is planned capital expenditures, and in the last two columns is realized investment over the same time horizon. The key interaction terms, such as *LT Horizon×Shock 2y* and *Pos shock×LT Horizon×Shock 2y*, test whether

Table 5: Investment plans response to MP-driven shocks to Treasury yields

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$	(3) $\hat{g}^p_{it}$	(4) $\hat{g}^p_{it}$	(5) $\hat{g}^p_{it}$	(6) $\hat{g}^p_{it}$	(7) $\hat{g}^p_{it}$	(8) $\hat{g}^p_{it}$
Shock 2y	0.364***							
	(0.114)							
LT Plans×Shock 2y	-0.580***							
	(0.170)							
Shock 2y (lag)		0.0724						
		(0.144)						
LT Plans×Shock 2y (lag)		-0.219						
		(0.182)						
Shock 5y			0.276**					
			(0.118)					
LT Plans×Shock 5y			-0.515***					
			(0.164)					
Shock 5y (lag)				-0.0907				
				(0.132)				
LT Plans×Shock 5y (lag)				-0.158				
				(0.196)				
Shock 10y					0.700***			
					(0.144)			
LT Plans×Shock 10y					-0.864***			
					(0.199)			
Shock 10y (lag)						-0.298*		
						(0.167)		
LT Plans×Shock 10y (lag)						-0.0110		
						(0.261)		
Shock 2-10y							0.112	
							(0.196)	
LT Plans×Shock 2-10y							0.212	
							(0.303)	
Shock 2-10y (lag)								-0.441**
								(0.175)
LT Plans×Shock 2-10y (lag)								0.356
								(0.309)
LT Plans	-0.0382	-0.0557**	-0.0359	-0.0557**	-0.0364	-0.0548**	-0.0318	-0.0534**
	(0.0254)	(0.0266)	(0.0253)	(0.0262)	(0.0254)	(0.0262)	(0.0252)	(0.0267)
Constant	0.354***	0.396***	0.357***	0.398***	0.357***	0.399***	0.368***	0.395***
	(0.0378)	(0.0402)	(0.0374)	(0.0399)	(0.0370)	(0.0397)	(0.0377)	(0.0400)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro × Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro lag × Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14173	14129	14173	14129	14173	14129	14173	14129
Rsquared	0.512	0.494	0.512	0.494	0.513	0.494	0.512	0.495

Note: This table reports OLS regressions of planned capital expenditure growth on changes in U.S. Treasury yields instrumented by MP shocks over the prior fiscal quarter. We include dummy variables for investment plans that extend two or more 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 capex growth is computed relative to the realized capex of four quarters ending one (two) fiscal quarter before the announcement, normalized for inflation, for Regressions 1,3,5,7 (2,4,5,8). The monetary-policy event window measures are constructed by summing 2-day shocks into a 90-day rolling window up to the quarter end prior to the announcement. The regressions also control for quarterly firm-level characteristics (including lagged cash-to-assets, leverage, log assets, return on assets, tangibility [PPE divided by assets], and Tobin's Q), the prior quarter change in the CFNAI index, and the interaction of the CFNAI change with all firm controls, as well as for the 2-, 5-, and 10-year U.S. Treasury yields on the day of the announcement. Firm fixed effects are included, and standard errors are clustered at the firm level. *Source:* Compustat, FRED, and manually collected data.

long-horizon investment plans are more sensitive to positive (tightening) vs. negative (loosening) shocks. Columns (1) and (2) highlight the distinct effects on long-term vs. short-term horizons, columns (3) and (4) look at the subset of existing plans, and columns (5) and (6) look at the subset of newly announced investment plans.

We document significantly asymmetric responses for ST plans, and a much stronger response for LT plans. An expansionary MPS reduces short-term plans and long-term plans less so. However, a contractionary MPS reduces both plans, and affects LT plans more. The magnitude is as follows: as 10 basis point positive shock to the 2-year UST yield will decrease ST plans by 2.6 percentage points and decrease LT plans by 7.4 percentage points.

Table 6: Investment response to Treasury yield shocks

	(1) $\hat{g}_{it}^{p}$	(2) $\hat{g}_{it}^{p}$	(3) Exist plans	(4) Exist plans	(5) New plans	(6) New plans	(7) Realized	(8) Realized
Shock 2y	0.378***	0.744***	0.298***	0.508***	0.718***	1.169***	0.480***	0.865***
	(0.0763)	(0.125)	(0.0971)	(0.160)	(0.132)	(0.182)	(0.0752)	(0.119)
LT Horizon	-0.0411	-0.0361	-0.0604**	-0.0482*	-0.0956*	-0.0834	0.105***	0.126***
	(0.0254)	(0.0285)	(0.0234)	(0.0275)	(0.0488)	(0.0506)	(0.0180)	(0.0241)
LT Horizon×Shock 2y	-0.555***	-0.488**	-0.507***	-0.329	-0.574**	-0.430	-0.398**	-0.0774
	(0.154)	(0.235)	(0.162)	(0.249)	(0.284)	(0.388)	(0.187)	(0.299)
Pos shock×Shock 2y		-0.995***		-0.540**		-1.381***		-1.042***
		(0.217)		(0.249)		(0.410)		(0.220)
Pos shock×LT Horizon×Shock 2y		-0.230		-0.521		-0.457		-1.040*
		(0.421)		(0.449)		(0.816)		(0.533)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro × Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro lag × Firm Controls	No	No	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25990	25990	17239	17239	8717	8717	24790	24790
Rsquared	0.456	0.457	0.500	0.500	0.447	0.448	0.180	0.182

Note: This table reports OLS regressions of planned capital expenditure growth on changes in U.S. Treasury yields instrumented by MP shocks over the prior fiscal quarter. We include dummy variables for investment plans that extend two or more 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 capex growth is computed relative to the realized capex of four quarters ending one (two) fiscal quarter before the announcement, normalized for inflation, for Regressions 1,3,5,7 (2,4,5,8). The monetary-policy event window measures are constructed by summing 2-day shocks into a 90-day rolling window up to the quarter end prior to the announcement. The regressions also control for quarterly firm-level characteristics (including lagged cash-to-assets, leverage, log assets, return on assets, tangibility [PPE divided by assets], and Tobin's Q), the prior quarter change in the CFNAI index, and the interaction of the CFNAI change with all firm controls, as well as for the 2-, 5-, and 10-year U.S. Treasury yields on the day of the announcement. Firm fixed effects are included, and standard errors are clustered at the firm level. *Source:* Compustat, FRED, and manually collected data.

How much of these planned changes are actually realized? The last two columns of Table 6 shows similar patterns for actual capex, with realized investment responding even more strongly to MPS. Comparing the coefficients across short- and long-term plans reveals that changes in planned capex explain a significant share of the pass-through to short-term investment and some of the pass-through to long-term investment. This finding indicates that firms' real-time investment adjustments in response to monetary policy shocks are quite sticky.

Finally, we look at how much long term plans are affected by year of projection. Table 7 reports the results. In response to changes in the 2-year US Treasury yield, there is a statistically significant and negative response to plan horizons from 2-5 years out, with a slightly higher response for plans three years out, and still larger response for four years out. The caveat here is that there are fewer firms that have plans 5 years out in the future. However, the results are generally consistent with horizon-dependent responses to monetary policy shocks, what we call a "term structure of investment".

Table 7: Realized investment response to shocks to Treasury yields by horizon

	(1) $\hat{g}_{it}^{p}$	(2) $\hat{g}_{it}^{p}$	(3) $\hat{g}_{it}^{p}$
Shock 2y	0.378***		
	(0.0763)		
Projection horizon (years)=2×Shock 2y	-0.521***		
	(0.162)		
Projection horizon (years)=3×Shock 2y	-0.599***		
	(0.199)		
Projection horizon (years)=4×Shock 2y	-0.651***		
	(0.247)		
Projection horizon (years)=5×Shock 2y	-0.507**		
	(0.214)		
Shock 10y		0.597***	
		(0.0794)	
Projection horizon (years)=2×Shock 10y		-0.667***	
		(0.179)	
Projection horizon (years)=3×Shock 10y		-0.695***	
		(0.205)	
Projection horizon (years)=4×Shock 10y		-0.911***	
		(0.244)	
Projection horizon (years)=5×Shock 10y		-0.739***	
		(0.279)	
Shock 2-10y			0.108
			(0.104)
Projection horizon (years)=2×Shock 2-10y			0.153
			(0.230)
Projection horizon (years)=3×Shock 2-10y			0.328
			(0.354)
Projection horizon (years)=4×Shock 2-10y			0.0990
			(0.482)
Projection horizon (years)=5×Shock 2-10y			0.00661
			(0.503)
Constant	0.307***	0.314***	0.304***
	(0.0291)	(0.0291)	(0.0291)
Firm Controls	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes
Macro × Firm Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Projection horizon FE	Yes	Yes	Yes
Observations	25990	25990	25990
Rsquared	0.457	0.457	0.456

Note: This table reports OLS regressions of realized capital expenditure growth on MP event window shocks in U.S. Treasury yields over the prior fiscal quarter. We include dummy variables for investment plans that at 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 capex growth is computed relative to the realized capex of the fiscal year before the announcement. The monetary-policy event window measures are constructed by summing 2-day shocks into a 90-day rolling window up to the quarter end prior to the announcement. The regressions also control for quarterly firm-level characteristics (including lagged cash-to-assets, leverage, log assets, return on assets, tangibility [PPE divided by assets], and Tobin's Q), the prior quarter change in the CFNAI index, and the interaction of the CFNAI change with all firm controls, as well as for the 2-, 5-, and 10-year U.S. Treasury yields on the day of the announcement. Firm fixed effects are included, and standard errors are clustered at the firm level. *Source:* Compustat, FRED, and manually collected data.

3.3 Mechanism of monetary policy transmission

We can disentangle the mechanism behind these changes by considering how shocks to uncertainty and inflation expectations may be driving these changes in plans. Specifically, we compute the 2-day monetary policy event window changes in the VIX, inflation expectations, firm equity value, and cost of debt. We sum the changes in these variables for the 90 days in the last fiscal quarter prior to the announcement of each plan. We get similar results if we use the shock to the 2-year UST yield in the 30-minutes around the MP announcement as an instrument for these changes.

It is useful to establish a "first-stage": that is, monetary policy shocks indeed have a significant effect on the 90-day rolling window sums of event-window shocks of these variables. Table 8 shows that event-window changes in VIX and inflation are affected by both Bauer et al. [2023] MPS and event-window changes in the 2-year UST in the way that one would expect: higher yields lead to higher uncertainty and lower inflation expectations.

Table 8: Mechanism: first stage effect of 2-year UST and Bauer-Swanson shocks on VIX and inflation

	(1) Shock to VIX	(2) Shock to VIX	(3) Shock 5y infl	(4) Shock 5y infl	(5) Shock 10y infl	(6) Shock 10y infl
Pure MPS	6.594**		-0.316**		-0.261***	
	(2.972)		(0.125)		(0.0942)	
Shock 2y		6.220**		-0.330***		-0.235***
		(2.540)		(0.118)		(0.0755)
Constant	-0.659	-0.482	0.0201	0.0118	0.0331**	0.0261*
	(0.816)	(0.814)	(0.0186)	(0.0178)	(0.0148)	(0.0143)
Macro Controls	✓	✓	✓	✓	✓	✓
Observations	301	301	301	301	301	301
Rsquared	0.226	0.228	0.0793	0.0926	0.0970	0.0989

Note: This table reports regressions of 2-day MP event window changes VIX, and 5- and 10-year inflation expectations from TIPS regressed on MPS. Interest rate shocks are adding up the monetary policy event window shocks from Bauer et al. [2023] to a 90 day rolling window up to the announcement day. Controls include the prior quarter change in the CFNAI index, the change in the CFNAI, and the 2-, 5-, and 10-year U.S. Treasury yields. Adjusts for heteroskedasticity in standard errors. *Source:* FRED, Bauer et al. [2023].

Table 9 examines how firms' cost of debt interacts with their investment planning in response to monetary policy (MP) shocks. Consistent with a real options perspective, long-term projects exhibit larger absolute responses when debt costs shift, and the presence of a positive shock amplifies the negative effect on both new and realized investment. The main takeaway is that higher debt financing costs—particularly

under contractionary conditions—lead to a stronger pullback in long-horizon or more discretionary projects, reinforcing the role of cost of capital in shaping investment decisions.

We first consider the most direct potential mechanism for MPS on investment: via firms' cost of debt. We use 2-day windows of bond yields around MP events, which reduces our sample significantly by conditioning on firms with actively traded bonds. Table 9 shows the results. In Column (1), we find that average shocks to the cost of debt around monetary policy events have weak effect on investment plans. When separated into positive versus negative shocks in Column (2), there is a statistically significant negative effect of an *increase* in the cost of debt on near-term investment plans. However, negative shocks to the cost of debt actually decrease ST plans, with no significant effect on LT plans. Surprisingly, the negative impact of an increase in the cost of debt is more pronounced for existing plans than for new ones. The effect of a positive shock on cost of debt is persistent, as it also aligns with reductions in realized investment in the near term. These results are broadly in line with Keynes [1937], that there is a cost of capital channel to monetary policy that affects firm investment.

Table 9: Investment response to cost of debt shocks

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$	(3) Exist plans	(4) Exist plans	(5) New plans	(6) New plans	(7) Realized	(8) Realized
Change in rD	0.498*	2.551***	0.728**	2.819***	0.102	1.804*	0.143	2.056***
	(0.301)	(0.650)	(0.340)	(0.670)	(0.583)	(0.932)	(0.280)	(0.539)
LT Horizon	-0.0611**	-0.0711**	-0.0742**	-0.0897***	-0.0895	-0.0899	0.112***	0.116***
	(0.0272)	(0.0291)	(0.0288)	(0.0306)	(0.0556)	(0.0578)	(0.0195)	(0.0213)
LT Horizon×Change in rD	0.255	-0.979	0.371	-1.489	0.0294	-0.399	-0.640	-0.408
	(0.770)	(1.136)	(1.009)	(1.368)	(0.969)	(1.439)	(0.630)	(1.099)
Pos shock×Change in rD		-4.495***		-4.719***		-3.508**		-4.202***
		(1.228)		(1.284)		(1.621)		(0.957)
Pos shock×LT Horizon×Change in rD		2.584		4.221*		0.214		-1.017
		(2.123)		(2.205)		(2.677)		(2.172)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro × Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro lag × Firm Controls	No	No	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15145	15145	10077	10077	5045	5045	14818	14818
Rsquared	0.459	0.460	0.497	0.499	0.459	0.460	0.204	0.206

Notes: This table reports OLS regressions of firm-level investment outcomes (planned or realized) on changes in the firm's cost of debt (*Change in rD*), with interaction terms capturing long-term horizons (*LT Horizon*) and the sign of the shock (*Pos shock*). Columns (1)–(2) present estimates for short-term and existing plans, columns (3)–(4) continue with existing plans under alternative specifications, and columns (5)–(8) show results for new plans and realized CapEx. All regressions include firm controls, macro controls, and fixed effects as indicated. Standard errors are clustered at the firm level, with t-statistics in parentheses. Asterisks denote significance at the 10%, 5%, and 1% levels, respectively.*Source:* Compustat, FRED, and manually collected data.

Next, we consider how uncertainty driven by MPS affects planned and realized investment. Table 10 reports how investment plans respond to MP event window shocks to the VIX, capturing fluctuations in market volatility driven by monetary policy events. Declines in the VIX are associated with decreases in near-term plans and puts upward pressure on long-term plans.

However, increases in uncertainty, as proxied by the VIX, have a much larger negative effect on 1-year horizon plans, and a positive effect on long-term plans. This asymmetry is consistent with Dixit and Pindyck [1994] and Bloom et al. [2007]: greater uncertainty causes firms to exercise a real option to delay, which we observe directly in the data as an increase in LT plans and a decline in ST plans in response to a spike in uncertainty. The magnitude is a one standard deviation increase in VIX due to monetary policy shocks will decrease ST capex growth by 2.2 percentage points but increase LT capex by 0.1 percentage point. This asymmetry suggests that when uncertainty spikes, firms reallocate away from near-term discretionary spending in favor of securing long-horizon strategies, possibly waiting for further information or more stable

financing conditions.

Table 10: Investment response to uncertainty shocks

	(1) $\hat{g}_{it}^{p}$	(2) $\hat{g}_{it}^{p}$	(3) Exist plans	(4) Exist plans	(5) New plans	(6) New plans	(7) Realized	(8) Realized
Shock to VIX	0.000995	0.00782***	0.00501***	0.00927***	-0.00137	0.0117***	0.00224*	0.00680***
	(0.00126)	(0.00204)	(0.00166)	(0.00227)	(0.00245)	(0.00434)	(0.00119)	(0.00199)
LT Horizon	-0.0373	-0.0683**	-0.0581**	-0.0903***	-0.0881*	-0.118**	0.107***	0.0860***
	(0.0247)	(0.0273)	(0.0228)	(0.0267)	(0.0490)	(0.0533)	(0.0177)	(0.0206)
LT Horizon×Shock to VIX	-0.00391	-0.0142***	-0.00634**	-0.0171***	-0.00237	-0.0124*	-0.00301	-0.00990*
	(0.00285)	(0.00487)	(0.00322)	(0.00544)	(0.00521)	(0.00698)	(0.00219)	(0.00527)
Pos shock×Shock to VIX		-0.0169***		-0.0102**		-0.0337***		-0.0113***
		(0.00374)		(0.00404)		(0.00843)		(0.00357)
Pos shock×LT Horizon×Shock to VIX		0.0239***		0.0245***		0.0267*		0.0159
		(0.00809)		(0.00857)		(0.0154)		(0.0103)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro × Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro lag × Firm Controls	No	No	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25990	25990	17239	17239	8717	8717	24790	24790
Rsquared	0.455	0.456	0.500	0.500	0.445	0.446	0.178	0.179

Notes: Each column shows an OLS regression of firm-level investment plan growth or realized investment on *Shock to VIX* (instrumented by monetary policy events), interacted with *LT Horizon* and *Pos shock*. Columns (1)–(2) analyze short-term vs. long-term plans, columns (3)–(4) focus on existing plans, and columns (5)–(6) examine new plans, with the last two columns reporting realized CapEx outcomes. Firm-level controls, macro controls, and firm fixed effects are included, and standard errors are clustered at the firm level. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. *Source:* Compustat, FRED, and manually collected data.

Table 11 explores the impact of inflation surprises at the 10-year horizon (*Shock 10y infl*) on short-term vs. long-term investment plans and realized CapEx. The results indicate that negative inflation surprises reduce ST plans while boosting LT plans, whereas positive inflation surprises intensify both of these effects, leading to an even larger cut in short-term projects and a stronger rise in long-term ones. These findings suggest that unexpected changes in inflation expectations linked to monetary policy cause firms to adjust near-term investments downward and shift resources into longer-horizon projects that might better hedge or capitalize on changing inflation regimes.

Table 11: Investment response to inflation shocks

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$	(3) Exist plans	(4) Exist plans	(5) New plans	(6) New plans	(7) Realized	(8) Realized
Shock 10y infl	-0.217***	0.566***	-0.291***	0.666***	0.0285	0.409**	-0.178***	0.415***
	(0.0432)	(0.0947)	(0.0503)	(0.128)	(0.1000)	(0.173)	(0.0437)	(0.0914)
LT Horizon	-0.0359	-0.0691**	-0.0570**	-0.0996***	-0.0844*	-0.0795	0.109***	0.0897***
	(0.0251)	(0.0278)	(0.0232)	(0.0266)	(0.0487)	(0.0511)	(0.0177)	(0.0198)
LT Horizon×Shock 10y infl	0.113	-0.582**	0.169*	-0.788***	-0.173	-0.0445	0.0579	-0.323
	(0.0892)	(0.254)	(0.0951)	(0.287)	(0.195)	(0.392)	(0.0840)	(0.278)
Pos shock×Shock 10y infl		-1.202***		-1.375***		-0.672**		-0.911***
		(0.139)		(0.181)		(0.267)		(0.143)
Pos shock×LT Horizon×Shock 10y infl		1.039***		1.356***		-0.188		0.573
		(0.397)		(0.444)		(0.558)		(0.412)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro × Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro lag × Firm Controls	No	No	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25990	25990	17239	17239	8717	8717	24790	24790
Rsquared	0.456	0.458	0.500	0.503	0.445	0.445	0.179	0.180

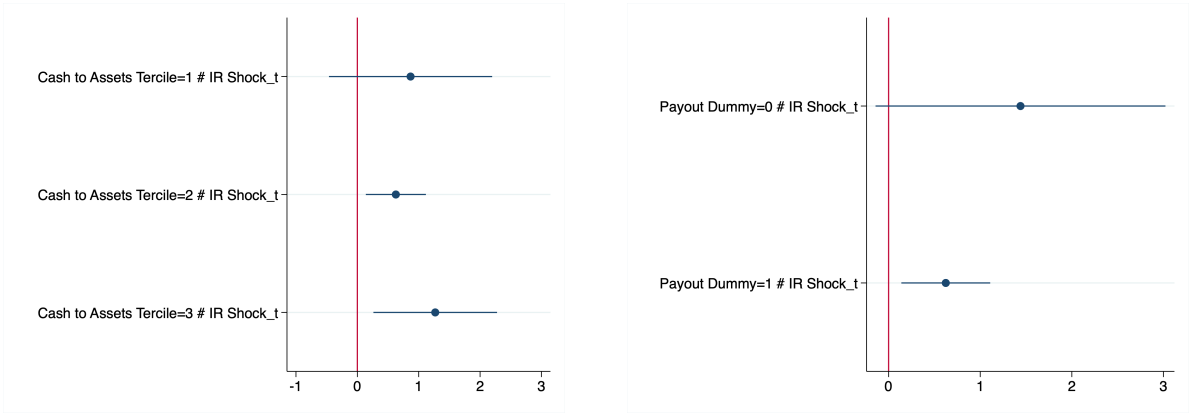
Notes: This table shows OLS regressions of firm-level investment (planned or realized) on *Shock 10y infl*, an inflation surprise measure at the 10-year horizon, interacted with *LT Horizon* and *Pos shock*. Columns (1)–(2) present short-term vs. long-term plan results, columns (3)–(4) analyze existing plans, columns (5)–(6) examine new plans, and columns (7)–(8) look at realized CapEx. All specifications include firm controls, macro controls, and firm fixed effects, with standard errors clustered at the firm level. Coefficients indicate that negative shocks to inflation lead to reallocation away from near-term plans, while positive shocks magnify these effects. Asterisks denote significance at the 10%, 5%, and 1% levels, respectively. *Source:* Compustat, FRED, and manually collected data.

As with all papers studying the effects of monetary policy, it is challenging to identify the effects of traditional monetary policy via interest rate shocks. Interpreting the effect of other "shock" variables, including event-window shocks to longer term interest rates, market uncertainty, and firm-level cost of debt, requires a broader definition of monetary policy. That is, these variables reflect not only MP-driven changes in interest rates, but also revelation of central bank information (Jarociński and Karadi [2020], Nakamura and Steinsson [2018]). In the context of our analysis, we are interested in *both* the interest rate and the information effect of monetary policy announcements, that may affect uncertainty and inflation expectations, as the central bank uses both as policy tools.

3.4 Heterogeneity across firms responsiveness

We investigate whether firms that are more financially constrained are more responsive to monetary policy, consistent with Bernanke and Gertler [1995]. We measure firms' financial constraints based on their cash-to-assets ratio, or whether they pay a dividend. As shown in Figure 6, we find that the investment plans of firms with a lower cash-to-assets ratio are not generally more responsive to monetary policy shocks than firms with a higher cash-to-assets ratio. We also find that the investment plans of firms that do not pay a dividend are not more responsive to monetary policy shocks than firms that do pay a dividend. This suggests that firms that are more financially constrained are not necessarily more responsive to monetary policy.

Figure 6: Do financially constrained firms respond more to monetary policy shocks?



Notes: This shows results for the following specification for our collected data:

$$\hat{g}_{ipt} = \beta PureMPS_t \times Tercile_{i,t} + \gamma_1 X_{it} + \gamma_2 X_t + \gamma_3 y_t + \gamma_4 X_{it} \times X_t + \gamma_5 X_{it} \times y_t + \alpha_i + \epsilon_{ipt} \tag{10}$$

where $\hat{g}_{ipt}$ is projected CAPX for firm i in future period p relative to realized CAPX today at time t, scaled by realized CAPX today. For the figure on the left, $Tercile_{i,t}$ is the cash-to-assets tercile for firm i at date $t-1$, with a higher tercile reflecting a larger ratio. For the figure on the right, $Tercile_{i,t}$ is a dummy variable reflecting whether a firm paid out a dividend in quarter $t-1$. Firm-level controls $X_{i,t}$ are size (ln Assets), leverage (Total Debt/Assets), return on assets (NI/Assets), tangibility (PPE/Assets), cash to assets (for the payout dummy specification), and Tobins's Q. Yield controls y_t are the two-year yield level $2y_t$ and the yield curve slope $10-2y_t$. Macro controls X_t are $\Delta CFNAI_t$, changes in CFNAI relative to three months ago. $PureMPS_t$ is the sum of all Jarociński and Karadi (2020) monetary policy shocks over the last 90 days leading up to announcement date t.

Table 12 reports regression estimates examining how a firm's debt composition influences its responsiveness to monetary policy shocks. Panel (a) focuses on the share of total debt issued as bonds, while Panel (b) considers the share of debt with floating interest rates. In each panel, the dependent variable (e.g., investment or planned capex growth) is regressed on an interacted term between the monetary policy shock (e.g., *Shock 2y*) and the relevant debt composition variable (e.g., *Bond share* or *Floating debt share*).

Controls for firm characteristics, macroeconomic conditions, and firm fixed effects are included. Columns (1) and (2) provide alternative specifications or additional interaction terms (e.g., *Shock 2y×Bond share*, *Pos shock×Shock 2y×Bond share*) to capture asymmetric effects. The key takeaway is that firms with a larger bond share of debt (Panel a) or with a lower fraction of floating-rate debt (Panel b) exhibit a more pronounced response to monetary policy shocks, indicating that capital structure plays a critical role in amplifying or dampening policy-induced changes in financing costs.

Table 12: Firms with more bond debt are more responsive

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$
Shock 2y	0.613***	0.835***
	(0.136)	(0.197)
Bond share	-0.112***	-0.0997***
	(0.0342)	(0.0367)
Shock 2y×Bond share	-0.638***	-0.451
	(0.210)	(0.293)
Pos shock×Shock 2y		-0.598
		(0.379)
Pos shock×Shock 2y×Bond share		-0.566
		(0.588)
Firm Controls	Yes	Yes
Macro Controls	Yes	Yes
Macro × Firm Controls	Yes	Yes
Firm FE	Yes	Yes
Observations	21365	21365
Rsquared	0.423	0.423

(a) Bond share of debt

	(1) $\hat{g}^p_{it}$	(2) $\hat{g}^p_{it}$
Shock 2y	0.0929	0.405***
	(0.0875)	(0.132)
Floating debt share	0.0666**	0.0637*
	(0.0329)	(0.0376)
Shock 2y×Floating debt share	0.633**	0.597*
	(0.248)	(0.330)
Pos shock×Shock 2y		-0.856***
		(0.265)
Pos shock×Shock 2y×Floating debt share		0.0676
		(0.726)
Firm Controls	Yes	Yes
Macro Controls	Yes	Yes
Macro × Firm Controls	Yes	Yes
Firm FE	Yes	Yes
Observations	21365	21365
Rsquared	0.422	0.423

(b) Floating share of debt

Notes: This table presents OLS regressions of firm-level investment outcomes on monetary policy shocks interacted with firm-specific debt composition variables. Panel (a) uses the fraction of total debt financed by bonds (*Bond share*), while Panel (b) uses the fraction of debt carrying floating interest rates (*Floating debt share*). The coefficient on *Shock 2y* measures the average effect of a policy shock on firms' investment decisions; the interaction term with *Bond share* or *Floating debt share* captures the differential response for firms more reliant on these types of debt. Additional triple interactions (e.g., *Pos shock×Shock 2y×Bond share*) allow for asymmetric effects depending on the sign of the shock. All specifications include firm controls, macro controls, and firm fixed effects (FE). Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. Asterisks indicate significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.*Source:* Compustat, manually collected data.

3.5 What kinds of investment are cut?

We next explore what types of investment are most sensitive to MPS. A useful case study is the rapid run-up in interest rates, led by monetary policy, in the first half of 2022. In the second quarter of 2022, when the Fed Funds rate increased 100 basis points, over two-thirds of companies decreased their investment plans. As an example, Ingles Markets, a grocery store chain with about $1 billion in market cap as of March 2025, stated

in its 2021 10-K (for fiscal year ending September 25, 2021) that it intended to invest in the range of 120-160 million for fiscal year 2022, which would "include investments in stores expected to open in fiscal year 2023, as well as technology improvements, upgrading and replacing existing store equipment and warehouse and transportation equipment and improvements to the Company's milk processing plant. The Company also plans to consider property acquisitions for future store development." In its 2022 Q2 10-Q, it revised this guidance downwards to 100-120 million, where the description of capex was much the same as before but no longer included "property acquisitions for future store development."

We can test how systematically different investment types get cut. For the roughly half of observations for which there is a qualitative discussion of the kind of investment, we classify investments into the following, non-mutually exclusive categories based on text: Maintenance, acquisitions, strategic, physical infrastructure, environmental, expansion, research and development, and new projects. For example, Mosaic Company, a large chemicals corporation, stated in its 2023 10-K "In 2025, we estimate environmental capital expenditures will be approximately $360 million and expenditures for land reclamation activities, Gypstack closure and water treatment activities are expected to be approximately $240 million." We would then set the Environmental investment dummy equal to 1. As another example, Cheesecake Factory in its October 2024 10-Q stated "We anticipate approximately $180 to $200 million in cash capital expenditures to support this level of unit development, as well as required maintenance on our restaurants"; we then classify this as maintenance capital expenditures. Table 13 lists the primary keywords we use to classify investment plans into different categories.

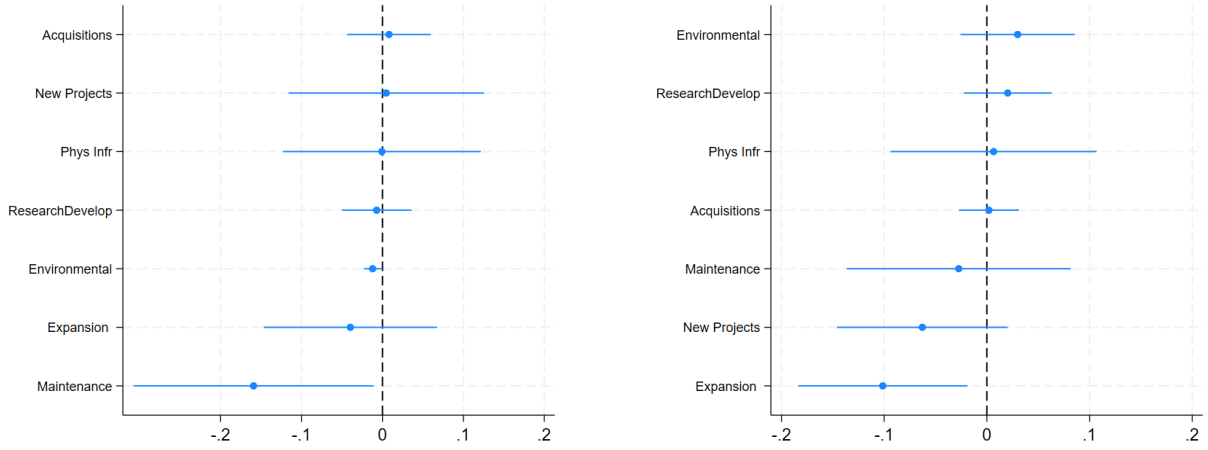
With this classification, we can test how each kind of investment plan responds to MPS. Specifically, we run the following regression:

$$\mathbf{1}\{\text{InvestmentType}\}_{it} = \beta_1 S_{it} + \mathbf{X}_{it}'\boldsymbol{\gamma} + \alpha_i + \epsilon_{it}, \tag{11}$$

where the outcome variable is a dummy variable that equals one for a given category of investment and zero otherwise. We also run the model using MPS from two quarters before the fiscal quarter end before a plan announcement to test for those plans that may take longer to adjust. We estimate this model only on the subsample of observations for which we have qualitative investment type information, conditional on the projection horizon ending at least three months after announcement.

Figure 7 shows the results. Figure 7a shows that prior quarter MPS have an statistically significantly neg-

Figure 7: Impact of MPS on different types of investment plans



(a) Prior quarter MPS

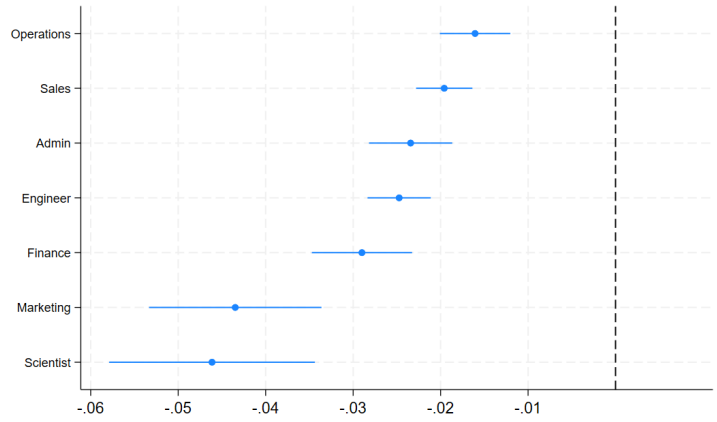
(b) Two quarters ago MPS

Note: Plots the coefficients of regressing dummy variables for each type of investment plan on MPS from Bauer et al. [2023], controlling for firm, macro, and firm by macro interacted controls, plus firm fixed effects, as per Equation 11. Investment types are classified using keywords per 13. *Source*: Manually collected data.

ative effect on environmental capex, and a weakly negative effect on maintenance and physical infrastructure investment. Surprisingly, new projects, acquisitions, and expansions are not at all affected by recent MPS. However, MPS from two quarters prior have a bigger effect on new projection and expansion, suggesting that these kinds of investment plans take longer.

Studying the nature of hiring after a shock can shed light on the kinds of investment companies may be adjusting in response to monetary policy. Figure 8 presents the estimated impact of monetary policy shocks on hiring across seven job categories: Operations, Sales, Administration, Engineering, Finance, Marketing, and Scientist. The point estimates suggest that most categories experience a decline in hiring following a positive shock to interest rates, with Scientist and Marketing exhibiting the largest negative responses. In contrast, hiring in Operations appears relatively less sensitive and remains closer to zero. These results imply that in the wake of tighter monetary policy, firms tend to reduce hiring in functions that are either more discretionary or more exposed to financing constraints, while continuing to fill roles essential for immediate operations. The differences across job types highlight the importance of internal resource allocation decisions under changing financing conditions.

Figure 8: Effect of Monetary Policy Shocks on Hiring by Job Category



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

$$\text{Hiring}_{it}^{\text{job type}} = \beta_1 \, \text{MPS}_{it} + \mathbf{X}_{it}'\gamma + \alpha_i + \epsilon_{it},$$

where $\text{Hiring}_{it}^{\text{job type}}$ is the change in hiring for job category (e.g., Operations, Sales, etc.) at firm i in period t, and MPS_{it} denotes monetary policy shocks. The vector $\mathbf{X}_{it}$ includes firm-level controls, macro controls, and any other relevant covariates, and α_i are firm fixed effects. Standard errors are clustered at the firm level. Negative coefficients indicate that higher monetary policy shocks are associated with a reduction in hiring for that job category.

4 Discussion

Our empirical results above offer several implications for economic theory and policy. First, the clear differential responses between short-term and long-term investment plans provide support for models of irreversible investment under uncertainty. The evidence aligns with Dixit and Pindyck [1994]: firms treat some investment decisions as real options, waiting for uncertainty to resolve, which leads to asymmetric reactions (bigger pullbacks under tightening than expansions under easing for short-horizon projects). Traditional neoclassical models or Tobin's q theory, which lack such option values, would not generate this asymmetry–those models predict more proportional and symmetric investment responses to changes in the cost of capital.

Second, our findings on new vs. existing plans challenge aspects of both the financial accelerator and simple neoclassical views. The fact that ongoing projects are largely insensitive to monetary policy shocks underscores the importance of sunk costs and commitments in investment behavior. Once a project is underway, firms behave as though the decision is largely made, and marginal changes in financing conditions have limited effect on completion. This is something a real options perspective captures (because once

the option is exercised, the option value component vanishes), but a financial accelerator model would not necessarily predict, since tighter policy should in theory make both new and old investments more expensive. Thus, our results call for enriching macro-finance models to differentiate between the initiation of new investments and continuation of existing ones.

Third, our results help explain the well-documented lags in monetary transmission to real activity. We find that much of the effect on real investment comes through changes in new plan formation and subsequent follow-through in actual spending. This suggests a mechanism for the lag: policy impacts the pipeline of future projects right away (which might not translate to spending until those projects would have started), thereby affecting actual expenditure with some delay. It also implies that looking at investment plans data could serve as an early indicator for future realized investment responses to monetary policy. For policy makers, this highlights why the full effect of a rate change on output may take several quarters to materialize–firms first adjust their planning (especially for discretionary projects), and only later does this feed into aggregate spending when those projects would have commenced or been completed.

Fourth, the heterogeneous responses across firms indicate that the aggregate impact of monetary policy may evolve as the composition of corporate financing changes. In an economy where firms predominantly rely on banks, the transmission might work more via bank lending volumes and the health of bank balance sheets (Bernanke and Gertler [1995]). However, as a larger share of the economy issues bonds, policy rate changes feed directly into market rates. Our evidence of higher sensitivity among bond-financed firms suggests that the potency of the interest rate channel could be increasing with financial market development.

In summary, our results advocate for monetary transmission models that incorporate real option effects, differentiating between types of investment and stages of project planning. They also suggest a need to revisit the assumptions of financial accelerator models in the context of modern capital markets, especially for larger, less financially constrained firms.

5 Conclusion

We hand-collect novel data on company investment plans to approximate counterfactual investment trajectories. This allows us to more precisely attribute changes in firm decision-making to monetary policy shocks. We furthefind that the stage of planning matters–new investments are highly responsive to policy changes, whereas existing projects with sunk costs are largely insulated–indicating that monetary policy mainly influ-

ences the initiation of projects rather than prompting widespread cancellation of ongoing investments. We show that investment responses differ by horizon: short-term plans react asymmetrically and less strongly overall compared to long-term plans, underscoring the role of uncertainty and option value in near-term investment decisions. Our results are broadly consistent with a real options view and helps explain the empirical lag from policy to realized output.

These contributions have several policy implications. Policymakers should be aware that the full impact of policy on aggregate investment can take time as earlier plan adjustments translate into actual spending reductions or increases. The findings also suggest that the mechanism of monetary policy varies significantly across the economy: while smaller firms may be more responsive due to financing constraints (Gertler and Gilchrist [1994]), the large firms in our sample are more likely to be optimally investing given the level of uncertainty in the economy. Moreover, understanding that much of the adjustment happens on the extensive margin of starting new projects can improve forecasts of future investment responses following policy moves.

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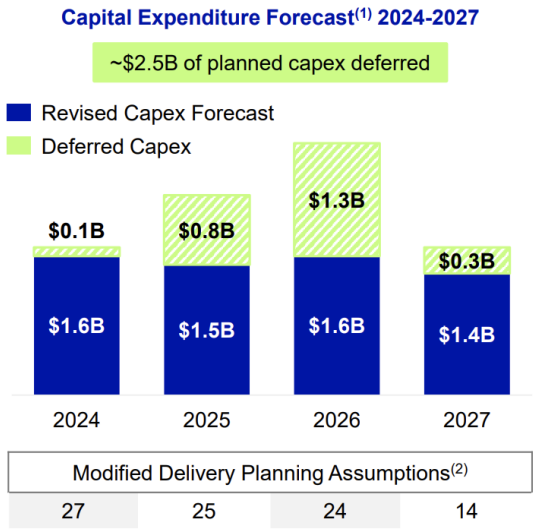
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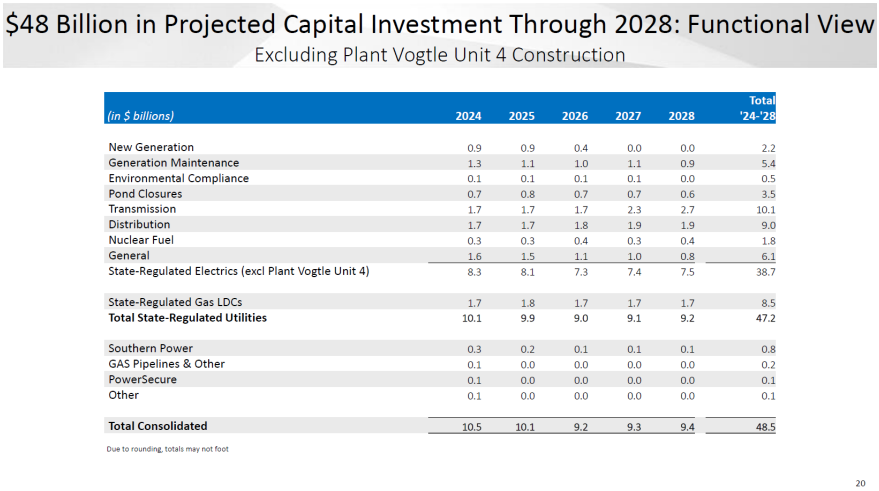
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A Additional Tables and Figures

Figure 9: Examples of investment plan disclosures



(a) Jetblue 2023 Q4 Earnings presentation



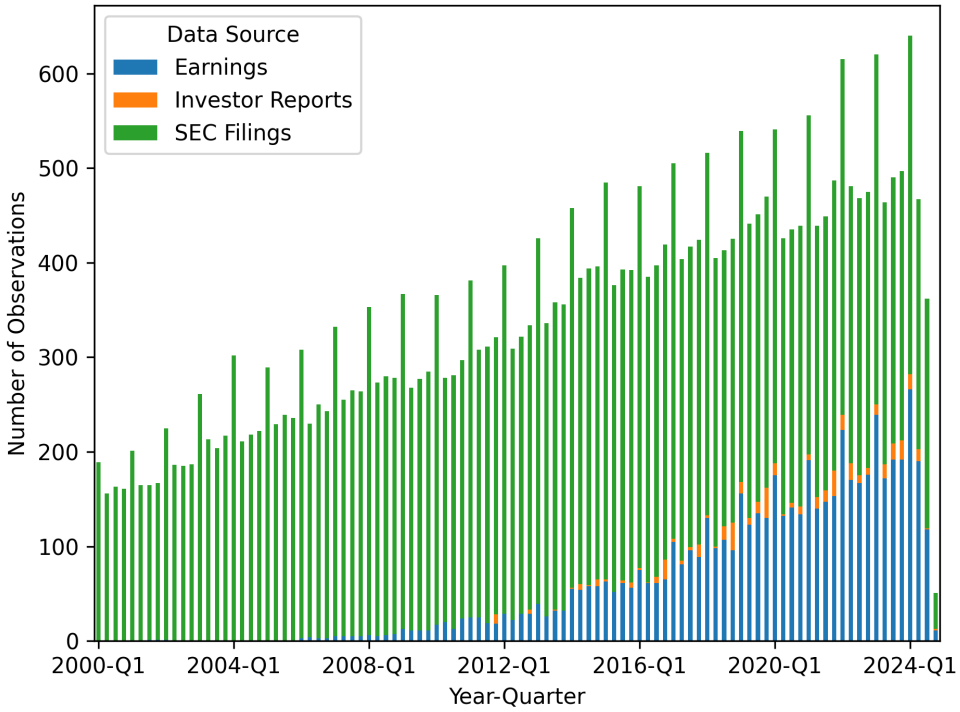
(in $ billions)	2024	2025	2026	2027	2028	Total '24-'28
New Generation	0.9	0.9	0.4	0.0	0.0	2.2
Generation Maintenance	1.3	1.1	1.0	1.1	0.9	5.4
Environmental Compliance	0.1	0.1	0.1	0.1	0.0	0.5
Pond Closures	0.7	0.8	0.7	0.7	0.6	3.5
Transmission	1.7	1.7	1.7	2.3	2.7	10.1
Distribution	1.7	1.7	1.8	1.9	1.9	9.0
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

(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 10: 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.

Table 13: Classification of investment plan types

Category	**Keywords**
Acquisitions	Acquisitions, Redevelopment, Acquisition
Strategic	Strategic, Advancement, Priorities, Synergies, Separation, Open, Projects, Initiatives, Emerging, Restructuring
Maintenance	Maintenance, Maintain, Repair, Replacement, Renovations, Renovation, Existing, Upgrades, Ongoing, Reliability, Cost Reduction, Modernize, Operations, Routine
Physical Infrastructure	Property, Equipment, Manufacturing, Nuclear, Aircraft, PPE, Infrastructure, Operating Assets
Dirty Energy	Drilling, Oil, Coal, Refining, Mining
Expansion Growth	Expansion, Expand, Grow, Growth, New, Stores, Construction, Improvements, Expanding, Transformation, Improve, Enhancement, Enhancements, Enhance, Enhancing
Environmental	Environmental, Clean, Reduce, Emissions, Renewable, Solar, Wind
Research & Development	Research, Development, Product, Innovation, Innovative, Exploration, AI, Technology, Artificial, Machine Learning

Note: Lists the categories of investment plan types and the corresponding words within investment plans that map to each category.
Source: Manually collected data.

Table 14: OLS: investment plans response to changes in Treasury yields

	(1) $\hat{g}_{it}^{p}$	(2) $\hat{g}_{it}^{p}$	(3) $\hat{g}_{it}^{p}$	(4) $\hat{g}_{it}^{p}$	(5) $\hat{g}_{it}^{p}$	(6) $\hat{g}_{it}^{p}$	(7) $\hat{g}_{it}^{p}$	(8) $\hat{g}_{it}^{p}$
Δ UST $2y_t$	0.123***							
	(0.0173)							
LT Plans$\times\Delta$ UST $2y_t$	-0.125***							
	(0.0283)							
Δ UST $2y_{t-1}$		0.0217						
		(0.0219)						
LT Plans$\times\Delta$ UST $2y_{t-1}$		-0.0397						
		(0.0283)						
Δ UST $5y_t$			0.106***					
			(0.0151)					
LT Plans$\times\Delta$ UST $5y_t$			-0.101***					
			(0.0313)					
Δ UST $5y_{t-1}$				-0.0171				
				(0.0215)				
LT Plans$\times\Delta$ UST $5y_{t-1}$				-0.00812				
				(0.0315)				
Δ UST $10y_t$					0.0851***			
					(0.0141)			
LT Plans$\times\Delta$ UST $10y_t$					-0.0870***			
					(0.0334)			
Δ UST $10y_{t-1}$						-0.0240		
						(0.0201)		
LT Plans$\times\Delta$ UST $10y_{t-1}$						0.00313		
						(0.0313)		
Δ UST 2-$10y_t$							-0.0228	
							(0.0271)	
LT Plans$\times\Delta$ UST 2-$10y_t$							0.0341	
							(0.0463)	
Δ UST 2-$10y_{t-1}$								-0.0778***
								(0.0239)
LT Plans$\times\Delta$ UST 2-$10y_{t-1}$								0.0820**
								(0.0415)
LT Plans	-0.0262	-0.0522**	-0.0282	-0.0539**	-0.0298	-0.0539**	-0.0298	-0.0501*
	(0.0252)	(0.0262)	(0.0251)	(0.0262)	(0.0251)	(0.0262)	(0.0254)	(0.0260)
Constant	0.332***	0.395***	0.350***	0.394***	0.364***	0.390***	0.359***	0.380***
	(0.0379)	(0.0401)	(0.0371)	(0.0397)	(0.0375)	(0.0402)	(0.0406)	(0.0421)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro $\times$ Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro lag $\times$ Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14173	14129	14173	14129	14173	14129	14173	14129
Rsquared	0.514	0.494	0.514	0.494	0.513	0.494	0.512	0.495

Note: This table reports OLS regressions of 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 two or more 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 capex growth is computed relative to the realized capex of four quarters ending one (two) fiscal quarter before the announcement, normalized for inflation, for Regressions 1,3,5,7 (2,4,5,8). The regressions also control for quarterly firm-level characteristics (including lagged cash-to-assets, leverage, log assets, return on assets, tangibility [PPE divided by assets], and Tobin's Q), the prior quarter change in the CFNAI index, and the interaction of the CFNAI change with all firm controls, as well as for the 2-, 5-, and 10-year U.S. Treasury yields on the day of the announcement. Firm fixed effects are included, and standard errors are clustered at the firm level. *Source:* Compustat, FRED, and manually collected data.

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.

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.[5] For 0.4% of observations, the projection period

[5]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.

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.[6] 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 capex 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.

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