UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Does Cash Flow?

An Empirical Study of Monetary Policy Transmission
Through Floating Rate Corporate Debt

BEHZAD JAWAN BAKHSH and DENNIS MUTISO MULI

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CHRISTER LJUNGWALL
(Supervisor)
GRADUATE SCHOOL
(Department)

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ABSTRACT

Considering the contemporary shift in the interest rate regime and the high levels of corporate debt in the US market, we show that monetary policy surprises have an impact on stock returns. This impact is dominated by a surprise in Fed forward guidance. By examining the liability structure of S&P 500 firms from 2005 to 2022, our results demonstrate the effectiveness of the cash flow channel. These balance sheet effects reveal that investors perceive that cash flows of firms with floating rate debt decline more in tightening policy surprises than firms with fixed rate debt, thereby, negatively affecting stock returns. Hence, cash flows. However, extending a methodology due Gürkaynak, Karasoy-Can, and Lee (2022), debt maturity fails to enhance the resolution of the cash flow channel. Similarly, we fail to observe the effectiveness of hedging in moderating the negative impact of the cash flow channel on stock returns.

JEL Classification: E43, E52, E58, G32, G43

Keywords: Monetary policy surprise, Monetary policy transmission, Cash flow channel, Fed, Federal Open Market Committee, Forward guidance, SEC filings, Hedging, Bank Debt, Floating rate debt

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Bakhsh

To Samra, For Everything
To Dennis who always weathers the storm with a smile
To my family, for their love, sacrifice and constant motivation
To my friends, for making my life easier

Mutiso

"What?"

To Behzad, an unlikely partnership at best. Proud of you.

"It takes a village"

My greatest gratitude is to my village, who spared no expense. My parents, who endure the ludicrous. My parents in-law who embraced me. Siblings. Friends. How can I thank you enough?

"impossible, then improbable, now inevitable"

To my children, the burden of a busy father was ever on you. I'll refund every lost embrace. To my wife, Miriam, I am ever grateful. Miriam, we trusted God with the improbable five years ago. Evidently, it is not impossible for Him.

"It is a safe thing to trust Him to fulfill the desires which He creates"
Amy Carmichael

Contents

1 INTRODUCTION

With the recent surge in inflation, central banks around the world are enacting policy actions to secure long-run price stability. The effectiveness of these central bank actions on their objectives (output, inflation and employment) is indirect at best. Rising interest rates, on the other hand, affect individual portfolio composition in step with evolving expectations and loss aversion (Gürkaynak, Karasoy-Can, and Lee, 2022; Criste and Lupu, 2014). The effect of monetary policy actions on equity prices is, therefore, direct. Equity markets are important to understand, as firms eventually invest in capital; consequently changing output and employment which are the very objectives of monetary policy manoeuvres. It is, therefore, vital for policy makers and financial market participants to understand what steers the influence of monetary policy actions on equity prices. We study this.

Although, equity markets respond immediately to the actions and announcements of central banks, the impact of monetary policy actions is difficult to predict as firms are heterogeneous along many dimensions (Gürkaynak, Karasoy-Can, and Lee, 2022; Ehrmann and Fratzscher, 2021). A rational investor's reaction can only be explained if they are updating their beliefs about firm fundamentals.[1] As asset prices reflect the present value of future cash flows, a reaction to monetary policy can be explained by the investor's revision of expectation about the firm's cash flow (Bernanke and Kuttner, 2005; Gürkaynak, Karasoy-Can, and Lee, 2022). We, therefore, study the impact of monetary policy surprises on stock returns as investors update their expectations about future cash flows.

Through monetary policy actions, interest rates affect the cash available to businesses and households (Bernanke and Gertler, 1995). Firms conventionally interact with interest rates through their capital structure. Interest rate payouts associated with debt represent a cash-outflow that lowers firm value. An increase in interest rates would induce higher payouts and, consequently, further lower firm value. Bernanke et al. (1988) note that in imperfect markets, firms favour debt over stock issuance because of its tax advantages and its use for sharing risk. We take stock of the global increase

[1] Fundamentals include the qualities of the firm that contribute to its intrinsic value. Mazouz and Wu (2022) and Fama and French (2015) illustrate that returns can be captured by fundamental information such as size, profitability and investment patterns.

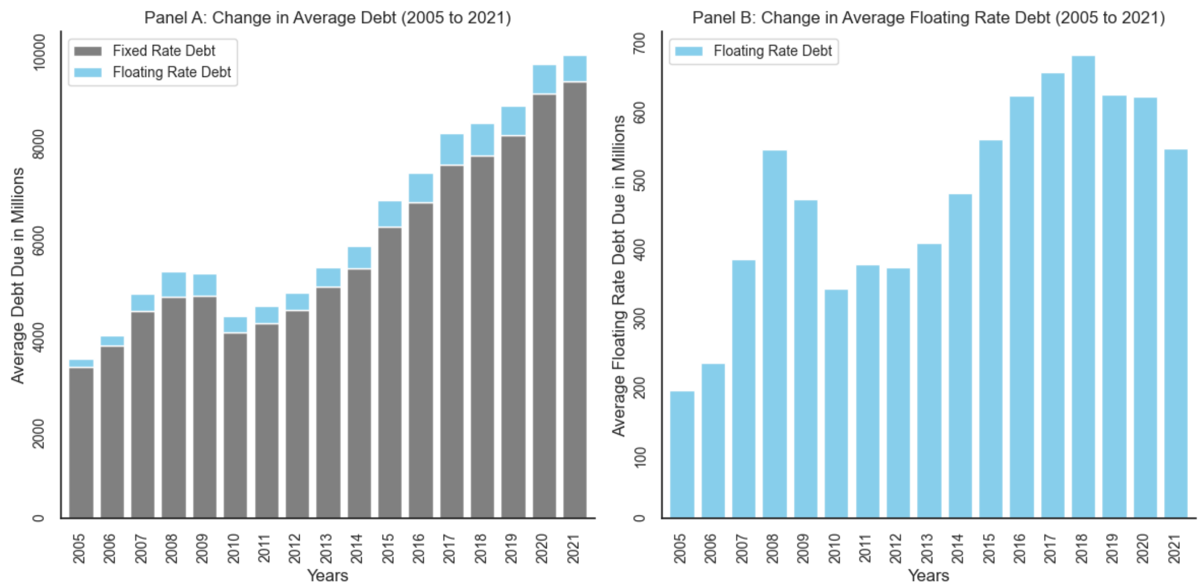

Figure 1: Panel A: Average Debt (Fixed and Floating). We plot average debt levels in S&P 500 affiliated firms in our data-set from 2005 to 2021. A larger portion of firm debt is in fixed rate debt over the period. There is a steady increase from 2010 to 2021 with a steep rise in 2020. **Panel B: Average Floating Rate Debt.** We plot average floating rate debt levels in the S&P 500 affiliated firms in our data-set from 2005 to 2021. Average floating rate debt peaks in 2008 and 2018 both times preceding events of near zero federal funds rate. In December 2008 the federal funds rate fell to an average of 0.16% from 5.25% in January 2007. Similarly, in April 2020 federal fund rates fell to an average 0.05% from 2.4% in July 2019. Complementing our observations of debt increase, Panel B shows that the indebtedness has been driven by fixed rate debt as floating rate debt has not risen significantly over the period.

in corporate debt. The United States business debt in 2020 stood at a historic high of 130% of GDP (Abraham, Cortina Lorente, and Schmukler, 2020; Jordà et al., 2020). In figure 1, we observe an increase in non-financial S&P 500[2] firms' indebtedness since 2005 in Panel A. Further, we observe that average floating rate levels follow interest rate movements in line with Faulkender (2005)'s observation that firms choose floating rate debt as yield curves steepen. Floating rate debt is however susceptible to policy shifts. As interest rates shift, fixed rate debt cash flows do not change but floating rate debt cash flows yield to these changes.

Ippolito, Ozdagli, and Perez-Orive (2018) observes bank debt levels as a proxy for floating rate debt in measuring the effects of monetary policy actions. Gürkaynak, Karasoy-Can, and Lee (2022) improves on this measure in creating an exposure variable that includes both the floating rate debt and its maturity. While evidence is abundant that investors observe firm balance sheets for floating rate debt, we build on their conceptual framework to assess three variables for floating rate debt: *bank debt leverage*,

[2]We define S&P 500 affiliated firms in our data-set as firms that have featured in the S&P 500 index from its inception in 1957 to 2022.

floating rate debt leverage and *exposure*. Employing these measures, we examine the cash flow channel of monetary policy transmission as cash flows of firms with floating rate debt change as a result of monetary policy surprise.

If firms consider cash flow exposure sufficiently volatile they turn to hedging, to match the interest rate sensitivity of their debts to their cash flows and avert financial distress. The use of derivative instruments in managing firm interest rate exposure is, however, questioned by Faulkender (2005) who posits that derivative instruments are employed by firms for speculation. We contribute to the debate by observing the utility of hedging against interest rate exposure.

Gürkaynak, Karasoy-Can, and Lee (2022) study monetary policy transmission through the cash flow channel by observing the reaction of S&P 500 firms between 2004 and 2018. We extend these observations to 2022 to study the effect of increased indebtedness within S&P 500 firms. We are set on commenting on the effectiveness of current contractionary monetary policy through this channel. How do investors react to monetary policy actions? Is the reaction of an unexpected rise in monetary policy rates more for firms with floating rate debt? Is the reaction more for firms with unhedged floating rate debt? We study this.

In our methodology, we face two emerging challenges. First, markets observe the forward guidance[3] along with the drivers of policy reviews and price their discernment into the market. We resolve this issue by employing monetary policy surprises instead of pure monetary policy actions as performed by Bernanke and Kuttner (2005) and Gürkaynak, Karasoy-Can, and Lee (2022). Second, monetary policy may be endogenous and central banks might be reacting to contemporary news and developments in the economy. In line with Gurkaynak, Sack, and Swanson (2011), we adopt the event study methodology to mitigate the endogeneity problem in our analysis.

Our study focuses on the period from 2005 to 2022, which encompasses 153 Federal Open Market Committee (FOMC) announcements.[4] We select this time frame based on the availability of data on firms' capital structure (debt) details in SEC filings. Using

[3]Through forward guidance, central banks provide information about their intentions regarding the future course of monetary policy.

[4]Monetary policy actions are a preserve of the FOMC in the United States. Prior to 1994, FOMC policy actions were inferred from the direction and scale of open market operations. Since February 1994, the FOMC has communicated policy actions through announcements following their meetings (Cieslak et al., 2019).

this data, we construct a comprehensive dataset that includes information on firms' fundamentals, monetary policy surprises, and stock returns. Our analysis reveals that monetary policy surprises have a significant impact on stock returns, and we find that suprise in forward guidance plays a key role in explaining this relationship, particularly at the Zero Lower Bound (ZLB). Moreover, our results indicate that the cash flow channel of monetary policy transmission impacts stock returns, demonstrating that cash flows. *Bank debt leverage*, however, is more significant than *exposure* in explaining this channel in contrast to Gürkaynak, Karasoy-Can, and Lee (2022). Therefore, we do not observe any significant role played by debt maturity. Further, we do not observe the utility of hedging in moderating the cash flow channel which challenges the very idea that firms use interest rate derivatives solely for hedging. Our findings provide valuable insights into the mechanisms by which monetary policy affects firm performance, with important implications.

The remainder of this discourse is organised as follows: Section 2 provides an overview of relevant literature along with formulating hypothesis. Section 3, along with describing the nature and sources of the data, proffers how we construct our variables. Section 4 seizes upon the variables created, presents methodology, our results, the analysis and discussion. Section 5 concludes this study.

2 LITERATURE REVIEW

We explore several crucial themes encompassing the capturing of monetary policy surprises, the influence of monetary policy on stock returns, and the channel through which monetary policy affects stock returns.

2.1 Monetary Policy Surprises

We expect that markets anticipate monetary policy actions by observing the Fed's forward guidance along with the drivers of policy reviews. In solving this challenge, we employ monetary policy surprises (unanticipated) instead of pure monetary policy actions as performed by Bernanke and Kuttner (2005) and Gürkaynak, Karasoy-Can, and Lee (2022).

To effectively capture monetary policy surprises, we review the existing literature on the topic. Notably, Friedman and Schwartz (1963) demonstrate that movements in monetary aggregates[5] precede movements in economic activity. Sims (1972) shows a similar relationship between money and nominal GNP. This indicates that manipulating nominal money can influence real economic activity, assuming money is at least partially exogenous (Bernanke and Gertler, 1995).

However, Bernanke and Blinder (1992) argue that the most accurate way to capture monetary policy actions is through the federal funds rate, rather than relying on measures such as M1, M2, BILL, BOND, CPBILL and TERM.[6] Cook and Hahn (1989) utilise this measure to analyse the impact of monetary policy actions on market interest rates. Similarly, Thorbecke (1997), employing raw changes in monetary policy– changes in federal funds rate – analyses the impact of monetary policy actions on stock returns. However, it is important to note that these measures incorporate both anticipated and unanticipated elements of policy since financial markets are forward-looking.

Kuttner (2001) improves the measure using the futures market on federal funds rate to categorise innovations into anticipated and unanticipated components. Of particular interest is the unanticipated component of monetary policy, as it has a direct effect on stock returns (Gürkaynak, 2005). To extract the unanticipated component, initial

[5] Monetary aggregates measure the money supply in an economy using: $M0$, $M1$ *and* $M2$.

[6] *BILL*: 3-month US treasury bill rate. *BOND*: 10-year US government bond rate. *CPBILL*: difference between 6-months commercial paper rate and 6-month treasury bill rate. *TERM*: difference between 10-year and 1-year US government bond rate.

research employs various derivative securities that are related to federal funds rate i.e. Term Federal Funds Loans; Federal Funds Futures; Term Eurodollar Deposits; Eurodollar Futures; Treasury Bills; Commercial Paper. However, federal funds futures exhibit superior performance in forecasting monetary policy at horizons up to six months while Term Federal Funds Loans, Term Eurodollar Deposits and Eurodollar Futures are essential for horizons up to one year (Gürkaynak, Sack, and Swanson, 2012).

Kuttner (2001) one dimensional measure is employed by Ippolito, Ozdagli, and Perez-Orive (2018) to test transmission channel of monetary policy. Monetary policy surprises (unanticipated) are informative in distinguishing the impact of monetary policy on asset returns as compared to pure innovations in the federal funds rate.

The FOMC sets policy rate which is the benchmark used by the market to set different market rates. However, target rate is just one component incorporated in the FOMC statement. In addition, statements about the future course of monetary policy and state of the economy are also provided in the announcement. Therefore, the one dimensional surprise belies the lack of other latent factors that may be influencing stock returns or characterising monetary policy surprises. Gurkaynak, Sack, and Swanson (2011) reject the hypothesis, empirically, that the response of asset prices can be explained by zero or one factor but fail to reject the utility of two factors. Therefore, a one-dimensional surprise factor is insufficient. Consequently, Gurkaynak, Sack, and Swanson (2011) propose the two dimensional surprise, namely target and path (defined in sub-section 3.3.3). Gürkaynak, Karasoy-Can, and Lee (2022) and Nakamura and Steinsson (2018) seize upon this measures in their assessments of monetary policy interactions with stock markets.

2.2 Monetary Policy and Stock Returns

The value of a firm is the present value of its discounted cash flows. Investors anticipate two types of cash flow: regular cash distributions during the life of the investment and terminal value on sale or liquidation (Damodaran, 2012; Kaplan and Ruback, 1995). As the Fed changes its policy, stock prices are affected through changes in cash flows and discount rates (Thorbecke, 1997).

Thorbecke (1997) shows that expansionary monetary policy innovations impact stock returns. Furthermore, he observes asymmetry in the response of small stocks to monetary policy as compared to big stocks. While Thorbecke (1997) concludes that the

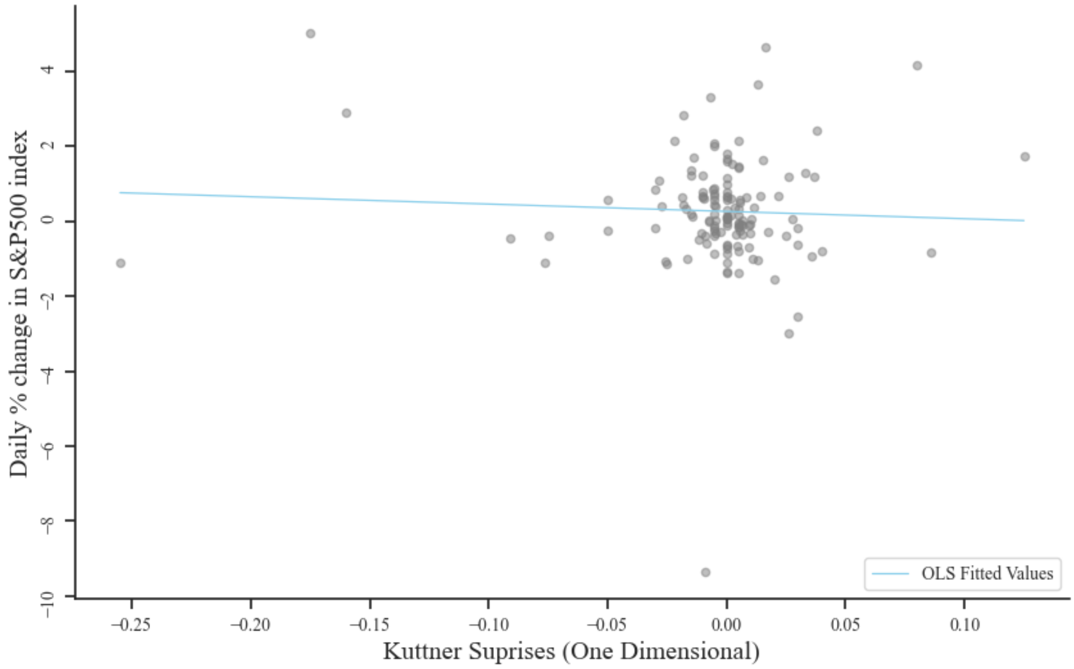

Figure 2: The S&P 500 Index changes versus one dimensional (Kuttner) surprises. We plot daily changes in the S&P 500 Index around FOMC statements against Kuttner surprises between 1994 and 2018. These Kuttner surprises are presented in Kuttner (2001) and Ippolito, Ozdagli, and Perez-Orive (2018). Kuttner (2001) and Gürkaynak, Karasoy-Can, and Lee (2022) observe a 30 minute window around the FOMC press statement. The OLS fitted plots are regressions of the returns vs the surprise without control variables.

Source: Yahoo finance and Gurkaynak, Sack, and Swanson (2011).

observed evidence supports the hypothesis that monetary policy impacts firms' access to credit, the author, however, does not make out the mechanism behind stock return reaction to innovations.

Bernanke and Kuttner (2005) quantify the impact of monetary policy shock on stock returns by showing that a surprise of 25bp rate cut results in 1% increase in stock price. As opposed to discount rate, they observe that expected future excess return and future dividend explain most of the variance in stock returns. However, investors also update their risk premium (Bernanke and Kuttner, 2005; Kuttner, 2001). Figure 2 illustrates the relationship between Kuttner Surprises and returns on the S&P 500 from 1994 to 2018.

Gurkaynak, Sack, and Swanson (2011) show that the effects of monetary policy on stock returns are captured by two factors, namely 'current federal funds rate *target*' and 'future *path* of policy'. Further, they show that both factors are important in explaining the interaction of monetary policy with stock returns. Gürkaynak, Karasoy-Can, and Lee (2022) and Nakamura and Steinsson (2018) use these factors to assess monetary policy transmissions into stock markets and find them relevant and influential. Ippolito, Ozdagli, and Perez-Orive (2018) employ Kuttner Surprises to measures the impact of monetary policy on stock returns but the observed impact is lost during the ZLB. Gürkaynak, Karasoy-Can, and Lee (2022) employ these two dimensional factors to improve on Ippolito, Ozdagli, and Perez-Orive (2018), observing monetary policy impacts on stock returns during the ZLB. Gürkaynak, Karasoy-Can, and Lee (2022)'s dataset is made up of 127 FOMC announcements between 2004 and 2018. They, inadvertently, fail to capture the effects of post-covid near zero interest rates between 2019 and 2022. We study this.

We expect to observe the following effects:

Hypothesis 1 *Monetary policy surprises have an impact on stock returns.*

Hypothesis 2 *Contractionary monetary policy surprises have a negative impact on stock returns.*

Ehrmann and Fratzscher (2004) find heterogeneity in the response of stocks to monetary policy shocks. They attribute heterogenous responses to financial constraints and Tobin's Q. However, they do not elaborate the channel through which cash flows of firms are affected.

2.3 Channels of Monetary Policy Transmission

The ultimate objective of monetary policy manoeuvres, though indirect, is to affect macroeconomic variables. There are three channels of monetary policy transmission into the real economy i.e. credit channel, exchange rate channel and interest rate (cash flow) channel (Riksbank, 2021). Credit channel affects real activity as it reduces the value of assets and they becomes less valuable collateral to access credit. Exchange rate channel employs currency channel to impact the flow of imports and exports, thereby affecting inflation and real activity. Interest rate channel, which is the subject of this study, affects cash flows of individuals and firms (Gürkaynak, Karasoy-Can, and Lee, 2022).

Bernanke and Kuttner (2005) propose an interpretation that stock returns are affected by policy through the firms' balance sheets. Their insights are consistent with the observations made by Ciccarelli, Maddaloni, and Peydró (2015) and Ashcraft and Campello (2007) that monetary policy affects the ability to initiate investment. Though Ciccarelli, Maddaloni, and Peydró (2015), Ashcraft and Campello (2007), and Bernanke and Kuttner (2005) identify the effect, they do not measure it. By observing that financially constrained firms are adversely impacted by monetary policy shocks, Ehrmann and Fratzscher (2004) hint at interest rate channel of monetary policy.

By observing the liability structure of firms, Ippolito, Ozdagli, and Perez-Orive (2018) illustrate that cash flows, at firm level, are affected differently based on the level of floating rate debt. They put forward that financially constrained firms with unhedged floating rate debt are particularly susceptible to monetary policy changes. They advance understanding into the direct and indirect effects of monetary policy on firm balance sheet strength. Though Ciccarelli, Maddaloni, and Peydró (2015) and Bernanke and Gertler (1995) observe strong effects, Ippolito, Ozdagli, and Perez-Orive (2018) seek to observe the mechanism of these effects. Their analysis, however, reveal that this effect disappears when policy rates are at the ZLB, contributing to the debate about the efficacy of large-scale asset purchases as an alternative tool. Further, monetary policy surprise used by Ippolito, Ozdagli, and Perez-Orive (2018) is still one dimensional.

Gürkaynak, Karasoy-Can, and Lee (2022) build on Ippolito, Ozdagli, and Perez-Orive (2018)'s model and incorporate debt maturity. This is done by creating a variable, *exposure*, defined in section 3.3.2. When exposure is considered, the effect is persistent even during the ZLB period. Gürkaynak, Karasoy-Can, and Lee (2022) cite *exposure* as a reason for the effectiveness of monetary policy at ZLB. However, the construct, *exposure*, has some drawbacks mentioned in section 3.3.2.

Further, Gürkaynak, Karasoy-Can, and Lee (2022) distinguish monetary policy surprises into current target and future path in identifying the source of stock market reactions. Figure 3 shows their enhanced resolution from delineated components of monetary policy surprises. Their dataset is made up of FOMC announcements between 2004 and 2018. Their period of choice does not cover contemporary effects of FOMC near zero rates in reaction to the COVID-19 pandemic and the rise in federal funds rate in 2022 to tackle inflation. We look at this period.

We are intent on observing:

Hypothesis 3 *The returns of firms that possess higher floating rate debt obligations are more adversely affected by contractionary monetary policy surprises.*

Hypothesis 4 *The returns of firms that possess higher floating rate debt obligations with longer maturity are more adversely affected by contractionary monetary policy surprises.*

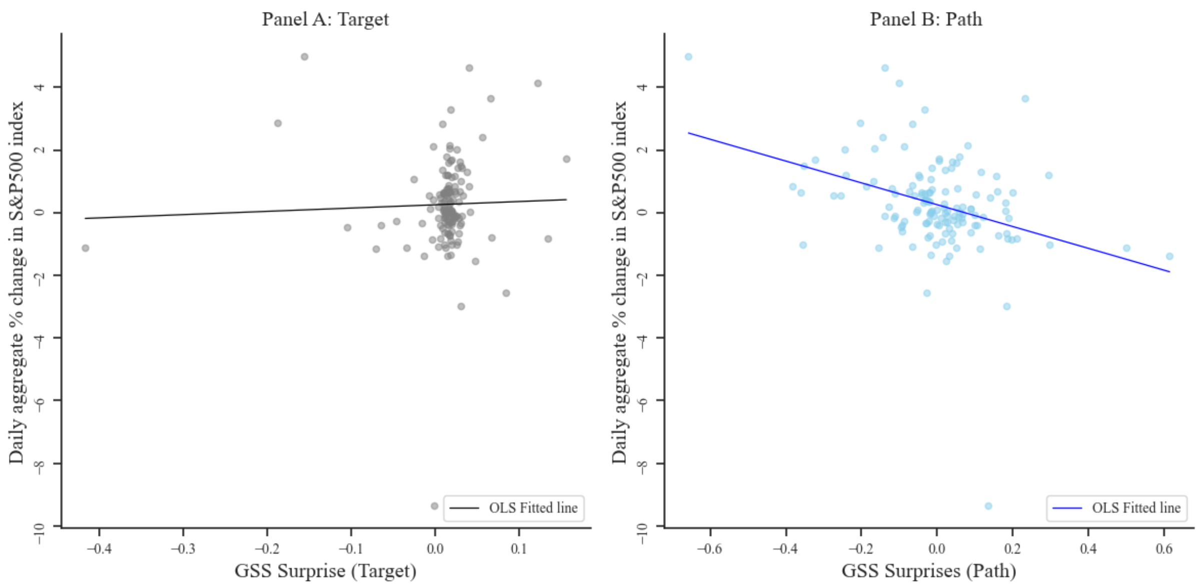

Figure 3: The S&P 500 Index changes versus two dimensional surprises as presented in Gürkaynak, Karasoy-Can, and Lee (2022) We plot daily changes in the S&P 500 index around FOMC statements against Gurkaynak, Sack, and Swanson (GSS) surprises between 1994 and 2018. The OLS fitted plots are regressions of the returns vs the surprises without control variables.
Source: Yahoo finance and Gürkaynak, Karasoy-Can, and Lee (2022).

2.4 Hedging

Firms employ hedging to match the interest rate sensitivity of their debts to their cash flows. Their use of derivative instruments in managing firm interest rate exposure is, however, questioned by Faulkender (2005). Bartram (2019) puts forward evidence that firms engage in hedging for speculation. Gürkaynak, Karasoy-Can, and Lee (2022), after controlling for speculation by removing firms using interest rate derivatives with low floating rate leverage ratio (less than 0.01%), observe that firms hedging their floating rate debt outperform firms without hedging. However, the underlying assumption that firms with higher floating rate leverage ratio use interest rate derivatives solely for hedging is questionable.

Bodnar et al. (2012) interview 1161 global firms and 50% of them respond that the market view plays an important role in the choice of derivatives. Further, Chernenko and Faulkender (2011) observe that firms use derivatives to reduce their dependence on external capital to finance investments. However, they do not observe the significance of derivative instruments in mitigating the costs of financial distress. Similarly, Ippolito, Ozdagli, and Perez-Orive (2018) observe that hedging is ineffective for financially unconstrained firms with floating rate debt whereas they observe mitigating effect of hedging for financially constrained firms. On the other hand, Gürkaynak, Karasoy-Can, and Lee (2022) advance a hand verified hedging indicator constructed in line with Ippolito, Ozdagli, and Perez-Orive (2018) and find hedging effective for financially unconstrained firms. We leverage on Gürkaynak, Karasoy-Can, and Lee (2022) findings as an initial word dictionary and through it, derive a comparatively clean hedging indicator using 10K (and 10Q) filings. We are intent on observing:

Hypothesis 5 *The returns of firms that possess higher unhedged floating rate debt obligations are more adversely affected by contractionary monetary policy surprises.*

Hypothesis 6 *The returns of firms that possess higher unhedged floating rate debt obligations with longer maturity are more adversely affected by contractionary monetary policy surprises.*

2.5 Endogeneity

Gurkaynak, Sack, and Swanson (2011) observe that monetary policy manoeuvres can be a response to stock market valuations as a signal of economic outlook. Similarly, Rigobon and Sack (2003) demonstrate that movements in broad equity price indices can elicit reactions from central banks. However, the intricate interplay between asset price movements and short-term interest rates creates an endogeneity problem, which complicates the relationship between the two factors (Rigobon and Sack, 2004). Bernanke and Kuttner (2005) acknowledge the challenge of contemporaneous responses of monetary policy to the stock market, while noting the potential violation of orthogonality assumptions as both monetary policy and stock markets simultaneously respond to news captured by the error term. They also highlight the issue of simultaneity during FOMC statements coinciding with other economic factors prior to 1994. To address this endogeneity problem, prior studies have employed variants of vector autoregression (VAR) models. Rigobon and Sack (2003) propose an estimator that identifies the response of asset prices by leveraging the heteroskedasticity of monetary policy shocks, assuming that the variance of these shocks is higher on FOMC dates. Gurkaynak, Sack, and Swanson (2011) suggest using high-frequency event study to narrow down the window around the FOMC statement to resolve these issues. By narrowing the window size, the impact of simultaneity on stock market and monetary policy is curtailed. Therefore, in line with Gurkaynak, Sack, and Swanson (2011), we adopt the event study methodology to mitigate the endogeneity problem in our analysis.

3 DATA AND VARIABLE CONSTRUCTION

3.1 Data and Data Sources

We turn our attention to data and data sources. For a resolution of our hypothesis, we construct our dataset to appreciate the firms through their fundamentals, capital structure (debt) details, stock price and Securities and Exchange Commission (SEC)-filings content. We resolve FOMC announcements into monetary policy surprises by using derivative securities of various maturities that track monetary policy expectations. Our interest is the interaction between firm characteristics and monetary policy surprises. Our sample period spans from 2005 to 2022 predicated on the availability of data regarding firms' capital structure (debt) details in SEC filings. To merge our datasets, we use filling dates or reporting dates attached to each data item. Bar monetary policy surprises and returns, variables in the regression are lagged by one quarter to ensure that market participants interact with the fundamentals.

3.1.1 Firm Level Data

We are interested in analyzing cash flow channel of monetary policy and we limit ourselves to financially unconstrained firms. Brisker, Çolak, and Peterson (2013) opine that inclusion in the S&P 500 index makes firms less uncertain and less constrained to raise cheap capital and are, therefore, not financially constrained. In the character of Gürkaynak, Karasoy-Can, and Lee (2022), we limit our sample to S&P 500 firms. We turn to CRSP for S&P 500 historical membership data and generate a list of 1699 firms that were part of the S&P 500 since inception (1957). We exclude financial firms as they are different from non-financial firms along many dimensions. According to Kuttner (2001) and Mamun and Hassan (2014), financial firms mediate lending and borrowing contracts which are largely driven by monetary policy and therefore directly import monetary policy into their balance sheet.[7] Further, we exclude firms in Transportation, Communications, Electric, Gas and Sanitary Service sectors based on their Standard Industrial Classification (SIC) codes in line with Gürkaynak, Karasoy-Can, and Lee (2022). We naturally include only firms that existed for the period and whose fundamentals are available on both Wharton Research Data Services (WRDS) and

[7] The value of their assets and liabilities are contingent on Monetary Policy.

Capital IQ (CIQ) for the period of our study.

Fundamentals are drawn from WRDS (Compustat-CIQ database). This data is sampled at quarterly frequency and contains information of total assets (atq), operating income before depreciation (oibdq), number of common shares (cshoq), price per share (prccq), total current debt (dlcq), total long term debt (dlttq), gross property plant and equipment (ppegtq), depreciation charge per quarter (dpq), cost of goods sold (cogsq), cash holdings (cheq) and retained earnings (req), along with firms' identifying variable (cik). Quarterly fundamentals provide the highest resolution in representing firms' fundamentals. We append the United States Consumer Price Index (CPI) quarterly data from Federal Reserve Economic Database (FRED) onto the fundamentals for deflation of our variable, *size*.

We download and verify capital structure details data from the CIQ database for our firms over the period of interest. We access SEC-Edgar filings data through an API (sec-api), parse and pickle[8] 10-X filing data for variable generation. We ignore variants of the 10-X filings such as amendments as they constitute a very small sample of our data-set[9]. We download the hedge indicator word list provided by Gürkaynak, Karasoy-Can, and Lee (2022).

We access historic stock price data from WRDS for daily close prices. This data is accessed from January 2005 to December 2022.

3.1.2 Monetary Policy Surprises

Our sample period spans from 2005 to 2022. During this period, there are 153 FOMC press releases (*events*). These press releases include both scheduled and unscheduled meetings in which the FOMC actually changed the target or decided against changing it. Gurkaynak, Sack, and Swanson (2011) note that FOMC statements generate surprise both from setting rates and what is "said".

We use market-based measures of monetary policy expectations to capture monetary policy surprises. We download daily prices for current month and three-month ahead federal funds futures, as well as two, three, and four quarters ahead eurodollar futures

[8]Pickles are a python binary protocol for serializing a data structure (strings in our case).

[9]From Loughran McDonald EDGAR-MasterIndexAnalysis only 21.67% of the 203,934 10-K filings between 2003 and 2021 were amended. Of these 0.3% were associated with risk factors, 2.8% on MD&A and 3.6% on controls and procedures. 48.2% of amendments were associated with proxy statements in 2021. 10-Q's are not audited fillings though they do not include material misrepresentation and from the repository only 7.16% were amended.

from Thomas Reuters Eikon data-stream from March 2003 to March 2023 predicated on the availability of data. Using these derivative assets, we construct Gürkaynak Sack and Swanson monetary policy surprises (GSS Factors) encompassing surprise in federal funds rate as well as forward guidance (explained in section 3.3.3). Our data differs from Gürkaynak, Karasoy-Can, and Lee (2022) as they use historical data since February 1, 1984 for estimation of GSS Factors. Further, we use daily data instead of 30-min data due to data constraints.

3.2 Pre-processing data

The best models or predictors are susceptible to bad data according to Kumar and Kalia (2012). Missing data can be ignored, removed entirely (dropping variable or observations), filled manually or filled using the most probable value (Kumar and Kalia, 2012). Our data contains missing values as shown in Table I. We assume that the last reported value is sustained through the unreported period. This is consistent with our belief that investors are updating their information through the data provided by the company, otherwise their previous knowledge is sustained. If the last reported value is not available, we assume that the value is 0 until it is reported.

The variables greatly affected by *missingness*[10] is ppegtq. This is due to firms in our dataset either not reporting on this variable during the quarterly period or entirely not reporting it (in the initial quarters or for the entire observed period). We are confident that by replacing quarterly data with the last reported value and replacing with 0 otherwise is a proper treatment. This rationale applies for atq and other variables apart from cik from WRDS. For cik, we manually inspect the data and replace missing values if we have enough information (company name and gvkey) to replace the data. We then proceed to remove remaining observations whose cik number we cannot decipher.

3.3 Variables of interest

3.3.1 Return

Returns ($\Delta P_{i,t}$) are calculated from daily stock prices for a firm i at time t. We reproduce percentage log returns of the close prices from the day before to the day after the event. Gorodnichenko and Weber (2016) employ a tight return window around the FOMC announcement to draw their empirical results while Gürkaynak, Karasoy-Can, and Lee (2022) use closing quotes of stock prices between the day before and the day

[10]The mechanism behind missing values is called missingness.

Table I
Number of Missing Values

Fundamentals are drawn from WRDS (Compustat-CIQ database). This data is sampled at quarterly frequencies and contains information of total assets (*atq*), operating income before depreciation (*oibdq*), number of common shares (*cshoq*), price per share (*prccq*), total current debt (*dlcq*), total long term debt (*dlttq*), gross property plant and equipment (*ppegtq*), depreciation charge per quarter (*dpq*), cost of goods sold (*cogsq*), cash holdings (*cheq*) and retained earnings (*req*) along with firms' identifying variable (*cik*). In the second column we present the number of missing values in the data downloaded from WRDS. The final column represents the values that are interpolated using a forward fill (filling with the last available information). Percentage of the total data downloaded before any cleaning or merging (74,887) set is presented in parentheses. Variables without missing values are not included in the table.

Variable	Missing Values (%)	Interpolated Values (%)
ppegtq	28515 (38.08%)	19281 (25.75%)
actq	14523 (19.39%)	1128 (1.51%)
dpq	9039 (12.07%)	2677 (3.57%)
oibdpq	8146 (10.88%)	2240 (2.99%)
dlcq	8060 (10.76%)	5092 (6.80%)
lcoq	5888 (7.86%)	895 (1.20%)
prccq	5735 (7.66%)	729 (0.97%)
req	5287 (7.06%)	1835 (2.45%)
dlttq	3671 (4.90%)	1204 (1.61%)
ceqq	3317 (4.43%)	880 (1.18%)
cheq	3273 (4.37%)	864 (1.15%)
ltq	3257 (4.35%)	820 (1.09%)
atq	3231 (4.31%)	822 (1.10%)
cshoq	3037 (4.06%)	250 (0.33%)
cogsq	2538 (3.39%)	364 (0.49%)
niq	2263 (3.02%)	119 (0.16%)
cik	1100 (1.47%)	0 (0.00%)

after the event. For robustness check, we generate one-day stock returns and cumulative abnormal returns (CAR).

3.3.2 Floating rate variables

We download data from CIQ capital structure details. We deploy a vba-macro to structure and return the variable of interest. We initially eliminate debt types denominated in foreign currencies, non-recourse debts and convertible debts. Foreign currency debt obligations are determined by two monetary policy regimes which is beyond the purview of this study. Fabozzi (2013) illustrates that contingent bonds are affected differently by price movements as compared to straight bonds[11]. Embedded

[11]Contingency provisions found in the bond's indenture include rights that enable their holders to take advantage of interest rate movements or may be exercised automatically. Option free bonds are referred to as straight bonds.

options introduce convexity that would be difficult to measure in the current context. We face a limitation that data related to debt is infrequently available at quarterly periods but available at annual frequency (Gürkaynak, Karasoy-Can, and Lee, 2022). Therefore floating rate variables are calculated at annual frequency. We construct three relevant variables for floating rate debt for firm i and j debt obligation. The time subscript is omitted for simplicity.

- **Bank-Debt Leverage** ($Leverage_{i,q(t)}$) is constructed by Ippolito, Ozdagli, and Perez-Orive (2018) and is the ratio of bank debts to total assets. Ippolito, Ozdagli, and Perez-Orive (2018) notes that banks issue a substantial portion of corporate loans at variable interest rates. Therefore, a significant proportion of firms' bank loans is floating rate debt. Bank debt is described as term loans or credit lines.

$$leverage_i = \frac{\sum_{j=1}^{n} Bank\_Debt\_Amount_{i,j}}{Total\,Assets_i} \tag{3.1}$$

- **Floating-rate Leverage** ($FRD\_leverage_{i,q(t)}$) is the ratio of total floating rate debt to total assets. Floating rate debt includes debts bearing floating rates (bank debts are included). We extend CIQ capital structure debt classification of floating rates by including debt whose description includes variable rate or floating rate along with those classified as floating rate by CIQ. This allows a strict exclusion criteria.

$$FRD\_leverage_i = \frac{\sum_{j=1}^{n} FRD\ Amount_{i,j}}{Total\,Assets_i} \tag{3.2}$$

- We construct **Exposure** ($Exposure_{i,q(t)}$) in line with Gürkaynak, Karasoy-Can, and Lee (2022). Differences between Exposure and Floating rate debt exists in the inclusion of maturity.

$$Exposure_i = \frac{1}{Total\,Assets_i} \sum_{j=1}^{n} \left[FRD\ Amount_{i,j} * FRD\ Maturity_{i,j}\right] \tag{3.3}$$

$Bank\ Debt\ Leverage_{i,q(t)}$ and $Floaring\ Rate\ Debt\ Leverage_{i,q(t)}$ are closely related as illustrated by Panel A figure 4. The figure illustrates that, by the 45 degree OLS line, that bank debt is mostly floating rate debt. Consequently, and of interest, Panel B shows that the introduction of maturity into floating rate debt to create *exposure* introduces a new dimension. This is in line with similar constructions by Gürkaynak, Karasoy-Can,

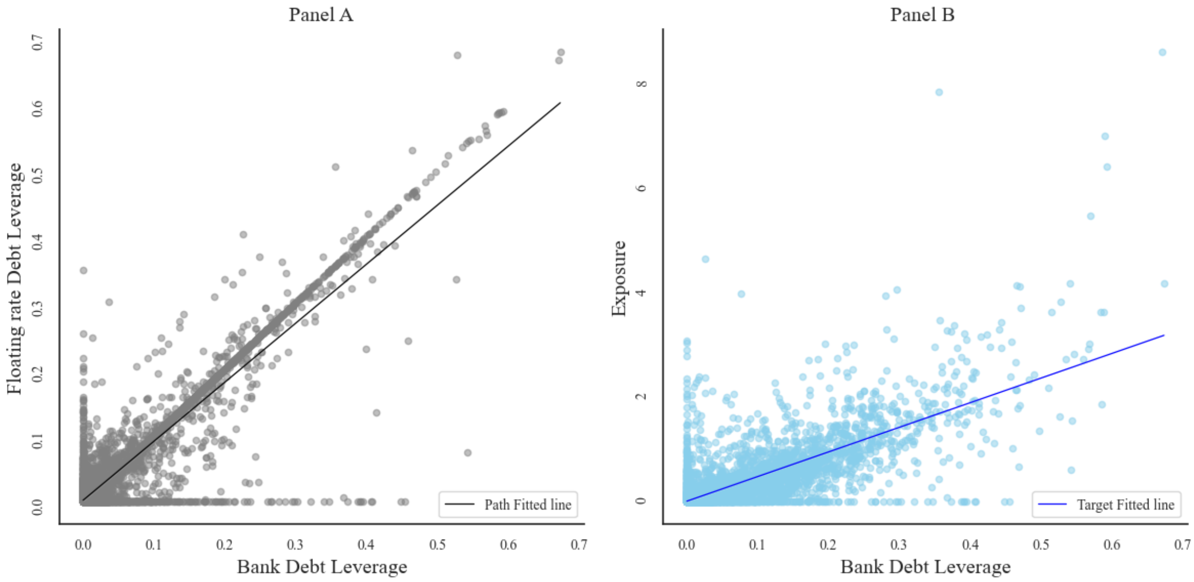

Figure 4: Panel A: Illustrates the relationship between our floating rate debt and Bank debt Leverage. Bank debt leverage is originated in Ippolito, Ozdagli, and Perez-Orive (2018) and the figure shows the close relationship between floating rate debt and Bank Debt Leverage. Gürkaynak, Karasoy-Can, and Lee (2022) illustrates using the OLS fitted line that bank debt is mainly floating rate debt. **Panel B:** Illustrates the relationship between our Exposure and Bank debt Leverage. Compared to Panel A, we observe that Exposure is not aligned to Bank debt and Gürkaynak, Karasoy-Can, and Lee (2022)'s construction investigates a different dimension of debt.

and Lee (2022) and Ippolito, Ozdagli, and Perez-Orive (2018).

In the construction of *exposure*, Gürkaynak, Karasoy-Can, and Lee (2022) intend to measure the impact of maturity. The construction of *exposure*, however, entails shortcomings. It does not consider the frequency of interim cash flows, the floating rate margin and might defectively measure maturity. Duration measures the interest rate sensitivity of bonds. Two bonds with matching maturity and yield to maturity but different cash flow frequency and amount result in different levels of terminal wealth for bond holders (Heck, Zivney, and Modani, 1995). As a measure of interest rate sensitivity for equity holders, *exposure*, falls short. Assume two floating rate loans with same *exposure*: a $1 billion loan with principal due in one year and a $100 million loan with 10 years to maturity. The two would have same *exposure*, assuming their total assets are equal for simplicity. Though total assets are a function of debt, the assumption on total asset is not trivial, as this is also a function of the firms debt-to-equity ratio. In figure 1 and Table III, we observe that floating rate debt is on average a fraction of the debt held by the firms observed. Consequently, there will be higher cash outflow for a firm having $1 billion loan as compared to a firm with $100 million left as principal in one year. This shows that firms with similar exposure can have different maturities and cash flows over time which, in turn, affects stock value and consequently stock returns.

3.3.3 GSS Surprise

We use market-based measures of monetary policy expectations to capture monetary policy surprises. Gürkaynak, Karasoy-Can, and Lee (2022) and Gurkaynak, Sack, and Swanson (2011) access intraday data on federal funds rate and eurodollar futures. The choice of these assets is informed by Gürkaynak, Sack, and Swanson (2007), who recommend federal fund futures and Eurodollars as efficient market based measures of monetary policy surprises out to a year.

Monetary policy surprises are captured by the creation of two variables (*target* and *path*). We closely follow the method proposed by Gurkaynak, Sack, and Swanson (2011). This is the same method utilised by Gürkaynak, Karasoy-Can, and Lee (2022) and Swanson (2021). We can refer to our empirical model, in part, in equation 3.4

$$\Delta y_t = \alpha + \beta Z_{1,t} + \gamma Z_{2,t} + \varepsilon_t \tag{3.4}$$

where we replace one dimensional surprise in monetary policy with two dimensions ($Z_{1,t}$ and $Z_{2,t}$). y_t is the stock return. These unobserved dimensions are estimated by factor analysis applied on a matrix **X** (T x n) where T corresponds to number of FOMC announcements (169) between March 2003 and March 2023, n corresponds to assets and each element of **X** corresponds to a daily change in asset prices around FOMC announcement.

$$X = \begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1n} \\ X_{21} & X_{22} & \cdots & X_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ X_{T1} & X_{T2} & \cdots & X_{T,n} \end{bmatrix} \tag{3.5}$$

The first two columns of $X_{T,1}$ and $X_{T,2}$ are measures of the changes in the current-month and three-month-ahead federal funds futures contracts, but contain a scaling adjustment to account for the timing of FOMC meetings within those months (details in Appendix A.1.2). The next three columns ($X_{T,3}$, $X_{T,4}$ and $X_{T,5}$) are measures of euro-dollar futures with 1.5, 2.5 and 3.5 quarters to maturity on average. We can write **X** in the form

$$X = \mathbf{F}\Lambda + \boldsymbol{\eta} \tag{3.6}$$

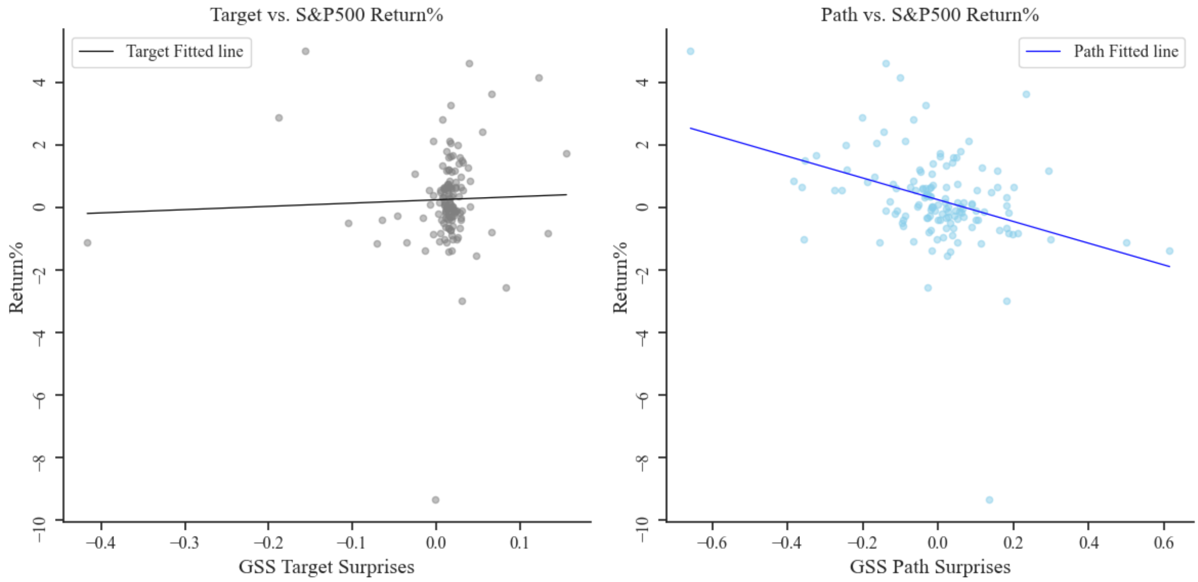

Figure 5: Monetary policy suprise and returns on the S&P 500 index. This figure presents similar evidence to that shown in figure 3 that the first two components have different relationships with returns on the S&P 500 index returns. We extend these observations to observe the effect of the surprises on our curated 761 S&P 500 firms.

where **F** is a T x 2 matrix of unobserved factors (we restrict ourselves to the first two factors), Λ is a 2 x n matrix of factor loadings, and η is a T x n matrix of white noise disturbances. We decompose **X** into its principal components after normalising to a mean of zero and unit variance. We restrict ourselves to the the first two components, F_1 and F_2, and normalise each to have unit variance. Structurally, we rotate them so that the factors correspond to surprise in the current federal fund rate target and expectations of the path of interest rate over the horizon (further defined in Appendix A.1.2). We interpret these components as *target* and *path* in line with Gurkaynak, Sack, and Swanson (2011). At time t, the variable target ($target_t$) captures the surprise related to changes in current policy rates, whereas path ($path_t$) encompasses the surprise in forward guidance. In figure 5, we show how our generated path and target variables relate to returns on the S&P 500 index. Our variables are closely aligned with those derived by Gurkaynak, Sack, and Swanson (2011) who observe a 30 minute window in deriving factors in figure 3. The construction of these two variables allows us to differentiate the real underlying concerns of investors (the future or the current) and to what degree these surprises influence returns.

3.3.4 Hedging indicator

Hedge, ($hedge_{i,q(t)}$) is a dummy variable created by analysing 10K (and 10Q) reports to identify firms that use interest rate hedging. At the end of each fiscal period, firms file reports with the SEC. Such filings contain mandatory and discretionary reporting on details about the firm. Within these filings, firms regularly report on risks and risk mitigation strategies. Gürkaynak, Karasoy-Can, and Lee (2022) construct a hedging dummy that sets to one if the following phrases and their variants are found in the 10-X report: "hedge interest rate", "hedge against interest rate" and "interest rate swap". We pick up from Gürkaynak, Karasoy-Can, and Lee (2022)'s list of positive and false positive words. From the list presented, we establish that all positive and negative phrases contain the phrase, "interest rate".

Using downloaded filings, we eliminate all punctuation and search for the phrases that contain the words "interest rate" within them. We then eliminate all phrases that contain numbers or word like "amount" and "level" to remove phrases that indicate levels of interest rate. We keep phrases that indicate hedging as they contain words like *swaps*, *hedge* and *contract*. We search through this list for false positive trends and expand our false positive indicators. We also update positive phrases that may have been left out in prior literature. We only find two relevant additions (futures and forwards) and discover that more variations are caused by punctuation.

Finally, using textual analysis techniques, we look through all relevant filings and construct the hedge dummy. We convert the entire filing into a string and remove all false positive phrases from the string. We thereafter look through the filing to see if there are instances where there is an occurrence of a positive phrase[12]. If we find a positive phrase, we indicate that the company has hedged. The list of positive phrases is presented in the Appendix Table XXI.

Our approach proves to be as effective as the indicator proffered by Gürkaynak, Karasoy-Can, and Lee (2022). We compare our results with those provided by Gürkaynak, Karasoy-Can, and Lee (2022). Of the 46,822 filings that are comparable to Gürkaynak, Karasoy-Can, and Lee (2022) we find 7031 (15.02%) differences. Of these 6951 (98.86% of the differences) are incidences where we indicate that there is

[12]We test out different methodologies to test for hedging but they are inferior to our methodology of eliminating false positives and searching for positives. 1. We experiment with lemmatization to remove inflections in our filings. This leads to Type I errors since by removing inflections we find more false positive or Type II errors since, by lemmatization, the structure of the sentence is lost and false positives are didentified as positive. 2. We experiment with searching for false positive first and positive thereafter. In this method we do not search for positive phrases if we find false positive but rather return no hedge. This too was prone to errors. We established that firms refer to previous years in their discussions and if they did not have a hedge in the past this method assumed they did not have a hedge, a Type I error.

Table II

Hedging Indicator: (Top and Bottom)

We tabulate the differences between our Hedge indicator in column (4) and that provided by Gürkaynak, Karasoy-Can, and Lee (2022) (G-Hedge) in column (6). We have 46,822 filings that are comparable to the list of hedge provided by Gürkaynak, Karasoy-Can, and Lee (2022). We find 7,031 (15.02%) differences between our indicators for hedge. Of these 6,951 (98.86% of the differences) are incidences where we indicate that there is a hedge but Gürkaynak, Karasoy-Can, and Lee (2022) indicates that there is no hedge. This table consists of a sample of the first 15 observations and the last 15 observations. On observations where we find hedge to be positive, we indicate the phrase found in column (5). We manually read the document searching for the phrases found and indicate in column (7) with a 1 when we are right and Gürkaynak, Karasoy-Can, and Lee (2022)'s indicator is wrong. Where Gürkaynak, Karasoy-Can, and Lee (2022) is right (and we are wrong) we further inspect the document for a motivation. *Data* is a Type I error where it indicates that there was a problem with the data source that we had collected using sec-api such as missing sections in the reports, consequently finding no hedge where there is a hedge. Fixed to floating indicates a Type II error where our hedge indicated a hedge for floating to fixed when it was from fixed to floating (no floating rate debt hedge). Column (1) indicates the gvkey of the firm, column (2) indicates the filing date and column 3 indicates the type of filing.

(1) gvkey	(2) Date	(3) Type	(4) Hedge	(5) Found	(6) G-Hedge	(7) Check	(8) Motivation
1078	02/03/2005	10-K	1	interest rate hedge	0	1	-
1078	15/02/2013	10-K	1	interest rate hedge	0	1	-
1078	21/02/2014	10-K	1	interest rate hedge	0	1	-
1161	05/08/2004	10-Q	1	interest rate hedging	0	0	data
1161	30/10/2014	10-Q	1	interest rate swap	0	0	data
1161	19/02/2015	10-K	1	interest rate swap	0	1	-
1161	18/02/2016	10-K	1	interest rate swap	0	1	-
1161	21/02/2017	10-K	1	interest rate swap	0	1	-
1161	27/02/2018	10-K	1	interest rate swap	0	1	-
1209	13/12/2004	10-K	1	interest rate swap	0	1	-
1209	22/11/2005	10-K	1	interest rate swap	0	1	-
1209	26/11/2008	10-K	1	interest rate swap	0	1	-
1209	26/04/2011	10-Q	1	interest rate swap	0	1	-
1209	27/07/2012	10-Q	1	interest rate hedge	0	1	-
31774	15/08/2017	10-Q	1	hedge interest rate	0	1	-
31774	09/11/2017	10-Q	1	hedge interest rate	0	1	-
31774	16/03/2018	10-K	1	hedge interest rate	0	1	-
31774	09/05/2018	10-Q	1	hedge interest rate	0	1	-
3336	08/11/2018	10-Q	1	interest rate swap	0	1	-
3336	08/02/2019	10-Q	1	interest rate swap	0	1	-
3336	13/06/2019	10-K	1	interest rate swap	0	1	-
3336	09/08/2019	10-Q	0	N/A	1	0	data
3336	12/11/2019	10-Q	0	N/A	1	0	data
32106	30/04/2019	10-Q	0	N/A	1	0	data
32106	01/08/2019	10-Q	0	N/A	1	0	data

Continued in next page...

(1) gvkey	(2) Date	(3) Type	(4) Hedge	(5) Found	(6) G-Hedge	(7) Check	(8) Motivation
32106	30/10/2019	10-Q	0	N/A	1	0	data
12485	04/08/2017	10-Q	1	interest rate swap	0	0	fixed to floating
100243	03/09/2019	10-K	1	interest rate swap	0	1	-
100243	07/11/2019	10-Q	1	interest rate swap	0	1	-
100243	11/02/2020	10-Q	1	interest rate swap	0	1	-

a hedge but Gürkaynak, Karasoy-Can, and Lee (2022) indicate that there is no hedge. We present the results of our inspection in Table II and Table IX. Table II shows the first 15 observations and the last 15 observations that have differences. We further present Table IX that contains a random sample of 30 observations.

In our top and bottom sample in Table II, we observe that our methodology was correct 73.33% of the time. We detected that our methodology was consistent between firms. In the random sample the methodology was correct 60% of the time as compared to the methodology used by Gürkaynak, Karasoy-Can, and Lee (2022). Gürkaynak, Karasoy-Can, and Lee (2022) perform a manual check that is both tedious and prone to errors as our sample shows. Our methodology is also prone to data constraints that make up 60% of the errors in the samples (Table II and IX). With time, methodology and data constraints aside, future research can generate accurate predictors of hedging.

3.4 Control variables

To account for factors that can affect stock returns, we incorporate book leverage, firm size, market-to-book ratio, profitability, asset maturity and financial slack as control variables. The inclusion of book leverage is relevant as firms may be highly leveraged and therefore more susceptible to the effects of monetary policy (Ippolito, Ozdagli, and Perez-Orive, 2018). Additionally, we control for firm size and market-to-book ratios, as these variables have been established as risk factors for asset prices by Fama and French (2015) and Fama and French (1993). Furthermore, these factors may impact the stock market's response to policy surprises due to their relationship with financial constraints and investment opportunities (Ippolito, Ozdagli, and Perez-Orive, 2018). We include profitability as a control variable, as firms that have lower profitability tend to exhibit a greater degree of sensitivity to monetary policy surprises (Ehrmann and Fratzscher, 2004). Asset maturity is included due to its relevance to stock returns (Gürkaynak, Karasoy-Can, and Lee, 2022). Lastly, we include financial slack as firms with low cash

Table III
Summary statistics for variables outlined

This table presents variables used for the regressions. The dummy variable Hedge = 1 is our hedging indicator for firms that engage in hedging activities against interest rate risks. Exposure, Bank Debt Leverage and Floating Rate Debt Leverage are as previously defined. We explore Fixed Rate Debt Leverage and Fixed Exposure into our framework to measure the impact of maturity on the interaction of monetary policy with a firms fixed term debt fixed rate debt. Size, Profitability, Book Leverage, Market-to-Book Ratio and Asset Maturity are briefly defined in the section 3.4 and elaborated in the Appendix A.2.2. To control for potentially speculative interest rate derivative investments, we only include firms whose floating rate debts constitute more than 1% of total assets.

	Hedge=0		Hedge=1		Total	
	Mean	SD	Mean	SD	Mean	SD
Exposure	0.10	0.28	0.22	0.48	0.16	0.40
Leverage	0.02	0.05	0.05	0.09	0.04	0.08
FRD Leverage	0.02	0.05	0.05	0.09	0.03	0.07
Fixed Exposure	1.49	1.81	2.01	1.71	1.77	1.77
Fixed Debt Lev	0.21	0.25	0.28	0.23	0.25	0.24
Asset Maturity	0.33	0.34	0.34	0.31	0.34	0.33
Size	8.41	1.23	9.02	1.21	8.74	1.25
Profitability	0.04	0.03	0.04	0.02	0.04	0.02
Book Leverage	0.35	0.31	0.49	0.29	0.43	0.31
Market to Book	2.30	1.85	1.80	1.23	2.03	1.56
Short term debt	0.03	0.04	0.04	0.05	0.03	0.05
Retained earnings	0.18	0.67	0.25	0.42	0.22	0.55
Financial Slack	0.17	0.16	0.11	0.11	0.14	0.14

flows are more sensitive to monetary policy (Ehrmann and Fratzscher, 2004).

Data regarding control variables is obtained from Compustat-CIQ database. Control variables are employed as lagged variables. Control variables for firm i at $q(t)$ (FOMC announcement quarter) are defined and their derivations contained in the Appendix A.2.2.

3.5 Summary Statistics

To merge our datasets, we use filling dates attached to each filling and firm cik numbers. Bar monetary policy surprise and returns, variables (of interest and control) in the regression are lagged by one quarter to ensure that market participants have interacted with firm fundamentals. Panel data is used in our estimation in order to control time varying firm fixed effects and check cross-sectional correlation of residuals (Ehrmann and Fratzscher, 2021). Our empirical model hinges on these samples and their relevant summary statistics are presented in Table III.

Our summary statistics are notably different from those present in Gürkaynak, Karasoy-Can, and Lee (2022) who observe mean for Exposure, Bank Debt Leverage and Floating rate debt leverage higher than ours. We attribute these differences to the differences in our data sources. Though both data sets are attributable to CIQ capital structure details, we highlight that the downloaded samples from WRDS and the Capital IQ database we access are different.

3.6 Limitations

We take S&P 500 firms which is usually used as a proxy for market. However, it is not the entire market. Therefore, an issue of *sample bias* may arise in our results. Furthermore, due to limited resources, intraday stock returns and futures data are not available which limits our ability to conduct further robustness tests and analyse the impact at higher frequencies.

We construct *exposure* using data from CIQ which provides information on the type of debt and its maturity. However, we encounter challenges as the data is not completely clean. Specifically, we find instances where the sum of floating rate debt provided in Capital Structure Details do not tally with the total floating rate debt mentioned in Capital Structure Summary in CIQ (Ippolito, Ozdagli, and Perez-Orive, 2018). We develop a VBA code for constructing *exposure* by analyzing the description, coupon rate and type of debt. However, in some instances, a single maturity date is not given and instead, a range of dates is given. In such cases, we calculate the average of the range to determine the maturity date.

Additionally, we calculate hedge by parsing 10-K (and 10-Q) filings using a python code. This may introduce measurement errors in our calculations as it involves textual data. In searching for the hedge indicator, Type I and Type II errors may influence our observations and measurement. We believe our data set is comparatively as clean as that used by Gürkaynak, Karasoy-Can, and Lee (2022). We take note of nascent technology such as AI-Large Language Models[13] that can produce even cleaner hedging indicators. Furthermore, constructing *exposure* at quarterly frequency is challenging due to limited data availability.

[13] Chat-GPT (chat.openai.com) and Bard (www.google.com) have APIs that can be connected to and instructed to check for hedging.

4 MODEL, RESULTS AND ANALYSIS

In this section, we test our hypotheses.

4.1 The Empirical Model

The empirical design is based on event study methodology wherein the effect of monetary policy surprises on stock returns is calculated at daily frequency to avoid endogeneity issues related to omitted variable bias and reverse causality (Gürkaynak, Karasoy-Can, and Lee, 2022). At lower frequencies, such as monthly or quarterly, it is difficult to disentangle the influence of stock market performance on monetary policy decisions from the impact of monetary policy on stock market movements. This difficulty arises because the relationship between stock market performance and monetary policy decisions can be bi-directional, with each affecting the other. A shorter estimation window, therefore, helps in capturing the true effect of monetary policy surprises on stock returns and reduce noise in estimation. The choice of using daily data instead of 30-minute window is to strike a balance between capturing the effects of monetary policy shocks and avoiding transient overshooting effects (Ehrmann and Fratzscher, 2021). At the same time, this decision is made within the constraints of our data, as 30-minute interval data for market-based measures of monetary policy expectations is not available to us.

4.2 Impact of monetary policy surprises on stock returns

In this section we expect to observe the following:

Hypothesis 1 *Monetary policy surprises have an impact on stock returns.*

Hypothesis 2 *Contractionary monetary policy surprises have a negative impact on stock returns.*

4.2.1 Empirical model: One dimension surprise

We initiate our analysis by analysing the impact of one dimensional monetary policy surprises on two-day stock returns around FOMC announcements using equation 4.1 by conducting a series of regression analyses presented in Table IV:

$$\Delta P_{it} = \beta_0 + \beta_1(MP1_t) + \Lambda(remaining\ controls\ and\ interaction\ terms) + \epsilon_{i,t} \qquad (4.1)$$

Table IV

Effects of One Dimensional Policy Surprise on Stock Returns

We regress the two-day stock return on a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.1 with only choice control variables. Column (2), along with the target, path and choice control variables introduces interactions as outlined in equation 4.1. Columns (3) is similar to column (2) but studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. This table presents variables of interest and the full table containing the controls and their interactions is presented in the Appendix Table XI. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return
MP1 Surprise	-7.312***	-13.356***	2.002
	(0.437)	(3.367)	(5.323)
Profitability	1.726	1.603	2.679*
	(1.071)	(1.066)	(1.601)
Book Leverage	-0.278***	-0.300***	0.009
	(0.095)	(0.095)	(0.165)
Market to Book	-0.011	-0.009	-0.062**
	(0.019)	(0.019)	(0.028)
Asset Maturity	-0.586***	-0.592***	-0.578**
	(0.130)	(0.130)	(0.227)
Financial Slack	0.899***	0.969***	0.743*
	(0.236)	(0.235)	(0.391)
Constant	0.054	0.055	0.014
	(0.080)	(0.080)	(0.131)
Observations	61925	61925	29793
R^2	0.017	0.018	0.018
Firm FE	YES	YES	YES
Controls*MP1	NO	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

where $MP1$ represents one-dimensional surprise in monetary policy. In Table IV Column (1), we address the initial problem as defined in equation 4.1 with control variables. Column (2), introduces interactions between the one dimension surprise (MP1) and the control variables. Columns (3) is similar to column (2) but studies the impact of monetary policy during the ZLB period.

4.2.2 Results and Analysis: One dimensional surprise

Our results in Table IV column 1 and 2 illustrate that one-dimensional contractionary policy surprises (positive) have a negative impact on stock returns. This is in line with previous research (Gürkaynak, Karasoy-Can, and Lee, 2022; Ippolito, Ozdagli, and Perez-Orive, 2018; Gürkaynak, Sack, and Swanson, 2007; Bernanke and Kuttner, 2005). However, one-dimensional surprises lose their effectiveness at ZLB as shown in column (3) Table IV (Gürkaynak, Karasoy-Can, and Lee, 2022; Ippolito, Ozdagli, and Perez-Orive, 2018). This highlights the benefit of incorporating other dimensions of monetary policy surprise to accurately study the effects of monetary policy on stock returns at ZLB.

4.2.3 Empirical model: Two dimensional surprise

We update the model to include two surprise variables (*Path* and *Target*) specified in Equation 4.2 to examine the impact of monetary policy on firm-level outcomes by conducting a series of regression analyses in Table V:

$$\Delta P_{it} = \beta_0 + \beta_1(target_t) + \beta_2(path_t) + \Lambda(remaining controls\ and\ interaction\ terms) + \epsilon_{i,t} \tag{4.2}$$

In Table V Column (1), we address the initial problem as defined in equation 4.2. In Column (2), we introduce interactions between control variables and the target and path variables. We investigate the relationship between monetary policy surprises and stock returns, controlling for firm-level characteristics such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack. Column (3), is similar to column (2) but eliminates observations where firm filing dates are equal to the FOMC announcement dates as a robustness check. Columns (4) studies the impact of monetary policy during ZLB period. We later present Table VI where we study the period assessed by Gürkaynak, Karasoy-Can, and Lee (2022). Table VI, Column (1) and Column (2) are similar to those presented in Table V. Table VI Column (3), studies the impact of monetary policy during ZLB period.

4.2.4 Results and Analysis: Two dimension surprise

Our results in column 1,2 and 3 in Table V illustrate that monetary policy surprises (*Target* and *Path*) have a negative impact on stock returns after controlling for firm-fixed effects and other variables that affect stock returns. A positive surprise in monetary

Table V

Effects of Two-Dimension Monetary Policy Surprise on Stock Returns

We regress the two-day stock return around a sample of 153 FOMC announcements February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity, and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.2 without interaction terms. Column (2), along with the target and path variables, introduces interactions between the path and target and control variables as outlined in equation 4.2. Column (3) is similar to column (2) but eliminates observations where firm filing dates are equal to the FOMC announcement date as a robustness check. Columns (4) studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB period is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. This table presents variables of interest and the full table containing the controls and their interactions is presented in the Appendix Table XII. All regressions use winsorized independent variables and robust standard errors.

	(1)	(2)	(3)	(4)
	Stock Return	Stock Return	Stock Return	Stock Return
Target	-7.029***	-12.050***	-12.122***	4.574
	(0.417)	(3.204)	(3.209)	(5.035)
Path	-4.642***	-15.819***	-15.827***	-16.622***
	(0.171)	(1.279)	(1.289)	(2.333)
Book Leverage	-0.257***	-0.253***	-0.258***	0.082
	(0.094)	(0.094)	(0.095)	(0.164)
Asset Maturity	-0.702***	-0.699***	-0.728***	-0.548**
	(0.130)	(0.130)	(0.131)	(0.227)
Path * Book Leverage		1.179*	1.285**	1.845
		(0.620)	(0.624)	(1.163)
Path * Asset Maturity		-0.502	-0.511	-3.217***
		(0.603)	(0.610)	(1.059)
Target * Book Leverage		-2.900**	-2.922**	0.316
		(1.407)	(1.409)	(2.228)
Target * Asset Maturity		-0.546	-0.416	1.819
		(1.373)	(1.376)	(1.966)
Constant	3.658***	3.673***	3.777***	3.256***
	(0.345)	(0.344)	(0.347)	(0.615)
Observations	61925	61925	60240	29793
R^2	0.038	0.042	0.043	0.027
Firm FE	YES	YES	YES	YES
Controls/Controls*Target/Path	NO	YES	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

policy (contractionary monetary policy) would result in negative stock returns at the time of FOMC announcement. Stocks, being a long horizon asset are expected to respond more to the future course of policy as compared to current target setting. Our findings demonstrate this, that the stock returns respond more significantly to the path factor relative to the target factor.

To further test the impact of monetary policy, we conduct analyses in Columns (4) to investigate the impact of monetary policy during the ZLB period. By examining the impact of monetary policy during the ZLB period, we can better understand the effectiveness of monetary policy in different economic conditions. During the ZLB period, our analysis reveals a persistent effect of monetary policy surprises. Specifically, we find that the coefficient of the *target* variable changes from -12.050 in the whole sample to 4.574 during the ZLB period. Meanwhile, the coefficient of the *path* variable changes from -15.819 in the full sample to -16.622 during the ZLB period.

Our results suggest that the ZLB period corresponds to a reduction in the impact of monetary policy *target* surprises. In column (4), during the ZLB, *target* variable is not significant. The target variable is constructed to be closely aligned to the one-dimensional monetary policy surprise in equation 4.1. This finding aligns with the work of Ippolito, Ozdagli, and Perez-Orive (2018), who also observe no impact of monetary policy surprises during the ZLB period using one-dimensional surprises.
Comparatively, the *path* variable magnitude is increased during the ZLB period, indicating that investors are more concerned about the future rate of monetary policy.

Our analysis further suggests that if financial markets revise their forecasts of output, earnings, and dividends upwards in response to positive *path* factor surprises, the decline in stock prices that would ordinarily be expected cannot be mitigated by the improved economic outlook. This is not consistent with Gürkaynak, Karasoy-Can, and Lee (2022) who perceive that improved economic output would outpace *path* factor surprises. We present the period reviewed by Gürkaynak, Karasoy-Can, and Lee (2022) in Table VI and these results are consistent with their observations and conclusions. In our period, we discern that investors, at the time of the monetary policy announcement, are more concerned with the impact of the future path of interest rates on firm debt. The period between January 2019 and December 2022 includes pronounced uncertainty (and interest) about the future path of rates due to Covid-19 and unrelenting inflation in 2022.
When comparing Table IV and Table V we observe that there is increased R^2 in using

Table VI
Effects of Two-Dimension Monetary Policy Surprise on Stock Returns: Gürkaynak, Karasoy-Can, and Lee (2022) Period

We regress the two-day stock return around a sample of 153 FOMC announcements between February 2005 and December 2018 (The period assessed by Gürkaynak, Karasoy-Can, and Lee (2022)). We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity, and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.2. Column (2), along with the target and path variables, introduces interactions between the path and target and control variables as outlined in equation 4.2. Column (3) studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB period is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. This table presents variables of interest and the full table containing the controls and their interactions is presented in the Appendix Table XIII. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return
Target	-6.143***	-22.139***	21.931
	(0.537)	(4.179)	(16.925)
Path	-6.387***	-13.465***	-9.091***
	(0.195)	(1.491)	(2.535)
Constant	4.412***	4.532***	1.948*
	(0.438)	(0.438)	(1.074)
Observations	48068	48068	23102
R^2	0.056	0.059	0.041
Firm FE	YES	YES	YES
Controls*Target/Path	NO	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

two dimensions and the effects of monetary policy are present during the ZLB period that is silenced with the one dimensional measure.

4.2.5 Robustness Test: Two dimension surprise

The results presented are highly robust.

As a robustness check, we exclude observations with filings on the same date as the FOMC announcement in column 3 Table V. This suggests that our results are robust and not driven by any potential confounding factors related to firms that release their filings on the same day as the FOMC announcement.

Further, we observe similar results by replacing two-day stock returns with one-day stock returns and CAR, indicating robustness of the results in Table XIV. In Table XIV Column 1,2,3, we introduce CAR and in Column 4, we use one day stock returns. In all these scenarios the significance of *path* and *target* is highlighted while their coefficients indicate that contractionary monetary policy has negative impacts on stock returns. In the ZLB, column 3, *target* loses its significance compared to *path* which increases in magnitude while significance is maintained. The magnitude of *path* is however lower than that of *target* in column 1 and 2. In our regressions with CAR and daily returns, *path* has a larger magnitude compared to *target*. The difference may emanate from FOMC statements being issued in the afternoon and slow market response to the surprise therein, particularly for the *path* surprise.

Firms in our dataset also employ derivative instruments to convert their fixed-rate debt to floating rate debt. We remove observations where firms without floating rate debt use interest rate derivatives to analyse the true impact of hedging in mitigating cash outflows of firms with floating rate debt. Our results are robust if we control for interest rate derivatives being used for converting fixed rate debt to floating rate debt in column 5 Table XIV.

Our results are robust. The interaction between monetary policy surprises and stock returns is consistent with our earlier conclusion.

4.3 Cash-Flow Channel of Monetary Policy Transmission

We are intent on observing:

Hypothesis 3 *The returns of firms that possess higher floating rate debt obligations are more adversely affected by contractionary monetary policy surprises.*

Hypothesis 4 *The returns of firms that possess higher floating rate debt obligations with longer maturity are more adversely affected by contractionary monetary policy surprises.*

4.3.1 Empirical model

We analyse the interaction between two dimensional monetary policy surprises and floating rate variables using equation 4.3 and a series of regression analyses. Our results are presented in Table VII:

$$\Delta P_{it} = \beta_0 + \beta_1(target_t) + \beta_2(path_t) + \beta_3(leverage_{i,t-1}) + \beta_4(target_t * leverage_{i,t-1})$$
$$+ \beta_5(path_t * leverage_{i,t-1}) + \beta_6(FRD\_leverage_{i,t-1})$$
$$+ \beta_7(target_t * FRD\_leverage_{i,t-1}) + \beta_8(path_t * FRD\_leverage_{i,t-1})$$
$$+ \beta_9(exposure_{i,t-1}) + \beta_{10}(target_t * exposure_{i,t-1}) + \beta_{11}(path_t * exposure_{i,t-1})$$
$$+ \Lambda(remaining\, controls\, and\, interaction\, terms) + \epsilon_{i,t} \tag{4.3}$$

where *leverage* refers to bank debt leverage as a fraction of total assets, *FRD leverage* refers to total floating rate debt as a fraction of total assets, and *exposure* refers to the construct defined in equation 3.3. In Table VII column (1), we incorporate *leverage* and its interaction terms with *target* and *path* as additional variables to the initial problem defined in Table V. In Column (2), we incorporate *Floating Debt Leverage* in place of *leverage*. Column (3) incorporates *Exposure* in place of *leverage* and *Floating Rate Debt Leverage*. In Column (4), we incorporate *Exposure*, *leverage*, *Floating Debt Leverage* and their interaction terms with *target* and *path* as defined in equation 4.3. In column (5) we drop FRD Leverage from cololumn (4). Column (6) is similar to column (4) but with firm and time fixed effects. Column (7) is similar to column (5) but with firm and time fixed effects.

We introduce time fixed effects in Table XVI where Column (1), is similar to Table VII column (1), with time fixed effects in place of firm fixed effects. Table XVI Column (2) similar to Table VII Column (2) introducing time fixed effects in place firm fixed effects. Table XVI Column (3) similar to Table VII Column (3) introducing time fixed effects in place firm fixed effects. Table XVI Column (4) is similar to Table VII column (4) introducing Time fixed effects in place firm fixed effects. In Table XVI column (5) we drop FRD Leverage from Table XVI column (4). Table XVI Column (6) is similar to column (5) introducing time fixed effects along firm fixed effects. The results in both tables are similar. We here analys results from Table VII.

Table VII

Floating rate variables and Monetary Policy Surprises

We conducted a regression analysis on the two-day stock return using a sample of 153 FOMC announcements from February 2005 to December 2022. The analysis included various firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity, and financial slack, as defined in Chapter 3. To address firm-level heterogeneity, all regressions incorporated firm-level fixed effects. Column (1) includes target, path, Leverage (Bank Debt Leverage) and choice control variables outlined in equation 4.2. Column (2) includes Floating Rate Debt (FRD) Leverage instead of Bank Debt Leverage in column (1). Column (3) includes Exposure in place of Floating Rate Debt (FRD) Leverage in column (2) or Bank Debt Leverage in column (1). Column (4) includes all three floating rate variables and their interaction terms. In column (5) we drop FRD Leverage from cololumn (4). Column (6) is similar to column (4) but with firm and time fixed effects. Column (7) is similar to column (5) but with firm and time fixed effects. All other conventions were consistent with those in Table V. This table presents variables of interest and the full table containing the controls and their interactions is presented in the Appendix Table XV. All regressions use winsorized independent variables and robust standard errors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Stock Return	Stock Return	Stock Return	Stock Return	Stock Return	Stock Return	Stock Return
Target	-12.728***	-12.696***	-12.850***	-12.623***	-12.617***		
	(3.337)	(3.293)	(3.280)	(3.337)	(3.336)		
Path	-14.452***	-14.878***	-14.890***	-14.518***	-14.470***		
	(1.349)	(1.338)	(1.326)	(1.346)	(1.347)		
Leverage	0.412			0.292	-0.008	-0.603	-0.217
	(0.327)			(0.672)	(0.495)	(0.526)	(0.394)
FRD Leverage		0.381		-0.612		0.819	
		(0.333)		(0.867)		(0.668)	
Exposure			0.103*	0.158	0.106	0.014	0.090
			(0.061)	(0.117)	(0.092)	(0.087)	(0.070)
Path * Leverage	-8.362***			-11.430**	-6.643*	-9.335**	-5.849*
	(2.432)			(5.218)	(4.025)	(4.395)	(3.443)
Path * FRD Leverage		-6.759***		11.469		8.263	
		(2.504)		(7.501)		(6.526)	
Path * Exposure			-1.474***	-1.638	-0.420	-1.097	-0.221
			(0.473)	(1.086)	(0.786)	(0.844)	(0.537)

Continued in next page...

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return	(7) Stock Return
Target * Leverage	4.645			-1.509	-4.315	-7.219	-9.498
	(6.434)			(12.252)	(10.556)	(9.608)	(7.568)
Target * FRD Leverage		5.800		-8.264		-8.238	
		(6.864)		(20.715)		(14.211)	
Target * Exposure			1.462	3.123	2.189	3.828	2.766^{*}
			(1.285)	(3.349)	(2.116)	(2.353)	(1.485)
Constant	3.617^{***}	3.633^{***}	3.617^{***}	3.610^{***}	3.615^{***}	0.922	0.921
	(0.344)	(0.344)	(0.344)	(0.345)	(0.344)	(0.739)	(0.739)
Observations	61925	61925	61925	61925	61925	61925	61925
R^2	0.042	0.042	0.042	0.043	0.043	0.372	0.372
Time FE	NO	NO	NO	NO	NO	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES
Controls/Controls*Target/Path	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.3.2 Results and Analysis

In Table VII column (1) and Table XVI column (1), we observe that an interaction between positive surprise in forward guidance (path factor) and bank debt leverage adversely affects stock returns. This show that a surprise in monetary policy is transmitted through balance sheet effect and bank debt leverage explains the mechanism behind this channel in line with Ippolito, Ozdagli, and Perez-Orive (2018). However, Ippolito, Ozdagli, and Perez-Orive (2018) observe that bank debt leverage loses significance at ZLB. This is due to the fact that Ippolito, Ozdagli, and Perez-Orive (2018) use a single dimension of monetary policy surprise which loses significance at ZLB as shown in Table V.

In Table VII column (2) and Table XVI column (2), we add floating rate debt *FRD Leverage* of a firm and its interaction terms with *target* and *path*. Similarly, in column (3), we include only *exposure* of a firm and its interaction terms with policy surprises. Our results show that *FRD Leverage* and *exposure* are also statistically significant, providing support to the existence of cash flow channel. To select the best indicator of floating rate debt, we use all three variables together in column (4). Our results show that the interaction between bank debt leverage and *path* maintain significance. This shows that bank debt leverage is the variable used by investors to appreciate cash flow channel.

We find the interaction between *path* and proxies for floating rate debt to be significant and negatively associated with stock returns in Table VII column 1,2 and 3. This is due to the fact that, in the case of both fixed and floating rate debt, the impact of current target setting on cash flows is typically minimal. However, investors are more concerned about unexpected changes in the future path of monetary policy. This shows that a one-dimensional surprise employed by Kuttner (2001) and Ippolito, Ozdagli, and Perez-Orive (2018) is not effective in explaining the transmission of monetary policy into stock market.

Our results in Table VII column (4) show that bank debt leverage (*leverage*) is the most significant indicator of floating rate debt used by investors. We do not observe maturity of a debt, in exposure, playing a significant role in explaining cash flow channel of monetary policy. Though we do not identify a significant relationship between path and exposure, our results are not conclusive on the importance of maturity. *Exposure* as a variable is not relevant for measuring maturity.

We observe the R^2 as we include new variables into the equation. By including each variable seperately in column 1,2 and 3 the R^2 is unchanged. By adding all variables into the same equation the R^2 increases but not considerably in column 4. In column 5 and 7, by eliminating FRD_leverage, the R^2 is unchanged as well. Therefore, we observe that investors are more concerned about bank debt as opposed to *exposure* or total floating rate debt. This result is in line with Ippolito, Ozdagli, and Perez-Orive (2018) who uses bank debt leverage as a proxy for floating rate debt.

4.3.3 Robustness Test

The results presented are robust.

For robustness check, we replace our two-day stock returns in Table XVII with CAR (Columns 1 and 2) and one-day stock returns (Columns 3 and 4) to analyse the channel of monetary policy transmission. We observe that cash flow channel is effective in monetary policy transmission into stock market using CAR by the persistent significance of the interaction between *path* and *leverage*. In column (3) for one-day stock returns, our results are not significant. However, by removing firms that employ hedging to convert their fixed rate debt to variable rate debt or speculating in column (4), our results for CAR and one-day stock returns support the existence of cash flow channel. In line with Gürkaynak, Karasoy-Can, and Lee (2022), we assume that firms employing interest rate derivatives without floating rate exposure to be using derivatives for speculation instead of hedging. We discuss this further as we explore the mediating impact of hedging on the cash flow channel of monetary policy.

4.4 Does hedging work?

We have established that monetary policy has an impact on stock returns and that cash flows. We hypothesised that monetary policy is transmitted through the balance sheet effect, whereby firms with floating rate debt are more negatively affected by contractionary monetary policy than firms with fixed rate debt. We now analyze the usefulness of hedging in moderating the cash flow channel.

Hypothesis 5 *The returns of firms that possess higher unhedged floating rate debt obligations are more adversely affected by contractionary monetary policy surprises.*

Hypothesis 6 *The returns of firms that possess higher unhedged floating rate debt obligations with longer maturity are more adversely affected by contractionary monetary* *policy surprises.*

4.4.1 Empirical model

We analyse the use of hedging in moderating the impact of floating rate debt on stock returns using equation 4.4 and a series of regression analyses. Our results are presented in Table VIII:

$$\begin{aligned}\Delta P_{it} = {} & \beta_0 + \beta_1(target_t) + \beta_2(path_t) + \beta_3(exposure_{i,t-1}) + \beta_4(target_t * exposure_{i,t-1}) \\ & + \beta_5(path_t * exposure_{i,t-1}) + \beta_6(hedge_{i,q(t)-1} * target_t * exposure_{i,t-1}) \\ & + \beta_7(hedge_{i,q(t)-1} * path_t * exposure_{i,t-1}) + \beta_8(leverage_{i,t-1}) \\ & + \beta_9(target_t * leverage_{i,t-1}) + \beta_{10}(hedge_{i,q(t)-1} * target_t * leverage_{i,t-1}) \\ & + \beta_{11}(path_t * leverage_{i,t-1}) + \beta_{12}(hedge_{i,q(t)-1} * path_t * leverage_{i,t-1}) \\ & + \Lambda(remaining\, controls\, and\, interaction\, terms) + \epsilon_{i,t} \qquad (4.4)\end{aligned}$$

Table VIII Column (1), includes the Hedge variable, which we add to the problem defined in table VII. The purpose of this column is to examine the relationship between the interaction of hedging and exposure, and hedging and bank debt on stock returns. Specifically, we aim to investigate whether hedging serves as a mitigating factor in reducing the effects of floating rate debt on stock returns as realised in Gürkaynak, Karasoy-Can, and Lee (2022) or the impact of hedging is insignificant as Ippolito, Ozdagli, and Perez-Orive (2018) observes. In Column (2), we extend the analysis from Column (1) by removing firm-fixed effects and introducing time fixed effects. Column (3) further strengthens our analysis by including both firm and time fixed effects. This provides more robust analysis by controlling for both firm-level and time-varying factors, which enhances the reliability and validity of our findings.

4.4.2 Results and Analysis

Our analysis reveals that, contrary to Gürkaynak, Karasoy-Can, and Lee (2022), hedging does not appear to mitigate the negative impact of positive surprises in Path on stock returns for firms with floating rate debt. Our results are in line with Ippolito, Ozdagli, and Perez-Orive (2018), who shows that hedging is not important for financially unconstrained firms. We can infer few reasons in support of these results.

Although we include *hedge*, which is a dummy variable indicating whether a firm hedges or not, we do not consider the actual amount of debt that is hedged. This

Table VIII

Does Hedging Work?

We regress the two-day stock return around a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. In Column (1), we augment the Hedge variable into the problem as defined in table VII. This column includes target, path, exposure, leverage, choice control variables and their interactions as outlined in equation 4.4. Column (2) is a version of Column (1) that includes only time fixed effects. Column (3), on the other hand, includes both firm and time fixed effects. All other conventions were consistent with those in Table V and VII. The term "leverage" refers to bank debt leverage. All regressions use winsorized independent variables. This table presents variables of interest and the full table containing the controls and their interactions is presented in the Appendix Table XVIII. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return
Target	-15.033***		
	(4.945)		
Path	-15.694***		
	(1.999)		
Leverage	0.669	-0.007	0.513
	(0.922)	(0.662)	(0.778)
Hedge	1.134***	0.285	0.641*
	(0.354)	(0.216)	(0.334)
Exposure	-0.139	-0.129	-0.173
	(0.181)	(0.125)	(0.140)
Hedge * Path	3.287	1.825	1.874
	(2.759)	(2.258)	(2.069)
Hedge * Target	4.142	2.231	2.248
	(6.798)	(5.939)	(4.166)
Hedge * Leverage	-1.183	-0.416	-1.127
	(1.040)	(0.768)	(0.828)
Hedge * Exposure	0.319	0.264*	0.342**
	(0.203)	(0.144)	(0.166)
Path * Leverage	-12.289	-14.786**	-15.045**
	(8.112)	(6.623)	(6.558)
Path * Exposure	1.523	0.958	1.097
	(1.657)	(1.387)	(1.168)
Target * Leverage	8.919	2.510	0.539
	(24.123)	(19.626)	(12.215)
Target * Exposure	5.678	6.817*	7.737***
	(4.775)	(3.913)	(2.709)
Hedge * Path * Leverage	7.089	11.922	12.102
	(9.354)	(7.521)	(7.722)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return
Hedge * Path * Exposure	-2.483	-1.718	-1.751
	(1.884)	(1.548)	(1.458)
Hedge * Target * Leverage	-18.457	-16.338	-13.370
	(26.832)	(21.769)	(14.738)
Hedge * Target * Exposure	-3.399	-4.384	-5.411
	(5.319)	(4.353)	(3.614)
Constant	3.119***	-0.178	0.587
	(0.383)	(0.162)	(0.754)
Observations	61925	61925	61925
R^2	0.044	0.366	0.373
Firm FE	YES	NO	YES
Time FE	NO	YES	YES
Controls/Hedge*Controls	YES	YES	YES
Hedge*Controls*Target/Path	YES	YES	YES

Robust standard errors are reported in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

limitation may have influenced the impact of our interaction term on stock returns. Therefore, future research may explore the effect of the amount of hedging on the interaction term and its impact on stock returns, which could provide a more nuanced understanding of how stock returns respond to the cash flow channel.

Our methodology for deriving hedge is susceptible to Type I and Type II errors. We indicate and illustrate that this issue is also present for the Hedge indicator fronted by Gürkaynak, Karasoy-Can, and Lee (2022).

Further, it is important to review interest rate swaps as a tool for hedging. Do firms use these derivative instruments for hedging or timing the market? Our results suggest interest rate derivatives are used to reduce their short-term cost of capital by timing the market. We can observe this in our dataset where floating rate debt changes frequently for a typical firm. Further, firms maintain their interest rate exposure based on the steepness of yield curve. With a steep yield curve, firms resort to floating rate debt to reduce their short-term cost of capital. However, when recession expectations are higher, firms prefer fixed rate debt (Faulkender, 2005). As indicated in figure 1, the levels of debt increase over time but average floating rate debt levels oscillate without increasing in tandem with debt.

4.4.3 Robustness Tests

For robustness check, we study the impact of hedging on interaction terms of *leverage* and *exposure* separately in Table XIX. We observe results similar to Table VIII while incorporating both firm-fixed and time-fixed effects or each of them separately.

Further, in Table XX, we replace our two-day stock returns with one-day stock returns and CAR to analyse the effectiveness of hedging in moderating the cash flow channel. In column (1) and (2), we use CAR instead of two-day stock return to verify our results. Similarly, in column (3) and (4), we employ daily stock returns. Our results are robust even after excluding firms which employ interest rate derivatives with fixed-rate debt. We assume that these firms engage in speculation rather than hedging in line with Gürkaynak, Karasoy-Can, and Lee (2022).

However, in column (5), we observe the interaction between hedge, path and leverage to be positive and significant but at 10% confidence interval if we exclude firms that use derivatives for speculation. However, we do not find the interaction between hedge, path and exposure to be significant. This implies that leverage as a measure of floating rate debt is more effective than exposure. Further, hedging is not altogether ineffective even for unconstrained firms. This result, therefore, provides an avenue for future research where the amount of floating rate hedged by a firm be used to analyse the effectiveness of hedging in cash flow channel.

5 Conclusion

We examine how individual firms' stock prices respond to monetary policy, which reflects market participants' beliefs about its impact on their performance. We observe that monetary policy surprises have an impact on stock returns. A positive (contractionary) surprise in monetary policy results in negative stock returns at the time of FOMC announcement, on average.

We find that the stock returns respond more significantly to the *path* factor relative to the *target* factor for our sample period (2005-22). This contrasts Gürkaynak, Karasoy-Can, and Lee (2022) results where they find *target* factor to have higher impact on stock returns during the period 2004-18. Our results differ because the period between January 2019 and December 2022 includes pronounced uncertainty about the future path of rates due to Covid-19 and unrelenting inflation in 2022. For the period 2005-18, our results align with theirs, even during the ZLB period. However, our results differ from Ippolito, Ozdagli, and Perez-Orive (2018) when we investigate the impact of monetary policy during the ZLB period. The impact of monetary policy on stock returns is sustained through a surprise in forward guidance which is not taken into account by Ippolito, Ozdagli, and Perez-Orive (2018). During the ZLB period, the surprise in current target rate is reduced as investors are more concerned about the future course of monetary policy and react negatively to a positive suprise in forward guidance. However, firms do no respond homogeneously to monetary policy surprises.

We employ liability structure of firms to examine heterogeneity in firms' responses to policy surprises. We compare firms with similar characteristics but different types of liabilities - fixed vs. floating rate. Interest expense of firms with floating-rate debt is altered whereas there is no impact on cash flows of firms having fixed-rate debt as a result of monetary policy surprise. We measure these cash flow implications using Gürkaynak, Karasoy-Can, and Lee (2022) methodology and proposed variables. We provide evidence that firms with floating-rate debt are more adversely impacted by a positive policy surprise than firms with fixed-rate debt. We further observe that the interaction between *path* and *leverage* is significant and negatively associated with stock returns. This implies that future path of monetary policy drives variance in stock returns.

Contrary to Gürkaynak, Karasoy-Can, and Lee (2022), we observe bank debt leverage to be more significant than *exposure* in explaining cash flow channel of monetary policy transmission. There is a room to improve *exposure* that truly captures the role played by debt maturity in creating this variable. Further, we observe that hedging does not mitigate the negative impact of positive surprises in *path* on stock returns for firms with floating rate debt and evidence is to the contrary.

We suggest that future research may explore the effect of the extent of hedging on the interaction term and its impact on stock returns, which would provide a more nuanced understanding of how stock returns respond to the cash flow channel. On Gürkaynak, Karasoy-Can, and Lee (2022), we note that our sample period does not fully align with their research and suggest that future studies should consider the impact of monetary policy surprises using data from the same periods which was unavailable to the authors. We also note, in Section 3.5 that the dataset used to construct floating rate variables, the dataset used to construct GSS surprises and the methodology used to construct hedge by Gürkaynak, Karasoy-Can, and Lee (2022) is dissimilar to ours. We suggest that a comparison between the two datasets for floating rate variables can help determine the more efficient predictor of the observed impacts. On methodology, we suggest nascent technology such as AI-Large Language Models that can produce cleaner hedging indicators. Our results are robust when we employ one day stock returns and CAR.

In an era of raging interest rates, we find that our analysis is relevant. On the onset of 2023, Silicon Valley Bank collapsed due to many factors including a mismatch between the duration of its assets and liabilities. While we do not comment on financial institutions, our study is relevant for market participants and regulators. Investors and other market participants are concerned about the value of their holdings while central banks are watching for the effectiveness and effects of their policies. Our study reveals that monetary policy is effective and that the firm value is affected, to the interest of regulators and participants. We comment on market participants assessment of hedging strategies employed by firms. Hedging does not moderate the flow of cash.

Therefore, cash still flows.

Bibliography

Abraham, Facundo, Juan Jose Cortina Lorente, and Sergio Schmukler (2020). “Growth of Global Corporate Debt: Main Facts and Policy Challenges”. In: *SSRN Electronic Journal* September. ISSN: 1556-5068. DOI: 10.2139/ssrn.3690997. URL: https://www.ssrn.com/abstract=3690997.

Ashcraft, Adam B. and Murillo Campello (Sept. 2007). “Firm balance sheets and monetary policy transmission”. In: *Journal of Monetary Economics* 54.6, pp. 1515–1528. ISSN: 0304-3932. DOI: 10.1016/J.JMONECO.2007.03.003.

Bartram, Söhnke M. (2019). “Corporate hedging and speculation with derivatives”. In: *Journal of Corporate Finance* 57. ISSN: 09291199. DOI: 10.1016/j.jcorpfin.2017.09.023.

Bernanke, Ben S. and Alan S. Blinder (1992). “The federal funds rate and the channels of monetary transmission”. In: *American Economic Review* 82.4. ISSN: 00028282.

Bernanke, Ben S and Mark Gertler (1995). “Inside the Black Box: The Credit Channel of Monetary Policy Transmission”. In: *Journal of Economic Perspectives* 9.4, pp. 27–48.

Bernanke, Ben S. and Kenneth N. Kuttner (2005). “What explains the stock market’s reaction to federal reserve policy?” In: *Journal of Finance* 60.3, pp. 1221–1257. ISSN: 00221082. DOI: 10.1111/j.1540-6261.2005.00760.x.

Bernanke, Ben S. et al. (1988). “Is There a Corporate Debt Crisis?” In: *Brookings Papers on Economic Activity* 1988.1. ISSN: 00072303. DOI: 10.2307/2534425.

Bodnar, Gordon M. et al. (2012). “Managing Risk Management”. In: *SSRN Electronic Journal*. DOI: 10.2139/ssrn.1787144.

Brisker, Eric R., Gönül Çolak, and David R. Peterson (May 2013). “Changes in cash holdings around the S&P 500 additions”. In: *Journal of Banking and Finance* 37.5, pp. 1787–1807. ISSN: 03784266. DOI: 10.1016/J.JBANKFIN.2013.01.021.

Chernenko, Sergey and Michael Faulkender (2011). “The two sides of derivatives usage: Hedging and speculating with interest rate swaps”. In: *Journal of Financial and Quantitative Analysis* 46.6. ISSN: 00221090. DOI: 10.1017/S0022109011000391.

Ciccarelli, Matteo, Angela Maddaloni, and José Luis Peydró (Oct. 2015). “Trusting the bankers: A new look at the credit channel of monetary policy”. In: *Review of Economic Dynamics* 18.4, pp. 979–1002. ISSN: 1094-2025. DOI: 10.1016/J.RED.2014.11.002.

Cieslak, Anna et al. (2019). “Stock Returns over the FOMC Cycle”. In: *THE JOURNAL OF FINANCE •* LXXIV.5. DOI: 10.1111/jofi.12818. URL: https://onlinelibrary.wiley.com/doi/10.1111/jofi.12818.

Cook, Timothy and Thomas Hahn (1989). "The effect of changes in the federal funds rate target on market interest rates in the 1970s". In: *Journal of Monetary Economics* 24.3, pp. 331–351. ISSN: 03043932. DOI: 10.1016/0304-3932(89)90025-1.

Cooper, Michael J., Huseyin Gulen, and Michael J. Schill (2008). "Asset growth and the cross-section of stock returns". In: *Journal of Finance* 63.4, pp. 1609–1651. ISSN: 00221082. DOI: 10.1111/j.1540-6261.2008.01370.x.

Criste, Adina and Iulia Lupu (2014). "The Central Bank Policy between the Price Stability Objective and Promoting Financial Stability". In: *Procedia Economics and Finance* 8, pp. 219–225. ISSN: 22125671. DOI: 10.1016/S2212-5671(14)00084-7.

Damodaran, Aswath (2012). *Investment Valuation: Tools and Techniques for Determining the Value of any Asset, University Edition*.

Ehrmann, Michael and Marcel Fratzscher (2004). "Taking Stock: Monetary Policy Transmission to Equity Markets". In: *SSRN Electronic Journal* 36.4, pp. 719–737. ISSN: 00222879. DOI: 10.1353/mcb.2004.0063. URL: https://www.jstor.org/stable/3839039.

— (2021). "Taking Stock: Monetary Policy Transmission to Equity Markets". In: *SSRN Electronic Journal* 36.4, pp. 719–737. DOI: 10.2139/ssrn.533023. URL: https://www.jstor.org/stable/3839039.

Fabozzi, Frank J. (2013). *Bond markets, analysis, and strategies*. Pearson, p. 733. ISBN: 9780132743549.

Fama, Eugene F. and Kenneth R. French (1993). "Common risk factors in the returns on stocks and bonds". In: *Journal of Financial Economics* 33.1. ISSN: 0304405X. DOI: 10.1016/0304-405X(93)90023-5.

— (Apr. 2015). "A five-factor asset pricing model". In: *Journal of Financial Economics* 116.1, pp. 1–22. ISSN: 0304405X. DOI: 10.1016/j.jfineco.2014.10.010.

Faulkender, Michael (2005). "Hedging or market timing? Selecting the interest rate exposure of corporate debt". In: *Journal of Finance* 60.2. ISSN: 00221082. DOI: 10.1111/j.1540-6261.2005.00751.x.

Friedman, Milton and Anna Jacobson Schwartz (1963). *A monetary history of the United States, 1867-1960*, pp. 1–860. ISBN: 0691003548. DOI: 10.2307/2550627.

Gorodnichenko, Yuriy and Michael Weber (2016). "Are Sticky Prices Costly? Evidence from the Stock Market †". In: *American Economic Review* 106.1, pp. 165–199. DOI: 10.1257/aer.20131513. URL: http://dx.doi.org/10.1257/aer.20131513.

Gürkaynak, Refet, Hatice Gökçe Karasoy-Can, and Sang Seok Lee (2022). "Stock Market's Assessment of Monetary Policy Transmission: The Cash Flow Effect". In: *Journal of Finance* 77.4, pp. 2375–2421. ISSN: 15406261. DOI: 10.1111/jofi.13163.

Gürkaynak, Refet S. (2005). "Using Federal Funds Futures Contracts for Monetary Policy Analysis". In: *Finance and Economics Discussion Series* 2005.29, pp. 1–33. ISSN: 19362854. DOI: 10.17016/feds.2005.29.

Gürkaynak, Refet S., Brian P. Sack, and Eric T. Swanson (2007). "Market-based measures of monetary policy expectations". In: *Journal of Business and Economic Statistics* 25.2. ISSN: 07350015. DOI: 10.1198/073500106000000387.

Gurkaynak, Refet S., Brian P. Sack, and Eric T. Swanson (2011). "Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements". In: *SSRN Electronic Journal*. DOI: 10.2139/ssrn.633281.

Gürkaynak, Refet S., Brian P. Sack, and Eric T. Swanson (Apr. 2012). "Market-Based Measures of Monetary Policy Expectations". In: *http://dx.doi.org/10.1198/073500106000000387* 25.2, pp. 201–212. ISSN: 07350015. DOI: 10.1198/073500106000000387. URL: https://www.tandfonline.com/doi/abs/10.1198/073500106000000387.

Heck, Jean L, Terry L Zivney, and Naval K Modani (1995). "A Simplified Approach to Measuring Bond Duration". In: *FINANCIAL SERVICES REVIEW* 4, pp. 31–40. ISSN: 1057-0810.

Ippolito, Filippo, Ali K. Ozdagli, and Ander Perez-Orive (2018). "The transmission of monetary policy through bank lending: The floating rate channel". In: *Journal of Monetary Economics* 95, pp. 49–71. ISSN: 03043932. DOI: 10.1016/j.jmoneco.2018.02.001. URL: https://doi.org/10.1016/j.jmoneco.2018.02.001.

Jordà, Òscar et al. (2020). "Zombies at Large? Corporate Debt Overhang and the Macroeconomy". In: *Federal Reserve Bank of San Francisco, Working Paper Series* 35, pp. 1.000–46.000. DOI: 10.24148/wp2020-36. URL: https://www.frbsf.org/economic-research/publications/working-papers/2020/36/.

Kaplan, Steven N. and Richard S. Ruback (1995). "The Valuation of Cash Flow Forecasts: An Empirical Analysis". In: *The Journal of Finance* 50.4, p. 1059. ISSN: 00221082. DOI: 10.2307/2329344.

Kumar, Mukesh and Arvind Kalia (2012). "Preprocessing and symbolic representation of stock data". In: *Proceedings - 2012 2nd International Conference on Advanced Computing and Communication Technologies, ACCT 2012*, pp. 83–88. ISBN: 9780769546407. DOI: 10.1109/ACCT.2012.89.

Kuttner, Kenneth N. (2001). "Monetary policy surprises and interest rates: Evidence from the Fed funds futures market". In: *Journal of Monetary Economics* 47.3, pp. 523–544. ISSN: 03043932. DOI: 10.1016/S0304-3932(01)00055-1.

Mamun, Abdullah and M. Kabir Hassan (Nov. 2014). "What explains the lack of monetary policy influence on bank holding companies?" In: *Review of Financial Economics* 23.4, pp. 227–235. ISSN: 10583300. DOI: 10.1016/j.rfe.2014.09.002. URL: https://onlinelibrary.wiley.com/doi/full/10.1016/j.rfe.2014.09.002https://onlinelibrary.wiley.com/doi/abs/10.1016/j.rfe.2014.09.002https://onlinelibrary.wiley.com/doi/10.1016/j.rfe.2014.09.002.

Mazouz, Khelifa and Yuliang Wu (Jan. 2022). "Why do firm fundamentals predict returns? Evidence from short selling activity". In: *International Review of Financial Analysis* 79, p. 101974. ISSN: 1057-5219. DOI: 10.1016/J.IRFA.2021.101974.

Nakamura, Emi and Jón Steinsson (2018). "High-frequency identification of monetary non-neutrality: The information effect". In: *Quarterly Journal of Economics* 133.3, pp. 1283–1330. ISSN: 15314650. DOI: 10.1093/QJE/QJY004.

Rigobon, Roberto and Brian Sack (2003). "Measuring the reaction of monetary policy to the stock market". In: *Quarterly Journal of Economics* 118.2, pp. 639–669. ISSN: 00335533. DOI: 10.1162/003355303321675473.

— (2004). "The impact of monetary policy on asset prices". In: *Journal of Monetary Economics* 51.8, pp. 1553–1575. URL: https://ideas.repec.org/a/eee/moneco/v51y2004i8p1553-1575.htmlhttps://ideas.repec.org//a/eee/moneco/v51y2004i8p1553-1575.html.

Riksbank, Sveriges (2021). "ARTICLE – Higher interest-rate sensitivity in the Swedish economy". In: 131.2017, pp. 70–80.

Sims, Christopher A. (1972). *Money, Income, and Causality*.

Stohs, Mark Hoven and David C Mauer (1996). "The Determinants of Corporate Debt Maturity Structure". In: *Source: The Journal of Business* 69.3, pp. 279–312. URL: https://www.jstor.org/stable/2353370.

Swanson, Eric T. (Mar. 2021). "Measuring the effects of federal reserve forward guidance and asset purchases on financial markets". In: *Journal of Monetary Economics* 118, pp. 32–53. ISSN: 0304-3932. DOI: 10.1016/J.JMONECO.2020.09.003.

Thorbecke, Willem (1997). "On stock market returns and monetary policy". In: *Journal of Finance* 52.2, pp. 635–654. ISSN: 00221082. DOI: 10.1111/j.1540-6261.1997.tb04816.x.

A Appendix

A.1 Equations and Derivations

A.1.1 Return calculation

Returns

$$\Delta P_{i,t} = ln(P_{i,t+1}) - ln(P_{i,t-1}) \tag{A.1}$$

A.1.2 Factor Estimation

This is a brief explanation of our factor estimation, more information is detailed in Gurkaynak, Sack, and Swanson (2011).

- **Scaling the first two columns (*mp1* and *mp2*) of the factor estimation matrix**

In section 3.3.3, we estimate the matrix **X** using two columns of federal fund futures and three columns of Eurodollar futures. Nakamura and Steinsson (2018), Gurkaynak, Sack, and Swanson (2011), and Gürkaynak, Sack, and Swanson (2007) heed that Federal fund rate futures exhibit a payout based on the average effective federal funds rate that prevails over the contract month in IMM index terms[14]. The implied rate for current-month federal fund futures contract, $ff1$, is largely the weighed average of the rate that has prevailed through the month, r_0, and the rate that is expected to prevail for the remainder of the month, r_1:

$$ff1_{t-\Delta t} = \frac{d1}{D1} r_0 + \frac{D1 - d1}{D1} E_{t-\Delta t}(r_1) + \rho 1_{t-\Delta t} \tag{A.2}$$

where $t - \Delta t$ represents the period immediately before FOMC announcement, ρ represents the term/risk premium present in the contract, *d1* denotes the day of the month of FOMC announcement, *D1* the total number of days of the respective month, $E_{t-\Delta t}(r_1)$ is the rate expected to prevail for the remainder of the month (Gurkaynak, Sack, and Swanson, 2011)

From equation A.2, the first column in matrix **X**, measure of the changes in the current-month is calculated as:

$$mp1_t = \left(ff1_t - ff1_{t-\Delta t}\right) \frac{D1}{D1 - d1} \tag{A.3}$$

Gurkaynak, Sack, and Swanson (2011) extends this into the implied rate for three-month ahead federal fund futures contract, *ff2*:

$$ff2_{t-\Delta t} = \frac{d2}{D2} E_{t-\Delta t}(r_1) + \frac{D2 - d2}{D2} E_{t-\Delta t}(r_2) + \rho 2_{t-\Delta t} \tag{A.4}$$

where $E_{t-\Delta t}(r_2)$ is the expectation about federal funds rate target that will prevail after the second FOMC meeting from today (Gurkaynak, Sack, and Swanson, 2011). *d2* denotes the day

[14] IMM stands for the International Monetary Market, a division of Chicago Mercantile Exchange (CME). The IMM index terms price is simply the implied rate subtracted from 100.

of the second FOMC announcement from the current months, *D2* the total number of days of the month in the second FOMC announcement from current month and $\rho 2$ represents the term/risk premium present in that contract. From A.4, *mp2* is calculated as:

$$mp2_t = \left[(ff2_t - ff2_{t-\Delta t}) - \frac{d2}{D2} mp1_t \right] \frac{D2}{D2 - d2} \tag{A.5}$$

- **Structural interpretation of the unobserved factors**

After the construction of the matrix, **X** in section 3.3.3, we allude to manipulations to clearly interpret our factors. After the rotation of the principal component factors for interpretation, we define **Z**, a 162 x 2 matrix, by

$$Z = FU \tag{A.6}$$

Where

$$U = \begin{bmatrix} \alpha_1 & \beta_1 \\ \alpha_2 & \beta_2 \end{bmatrix} \tag{A.7}$$

Gurkaynak, Sack, and Swanson (2011) identifies U using four restrictions.

1. Columns of U are normalised to have unit length (normalising Z_1 and Z_2 to have unit variance)

2. Z_1 and Z_2 should be orthogonal

3. Z_2 must not influence the policy surprise $mp1$. Let γ_1 and γ_2 denote the known loading of mp1 on F_1 and F_2, respectively. Since

$$F_1 = \frac{1}{\alpha_1\beta_2 - \alpha_2\beta_1}[\beta_2 Z_1 - \alpha_2 Z_2] \tag{A.8}$$

$$F_1 = \frac{1}{\alpha_1\beta_2 - \alpha_2\beta_1}[\beta_2 Z_1 - \alpha_2 Z_2] \tag{A.9}$$

4. following that

$$\gamma_2\alpha_1 - \gamma_1\alpha_2 = 0 \tag{A.10}$$

Finally, Gurkaynak, Sack, and Swanson (2011), recommend that Z_1 is re-scaled to move mp1 one for one and Z_2 is re-scaled to have similar magnitude as the year ahead Eurodollar futures rate as Z_1 has on the same rate.

A.2 Tables

A.2.1 Hedging indicator

Table IX
Hedging Indicator:
(Random Sample)

We tabulate the differences between our Hedge indicator in column (4) and that provided by Gürkaynak, Karasoy-Can, and Lee (2022) (G-Hedge) in column (6). We have 46,822 filings that are comparable to the list of hedge provided by Gürkaynak, Karasoy-Can, and Lee (2022). We find 7,031 (15.02%) differences between our indicators for hedge. Of these 6,951 (98.86% of the differences) are incidences where we indicate that there is a hedge but Gürkaynak, Karasoy-Can, and Lee (2022) indicates that there is no hedge. This table consists of a random sample of 30 observations of differences between our hedging indicator. On observations where we find hedge to be positive, we indicate the phrase found in column (5). We manually read the document searching for the phrases found and indicate in column (7) with a 1 when we are right and Gürkaynak, Karasoy-Can, and Lee (2022)'s indicator is wrong. Where Gürkaynak, Karasoy-Can, and Lee (2022) is right (and we are wrong) we further inspect the document for a motivation. *Data* is a Type I error where it indicates that there was a problem with the data source that we had collected using sec-api such as missing sections in the reports, consequently finding no hedge where there is a hedge. Fixed to floating indicates a Type II error where our hedge indicated a hedge for floating to fixed when it was from fixed to floating (no floating rate debt hedge). Historical indicates observations where the firms are describing historical use of hedging. Do not use highlights incidences when the firm uses unidentified phrasing to idnicate that they do not use or there is no way of controlling for such a case. Column (1) indicates the gvkey of the firm, column (2) indicates the filing date and column 3 indicates the type of filing.

(1) **gvkey**	(2) **Date**	(3) **Type**	(4) **Hedge**	(5) **Found**	(6) **G-Hedge**	(7) **Check**	(8) **Motivation**
1209	27/07/2011	10-Q	1	interest rate swap	0	1	-
1209	24/07/2013	10-Q	1	interest rate swap	0	1	-
1209	24/07/2014	10-Q	1	interest rate swap	0	1	-
2154	01/08/2014	10-Q	1	hedges interest rate	0	1	-
2435	27/06/2011	10-K	1	interest rate hedge	0	0	data
4699	20/02/2019	10-K	1	hedge interest rate	0	1	-
12485	07/11/2018	10-Q	1	interest rate swap	0	1	-
4699	23/02/2009	10-K	1	hedge interest rate	0	1	-
4799	08/08/2011	10-Q	1	hedge interest rate	0	1	-
5597	28/07/2017	10-Q	1	interest rate derivative	0	1	-
6136	28/07/2016	10-Q	1	interest rate swap	0	0	historical
7435	30/07/2015	10-Q	1	hedge against interest rate	0	1	-
11259	01/04/2015	10-K	1	interest rate hedge	0	0	data
11535	29/10/2007	10-Q	1	interest rate protection	0	0	do not use
10614	06/03/2006	10-K	1	interest rate swap	0	0	fixed to floating
6653	08/11/2011	10-Q	1	interest rate protection	0	0	data
3504	22/12/2016	10-K	1	interest rate derivative	0	1	-
10631	07/05/2010	10-Q	1	interest rate swap	0	0	data
10903	04/08/2014	10-Q	1	interest rate swap	0	1	-
7938	02/08/2016	10-Q	1	interest rate swap	0	1	-
13700	06/05/2016	10-Q	1	interest rate swap	0	0	fixed to floating
26011	07/08/2006	10-Q	1	interest rate swap	0	0	data
28180	08/11/2012	10-Q	1	interest rate swap	0	0	historical
29804	30/10/2009	10-Q	1	interest rate swap	0	0	data/financial
8264	19/02/2004	10-K	1	interest rate hedge	0	1	-

Continued in next page...

(1) **gvkey**	(2) **Date**	(3) **Type**	(4) **Hedge**	(5) **Found**	(6) **G-Hedge**	(7) **Check**	(8) **Motivation**
8099	29/10/2015	10-Q	1	interest rate derivative	0	1	-
8694	08/02/2019	10-K	1	hedges for interest rate	0	1	-
7881	31/10/2007	10-Q	1	interest rate swap	0	0	fixed to floating
8214	10/02/2016	10-K	1	hedges interest rate	0	1	-
4199	26/02/2015	10-K	1	interest rate swap	0	1	-

A.2.2 Control variables

Table X

Control Variable Definitions and Derivation

Fundamentals are drawn from WRDS (Compustat-CIQ database). This data is sampled at quarterly frequencies and contains information of total assets (*atq*), operating income before depreciation (*oibdq*), number of common shares (*cshoq*), price per share (*prccq*), total current debt (*dlcq*), total long term debt (*dlttq*), gross property plant and equipment (*ppegtq*), depreciation charge per quarter (*dpq*), cost of goods sold (*cogsq*), cash holdings (*cheq*) and retained earnings (*req*) along with firms' identifying variable (*cik*). Quarterly fundamentals provide the highest resolution in representing firms' fundamentals. We append the United States Consumer Price Index (*CPI*) quarterly data from FRED economic database onto the fundamentals for deflation of our variable, *size*. We present control variable construction

Control Variable (Frequency)	**Definition**	**Construction**
Bank Debt Leverage (annual)	This is the sum of bank issued loans defined as term loans and credit lines as a fraction of total assets	$\frac{Total\,Bank\,Debt}{ATQ}$
Floating rate debt leverage (quarterly)	This is the sum of of all floating rate debt as a fraction of total assets	$\frac{Total\,Floating\,Rate\,Debt}{ATQ}$
ZLB (quarterly)	This is a dummy variable that is equal to 1 for the period from 01/01/2009 to 31/12/2015 and 01/03/2019 to 31/12/2021.	$dummy\,variable$
Size (quarterly)	This is the total assets deflated by CPI. It is included as the growth in assets of a big firm is relatively small and risk-adjusted stock return is negatively related to asset growth rate (Cooper, Gulen, and Schill, 2008).	$log(Deflated\,ATQ)$
Profitability (quarterly)	This is the operating income before depreciation as a fraction of total assets. It is included as less profitable firms are more sensitive to industry news.	$\frac{OIBDQ}{ATQ}$
Book Leverage (quarterly)	This is a ratio of current and long term debts as a fraction of book value of equity and total debt (total debt + value of equity)	$\frac{DLCQ+DLTTQ}{DLCQ+DLTTQ+CEQQ}$

Continued...

Control Variable (Frequency)	**Definition**	**Construction**
Market to book ratio (quarterly)	The sum of the market value of equity and total debts as a fraction of total assets. It impacts stock returns due to change in market value of debt and equity.	$\frac{PRCCQ \cdot CSHOQ + DLCQ + DLTTQ}{ATQ}$
Asset maturity (quarterly)	The sum of the product of gross property, plant, and equipment as a fraction of total assets and as a fraction of depreciation and amortisation and the product of current assets as a fraction of total assets and as a fraction of cost of goods sold. It is is related to replacement cost of an asset. During periods of high interest rates, replacement costs would be higher and, consequently, a factor in determination of stock returns (Stohs and Mauer, 1996) .	$\frac{PPE}{ATQ} \cdot \frac{PPE}{DPQ} + \frac{CA}{ATQ} \cdot \frac{CA}{COGS}$
Financial Slack (quarterly)	Cash holding as a fraction of total assets.	$\frac{CHEQ}{ATQ}$
Retained Earnings (quarterly)	Retained earnings as a fraction of total assets	$\frac{REQ}{ATQ}$
Short term debt (quarterly)	Short-term debt as a fraction of total assets	$\frac{DLCQ}{ATQ}$

A.2.3 Regression Tables

Table XI

Effects of One Dimensional Policy Surprise on Stock Returns

We regress the two-day stock return on a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.1 with choice control variables. Column (2), along with the target, path variables and choice control variables introduces interactions as outlined in equation 4.1. Columns (3) is similar to column (2) but studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. This is the the full table containing the controls and their interactions while a partial table is presented in the Table IV. All regressions use winsorized independent variables and robust standard errors.

[redacted]	(1)	(2)	(3)
Stock Return	Stock Return	Stock Return	
MP1 Surprise	-7.312***	-13.356***	2.002
	(0.437)	(3.367)	(5.323)
Profitability	1.726	1.603	2.679*
	(1.071)	(1.066)	(1.601)
Book Leverage	-0.278***	-0.300***	0.009
	(0.095)	(0.095)	(0.165)
Market to Book	-0.011	-0.009	-0.062**
	(0.019)	(0.019)	(0.028)
Asset Maturity	-0.586***	-0.592***	-0.578**
	(0.130)	(0.130)	(0.227)
Financial Slack	0.899***	0.969***	0.743*
	(0.236)	(0.235)	(0.391)
MP1 Surprise * Size		0.750**	-0.738
		(0.341)	(0.523)
MP1 Surprise * Profitability		-13.961	-32.693
		(23.796)	(42.240)
MP1 Surprise * Book Leverage		-3.811***	-0.529
		(1.472)	(2.303)
MP1 Surprise * Market to Book		0.184	-0.899*
		(0.360)	(0.470)
MP1 Surprise * Asset Maturity		-0.953	0.615
		(1.442)	(2.087)
MP1 Surprise * Financial Slack		12.693***	8.628*
		(3.832)	(4.857)
Constant	0.054	0.055	0.014
	(0.080)	(0.080)	(0.131)
Observations	61925	61925	29793
R^2	0.017	0.018	0.018
Firm FE	YES	YES	YES
Controls*MP1	NO	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XII

Effects of Two-Dimension Monetary Policy Surprise on Stock Returns

We regress the two-day stock return around a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.2. Column (2), along with the target and path variables, introduces interactions between the path and target and control variables as outlined in equation 4.2. Column (3) is similar to column (2) but eliminates observations where firm filing dates are equal to the FOMC announcement date as a robustness 3. Columns (4) studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB period is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. This is the the full table containing the controls and their interactions while a partial table is presented in the Table V. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return
Target	-7.029***	-12.050***	-12.122***	4.574
	(0.417)	(3.204)	(3.209)	(5.035)
Path	-4.642***	-15.819***	-15.827***	-16.622***
	(0.171)	(1.279)	(1.289)	(2.333)
Size	-0.401***	-0.403***	-0.414***	-0.375***
	(0.037)	(0.037)	(0.037)	(0.068)
Profitability	0.818	0.882	0.022	2.154
	(1.072)	(1.068)	(1.072)	(1.611)
Book Leverage	-0.257***	-0.253***	-0.258***	0.082
	(0.094)	(0.094)	(0.095)	(0.164)
Market to Book	0.018	0.012	0.025	-0.026
	(0.019)	(0.019)	(0.019)	(0.029)
Asset Maturity	-0.702***	-0.699***	-0.728***	-0.548**
	(0.130)	(0.130)	(0.131)	(0.227)
Financial Slack	0.475**	0.482**	0.477**	0.462
	(0.237)	(0.236)	(0.237)	(0.386)
Path * Size		1.038***	1.037***	1.288***
		(0.133)	(0.134)	(0.244)
Path * Profitability		-16.550**	-16.767**	-23.887*
		(8.216)	(8.263)	(14.161)
Path * Book Leverage		1.179*	1.285**	1.845
		(0.620)	(0.624)	(1.163)
Path * Market to Book		1.327***	1.315***	1.944***
		(0.132)	(0.132)	(0.288)
Path * Asset Maturity		-0.502	-0.511	-3.217***
		(0.603)	(0.610)	(1.059)
Path * Financial Slack		-1.067	-0.793	-3.981
		(1.414)	(1.420)	(2.509)
Target * Size		0.567*	0.573*	-0.937*
		(0.324)	(0.324)	(0.494)
Target * Profitability		5.052	1.192	-38.895
		(23.284)	(23.295)	(40.518)
Target * Book Leverage		-2.900**	-2.922**	0.316
		(1.407)	(1.409)	(2.228)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return
Target * Market to Book		-0.149	-0.098	-1.093**
		(0.353)	(0.353)	(0.446)
Target * Asset Maturity		-0.546	-0.416	1.819
		(1.373)	(1.376)	(1.966)
Target * Financial Slack		13.469***	13.573***	8.161*
		(3.612)	(3.621)	(4.635)
Constant	3.658***	3.673***	3.777***	3.256***
	(0.345)	(0.344)	(0.347)	(0.615)
Observations	61925	61925	60240	29793
R^2	0.038	0.042	0.043	0.027
Firm FE	YES	YES	YES	YES
Controls*Target/Path	NO	YES	YES	YES

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XIII

Effects of Two-Dimension Monetary Policy Surprise on Stock Returns: Gürkaynak, Karasoy-Can, and Lee (2022) Period

We regress the two-day stock return around a sample of 153 FOMC announcements between February 2005 and December 2018 (The period assessed by Gürkaynak, Karasoy-Can, and Lee (2022)). We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.2. Column (2), along with the target and path variables, introduces interactions between the path and target and control variables as outlined in equation 4.2. Column (3) studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB period is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. This is the the full table containing the controls and their interactions while a partial table is presented in the Table VI. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return
Target	-6.143***	-22.139***	21.931
	(0.537)	(4.179)	(16.925)
Path	-6.387***	-13.465***	-9.091***
	(0.195)	(1.491)	(2.535)
Size	-0.464***	-0.478***	-0.206*
	(0.047)	(0.047)	(0.121)
Profitability	-0.673	-0.728	-1.053
	(1.198)	(1.196)	(1.849)
Book Leverage	-0.078	-0.071	0.600**
	(0.113)	(0.113)	(0.242)
Market to Book	-0.040	-0.047*	-0.080*
	(0.025)	(0.025)	(0.044)
Asset Maturity	-0.610***	-0.604***	-0.760**
	(0.157)	(0.157)	(0.317)
Financial Slack	-0.027	-0.037	-0.694
	(0.270)	(0.271)	(0.479)
Path * Size		0.697***	0.606**
		(0.157)	(0.263)
Path * Profitability		-12.541	-13.623
		(9.433)	(15.056)
Path * Book Leverage		0.208	2.169*
		(0.769)	(1.216)
Path * Market to Book		1.337***	0.875***
		(0.199)	(0.311)
Path * Asset Maturity		-1.774***	-3.515***
		(0.685)	(1.135)
Path * Financial Slack		-2.082	-3.991
		(1.624)	(2.623)
Target * Size		1.619***	-0.567
		(0.429)	(1.742)
Target * Profitability		-0.021	-199.316*
		(28.644)	(106.083)
Target * Book Leverage		-3.320*	21.584***
		(1.881)	(7.880)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return
Target * Market to Book		1.115**	-0.538
		(0.569)	(1.759)
Target * Asset Maturity		-1.932	24.692***
		(1.780)	(7.811)
Target * Financial Slack		15.082***	-25.804
		(4.990)	(16.175)
Constant	4.412***	4.532***	1.948*
	(0.438)	(0.438)	(1.074)
Observations	48068	48068	23102
R^2	0.056	0.059	0.041
Firm FE	YES	YES	YES
Controls*Target/Path	NO	YES	YES

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XIV
Effects of Two-Dimension Monetary Policy Surprise on Stock Returns: Robustness check

We regress the Market-Model Adjusted Cummulative Abnormal Return (CAR) squared around a sample of 153 FOMC announcements between February 2005 and December 2022 for column 1, 2 and 3. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To account for firm-level heterogeneity, all regressions also include firm-level fixed effects. Column (1) addresses the initial problem as defined in equation 4.2 similar to Table VII Column (1). Column (2) introduces interactions between the path and target and control variables as outlined in equation 4.2 similar to Table VII Column (2). Column (3) studies the impact of monetary policy during the Zero Lower Bound (ZLB) period. The ZLB period is defined as the period between January 2009 and December 2015 and the period between March 2020 and December 2021. We regress the One day Stock Return around a sample of 153 FOMC announcements between February 2005 and December 2022 similar to Table VII Column (1). For Column (4) we regress the one day stock return on the fundamentals similar to column (2) in all other aspects. We regress the two day Stock Return around a sample of 153 FOMC announcements between February 2005 and December 2022 for column (5) after eliminating observations that may involve speculating. In our data set we define these as firms that do not hold floating rate debt but have hedged. This is the the full table containing the controls and their interactions. All regressions use winsorized independent variables and robust standard errors.

	(1) CAR	(2) CAR	(3) CAR	(4) Daily Return	(5) Stock Return
Target	-0.550***	-1.052***	-0.655	-5.323**	-12.888***
	(0.041)	(0.314)	(0.610)	(2.452)	(4.076)
Path	-0.119***	-0.384***	-0.632***	-2.534***	-16.258***
	(0.016)	(0.126)	(0.229)	(0.925)	(1.631)
Size	-0.035***	-0.035***	-0.023***	-0.204***	-0.362***
	(0.003)	(0.003)	(0.006)	(0.026)	(0.044)
Profitability	-0.501***	-0.489***	-0.834***	-0.860	1.282
	(0.105)	(0.105)	(0.155)	(0.761)	(1.247)
Book Leverage	0.055***	0.055***	0.107***	-0.194***	-0.221*
	(0.009)	(0.009)	(0.015)	(0.066)	(0.116)
Market to Book	-0.007***	-0.007***	-0.006**	-0.008	0.022
	(0.002)	(0.002)	(0.003)	(0.014)	(0.022)
Asset Maturity	0.016	0.016	0.048**	-0.306***	-0.680***
	(0.012)	(0.012)	(0.020)	(0.092)	(0.157)
Financial Slack	-0.052**	-0.052**	-0.061*	0.177	0.988***
	(0.022)	(0.022)	(0.031)	(0.168)	(0.290)
Path * Size		0.027**	0.038*	0.039	1.062***
		(0.013)	(0.022)	(0.095)	(0.174)
Path * Profitability		-1.059	2.518*	15.405***	-7.432
		(0.841)	(1.351)	(5.670)	(9.293)
Path * Book Leverage		-0.067	-0.091	-0.832*	1.136
		(0.065)	(0.112)	(0.434)	(0.753)
Path * Market to Book		0.057***	0.064**	0.080	1.230***
		(0.012)	(0.027)	(0.097)	(0.149)
Path * Asset Maturity		-0.027	-0.020	-0.802**	-0.804
		(0.056)	(0.096)	(0.397)	(0.711)
Path * Financial Slack		-0.034	0.052	-0.332	-0.848
		(0.135)	(0.203)	(1.019)	(1.639)
Target * Size		0.054*	0.024	0.523**	0.547

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	(1) CAR	(2) CAR	(3) CAR	(4) Daily Return	(5) Stock Return
		(0.031)	(0.059)	(0.250)	(0.424)
Target * Profitability		2.555	7.711**	-26.459*	11.882
		(2.476)	(3.847)	(15.964)	(26.729)
Target * Book Leverage		-0.288*	-0.540**	0.650	-2.132
		(0.162)	(0.222)	(1.129)	(1.707)
Target * Market to Book		0.013	-0.049	0.099	-0.147
		(0.037)	(0.045)	(0.274)	(0.393)
Target * Asset Maturity		0.031	0.087	-0.571	-0.068
		(0.136)	(0.175)	(1.080)	(1.653)
Target * Financial Slack		0.144	0.640	9.974***	15.500***
		(0.413)	(0.460)	(2.725)	(4.166)
Constant	0.460***	0.459***	0.316***	2.186***	3.096***
	(0.032)	(0.032)	(0.056)	(0.242)	(0.399)
Observations	54870	54870	26258	61925	42296
R^2	0.092	0.093	0.119	0.019	0.047
Firm FE	YES	YES	YES	YES	YES
Controls*Target/Path	NO	YES	YES	YES	YES

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XV

Cash Flow Channel of Monetary Policy Surprise transmission

We conduct a regression analysis on the two-day stock return using a sample of 153 FOMC announcements from February 2005 to December 2022. The analysis included various firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To address firm-level heterogeneity, all regressions incorporated firm-level fixed effects. Column (1), is similar to column (1) Table V, which included target, path, Leverage (Bank Debt Leverage) and choice control variables outlined in equation 4.2. Column (2) includes Floating Rate Debt (FRD) Leverage instead of Bank Debt Leverage in column (1). Column (3) includes Exposure in place of Floating Rate Debt (FRD) Leverage in column (2) or Bank Debt Leverage in column (1). Column (4) includes all three floating rate variables and their interaction terms. In column (5) we drop FRD Leverage from cololumn (4). Column (6) is similar to column (4) but with firm and time fixed effects. Column (7) is similar to column (5) but with firm and time fixed effects. All other conventions were consistent with those in Table V. The term "leverage" refers to bank debt leverage. This is the the full table containing the controls and their interactions while a partial table is presented in the Table VII. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return	(7) Stock Return
Target	-12.728***	-12.696***	-12.850***	-12.623***	-12.617***		
	(3.337)	(3.293)	(3.280)	(3.337)	(3.336)		
Path	-14.452***	-14.878***	-14.890***	-14.518***	-14.470***		
	(1.349)	(1.338)	(1.326)	(1.346)	(1.347)		
Leverage	0.412			0.292	-0.008	-0.603	-0.217
	(0.327)			(0.672)	(0.495)	(0.526)	(0.394)
Size	-0.399***	-0.400***	-0.398***	-0.398***	-0.398***	-0.107	-0.106
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.078)	(0.078)
Profitability	0.877	0.867	0.858	0.855	0.844	0.504	0.497
	(1.068)	(1.068)	(1.068)	(1.068)	(1.068)	(1.511)	(1.511)
Book Leverage	-0.279***	-0.278***	-0.287***	-0.282***	-0.286***	0.164	0.165
	(0.097)	(0.097)	(0.096)	(0.097)	(0.097)	(0.105)	(0.105)
Market to Book	0.013	0.013	0.012	0.012	0.013	0.025	0.025
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.035)	(0.035)
Asset Maturity	-0.685***	-0.689***	-0.682***	-0.678***	-0.681***	-0.357**	-0.355**
	(0.130)	(0.130)	(0.130)	(0.130)	(0.130)	(0.168)	(0.168)
Financial Slack	0.518**	0.508**	0.515**	0.518**	0.517**	0.249	0.248
	(0.237)	(0.237)	(0.237)	(0.237)	(0.237)	(0.240)	(0.241)
Path * Leverage	-8.362***			-11.430**	-6.643*	-9.335**	-5.849*

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	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return	(7) Stock Return
	(2.432)			(5.218)	(4.025)	(4.395)	(3.443)
Path * Size	0.917***	0.952***	0.952***	0.924***	0.918***	0.140	0.135
	(0.138)	(0.138)	(0.137)	(0.138)	(0.138)	(0.280)	(0.276)
Path * Profitability	-17.363**	-17.051**	-17.004**	-17.324**	-17.344**	20.185*	20.225*
	(8.235)	(8.232)	(8.223)	(8.230)	(8.235)	(11.054)	(11.062)
Path * Book Leverage	1.793***	1.643**	1.686***	1.793***	1.810***	0.139	0.141
	(0.646)	(0.644)	(0.641)	(0.647)	(0.647)	(0.586)	(0.584)
Path * Market to Book	1.311***	1.318***	1.315***	1.307***	1.311***	0.048	0.049
	(0.132)	(0.132)	(0.132)	(0.132)	(0.132)	(0.326)	(0.326)
Path * Asset Maturity	-0.681	-0.623	-0.620	-0.669	-0.674	-1.552	-1.557
	(0.607)	(0.606)	(0.605)	(0.606)	(0.606)	(1.131)	(1.131)
Path * Financial Slack	-1.969	-1.668	-1.699	-1.982	-1.968	0.265	0.284
	(1.426)	(1.424)	(1.422)	(1.426)	(1.425)	(1.726)	(1.732)
Target * Leverage	4.645			-1.509	-4.315	-7.219	-9.498
	(6.434)			(12.252)	(10.556)	(9.608)	(7.568)
Target * Size	0.629*	0.629*	0.647**	0.628*	0.628*	0.960	0.963
	(0.334)	(0.331)	(0.330)	(0.334)	(0.334)	(0.634)	(0.639)
Target * Profitability	5.710	5.578	5.381	4.909	5.046	-11.629	-11.543
	(23.316)	(23.327)	(23.312)	(23.321)	(23.327)	(19.090)	(19.133)
Target * Book Leverage	-3.228**	-3.280**	-3.411**	-3.325**	-3.339**	-1.779	-1.774
	(1.459)	(1.449)	(1.448)	(1.461)	(1.460)	(1.168)	(1.156)
Target * Market to Book	-0.148	-0.155	-0.149	-0.138	-0.148	0.239	0.232
	(0.353)	(0.353)	(0.354)	(0.355)	(0.354)	(0.650)	(0.653)
Target * Asset Maturity	-0.449	-0.457	-0.457	-0.492	-0.480	-0.195	-0.189
	(1.378)	(1.376)	(1.376)	(1.379)	(1.378)	(2.293)	(2.302)
Target * Financial Slack	13.920***	13.935***	14.000***	13.772***	13.825***	12.766	12.839
	(3.673)	(3.666)	(3.648)	(3.677)	(3.671)	(9.729)	(9.828)
FRD Leverage		0.381		-0.612		0.819	
		(0.333)		(0.867)		(0.668)	
Path * FRD Leverage		-6.759***		11.469		8.263	

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	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return	(7) Stock Return
		(2.504)		(7.501)		(6.526)	
Target * FRD Leverage		5.800		-8.264		-8.238	
		(6.864)		(20.715)		(14.211)	
Exposure			0.103*	0.158	0.106	0.014	0.090
			(0.061)	(0.117)	(0.092)	(0.087)	(0.070)
Path * Exposure			-1.474***	-1.638	-0.420	-1.097	-0.221
			(0.473)	(1.086)	(0.786)	(0.844)	(0.537)
Target * Exposure			1.462	3.123	2.189	3.828	2.766*
			(1.285)	(3.349)	(2.116)	(2.353)	(1.485)
Constant	3.617***	3.633***	3.617***	3.610***	3.615***	0.922	0.921
	(0.344)	(0.344)	(0.344)	(0.345)	(0.344)	(0.739)	(0.739)
Observations	61925	61925	61925	61925	61925	61925	61925
R^2	0.042	0.042	0.042	0.043	0.043	0.372	0.372
Time FE	NO	NO	NO	NO	NO	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES
Controls/Controls*Target/Path	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XVI

Cash Flow Channel of Monetary Policy Surprise transmission: Time Fixed Effects and Firm Fixed Effects

We conduct a regression analysis on the two-day stock return using a sample of 153 FOMC announcements from February 2005 to December 2022. The analysis included various firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack as defined in Chapter 3. Column (1), is similar to Table XV column (1), which included target, path, Leverage (Bank Debt Leverage) and choice control variables outlined in equation 4.2 while the difference exists in the introduction of Time fixed effects and removing firm fixed effects. Column (2) includes Floating Rate Debt (FRD) Leverage instead of Bank Debt Leverage in column (1) similar to Table XV Column (2) while the difference exists in the introduction of Time fixed effects and removing firm fixed effects. Column (3) includes Exposure in place of Floating Rate Debt (FRD) Leverage in column (2) or Bank Debt Leverage in column (1) similar to Table XV Column (3) while the difference exists in the introduction of Time fixed effects and removing firm fixed effects. Column (4) includes all three floating rate variables and their interaction terms similar to Table XV column (4) while the difference exists in the introduction of Time fixed effects and removing firm fixed effects. In column (5) we drop FRD Leverage from column (4). Column (6) is similar to column (5) while the difference exists in the introduction of both time fixed and firm fixed effects. All other conventions were consistent with those in Table V. This is the the full table containing the controls and their interactions while a similar table is presented in the Table XV and a partial version in Table VII. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Leverage	0.118			-0.384	-0.187	-0.217
	(0.189)			(0.467)	(0.334)	(0.394)
FRD Leverage		0.205		0.416		
		(0.191)		(0.612)		
Exposure			0.041	0.031	0.071	0.090
			(0.035)	(0.080)	(0.062)	(0.070)
Size	-0.015	-0.014	-0.014	-0.015	-0.015	-0.106
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.078)
Profitability	0.315	0.317	0.317	0.292	0.294	0.497
	(0.675)	(0.675)	(0.675)	(0.675)	(0.675)	(1.511)
Book Leverage	-0.002	-0.007	-0.008	-0.005	-0.005	0.165
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)	(0.105)
Market to Book	0.055***	0.055***	0.055***	0.054***	0.055***	0.025
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.035)
Asset Maturity	-0.067	-0.066	-0.066	-0.067	-0.067	-0.355**
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.168)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Financial Slack	0.104	0.108	0.110	0.107	0.107	0.248
	(0.106)	(0.105)	(0.105)	(0.106)	(0.106)	(0.241)
Path * Leverage	-7.094***			-9.115**	-5.812*	-5.849*
	(1.937)			(3.968)	(3.168)	(3.443)
Path * FRD Leverage		-5.948***		7.826		
		(2.007)		(5.883)		
Path * Exposure			-1.247***	-1.146	-0.320	-0.221
			(0.380)	(0.886)	(0.625)	(0.537)
Path * Size	0.124	0.148	0.154	0.130	0.124	0.135
	(0.118)	(0.117)	(0.117)	(0.118)	(0.118)	(0.276)
Path * Profitability	20.154***	20.472***	20.518***	20.135***	20.174***	20.225*
	(6.454)	(6.452)	(6.443)	(6.446)	(6.451)	(11.062)
Path * Book Leverage	0.271	0.155	0.177	0.281	0.284	0.141
	(0.560)	(0.558)	(0.555)	(0.561)	(0.561)	(0.584)
Path * Market to Book	0.037	0.040	0.040	0.038	0.038	0.049
	(0.111)	(0.111)	(0.111)	(0.111)	(0.111)	(0.326)
Path * Asset Maturity	-1.588***	-1.546***	-1.538***	-1.576***	-1.580***	-1.557
	(0.452)	(0.451)	(0.450)	(0.452)	(0.452)	(1.131)
Path * Financial Slack	0.274	0.512	0.498	0.252	0.271	0.284
	(1.192)	(1.189)	(1.185)	(1.192)	(1.192)	(1.732)
Target * Leverage	1.355			-6.913	-9.466	-9.498
	(5.609)			(9.789)	(8.554)	(7.568)
Target * FRD Leverage		3.401		-8.904		
		(6.080)		(18.012)		
Target * Exposure			1.088	3.764	2.639	2.766*
			(1.133)	(2.926)	(1.741)	(1.485)
Target * Size	0.946***	0.967***	0.990***	0.946***	0.950***	0.963
	(0.304)	(0.302)	(0.300)	(0.304)	(0.304)	(0.639)
Target * Profitability	-11.963	-11.939	-11.968	-13.060	-12.975	-11.543
	(20.935)	(20.931)	(20.921)	(20.945)	(20.946)	(19.133)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Target * Book Leverage	-1.474	-1.598	-1.760	-1.585	-1.582	-1.774
	(1.298)	(1.284)	(1.287)	(1.301)	(1.299)	(1.156)
Target * Market to Book	0.229	0.226	0.229	0.241	0.234	0.232
	(0.338)	(0.339)	(0.339)	(0.341)	(0.339)	(0.653)
Target * Asset Maturity	-0.172	-0.152	-0.138	-0.213	-0.203	-0.189
	(1.189)	(1.187)	(1.187)	(1.189)	(1.189)	(2.302)
Target * Financial Slack	12.990***	13.125***	13.251***	12.776***	12.855***	12.839
	(3.374)	(3.368)	(3.347)	(3.382)	(3.371)	(9.828)
Constant	-0.030	-0.039	-0.037	-0.027	-0.028	0.921
	(0.108)	(0.107)	(0.106)	(0.108)	(0.108)	(0.739)
Observations	61925	61925	61925	61925	61925	61925
R^2	0.365	0.365	0.365	0.365	0.365	0.372
Firm FE	NO	NO	NO	NO	NO	YES
Time Effects	YES	YES	YES	YES	YES	YES
Controls/Controls*Target/Path	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XVII
Cash Flow Channel of Monetary Policy Surprise transmission: Robustness Tests

We conducted a regression analysis on the two-day stock return using a sample of 153 FOMC announcements from February 2005 to December 2022. The analysis included various firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. To address firm-level heterogeneity, all regressions incorporated firm-level fixed effects. Column (1), is similar to column (1) Table V, which included target, path, Leverage (Bank Debt Leverage) and choice control variables outlined in equation 4.2. Column (2) includes Floating Rate Debt (FRD) Leverage instead of Bank Debt Leverage in column (1). Column (3) includes Exposure in place of Floating Rate Debt (FRD) Leverage in column (2) or Bank Debt Leverage in column (1). Column (4) includes all three floating rate variables and their interaction terms. All other conventions were consistent with those in Table V. The term "leverage" refers to bank debt leverage. This is the the full table containing the controls and their interactions. All regressions use winsorized independent variables and robust standard errors.

	(1) CAR	(2) CAR	(3) Daily Return	(4) Daily Return
Leverage	0.009	0.027	0.078	0.083
	(0.030)	(0.034)	(0.176)	(0.195)
Size	-0.027***	-0.037***	-0.038	-0.033
	(0.005)	(0.006)	(0.051)	(0.053)
Profitability	-0.581***	-0.529***	-0.923	-0.777
	(0.142)	(0.150)	(1.087)	(1.106)
Book Leverage	0.058***	0.049***	0.094	0.063
	(0.010)	(0.013)	(0.068)	(0.087)
Market to Book	-0.005**	-0.005**	0.005	0.009
	(0.002)	(0.002)	(0.025)	(0.025)
Asset Maturity	0.029***	0.023*	-0.096	-0.038
	(0.011)	(0.013)	(0.113)	(0.125)
Financial Slack	0.042**	0.045	0.138	0.192
	(0.021)	(0.027)	(0.171)	(0.188)
Path * Leverage	-0.406**	-0.413**	-2.193	-2.589*
	(0.165)	(0.192)	(1.396)	(1.468)
Path * Size	0.003	-0.007	0.081	0.081
	(0.013)	(0.017)	(0.182)	(0.210)
Path * Profitability	0.238	-0.093	16.763**	17.205**
	(1.012)	(1.033)	(8.195)	(7.497)
Path * Book Leverage	-0.055	-0.088	-0.290	-0.079
	(0.077)	(0.077)	(0.384)	(0.494)
Path * Market to Book	0.017	0.013	-0.095	-0.128
	(0.013)	(0.015)	(0.211)	(0.203)
Path * Asset Maturity	-0.069	-0.079	-0.639	-0.552
	(0.059)	(0.083)	(0.638)	(0.743)
Path * Financial Slack	-0.008	-0.024	0.847	0.438
	(0.110)	(0.155)	(1.074)	(1.154)
Target * Leverage	-1.057	-1.016	2.556	1.716
	(0.870)	(0.954)	(3.044)	(2.993)
Target * Size	0.007	0.018	0.439	0.333
	(0.021)	(0.034)	(0.268)	(0.336)
Target * Profitability	5.416**	6.640**	-8.489	1.916
	(2.489)	(2.802)	(15.966)	(21.413)
Target * Book Leverage	-0.311*	-0.378*	0.661	1.639

	(0.158)	(0.228)	(0.784)	(1.034)
Target * Market to Book	-0.051**	-0.064*	-0.191	-0.308
	(0.025)	(0.037)	(0.215)	(0.215)
Target * Asset Maturity	-0.024	-0.097	-0.655	-0.812
	(0.170)	(0.204)	(1.232)	(1.534)
Target * Financial Slack	0.286	0.307	11.010**	11.960***
	(0.507)	(0.561)	(4.667)	(4.564)
Constant	0.357***	0.461***	0.773	0.684
	(0.049)	(0.057)	(0.484)	(0.487)
Observations	54870	37292	61925	42296
R^2	0.165	0.173	0.415	0.412
Time FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
Controls/Controls*Target/Path	YES	YES	YES	YES

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XVIII
Does Hedging Work?

We regress the two-day stock return around a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. In Column (1), we augment the Hedge variable into the problem as defined in table VII. This column includes target, path, exposure, leverage, choice control variables and their interactions as outlined in equation 4.4. Column (2) is a version of Column (1) that includes only time fixed effects. Column (3), on the other hand, includes both firm and time fixed effects. All other conventions were consistent with those in Table V and VII. The term "leverage" refers to bank debt leverage. This is the the full table containing the controls and their interactions while a partial table is presented in the Table VIII. All regressions use winsorized independent variables and robust standard errors

	(1) Stock Return	(2) Stock Return	(3) Stock Return
Target	-15.033***		
	(4.945)		
Path	-15.694***		
	(1.999)		
Leverage	0.669	-0.007	0.513
	(0.922)	(0.662)	(0.778)
Hedge	1.134***	0.285	0.641*
	(0.354)	(0.216)	(0.334)
Exposure	-0.139	-0.129	-0.173
	(0.181)	(0.125)	(0.140)
Size	-0.351***	0.002	-0.083
	(0.041)	(0.017)	(0.080)
Profitability	1.735	1.380*	2.113
	(1.297)	(0.838)	(1.474)
Book Leverage	-0.352***	-0.034	0.098
	(0.125)	(0.077)	(0.118)
Market to Book	0.009	0.037***	0.010
	(0.023)	(0.014)	(0.037)
Asset Maturity	-0.703***	-0.134**	-0.382**
	(0.151)	(0.064)	(0.173)
Financial Slack	0.899***	0.365**	0.474*
	(0.286)	(0.144)	(0.282)
Hedge * Path	3.287	1.825	1.874
	(2.759)	(2.258)	(2.069)
Hedge * Target	4.142	2.231	2.248
	(6.798)	(5.939)	(4.166)
Hedge * Leverage	-1.183	-0.416	-1.127
	(1.040)	(0.768)	(0.828)
Hedge * Exposure	0.319	0.264*	0.342**
	(0.203)	(0.144)	(0.166)
Hedge * Size	-0.105***	-0.028	-0.059*
	(0.036)	(0.022)	(0.033)
Hedge * Profitability	-2.650	-3.108**	-4.406**
	(1.925)	(1.390)	(1.833)
Hedge * Book Leverage	0.149	0.063	0.149
	(0.149)	(0.104)	(0.140)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return
Hedge * Market to Book	0.007	0.047**	0.039
	(0.033)	(0.023)	(0.029)
Hedge * Asset Maturity	0.031	0.135	0.035
	(0.142)	(0.087)	(0.115)
Hedge * Financial Slack	-0.821**	-0.543**	-0.504
	(0.335)	(0.213)	(0.316)
Path * Leverage	-12.289	-14.786**	-15.045**
	(8.112)	(6.623)	(6.558)
Path * Exposure	1.523	0.958	1.097
	(1.657)	(1.387)	(1.168)
Path * Size	0.991***	0.216	0.233
	(0.211)	(0.179)	(0.302)
Path * Profitability	-7.387	21.283***	21.380**
	(10.221)	(7.878)	(8.759)
Path * Book Leverage	2.106**	0.569	0.404
	(0.961)	(0.888)	(0.791)
Path * Market to Book	1.148***	0.019	0.022
	(0.164)	(0.134)	(0.318)
Path * Asset Maturity	-0.139	-1.277*	-1.260
	(0.854)	(0.665)	(0.991)
Path * Financial Slack	-1.076	0.157	0.275
	(1.887)	(1.569)	(1.844)
Target * Leverage	8.919	2.510	0.539
	(24.123)	(19.626)	(12.215)
Target * Exposure	5.678	6.817*	7.737***
	(4.775)	(3.913)	(2.709)
Target * Size	0.666	0.896**	0.929
	(0.517)	(0.456)	(0.720)
Target * Profitability	-3.242	-8.966	-7.571
	(29.741)	(26.215)	(20.722)
Target * Book Leverage	-3.571*	-1.525	-1.797
	(2.084)	(1.855)	(1.533)
Target * Market to Book	0.174	0.332	0.328
	(0.447)	(0.415)	(0.492)
Target * Asset Maturity	0.860	1.098	0.996
	(1.934)	(1.670)	(2.334)
Target * Financial Slack	17.353***	16.286***	16.457
	(4.841)	(4.465)	(10.182)
Hedge * Path * Leverage	7.089	11.922	12.102
	(9.354)	(7.521)	(7.722)
Hedge * Path * Exposure	-2.483	-1.718	-1.751
	(1.884)	(1.548)	(1.458)
Hedge * Path * Size	-0.245	-0.195	-0.202
	(0.284)	(0.235)	(0.253)
Hedge * Path * Profitability	-32.565*	-5.242	-5.104
	(17.700)	(13.353)	(14.914)
Hedge * Path * Book Leverage	-0.621	-0.462	-0.424
	(1.314)	(1.131)	(1.183)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return
Hedge * Path * Market to Book	0.550*	0.088	0.106
	(0.286)	(0.218)	(0.278)
Hedge * Path * Asset Maturity	-0.935	-0.610	-0.599
	(1.217)	(0.911)	(1.221)
Hedge * Path * Financial Slack	0.367	0.833	0.566
	(2.978)	(2.487)	(3.143)
Hedge * Target * Leverage	-18.457	-16.338	-13.370
	(26.832)	(21.769)	(14.738)
Hedge * Target * Exposure	-3.399	-4.384	-5.411
	(5.319)	(4.353)	(3.614)
Hedge * Target * Size	-0.006	0.157	0.146
	(0.688)	(0.597)	(0.450)
Hedge * Target * Profitability	40.346	1.498	1.187
	(47.782)	(41.764)	(24.392)
Hedge * Target * Book Leverage	-0.449	-0.423	-0.375
	(2.944)	(2.605)	(1.687)
Hedge * Target * Market to Book	-1.003	-0.331	-0.315
	(0.731)	(0.647)	(0.525)
Hedge * Target * Asset Maturity	-2.770	-2.696	-2.433*
	(2.767)	(2.389)	(1.240)
Hedge * Target * Financial Slack	-10.224	-9.186	-9.773
	(8.003)	(7.229)	(8.487)
Constant	3.119***	-0.178	0.587
	(0.383)	(0.162)	(0.754)
Observations	61925	61925	61925
R^2	0.044	0.366	0.373
Firm FE	YES	NO	YES
Time FE	NO	YES	YES
Controls/Controls*Target/Path	YES	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XIX

Does Hedging Work?
Robustness test

We regress the two-day stock return around a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. Column (1), is similar to Table XVIII column (1), however it eliminates Exposure and its interaction terms. This column includes target, path, leverage, choice control variables and their interactions as outlined in equation 4.4. Column (2), is similar to Table XVIII column 1 while eliminating Leverage and its interaction terms. This column includes target, path, exposure, choice control variables and their interactions as outlined in equation 4.4. Column (3) is similar to Column (1) that includes only time fixed effects. This column includes target, path, leverage, choice control variables and their interactions as outlined in equation 4.4. Column (4) is similar to Column (2) that includes only time fixed effects. This column includes target, path, exposure, choice control variables and their interactions as outlined in equation 4.4. Column (5) is similar to Column (2) and column (4) that includes both firm fixed and time fixed effects. Column (6) is similar to Column (1) and column (3) that includes both firm fixed and time fixed effects. All other conventions are consistent with those in Table IV and V. The term "leverage" refers to bank debt leverage. All regressions use winsorized independent variables and robust standard errors.

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Target	-15.281***	-14.714***				
	(4.954)	(4.883)				
Path	-15.726***	-16.282***				
	(1.999)	(1.961)				
Leverage	0.133		-0.503			-0.155
	(0.594)		(0.430)			(0.504)
Hedge	1.140***	1.068***	0.274	0.249	0.567*	0.646*
	(0.354)	(0.350)	(0.216)	(0.213)	(0.329)	(0.335)
Size	-0.352***	-0.354***	0.002	0.001	-0.086	-0.084
	(0.041)	(0.041)	(0.017)	(0.017)	(0.079)	(0.080)
Profitability	1.722	1.716	1.358	1.401*	2.116	2.090
	(1.297)	(1.297)	(0.839)	(0.839)	(1.477)	(1.474)
Book Leverage	-0.352***	-0.343***	-0.040	-0.033	0.104	0.096
	(0.125)	(0.125)	(0.076)	(0.077)	(0.118)	(0.118)
Market to Book	0.010	0.009	0.037***	0.037***	0.010	0.011
	(0.023)	(0.023)	(0.014)	(0.014)	(0.037)	(0.037)
Asset Maturity	-0.705***	-0.705***	-0.135**	-0.134**	-0.383**	-0.384**
	(0.151)	(0.151)	(0.064)	(0.064)	(0.173)	(0.173)

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	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Financial Slack	0.898***	0.892***	0.371**	0.364**	0.471*	0.474*
	(0.286)	(0.286)	(0.144)	(0.144)	(0.284)	(0.281)
Hedge * Path	3.330	3.461	1.841	2.291	2.371	1.897
	(2.761)	(2.714)	(2.260)	(2.218)	(2.132)	(2.072)
Hedge * Target	4.318	3.005	2.460	0.924	1.105	2.530
	(6.802)	(6.666)	(5.940)	(5.792)	(3.931)	(4.177)
Hedge * Leverage	0.073		0.678			0.217
	(0.663)		(0.480)			(0.532)
Hedge * Size	-0.107***	-0.100***	-0.028	-0.025	-0.052	-0.060*
	(0.036)	(0.036)	(0.022)	(0.022)	(0.033)	(0.034)
Hedge * Profitability	-2.609	-2.555	-3.048**	-3.034**	-4.321**	-4.352**
	(1.926)	(1.925)	(1.391)	(1.388)	(1.833)	(1.836)
Hedge * Book Leverage	0.166	0.130	0.072	0.052	0.131	0.166
	(0.148)	(0.148)	(0.103)	(0.103)	(0.139)	(0.140)
Hedge * Market to Book	0.007	0.008	0.047**	0.047**	0.039	0.039
	(0.033)	(0.033)	(0.023)	(0.023)	(0.029)	(0.029)
Hedge * Asset Maturity	0.029	0.037	0.137	0.138	0.041	0.034
	(0.142)	(0.142)	(0.087)	(0.087)	(0.114)	(0.115)
Hedge * Financial Slack	-0.817**	-0.798**	-0.546**	-0.532**	-0.479	-0.500
	(0.336)	(0.335)	(0.213)	(0.212)	(0.317)	(0.316)
Path * Leverage	-7.560		-12.007***			-11.870**
	(5.527)		(4.639)			(4.636)
Path * Size	0.995***	1.040***	0.216	0.273	0.293	0.234
	(0.211)	(0.209)	(0.179)	(0.178)	(0.302)	(0.303)
Path * Profitability	-7.310	-7.030	21.308***	21.754***	21.821**	21.435**
	(10.211)	(10.203)	(7.877)	(7.870)	(8.832)	(8.771)
Path * Book Leverage	2.147**	1.959**	0.592	0.402	0.230	0.428
	(0.958)	(0.957)	(0.883)	(0.884)	(0.810)	(0.779)
Path * Market to Book	1.145***	1.150***	0.015	0.021	0.025	0.018
	(0.164)	(0.164)	(0.134)	(0.134)	(0.316)	(0.318)

Continued in next page...

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Path * Asset Maturity	-0.129	-0.079	-1.275*	-1.207*	-1.191	-1.258
	(0.854)	(0.853)	(0.665)	(0.662)	(0.984)	(0.990)
Path * Financial Slack	-1.118	-0.715	0.132	0.577	0.713	0.251
	(1.886)	(1.880)	(1.568)	(1.549)	(1.884)	(1.825)
Target * Leverage	29.134*		26.943*			28.343***
	(15.771)		(14.199)			(7.440)
Target * Size	0.683	0.642	0.907**	0.885**	0.924	0.944
	(0.518)	(0.512)	(0.457)	(0.451)	(0.708)	(0.728)
Target * Profitability	-1.078	-4.044	-5.962	-9.094	-7.506	-4.125
	(29.792)	(29.710)	(26.317)	(26.193)	(20.188)	(19.726)
Target * Book Leverage	-3.397	-3.508*	-1.340	-1.531	-1.823	-1.583
	(2.103)	(2.069)	(1.868)	(1.846)	(1.556)	(1.570)
Target * Market to Book	0.150	0.174	0.294	0.325	0.318	0.285
	(0.447)	(0.447)	(0.414)	(0.414)	(0.487)	(0.502)
Target * Asset Maturity	0.870	0.813	1.102	1.068	0.963	1.001
	(1.933)	(1.936)	(1.667)	(1.671)	(2.341)	(2.318)
Target * Financial Slack	17.358***	17.197***	16.310***	16.289***	16.522	16.491
	(4.843)	(4.807)	(4.469)	(4.412)	(10.087)	(10.118)
Hedge * Path * Leverage	-1.702		5.992			6.182
	(6.188)		(5.116)			(4.810)
Hedge * Path * Size	-0.244	-0.258	-0.193	-0.231	-0.242	-0.201
	(0.284)	(0.282)	(0.236)	(0.233)	(0.268)	(0.252)
Hedge * Path * Profitability	-32.420*	-32.289*	-4.917	-5.357	-5.228	-4.881
	(17.706)	(17.676)	(13.368)	(13.335)	(14.649)	(14.888)
Hedge * Path * Book Leverage	-0.720	-0.594	-0.535	-0.355	-0.312	-0.495
	(1.311)	(1.305)	(1.127)	(1.122)	(1.220)	(1.164)
Hedge * Path * Market to Book	0.548*	0.551*	0.085	0.088	0.106	0.104
	(0.286)	(0.286)	(0.218)	(0.218)	(0.280)	(0.279)
Hedge * Path * Asset Maturity	-0.963	-0.952	-0.631	-0.663	-0.653	-0.619
	(1.218)	(1.215)	(0.911)	(0.909)	(1.176)	(1.219)

Continued in next page...

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
Hedge * Path * Financial Slack	0.299	0.205	0.758	0.497	0.214	0.511
	(2.980)	(2.973)	(2.489)	(2.473)	(3.191)	(3.149)
Hedge * Target * Leverage	-29.290*		-30.657**			-31.544***
	(17.426)		(15.522)			(5.715)
Hedge * Target * Size	-0.033	0.086	0.125	0.265	0.239	0.111
	(0.688)	(0.679)	(0.598)	(0.586)	(0.442)	(0.457)
Hedge * Target * Profitability	37.557	42.307	-1.178	3.657	3.127	-1.886
	(47.773)	(47.730)	(41.808)	(41.705)	(23.882)	(23.929)
Hedge * Target * Book Leverage	-0.474	-0.722	-0.494	-0.754	-0.661	-0.476
	(2.952)	(2.922)	(2.610)	(2.585)	(1.572)	(1.808)
Hedge * Target * Market to Book	-0.957	-0.999	-0.289	-0.323	-0.306	-0.268
	(0.729)	(0.731)	(0.645)	(0.645)	(0.525)	(0.522)
Hedge * Target * Asset Maturity	-2.713	-2.597	-2.644	-2.475	-2.222*	-2.382*
	(2.767)	(2.761)	(2.386)	(2.381)	(1.147)	(1.227)
Hedge * Target * Financial Slack	-9.819	-9.586	-8.748	-8.475	-9.166	-9.365
	(8.010)	(7.959)	(7.263)	(7.191)	(8.102)	(8.188)
Exposure		-0.046		-0.136*	-0.103	
		(0.117)		(0.081)	(0.090)	
Hedge * Exposure		0.150		0.206**	0.183*	
		(0.129)		(0.090)	(0.105)	
Path * Exposure		-0.283		-1.257	-1.131	
		(1.126)		(0.981)	(0.827)	
Target * Exposure		7.127**		7.246**	7.834***	
		(3.171)		(2.953)	(1.537)	
Hedge * Path * Exposure		-1.505		0.037	0.002	
		(1.245)		(1.065)	(0.901)	
Hedge * Target * Exposure		-6.374*		-7.004**	-7.540***	
		(3.494)		(3.209)	(1.682)	
Constant	3.129***	3.149***	-0.174	-0.175	0.564	0.595

Continued in next page...

	(1) Stock Return	(2) Stock Return	(3) Stock Return	(4) Stock Return	(5) Stock Return	(6) Stock Return
	(0.383)	(0.383)	(0.162)	(0.160)	(0.752)	(0.753)
Observations	61925	61925	61925	61925	61925	61925
R^2	0.043	0.043	0.366	0.366	0.372	0.372
Firm FE	YES	YES	NO	NO	YES	YES
Time FE	NO	NO	YES	YES	YES	YES
Controls/Controls*Target/Path	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table XX

Does Hedging Work?
Robustness test 2

We regress the CAR, two day stock returns and Daily returns around a sample of 153 FOMC announcements between February 2005 and December 2022. We include several firm-level control variables such as size, profitability, book leverage, market-to-book ratio, asset maturity and financial slack, as defined in Chapter 3. Column (1) and column (2) are similar to Table VIII column (3) while regressing on CAR. Column (2) eliminates observations that may involve speculating. In our data set we define these as firms that do not hold floating rate debt but have hedged. Column (3) and column (4) are similar to Table VIII column (3) while regressing on One day stock returns (Daily returns). Column (4) eliminates observations that may involve speculating. Column (5) is similar to Table VIII column (3) while regressing on two day stock returns (Daily returns). Column (5) eliminates observations that may involve speculating. All other conventions were consistent with those in Table IV and V. The term "leverage" refers to bank debt leverage. All regressions use winsorized independent variables and robust standard errors.

	(1) CAR	(2) CAR	(3) Daily Stock Return	(4) Daily Stock Return	(5) Stock Return
Leverage	0.017	0.010	0.481	0.422	1.869
	(0.081)	(0.078)	(0.479)	(0.479)	(1.442)
Hedge	-0.011	0.029	0.279	0.053	1.655***
	(0.035)	(0.046)	(0.223)	(0.310)	(0.412)
Exposure	0.015	0.027	-0.130	-0.105	6.935
	(0.018)	(0.018)	(0.095)	(0.097)	(7.151)
Size	-0.029***	-0.038***	-0.028	-0.035	-0.319***
	(0.005)	(0.007)	(0.051)	(0.053)	(0.049)
Profitability	-0.545***	-0.511***	-0.797	-0.737	0.905
	(0.155)	(0.157)	(1.100)	(1.120)	(1.429)
Book Leverage	0.050***	0.040***	0.020	0.022	-0.238*
	(0.013)	(0.014)	(0.084)	(0.093)	(0.142)
Market to Book	-0.004	-0.003	0.011	0.011	-0.001
	(0.003)	(0.003)	(0.025)	(0.025)	(0.026)
Asset Maturity	0.045***	0.035**	-0.092	-0.049	-0.627***
	(0.013)	(0.015)	(0.113)	(0.124)	(0.181)
Financial Slack	0.043	0.049	0.186	0.286	0.858***
	(0.027)	(0.030)	(0.200)	(0.211)	(0.325)
Hedge * Path * Leverage	0.119	0.226	0.649	0.373	27.644*

Continued in next page...

	(1) CAR	(2) CAR	(3) Daily Stock Return	(4) Daily Stock Return	(5) Stock Return
	(0.617)	(0.712)	(5.343)	(5.887)	(14.732)
Hedge * Path * Exposure	-0.208	-0.229	-0.506	-0.430	60.896
	(0.133)	(0.142)	(1.081)	(1.086)	(86.932)
Hedge * Path * Size	0.028	0.015	-0.123	-0.170	1.356***
	(0.024)	(0.035)	(0.187)	(0.176)	(0.231)
Hedge * Path * Profitability	1.828	1.246	1.168	6.191	-47.355**
	(1.787)	(2.058)	(11.898)	(15.289)	(21.258)
Hedge * Path * Book Leverage	0.075	0.033	-0.221	0.536	0.466
	(0.137)	(0.155)	(0.501)	(0.771)	(1.524)
Hedge * Path * Market to Book	0.000	-0.007	0.094	-0.022	0.803**
	(0.022)	(0.030)	(0.139)	(0.164)	(0.351)
Hedge * Path * Asset Maturity	0.138	0.191	-1.064	-1.474	0.570
	(0.129)	(0.156)	(0.746)	(0.894)	(1.466)
Hedge * Path * Financial Slack	-0.333	-0.617	1.133	-0.750	8.728***
	(0.341)	(0.462)	(1.852)	(2.929)	(3.264)
Hedge * Path	-0.340*	-0.162	1.070	1.263	-12.926***
	(0.192)	(0.294)	(1.691)	(1.732)	(2.177)
Hedge * Target	0.143	-0.011	-2.436	-3.559	-9.209*
	(0.546)	(0.607)	(4.021)	(4.344)	(5.314)
Hedge * Leverage	-0.008	0.007	-0.833	-1.094*	-1.448
	(0.097)	(0.099)	(0.536)	(0.640)	(1.703)
Hedge * Exposure	-0.021	-0.036*	0.215*	0.232*	-7.958
	(0.020)	(0.020)	(0.111)	(0.127)	(8.433)
Hedge * Size	0.003	-0.000	-0.026	0.004	-0.154***
	(0.004)	(0.005)	(0.023)	(0.032)	(0.041)
Hedge * Profitability	-0.096	-0.118	-0.444	-0.166	-2.366
	(0.180)	(0.271)	(1.110)	(1.675)	(2.203)
Hedge * Book Leverage	0.016	0.030	0.148	0.131	0.043
	(0.013)	(0.021)	(0.099)	(0.147)	(0.172)
Hedge * Market to Book	-0.003	-0.007*	-0.019	-0.011	0.011

Continued in next page...

	(1) CAR	(2) CAR	(3) Daily Stock Return	(4) Daily Stock Return	(5) Stock Return
	(0.003)	(0.004)	(0.019)	(0.025)	(0.041)
Hedge * Asset Maturity	-0.030**	-0.039**	-0.015	0.044	-0.008
	(0.014)	(0.020)	(0.077)	(0.102)	(0.168)
Hedge * Financial Slack	-0.008	-0.020	-0.100	-0.452	-0.993**
	(0.028)	(0.040)	(0.196)	(0.280)	(0.393)
Hedge * Target * Leverage	0.829	0.435	-21.998**	-30.977***	-15.732
	(2.997)	(3.029)	(8.586)	(11.188)	(38.945)
Hedge * Target * Exposure	0.208	0.384	0.366	1.392	43.974
	(0.313)	(0.306)	(2.141)	(2.592)	(230.905)
Hedge * Target * Size	-0.023	0.003	0.353	0.277	1.250**
	(0.060)	(0.062)	(0.418)	(0.460)	(0.539)
Hedge * Target * Profitability	-2.457	2.882	0.670	13.985	41.955
	(3.968)	(6.330)	(21.102)	(31.805)	(57.003)
Hedge * Target * Book Leverage	0.099	-0.288	1.628	6.112**	-0.985
	(0.223)	(0.311)	(1.496)	(2.682)	(3.338)
Hedge * Target * Market to Book	-0.043	-0.108	-0.429	-0.619	-0.238
	(0.093)	(0.162)	(0.264)	(0.391)	(0.962)
Hedge * Target * Asset Maturity	0.268	0.290	-1.954	-3.558**	-2.597
	(0.193)	(0.221)	(1.479)	(1.505)	(3.280)
Hedge * Target * Financial Slack	0.537	0.647	-1.191	-0.785	-4.319
	(0.426)	(0.744)	(3.826)	(5.221)	(8.567)
Path * Leverage	-0.346	-0.383	-3.909	-4.024	-39.978***
	(0.550)	(0.557)	(5.165)	(5.098)	(12.697)
Path * Exposure	0.153	0.154	0.749	0.713	-68.715
	(0.109)	(0.110)	(1.064)	(1.062)	(70.668)
Path * Size	-0.006	-0.007	0.147	0.147	-0.571***
	(0.018)	(0.018)	(0.218)	(0.217)	(0.084)
Path * Profitability	-0.283	-0.197	15.511*	15.456*	-12.895
	(1.236)	(1.261)	(8.057)	(7.835)	(11.343)
Path * Book Leverage	-0.107	-0.111	-0.161	-0.171	1.710

Continued in next page...

	(1) CAR	(2) CAR	(3) Daily Stock Return	(4) Daily Stock Return	(5) Stock Return
	(0.071)	(0.072)	(0.480)	(0.472)	(1.103)
Path * Market to Book	0.015	0.013	-0.117	-0.121	0.867***
	(0.016)	(0.016)	(0.233)	(0.219)	(0.186)
Path * Asset Maturity	-0.141	-0.142	-0.104	-0.073	0.087
	(0.111)	(0.113)	(0.662)	(0.673)	(0.981)
Path * Financial Slack	0.076	0.078	0.588	0.543	-6.787***
	(0.199)	(0.202)	(1.290)	(1.290)	(1.906)
Target * Leverage	-2.267	-2.191	15.058**	15.890**	9.020
	(1.574)	(1.586)	(7.114)	(7.255)	(35.892)
Target * Exposure	-0.042	-0.072	1.364	1.080	35.900
	(0.210)	(0.212)	(1.716)	(1.781)	(197.868)
Target * Size	0.016	0.015	0.305	0.278	-0.749***
	(0.041)	(0.041)	(0.383)	(0.383)	(0.194)
Target * Profitability	6.107**	6.189**	-6.819	-5.796	-28.117
	(2.565)	(2.638)	(19.445)	(19.271)	(32.421)
Target * Book Leverage	-0.334*	-0.332*	-0.075	-0.122	-3.895*
	(0.187)	(0.189)	(1.252)	(1.202)	(2.280)
Target * Market to Book	-0.035	-0.039	-0.049	-0.087	-0.074
	(0.045)	(0.049)	(0.222)	(0.225)	(0.485)
Target * Asset Maturity	-0.146	-0.158	0.254	0.186	0.267
	(0.228)	(0.228)	(1.634)	(1.643)	(2.202)
Target * Financial Slack	0.072	0.080	10.785**	10.917**	11.855**
	(0.627)	(0.644)	(4.891)	(4.846)	(4.927)
Constant	0.373***	0.457***	0.623	0.631	2.863***
	(0.053)	(0.059)	(0.491)	(0.486)	(0.462)
Observations	54870	37292	61925	42296	43613
R^2	0.165	0.174	0.415	0.413	0.043
Firm FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES

Continued in next page...

	(1) CAR	(2) CAR	(3) Daily Stock Return	(4) Daily Stock Return	(5) Stock Return
Controls/Controls*Target/Path	YES	YES	YES	YES	YES

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A.2.4 Word List

Table XXI
Hedging Indicator: Phrase List

We tabulate the list of phrases from both Gürkaynak, Karasoy-Can, and Lee (2022) and our additions. This list contains a random sample from the list as the final list of False positives was 4190 phrases. The list is for illustration.

Positive	**False Positive**
hedge against interest rate	not currently hedge or otherwise use derivative instruments to manage interest rate
hedges against interest rate	not designate the interest rate swap as a cash flow hedge and the interest rate swap will not qualify for hedge accounting
hedging against interest rate	fixed rate receipts in exchange for making floating rate payments
hedge interest rate	not hedged against any interest rate
hedges interest rate	not currently using an interest rate
hedging interest rate	not using interest rate
hedge for interest rate	not use interest rate
hedges for interest rate	swaps changed the fixed rate exposure on the debt to variable
hedging for interest rate	a fixed rate to a floating rate
hedging of interest rate	receives fixed interest rate payments and makes variable interest rate payments
interest rate hedge	not engage in interest rate
interest rate hedging	not using an interest rate
interest rate risk hedge	fixed rates into variable rates
interest rate risk hedging	will receive fixed interest rate payments and will make variable interest rate payments
interest rate derivative	we pay variable rates and we receive a fixed rate
interest rate swap agreement	fixed rate amounts in exchange for making floating rate payments
interest rate contract	not hedging interest rate
interest rate agreement	not hedged any interest rate
interest rate collar	not engage in any interest rate
interest rate cap	not use derivative financial instruments such as interest rate swap
interest rate protection	in the future we may enter into interest rate swap
hedge our interest rate	fixed rate obligations to floating rate obligations
interest rate futures	fixed to variable rate interest rate
interest rate forward	not entered into any swap agreement
interest rate transactions hedged	not have any derivative instruments outstanding
interest rate macro hedge	fixed rates into floating rates
interest rate being hedged	not currently using any interest rate
interest rate payments hedged	not hedging any interest rate
uses interest rate cash flow hedges	fixed rate debt to variable rate
interest rate dynamic hedge	fixed to floating interest rate
swaps covering interest rate	exchange an obligation to make fixed debt payments for an obligation to make floating rate payments,...
swaps mitigated interest rate	receive fixed pay floating interest rate
interest rate related derivative	not currently use an interest rate

Continued in next page...

Positive	**False Positive**
interest rate risk derivatives	not participate in hedging programs interest rate swaps or other activities involving the use of derivative financial instruments to manage interest rate risk
interest rate exposure derivative	not using any interest rate
interest rate risks derivative	currently no interest rate
interest rate exposures derivative	fixed to variable interest rate
interest rate cash flow hedges	not engaged in any interest rate

B Online Appendix [15]

We extend our gratitude to Gürkaynak, Karasoy-Can, and Lee (2022) for their commitment to the study of the impacts of monetary policy through the provision of their stata code, word-list and methodology. We follow in their footsteps and provide our code and findings for future research and critique. We are limited on the extent of the code and information we can share as most of our data is proprietary. However:

1. We provide the excel macros file (***03 Exposure creation document.xlsm***) that we deploy to develop our exposure variable. However, the files downloaded from S&P Capital IQ under *Capital Structure Details* for each company are proprietary. Therefore, we provide a dummy sample (***03. 10.xls***) for ease of visualisation.

2. We use sec-api to download data from SEC-Edgar database. The code used is a modified version of that provided by sec-api. By developing the hedge variable, we test differences between the text/html files downloaded from sec-api and those downloaded from Notre-Dame university website[16]. We find that the latter's information is free and similar in all aspects. We therefore do not provide this code.

3. We provide the code used in the creation of the hedge variable (***04 Final Read Hedge.ipynb***) and the resulting file containing information about firms' hedging activities (***04. Hedge variable.csv***).

4. We provide the code and methodology employed to derive the raw GSS-factors which are used to develop the final GSS factors as previously described. The development of the final GSS factors is done using a modification of the code provided by Gürkaynak, Sack, and Swanson (2007). The code provided is stored under the name ***05 GSS Factor derivation.ipnyb***

All other methodology cannot be provided without a violation of proprietary rights. The code and methodology are provided at https://github.com/mulijawan/doescashflow. We also provide the following codes below.

1. VBA macros for the creation of exposure in section B.1.

2. Python code for converting files downloaded from Notre-Dame into pickles in section B.2.

3. Python code for creating the hedge variable in sec B.3 and comparing with Gürkaynak, Karasoy-Can, and Lee (2022) in section B.4.

4. Python code for creation of raw GSS factor matrix in section B.5.

[15] This online appendix was not distributed for evaluation by the grading committee. It is therefore not subject to the grading committee input or assessment.

[16] https://sraf.nd.edu/sec-edgar-data/

B.1 Read and create Exposure from S&P Capital IQ Capital Structure Details download: VBA Code

In considering the length of vba equations, anyone who wishes to deploy this macro may need to consider formatting the equations that are longer than one line. All considered, the code is fit to deploy. Some portion of the code is aesthetic as it creates a progress bar. When going through hundreds of documents, the progress bar relays important information as regards how far along the process is. This portion of the code is however dispensable.

```
Dim j As Long
Dim strFolder As String

Sub AAwork()
    Call ADeleteuselesssheets
    Call AWorkbookrunMain
    Call ACreateMastersheet
End Sub

Sub ADeleteuselesssheets()
    Application.ScreenUpdating = False
    Dim wb As Workbook
    Dim strFile As String
    Dim i As Long
    Dim strWBName As String

    Dim CurrentUFProgressBar As Double
    Dim UFProgressBarPercentage As Double
    Dim BarWidth As Long

        strFolder = "**********directory for folder with downloaded S&P Capital
         ↪ IQ files************"

        CountFolder
        strFile = Dir(strFolder & "*.xls*")
        Call InitUFProgressBarBar

        Do While strFile <> ""
            Set wb = Workbooks.Open(strFolder & strFile)
            Deleteuseless
            strWBName = ActiveWorkbook.Name
            Application.DisplayAlerts = False
            wb.Close SaveChanges:=True
```

```
            strFile = Dir
            i = i + 1

            CurrentUFProgressBar = i / j
            BarWidth = UFProgressBar.Border.Width * CurrentUFProgressBar
            UFProgressBarPercentage = Round(CurrentUFProgressBar * 100, 0)

            UFProgressBar.Bar.Width = BarWidth
            UFProgressBar.Text.Caption = UFProgressBarPercentage & "% Complete"
            UFProgressBar.Number.Caption = i & " (" & strWBName & ") " & " file/s in " & j & " files "

            DoEvents
            Application.CutCopyMode = False
         Loop
    Application.ScreenUpdating = True
    Unload UFProgressBar
End Sub

Sub ACreateMastersheet()
    Application.ScreenUpdating = False
    zcrtnewsheet
    Dim wb As Workbook
    Dim strFolder As String
    Dim strFile As String
    Dim i As Long

        strFolder = "**********directory for folder with downloaded S&P Capital IQ files************"

        CountFolder
        strFile = Dir(strFolder & "*.xls*")
        Do While strFile <> ""
            Set wb = Workbooks.Open(strFolder & strFile)
            Sheets("Collection").Select
            Set SourceRange = Range(Range("A2"), Range("A2").End(xlToRight).End(xlDown))
            SourceData = SourceRange.Value
            wb.Close SaveChanges:=True

            Application.DisplayAlerts = False
```

```
            Set destRange = Workbooks("Exposure creation
             ↪ document.xlsm").Sheets("Allcompanies").Range("A1").End(xlDown).
             ↪ End(xlDown).End(xlDown).End(xlUp).Offset(1, 0)
            destRange.Resize(UBound(SourceData, 1), UBound(SourceData, 2)).Value
             ↪ = SourceData
            Application.DisplayAlerts = True
            strFile = Dir
            i = i + 1
        Loop
    Application.ScreenUpdating = True

End Sub

Sub BMain()
    Createws

    Dim ws As Worksheet
    Dim i As Integer
    For i = 2 To Worksheets.Count
        Sheets(i).Select
        Clear
        DMacro (i)
        EFit
    Next i
    Sheets(1).Select
    EFit

End Sub

Sub DMacro(i)

    Range("K13").Select

    Dim ro As Long
    Dim co As Long
    Dim ca As Long
    Dim ra As Long
    Dim dat As String
    Dim dat2 As String
    strAddress = ActiveCell.Address
    ro = Range(strAddress).Row + 1
```

```
    co = Range(strAddress).Column + 10
    ActiveCell.Offset(-1, -10).Select
    dat = Mid(Selection, 10, 11)
    ActiveCell.Offset(1, 10).Select
    Call zheading

    Do
        Call Values(dat)
    Loop Until IsEmpty(ActiveCell.Value) = True And IsEmpty(ActiveCell.Offset(0,
     ↪  -1).Value) = True And IsEmpty(ActiveCell.Offset(0, -2).Value) = True

    Call zAdd(ro, co, i)
    strAddress = ActiveCell.Address

    ra = Range(strAddress).Row + 6
    ca = Range(strAddress).Column + 11

    ActiveCell.Offset(4, -9).Select
    dat2 = Mid(Selection, 10, 11)

    If InStr(ActiveCell.Value, "FY") > 0 Or InStr(ActiveCell.Offset(1, 0), "FY")
     ↪  > 0 Then
        ActiveCell.Offset(1, 10).Select
        Call zheading
        Do
            Call Values(dat2)

        Loop Until IsEmpty(ActiveCell.Value) = True And
         ↪  IsEmpty(ActiveCell.Offset(0, -1).Value) = True And
         ↪  IsEmpty(ActiveCell.Offset(0, -2).Value) = True
        Call zAdd(ra, ca, i)
    End If

End Sub
Sub zheading()

    ActiveCell.Select
    ActiveCell.FormulaR1C1 = "Date"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Month"
```

```
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Year"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Imp. Date"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Formatted Date"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "No. of days"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "No. of years"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Float"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Any Exposure"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Bank Debt Lev"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Fixed Debt"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Exposure"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Floating rate debt Lev"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Fixed Exposure"

    ActiveCell.Offset(1, -14).Select

End Sub
```

```
Sub Values(dat)
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = Mid(dat, 5, 2)

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = Mid(dat, 1, 3)

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = Mid(dat, 8, 4)

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "=CONCAT(RC[-3],""/"",RC[-2],""/"",RC[-1])"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "=DATEVALUE(RC[-1])"
    Selection.NumberFormat = "m/d/yyyy"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "=MAX(IF(ISTEXT(RC[-10])=TRUE,IF(LEN(RC[-10])=11,CONCAT(""31/Dec/"",ROUNDUP(((LEFT(RC[-10],4))+RIGHT(RC[-10],4))/2,0))-RC[-1],IF(LEN(RC[-10])=14,CONCAT(""31/Dec/"",ROUNDUP(((MID(RC[-10],4,4))+RIGHT(RC[-10],4))/2,0))-RC[-1],0)),IF(RC[-10]<30000,IF(CONCAT(""31/Dec/"",RC[-10])<RC[-1],0,(CONCAT(""31/Dec/"",RC[-10])-RC[-1])),IF(RC[-1]>RC[-10],0,IFERROR(RC[-10]-RC[-1],0)))),0)"

    ActiveCell.Select

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "=IFERROR(RC[-1]/365,0)"

    Selection.NumberFormat = "0.00"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "=IF(RC[-13]=""NA"",0,1)"

    ActiveCell.Offset(0, 1).Select
```

```
ActiveCell.FormulaR1C1 =
 ↪ "=IFERROR((RC[-1]*RC[-16]*RC[-2]*IF(RC[-10]=""Yes"",0,1)*
 ↪ IF(ISNUMBER(SEARCH(""Non recourse"",RC[-18])),0,1)),0)*
 ↪ IF((ISNUMBER(SEARCH(""Non-recourse"",RC[-18]))),0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Non recourse"",RC[-18]))),0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Nonrecourse"",RC[-18]))),0,1)"

ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = "=IFERROR(IF(OR(ISNUMBER(SEARCH(""Term
 ↪ Loans"",RC[-18])),ISNUMBER(SEARCH(""revolving
 ↪ credit"",RC[-18])),ISNUMBER(SEARCH(""term
 ↪ loan"",RC[-19])),ISNUMBER(SEARCH(""term
 ↪ loan"",RC[-19])),ISNUMBER(SEARCH(""revolving
 ↪ borrowings"",RC[-19])),ISNUMBER(SEARCH(""revolving
 ↪ credit"",RC[-19])),ISNUMBER(SEARCH(""due to
 ↪ bank"",RC[-19]))),1,0)*RC[-17]*IF(RC[-10]=""USD"",1,0)*
 ↪ IF(RC[-11]=""Yes"",0,1)*IF((ISNUMBER(SEARCH(""Non
 ↪ recourse"",RC[-19]))),0,1),0)*
 ↪ IF((ISNUMBER(SEARCH(""Non-recourse"",RC[-19]))),0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Nonrecourse"",RC[-19]))),0,1)*IF(RC[-3]>0,1,0)"

ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = "=IFERROR(IF(RC[-4]>0,1,0)*RC[-18],0)"

ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 =
 ↪ "=IFERROR(RC[-3]*IF(RC[-12]=""USD"",1,0),0)*IF(RC[-13]=""Yes"",0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Non-recourse"",RC[-21]))),0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Non recourse"",RC[-21]))),0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Nonrecourse"",RC[-21]))),0,1)"

ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 =
 ↪ "=IFERROR((RC[-5]*RC[-20]*(IF(RC[-14]=""Yes"",0,1))*(IF(RC[-13]=""USD"",1,0))*
 ↪ IF((ISNUMBER(SEARCH(""Non-recourse"",RC[-22]))),0,1)*IF((ISNUMBER(SEARCH(""Non
 ↪ recourse"",RC[-22]))),0,1)* IF(RC[-6]>0,1,0)),0)*
 ↪ IF((ISNUMBER(SEARCH(""Non-recourse"",RC[-22]))),0,1)*IF((ISNUMBER(SEARCH(""Non
 ↪ recourse"",RC[-22]))),0,1)*
 ↪ IF((ISNUMBER(SEARCH(""Nonrecourse"",RC[-22]))),0,1)"

ActiveCell.Offset(0, 1).Select
```

```
    ActiveCell.FormulaR1C1 = "=IF(RC[-6]=0,1,0)*IF(ISNUMBER(RC[-21]),RC[-21],0)*RC[-7]"

    ActiveCell.Offset(1, -14).Select

End Sub
Sub zAdd(r, C, i)

    Dim cc As Long
    Dim cd As Long

    cc = C - 2
    cd = C + 1

    Dim strWBName As String
    strWBName = ActiveWorkbook.Name

    ActiveCell.Offset(0, 14).Select
    ActiveCell.FormulaR1C1 = "=SUM(R" & (r) & "C" & ":R[-1]C)"
    ActiveCell.Copy
    Worksheets(1).Select
    Range("K" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Worksheets(i).Select

    ActiveCell.Offset(0, -1).Select
    ActiveCell.FormulaR1C1 = "=SUM(R" & (r) & "C" & ":R[-1]C)"
    ActiveCell.Copy
    Worksheets(1).Select
    Range("H" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Worksheets(i).Select

    ActiveCell.Offset(0, -1).Select
    ActiveCell.FormulaR1C1 = "=SUM(R" & (r) & "C" & ":R[-1]C)"
    ActiveCell.Copy
    Worksheets(1).Select
    Range("E" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
```

```
        :=False, Transpose:=False
        Worksheets(i).Select

        ActiveCell.Offset(0, -1).Select
        ActiveCell.FormulaR1C1 = "=(SUM(R" & (r) & "C" & ":R[-1]C))"
        ActiveCell.Copy
        Worksheets(1).Select
        Range("F" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
        Worksheets(i).Select

        ActiveCell.Offset(0, -1).Select
        ActiveCell.FormulaR1C1 = "=SUM(R" & (r) & "C" & ":R[-1]C)"
        ActiveCell.Copy
        Worksheets(1).Select
        Range("G" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
        Worksheets(i).Select

        ActiveCell.Offset(0, -1).Select
        ActiveCell.FormulaR1C1 = "=SUM(R" & (r) & "C" & ":R[-1]C)"
        ActiveCell.Copy
        Worksheets(1).Select
        Range("D" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
        Worksheets(i).Select

        ActiveCell.Offset(0, -3).Select
        ActiveCell.FormulaR1C1 = "=TRIM(MID(R5C1,FIND("":"",R5C1)+1,FIND("")"",R5C1)-FIND("":"",R5C1)-1))"
        ActiveCell.Copy
        Worksheets(1).Select
        Range("J" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
        :=False, Transpose:=False
        Worksheets(i).Select

        ActiveCell.Offset(0, -1).Select
```

```
    ActiveCell.FormulaR1C1 = "=R[-1]C"
    ActiveCell.Copy
    Worksheets(1).Select
    Range("C" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Selection.NumberFormat = "m/d/yyyy"
    Worksheets(i).Select

    ActiveCell.Offset(0, -1).Select
    ActiveCell.FormulaR1C1 = "=LEFT(R" & (r - 2) & "C1,7)"
    ActiveCell.Copy
    Worksheets(1).Select
    Range("I" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Worksheets(i).Select

    ActiveCell.Offset(0, -1).Select
    ActiveCell = Left(strWBName, Len(strWBName) - 4)
    ActiveCell.Copy
    Worksheets(1).Select
    Range("A" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Worksheets(i).Select

    ActiveCell.Offset(0, -1).Select
    ActiveCell.FormulaR1C1 = "=IFERROR(LEFT(R5C1,(FIND(""("",R5C1,1)-1)),LEFT(R5C1,(FIND("">"",R5C1,1)-1)))"
    ActiveCell.Copy
    Worksheets(1).Select
    Range("B" & Rows.Count).End(xlUp).Offset(1, 0).PasteSpecial Paste:=xlPasteValues, Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Worksheets(i).Select

    ActiveCell.Offset(0, -2).Select
End Sub

Sub EFit()
```

```
    Columns("A:A").Select
    Range(Selection, Selection.End(xlToRight)).Select
    With Selection
        .WrapText = False
    End With
    ActiveSheet.UsedRange.EntireColumn.AutoFit
End Sub

Sub Clear()
    Columns("K:K").Select
    Range(Selection, Selection.End(xlToRight)).Select
    Selection.Clear
End Sub
Sub Createws()
    Dim exists As Boolean

    For t = 1 To Worksheets.Count
        If Worksheets(t).Name = "Collection" Then
            exists = True
        End If
    Next t

    If Not exists Then
        Sheets.Add Before:=Sheets(1)
        Sheets(1).Name = "Collection"
    End If

    Sheets(1).Select

    Columns("A:A").Select
    Range(Selection, Selection.End(xlToRight)).Select
    Selection.Clear

    Range("A1").Select

    ActiveCell.Select
    ActiveCell.FormulaR1C1 = "Ticker"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Company name"
```

```
        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "End of year"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Total Exposure.TA"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Exposure.TA (Local Exposure)"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Fixed Debt"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Bank Debt Lev"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Floating rate debt Lev"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Financial Year"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Check Ticker"

        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = "Fixed Exposure"

    End Sub

    Sub zcrtnewsheet()
        Dim exists As Boolean

        For t = 1 To Worksheets.Count
            If Worksheets(t).Name = "Allcompanies" Then
                exists = True
            End If
        Next t

        If Not exists Then
            Sheets.Add Before:=Sheets(1)
            Sheets(1).Name = "Allcompanies"
```

```
    End If

    Sheets(1).Select

    Cells.Clear
    Cells.ClearFormats

    Range("A1").Select

    ActiveCell.Select
    ActiveCell.FormulaR1C1 = "Ticker"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Company name"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "End of year"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Total Exposure.TA"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Exposure.TA (Local Exposure)"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Fixed Debt"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Bank Debt Lev"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Floating rate debt Lev"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Financial Year"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Check Ticker"

    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = "Fixed Exposure"
```

```
End Sub

Sub Copy()
    With Sheets("Sheet1")
    .Columns("B:B").Value = .Columns("A:A").Value
    End With
End Sub

Sub ProgressBar_Chart()

    Dim i As Long
    Dim j As Long
    Dim CurrentUFProgressBar As Double
    Dim UFProgressBarPercentage As Double
    Dim BarWidth As Long

    Dim strDir As String
    Dim strFile As String

    strDir = "C:\Users\swift\OneDrive - University of Gothenburg\Masters
     ↪ Thesis\Data\Files\"
    file = Dir(strDir & "*.xls*")

    While (file <> "")
        j = j + 1
        file = Dir
    Wend
    i = 1

    Call InitUFProgressBarBar

    Do While i <= j

        CurrentUFProgressBar = i / j
        BarWidth = UFProgressBar.Border.Width * CurrentUFProgressBar
        UFProgressBarPercentage = Round(CurrentUFProgressBar * 100, 0)

        UFProgressBar.Bar.Width = BarWidth
        UFProgressBar.Text.Caption = UFProgressBarPercentage & "% Complete"
```

```
        DoEvents

        i = i + 1

    Loop

    Unload UFProgressBar

End Sub


Sub InitUFProgressBarBar()

    With UFProgressBar
        .Bar.Width = 0
        .Text.Caption = "0%"
        .Show vbModeless
    End With

End Sub

Sub CountFolder()
    Dim strFile As String

    file = Dir(strFolder & "*.xls*")

    j = 0

    While (file <> "")
        j = j + 1
        file = Dir
    Wend

End Sub
```

B.2 Converting downloaded text files into pickles code: Python Code

We suggest that downloading data from Notre-Dame university website[17] in order to derive the hedge variable is sufficient and sec-api offers no advantage. Further we provide code that can be used to convert the text files downloaded into pickles. Pickles allow for quick reading of the text and flexibility in testing the hypothesis.

#Import packages

```python
import pandas as pd  # Import the pandas library for data manipulation and
↪ analysis
# Read Pickle file
import pickle  # Import the pickle module for reading and writing pickle files
# This module implements specialized container datatypes providing alternatives
↪ to Pythons general purpose built-in containers, dict, list, set, and tuple.
from collections import Counter
import numpy as np  # Import the NumPy library for numerical computing
np.random.seed(0)  # Set the random seed for reproducibility
import re  # Import the re module for regular expression operations
import io  # Import the io module for handling I/O operations
import os  # Import the os module for interacting with the operating system
import time  # Import the time module for time-related functions
import concurrent.futures  # Import the concurrent.futures module for parallel
↪ execution
```

 # File Parsing and Text Cleaning Functions

```python
def parse_file_name(file_name):
    parts = file_name.split('_')
    date = parts[0]  # Extract the date from the file name
    filesource = parts[1]  # Extract the file source from the file name
    cik = parts[4]  # Extract the CIK from the file name
    return filesource, cik, date  # Return the extracted components as a tuple

def clean_text(text):
    text = text.replace('\n', ' ')  # Replace newline characters with a space
    text = text.lower()  # Convert the text to lowercase
    return text  # Return the cleaned text
```

[17] https://sraf.nd.edu/sec-edgar-data/

File Processing and Parallel Execution

```python
# Set the directory containing the files
folder = r'C:\Users...\10X'
folder2 = r'C:\Users....\Storage'

# Create a generator expression to iterate over the files in the directory
files = (f for f in os.listdir(folder) if f.endswith('.htm') or f.endswith('.txt'))

# List of invalid sources to be excluded
invalid_sources = ['10-QSB','10QSB','10QSB-A','10-QSB-A','10-Q-A','10-K-A','10KSB-A','10KSB', '10-K405', '10KSB', '10-KSB', '10KSB40','10-K-A', '10-K405-A', '10-KSB-A', '10-KSB-A', '10KSB40-A','10-KT', '10KT405', '10-KT-A', '10KT405-A','10-QT', '10-QT-A','10QT', '10QT-A']

def process_file(file):
    # Loop through each file and extract the text
    for file in files:
        name = file.replace('.txt', '')

        # Get the first and second parts of the filename
        filesource, cik, date = parse_file_name(name)
        file_name = f"{folder2}/{cik}_{filesource}_{date}.p"

        if filesource in invalid_sources:
            # Remove the file if it has an invalid filing type
            os.remove(os.path.join(folder, file))
            print(f"Removed {file} (filingtype is invalid)")
            continue

        if os.path.exists(file_name):
            # Remove the file if it already exists
            os.remove(os.path.join(folder, file))
            print(f"Removed {file} (already exists)")
            continue

        # Open the file in read mode
        with open(os.path.join(folder, file), 'r', encoding="utf-8") as f:
            extracted_text = f.read()
            extracted_text = clean_text(extracted_text)
```

```
            my_string = extracted_text

            # Dump the extracted text into a pickle file
            with open(file_name, "wb") as f:
                pickle.dump(my_string, f)

            print(f"Processed {file} {date}")

# Process files in parallel using a ThreadPoolExecutor
with concurrent.futures.ThreadPoolExecutor() as executor:
    executor.map(process_file, os.listdir(folder))
```

B.3 Read and Create Hedge : Python Code

#Import packages

```
import pandas as pd  # Import the pandas library for data manipulation and analysis
import pickle  # Import the pickle module for serialization and deserialization of Python objects
from collections import Counter  # Import the Counter class from the collections module for counting occurrences
import numpy as np; np.random.seed(0)  # Import the numpy library for numerical computing and set a random seed for reproducibility
import re  # Import the re module for regular expression support
import io  # Import the io module for input/output operations
import os  # Import the os module for interacting with the operating system
import string  # Import the string module for string manipulation and character sets
import concurrent.futures  # Import the concurrent.futures module for asynchronous execution of functions
import time  # Import the time module for time-related functions
```

#Load and prepare word lists. Define functions for cleaning strings.

```
# Read the Excel file into a DataFrame
Positive = pd.read_excel('Word dictionary.xlsx',sheet_name='Positive')  # Read the 'Positive' sheet from the 'Word dictionary.xlsx' file
F_Positive = pd.read_excel('Word dictionary.xlsx',sheet_name='Fpositive')  # Read the 'Fpositive' sheet from the 'Word dictionary.xlsx' file

# Prepare word lists
words_to_check = Positive['Positive'].astype(str).tolist()  # Convert the 'Positive' column of the 'Positive' DataFrame to a list of strings
words_to_remove = F_Positive['Negative'].astype(str).tolist()  # Convert the 'Negative' column of the 'F_Positive' DataFrame to a list of strings

# Remove spaces from word lists
words_to_check = [word.replace(' ', '') for word in words_to_check]  # Remove spaces from each word in 'words_to_check' list
words_to_remove = [word.replace(' ', '') for word in words_to_remove]  # Remove spaces from each word in 'words_to_remove' list

# Function to parse file name
def parse_file_name(file_name):
```

```
    parts = file_name.split('_')  # Split the file name by underscore character
    cik = parts[0]  # Extract the first part as 'cik'
    fillingt = parts[1]  # Extract the second part as 'fillingt'
    date = parts[2]  # Extract the third part as 'date'
    return cik, date, fillingt  # Return the extracted components as a tuple

# Function to clean text
def clean_text(text):
    text = text.replace('\n','')  # Remove newline characters from the text
    text = text.replace('\t','')  # Remove tab characters from the text
    text = text.replace(',', '')  # Remove commas from the text
    text = text.replace('-', '')  # Remove hyphens from the text
    text = text.replace('_', '')  # Remove underscores from the text
    text = text.replace(' ', '')  # Remove spaces from the text
    text = text.lower()  # Convert the text to lowercase
    return text  # Return the cleaned text
```

#Set directory and define function. Run concurrent code.

```
# Set the directory containing the files
folder = r'C:\Users\...\10Kfilepath'
# Create a generator expression to iterate over the files in the directory
files = (f for f in os.listdir(folder) if f.endswith('.p'))
# Initialize an empty list to store the results
results = []
def process_file(file):
    # Loop through each file and extract the text
    for file in files:
        name = file.replace('.p', '')
        # Get the first and second parts of the filename
        cik, date, fill = parse_file_name(name)

        # Open the file in read mode
        with open(os.path.join(folder, file), 'rb') as f:
            # Create a BeautifulSoup object if the file is HTML
            start_time1 = time.time()

            data = pickle.load(f)
            extracted_text = str(data)
            wrd='N/A'

            #extracted_text = test_trans(extracted_text)
```

```
            extracted_text = clean_text(extracted_text)
            has_word = 0

            for wod in words_to_remove:
                extracted_text = extracted_text.replace(wod, '')

            for wd in words_to_check:
                if wd in extracted_text:
                    has_word = 1
                    wrd = wd
                    break

            # Add the filename and has_word flag to the results list
            results.append([cik,date,fill,has_word,wrd])
            elapsed_time1 = time.time() - start_time1
            print(f"Processed {date}: in {elapsed_time1:.2f} seconds: Hedge =
             ↪ {has_word} {wrd}")

# Use ThreadPoolExecutor to execute process_file function concurrently
with concurrent.futures.ThreadPoolExecutor() as executor:
    # Map the process_file function to each file in the directory
    executor.map(process_file, os.listdir(folder))
```

#Create pandas data-frame and send to csv.

```
# Create a Pandas DataFrame from the results list
hedge = pd.DataFrame(results, columns=['CIK','Date','filling type',
 ↪ 'Hedge','word found'])
hedge['Date'] =
 ↪ pd.to_datetime(hedge['Date'],format='%Y%m%d').dt.strftime('%Y-%m-%d')
hedge['CIK']=hedge['CIK'].astype(int)
hedge.to_csv('Hedge.csv', index=False)
```

B.4 Compare our derived Hedge and Gürkaynak, Karasoy-Can, and Lee (2022) Hedge: Python Code

 # We Import Gürkaynak, Karasoy-Can, and Lee (2022) hedge to compare with our results below

```
gur_hedge=pd.read_csv('..\Data\Excel xlsx and csv\Final
    Download\hedgedatagurkaynak.csv')
gur_hedge.rename(columns={'filingdate' : 'Date'},inplace=True)
gur_hedge['Date'] =
    pd.to_datetime(gur_hedge['Date'],format='%d/%m/%Y').dt.strftime('%Y-%m-%d')
gur_hedge['gvkey']=gur_hedge['gvkey'].astype(int)
gur_hedge.drop(columns=['hedge1'],inplace=True)
```

 # We combine our data with funamental data from WRDS to identify our sample with gvkeys instead of CIK numbers as used in Edgar filings. Gurkaynak used gvkeys. We use CIK numbers

```
Fundamentals_raw = pd.read_csv('..\Data\Excel xlsx and csv\Final
    Download\Fundamentals.csv')
Fundamentals_raw= Fundamentals_raw[['gvkey','cik']]
Fundamentals_raw.drop_duplicates(inplace=True)
Fundamentals_raw.dropna(inplace=True)
Fundamentals_raw=Fundamentals_raw.astype(int)
test_hedges=pd.merge(hedge,Fundamentals_raw,how='inner',right_on='cik',left_on='CIK')
test_hedges['Date'] =
    pd.to_datetime(test_hedges['Date'],format='%Y-%m-%d').dt.strftime('%Y-%m-%d')
```

 # Comparing the two datasets

```
Comparison = pd.merge(test_hedges, gur_hedge, on=['gvkey', 'Date'],how='inner')
Comparison.sort_values(by=['cik','Date'], inplace=True)
Comparison.to_csv('..\Data\Excel xlsx and csv\Final produced\hedgecompare.csv',
    index=False)
```

 # Below we test out the weight of negative and positive findings that are dissimilar from Gurkaynack

```
positivefind=Comparison[(Comparison['Hedge'] != Comparison['hedge2']) &
    (Comparison['Hedge'] == 1)]
negativefind=Comparison[(Comparison['Hedge'] != Comparison['hedge2']) &
    (Comparison['Hedge'] != 1)]
```

B.5 GSS Factor Derivation: Python Code

#Import packages

```
import pandas as pd
import numpy as np; np.random.seed(0)
import csv
import os
from pathlib import Path
```

#Create Matrix of prices

```
# Read downloads FF = Futures and ED = Eurodollars. The eurodollars used are defined in the main text.
FFC1 = pd.read_excel('FFC1 03 to 23.xlsx')
FFC1['FFC1']=FFC1['Close']
FFC1['F1Open']=FFC1['Open']
FFC1=FFC1[['Exchange Date','FFC1','F1Open']]

FFC2 = pd.read_excel('FFC2 03 to 23.xlsx')
FFC2['FFC2']=FFC2['Close']
FFC2['F2Open']=FFC2['Open']
FFC2=FFC2[['Exchange Date','FFC2','F2Open']]

FFC3 = pd.read_excel('FFC3 03 to 23.xlsx')
FFC3['FFC3']=FFC3['Close']
FFC3['F3Open']=FFC3['Open']
FFC3=FFC3[['Exchange Date','FFC3','F3Open']]

FFC4 = pd.read_excel('FFC4 03 to 23.xlsx')
FFC4['FFC4']=FFC4['Close']
FFC4['F4Open']=FFC4['Open']
FFC4=FFC4[['Exchange Date','FFC4','F4Open']]

ED2 = pd.read_excel('ED2 03 to 23.xlsx')
ED2['E2']=ED2['Close']
ED2['E2Open']=ED2['Open']
ED2=ED2[['Exchange Date','E2','E2Open']]

ED3 = pd.read_excel('ED3 03 to 23.xlsx')
ED3['E3']=ED3['Close']
ED3['E3Open']=ED3['Open']
ED3=ED3[['Exchange Date','E3','E3Open']]
```

```python
ED4 = pd.read_excel('ED4 03 to 23.xlsx')
ED4['E4']=ED4['Close']
ED4['E4Open']=ED4['Open']
ED4=ED4[['Exchange Date','E4','E4Open']]

FOMC = pd.read_excel('FOMC Dates2.xlsx')
FOMC.rename(columns={'Date(UK)': 'FOMC'}, inplace=True)
FOMC=FOMC[['FOMC']]

#we manually input all the FOMC dates that are Approx 60 days away
NFOMC = pd.read_excel('FFC1 03 to 23.xlsx')
NFOMC=NFOMC[['Next','Exchange Date']]

def get_num_days(row):
    year = int(row['Year'])
    month = int(row['Month'])
    return calendar.monthrange(year, month)[1]
NFOMC['Month']= NFOMC['Next'].dt.strftime('%m')
NFOMC['Year']= NFOMC['Next'].dt.strftime('%Y')
NFOMC['D2'] = NFOMC.apply(get_num_days, axis=1)
NFOMC['d2']= NFOMC['Next'].dt.strftime('%d')
NFOMC['d2'] = NFOMC['d2'].astype(int)
NFOMC=NFOMC[['Exchange Date','D2','d2']]
#NFOMC['Date']=pd.to_datetime(NFOMC)

sunday_mask = NFOMC['Exchange Date'].dt.weekday == 6
NFOMC.loc[sunday_mask, 'Exchange Date'] += pd.to_timedelta('1 day')

sunday_mask = FOMC['FOMC'].dt.weekday == 6
FOMC.loc[sunday_mask, 'FOMC'] += pd.to_timedelta('1 day')
Matrix = pd.merge(FFC1, FFC2, on='Exchange Date')
Matrix = pd.merge(Matrix, FFC3, on='Exchange Date')
Matrix = pd.merge(Matrix, FFC4, on='Exchange Date')
Matrix = pd.merge(Matrix, ED2, on='Exchange Date')
Matrix = pd.merge(Matrix, ED3, on='Exchange Date')
Matrix = pd.merge(Matrix, ED4, on='Exchange Date')

Matrix.sort_values(['Exchange Date'], inplace=True)
Matrix.reset_index(inplace=True, drop=True)
```

```
Matrix['FF1']=-Matrix['FFC1']+Matrix['F1Open']
Matrix['FF2']=-Matrix['FFC2']+Matrix['F2Open']
Matrix['FF3']=-Matrix['FFC3']+Matrix['F3Open']
Matrix['FF4']=-Matrix['FFC4']+Matrix['F4Open']

Matrix['ED2']=(Matrix['E2']-Matrix['E2Open'])
Matrix['ED3']=(Matrix['E3']-Matrix['E3Open'])
Matrix['ED4']=(Matrix['E4']-Matrix['E4Open'])

Matrix.drop(['FFC1', 'F1Open', 'FFC2', 'F2Open', 'FFC3', 'F3Open',
        'FFC4', 'F4Open', 'E2', 'E2Open', 'E3', 'E3Open', 'E4', 'E4Open',],
        axis=1, inplace=True)
```

#Calibrate Final Matrix

```
FOMC = pd.read_excel(r'NFOMC.xlsx')
FOMC.rename(columns={'NFOMC': 'Exchange Date'}, inplace=True)
FOMC['Time']= FOMC['Exchange Date'].dt.strftime('%m/%d/%Y')
FOMC['Date']= FOMC['Exchange Date'].dt.strftime('%d')
FOMC['Month']= FOMC['Exchange Date'].dt.strftime('%m')
FOMC['Year']= FOMC['Exchange Date'].dt.strftime('%Y')
FOMC['Month_Year']= FOMC['Exchange Date'].dt.strftime('%m/%Y')
FOMC['Quarter']= FOMC['Exchange Date'].dt.to_period('Q')
FOMC['D2'] = FOMC.apply(get_num_days, axis=1)
FOMC['d2'] = FOMC['Date'].astype(int)
FOMC.rename(columns={'Exchange Date': 'NFOMC'}, inplace=True)
FOMC.rename(columns={'Date(UK)': 'Exchange Date'}, inplace=True)

FOMC['Time']= FOMC['Exchange Date'].dt.strftime('%m/%d/%Y')
FOMC['Date']= FOMC['Exchange Date'].dt.strftime('%d')
FOMC['Month']= FOMC['Exchange Date'].dt.strftime('%m')
FOMC['Year']= FOMC['Exchange Date'].dt.strftime('%Y')
FOMC['Month_Year']= FOMC['Exchange Date'].dt.strftime('%m/%Y')
FOMC['Quarter']= FOMC['Exchange Date'].dt.to_period('Q')
FOMC['D1'] = FOMC.apply(get_num_days, axis=1)
FOMC['d1'] = FOMC['Date'].astype(int)
FOMC['D1_d1'] = FOMC['D1']-FOMC['d1']
FOMC['D1/(D1_d1)'] =  FOMC['D1']/FOMC['D1_d1']

FOMC['D2_d2'] = FOMC['D2']-FOMC['d2']
FOMC['d2/D2'] = FOMC['d2']/FOMC['D2']
```

```
FOMC['D2/(D2_d2)'] =  FOMC['D2']/FOMC['D2_d2']

FOMC
Mat = pd.merge_asof(FOMC, Matrix, on='Exchange Date', direction='nearest')

Mat['MP1']=(Mat['FF1'])*Mat['D1/(D1_d1)']
Mat['MP2']=(Mat['FF2'])
Mat['MP1']= Mat.apply(lambda row: row['MP2'] if row['D1_d1'] <= 7 else row['MP1'], axis=1)

Mat['MP3']=((Mat['FF3'])-(Mat['d2/D2']*Mat['MP1']))*Mat['D2/(D2_d2)']
Mat['MP4']=(Mat['FF4'])
Mat['MP3']= Mat.apply(lambda row: row['MP4'] if row['D2_d2'] <= 7 else row['MP3'], axis=1)

Mat.drop(['NFOMC','Month_Year','Quarter', 'D2', 'd2','D1_d1', 'D1','D2_d2','D1/(D1_d1)', 'd2/D2', 'D2/(D2_d2)','d1',], axis=1, inplace=True)
Mat.rename(columns={'Exchange Date': 'FOMC','Date':'day', 'Month':'month', 'Year':'year'},inplace=True)
Mat[Mat['FOMC']=='2020-03-15']

Mat.to_excel('GSSRaw.xlsx', index=False)
Mat.tail(50)
```

This raw file is used in Gürkaynak, Karasoy-Can, and Lee (2022) code to derive GSS Factors.