The Impact of Securities Regulation on New Keynesian Firms*

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November 21, 2022

Abstract

This paper describes a new fact and then analyzes its implication for aggregate fluctuations: sticky-price firms overstated accounting earnings more often than flexible-price firms prior to the passage and implementation of the Sarbanes-Oxley Act (SOX) but refrained more from overstating earnings after SOX. Sticky-price firms also paid lower loan spreads after SOX than before, experienced negative returns around the Enron scandal, and experienced positive returns around the SEC's approval of the change in listing requirements. We develop a New Keynesian model that incorporates both a financial accelerator (Bernanke and Gertler, 1989) and firms featured with differential output-price stickiness. The model mirrors both pre- and post-SOX scenarios and shows that, when investigating the profits reported by sticky-price firms is more costly for lenders, such firms are endogenously more volatile in equity returns and display higher capital-investment and stock-price sensitivities to monetary-policy shocks. Our further empirical analyses yield results that are in line with these model predictions.

JEL Classification: E12, E44, G28, G32, G33

Keywords: Nominal Rigidities, Financial Accelerator, New Keynesian Models, Earnings Misstatement, Sarbanes-Oxley Act, Monetary Policy.

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*We are grateful to Michael Weber for sharing the proprietary data of frequency of price adjustment at the sector level and sharing the change of the fed funds futures implied rate. We thank Boragan Aruoba, Kaiji Chen, Francesco D'Acunto, Sudipto Dasgupta, Xiang Fang, Urban Jermann, Kai Li, Yueran Ma, Stefan Schantl, Eric Swanson, Jincheng Tong, Pengfei Wang, Michael Weber, and seminar participants at the 2022 China International Conference in Macroeconomics (CICM), the 2022 China International Conference in Finance (CICF), University of Melbourne, and Peking University HSBC Business School for helpful comments. Zhang acknowledges support from the National Natural Science Foundation of China (No.72003102).

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The sticky-price goods that make up the remaining 70 percent of the CPI market basket don't appear to respond to economic conditions. Wall Street Journal (May 21, 2010)

Claims that the disclosure of the impact of inflation will impair the ability of those in a given industry to raise capital are overstated ... The need for disclosure of the impact of inflation on corporate performance is simply no longer open to serious debate. The question is not whether it should be disclosed, but how. Harold Williams, Chairman of SEC (1977)

1 Introduction

This paper describes a new fact and then analyzes its implication for aggregate fluctuations: compared with firms with flexible-output prices, firms with sticky-output prices overstate accounting earnings more often prior to the passage of the Sarbanes-Oxley Act (SOX) but refrained more from overstating earnings immediately following SOX. This type of managerial misreporting causes sticky-price firms to face extra credit-market frictions, which contributes to the observed heterogeneity in firms' responsiveness to changes in monetary policy.[1]

Our findings suggest product pricing and the credit market could join together to propagate and amplify monetary-policy shocks to the macroeconomy. Our study links two independent channels proposed by the seminal work of Bernanke et al. (1999) in a New Keynesian model with a finance accelerator. In the first channel, firms holding output prices fixed respond to monetary-policy-stimulated demand by selling more (e.g., Taylor, 1980; Calvo, 1983). In the second channel, expansionary monetary policy increases borrowers' net cash flows and collateral value, relaxes their financial constraints, and amplifies the effects of monetary policy (e.g., Bernanke and Gertler, 1989, 1995). Nevertheless, Bernanke et al. (1999) assume firms' inability to adjust prices does not limit their access to credit markets. Under this assumption, firms with differential price stickiness are equally more (less) able to finance inputs and production after monetary expansions (contractions) and, when studying the interaction between financial friction and monetary-policy transmission, scholars often isolate the effect of price stickiness from financial frictions (see Fisher, 1933; Gertler and Gilchrist,1994; Ippolito et al., 2018; Ozdagli, 2018; Ozdagli and Velikov, 2020; Ottonello and

[1] Reasons why firms adjust their output prices less frequently include coordination failure among industry peers (Blinder, 1994; Blinder et al., 1997), managerial inefficiency (Zbaracki et al., 2004), customer antagonization (Anderson and Simester, 2010), firms anchoring on reference prices and costs (Eichenbaum et al., 2011), and, more generally, menu costs (Anderson et al., 2015). Exploring the determinants of output-price stickiness is beyond the scope of this paper.

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Winberry, 2020).

A recent literature has documented that sticky-price firms have lower leverage and pay higher cost of debt, primarily because such firms have higher cash-flow volatility (D'Acunto et al., 2018; Augustin et al., 2021). We share with these papers the study of the role of nominal rigidities on financial frictions. However, we distinguish our study from these two papers by emphasizing on the role of managerial misreporting. And we also differ from those authors by incorporating the (mis)reporting-based micro-foundation into the New Keynesian framework à la Bernanke et al. (1999) to analyze how financial frictions propagate and amplify the impact of nominal shocks on the real economy.

We conjecture that, because lenders cannot costlessly verify borrowers' profits, firms' inflexibility in resetting output prices delays the revelation of profit-damaging news to the public. Although voluntary disclosure could address the problem, managers often keep such information confidential either because of their conflict of interest with shareholders or for a variety of strategic motives. For this reason, borrowers' output-price stickiness increases the verification cost born by lenders, who in turn require a higher return on loans extended to sticky-price borrowers, especially when managers of borrowing firms have greater discretion over reporting (e.g., Townsend, 1979; Gale and Hellwig, 1985). Indeed, prior literature documents that the quality of borrowers' financial statements plays a pivotal role in determining the design of a debt contract, even though lenders often acquire borrowers' private information (e.g., Costello and Wittenberg-Moerman, 2011; Ozdagli, 2018).

To build our empirical laboratory, we bring U.S.-headquartered, S&P 1500 constituent firms with differential price stickiness into the context of a securities regulation and its financial-market consequences. Specifically, we exploit the passage and implementation of SOX on July 25, 2002, the most far-reaching securities legislation since the Securities Acts of 1933 and 1934. The legislation mandated that managers of publicly listed firms individually certify the accuracy of financial reporting, substantially increased penalties for fraudulent misreporting, and increased external auditors' independence to review financial statements.[2] Because SOX was triggered directly by the collapse of Enron in late 2001, the regulation was plausibly exogenous to both fundamentals and price stickiness for a majority of public firms that were not involved in financial scandals and

[2] The sections of the bill cover responsibilities of a public firm's board of directors, add criminal penalties for certain misconduct, and require the Securities and Exchange Commission (SEC) to create regulations to define how public firms are to comply with the law.

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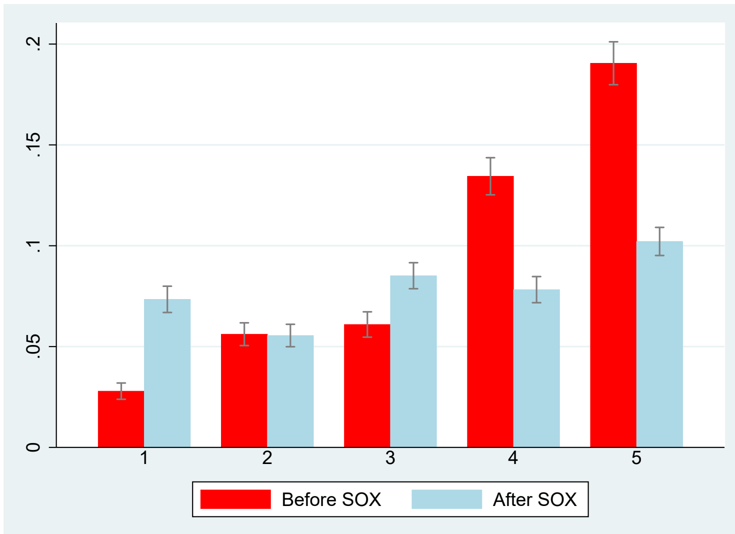
Figure 1: **Price Stickiness and Earnings Overstatement**

The figure plots the likelihood (y-axis) that firm managers overstate earnings for groups of firms with increasing output-price stickiness. The pre- and post-SOX periods are 1994Q1-2003Q2 and 2003Q3-2012Q4, respectively. The sample consists of S&P 1500 constituent firms headquartered in the U.S. Utilities and Financial sectors are excluded. Price stickiness is measured as the frequency of price adjustment (FPA) multiplied by -1. In the sample period of 2002-2012, FPA at 6-digit NAICS sectors is calculated by Pasten et al. (2017).



bankruptcies (e.g., Ozdagli, 2018; D'Acunto et al., 2020).[3]

In Figure 1, we sort firms into five equally sized groups with increasing price stickiness and, for each group, we calculate the assets-weighted frequency with which managers overstate earnings.[4] The figure shows that before SOX, managers of firms with higher price stickiness more frequently overstated earnings.[5] Moving from firms with the most flexible price to firms with the stickiest price increases the likelihood of overstatement from around 4% to 18%. In contrast to such a pre-SOX scenario, managers of sticky-price firms refrained more from overestimating earnings after SOX than before, as visualized by a flattened relationship between price stickiness and earnings overstatement.[6]

[3]Our empirical design—selecting the most representative domestic firms and assigning higher weights on large firms—aims to address the concern that SOX imposed real costs on both foreign and small firms (e.g., Holmstrom and Kaplan, 2003; Zhang, 2007; Engel et al., 2007; Morosi and Marroud, 2008; Iliev, 2010).

[4]Our weighting scheme is justified by the SEC's guidance stating that the risk of financial reporting misstatements is higher in larger firms. For reference, see SEC Release Nos. 33-8810 and 34-55929. Commission guidance regarding management's report on internal control over financial reporting under Section 13(a) or 15(d) of the Securities Exchange Act of 1934, June 20, 2007.

[5]We classify "misstatement periods" as time periods (at the year-quarter level) during which earnings are overstated. The frequency of earnings overstatement is therefore the frequency with which such misstatement periods occur in our sample.

[6]From the Audit Analytics Restatement database, we collect approximately 10,500 firm-year-quarter observations associated with at least one restatement filing with the SEC. More than 83% of these fillings stated that the effect of

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Based on the above eyeball evidence, we use a difference-in-differences (DiD) framework that allows us to estimate the impact of securities regulation on sticky-price firms after partialling out firm-level characteristics, time-invariant unobservables, and time-varying sectoral unobservables. To further distinguish our misreporting channel from Augustin et al.'s (2021) cash-flow volatility channel, we also control for return-based fundamental volatility.

Turning to the effect of SOX on misreporting and on credit-market friction, the picture that emerges is striking: relative to otherwise similar managers, managers of firms with sticky-output prices immediately refrained from overstating earnings following the passage and implementation of SOX. Notably, the attenuating effect of SOX on misreporting by sticky-price firms was long-lasting and became effective immediately after SOX. Over the period of 1994-2012, managers were 2 percentage points more likely to restate earnings downward if output-price is a one-standard-deviation stickier, which is equivalent to 20% of the sample mean. However, the pre- and post-SOX scenarios sharply contrast to each other: before July 2002, a one-standard-deviation increase in price stickiness increased the misreporting frequency by 4 percentage points; after July 2002, the level of price stickiness barely correlated with misreporting.

Next, we show the change in loan spreads paid by sticky-price firms before and after SOX is consistent with managerial misreporting aggravating credit-market frictions. Compared with otherwise similar firms, borrowing firms with sticky-output prices paid sizably lower loan spreads after SOX than before. One potential concern is that the nationwide implementation of SOX was accompanied by other major economic and political news (e.g., the impending war in Iraq or the creation of the Department of Homeland Security), which might confound our causal inference (Leuz, 2007). As a refinement of our analysis, we use a triple DiD specification by exploiting additional firm-level variation in borrower-side information quality. We show more opaque sticky-price firms experienced a significantly larger decrease in loan spreads after SOX than before, compared with less opaque firms with the same level of price stickiness. Our triple-DiD results support the notion that given monitoring intensity and technology, lenders respond to improved borrower-side information quality by charging lower loan spreads.

To further identify a causal effect from price stickiness to misreporting, we perform tight-window

restatement on firms' financial statement is "adverse." We refer to restatements with an adverse impact on restating firms' reported accounting performance as "earnings overstatements." Our unreported results suggest that compared with flexible-price firms, sticky-price firms did not reduce the frequency with which managers understate earnings after SOX relative to before.

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event studies to show stocks of sticky-price firms experienced more negative daily abnormal returns surrounding several scandalous events (e.g., Enron filed earnings restatements and bankruptcy).[7] We also show sticky-price firms experienced more positive returns around several key events related to corporate governance reforms (e.g., the SEC approved proposals made by the NYSE and NASDAQ to reform public firms' disclosure practices and corporate governance).[8]

Building on our empirical fact, we present a New Keynesian model à la Li and Palomino (2014) to assess how this misreporting channel intermediates the real effect of monetary-policy shocks through firms' heterogeneous inability to change output prices. A departure from prior literature (Bernanke et al., 1999; Ottonello and Winberry, 2020), we assume borrowing firms with sticky-output prices have to pay higher loan spreads, because lenders bear a higher cost to verify the performance of such borrowers. More importantly, the difference between spreads paid by sticky- and flexible-price borrowers is counter-cyclical, which we show is the key driver of model results.

Our New Keynesian model predicts sticky-price firms are more volatile in equity returns and exhibit a higher capital-investment, or stock-price, sensitivity to unexpected changes in monetary policy. In particular, we analytically show the counter-cyclical interest-rate premium paid by sticky-price borrowers is what drives these firms' equity-return volatility. The reason is that, when facing greater financial frictions due to misreporting, such firms' capital investment and debt financing are more sensitive to economic and credit-market conditions; for example, firms with sticky-output prices borrow and invest more (less) after expansionary (contractionary) monetary policy shocks.

To quantify the impact of the above credit-market frictions on the aggregate economy, we calibrate the model using both observable features of raw data and realistic parameters employed by prior literature. We also change the parameter governing lenders' verification cost to mirror the pre- and post-SOX periods. We show that a sizable reduction in lenders' verification cost, and thereby their required return on loans extended to firms, weakens their responsiveness to monetary-policy surprises, and reduces these firms' return volatility.

We next perform empirical analysis to test the above model predictions. Together, our findings can be summarized as follows. First, sticky-price firms became less volatile in equity returns following the passage and implementation of SOX. This finding is consistent with our model predictions

[7] Commission File Number 1-13159 (U.S. Securities and Exchange Commission, November 8, 2001).

[8] "SEC Approves NYSE, NASDAQ Strengthening of Corporate Governance Standards for Listed Companies" (U.S. Securities and Exchange Commission, November 4, 2003).

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that, faced with greater misreporting-induced, financial frictions prior to SOX, sticky-price firms' higher return volatility is attributable to their lumpy investment and debt financing in response to monetary-policy shocks. Second, compared with flexible-price firms firms, sticky-price firms invested more (less) after monetary expansions (contractions) before SOX, but such a difference between two types of firms disappeared after SOX. Third, sticky-price firms display a higher stock-price sensitivity to monetary policy shocks before SOX, but this effect became essentially zero after SOX.

Literature: Our paper adds to several strands of literature. The first is related to the study on how credit-market friction influences the aggregate economy. Carlstrom and Fuerst (1997) embed borrower-agency costs of a lending relationship into a real-business cycle model. Bernanke et al. (1999) incorporate agency costs into a New Keynesian model to examine the interaction of credit-market frictions with shocks to monetary policy. Ottonello and Winberry (2020) build on Bernanke et al.'s (1999) framework to include firm heterogeneity in default risk. Bernanke et al. (1999) and Ottonello and Winberry (2020) assume price stickiness is independent from financial friction.

Specifically, we show monetary policy shocks affect the real economy through information-sensitive external financing. Ozdagli (2018) exploits Arthur Andersen's demise to document that Andersen's clients, which were more costly to audit, have a lower leverage and a weaker reaction to expansionary monetary shocks.[9] Ozdagli and Velikov (2020) create a monetary-policy exposure index based on observable firm characteristics that capture the credit channel, balance-sheet liquidity, discount-rate effect, and nominal rigidities. The authors show the index successfully captures stocks' responses to monetary policy. Armstrong et al. (2019) find better accounting quality moderates firms' stock-price response and future investment sensitivity to unexpected changes in monetary policy.

The second strand is the emerging literature that establishes a link from firms' product-pricing strategy to capital-market frictions (e.g., Weber, 2015; Gorodnichenko and Weber, 2016; D'Acunto et al., 2018; Hsu et al., 2019; Xie, 2020; Gu and Xie, 2021; Augustin et al., 2021; Fang et al., 2021; Konchitchki and Xie, 2022). These authors find price rigidity is an important determinant of equity premium, return volatility, leverage, credit risk, earnings persistence, stock-market efficiency, and

[9] The key to explain Ozdagli's (2018) finding is that bank debt usually has a floating interest rate, which makes stock prices more responsive to monetary policy (Ippolito, Ozdagli, and Perez-Orive, 2018).

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inflation-risk exposure.

The third strand is the literature on nominal rigidities in debt contracts. Existing studies suggest that when a firm issues debt with a fixed nominal coupon, the real value of future payments changes with unexpected price-level changes, which in turn increases firms' default risk (e.g., Kang and Pflueger, 2015; Gomes et al., 2016; Bhamra et al., 2021; Corhay and Tong, 2021).

2 Institutional Background and Data

2.1 The Sarbanes-Oxley Act

SOX was passed in Congress on July 25, 2002, in response to several high-profile financial scandals in corporate America, which resulted in billions of dollars of losses for investors. President George W. Bush signed the bill into law on July 30, 2002.[10] The Act has widely been considered the most far-reaching securities legislation since the Securities Acts of 1933 and 1934. The implementation of SOX started soon after its passage and the rulemaking activities continued in 2003.[11]

SOX consists of 11 sections. Several key provisions are worth mentioning. First, Section 302 of the Act requires firm chief executive officers (CEOs) and chief finance officers (CFOs) to certify the veracity of firms' financial statements, and demands more timely and detailed disclosures. Second, the "real time issuer disclosure" mandate in Section 409 of the Act was intended to provide investors with better and faster disclosure of important material corporate events.[12] Third, Section 404 requires companies to put in place and periodically test procedures that monitor the internal control systems ensuring accurate financial reports. This Section also requires that managers report their findings in a special management report; in addition, external auditors of the company must attest to management's evaluation. Fourth, SOX sets more stringent standards for audit-committee membership. All members of the audit committee must be independent, and firms must disclose whether at least one member is a financial expert.[13] Fifth, SOX requires CEOs and CFOs to disgorge bonus compensation and stock-sale profits during any 12-month period following

[10] For institutional details, see H.R.3763 – Sarbanes-Oxley Act of 2002.

[11] The SEC adopted rules on management report of internal controls on May 27. The Public Company Accounting Oversight Board (PCAOB) audit standard of internal controls was approved by the SEC in June 2004, which completed the major rulemaking activities directed by SOX.

[12] "SEC Adopts Rules on Provisions of Sarbanes-Oxley Act" (U.S. Securities and Exchange Commission, January 15, 2003).

[13] "Final Rule: Management's Report on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports" (U.S. Securities and Exchange Commission, August 28, 2008).

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a financial report that is subsequently restated due to their misconduct. Sixth, SOX defines some new criminal offenses (i.e., destruction of documents with intent to obstruct justice) and raises criminal penalties attached to existing offenses.[14]

2.2 Data

We focus on U.S.-headquartered, S&P 1500 constituent firms. The S&P 1500 includes all stocks in the S&P 500, S&P 400 (mid-cap stocks), and S&P 600 (small-cap stocks). These firms capture approximately 90% of the available stock market capitalization in the U.S., thereby maintaining the representativeness of the whole economy in economic terms.[15]

Output-price stickiness is measured at the 6-digit NAICS sector level. We assume different firms in the same 6-digit NAICS sector are subject to the same degree of price stickiness. This assumption is reasonable because firms operating in the same granular sector are similar in many aspects, including product functions, inputs, labors, technologies, and other business conditions.

We use the data for frequency of price adjustment (FPA) provided by Pasten, Schoenle, and Weber (2017) to measure price stickiness. Using the confidential microdata underlying the Producer Price Index (PPI) from 2002 to 2012, the authors calculate the FPA at the goods level as the ratio of the number of price changes to the total number of sample months. For example, if an observed price path is \$5 for three months and then \$10 for another two months, one price change occurs during five months, and the frequency is 1/5. The authors then aggregate goods-based frequencies into 674 data points at the level of 6-digit NAICS sectors. FPA measures the mean fraction of months with price changes during the sample period à la Calvo (1983) and is time invariant. The data are consistent with the finding by Nakamura and Steinsson (2008) that a median duration of prices is between eight and 11 months.[16]

The syndicated loan sample is a set of loan issuances from the Dealscan database provided by the Loan Pricing Corporation (LPC). We collapse a package with multiple facilities contracted on

[14] Executives who knowingly certify false financial reports are subject to a fine of \$5 million, a 20-year prison term, or both. Criminal penalties are increased for mail fraud, violation of the Employee Retirement Income Security Act of 1974 (ERISA) reporting and disclosure rules, and violation of the Securities Exchange Act of 1934. "Attorney General August 1, 2002 Memorandum on the Sarbanes-Oxley Act of 2002" (U.S. Department of Justice, August 1, 2002).

[15] Our estimation results are virtually the same if we expand the sample to all firms.

[16] We match FPA to Compustat firms based on the 6-digit NAICS sector codes. If Compustat firms' 6-digit NAICS codes are not matched with those in the adjustment-frequency data, we switch to using 5-digit codes. To minimize measurement errors, and to make the sector-level data as granular as possible, we stop this procedure at 5-digit codes.

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the same date into one observation. Loan spread is calculated as the sum of the amount across facilities, the average maturity, and the average all-in-drawn spread over the London Interbank Offered Rate (LIBOR).[17] We collect stock returns from the daily and monthly stock-return file from the Center for Research in Security Prices (CRSP). We obtain financial and balance-sheet variables from Compustat. We gather earnings restatements from the Audit Analytics Restatement database that covers all SEC registrants who have disclosed a financial-statement restatement in electronic filings since January 1, 1995.

Panels A and B of Table 1 present descriptive statistics on the Compustat and DealScan samples, respectively. The sample unit with the Compustat sample is at the level of firm-year-quarter; the sample unit with the DealScan sample is at the level of loan package. Price stickiness varies substantially across firms. On average, a firm will keep prices constant for eight months. As Figure 2 shows, the distribution of FPA is positively skewed. The 28.6% monthly frequency of price adjustment implies a duration of 6.83 months for price spells.[18]

3 Empirical Findings

3.1 Earnings Overstatement

In this section, we examine the relation between the frequency of a firm's earnings overstatement and its price stickiness. For several reasons, we estimate weighted least squares (WLS) regressions in which observations are weighted by firm assets. First, the SEC's guidance and identification of firm characteristics (that help to predict financial fraud) suggests the risk of financial misreporting is higher for larger firms. Second, the BLS samples establishments based on the value of shipments. We assign higher weight to larger firms within the same industry to mitigate potential effects of measurement errors from using industry-level data on output-price stickiness.

We choose to begin the sample in 1994Q1 because the first restatement was announced in 1995Q1. We allow four quarters to precede 1995Q1 to include possible misstatement periods corresponding to restatement announcements in 1995Q1. Our results are not sensitive to how we select sample periods. We choose to end the sample in 2012Q4, which corresponds to the end of the period during which Pasten et al. (2017) observe microdata underlying the PPI program.

[17] We match loans to Compustat via the August 2012 version of the Dealscan-Compustat linking table introduced by Chava and Roberts (2008).

[18] We use $-1/\log(1\text{-adjustment frequency})$ to calculate implied duration.

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We aim to compare the frequency with which firms overstated accounting earnings before and after SOX across firms featured with differential price stickiness. To implement this strategy, we employ the following DiD design:

$$\begin{aligned} Overstatement_{i,s} = \alpha + \beta \times Sticky_j + \gamma \times Sticky_j \times Post_{i,s} + \delta \times Post_{i,s} \\ + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{i,s}, \end{aligned} \tag{3.1}$$

where i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC sector, year-quarter, and year, respectively. $Overstatement_{i,s}$ is a dummy variable that equals 1 if firm i overstated earnings (or book equity) during year-quarter s, and 0 otherwise. The Audit Analytics Restatement database records (1) whether the restatement's effect on financial statement is adverse or not and (2) the beginning and ending dates for which the SEC registrant is restating. Based on the above information, we identify the "misstatement period" over which firms overstated accounting performance. These overstatements lead managers of misstating firms to adjust downward accounting performances that were reported over the misstatement period.

$Sticky_j$ is FPA in sector j multiplied by -1 so that a higher $Sticky_j$ indicates higher output-price stickiness, and vice versa. $Post_{i,s}$ is an indicator equal to 1 if year-quarter s is after 2002Q3, and 0 otherwise. A set of firm (η_i) (or 1-digit SIC industry à la Augustin et al. (2021) (η_k)) fixed effects absorb time-invariant characteristics that differ across firms (or industries).[19] In the most restrictive specification, we add a set of 1-digit-SIC $\times$ time fixed effects ($\eta_{k,s}$) to absorb time-varying shocks at the level of the broad industry category. $X_{i,t-1}$ is a set of control variables employed by D'Acunto et al. (2018), including firm size (the logarithm of sales), long-term debt ratio, book-to-market ratio, profitability, price-to-cost margin, intangible assets to assets, and the Herfindahl-Hirschman Index (HHI) measuring market concentration. We cluster standard errors at the 6-digit NAICS level.[20]

Using the above regression, we compare the change in the frequency with which sticky-price firms overstate earnings before and after SOX to the change with the frequency with which flexible-price

[19] Because output-price stickiness is measured at the 6-digit NAICS industry, we use industries under other classifications to control for industry fixed effects. Our results are not materially altered if we use Hoberg-Phillips text-based or Fama-French 48-industry classification.

[20] We conduct several robustness checks. First, we compare the likelihoods of misreporting between sticky-price firms (top 50% of the distribution by price stickiness) and flexible-price firms (bottom 50% of the distribution by price stickiness). Second, we follow Bertrand et al. (2004) to average all the variables in the regression analysis at the firm level before and after 2002Q3. This "collapsed sample" leaves us with at most two observations.

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firms overstate before and after SOX. The regression coefficient γ captures the double difference. Table 2 presents the estimates of regression (3.1). We find that, unconditionally, managers of sticky-price firms are significantly more likely to overstate earnings (column (1)). A one-standard-deviation increase in price stickiness increases such a likelihood by 2.04 (0.17×0.12) percentage points, which is about 20% of the sample mean. More importantly, managers of sticky-price firms, overstated significantly less often after SOX than before SOX, with γ ranging from -0.16 to -0.22 depending on the specifications. For example, with the time fixed effect (column (2)), a one-standard-deviation increase in price stickiness increases the likelihood of overstatement by 3.9 (0.17 $\times$ 0.23) before SOX, but only by 1.2 (0.17 $\times$ (0.23-0.16)) percentage points after SOX.

Although the economic magnitudes vary slightly across specifications, our estimates are robust to the inclusion of time- and industry-fixed effects (column (3)), industry-time effects (column (4)), and firm- and industry-time fixed effects (column (5)). We also add total volatility to check if the cash-flow-volatility channel plays a role here (e.g., Augustin et al., 2021). Our results suggest managerial misreporting is not driven by the volatility of firm cash flows (column (6)).

Parallel-Trends Assumption. A necessary condition for identification is the parallel-trends assumption, which states that the evolution of earnings overstatements by sticky- and flexible-price firms would have followed common trends before and after SOX, had the securities regulation not happened. We estimate the following regression over the period of 1997Q1-2012Q4 to assess this assumption:

$$Overstatement_{i,s} = \alpha + \sum_{s=1997Q2}^{2008Q4} \beta_s \times Sticky_j + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{i,s},$$

where we drop the interactions with 1997Q1, which serves as the base period. Thus, the estimated β coefficients represent changes in the difference between sticky- and flexible-price firms between 1997Q1 and period s.

The evidence provided by Figure 3 is striking—managers of sticky-price firms immediately refrained from misreporting following the passage of SOX. Whereas the difference between sticky- and flexible-price firms fluctuates around zero somewhat during the pre-period, the overall trend before SOX is flat and no discernible pre-trend exist. The trend, however, changes when Congress passed SOX (i.e., 2002Q3). Specifically, the point estimates stayed statically below zero until

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2009, suggesting a long-lasting impact of securities regulation on sticky-price firms' misreporting behavior. Our results suggest direct experience of Enron's fall might make sticky-price firms, who are more associated with potential reporting misconduct, reassess the probability and consequences of facing punishment and hence induce a change in their misreporting behavior (D'Acunto et al., 2022).

3.2 Loan Spread

In this section, we show sticky-price firms paid lower loan spreads after SOX than before, consistent with prior literature on how accounting quality is linked to debt contracting outcomes (e.g., Sufi, 2007, 2009; Graham et al., 2008; Wittenberg-Moerman, 2008; Ivashina, 2009; Costello and Wittenberg-Moerman, 2011).

In the tests below, we focus on syndicated loans rather than public bonds for several reasons. First, compared with small firms, large firms rely more on bank debt (Beck et al., 2008).[21] Second, these large firms had infrequently issued bonds over the period of 1997-2012. Third, the sample period of transactions for U.S. corporate bonds from the TRACE Enhanced database starts in July 2002, and hence, we do not observe yield spreads before SOX.

We estimate the following DiD design:

$$\begin{aligned} \mathit{LoanSprd}_{n,i,s} = \alpha + \beta \times \mathit{Sticky}_j + \gamma \times \mathit{Sticky}_j \times \mathit{Post}_{i,s} + \delta \times \mathit{Post}_{i,s} \\ + X'_{i,t-1} \times \theta + \eta_t + \eta_{k,t} + \epsilon_{n,i,s}. \end{aligned} \tag{3.2}$$

For each loan package n signed by firm i as of year-month s, $\mathit{LoanSprd}_{n,i,s}$ is the average all-in-drawn spreads (in basis point) over LIBOR.[22]

Table 3 presents the regression results. Unconditionally, firms paid a similar loan-spread amount over the period of 1990-2012 (column (1)). Compared with flexible-price firms, sticky-price firms paid much lower loan spreads after SOX than before. Before SOX, a one-standard-deviation increase in price stickiness is associated with a 9.1-basis-point (0.19 $\times$ 47.7) increase in *LoanSprd*; after SOX, a one-standard-deviation increase in stickiness is associated with a 3.3-basis-point (0.19 $\times$ (47.7-65) decrease in *LoanSprd* (column (2)). These numbers speak to a sizable change in the loan-spread

[21] D'Acunto et al. (2018) find the vast majority of the firm-year observations among S&P 500 firms have a credit line open with at least one bank (94.6%).

[22] We collapse a package with multiple facilities contracted on the same date into one observation.

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value as percentages of the sample mean: 7.6% (9.1/120.3) and 2.7% (3.3/120.3). The results are not materially altered when we use different regression specifications (columns (3)-(5)) and we control for the return-based measure of cash-flow volatility (column (6)).

Our results on loan spreads might be driven by managers of sticky-price firms taking fewer risks during the post-SOX period (e.g., Kang et al., 2010; Bargeron et al., 2010). We report in Table A.1 that following SOX, sticky-price firms did not cut capital investment more than flexible-price firms, suggesting changes in risk-taking activities cannot explain the reduction in loan spreads.

Figure 4 proposes a visual assessment for whether the trends in loan spreads were parallel across sticky- and flexible-price firms in periods before SOX was implemented. The figure plots the estimates of β and the 95% confidence intervals from the following regression:

$$LoanSprd_{n,i,s} = \alpha + \sum_{\tau=-9}^{7} \beta_\tau \times Sticky_j + \sum_{\tau=-9}^{7} \gamma_s + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,t} + \epsilon_{n,i,s}, \qquad (3.3)$$

where the excluded period is event year -10, and β_s is the change in the effect of price stickiness on loan spread from event year -10 to event year τ. We fail to reject the null hypothesis that the effect of price stickiness is equal to that in the baseline year for all years before the passage of SOX.[23]

Our analysis so far does not rule out the possibility that lenders engage in substitution across loan contract terms. Indeed, banks might cut interest rates but may simultaneously set other contractual terms harsher. We therefore check the possibility of substitution from loan spread to the other two important contractual terms—loan maturity and collateral provision (e.g., Diamond, 1991a,b; Rajan and Winton, 1995). Table A.2 presents our estimates of the effect of SOX on the maturity of syndicated loans and the frequency with which lenders require collateral from borrowers. We find that after SOX relative to before, loans borrowed by sticky-price firms have longer

[23]Figure 4 tells us syndicated loan borrowers with sticky prices even paid lower spreads during the Great Recession, whereas Augustin et al. (2021), by contrast, document that yield spreads of sticky-price bond issuers increased more in response to the Lehman Brothers' bankruptcy in September 2008. We reconcile these contradictory results as follows. First, Augustin et al. (2021) source transaction data from the secondary bond market, thereby comparing spreads for the same bond before and after September 2008. However, we source data from the primary syndicated loan market, thereby allowing for the selection of different borrowers, or the selection of the same borrower with different borrowing purposes, into our sample. Second, the heightened uncertainty in the case of traded bonds could be considerably attenuated in the case of newly issued syndicated loans, because lead lenders frequently acquire private/soft information from borrowers. To the extent that the 2008-09 financial crisis was largely exogenous to the fundamental of a majority of non-banking sectors, and all else equal, borrowing firms' product-market operations were not significantly altered. Indeed, Ivashina and Scharfstein (2010) find new lending for real investment (e.g., working capital and capital expenditures) fell by only 14% in the last quarter of 2008 relative to the prior quarter, whereas new lending for restructuring (LBOs, M&As, share repurchases) contracted by almost 80% relative to the peak of the credit boom.

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maturities and are less likely to be secured. Figure 5 presents a visual assessment of the parallel trends of loan maturity and collateralization frequency between sticky- and flexible-price firms. The estimates of β_s from regression models akin to equation (3.3) are statistically indistinguishable from zero during periods preceding SOX but significantly trend up (down) for loan maturity (for collateralization frequency) after SOX.

3.3 Triple-Differences Strategy

The results we have presented so far might raise the concern that, rather than lenders' reaction to managerial misreporting, unobservable systematic differences between sticky- and flexible-price firms could vary around SOX, and such changes might explain the differential trends in loan spreads. Indeed, it has been well noted that the nationalwide implementation of SOX was accompanied by simultaneous economic shocks (e.g., Leuz, 2007), which might drive the time-series variation of loan spreads through sticky-price firms' exposure to macro shocks unrelated to managers' misreporting incentives. To tackle this important concern, we move on to the triple-differences strategy, which, by holding price stickiness constant, exploits variation in borrowers' information quality.

Specifically, we compare loan spreads before and after SOX, across sticky- and flexible-price borrowers, and across borrowers with differential information quality. To implement this strategy, we employ the following triple-interaction strategy:

$$\begin{aligned} LoanSprd_{n,i,s} = \alpha + \beta_1 \times Sticky_j \times Post_{i,s} \times Opaque_{i,t-1} + \beta_2 \times Sticky_j \times Post_{i,s} + \\ \beta_3 \times Post_{i,s} \times Opaque_{i,t-1} + \beta_4 \times Sticky_j \times Opaque_{i,t-1} + \beta_5 \times Sticky_j + \\ \beta_6 \times Opaque_{i,t-1} + \beta_7 \times Post_{i,s} + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,t} + \epsilon_{n,i,s}, \end{aligned} \tag{3.4}$$

where $\beta_1 + \beta_2$ and β_2 capture the double difference of the outcome across price stickiness and before and after SOX, computed separately for opaque and transparent firms. $Opaque_{i,t}$ is a dummy variable that equals 1 if borrower i's information quality is low as of year $t-1$, and hence, lenders require more intensive monitoring, and 0 otherwise. We follow Sufi (2007) and Ozdagli (2018) to employ three commonly used measures of borrower-side opaqueness, as explained below.

Our first measure of borrower-side information opaqueness is based on the extent to which outsiders rely on accrual accounting to reconcile the differential timings between when cash inflows/outflows arrive and when revenues/expenses are recognized. Because more accrued earnings

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are less persistent into future (e.g., Sloan, 1996), lenders might more intensively monitor borrowers with more accruals.[24] Dechow et al. (2011) find that compared with other accruals measures, the difference in *RRST* accruals between firms' misstated and normal years is the highest. In addition, *RRST* accruals strongly predicts the likelihood that the SEC issues Accounting and Auditing Enforcement Releases (AAERs) during, or at, the conclusion of an investigation against a company, an auditor, or an officer for alleged accounting and/or auditing misconduct.

Panel A of Table 4 reports our estimates. We define *Opaque* as a dummy variable that equals 1 if a firm's 6-digit-NAICS-sector adjusted *RRST* accruals is above the 90th percentile of its sample distribution, and 0 otherwise.[25] Sticky-price borrowers with abnormally high accruals paid much lower spreads after SOX than before; by contrast, for sticky-price borrowers accruing earnings less, the effect of SOX on loan spreads is rather modest. As for economic magnitude, borrowers with abnormally high accruals paid about 60-basis-point-lower (0.19×135.9) loan spreads after SOX if their product price was a one-standard-deviation stickier (column (5)).

Our second measure of borrower-side information opaqueness is based on whether a borrowing firm has S&P long-term credit ratings. *Opaque* is a dummy variable that equals 1 if firm *i*' does not have a long-term credit rating upon debt contracting, and 0 otherwise.[26] In Panel B of Table 4, we detect an economically and statistically significant cut of spreads by lenders extending loans to stickier borrowers without a credit rating, but the effect is fairly moderate for sticker firms with a rating. Specifically, borrowers without a rating paid about 33-basis-point-lower ($0.19 \times (165.4 + 9.6)$) spreads after SOX in response to a one-standard-deviation increase in their price stickiness (column (5)).

Our third measure of borrower-side information opaqueness is based on the concentration of syndicate. Sufi (2007) document evidence that when borrowing firms require more intense due diligence and monitoring, the lead arranger (informed lender) retains a larger share of the loan.

[24] Following Richardson et al. (2005), we measure firms' accounting accruals (*RSST* accruals hereafter) that extends the definition of working-capital accruals to include changes in long-term operating assets and long-term operating liabilities. This measure is equal to the change in non-cash net operating assets. According to Richardson et al. (2005), *RSST* accruals is constructed as (ΔWC + ΔNCO + ΔFIN)/Average total assets, where WC = [Current Assets (DATA 4) - Cash and Short-term Investments (DATA 1)] - [Current Liabilities (DATA 5)- Debt in Current Liabilities (DATA 34)]; NCO = [Total Assets (DATA 6) - Current Assets (DATA 4) - Investments and Advances (DATA 32)] - [Total Liabilities (DATA 181) - Current Liabilities (DATA 5) - Long-term Debt (DATA 9)]; FIN=[Short-term Investments (DATA 193)+Long-term Investments (DATA 32)-[Long-term Debt (DATA 9) + Debt in Current Liabilities (DATA 34) + Preferred Stock (DATA 130)].

[25] Our untabulated results suggest borrowers with unusually high accruals pay an extra 40 basis points of spread.

[26] Our untabulated results suggest borrowers without an S&P 1500 long-term rating pay an extra 27 basis points.

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We thus define *Opaque* as a dummy variable that equals 1 if the lead arranger is the sole lender and therefore claims 100% ownership of the loan, and 0 otherwise. Compared with spreads of loans with low ownership concentration (low lender monitoring incentive), spreads for loans with high concentration should be more sensitive to changes in borrower-side misreporting. Panel C of Table 4 shows sticky-price firms borrowing from only one lender experienced a 111-basis-point (0.19 $\times$ (567.8 + 20.7)) reduction in spread if the product price was a one-standard-deviation stickier.

3.4 Event Study

In this section, we perform a cross-sectional regression of daily abnormal stock returns around several major events on price stickiness. The analysis not only establishes a casual link between price stickiness and managerial misreporting, but also addresses the concern that results in Table 3 are driven by industry-level time trends.

We estimate the following regression model:

$$CAR_i = \alpha + \beta \times Sticky_j + X_i' \times \theta + \epsilon_i, \tag{3.5}$$

where for each firm i, CAR_i is the cumulative abnormal returns estimated over the window of [-1, +1] days relative to the dates on which an event occurred. We estimate daily abnormal returns from the market model to take into account the fact that sticky-price firms have riskier profits and are intrinsically more exposed to market risk (Weber, 2015). Similar to Chhaochharia and Grinstein (2007), we select the following events around which sticky-price firms' daily returns are expected to be negative due to a nationwide fear of financial frauds: (1) Enron filed an earnings restatement (November 8, 2001); (2) SEC asked NYSE and Nasdaq to review their corporate governance requirements (February 13, 2002); and (3) WorldCom announced its profits had been inflated by $3.8 billion (June 25, 2002). We also select the following events around which sticky-price firms' daily returns are expected to be positive due to investors' appreciation of corporate governance reform: (1) Nasdaq's Executive Committee approved the first round of new corporate governance requirements (April 12, 2002); (2) the Senate passed the bill of Senator Sarbanes to enhance auditing related procedures, corporate responsibility, and financial disclosure (July 15, 2002); and (3) the SEC approved proposals by the NYSE and NASDAQ on corporate governance reforms (November 4, 2003).

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Panel A of Table 5 presents our tight-window estimates. Sticky-price firms experienced more negative returns around the confirmation of Enron and WorldCom scandals, suggesting investors expressed more concerns about sticky-price firms on the misreporting problem. The evaporation of firm value amounts to 0.85% and 0.7% around the Enron and WorldCom scandals, respectively, if a firm's product price is one-standard-deviation stickier. In addition, sticky-price firms also experienced negative returns around the time NYSE and Nasdaq were required by the SEC to review corporate governance.

In contrast to the above event-study estimates, we find sticky-price firms experienced more positive returns around April 12, 2002 and November 4, 2003—the beginning and ending dates on which the two stock exchanges (i.e., NYSE and NASDAQ) proposed changes in listing standards to the SEC to improve corporate governance, particularly in the areas of board and shareholder monitoring. Notably, sticky-price firms experienced mildly positive returns around the key SOX event (July 15, 2002), suggesting net private costs (e.g., non-audit services, corporate responsibilities, and internal controls) imposed by SOX provisions on public firms do not increase with price stickiness.

Panel B of Table 5 suggests our results are robust to using daily abnormal returns that are estimated from a four-factor adjusted model. Compared with Panel A, sticky-price firms experienced larger negative returns around the time of the Enron scandal but statistically more positive returns when the Senate passed SOX.

4 Model

In this section, we develop a New Keynesian model of an economy with heterogeneous price stickiness and financial frictions. Specifically, we follow Li and Palomino (2014) to incorporate two sectors in the economy, which are characterized by sticky- and flexible-output prices. Firms can borrow from banks but subject to borrowing constraints à la Bernanke and Gertler (1989). To mirror the pre-SOX credit-market scenario, we assume banks bear higher costs to verify the accounting performance of firms in the sticky-price sector than firms in the flexible-price sector; to mirror the post-SOX scenario, we assume banks bear same costs to verify firm performance in these two sectors. We then simulate the economy to examine the impact of securities regulation on sticky-price firms' responsiveness to changes in monetary policy along the following several dimensions:

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dividend, return, investment, loan, and credit spread.

In the following sections, we first introduce different model ingredients and then use the model to derive several theoretical predictions that are empirically testable.

4.1 Households

The household maximizes her lifetime utility:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\log C_t - (L_t)^{1+\phi_L}/(1+\phi_L)\right],$$

where β is the discount factor, C_t is consumption, L_t is hours of work, and ϕ_L is the parameter of the Frisch elasticity of labor. Households save B^P_{t-1} in the financial intermediaries, and receive R_{t-1} for each unit of loan at time t. The budget constraint of households follows:

$$C_t + \frac{B^P_t}{P_t} = \frac{R_{t-1} B^P_{t-1}}{P_t} + w_t L_t + \mathcal{D}_t - \mathcal{T}^P_t,$$

where w_t is the real wage, P_t is the price of consumption goods at time t, $\Pi_t \equiv P_t/P_{t-1}$ is the gross inflation rate, $\mathcal{D}_t$ is the lump-sump profits received from the retailers, and $\mathcal{T}^P_t$ is the lump-sum tax.

The first-order conditions for consumption and labor supply are

$$\frac{1}{C_t} = \mathbb{E}_t \left(\frac{\beta R_t}{\Pi_{t+1} C_{t+1}}\right), \tag{4.1}$$

and

$$w_t = (L_t)^{\phi_L} C_t. \tag{4.2}$$

We define $M^h_{t+1} \equiv \frac{\beta C_t}{C_{t+1}}$ as the household pricing kernel so that (4.1) can be expressed as

$$\mathbb{E}_t \left[R_t M^h_{t+1}/\Pi_{t+1}\right] = 1. \tag{4.3}$$

4.2 Entrepreneurs

Two types of entrepreneurs (denoted by superscript j, $j = 1, 2$) exist, differing in the ability to reset output prices. Specifically, type 2 entrepreneurs encounter greater inflexibility than type 1

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entrepreneurs in resetting output prices. For simplicity, we call the goods sector occupied by type 2 entrepreneurs the "sticky-price" sector and the goods sector occupied by type 1 entrepreneurs the "flexible-price" sector. We label the latter the flexible sector not because output prices in this sector are perfectly flexible but to distinguish this sector from the other sector. Entrepreneur i of type j produces intermediate good $Y_{jt}(i)$ according to a Cobb-Douglas function:

$$Y_{jt}(i) = A_t(K_{jt-1}(i))^{\alpha}(L_{jt}(i))^{1-\alpha}, \tag{4.4}$$

where the technology A_t evolves as

$$\log A_t = (1-\rho_a)\log A + \rho_a \log A_{t-1} + \sigma_a \varepsilon_{a,t}$$

. $\varepsilon_{a,t}$ is an independent shock with standard normal distribution, and A is normalized to be 1.

The physical capital $K_{jt-1}(i)$ used for the period t production is determined at time $t-1$. Entrepreneurs purchase investment goods from capital producers at price P_t^k, and capital accumulates following the law of motion:

$$K_{jt}(i) = e^{z_t} I_{jt}(i) + (1-\delta)K_{jt-1}(i), \tag{4.5}$$

where δ is the depreciation rate and $I_{jt}(i)$ is investment. Capital accumulation yields the following investment adjustment cost:

$$\xi^I_{j,t}(i) = \frac{\kappa_I K_{jt-1}(i)}{2}\left(\frac{I_{jt}(i)}{K_{jt-1}(i)} - \delta\right)^2.$$

Entrepreneurs sell the intermediate goods to retailers at price $P_{jt}(i)$. The markup for retailers is

$$X_{jt}(i) \equiv P_t/P_{jt}(i).$$

Define the markup for sector j:

$$X_{jt} \equiv P_t/P_{jt},$$

so that

$$P_{jt}/P_{jt}(i) = X_{jt}(i)/X_{jt}\,.$$

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Changing the price for intermediate goods yields the following adjustment cost in real terms:

$$\xi^P_{j,t}(i) = \frac{\phi_j Y_t}{2}\left(\frac{P_{jt}(i)}{P_{jt-1}(i)} - \Pi\right)^2 = \frac{\phi_j Y_t}{2}\left(\frac{X_{jt-1}(i)\Pi_t}{X_{jt}(i)} - \Pi\right)^2,$$

where Y_t is the amount of final goods, and $\phi_2 > \phi_1$ echos our assumption that type 2 entrepreneurs incur higher costs than type 1 entrepreneurs to adjust output prices.

Entrepreneurs choose real dividend $d_{jt}(i)$, capital stock $K_{jt}(i)$, price $X_{jt}(i)(p_{jt}(i))$, real loans $b_{jt}(i)$, and labor input $L_{jt}(i)$ to maximize their discounted sum of future dividends $\mathbb{E}_0 \sum_{t=0}^{\infty} M_{0\to t} d_{jt}(i)$, subject to constraints (4.4)-(4.9), where $M_{0\to t} \equiv \Pi^t_{s=0} M_s$. Define the firm's pricing kernel as $M_t = (M^h_t/\beta) \times \gamma$, where γ is the discount rate applied to an entrepreneur, and $\gamma < \beta$ indicates entrepreneurs are less patient than the households, and therefore ensures a positive dividend. The borrowing constraint the entrepreneurs face is

$$b_{jt}(i) \leq \mu \mathbb{E}_t[K_{jt}(i)\Pi_{t+1}/R^B_{jt}], \tag{4.6}$$

where μ is the loan-to-value ratio, R^B_{jt} is the return on loans extended to borrowing firms of type j, and $B_{jt}(i)$ is the nominal loan that entrepreneurs borrowed from households. The budget constraint in real terms for entrepreneur i of type j is thus given by

$$\begin{aligned}\frac{Y_{jt}(i)}{X_{jt}(i)} + b_{jt}(i) = d_{jt}(i) + \left[K_{jt}(i) - (1-\delta)K_{jt-1}(i)\right] e^{-z_t} + \frac{R^B_{jt-1} b_{jt-1}}{\Pi_t} \\ + w_t L_{jt}(i) + \xi^P_{j,t}(i) + \xi^I_{j,t}(i).\end{aligned} \tag{4.7}$$

Entrepreneur i of type j faces the following downward-sloping demand curve:

$$Y_{jt}(i) = \left(\frac{X_{jt}(i)}{X_{jt}}\right)^{\epsilon} Y_{jt}, \tag{4.8}$$

where ϵ is the degree of substitution among differentiated type j goods. Entrepreneur i of type j also faces the following positive-dividend constraint:

$$d_{jt}(i) \geq 0. \tag{4.9}$$

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4.3 Financial Intermediaries

A continuum of perfectly competitive financial intermediaries exists. They take deposits from households and lend money to the entrepreneurs. Before extending a loan to an entrepreneur, financial intermediaries have to verify and evaluate the entrepreneur's assets, which incurs an investigation cost, Ω_{jt}, for firms in sector j. Results in section 3.1 indicate managers of sticky-price firms were more likely to overstate earnings during the pre-SOX period, and they were much less likely to do so during the post-SOX period. Graham et al. (2008) and Costello and Wittenberg-Moerman (2011) show that lenders increase interest rates and impose tighter monitoring following borrowers' financial misreporting. Based on these empirical facts, we assume financial intermediaries pay higher costs to audit firms with sticky-output prices.

For simplicity and without loss of generality, we normalize lenders' cost to investigate flexible-price entrepreneurs to be zero, that is, $\Omega_{1t} = 0$. Following Dow et al. (2005), we assume the cost to investigate sticky-price firms is linear in loan size. Specifically, $\Omega_{2t} = \omega_t b_{2t}$, where $\omega_t > 0$ is the linear cost parameter and its magnitude varies over business cycles. We assume banks' cost to investigate per unit of loan is higher during recession than during boom, for reasons as follows. Because we only model a representative firm, the investigation cost is effectively the averaged costs that banks spend on investigating sticky-price firms in the economy. The common belief is that a boom encourages and conceals financial fraud and misrepresentation by firms, which are then revealed by the ensuing bust (Kaplan and Stein, 1993; Schilit, 2002). Povel et al. (2007) argue that the cause of this phenomenon is the counter-cyclical monitoring efforts of investors and banks, who optimally choose the level of monitoring effort based on their prior beliefs about the number of fraudulent firms as a fraction of firms seeking financing. Banks' investigation effort is low when they expect less frauds, which happens in good times, and the effort is high when they expect more frauds, which happens in bad times.

Banks choose the loan size b_{2t} to maximize their profits:

$$\max_{\{R_{2t}\}} R_{2t} b_{2t} - R_t (b_{2t} + \Omega_{2t}) \, .$$

In equilibrium, the loan market clears and the demand of loans (from firms' optimization) equals the supply. Due to perfect competition, banks make zero profits in equilibrium, which determines

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the equilibrium loan rate R_{2t}. We can easily show that the loan rate for sticky-price firms is given by $R_{2t} = R_t(1+\omega_t)$. Because we normalize the cost to investigate flexible-price firms at zero, their loan rate is the risk-free rate, that is, $R_{1t} = R_t$. As a result, the credit spread between sticky- and flexible-price firms is given by $R_{2t} - R_{1t} = \omega_t R_t$ and is countercyclical, which is consistent with the evidence in Augustin et al. (2021).[27] We formulate the investigation-cost parameter as follows: $w_t = a + b(\log(C_t) - \log(C_{ss}))$, where C_{ss} is the steady-state value of consumption and a and b are positive constants in the pre-SOX period, whereas their values are set at zero in the post-SOX period.

4.4 Intermediate Goods

Intermediate-goods sector j purchases type j entrepreneurs' products and compose them into type j intermediate goods Y_t^j:

$$Y_{jt} = \left[\int_0^{\zeta_j} (Y_{jt}(i))^{(\epsilon-1)/\epsilon} di\right]^{\frac{\epsilon}{\epsilon-1}},$$

where ζ_j is the size of sector j, and $\zeta_1 + \zeta_2 = 1$. Profits maximization and zero profits lead to the demand function (4.8).

4.5 Final Goods

The final-goods-sector purchases intermediate goods and composites them into identical final goods:

$$Y_t = \left[\sum_{j=1}^{2} (Y_{jt})^{(\eta-1)/\eta}\right]^{\frac{\eta}{\eta-1}},$$

where η is the degree of substitution between the two types of intermediate goods. The demand for sectors 1 and 2 are:

$$Y_{jt} = X_{jt}^{\eta} Y_t \,, \qquad \text{for } j = 1, 2 \,. \tag{4.10}$$

4.6 Monetary Policy

The monetary authority implements a Taylor-type interest rate rule:

$$r_t = (1-\rho_r)log(R) + \rho_r r_{t-1+}(1-\rho_r)\phi_\pi(\pi_t - \pi) + \varepsilon_{R,t}, \tag{4.11}$$

[27] Augustin et al. (2021) find that, compared with flexible-price firms, sticky-price firms experience a significantly larger increase in credit spreads following the 2008 Lehman Brothers bankruptcy.

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where $\pi_t = log(\Pi_t)$ and $\varepsilon_{R,t+1}$ is the i.i.d. shock.

4.7 Equilibrium

The final-goods market, capital-good market, labor market, and loan market are all clear:

$$Y_t = C_t + I_t + G_t \tag{4.12}$$

$$K_t = \zeta_1 K_{1t} + (1 - \zeta_1) K_{2t} \tag{4.13}$$

$$I_t = \zeta_1 I_{1t} + (1 - \zeta_1) I_{2t} \tag{4.14}$$

$$L_t = \zeta_1 L_{1t} + (1 - \zeta_1) L_{2t} \tag{4.15}$$

$$b_t = \zeta_1 b_{1t} + (1 - \zeta_1) b_{2t}, \tag{4.16}$$

where

$$G_t = GoY \times Y_t \tag{4.17}$$

is government spending and is a fixed proportion of output.

4.8 Calibration and Results

Calibration: We calibrate the parameters of the model as follows and report them in Table 6. The unit of time is a quarter. We assume a zero-trend inflation rate, so that the steady-state inflation Π equals 1. The elasticity of substitutions both among intermediate goods within each sector, ϵ, and between the sticky- and flexible-price sectors, η, are set at 11, implying a steady state price markup of 10%. The discount factor of the household is set at $\beta = 0.99$, which together with $\Pi = 1$ implies a steady-state risk-free short-term rate of 400 basis points at an annualized frequency (i.e., $R = 1.01$). Following Iacoviello (2005), we set the discount factor of the entrepreneur γ at 0.98. The inverse Frisch elasticity, ϕ_L, is set at 5 according to Galí (2015), implying a Frisch elasticity of labor supply of 0.2. The capital depreciation rate δ is set at 0.025 following Christiano et al. (2014). We set capital share α at 0.35 to the labor share of 65% in the private non-farm business sector.

We set ϕ_1 and ϕ_2 to target the Calvo parameters at 0.6 and 0.9:[28] The relationship between

[28] In the macroeconomics literature, the Calvo parameter is usually set at around 0.75 according to the Bayesian estimation of medium-scale New Keynesian DSGE models. For example, the estimated mean and standard deviation for the parameter are 0.74 and 0.035, respectively, in Christiano, Motto, and Rostagno (2014). We choose a wide-

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the price-adjustment cost parameter ϕ_j and the Calvo parameter θ_j satisfies $\phi_j = \frac{\theta_j(\epsilon_j - 1)}{(1-\theta_j)(1-\beta\theta_j)}$, which ensures the New Keynesian Phillips curves with differential price stickiness yield the same slope. We assume that, regardless of price stickiness, the loan-to-value ratio is 0.8 for both types of firms, considering the estimated values for entrepreneurs and impatient households are 0.89 and 0.55 in Iacoviello (2005). We set the parameter for the investment-adjustment cost κ_I to be 66.67 according to Iacoviello (2005).

We set pre-SOX values of a and b to match the 40-basis-point (bp) steady-state, annualized credit spread between sticky- and flexible-price firms, and the negative correlation between the spread and consumption changes. We set post-SOX values of a and b at zero, so that the loan rates for firms with differential price stickiness are the same ($\omega_t \equiv 0$). We set the Taylor-rule inflation parameter at $\phi_\pi = 1.5$, and the smoothing parameter at $\rho_r = 0.8$ according to Sims, Wu, and Zhang (2021). We set government spending at 18% of GDP according to Smets and Wouters (2007). We report all the calibrated parameters in Table 6.

Results: To understand how financial frictions affect the propagation of a monetary-policy shock, we plot the impulse responses of sticky- and flexible-price firms to a 25bp unexpected decrease in the federal funds rate in Figure 6 and the impulse responses of aggregate variables in Figure 7. Because the impulse responses of flexible-price firms before and after SOX are almost identical, we only plot the pre-SOX responses for flexible-price firms. The only difference between the pre- and post-SOX economic environments is that sticky-price firms bear higher debt-financing costs during the pre-SOX period. Therefore, the comparison between pre- and post-SOX responses of sticky-price firms indicates the impact of misreporting-induced financial friction, whereas the comparison between post-SOX sticky- and flexible-price firms indicates the impact of price stickiness. A general observation is that, even without financial frictions, investment and sales of sticky-price firms are more responsive to monetary-policy shocks than flexible-price firms, consistent with Li and Palomino (2014). Financial friction merely amplifies sticky-price firms' responses of investment and sales. By contrast, debt financing, dividend payouts, and stock returns are more responsive to monetary policy shocks only when financial friction is present. Next, we explain the impulse responses in detail.

enough range (about four-standard-deviations) for the estimated Calvo parameter, and map the upper and lower bounds to ϕ_1 and ϕ_2.

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After an expansionary monetary-policy shock (i.e., a decrease in the various base interest rates controlled by central banks), the nominal interest rate goes down, but both output and the general price level go up. A lower interest rate leads to a higher debt capacity and a lower cost of capital; consequently, investments of both sticky- and inflexible-price firms rise.

Given lower interest rates, all firms experience an increase in debt capacity; however, sticky-price firms experience an even larger increase because during this period, investigation cost is also lower and the loan spread between sticky- and flexible-price firms decreases. As a result, sticky-price firms expand capital investment more after expansionary monetary-policy shocks, and, due to the financial accelerator (Bernanke et al., 1999), a higher capital level further increases sticky-price firms' debt capacity in the future. Due to a lower financing cost and better investment opportunities for a prolonged period, the dividend and stock price rise. Note that without financial friction, sticky- and flexible-price firms' loan size and stock returns identically respond to the same monetary-policy shock. Without financial frictions (zero investigation costs), sticky- and flexible-price firms' loan rates are the same and thus their changes in loan size are also similar. Without the amplifying effect of financial friction, the difference between dividend responses of sticky- and flexible-price firms is only sizable when the monetary-policy shock hits but disappears quickly. Thus, stock prices—the sum of all future discounted dividends—show little difference between sticky- and flexible-price firms. With financial friction, however, the difference in dividend responses is much larger and long-lasting, leading to a much larger increase in stock returns for sticky-price firms.

To emphasize the importance of credit spread between sticky- and flexible-price firms, we also investigate the model with the assumption that borrowing firms with differential price stickiness pay the same loan spread, but sticky-price firms have a lower loan-to-value ratio ($\mu_1 > \mu_2$ in (4.6)). In Figure A.1, we show return volatility for these two types of firms after a monetary policy shock. The result of our baseline model is reversed: flexible-price firms, instead of sticky-price firms, have more volatile equity returns. As a result, without credit spread, the collateral constraint itself cannot generate the higher return volatility observed in sticky-price firms.

To summarize, the investment and dividend of sticky-price firms respond more to monetary-policy shocks relative to inflexible-price firms, and financial frictions greatly amplify these differences. Due to misreporting-induced financial friction, sticky-price firms have more volatile stock returns and higher credit spreads than flexible-price firms during the pre-SOX period. After SOX,

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tighter securities regulation forces sticky-price firms to refrain from misreporting, which in turn reduces credit-market information asymmetry and therefore their credit spreads. As a result, the volatility of investments and stock returns drop substantially after SOX.

5 Testing Model Predictions

We now bring several key predictions derived from the New Keynesian model into the data. These testable predictions are based on the assumption that, when managers have discretion over reporting choices, output-price stickiness constitutes a source of credit-market friction, summarized as follows.

(a) Sticky-price firms are more volatile in equity returns but experience a post-SOX larger decline in return volatility.

(b) Capital investment made by sticky-price firms is more sensitive to monetary-policy shocks (i.e., firms invest more (less) after expansionary (contractionary) policy shocks), but these firms display a post-SOX larger decline in such sensitivity.

(c) The stock price of sticky-price firms is more sensitive to monetary-policy shocks (i.e., firms' value increases (decreases) after expansionary (contractionary) policy shocks), but these firms display a post-SOX larger decline in such sensitivity.

5.1 Return Volatility

One prevailing explanation for why sticky-price firms are more volatile in returns is important but different from the mechanism proposed by our New Keynesian model. That is, firms' inability to adjust price widens the range in which the discounted present value of cash flows can fluctuate after monetary-policy shocks (Gorodnichenko and Weber, 2016). This insight has wide application in corporate finance and industry organization.

Our general-equilibrium model predicts a new channel through which sticky-output price is linked to return volatility; that is, the credit-market friction, particularly the counter-cyclical credit spread that lenders charge sticky-price borrowers due to managerial misreporting, causes such firms' capital investment and debt financing to be more responsive to nominal shocks, which in turn boosts these firms' return volatility. Below, we provide empirical evidence that sticky-price firms experienced a post-SOX larger decline in equity returns than flexible-price firms.

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In Panel A of Table 7, we estimate the effects of SOX on idiosyncratic volatility. Consistent with our model predictions, firms with sticky-output prices are associated with higher return volatility (column (1)); such firms, however, became much less volatile after SOX than before, and the point estimates stay similar with different specifications. A one-standard-deviation increase in price stickiness increases idiosyncratic volatility by 3.1 (0.17 × 0.18) and 0.7 (0.17 × (0.18-0.14)) percentage points during the pre- and post-SOX periods, respectively. In Panel B of Table 7, we also use the implied volatility of option contracts as a proxy for forward-looking and subjective measure of firm volatility. We find similar results.[29]

5.2 Investment Sensitivity to Monetary Policy Shocks

In this section, we explore the relation between output-price stickiness and investment sensitivity to monetary-policy shocks. To measure monetary-policy shocks, we use innovations in the fed funds futures following Gorodnichenko and Weber (2016) and Bergman et al. (2021). Specifically, v_d (expressed in percent) is the surprise component of the announced change in the fed funds rate on the Federal Open Market Committee (FOMC) meeting data, calculated as follows. A positive (negative) surprise component corresponds to an expansionary (a contractionary) monetary-policy shock or, equivalently, a decrease (an increase) in interest rates:

$$v_d = \frac{D}{D-t}(ff^0_{\tau+\Delta\tau^+} - ff^0_{\tau-\Delta\tau^-}), \tag{5.1}$$

where τ is the time when the FOMC issues an announcement, $ff^0_{\tau+\Delta\tau^+}$ is the federal funds futures rate shortly after τ, $ff^0_{\tau-\Delta\tau^-}$ is the fed funds futures rate just before τ, and D is the number of days in the month. The $\frac{D}{D-d}$ term adjusts for the fact that the fed funds futures settle on the average effective overnight fed funds rate. In our main specification, we consider "tight" time windows where the scaled change of the fed funds futures implied rate within a 30-minute event window around the FOMC press release (-10 min, +20 min).[30] Our data on the press releases of the FOMC meetings covers from February 5, 1997, through December 12, 2012.

Similar to the specification used by Ottonello and Winberry (2020), we employ the following

[29] In the cross section, implied volatility matches the realized volatility; in the time series, implied volatility is systematically related to realized volatility (Mixon, 2009).

[30] The results are not sensitive to a "wide" window where the scaled change in the implied rate is within a 60-minute event window around the FOMC press release (-15 min, +45 min).

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triple-interaction strategy to estimate the sensitivity of firms' capital investment to monetary-policy surprises:

$$\begin{aligned}\Delta log(Capital)_{i,s} = \alpha + \beta \times Sticky_j \times \overline{v}_s + \gamma \times Sticky_j \times \overline{v}_s \times Post_{i,s} \\ +\delta \times Sticky_j \times Post_{i,s} + Z'_{i,t-1} \times \theta + \eta_i + \eta_s + \epsilon_{i,s}.\end{aligned} \tag{5.2}$$

$\Delta log(Capital_{i,s})$ is the change in the logarithm of invested capital from quarter s-1 to quarter s for each firm i. Following Ottonello and Winberry (2020), we time aggregate the high-frequency shocks to the quarterly frequency to merge them with Compustat data at the firm-year-quarter level. $\overline{v}_s$ is the moving average of the monthly raw shocks weighted by the number of remaining days in quarter s after the shock occurs on day d. The time-aggregation strategy ensures we weight monetary shocks by the amount of time firms have had to react to them.[31] The firm fixed effects (η_i) capture permanent differences in investment behavior across firms, and in the most restrictive specification, the industry-time fixed effects $\eta_{j',s}$ capture differences in how broad sectors are exposed to aggregate shocks. Following Ottonello and Winberry (2020), we include the logarithm of total assets, sales growth, and current assets over total assets in the vector $Z'_{i,t-1}$.

Our first coefficient of interest is β, the unconditional sensitivity of investment $\Delta log(Capital)_{i,s}$ to monetary-policy shocks $\overline{v}_s$. Our estimate of β is driven by permanent heterogeneity in responsiveness across firms, because price stickiness is a time-invariant constant. The second coefficient of interest is γ, which measures the extent to which β has changed during the post-SOX period. By interacting *Sticky* and $\overline{v}_s$ with *Post*, we allow the responsiveness to vary across regulatory regimes governing financial reporting.

Table 8 reports the results from estimating equation (5.2). For simplicity, we only report coefficients that are relevant for the inference. Columns (1) shows sticky-price firms are more responsive to monetary shocks unconditionally in our sample period. Column (1)-(2) imply a firm has approximately a 0.031-unit (0.17 × 0.182) higher sensitivity of investment to monetary policy when its output price is one-standard-deviation stickier. Column (3)-(4) show such an investment-monetary-shock sensitivity was 0.058-unit (0.17 × 0.34) higher if price is one standard deviation stickier before SOX but completely vanished after SOX. This result is consistent with our model prediction that financial friction, rather than price stickiness itself, is the key driver of sticky-price

[31] Our baseline results also hold if we time-aggregate the high-frequency shocks by taking the simple sum within the quarter.

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firms' more volatile stock returns. Adding year-quarter, industry, and firm fixed effects, as well as interactions of industry fixed effects with monetary-policy shocks, does not significantly change our point estimates. In columns (5)-(8) of Table 8, we adjust seasonality for the capital investment.

5.3 Stock-Price Sensitivity to Monetary-Policy Shocks

Our last effort is to examine whether sticky-price firms' stock prices were significantly more responsive to monetary policy before 2002Q3 and whether SOX has reduced the responsiveness of sticky-price firms. This testable prediction is naturally derived from our New Keynesian model. We employ an event-study approach in the tradition of Cook and Hahn (1989), Bernanke and Kuttner (2005), and more recently Ippolito et al. (2018), Ozdagli (2018), Armstrong et al. (2019), and Ozdagli and Velikov (2020).

Specifically, we estimate the following DiD design in a spirit similar to equation (5.2):

$$\begin{aligned} Ret_{i,d} = \alpha + \beta \times Sticky_j \times v_d + \gamma \times Sticky_j \times v_d \times Post_{i,d} + \delta \times Sticky_j \times Post_{i,d} \\ + Z'_{i,s-1} \times \theta + \eta_i + \eta_d + \epsilon_{i,d}, \end{aligned} \tag{5.3}$$

where $Ret_{i,d}$ is the raw stock return (in percentage points) on FOMC announcement date d for firm i. Again, the sign of v_d is flipped so that a positive (negative) shock corresponds to an expansionary (a contractionary) monetary-policy shock. In particular, our model studies how the stock-price reaction to monetary-policy surprises varies with the degree of output-price stickiness and how the passage of SOX changes this relationship.

Table 9 reports the results from estimating equation (5.3). The first column in Panel A of Table 9 shows a one-standard-deviation (0.17) increase in output-price stickiness causes the stock price to increase 1.20 (0.17×7.08) percentage points more in response to a one-percentage-point surprise decrease in the fed funds rate. To illustrate the economic magnitude, the same surprise decrease in the fed funds rate causes the stock price of the firm with the average level of stickiness to increase 2.51% on average. The last three columns in Panel A show the incremental contribution of price stickiness to the stock-price responsiveness completely disappeared after SOX.

Following Ippolito et al. (2018) and Ozdagli (2018), we perform placebo experiments. Specifically, we use the same specification as in equation (5.3) but replaces the dependent variable with the last two-day raw returns prior to the FOMC meetings. Because of the blackout period preceding

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an FOMC announcement and the resulting little, if any, monetary-policy-related news prior to an announcement, the two-day pre-FOMC period would be an ideal pseudo-control sample where one would expect no significant difference in stock-price sensitivity caused by output-price stickiness. As Table A.3 shows, the coefficients of $Sticky \times v$ are indistinguishable from zero in most columns. As for the coefficients of v and $Sticky \times v \times Post$, the placebo-experiment results go in the opposite direction of the effect observed on FOMC announcement dates.

6 Conclusion

Bernanke et al. (1999) introduces information asymmetry between borrowers and lenders into a New Keynesian dynamic general equilibrium model to explain how credit-market frictions amplify nominal and real shocks to the economy. As a violation of the assumption underlying the Modigliani and Miller (1958) paradigm, the financial structure in Bernanke et al. (1999) is relevant to economic decisions. In their model, however, financial structure is independent of a firm's inability to adjust prices.

In this paper, we exploit a quasi-natural experiment to provide micro-founded evidence that firms' output-price stickiness constitutes a source of financial frictions. After Congress's passage and implementation of SOX — a significant legislative event triggered by unprecedented accounting scandals—firms with stickier prices paid lower loan spreads in the credit market. We build a New Keynesian model of an economy in which firms are featured with differential inflexibility to adjust prices and lenders require a higher return on loans extended to borrowing firms with stickier prices. We show such a modification of Bernanke et al. (1999) yields a set of theoretical predictions concerning the difference between sticky- and flexible-price firms. We empirically verify these predictions in the data.

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References

Anderson, E., N. Jaimovich, and D. Simester (2015). Price stickiness: Empirical evidence of the menu cost channel. *Review of Economics and Statistics 97*(4), 813–826.

Anderson, E. T. and D. I. Simester (2010). Price stickiness and customer antagonism. *Quarterly Journal of Economics 125*(2), 729–765.

Armstrong, C. S., S. Glaeser, and J. D. Kepler (2019). Accounting quality and the transmission of monetary policy. *Journal of Accounnting and Economics 68*, 1–28.

Augustin, P., L. Cong, A. Corhay, and M. Weber (2021). Price rigidities and credit risk. *Chicago Booth Research Paper No. 21-14, Fama-Miller Working Paper*.

Bargeron, L. L., K. M. Lehn, and C. J. Zutter (2010). Sarbanes-Oxley and corporate risk-taking. *Journal of Accounting Economics 49*(1-2), 291–305.

Beck, T., A. Demirgüç-Kunt, and V. Maksimovic (2008). Financing patterns around the world: Are small firms different? *Journal of Financial Economics 89*(3), 467–487.

Bergman, N., D. Masta, and M. Weber (2021). Heterogeneous labor market effects of monetary policy. *Working Paper. University of Chicago Booth School of Business*.

Bernanke, B. and M. Gertler (1989). Agency costs, net worth, and business fluctuations. *American Economic Review 79*, 14–31.

Bernanke, B. S. and M. Gertler (1995). Inside the black box: The credit channel of monetary policy transmission. *Journal of Economic Perspectives 9*(4), 27–48.

Bernanke, B. S., M. Gertler, and S. Gilchrist (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of Macroeconomics 1*, 1341–1393.

Bernanke, B. S. and K. N. Kuttner (2005). What explains the stock market's reaction to federal reserve policy? *Journal of Finance 60*(3), 1121–1157.

Bertrand, M., E. Duflo, and S. Mullainathan (2004). How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics 119*(1), 249–275.

Bhamra, H. S., C. Dorion, A. Jeannere, and M. Weber (2021). High inflation: Low default risk and low equity valuations. *Review of Financial Studies, Forthcoming*.

Blinder, A. (1994). On sticky prices: Academic theories meet the real world. *In Monetary Policy, edited by G. Mankiw, University of Chicago Press 15*(3), 117–150.

Blinder, A. S., E. Canetti, D. Lebow, and J. Rudd (1997). *Asking about Prices*. New York: Russell Sage Foundation.

Calvo, G. A. (1983). Staggered prices in a utility-maximizing framework. *Journal of Monetary Economics 12*(3), 383–398.

Carlstrom, C. T. and T. S. Fuerst (1997). Agency costs, net worth, and business fluctuations: A computable general equilibrium analysis. *American Economic Review 87*, 893–910.

Chava, S. and M. Roberts (2008). How does financing impact investment? The role of debt covenants. *Journal of Finance 63*, 2085–2121.

Chhaochharia, V. and Y. Grinstein (2007). Corporate governance and firm value: the impact of the 2002 governance rules. *Journal of Finance 62*, 1789–1825.

Electronic copy available at: https://ssrn.com/abstract=3963813

Christiano, L. J., R. Motto, and M. Rostagno (2014). Risk shocks. *American Economic Review 104*(1), 27–65.

Cook, T. and T. Hahn (1989). The effect of changes in the federal funds rate target on market interest rates in the 1970s. *Journal of Monetary Economics 24*(3), 331–351.

Corhay, A. and J. Tong (2021). Inflation risk and the finance-growth nexus. *Rotman School of Management Working Paper No. 3795679, Available at SSRN: https://ssrn.com/abstract=3795679 or http://dx.doi.org/10.2139/ssrn.3795679*.

Costello, A. and R. Wittenberg-Moerman (2011). The impact of financial reporting quality on debt contracting: Evidence from internal control weakness reports. *Journal of Accounting Research 44*(1), 97–136.

D'Acunto, F., R. Liu, C. Pflueger, and M. Weber (2018). Flexible prices and leverage. *Journal of Financial Economics 129*(1), 46–68.

D'Acunto, F., M. Weber, and J. Xie (2022). Punish one, teach a hundred: The sobering effect of punishment on the unpunished. *Chicago Booth Research Paper No. 19-06, Fama-Miller Working Paper*.

D'Acunto, F., J. Xie, and J. Yao (2020). Trust and contracts: Empirical evidence. *CESifo Working Paper No.8714*.

Dechow, P., W. Ge, C. R. Larson, and R. Sloan (2011). Predicting material accounting misstatements. *Contemporary Accounting Research 28*(1), 17–82.

Diamond, D. W. (1991a). Debt maturity structure and liquidity risk. *Quarterly Journal of Economics 106*(3), 709–737.

Diamond, D. W. (1991b). Monitoring and reputation: the choice between bank loans and directly placed debt. *Journal of Political Economy 99*, 689–721.

Dow, J., G. Gorton, and A. Krishnamurthy (2005). Equilibrium investment and asset prices under imperfect corporate control. *American Economic Review 95*(3), 659–681.

Eichenbaum, M., N. Jaimovich, and S. Rebelo (2011). Reference prices, costs, and nominal rigidities. *American Economic Review 101*(1), 234–262.

Engel, E., R. Hayes, and X. Wang (2007). The Sarbanes-Oxley Act and firms' going-private decisions. *Journal of Accounting and Economics 44*(1), 116–145.

Fang, X., N. Roussanov, and Y. Liu (2021). Getting to the core: Inflation risks within and across asset classes. *Jacobs Levy Equity Management Center for Quantitative Financial Research Paper*.

Fisher, I. (1933). The debt-deflation theory of great depressions. *Econometrica 1*(4), 337–357.

Gale, D. and M. Hellwig (1985). Incentive-compatible debt contracts: The one-period problem. *Review of Economic Studies 52*(4), 647–663.

Galí, J. (2015). *Monetary Policy, Inflation, and the Business Cycle* (2 ed.). Princeton, NJ: Princeton University Press.

Gertler, M. and S. Gilchrist (1994). Monetary policy, business cycles, and the behavior of small manufacturing firms. *Quarterly Journal of Economics 109*(2), 309–340.

Gomes, J., U. Jermann, and L. Schmid (2016). Sticky leverage. *American Economic Review 106*(12), 3800–3828.

Electronic copy available at: https://ssrn.com/abstract=3963813

Gorodnichenko, Y. and M. Weber (2016). Are sticky prices costly? Evidence from the stock market. *American Economic Review 106*(1), 165–199.

Graham, J. R., S. Li, and J. Qiu (2008). Corporate misreporting and bank loan contracting. *Journal of Financial Economics 89*(1), 44–61.

Gu, L. and J. Xie (2021). Price rigidities and the value of public information. *Working paper. Peking University HSBC Business School*.

Holmstrom, B. and S. N. Kaplan (2003). The state of u.s. corporate governance: What's right and what's wrong? *Journal of Applied Corporate Finance 15*(3), 8–20.

Hsu, A., E. Li, and F. Palomino (2019). Real and nominal equilibrium yield curves. *Management Science. Forthcoming*.

Iacoviello, M. (2005). House prices, borrowing constraints, and monetary policy in the business cycle. *American Economic Review 95*(3), 739–764.

Iliev, P. (2010). The effect of SOX Section 404: Costs, earnings quality, and stock prices. *Journal of Finance 65*(3), 1163–1196.

Ippolito, F., A. Ozdagli, and A. Perez-Orive (2018). The transmission of monetary policy through bank lending: The floating rate channel. *Journal of Monetary Economics 95*(May), 49–71.

Ivashina, V. (2009). Asymmetric information effects on loan spreads. *Journal of Financial Economics 92*(2), 300–319.

Ivashina, V. and D. S. Scharfstein (2010). Bank lending during the financial crisis of 2008. *Journal of Financial Economics 97*(3), 319–338.

Kang, J. and C. E. Pflueger (2015). Inflation risk in corporate bonds. *Journal of Finance 70*(1), 115–162.

Kang, Q., Q. Liu, and R. Qi (2010). The Sarbanes-Oxley Act and corporate investment: A structural assessment. *Journal of Financial Economics 96*(2), 291–305.

Kaplan, S. N. and J. C. Stein (1993, May). The evolution of buyout pricing and financial structure in the 1980s. *Quarterly Journal of Economics 108*(2), 313–357.

Konchitchki, Y. and J. Xie (2022). Undisclosed material inflation risk. *Working Paper. University of California, Berkeley*.

Leuz, C. (2007). Was the Sarbanes-Oxley Act of 2002 really this costly? A discussion of evidence from event returns and going-private decisions. *Journal of Accounting and Economics 44*, 146–165.

Li, E. and F. Palomino (2014). Nominal rigidities, asset returns, and monetary policy. *Journal of Monetary Economics 66*, 210–225.

Mixon, S. (2009). Option markets and implied volatility: Past versus present. *Journal of Financial Economics 94*(2), 171–191.

Modigliani, F. and M. H. Miller (1958). The cost of capital, corporation finance, and the theory of investment. *American Economic Review 48*(3), 261–297.

Morosi, A. and N. Marroud (2008). "You can enter but you cannot leave...": U.S. securities markets and foreign firms. *Journal of Finance 63*(5), 2477–2506.

Nakamura, E. and J. Steinsson (2008). Five facts about prices: A reevaluation of menu cost models. *Quarterly Journal of Economics 123*(4), 1415–1464.

Electronic copy available at: https://ssrn.com/abstract=3963813

Ottonello, P. and T. Winberry (2020). Financial heterogeneity and the investment channel of monetary policy. *Econometrica 88*(6), 2473–2502.

Ozdagli, A. (2018). Financial frictions and the stock price reaction to monetary policy. *Review of Financial Studies 31*(10), 3895–3936.

Ozdagli, A. and M. Velikov (2020). Show me the money: The monetary policy risk premium. *Journal of Financial Economics 135*(2), 320–339.

Pasten, E., R. Schoenle, and M. Weber (2017). Price rigidities and the granular origins of aggregate fluctuations. *Unpublished Manuscript. University of Chicago Booth School of Business*.

Povel, P., R. Singh, and A. Winton (2007, July). Booms, busts, and fraud. *Review of Financial Studies 20*(4), 1219–1254.

Rajan, R. and A. Winton (1995). Covenants and collateral as incentives to monitor. *Journal of Finance 50*, 1113–1146.

Richardson, S., R. Sloan, M. Soliman, and I. Tuna (2005). Accrual reliability, earnings persistence, and stock prices. *Journal of Accounting and Economics 39*(3), 437–485.

Schilit, H. (2002). *Financial Shenanigans*. New York: McGraw-Hill.

Sims, E., J. C. Wu, and J. Zhang (2021). The four equation New Keynesian model. *Review of Economics and Statistics. Forthcoming*.

Sloan, R. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review 71*(3), 289–315.

Smets, F. and R. Wouters (2007). Shocks and frictions in US business cycles: A bayesian dsge approach. *American Economic Review 97*(3), 586–606.

Sufi, A. (2007). Information asymmetry and financing arrangements: Evidence from syndicated loans. *Journal of Finance 62*, 629–668.

Sufi, A. (2009). The real effects of debt certification: Evidence from the introduction of bank loan ratings. *Review of Financial Studies 22*(4), 1659–1691.

Taylor, J. B. (1980). Aggregate dynamics and staggered contracts. *Journal of Political Economy 88*(1), 1–23.

Townsend, R. M. (1979). Optimal contracts and competitive markets with costly state verification. *Journal of Economic Theory 21*(2), 265–293.

Weber, M. (2015). Nominal rigidities and asset pricing. *Unpublished Manuscript. University of Chicago Booth School of Business*.

Wittenberg-Moerman, R. (2008). The role of information asymmetry and financial reporting quality in debt trading: Evidence from the secondary loan market. *Journal of Accounting and Economics 46*(2-3), 240–260.

Xie, J. (2020). Capital-market consequences of asymmetric output-price rigidities. *Journal of Monetary Economics 114*, 221–239.

Zbaracki, M., M. Ritson, D. Levy, S. Dutta, and M. Bergen (2004). Managerial and customer costs of price adjustment: Direct evidence from industrial markets. *Review of Economics and Statistics 86*, 514–553.

Zhang, I. (2007). Economic consequences of the Sarbanes-Oxley Act of 2002. *Journal of Accounting and Economics 44*, 74–115.

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Figure 2: **Distribution of Monthly Frequency of Price Adjustment**

The figure plots the distribution of the monthly FPA. The samples are restricted to S&P 1500 constituent firms headquartered in the U.S. The sample period is 1994Q1-2012Q4. Utilities and Financial sectors are excluded. In the sample period of 2002-2012, the FPA at NAICS sectors of different granularities is calculated by Pasten et al. (2017). Equal-weighted probabilities of price adjustments at the goods level are calculated using the micro-data underlying the PPI constructed by the BLS. The granularity for FPA is at the 6-digit level.

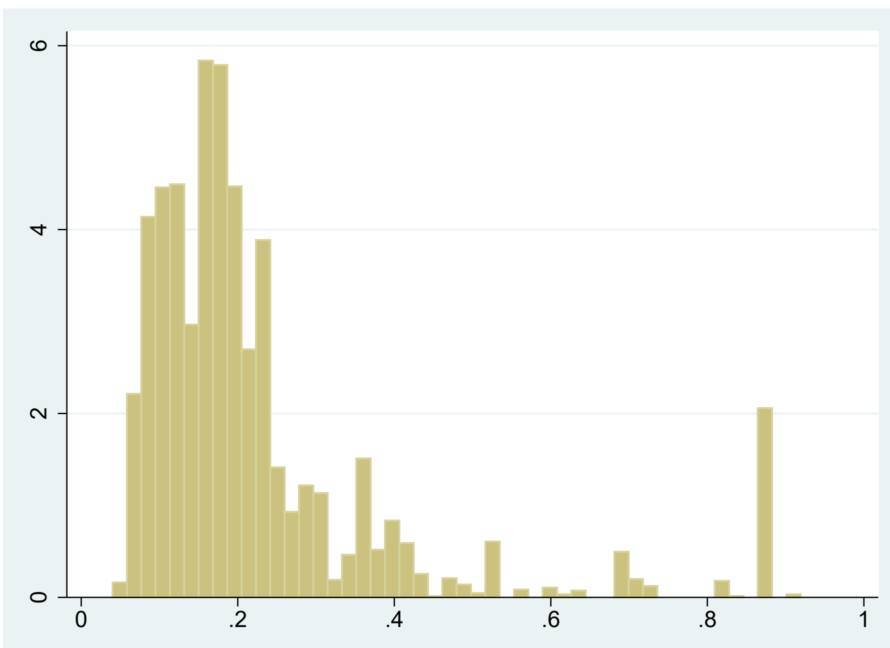

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Figure 3: **Dynamics of Earnings Overstatement**

The figure plots the estimates of β and the 95% confidence intervals from following weighted least squares equation in which observations are weighted by firm assets:

$$Overstatement_{i,s} = \alpha + \sum_{s=1997Q2}^{2008Q4} \beta_s \times Sticky_j + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{i,s},$$

where $Overstatement_{i,s}$ is a dummy variable that equals 1 if firm i overstated earnings or book equity in year-quarter s, and 0 otherwise. The excluded period is 1997Q1. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

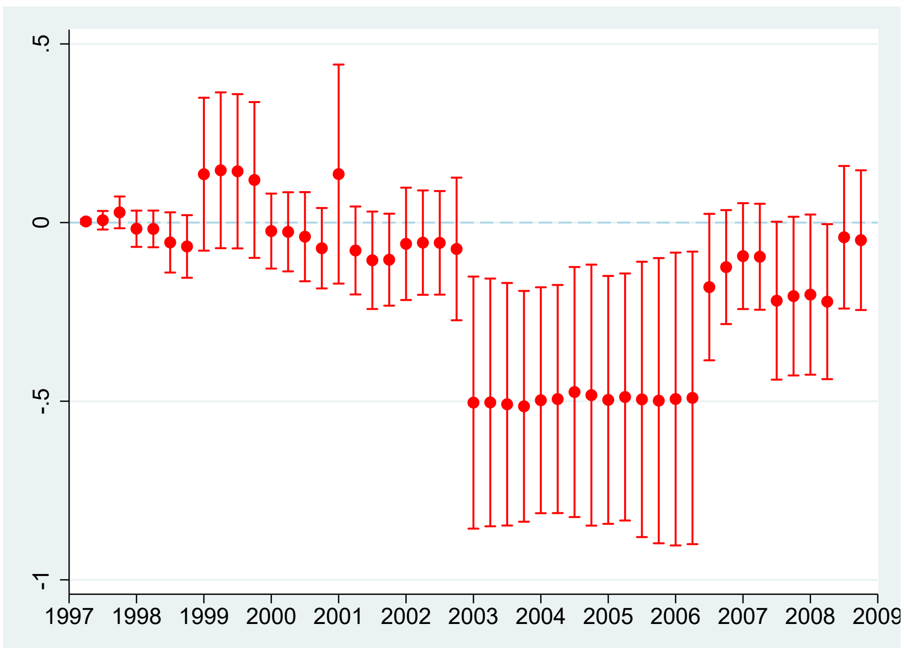

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Figure 4: **Dynamics of Loan Spread**

The figure plots the estimates of β and the 95% confidence intervals from the following WLS regression in which observations are weighted by firm assets:

$$LoanSprd_{n,i,s} = \alpha + \sum_{\tau=-9}^{7} \beta_s \times Sticky_j + \sum_{\tau=-9}^{7} \gamma_s + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,t} + \epsilon_{n,i,s},$$

where for each loan package n signed by firm i as of year-month s, $LoanSprd_{n,i,s}$ (in basis point) is the average all-in-drawn spreads over the London Interbank Offered Rate. *Sticky* is the FPA multiplied by -1. $-9 \leq \tau \leq 7$ indicates the τth event year (12 months) relative to July 25, 2002. The excluded period is event year $\tau = 10$. η_i and $\eta_{k,t}$ indicate a full set of firm- and industry-year fixed effects. See Table 1 for the definition of control variables. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

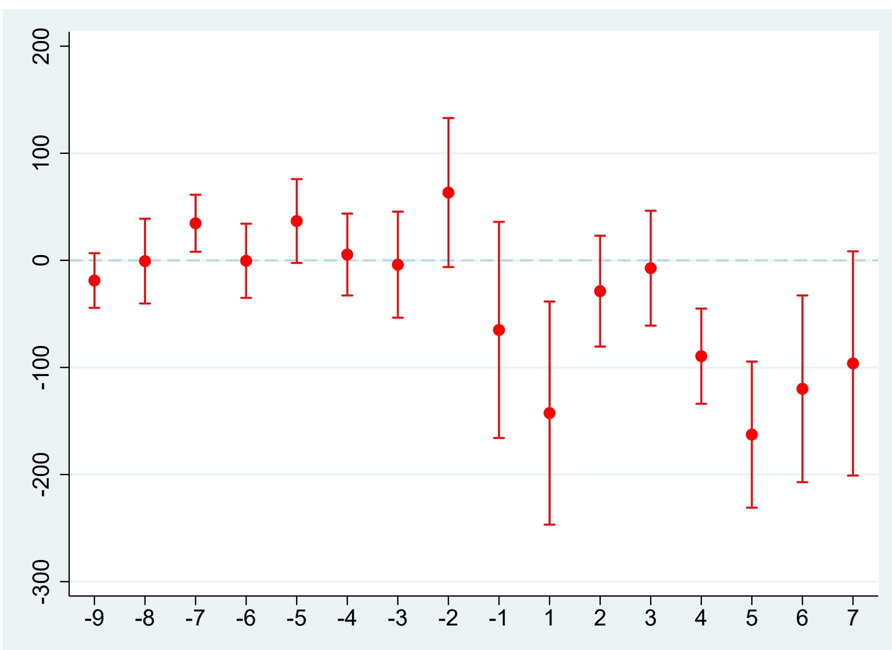

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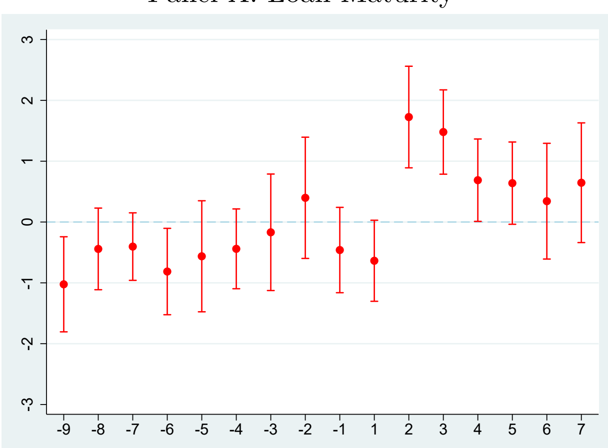
Figure 5: **Dynamics of Loan Maturity and Collateralization Frequency**

The figure plots the estimates of β and the 95% confidence intervals from the following WLS regression in which observations are weighted by firm assets:

$$Y_{n,i,s} = \alpha + \sum_{\tau=-9}^{7} \beta_s \times Sticky_j + \sum_{\tau=-9}^{7} \gamma_s + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{n,i,s},$$

where $Y_{n,i,s}$ indicates $log(Maturity)_{n,i,s}$ in Panel A and $Collateral_{n,i,s}$ in Panel B, respectively. For each loan package n signed by firm i as of year-month s, $log(Maturity)_{n,i,s}$ is the logarithm of loan maturity (months). For each package, *Maturity* is averaged across facilities, weighted by the facility-level loan amount. For each loan package n signed by firm i as of year-month s, $Collateral_{n,i,s}$ is an indicator equal to 1 if lenders require collateral, and 0 otherwise. Sticky is the FPA multiplied by -1. $-9 \leq \tau \leq 7$ indicates the τth event year (12 months) relative to July 25, 2002. The excluded period is event year $\tau = 10$. η_i and $\eta_{k,t}$ indicate a full set of firm- and industry-year fixed effects. See Table 1 for the definition of control variables. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

Panel A. Loan Maturity



Panel B. Collateralization Frequency

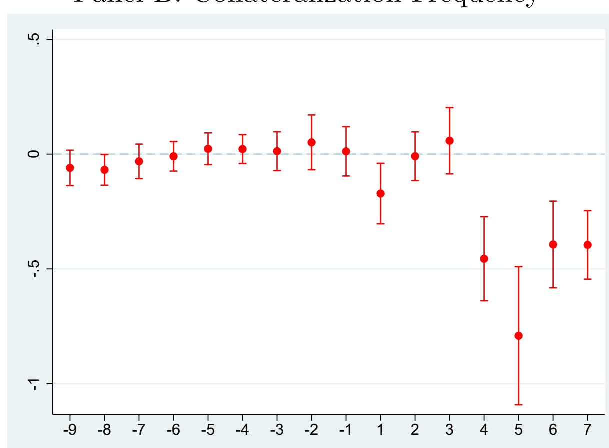


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Figure 6: **Impulse Responses of Firms**

This figure plots the firms' impulse responses to a 25bp expansionary monetary-policy shock. The x-axes are time in quarter, and the y-axes are either percent deviation from steady state or values in level. The blue solid lines are for sticky-price firms after SOX, the red dashed lines are for sticky-price firms before SOX, and the yellow dotted lines are for flexible-price firms.

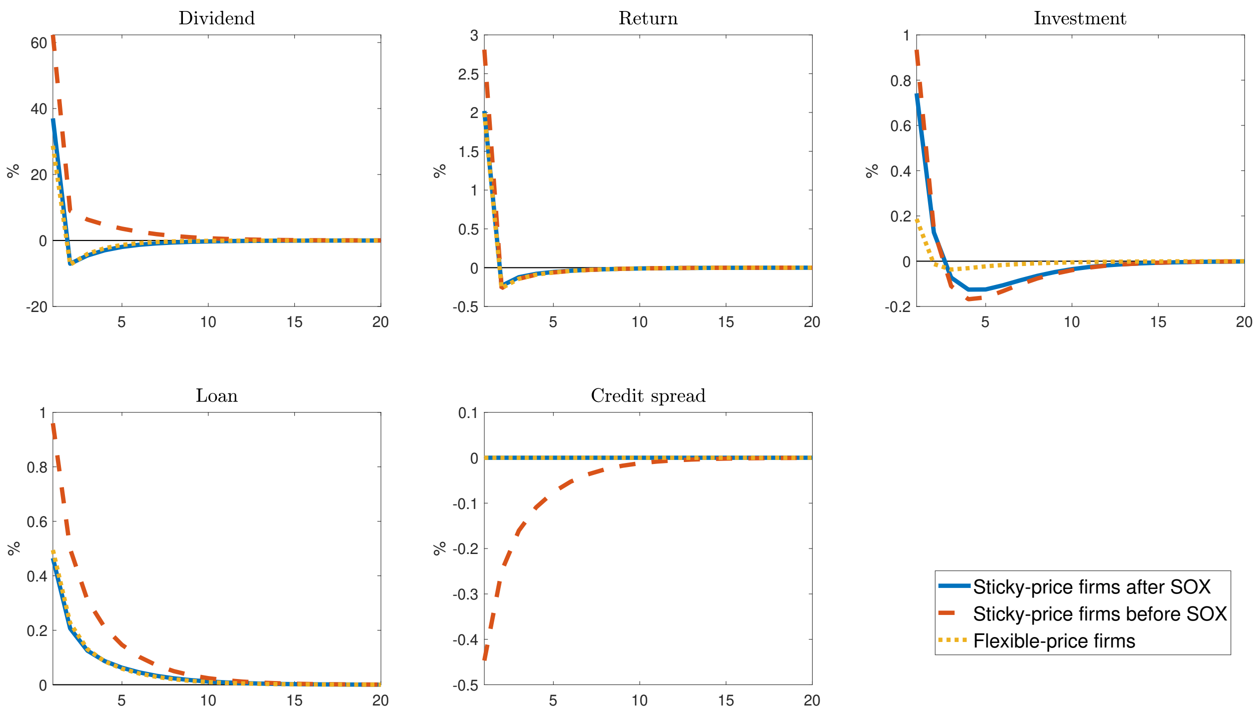

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Figure 7: **Impulse Responses of Aggregate Variables**

This figure plots the impulse responses of aggregate variables to a 25bp expansionary monetary policy shock. The x-axes are time in quarter, and the y-axes are percent deviation from steady state. The blue solid lines are for the case after SOX, and the red dashed lines are for the case before SOX.

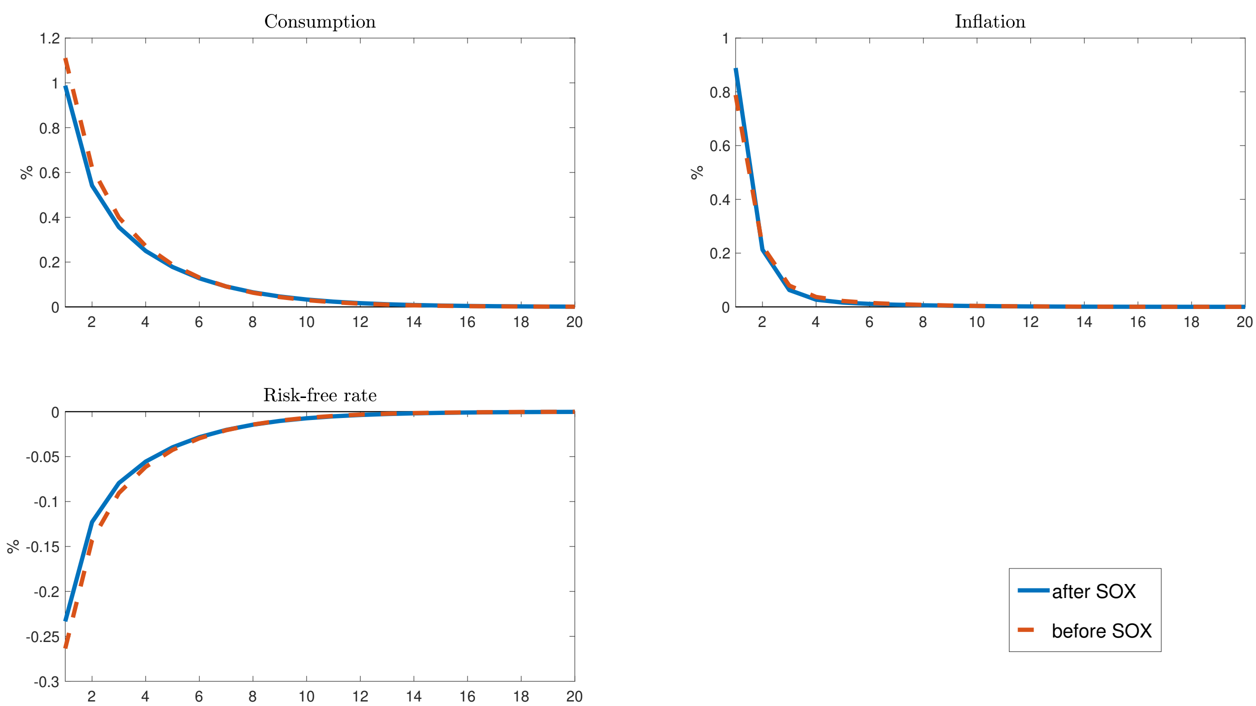

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Table 1: **Descriptive Statistics**

The samples are restricted to S&P 1500 constituent firms headquartered in the U.S. The sample period is 1994Q1-2012Q4 and 1990Q1-2012Q4 for Panel A and Panel B, respectively. Utilities and Financial sectors are excluded. *Post* is an indicator equal to 1 if year-quarter s is after 2002Q3, and 0 otherwise. $Overstatement_{i,s}$ is a dummy variable that equals 1 if firm i overstated earnings or shareholders equity in year-quarter s, and 0 otherwise. *Sticky* is the FPA multiplied by -1. In the sample period of 2002-2012, the FPA at NAICS sectors of different granularities is calculated by Pasten et al. (2017). Equal-weighted probabilities of price adjustments at the goods level are calculated using the micro-data underlying the PPI constructed by the BLS. The granularity for FPA is at the 6-digit NAICS level. *Total Vol* is the standard deviation of raw daily returns over quarter s. *Leverage* is debt maturing in more than two years to total assets. *Profitability* is operating income over total assets. *Assets* is the total assets (in millions). *Size* is the logarithm of sales (in millions). *B-M ratio* is the book equity for the fiscal year ending in calendar year t-1 over the market equity as of December t-1. *Intangibility* is intangible assets defined as total assets minus the sum of net property, plant, and equipment; cash and short-term investments; total receivables; and total inventories to total assets. *PCM* is the price-to-cost margin. *HHI* is the Herfindahl-Hirschman Index based on sales of Compustat firms. *LoanSprd* is the average all-in-drawn spreads (in basis points) over the London Interbank Offered Rate. *Ln(Maturity)* is the logarithm of averaged loan maturities (in months) across facilities, weighted by the facility-level loan amount. *Collateral* is an indicator equal to 1 if lenders require collateral, and 0 otherwise.

	Mean	Std	P1	P10	P25	P50	P75	P90	P99	Nobs
				Panel A. Compustat Sample						
Overstatement	0.10	0.30	0.00	0.00	0.00	0.00	0.00	0.00	1.00	62,647
Sticky	-0.23	0.17	-0.88	-0.40	-0.24	-0.18	-0.12	-0.09	-0.06	62,647
Post	0.54	0.50	0.00	0.00	0.00	1.00	1.00	1.00	1.00	62,647
Total Vol	0.43	0.21	0.16	0.22	0.29	0.38	0.52	0.71	1.18	61,804
Leverage	0.17	0.15	0.00	0.00	0.02	0.16	0.27	0.38	0.59	62,647
Profitability	0.10	0.10	-0.22	0.02	0.06	0.10	0.15	0.20	0.36	62,647
Assets	6,293	20,581	80	242	509	1,346	4,165	13,775	85,149	62,647
Size	7.15	1.60	3.64	5.22	6.08	7.06	8.16	9.32	11.00	62,647
B-M ratio	0.52	0.40	0.05	0.16	0.27	0.43	0.65	0.95	1.91	62,647
Intangibility	0.27	0.18	0.02	0.06	0.12	0.24	0.39	0.54	0.78	62,647
PCM	0.38	0.39	-0.01	0.16	0.26	0.37	0.53	0.69	0.91	62,647
HHI	0.08	0.07	0.03	0.04	0.04	0.06	0.09	0.16	0.34	62,647
				Panel B. DealScan Sample						
Sticky	-0.25	0.19	-0.88	-0.48	-0.29	-0.20	-0.14	-0.10	-0.06	9,784
Post	0.45	0.50	0.00	0.00	0.00	0.00	1.00	1.00	1.00	9,784
LoanSprd	120.27	105.78	15	25	40	87.5	175	255	450	8,006
Ln(Maturity)	3.58	0.74	1.60	2.48	3.18	3.85	4.09	4.17	4.79	8,912
Collateral	0.17	0.37	0.00	0.00	0.00	0.00	0.00	1.00	1.00	9,784
Post	0.45	0.50	0.00	0.00	0.00	0.00	1.00	1.00	1.00	9,784
Total Vol	0.03	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.07	8,084
Leverage	0.21	0.14	0.00	0.01	0.11	0.20	0.31	0.40	0.59	9,784
Profitability	0.11	0.07	-0.09	0.03	0.06	0.10	0.14	0.19	0.34	9,784
Assets	9,851	28,690	125	380	824	2,170	7,610	21,484	164,735	9,784
Size	7.85	1.54	4.63	5.97	6.75	7.72	8.91	9.89	11.69	9,784
B-M ratio	0.53	0.41	0.05	0.17	0.28	0.44	0.66	0.97	1.98	9,784
Intangibility	0.28	0.18	0.02	0.07	0.14	0.25	0.40	0.54	0.77	9,784
PCM	0.35	0.21	0.04	0.14	0.22	0.33	0.46	0.61	0.86	9,784
HHI	0.06	0.04	0.01	0.03	0.03	0.05	0.07	0.11	0.22	9,784

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Table 2: **Price Stickiness and Earnings Overstatement**

This table reports the results for estimating the following WLS regression on S&P 1500 constituent firms headquartered in the U.S. over the sample period of 1994Q1-2012Q4. Observations are weighted by firm assets. Utilities and Financial sectors are excluded:

$$Overstatement_{i,s} = \alpha + \beta \times Sticky_j + \gamma \times Sticky_j \times Post_{i,s} + \delta \times Post_{i,s} + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{i,s},$$

where $Overstatement_{i,s}$ is a dummy variable that equals 1 if firm i overstated earnings or shareholders equity in year-quarter s, and 0 otherwise. *Sticky* is the FPA multiplied by -1. $Post_{i,s}$ is an indicator equal to 1 if year-quarter s is after 2002Q3, and 0 otherwise. See Table 1 for the definition of control variables. i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC industry, year-quarter, and year, respectively. *Time FE* is a set of dummies that capture year-quarters. *SIC1 FE* is a set of 1-digit SIC industries. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)
Sticky	0.12***	0.23***	0.18**	0.18***		
	(3.29)	(3.43)	(2.19)	(2.68)		
Sticky × Post		-0.16*	-0.20**	-0.22***	-0.23**	-0.22**
		(-1.89)	(-2.01)	(-3.20)	(-2.45)	(-2.22)
Total Vol						0.07
						(1.22)
Leverage	0.19**	0.19***	0.19***	0.18***	0.07	0.06
	(2.55)	(2.73)	(3.08)	(3.23)	(0.91)	(0.75)
Profitability	-0.17*	-0.22**	-0.18**	-0.18**	-0.13	-0.14
	(-1.92)	(-2.05)	(-2.01)	(-2.06)	(-0.98)	(-1.04)
Size	-0.00	-0.00	-0.01	-0.01	0.03	0.03
	(-0.52)	(-0.40)	(-1.01)	(-1.42)	(1.31)	(1.37)
B-M ratio	0.01	0.00	-0.00	0.00	-0.02	-0.02
	(0.52)	(0.02)	(-0.02)	(0.06)	(-0.85)	(-1.09)
Intangibility	-0.09	-0.09	-0.04	-0.03	-0.04	-0.03
	(-1.65)	(-1.61)	(-0.96)	(-0.60)	(-0.52)	(-0.37)
PCM	-0.02	-0.02	0.01	0.01	0.06	0.06
	(-0.59)	(-0.62)	(0.31)	(0.28)	(0.78)	(0.80)
HHI	-0.16	-0.16	-0.21**	-0.22**	0.04	0.02
	(-1.53)	(-1.48)	(-1.98)	(-2.07)	(0.14)	(0.07)
Constant	0.17***	0.18***	0.12**	0.16***	-0.26	-0.29
	(2.77)	(2.74)	(2.38)	(3.78)	(-1.21)	(-1.33)
Time FE	Yes	Yes	Yes	No	No	No
SIC1 FE	No	No	Yes	No	No	No
SIC1 × Time FE	No	No	No	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes
N	62,647	62,647	62,647	62,647	62,647	61,804
Adjusted R^2	0.05	0.05	0.06	0.10	0.35	0.34

standard errors in parentheses

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

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Table 3: **Price Stickiness and Loan Spread**

This table reports the results for estimating the following WLS regressions on S&P 1500 constituent firms headquartered in the U.S. over the sample period of 1990-2012. Observations are weighted by firm assets. Utilities and Financial sectors are excluded:

$$LoanSprd_{n,i,s} = \alpha + \beta \times Sticky_j + \gamma \times Sticky_j \times Post_{i,s} + \delta \times Post_{i,s} + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,t} + \epsilon_{n,i,s}.$$

For each loan package n signed by firm i in year-month s, $LoanSprd_{n,i,s}$ (in basis point) is the average all-in-drawn spreads over the London Interbank Offered Rate. *Sticky* is the FPA multiplied by -1. i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC industry, year-month, and year, respectively. $Post_{i,s}$ is an indicator equal to 1 if year-month s is after 2002Q3, and 0 otherwise. See Table 1 for the definition of control variables. *Time FE* is a set of dummies that capture years. *SIC1 FE* is a set of dummies that capture 1-digit SIC industries. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)
Sticky	11.16	47.74***	26.36*	20.49*		
	(0.77)	(4.18)	(1.72)	(1.66)		
Sticky × Post		-64.98**	-82.20***	-67.05***	-89.64***	-65.69***
		(-2.20)	(-3.00)	(-4.23)	(-4.40)	(-3.04)
Post		40.83	36.45	38.62	35.83	31.15
		(1.32)	(1.21)	(1.38)	(1.20)	(1.06)
Total Vol						143.07***
						(5.90)
Leverage	151.21***	150.90***	137.16***	129.03***	86.74***	84.85***
	(5.83)	(6.06)	(6.08)	(5.92)	(3.81)	(4.28)
Profitability	-232.87***	-227.05***	-191.26***	-162.27***	-9.07	-38.13
	(-4.04)	(-4.37)	(-4.34)	(-3.75)	(-0.19)	(-0.90)
Size	-12.02***	-11.89***	-14.69***	-16.11***	-26.94***	-25.66***
	(-5.74)	(-5.63)	(-9.28)	(-12.94)	(-6.20)	(-7.68)
B-M ratio	37.04***	35.48***	34.36***	38.94***	29.91***	30.16***
	(6.63)	(6.76)	(7.32)	(7.24)	(5.35)	(8.02)
Intangibility	2.63	1.59	2.95	-1.99	52.78**	31.04*
	(0.17)	(0.11)	(0.17)	(-0.11)	(2.48)	(1.72)
PCM	-16.01	-21.22*	-11.64	-10.56	-59.53*	-65.66*
	(-1.34)	(-1.70)	(-0.90)	(-0.90)	(-1.65)	(-1.92)
HHI	36.68	48.05	63.00	68.80	15.13	11.08
	(0.52)	(0.65)	(0.68)	(0.76)	(0.12)	(0.11)
Constant	177.51***	155.57***	143.60***	182.61***	284.99***	242.83***
	(7.81)	(6.02)	(5.63)	(8.80)	(5.50)	(6.01)
Time FE	Yes	Yes	Yes	No	No	No
SIC1 FE	No	No	Yes	No	No	No
SIC1 × Time FE	No	No	No	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes
N	8,006	8,006	8,006	8,006	8,006	7,891
Adjusted R^2	0.39	0.40	0.41	0.45	0.52	0.56

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

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Table 4: **Price Stickiness and Loan Spread: Triple Interaction Strategies, Full Set of Interactions**

This table reports the results for estimating the following WLS regressions on S&P 1500 constituent firms headquartered in the U.S. over the sample period of 1990-2012. Observations are weighted by firm assets. Utilities and Financial sectors are excluded:

$$LoanSprd_{n,i,s} = \alpha + \beta_1 \times Sticky_j \times Post_{i,s} \times Opaque_{i,t-1} + \beta_2 \times Sticky_j \times Post_{i,s} + \beta_3 \times Post_{i,s} \times Opaque_{i,t-1} + \beta_4 \times Sticky_j \times Opaque_{i,t-1} + \beta_5 \times Sticky_j + \beta_6 \times Opaque_{i,t-1} + \beta_7 \times Post_{i,s} + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,t} + \epsilon_{n,i,s}.$$

For each loan package n signed by firm i in year-month s, $LoanSprd_{n,i,s}$ (in basis points) is the average all-in-drawn spreads over the London Interbank Offered Rate. *Sticky* is the FPA multiplied by -1. $Post_{i,s}$ is an indicator equal to 1 if year-month s is after 2002Q3, and 0 otherwise. In Panel A, $Opaque_{i,t-1}$ is a dummy variable that equals 1 if firm i's 6-digit-NAICS-industry-adjusted accruals in year t-1 is above the 90th percentile of its sample distribution, and 0 otherwise. In Panel B, $Opaque_{i,t-1}$ is a dummy variable that equals 1 if firm i' does not have a long-term credit rating upon debt contracting, and 0 otherwise. In Panel C, $Opaque_{i,t-1}$ is a dummy variable that equals 1 if a loan is offered by only one lender, and 0 otherwise. See Table 1 for the definition of control variables. i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC industry, year-quarter, and year, respectively. *Time FE* is a set of dummies that capture years. *SIC1 FE* is a set of dummies that capture 1-digit SIC industries. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)
	Panel A: Abnormal Accruals $\geq$ 90 pctl				
Sticky × Post × Opaque	-325.73***	-280.08**	-294.66**	-327.13**	-315.90**
	(-2.66)	(-2.28)	(-2.23)	(-2.52)	(-2.42)
Sticky × Post	-10.04	-14.08	-25.21	-10.80	3.61
	(-0.45)	(-0.64)	(-1.29)	(-0.44)	(0.14)
Post × Opaque	-50.24*	-32.85	-42.03	-14.56	-16.94
	(-1.74)	(-1.12)	(-1.21)	(-0.43)	(-0.49)
Sticky × Opaque	113.38**	62.43	110.99*	91.32	63.55
	(2.22)	(1.09)	(1.74)	(1.49)	(1.07)
Sticky	37.95*	10.12	12.52		
	(1.69)	(0.48)	(0.78)		
Opaque	44.60***	18.57	37.78*	6.20	5.34
	(3.22)	(0.98)	(1.90)	(0.30)	(0.25)
Post	69.65	67.21	59.24	69.93	59.94
	(1.37)	(1.32)	(1.17)	(1.24)	(1.08)
N	4,387	4,387	4,387	4,387	4,319
Adjusted R^2	0.47	0.48	0.50	0.62	0.64
Controlling *Total Vol*?	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	No	No	No
SIC1 FE	No	Yes	No	No	No
SIC1 × Time FE	No	No	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes

standard errors in parentheses

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

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	(1)	(2)	(3)	(4)	(5)
	Panel B: No S&P Long-term Rating				
Sticky × Post × Opaque	-132.21***	-109.71***	-137.35***	-173.58***	-165.38***
	(-5.31)	(-3.71)	(-5.55)	(-7.56)	(-6.58)
Sticky × Post	-8.80	-29.09***	-21.38*	-19.91*	-9.63
	(-0.85)	(-2.96)	(-1.84)	(-1.90)	(-1.03)
Post × Opaque	-27.70**	-25.81**	-37.04***	-47.64***	-40.95***
	(-2.24)	(-2.11)	(-4.06)	(-4.22)	(-3.55)
Sticky × Opaque	88.05***	53.68*	80.74***	75.53**	66.04**
	(3.51)	(1.90)	(2.71)	(2.55)	(2.32)
Sticky	16.32	-7.23	-20.87		
	(1.04)	(-0.45)	(-1.58)		
Opaque	49.31***	32.58***	34.33***	9.75	8.60
	(3.50)	(2.78)	(3.62)	(0.93)	(0.83)
Post	64.00*	65.43*	67.42*	65.47	55.71
	(1.67)	(1.72)	(1.83)	(1.61)	(1.39)
N	6,217	6,217	6,217	6,217	6,121
Adjusted R^2	0.41	0.42	0.47	0.54	0.55
	Panel C: Sole Lender				
Sticky × Post × Opaque	-529.31**	-570.33**	-574.96**	-587.02**	-567.84**
	(-2.27)	(-2.43)	(-2.57)	(-2.30)	(-2.21)
Sticky × Post	-21.58**	-43.15***	-34.88***	-30.13***	-20.74**
	(-2.04)	(-4.68)	(-3.07)	(-2.83)	(-2.18)
Post × Opaque	-55.48	-68.89	-64.32	-79.57	-69.40
	(-1.14)	(-1.41)	(-1.40)	(-1.62)	(-1.43)
Sticky × Opaque	-35.86***	-24.32*	-40.99**	-52.49**	-49.34**
	(-3.06)	(-1.90)	(-2.26)	(-2.59)	(-2.36)
Sticky	29.45**	5.38	-6.75		
	(2.02)	(0.30)	(-0.47)		
Opaque	4.70	9.17	4.43	-1.77	-2.43
	(0.44)	(0.89)	(0.59)	(-0.24)	(-0.39)
Post	33.92**	34.62**	35.86***	32.93**	24.60*
	(2.38)	(2.53)	(2.64)	(2.47)	(1.84)
N	6,216	6,216	6,216	6,216	6,120
Adjusted R^2	0.44	0.46	0.51	0.58	0.59
Controlling *Total Vol*?	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	No	No	No
SIC1 FE	No	Yes	No	No	No
SIC1 × Time FE	No	No	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes

standard errors in parentheses

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

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Table 5: **Event Stock Returns**

This table reports the results for estimating the following WLS equation on S&P 1500 constituent firms headquartered in the U.S. Utilities and Financial sectors are excluded:

$$CAR_i = \alpha + \beta \times Sticky_j + X_i' \times \theta + \epsilon_i.$$

Daily abnormal returns are estimated from a market model (Panel A) and four-factor adjusted model (Panel B), respectively. For each firm i, CAR_i is the cumulative abnormal returns estimated over the window of [-1, +1] days relative to two sets of events. The first set includes the following scandalous events: (1) Enron filed an earnings restatement with the SEC (November 8, 2001), (2) the SEC asked NYSE and Nasdaq to review their corporate governance requirements (February 13, 2002), and (3) WorldCom announced its profits had been inflated by $3.8 billion (June 25, 2002). The second set of events includes the following events related to governance reforms: (1) Nasdaq's Executive Committee approved the first round of new corporate governance requirements (April 12, 2002), (2) the Senate passed the bill of Senator Sarbanes to enhance auditing-related procedures, corporate responsibility, and financial disclosure (July 15, 2002), and the SEC approved proposals by NYSE and NASDAQ on corporate governance reforms (November 4, 2003). *Sticky* is the FPA multiplied by -1. All control variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	Scandalous Events			Governance Reforms		
	Nov 8, 2001	Feb 13, 2002	Jun 25, 2002	Apr 12, 2002	Jul 15, 2002	Nov 4, 2003
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Market-model adjusted returns					
Sticky	-0.05***	-0.05***	-0.04*	0.03*	0.03	0.02**
	(-3.25)	(-3.05)	(-1.94)	(1.91)	(1.62)	(2.08)
Constant	-0.01	-0.01	-0.01	0.07***	0.03	0.05***
	(-0.32)	(-0.36)	(-0.37)	(3.13)	(1.05)	(2.98)
Adjusted R^2	0.08	0.20	0.10	0.15	0.23	0.13
	Four-factor-model adjusted returns					
Sticky	-0.08***	-0.03*	-0.04	0.04***	0.04**	0.02***
	(-4.33)	(-1.72)	(-1.64)	(2.70)	(2.21)	(2.67)
Constant	-0.01	0.00	-0.01	0.03	0.01	0.03
	(-0.63)	(0.03)	(-0.58)	(1.39)	(0.23)	(1.56)
Adjusted R^2	0.15	0.09	0.07	0.07	0.09	0.07
Controls	X	X	X	X	X	X
N	913	905	898	902	904	896

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Table 6: **Parameter Values of the Model**

Parameter	Value	Description (Target)
β	0.99	Discount factor, household (target $R = 1.02$)
β_e	0.98	Discount factor, firm
ϕ_L	5	Inverse Frisch elasticity
Π	1	Steady-state trend inflation
δ	0.025	Capital depreciation rate
α	0.35	The labor share of private non-farm business sector is 0.65
μ	0.8	Loan-to-value ratio
ϵ	11	Elasticity of substitution (target markup ten percent)
η	11	Elasticity of substitution between intermediate goods
ϕ_1	36.95	Price-adjustment cost, firm with lower price stickiness (target Calvo parameter = 0.6)
ϕ_2	825	Price-adjustment cost, firm with higher price stickiness (target Calvo parameter = 0.9)
κ_I	66.67	Investment-adjustment cost
ζ	0.5	Size of firms with less stickiness
a	9.9×10^{-4}	Investigation cost linear term (target $R_2^B - R_1^B = 0.4\%/400$ before SOX)
b	-0.4	Investigation cost squared term
ϕ_π	1.5	Taylor-rule inflation
ρ_r	0.8	Taylor-rule smoothing
GoY	0.18	Government-spending-to-GDP ratio

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Table 7: **Price Stickiness and Firm Volatility**

This table reports the results for estimating the following WLS equation on S&P 1500 constituent firms headquartered in the U.S. over the sample period of 1994-2012 (Panel A) and 1997-2012 (Panel B), respectively. Utilities and Financial sectors are excluded:

$$Y_{i,s} = \alpha + \beta \times Sticky_j + \gamma \times Sticky_j \times Post_{i,s} + \delta \times Post_{i,s} + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{i,s},$$

where $Y_{i,s}$ are the standard deviation of Fama-French/Chart four-factor-adjusted returns in quarter s for firm i (Panel A) and the average of implied daily volatility of call-option contracts in quarter s for firm i (Panel B). *Sticky* is the FPA multiplied by -1. $Post_{i,s}$ is an indicator equal to 1 if year-month s is after 2002Q3, and 0 otherwise. i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC industry, year-quarter, and year, respectively. *Time FE* is a set of dummies that capture year-quarters. *SIC1 FE* is a set of dummies that capture 1-digit SIC industries. See Table 1 for the definition of control variables. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Idiosyncratic Volatility					
Sticky	0.08**	0.18***	0.17***	0.18***		
	(2.44)	(4.43)	(6.01)	(6.79)		
Sticky × Post		-0.14***	-0.15***	-0.14***	-0.14***	-0.03***
		(-7.05)	(-6.42)	(-6.07)	(-5.83)	(-2.74)
N	76,370	76,370	76,370	76,370	76,370	75,240
Adjusted R^2	0.44	0.44	0.48	0.53	0.63	0.75
	Panel B. Option Implied Volatility					
Sticky	0.88**	2.66***	2.26***	2.26***		
	(2.44)	(5.95)	(5.33)	(5.87)		
Sticky × Post		-2.44***	-2.84***	-2.87***	-3.00***	-1.30***
		(-6.22)	(-5.27)	(-5.45)	(-8.18)	(-6.28)
N	33,619	33,619	33,619	33,619	33,619	33,080
Adjusted R^2	0.56	0.58	0.63	0.66	0.81	0.88
Controlling *Total Vol*?	No	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	No	No	No
SIC1 FE	No	No	Yes	No	No	No
SIC1 × Time FE	No	No	No	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes

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Table 8: **Price Stickiness and Investment Sensitivity to Monetary Policy**

This table reports the results for estimating the following linear equation on S&P 1500 constituent firms headquartered in the U.S. The sample period is 1997-2012. Utilities and Financial sectors are excluded.

$$Y_{i,s} = \alpha + \beta \times Sticky_j \times \overline{v}_s + \gamma \times Sticky_j \times \overline{v}_s \times Post_{i,s} + \delta \times Sticky_j \times Post_{i,s}$$
$$+Z'_{i,t-1} \times \theta + \eta_i + \eta_s + \epsilon_{i,s},$$

$Y_{i,s}$ are the change in the logarithm of invested capital from quarter $s-1$ to quarter s ($\Delta log(Capital) = log(Capital)_{i,s} - log(Capital)_{i,s-1}$) in columns (1)-(4) and the seasonally-adjusted change in the logarithm of invested capital from quarter $s-4$ to quarter s ($\Delta log(Capital) = log(Capital)_{i,s} - log(Capital)_{i,s-4}$) in columns (5)-(8) . $\overline{v}_s$ is a moving average of v_d (in percent) weighted by the number of days in the quarter s after the shock occurs. v_d is the scaled change of the fed funds futures implied rate within a 30-minute event window around the FOMC press release (-10 min, +20 min) on day d. The sign of v_m is flipped so that a positive (negative) shock corresponds to an expansionary (a contractionary) monetary policy shock or a decrease (an increase) in interest rates. *Sticky* is the FPA multiplied by -1. *Time FE* is a set of dummies that capture year-quarters. *SIC1 FE* is a set of dummies that capture 1-digit SIC industries. Control variables include the logarithm of total assets, sales growth, and current assets over total assets. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	$\Delta log(Capital)$				$\Delta log(Capital)$ (SA)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sticky × $\overline{v}$	0.182*	0.182*	0.340***	0.349***	0.288	0.290*	0.361*	0.391*
	(0.099)	(0.102)	(0.119)	(0.123)	(0.177)	(0.176)	(0.199)	(0.210)
Sticky × $\overline{v}$ × Post			-0.462*	-0.488*			-0.724**	-0.782***
			(0.237)	(0.257)			(0.282)	(0.296)
Sticky × Post			-0.033*	-0.033*			-0.217***	-0.215***
			(0.018)	(0.018)			(0.072)	(0.072)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
$\overline{v}$× Controls	No	Yes	No	Yes	No	Yes	No	Yes
SIC1 × Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	65,399	65,399	65,399	65,399	65,352	65,352	65,352	65,352
Adjusted R^2	0.13	0.13	0.13	0.13	0.30	0.30	0.30	0.30

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

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Table 9: **Price Stickiness and Stock-Price Sensitivity to Monetary Policy**

This table reports the results for estimating the following linear equation on S&P 1500 constituent firms headquartered in the U.S. The sample period is 1997-2012. Utilities and Financial sectors are excluded:

$$Ret_{i,d} = \alpha + \beta \times Sticky_j \times v_d + \gamma \times Sticky_j \times v_d \times Post_{i,d} + \delta \times Sticky_j \times Post_{i,d}$$
$$+Z'_{i,s-1} \times \theta + \eta_i + \eta_d + \epsilon_{i,d}.$$

For each firm i, $Ret_{i,d}$ is the raw stock return (in percentage points) on FOMC announcement date d. v_d is the scaled change of the fed funds futures implied rate within a 30-minute event window around the FOMC press release (-10 min, +20 min) on day d. The sign of v_d is flipped so that a positive (negative) shock corresponds to an expansionary (a contractionary) monetary policy shock or a decrease (an increase) in interest rates. Sticky is the FPA multiplied by -1. $Post_{i,s}$ is an indicator equal to 1 if year-month s is after 2002Q3, and 0 otherwise. *Time FE* is a set of dummies that capture event days. *SIC1 FE* is a set of 1-digit SIC industries. See Table 1 for the definition of control variables. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
v	2.517***						
	(0.783)						
Inflex × v		7.077***	6.695**	2.937	13.987***	13.613***	9.161***
		(2.383)	(2.645)	(2.027)	(3.548)	(3.727)	(2.576)
Inflex × v × Post					-11.163***	-11.347***	-11.467***
					(3.164)	(3.127)	(2.972)
Inflex × Post					-0.645*	-0.641*	-0.652*
					(0.357)	(0.355)	(0.350)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	Yes	Yes	Yes	Yes	Yes
v × Controls	No	No	Yes	Yes	No	Yes	Yes
v × SIC1 FE	No	No	No	Yes	No	No	Yes
N	58,083	58,083	58,083	58,083	58,083	58,083	58,083
Adjusted R^2	0.01	0.31	0.31	0.32	0.31	0.31	0.32

standard errors in parentheses

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

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Online Appendix:
The Impact of Securities Regulation on New Keynesian Firms

Erica Xuenan Li, Jin Xie, and Ji Zhang

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Figure A.1: **Impulse Responses of Firms without Credit Spread Differences**

This figure plots the firms' impulse responses to a 25bp expansionary monetary-policy shock.The x-axes are time in quarter, and the y-axes are either percent deviation from steady state or values in level. The blue solid lines are for sticky firms after SOX, the red dashed lines are for sticky-price firms before SOX, and the yellow dotted lines are for inflexible-price firms.

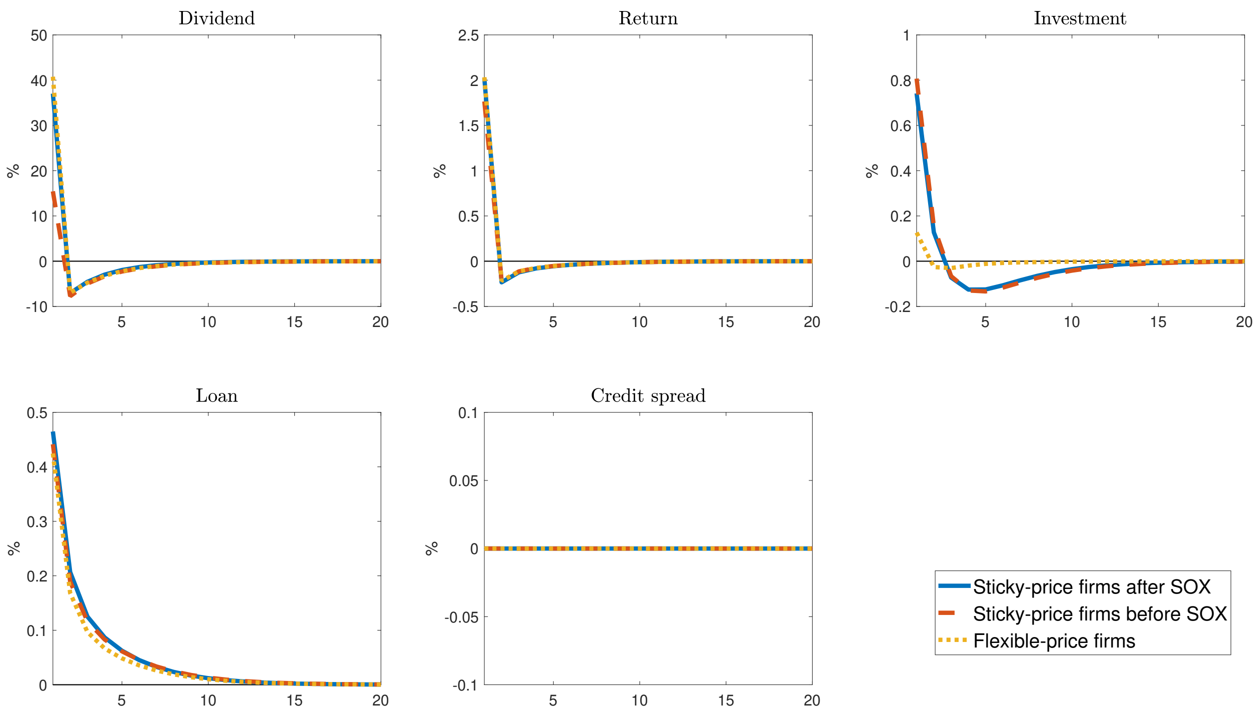

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Table A.1: **Price Stickiness and Capital Investment**

This table reports the results for estimating the following WLS regressions on S&P 1500 constituent firms headquartered in the U.S. over the sample period of 1994Q1-2012Q4. Observations are weighted by firm assets. Utilities and Financial sectors are excluded:

$$CAPX_{i,s} = \alpha + \beta \times Sticky_j + \gamma \times Sticky_j \times Post_{i,s} + \delta \times Post_{i,s} + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,s} + \epsilon_{i,s},$$

where $CAPX_{i,s}$ is capital expenditures over total assets for firm i in year-quarter s. *Sticky* is the FPA multiplied by -1. i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC industry, year-month, and year, respectively. $Post_{i,s}$ is an indicator equal to 1 if year-month s is after 2002Q3, and 0 otherwise. See Table 1 for the definition of control variables. *Time FE* is a set of dummies that capture year-quarters. *SIC1 FE* is a set of dummies that capture 1-digit SIC industries. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)
Sticky	-0.02**	-0.02***	-0.01***	-0.01***		
	(-2.50)	(-2.70)	(-3.76)	(-3.78)		
Sticky × Post		-0.00	-0.00	-0.00	0.00	0.00
		(-0.63)	(-0.32)	(-0.15)	(0.26)	(0.45)
Controlling *Total Vol*?	No	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	No	No	No
SIC1 FE	No	No	Yes	No	No	No
SIC1 × Time FE	No	No	No	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes
N	82,069	82,069	82,069	82,069	82,069	80,954
Adjusted R^2	0.31	0.31	0.45	0.48	0.66	0.67

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

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Table A.2: **Price Stickiness and Loan-Contract Characteristics**

This table reports the results for estimating the following linear equation on S&P 500 constituent firms headquartered in the U.S. over the sample period of 1990-2012. Utilities and Financial sectors are excluded:

$$Y_{n,i,s} = \alpha + \beta \times Sticky_j + \gamma \times Sticky_j \times Post_{i,s} + \delta \times Post_{i,s} \\ + X'_{i,t-1} \times \theta + \eta_i + \eta_{k,t} + \epsilon_{n,i,s},$$

where $Y_{n,i,s}$ indicates $log(Maturity)_{n,i,s}$ (Panel A) and $Collateral_{n,i,s}$ (Panel B), respectively. For each loan package n signed by firm i in year s, $log(Maturity)_{n,i,s}$ is the logarithm of loan maturity (in months). For each package, *Maturity* is averaged across facilities, weighted by the facility-level loan amount. For each loan package n signed by firm i in year s, $Collateral_{n,i,s}$ is an indicator equal to 1 if lenders require collateral, and 0 otherwise. *Sticky* is the FPA multiplied by -1. i, j, k, s, and t index the firm, the 6-digit NAICS sector, the 1-digit SIC industry, year-month, and year, respectively. *Time FE* is a set of dummies that capture event days. *SIC1 FE* is a set of 1-digit SIC industries. See Table 1 for the definition of control variables. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Loan Maturity					
Sticky	-0.38**	-0.57**	-0.65***	-0.75***		
	(-2.48)	(-2.56)	(-3.17)	(-4.83)		
Sticky × Post		0.34	0.34*	0.52***	0.95***	0.94***
		(1.61)	(1.72)	(3.48)	(5.29)	(5.24)
Post		0.39**	0.38**	0.35**	0.55***	0.55***
		(1.98)	(1.99)	(2.26)	(3.35)	(3.37)
N	8,912	8,912	8,912	8,912	8,912	8,790
Adjusted R^2	0.18	0.19	0.19	0.28	0.28	0.28
	Panel B. Collateralization Frequency					
Sticky	-0.00	0.09*	0.03	0.00		
	(-0.01)	(1.76)	(0.50)	(0.08)		
Sticky × Post		-0.18**	-0.23***	-0.22***	-0.24***	-0.20***
		(-2.06)	(-2.63)	(-4.32)	(-6.54)	(-5.14)
Post		-0.13**	-0.15***	-0.13***	-0.13***	-0.14***
		(-2.51)	(-2.72)	(-4.60)	(-5.17)	(-6.03)
N	9,784	9,784	9,784	9,784	9,784	9,645
Adjusted R^2	0.16	0.17	0.18	0.23	0.34	0.36
Controlling *Total Vol*?	No	No	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	No	No	No
SIC1 FE	No	No	Yes	No	No	No
SIC1 × Time FE	No	No	No	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes

standard errors in parentheses

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

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Table A.3: **Price Stickiness and Stock-Price Sensitivity to Monetary Policy: Placebo Test**

This table reports the results for estimating the following linear equation on S&P 1500 constituent firms headquartered in the U.S. The sample period is 1997-2012. Utilities and Financial sectors are excluded.

$$Ret_{i,d-1->d-2} = \alpha + \beta \times Sticky_j \times v_d + \gamma \times Sticky_j \times v_d \times Post_{i,d} + \delta \times Sticky_j \times Post_{i,d} \\ + Z'_{i,s-1} \times \theta + \eta_i + \eta_d + \epsilon_{i,d}.$$

For each firm i, $Ret_{i,d-1->d-2}$ is the raw stock return (in percentage points) in the two days preceding the FOMC announcement date d. v_d is the scaled change of the fed funds futures implied rate within a 30-minute event window around the FOMC press release (-10 min, +20 min) on day d. The sign of v_d is flipped so that a positive (negative) shock corresponds to an expansionary (a contractionary) monetary policy shock or a decrease (an increase) in interest rates. *Sticky* is the FPA multiplied by -1. $Post_{i,s}$ is an indicator equal to 1 if year-month s is after 2002Q3, and 0 otherwise. *Time FE* is a set of dummies that capture event days. *SIC1 FE* is a set of dummies that capture 1-digit SIC industries. See Table 1 for the definition of control variables. All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the level of 6-digit NAICS sectors.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
v	-0.749						
	(0.506)						
Inflex × v		1.202	2.392	0.879	-3.316	-2.612	-3.210
		(2.260)	(2.575)	(3.509)	(4.079)	(4.138)	(4.075)
Inflex × v × Post					6.966	7.843*	7.105
					(4.954)	(4.301)	(4.458)
Inflex × Post					-0.073	-0.094	-0.089
					(0.239)	(0.234)	(0.228)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	Yes	Yes	Yes	Yes	Yes
v × Controls	No	No	Yes	Yes	No	Yes	Yes
v × SIC1 FE	No	No	No	Yes	No	No	Yes
N	58,083	58,083	58,083	58,083	58,083	58,083	58,083
Adjusted R^2	0.01	0.35	0.35	0.36	0.35	0.35	0.36

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

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