Working Papers

FEDERAL RESERVE BANK OF BOSTON

No. 14-6

Financial Frictions and the Reaction of Stock Prices to Monetary Policy Shocks

Ali Ozdagli

Abstract:

This paper reveals and tests a new theoretical implication of the credit channel of monetary policy: as financial frictions (monitoring or auditing costs) increase, the reaction of stock prices to monetary policy shocks decreases. Correspondingly, towards the end of the Enron accounting scandal, the stock prices of firms sharing the same auditor as Enron responded by about 50 to 60 basis points less than other firms to a 10 basis point reduction in the federal funds target rate. This effect is particularly strong among more opaque firms for which financial statements likely provide a more important monitoring tool.

Keywords: financial constraints, stock market, credit channel, monetary policy

JEL Classifications: G32, G12, E44, E52

Ali Ozdagli is a senior economist in the research department at the Federal Reserve Bank of Boston. His e-mail address is ali.ozdagli@bos.frb.org.

I am grateful to Gabriel Chodorow-Reich, Jens Hilscher, Peter Karadi, Anil Kashyap, and in particular Joe Peek for very useful discussions. I also thank seminar participants at the Federal Reserve Bank of Boston, the University of Wisconsin Business School, the 2014 Society for Economic Dynamics, and the 2014 North American Econometric Society Meeting for comments and suggestions, and Yifan Yu for research assistance.

This version: July 29, 2014

> Yes, it is a black box. But it is a black box that's growing the wholesale business by about 50 percent in volume and profitability. That's a good black box.
>
> Jeff Skilling, Enron CEO, February, 21, 2001

> It's in a bunch of complex businesses. Its financial statements are nearly impenetrable. So why is Enron trading at such a huge multiple?
>
> Bethany McLean, *Fortune*, March, 5, 2001

1 Introduction

This paper studies the relationship between financial frictions and the reaction of stock prices to monetary policy shocks. Using the popular financial accelerator framework of Bernanke, Gertler, and Gilchrist (BGG, 1999), the paper reveals a new implication of the credit channel of monetary policy: the stock prices of financially more constrained firms, that is, firms subject to greater monitoring costs in the BGG framework, are *less* responsive to monetary policy shocks because monetary policy affects stock prices through access to external finance, and firms with greater monitoring costs rely less on external finance.

Since the main source of financial frictions in the BGG framework is monitoring costs, the ideal test of this theoretical result requires an experiment with treatment and control groups where the monitoring cost of the treatment group is increased relative to that of the control group. Due to the absence of these ideal conditions, the literature usually relies on

indirect proxies for financial constraints. However, these proxies might suffer from endogeneity problems. Instead, this paper recognizes that firms' financial statements serve to greatly reduce the monitoring costs of investors, and uses the Enron accounting scandal of 2001 and the resulting demise of its auditing firm, Arthur Andersen, as an exogenous large shock to the monitoring cost of other Arthur Andersen clients in comparison to the clients of other auditing companies.[1] Consistent with the new theoretical result, the paper finds that the stock prices of Arthur Andersen clients responded by about 50 to 60 basis points less than other firms to a 10 basis point surprise reduction in the federal funds target rate in the final days of the Enron scandal. This effect is very large, considering that, on average, a 10 basis point surprise decrease in the federal funds target rate leads to a 100 basis point increase in stock prices during this time period. Moreover, the effect is particularly strong among firms with no ratings, high R&D spending, and positive accruals, which are popular proxies for a firm's opaqueness (e.g., Sufi [2007]), likely reflecting that a reliable financial statement is a more important monitoring tool for opaque firms.

This paper is closely related to the widely studied topic of how monetary policy is transmitted to the real economy, particularly through the credit channel.[2] The implications of the credit channel for firms' investment and hiring decisions have been extensively studied in a long strand of literature pioneered by Gertler and Gilchrist (1994), Kashyap, Lamont, and Stein (1994), and Oliner and Rudebusch (1996), among others. This paper is also related to an extensive literature on how monetary policy affects stock prices.[3] However, because

[1] Consistent with this identification strategy, Bernanke, Gertler, and Gilchrist (1999) use the terms "monitoring cost" and "auditing cost" interchangeably.

[2] More recently, the meaning of the credit channel has been blurred due to alternative mechanisms that have been proposed to explain how this channel should work. This paper refers to the traditional credit channel which today is more widely known as the firm (borrower) balance sheet channel.

[3] A long but incomplete list includes Geske and Roll (1983), Kaul (1987), Lee (1992), Thorbecke (1997), Patelis(1997), Bomfim and Reinhart (2000), Kuttner (2001), Cochrane and Piazzesi (2002), Bomfim (2003), Fuhrer and Tootell (2003), Rigobon and Sack (2004), Bernanke and Kuttner (2005), Gurkaynak, Sack, and

these two strands of literature grew separately, there are relatively few papers that study their intersection–that is, how the credit channel influences the sensitivity of stock prices to monetary policy shocks, the topic of this paper.

Due to the difficulties in measuring financial constraints, the papers that do explore this intersection look at indirect proxies, most notably firm size, using the license provided by Gertler and Gilchrist (1994) who argue that "in nearly every study the 'likely to be constrained' firms are much smaller on average than the control group." Perez-Quiros and Timmermann (2000) use the lagged change in the monetary base as a proxy for monetary policy decisions and find that small firms' stock prices react more strongly to monetary policy. Lamont, Polk, and Saá-Requejo (2001) recognize that modern monetary policy is actually based on interest rates rather than the monetary base. Therefore, they study the federal funds rate and the discount window rate, but find no evidence that the relative performance of constrained firms reflects monetary policy, credit conditions, or business cycles. Ehrmann and Fratscher (2004) recognize that investors are not caught totally off-guard when the federal funds target rate changes, and therefore argue that stock prices should react only to the surprise component in the target rate change. They calculate the surprise component of the federal funds target rate change by using the difference between the actual target rate change and the anticipated change measured by survey expectations. In their study on S&P 500 firms, they find that firms that are small, have poor credit ratings, low debt-to-capital ratios, or a high Tobin's q are affected more significantly by monetary policy shocks. Subsequent papers in this literature examine the same problem, albeit in a more international setting.[4]

This paper's contribution addresses two shortcomings in this literature. First, the hy-

Swanson (2005), and Bjørnland and Leitemo (2009). See also Sellin (2001) for an earlier survey.

[4]See, for example, Ammer, Vega, and Wongsman (2010) and Laeven and Tong (2012).

potheses in these earlier papers are not based on an explicitly formulated theory, generating in turn the lack of a clear definition of financial constraints. To address this problem, this paper provides a clean analysis based on the financial accelerator framework of Bernanke, Gertler, and Gilchrist (1999) who define financial frictions as monitoring costs.[5] While the framework is not new, the novel implication of the model is loud and clear: firms subject to greater monitoring costs are less responsive to monetary policy shocks because monetary policy affects firms' stock prices through the cost of external finance, and firms subject to greater monitoring cost rely less on external finance. While there are myriad ways to model financial constraints and the effect of monetary policy on firms, the paper uses this particular framework, not only because of this framework's popularity but also because the paper seeks to replace the vague definition of financial constraints used in previous empirical studies with a more precise and clear definition, namely monitoring costs, that one can more easily study.

Second, this paper addresses the endogeneity problem associated with indirect proxies for financial constraints, a problem that has been increasingly recognized in the empirical corporate finance literature over the last decade.[6] For this purpose, the paper uses the Enron accounting scandal as an exogenous variation in the monitoring cost of Arthur Andersen clients relative to the clients of other auditing firms. This approach alleviates the endogeneity problem because the origin of the accounting scandal is external to the firms we study, a sample that excludes Enron. Before the scandal, Enron was highly praised for its success.

[5] Based on the costly state verification model in Townsend (1979), the Bernanke, Gertler, and Gilchrist (1999) framework is very widely used and cited in the literature. See Iacoviello (2005), Fernández-Villaverde (2010), Christiano, Trabandt, and Walentin (2011), and Gertler and Karadi (2011) for recent examples.

[6] As an example of bias in previous studies, Ehrmann and Fratscher (2004) aim to solve the endogeneity problem caused by the mismeasurement of monetary policy surprises but they ignore the mismeasurement and omitted variable bias caused by using proxies for vaguely defined financial constraints. They find that the stock prices of small firms in their sample, consisting of S&P 500 firms, respond more to monetary policy shocks. However, I find that in a more comprehensive sample of the overall stock market, smaller firms' stock prices seem to react less to monetary policy shocks, even after controlling for the liquidity of the stock. While these results are outside of the scope of this paper, they are available upon request.

The subpar accounting practices of Enron and Arthur Andersen did not surface until 2001. The positive perception of Arthur Andersen's pre-scandal auditing quality is evident not only in mass media accounts, but also in the academic literature on auditor choice that tended to put all of the Big Five accounting firms into the same quality category prior to the Enron scandal. Therefore, it is reasonable to assume that the auditor choice of a particular firm did not have any sizable effect on the market valuation of this firm before the scandal. Nevertheless, the paper also addresses any remaining endogeneity concerns by using intraday returns, an instrumental variable (IV) approach, panel data analysis, and a placebo experiment as discussed in Roberts and Whited (2013).

2 The Model and a New Empirical Prediction

This section shows that the responsiveness of a firm's market value of equity to monetary policy shocks decreases as financial frictions increase. For this purpose, we follow the popular framework in Bernanke, Gertler, and Gilchrist (1999), Appendix A in particular.

If we let w be the firm's profitability, K its capital, and B the face value of debt, we can write the firm's problem subject to costly state verification as

$$V = \max_{K,B} E\left(wK - B\right)^{+},$$

subject to the incentive compatibility constraint of the lender

$$R\left(K - N\right) = E\left(\mathbb{I}_{wK \geq B} B + \mathbb{I}_{wK < B}\left(1 - \mu\right) wK\right),$$

where R is the gross risk-free rate, N is the firm's given net worth, or book equity, μ is the

monitoring cost, and $\mathbb{I}$ denotes the indicator function that is equal to one if the corresponding condition is satisfied and zero otherwise. For ease of exposition, the price of capital and the aggregate return on capital are normalized to one.[7] The object of interest is $\partial^2 \ln V/\partial R \partial \mu$ because the interest rate is set by the monetary authority and the monitoring cost constitutes the main source of financial frictions.

Defining $v \equiv V/N, k \equiv K/N$, and $\bar{w} \equiv B/K$, we can rewrite the firm's problem as

$$v = \max_{k,\bar{w}} E\left(w - \bar{w}\right)^{+} k, \tag{1}$$

subject to

$$R\left(k-1\right) = E\left(\mathbb{I}_{w \geq \bar{w}} \bar{w} + \mathbb{I}_{w<\bar{w}} \left(1-\mu\right) w\right) k. \tag{2}$$

Because the paper focuses on how the percentage change in stock prices in response to a change in the risk-free rate varies with monitoring costs, and because net worth, N, is a state variable independent of the interest rate, one can directly work with v, instead of V, which reduces the problem's dimension.

The first proposition below shows that firms using more external finance are more responsive to monetary policy shocks.

Proposition 1 *The sensitivity of a firm's stock value to monetary policy shocks, $d \ln V/dR$ increases as the ratio of total capital to net worth, K/N, increases.*

Proof. Solving constraint (2) for k and plugging the solution into objective function (1) results in an unconstrained problem in $\bar{w}$. Then, using the envelope theorem, we obtain

[7] The original BGG framework can readily be obtained by imposing $E\left(w\right) = R^K$, where R^K is the return on capital, and by substituting K with QK where Q is the price of capital, or equivalently, by interpreting K as the market value of capital. All the results and proofs in this section remain unchanged.

$d \ln V/dR = 1/R - 1/\left[R - E\left(\mathbb{I}_{w \geq \bar{w}} \bar{w} + \mathbb{I}_{w < \bar{w}} (1-\mu) w\right)\right]$. Using constraint (2), this reduces to $d \ln V/dR = (1-k)/R$, which is negative because $k > 1$ and moreover $|d \ln V/dR|$ increases in $k \equiv K/N$. ■

Intuitively, monetary policy affects a firm's behavior by changing its cost of external finance. Therefore, a firm that relies more on external finance will be more affected by a monetary policy shock. The next proposition establishes that firms subject to greater monitoring costs use less external finance.

Proposition 2 *Let $f(w)$ and $F(w)$ denote the pdf and cdf of the firm's productivity, $h(w) \equiv f(w)/(1-F(w))$ denote the hazard rate, and let $\bar{w}h(\bar{w})$ be increasing in $\bar{w}$. Then, the ratio of total capital to net worth, K/N, decreases in monitoring costs, μ.*

Proof. See Appendix. ■

Intuitively, firms with greater monitoring costs rely less on external finance than they otherwise would because they have to pay a higher cost of external finance. The assumption regarding the hazard rate is imposed by Bernanke, Gertler, and Gilchrist (1999) to guarantee a non-rationing outcome, which is particularly realistic for the publicly listed firms being studied. Further details can be found in Appendix A.1 of Bernanke, Gertler, and Gilchrist (1999).

Together, these two propositions yield the conclusion that firms with higher monitoring costs rely less on external finance than they otherwise would, which makes them less sensitive to monetary policy shocks. Therefore, the two propositions lead to the following corollary, which is the main theoretical result of this paper.

Corollary 3 *The monetary policy sensitivity of a firm's stock price decreases as its monitoring costs increase.*

This simple theoretical analysis omits other potential channels that may reduce or amplify the effect of the channel studied here. For example, while a non-rationing equilibrium seems to be more realistic for the publicly listed companies being examined, credit rationing may still play a role. In this case, firms that previously have been rationed in the debt market may be able to borrow more due to an accommodative monetary policy, and this situation could alleviate the effect of increased monitoring costs. Alternatively, firms that are harder to monitor might have a greater perceived dispersion in their profitability, w, which may further limit these firms' access to credit, amplifying the effect of monitoring costs. Ultimately, the net effect is an empirical question which is addressed in the next section.

3 Empirical Analysis: Motivation and Data

3.1 Motivation of Empirical Strategy

Testing the main hypothesis of this paper poses two main empirical challenges: the endogeneity of a firm's financial constraints and the identification of monetary policy actions. In terms of the first challenge, the ideal test of the main hypothesis requires an experiment with treatment and control groups where the monitoring cost of the treatment group increases relative to that of the control group. Due to the absence of these ideal conditions, the literature generally relies on indirect proxies for financial constraints but these proxies might suffer from endogeneity problems, in particular from omitted variable bias. Instead, this paper's identification approach recognizes that firms' financial statements serve to greatly reduce investors' monitoring costs and uses the Enron accounting scandal of 2001 and the resulting demise of its accounting firm, Arthur Andersen, as an exogenous large shock to the monitoring cost of other Arthur Andersen clients in comparison to other auditors' clients.

Consistent with this identification strategy, Bernanke, Gertler, and Gilchrist (1999) use the terms "monitoring cost" and "auditing cost" interchangeably.

There are two implicit assumptions in this identification approach. The first one is that a firm's auditor choice did not have any sizable effect on the market valuation of the firm before the scandal. In particular, prior to the Enron scandal, the perceived probability that an Arthur Andersen client would engage in fraud was not different compared to the clients of other auditing firms. This pattern is evident not only in mass media accounts, which highly praised Enron before the scandal, but also in the academic literature on auditing quality that puts all of the Big Five accounting firms, including Arthur Andersen, into the same quality category prior to the Enron scandal.[8] Consistent with this pattern, Eisenberg and Macey (2004) and Agrawal and Chada (2005) find that Arthur Andersen clients did not get involved with more financial restatements than other firms in the years preceding the Enron scandal. Similarly, Dyck, Morse, and Zingales (2013) find that Arthur Andersen clients were not more likely to engage in earnings manipulation compared to other firms, and in their study of the economic cost of fraud, they make the same identification assumption used in this paper.

A weaker, but still sufficient, version of this assumption is that the auditor choice is independent of the characteristics that might affect how a firm's stock price sensitivity to monetary policy shocks changes with increasing monitoring costs. This is a weaker assumption than assuming that a firm's auditor choice does not have a material effect on its market valuation. Nevertheless, the analysis in the next section hedges against any remaining endogeneity concerns that might have been overlooked by using the auditor choice in 1995 as an

[8] See, for example, Francis, Mayden, and Sparks (1999). This tendency of pooling Big Five accounting firms into the same quality cohort has continued in the top accounting journals even after the Enron scandal. See, for example, Chaney, Jeter, and Shivakumar (2004) and Chang, Dasgupta, and Hilary (2009).

instrument in an IV framework, noting that firms usually establish long-term relationships with their auditors. Although the characteristics that affect a firm's market valuation vary over time, these changes are unlikely to be correlated with its auditor choice made a long time ago. While using lagged independent variables is quite common in the macroeconomics and finance literature, researchers generally use one-year lags. By using a longer lag of five years, the IV approach tries to be as conservative as possible and stack the odds against the main hypothesis, although the lag length does not have any qualitative effect on these results. A second IV approach also uses the auditor choice in 1998 and 1999 as instruments because the auditor choice from earlier years does not seem to have any explanatory power for the auditor choice in 2000, once one controls for the auditor choice in 1998 and 1999.

The second assumption relies on the contagion effects of possible accounting fraud based on sharing the same auditing firm: the perceived reliability of financial statements by other Arthur Andersen clients decreased relative to clients of other auditors. Consistent with this assumption, Dyck, Morse, and Zingales (2013) find that the probability of fraud detection increased dramatically for former Arthur Andersen clients once they switched to another auditor after the Enron scandal. Moreover, Gleason, Jenkins, and Johnson (2008) use stock returns to provide evidence for the contagion effect that accounting restatements have on the credibility of financial statements issued by non-restating firms. They argue that the contagion effect is unrelated to changes in analysts' earnings-per-share forecasts, and hence the economic prospects of the firms, and that it is stronger for the firms with low accounting quality (high accruals) that share the same external auditor. This finding is also consistent with the assumption that the Enron scandal decreased the perceived reliability of financial statements and hence increased investors' cost of monitoring other Arthur Andersen clients.

Under these two assumptions, this paper's approach addresses the first challenge of alle-

viating the endogeneity problem related with financial constraints. In order to address the second challenge, the endogeneity of monetary policy actions, the paper follows the approach of Kuttner (2001) and Bernanke and Kuttner (2005) that separates the monetary policy actions into the unexpected (*surprise*) component and the anticipated (*expected*) component on Federal Open Market Committee (FOMC) announcement dates because the equity market would have already responded to anticipated policy actions. The identification of the surprise element in the target-rate change relies on the price of the current month 30-day federal funds futures contracts, a price which incorporates market expectations of the effective federal funds rate. This approach is preferable because federal funds futures outperform target-rate forecasts based on other financial market instruments or based on alternative methods, such as sophisticated time series specifications and monetary policy rules.[9] Another advantage of looking at one-day changes in near-dated federal funds futures is that federal funds futures do not exhibit predictable time-varying risk premia (and forecast errors) over daily frequencies.[10] Similarly, over daily frequencies, the effect of the Enron scandal on the risk premium of any firm is negligible compared to the effect of the monetary policy surprise on FOMC announcement dates.

The Enron scandal was not a sudden event, but rather a scandal that unfolded over the course of 2001. Thus, there is no perfectly reliable way to figure out investors' beliefs about the probability of an accounting scandal. Therefore, it is necessary to use an FOMC announcement date with a sizable monetary policy surprise that occurred late enough in 2001 to incorporate the full effect of the scandal. Moreover, unscheduled FOMC announcements must be omitted to avoid the effect of timing shocks which would reduce the exogeneity

[9] See Evans (1998) and Gürkaynak, Sack, and Swanson (2007) for details.

[10] See, for example, Piazzesi and Swanson (2008). Details of this policy surprise measure are given in the data section.

of the measured policy surprise. These criteria lead to the choice of the scheduled FOMC announcement on November 6, 2001, because this date includes a sizable monetary policy surprise (-10 basis points) for the 50 basis point reduction in the federal funds target rate on that date, and it is very close to November 8, 2001, when Enron filed the 8-K report announcing that it would restate financial documents dating from 1997 through the second quarter of 2001.[11]

As a comparable "before treatment" date, May 15, 2001, is chosen because this date shares similar characteristics to the announcement made on November 6, 2001. In particular, the change in the federal funds target rate on both dates was -50bp, both were scheduled announcements, and each had a similar size for the monetary policy surprise component, -8bp versus -10bp. Moreover, because both surprises are negative, any estimated difference between the stock price reactions of Arthur Andersen clients and other firms cannot be attributed to asymmetric effects of expansionary and contractionary policy shocks. The other FOMC dates in early 2001 were either unscheduled, which would introduce timing shocks and violate the exogeneity of the monetary policy surprise, or had zero or positive surprises.

The main analysis employs a difference-in-differences approach implemented as the re-

[11] The financial restatement announcement on November 8 was not a big surprise to market participants. On October 16, 2002, Enron posted huge losses in shareholder's equity as a nonrecurring item related to the termination of "certain structured finance arrangements." On October 22, 2001, Enron announced that the Securities and Exchange Commission (SEC) had requested information regarding certain related-party transactions. Following October 16, 2001, Enron's stock price fell almost 75 percent from \$33.84 to \$9.05 by November 7, 2001, the day before it announced that it would restate earnings for 1997 through 2001. In the days surrounding the restatement announcement, its stock price fell from \$9.05 to \$8.63, a drop of less than 5 percent, suggesting that the market had priced in the financial restatement before the announcement. This suggests that the financial restatement announcement on November 8 was not a big surprise to market participants, which justifies our use of the November 6, 2001, FOMC announcement as the "after" period.

gression

$$return = \beta_0 + \beta_1 \text{AAClient} + \beta_2 \text{After} + \delta \text{AAClient} * \text{After} + \text{controls} + \text{error},$$

where δ is the parameter of interest. *AAClient* is a dummy variable equal to one if the firm's financial statements for year 2000 were audited by Arthur Andersen and is zero otherwise. *After* is a dummy variable that is equal to one for the observations on November 6, 2001, and zero for observations on May 15, 2001.

The difference-in-differences approach does not use any time series dimension because investors changed the probability they assigned to an accounting scandal as the events progressed, and this probability is hard to measure. Despite the absence of such a measure, one can still attempt a panel data analysis if one is content with an imperfect proxy for investor beliefs about the scandal. To facilitate this panel data analysis, section 5 conjectures that the fate of Enron in 2001 was tied to the outcome of the scandal and hence uses Enron's Expected Default Frequency (EDF) from Moody's as a proxy for investor beliefs about the scandal. The results from the difference-in-differences approach are validated by this panel data analysis, which is presented in section 5.[12]

3.2 Data Description

Monetary Policy Surprise: Following Bernanke and Kuttner's analysis, an event is defined as a scheduled FOMC meeting where the new federal funds target rate is announced.

[12] These results are robust when Enron's daily stock price is used instead of Moody's daily EDF, which is not surprising given that Enron's stock price is a direct ingredient in the EDF measure. The monthly distress likelihood score of Campbell, Hilscher and Sziglayi (2008) is also tried as an alternative measure. While the results are qualitatively similar, they have lower statistical significance, as would be expected from the increased measurement error due to matching daily data with monthly proxies.

Kuttner (2001) and Bernanke and Kuttner (2005) obtain the corresponding surprise change in the target rate by first calculating the change in the rate implied by the corresponding futures contract, given by 100 minus the futures contract price; then scaling this result by a factor associated with the number of days of the month in which the event occurred because the payoff of the contract is determined by the average realized federal funds effective rate during the month. Accordingly, the unexpected target-rate change for an event taking place on day d of month m is given by

$$\Delta i^u = \frac{D}{D-d}(f^0_{m,d} - f^0_{m,d-1}),$$

where $f^0_{m,d} - f^0_{m,d-1}$ is the change in the current-month implied futures rate, and D is the number of days in the month. To suppress the end-of-month noise in the federal funds rate, the unscaled change in the implied futures rate is used as the measure of the target-rate surprise when the event occurs during the last three days of a month. If the event happens on the first day of a month, $f^1_{m-1,D}$ is used instead of $f^0_{m,d-1}$. The expected federal funds rate change is defined as the difference between the actual change minus the surprise:

$$\Delta i^e = \Delta i - \Delta i^u,$$

where Δi is the actual federal funds rate change. The data for the decomposition of the federal funds target rate changes can be obtained from Kenneth Kuttner's webpage.[13]

Firm-Level Data: The dependent variable, the stock returns on particular FOMC announcement dates, comes from the daily CRSP files. The control variables are based on auditor information and balance sheet data from Compustat annual files and on market

[13] http://econ.williams.edu/people/knk1/research

value data from CRSP.[14] The robustness checks also use minute-level intraday returns from QuantQuote. To ensure the liquidity of the stocks, penny stocks are dropped following Amihud (2002), who defines penny stocks as stocks with a price less than $5. Further filtering of the data follows Kashyap, Lamont, and Stein (1994). First, the informativeness of financial statements are similar across companies because the sample is restricted to firms having December as their fiscal year-end. Second, the sample excludes firms that have undergone a significant merger or acquisition in 2001, as indicated by the footnote of the sales item in Compustat (SALE_FN).[15]

The difference-in-differences analysis uses only firms that have stock return data on both FOMC announcement dates of interest (May 15 and November 6). This approach implicitly controls for firm-specific fixed effects on returns because, in a balanced panel of two dates, a difference-in-difference regression and a fixed-effects panel regression provide the same coefficient estimates. However, section 5 provides the panel data analysis of the eight scheduled FOMC announcement dates in 2001, which uses an unbalanced panel to provide a more comprehensive picture.

The control variables are the usual suspects taken from the cross-sectional asset pricing literature. Market Leverage is calculated by dividing the book value of debt by the sum of the book value of debt and the market value of common equity. The market value of common equity is calculated as the stock price times shares outstanding from CRSP as of December 31, 2000. The book value of debt is calculated as total assets minus book equity, where book equity is equal to the sum of common equity and deferred taxes, as in Fama and French

[14] The use of annual data follows Sufi (2007) and Leary and Roberts (2010), among others. The use of annual data reduces the number of missing observations and limits potential problems with seasonality in some data items.

[15] See Anantharaman and Lee (2014) and Kinney, Pamrose, and Scholz (2004) for examples of the use of SALE_FN as an indicator of merger and acquisition activities.

(1992), (Compustat items CEQ and TXDITC, respectively). Book-to-Market is the book value of equity divided by the market value of equity. Assets means total assets (Compustat Item AT).[16] Profitability is operating income (Compustat Item OIBDP) divided by total assets. Finally, the CAPM beta is calculated using daily returns between the current FOMC announcement date and the prior FOMC announcement date.

Table 1 provides the key statistics for the control variables, both for the full sample and for the subsamples of clients of different Big Five accounting firms. A clear pattern in this table is that the key statistics for these control variables are remarkably similar across different subsamples. Therefore, it is safe to argue that Arthur Andersen's clients have similar characteristics to the clients of other Big Five firms, at least for the key characteristics being examined. Moreover, all of the Big Five accounting firms are very diversified in terms of the industries that their clienteles belong to, which further supports this argument.

[TABLE 1 ABOUT HERE]

4 Empirical Results: Difference-in-Differences

This section presents the results from the regression

$$return = \beta_0 + \beta_1 \text{AAClient} + \beta_2 \text{After} + \delta \text{AAClient} * \text{After} + \text{controls} + \text{error},$$

where δ is the parameter of interest. AAClient is a dummy variable equal to one if the firm's financial statements for year 2000 were audited by Arthur Andersen and equal to zero otherwise. After is a dummy variable that is equal to one for the observations on

[16] Ozdagli (2012) shows that book leverage can be calculated using the book-to-market equity ratio and market leverage. Therefore, we omit book leverage as an additional control to avoid multicollinearity.

November 6, 2001, and equal to zero for observations on May 15, 2001. Because monetary policy surprises were expansionary on both dates, the theory implies that the stock prices of Arthur Andersen clients should have reacted relatively less positively to the monetary policy shock on November 6, and hence that $\delta < 0$.

[TABLE 2 ABOUT HERE]

Column 1 in Table 2 presents the results of this regression without using any additional control variables. The first line tells us that following the Enron scandal, the sensitivity of the stock prices of Arthur Andersen clients to a 10 basis point reduction in the federal funds target rate decreased by about 70 basis points relative to that of other auditors' clients. This effect is very large, considering that, on average, a 10 basis point surprise decrease in the federal funds target rate leads to about a 100 basis point increase in stock prices during this time period.[17]

Column 2 presents the results of the same regression after including control variables. These controls do not seem to affect the average returns on these two dates, with the exception of the CAPM beta that is positively related with returns. More importantly, the coefficient of interest, that on AAClient*After, practically stays the same.

The necessary and sufficient identification assumption for columns 1 and 2 is that the auditor choice is independent of the characteristics that might affect how a firm's stock price sensitivity to monetary policy shocks changes with increasing monitoring costs. However, it is possible that the perceived auditing quality between clients of Big Five auditing firms and the remaining auditing firms might have been different in 2000. This potential difference is also evident from that period's academic accounting literature, which studies auditing

[17] This 100 basis point stock price increase in response to a 10 basis point surprise reduction in the policy rate comes from a panel regression using all scheduled FOMC announcements in 2001.

quality by regarding Big Five auditing firms and other auditing firms as providing different qualities of service. Therefore, column 3 repeats the regression by focusing on the subsample of Big Five auditing firms' clients. Because the firms that prepare clean balance sheets, and hence have non-missing control variables, tend to be clients of the Big Five accounting firms, the number of observations in column 3 differs little from the number of observations in column 2, and the coefficient estimates are very close to each other, as expected.

Despite these best efforts, there may be some endogeneity concerns that may have been overlooked. In order to address any remaining concerns, note that firms usually establish long-term relationships with their auditors, but that the characteristics that affect their market valuation vary over time so that these characteristics are unlikely to be correlated with their auditor choice made a long time ago. Correspondingly, one can use the auditor choice in fiscal year 1995 as an instrument in an IV framework.

While popular in the macroeconomics and finance literature, using lagged independent variables as instruments can still cause problems if the source of endogeneity, such as omitted variables, is also persistent, as discussed in Roberts and Whited (2013). Using a long lag (1995 versus 2000) alleviates this problem for this particular case, because a firm's auditor choice is much more persistent than many other firm characteristics that could potentially affect the reaction of stock prices to monetary policy shocks as the Enron scandal unfolds. In particular, about 95 percent of the firms retain their auditor from one year to the next, whereas firm characteristics, such as leverage, have an autocorrelation of about 50 percent to 60 percent.[18] Market-based risk characteristics, such as book-to-market ratios, that are deemed to be more important determinants of stock returns have even lower autocorrelation. Therefore, while the auditor choice in 1995 is highly correlated with the auditor choice in

[18] See, for example, Lemmon, Roberts, and Zender (2008) for a more detailed discussion of the persistence of capital structure.

2000 (relevance condition), it would be much less correlated with any potential omitted firm characteristics that affect the reaction of stock prices to monetary policy shocks in 2000 (exclusion restriction). As a result, any potential bias in OLS should disappear to a large extent when using a firm's auditor choice in 1995 as an instrumental variable.[19] Column 4 shows that the resulting coefficient for AAClient*After has the same sign and a similar magnitude, and the Hausman χ^2 test statistic equal to 5.14 ($p = 0.74$) suggests that endogeneity is not a big concern.[20]

Unreported regressions reveal that after controlling for the auditor choice in 1998 and 1999, the auditor choice in earlier years does not have any explanatory power for the auditor choice in 2000. Therefore, for completeness, column 5 reports the instrumental variable estimates using the auditor choice in 1998 and 1999 as instruments, and these estimates are similar to the previous estimates. All of these instruments pass the standard tests for instrument weakness and overidentification.

As discussed in popular texts like Angrist and Pischke (2009) and Roberts and Whited (2013), the Achilles heel of the difference-in-differences approach is the non-parallel time trend across firms. I check this possibility by separating stocks into portfolios by their auditing firms and running a regression of different portfolio returns on a linear trend. In unreported regression results, I find that the p-value for the hypothesis of equal time trends is 0.3, which suggests that a monotonic time trend is not a primary concern.

Nevertheless, a linear time trend might not be the perfect way to approach this issue. To be more precise, the non-parallel time trend issue is actually an omitted variable problem.

[19] One variable that is as highly persistent as auditor choice and that might be related to a firm's responsiveness to monetary policy is its industry. However, the presence of Arthur Andersen clients across different industries seems to be similar to that of other auditing firms' clients. Nevertheless, when industry controls are added in the robustness section for completeness, the results are essentially unchanged.

[20] The χ^2 statistic comes from the bootstrapped Hausman test, as in Cameron and Trivedi (2010, p. 443), that does not require one of the estimators to be efficient.

The concern is that there might be an exogenous force other than the monetary policy shock, such as news related to Enron, that moves the stock returns of Arthur Andersen clients and other firms in different directions on May 15 and November 6. In order to address this concern, the regression is repeated for the event window between 2:00 pm (15 minutes before the FOMC announcement) and 4:00 pm (the market close) to ensure that most of the stock return movement is attributable to the monetary policy announcement.[21] This choice also stacks the odds against the main hypothesis because Enron's stock price was flat in the November 6 event window (9.69 versus 9.67), whereas on May 15 it went down by about 1 percent, from 57.45 to 56.99. Therefore, if there was any Enron-related news that would depress stock prices of Arthur Andersen clients in this window it is more likely to happen on May 15 rather than on November 6, which stacks the odds against this identification method. Column 6 in Table 2 shows that, for the intraday returns, the coefficient of AAClient*After is of a magnitude similar to the coefficients in columns 1 and 2 (differing from each other only by about one standard deviation) and is still statistically significant.[22]

Finally, columns 7 and 8 present the results for the rated and unrated firms separately.[23] The first lines in these columns show that, for these two groups of firms, the estimated coefficients of interest differ from each other in an economically significant way, and the second line between these columns shows that this difference is statistically significant as

[21] This narrow window choice should also address any remaining concerns regarding whether the difference between November 6 and May 15 is due to a time-varying risk premium because the effect of the risk premium on returns in an intraday window is even lower than that in a daily window, which itself is already negligible. Moreover, because the narrow window starts just before the FOMC announcement it addresses any concerns regarding whether the difference between Arthur Andersen clients and other firms can be attributed to the pre-FOMC drift discussed in Lucca and Moench (2013).

[22] Market leverage has a negative and statistically significant coefficient in the intraday regressions. The asset pricing literature is divided regarding the relationship between market leverage and stock prices; see, for example, Gomes and Schmid (2010) and Ozdagli (2012), among others.

[23] Following Avromov, Chordia, Jostova, and Philipov (2007) and Colla, Ippolito, and Li (2013), a firm-year observation is denoted as rated if it has at least one monthly Standard & Poor's long-term issuer rating, as recorded in Compustat.

well. In particular, almost all of the effect seems to stem from unrated firms, consistent with Sufi (2007) who argues that the unrated firms are more opaque, and hence that monitoring costs are more important for them.

This finding is also consistent with the monitoring cost channel studied in this paper, as financial statements are more important instruments for more opaque firms which lack other sources of signaling, such as bond prices. These opaque firms experience a greater shock to their monitoring cost after a decrease in the reliability of their financial statements. Of course, unrated firms might have some characteristic other than opaqueness that may generate this result. To address this issue, I also use an instrumental variable approach employed in Faulkender and Petersen (2006), Sufi (2007), and Santos and Winton (2008) where the instrumental variables are whether a firm is in the S&P 500, whether the firm is listed on the New York Stock Exchange, and whether the firm is in a three-digit SIC industry that includes other firms with credit ratings. The IV estimate for the difference between rated and unrated firms is -2.21 ($p<0.01$), and the Hausman test cannot reject the null hypothesis of equality between the two coefficients ($p=0.25$).

The next section provides a more in-depth examination of the robustness of these results in a panel data setting. The panel data analysis allows the use of the policy surprise on each FOMC announcement date in 2001, a surprise that differs across dates. Further robustness checks include other measures of opaqueness, such as R&D spending and accruals, which are also used by Sufi (2007), among others.

5 Robustness of Empirical Results: Panel Data

So far, the analysis does not include any time series dimension because investors likely kept changing the probability they assigned to an Enron accounting scandal over the course of 2001, and this probability is hard to measure precisely. Nevertheless, it is realistic to assume that Enron's fate in 2001 was tied to the outcome of the accounting scandal involving Arthur Andersen. Therefore, one can use Enron's proximity to default as a proxy for investors' beliefs. The following analysis uses Moody's Expected Default Frequency (EDF) as this proxy.

The econometric model is specified as

$$\begin{aligned} return &= \beta_0 + \beta_1 \text{Surprise} * \text{AAClient} \\ &\quad + \delta_1 \text{EDF} * \text{AAClient} + \delta_2 \text{EDF} * \text{Surprise} + \delta_3 \text{EDF} * \text{Surprise} * \text{AAClient} \\ &\quad + \text{time dummies} + \text{firm fixed effects} + \text{other controls} + \text{error}, \end{aligned}$$

where Surprise is the monetary policy surprise on the scheduled FOMC announcement dates in 2001. The standalone AAClient dummy is absorbed by the firm fixed effect, and the standalone EDF and Surprise are absorbed by the date fixed effects. The EDF is calculated by first taking the logarithm of Moody's daily Expected Default Frequency of Enron in order to control for non-linearities and then taking its equally-weighted 10-day moving average (up to, but not including, the FOMC dates) in order to reduce the mismeasurement due to high volatility of the daily EDF measure.[24] The parameter of interest is δ_3; that is, how Enron's proximity to default affects the relative stock price reaction of Arthur Andersen clients to

[24] A separate analysis using the Hodrick-Prescott filter leads to similar results. However, I prefer using the moving-average of past values because it eliminates the look-ahead bias inherent in the Hodrick-Prescott filter.

monetary policy surprises. The theory suggests that $\delta_3 < 0$, once Surprise is scaled so that a positive policy surprise implies an expansionary shock.

The event dates consist of the scheduled FOMC announcement dates in 2001. The sample stops after 2001 because 2002 was riddled with accounting scandals involving other auditing firms, starting in January with Homestore.com whose auditing firm was Pricewaterhouse-Coopers, and in February with Qwest, whose auditing firm was KPMG.[25]

[TABLE 3 ABOUT HERE]

Table 3 summarizes the results which are consistent with the results in the previous section and the conjecture that ties Enron's fate to the accounting scandal. In particular, as Enron's proximity to default increases, the stock prices of Arthur Andersen clients react less to monetary policy surprises in comparison to the stock prices of other auditing firms' clients. The results in Table 3 can be compared to those in Table 2 if the estimates in Table 3 are used in order to calculate the relative change in the monetary policy sensitivity of Arthur Andersen clients' stock prices from May 15 to November 6, 2001. During this period, Enron's EDF measure changed by 2.79. Therefore, column 1 in Table 3 implies that a 10 basis point surprise decline in the federal funds target rate generates a reaction that is about 50 basis points $(1.71 * (\Delta EDF) * 10)$ less for the stock prices of Arthur Andersen clients compared to the clients of other auditing firms, which is in the ballpark of the numbers reported in Table 2. Moreover, columns 2 and 3 in Table 3 imply that the difference between rated and unrated firms is $-6.29 * (\Delta EDF) * 10 \approx -175$ basis points (-1.75 percentage points), which is consistent with the -1.24 $(-1.235 - (-0.001))$ percentage point estimate reported in Table 2.

[25] See http://www.forbes.com/2002/07/25/accountingtracker.html.

Regarding this result, an obvious concern is that larger firms are more likely to be rated and firm size is the main driver of these results. Indeed, columns 4 and 5 show that if the sample is divided into large and small firms based on the median firm size, a pattern similar to that for rated and unrated firms emerges. In order to address this concern, the sample is divided into four groups based on size and rating availability, and the coefficients on EDF∗Surprise∗AAClient for each group are compared in the table below. As expected, the majority of the sample is concentrated in the Big&Rated and Small&Unrated groups. The table's message is clear: the difference between rated and unrated Arthur Andersen clients holds for both big and small firms, whereas the difference between big and small firms becomes statistically insignificant and actually goes in the opposite direction both in the rated and unrated groups of firms. These results suggest that the effect of ratings availability dominates the effect of firm size.

Coefficient of EDF*Surprise*AAClient When Firms are Double Sorted

	Rated	Unrated	Unrated-Rated
Big	1.793	-4.571	-6.365*
	(1.681)	(2.965)	(3.401)
	498	222	
Small	4.671	-4.288**	-8.960**
	(4.055)	(1.792)	(4.333)
	44	990	
Small-Big	2.877	0.282	
	(4.292)	(3.456)	

Each cell goes from top to bottom: the coefficient, standard error, and number of firms. See Table 3 and the text for details of how the variables are constructed.

Having eliminated the possibility that the results are driven by firm size, the analysis

continues to follow Sufi (2007) and uses alternative measures of firm opaqueness (R&D spending and accruals, in particular) to establish the robustness of these results. Columns 6 and 7 of Table 3 provide a comparison of firms with low and high R&D spending (relative to total assets) and find a very similar pattern, but one that is actually stronger in terms of its magnitude when compared to the difference between rated and unrated firms (-9.66 versus -6.29).

The rest of the columns in Table 3 repeat the same analysis for firms with positive accruals, as these firms are more likely to engage in earnings management and hence need better auditing practices. Two different accruals measures are used. The first measure comes from Sloan (1996), which is also used in Sufi (2007).[26] The second measure modifies this first measure by adding accruals (unremitted earnings) from unconsolidated subsidiaries (Compustat item ESUB) because off-balance-sheet assets played a very significant role in the Enron scandal, which in turn might have drawn investors attention to these assets. Besides addressing the earnings management issue that is directly relevant to the reliability of financial statements, accruals have the additional advantage of providing extra credibility to the results for the main hypothesis because they are actually negatively correlated with R&D spending in our sample, with Pearson and Spearman correlations of -0.2 and -0.1, respectively.

Columns 8 and 9 provide the results for the Sloan accruals measure, and columns 10 and 11 provide the results for the modified accruals measure. Both sets of results are consistent with the results that are obtained using ratings availability and R&D spending. In particular,

[26] The Sloan (1996) accrual measure is given by ((ΔACT-ΔCHE)-(ΔLCT-ΔDLC-ΔTXP)-DP)/((AT+L.AT)/2). All variables are from Compustat, fiscal year 2000: ACT is total current assets, CHE is cash and short-term investments, LCT is total current liabilities, TXP is income taxes payable, DP is depreciation and amortization, AT is total assets and L.AT is the total assets from the previous year.

the differential effect between Arthur Andersen clients and other firms seems to stem from firms that are more likely to engage in earnings management because these firms' monitoring costs take a bigger hit if their auditor's reputation is tarnished. As seen in the second line between columns 8 and 9 and between columns 10 and 11, this result is both economically and statistically significant like the result for the R&D measure in columns 6 and 7, despite the slightly negative cross-sectional correlation between the accrual measure and the R&D spending measure.

[TABLE 4 ABOUT HERE]

Before wrapping up, two more robustness checks are provided in Tables 4 and 5. Table 4 replicates the results of Table 3 including the Industry*Auditor level clustering of standard errors and a full set of interacted Industry Dummy controls using SIC2-level industry codes (EDF∗IndDummy, Surprise∗IndDummy, EDF∗Surprise∗IndDummy) for each of the 69 industries in our sample, and a full set of interacted firm control variables. The results are very similar to those in Table 3.[27] Finally, Table 5 provides the results from a placebo-experiment using the data from 2000, in accordance with the falsification test discussed in Roberts and Whited (2013). As expected, none of the coefficients of interest are statistically significant, and the coefficients actually go in the opposite direction of the ones in Table 3 when firms are compared based on R&D spending and accruals. This finding provides further credibility to the results in Table 3.

[TABLE 5 ABOUT HERE]

[27] Unreported regressions also include Enron stock returns and its interaction with AAClient, EDF, and AAClient*EDF on FOMC announcement dates in order to control for any Enron-related news on FOMC dates that the identification mechanism might not have been able to address. The results in Table 4 remain similar, consistent with the identification assumption that the monetary policy surprises are orthogonal to Enron-related news.

6 Conclusion

This paper studies the relationship between financial frictions and the reaction of stock prices to monetary policy shocks. The theoretical analysis follows the framework used in Bernanke, Gertler, and Gilchrist (1999) and shows that the stock prices of more financially constrained firms should react less to monetary policy. The paper also presents strong empirical evidence based on the differential effect of the Enron/Arthur Andersen scandal on the Arthur Andersen clients' sensitivity to monetary policy after the scandal. The results are robust to several identification methods including difference-in-differences, intraday returns, instrumental variables, panel data analysis, and a placebo experiment as discussed in Roberts and Whited (2013).

An important message of the paper is that any empirical analysis of financial frictions, monetary policy, and stock prices should be based on strong theoretical foundations and a clear definition of the financial friction being examined. In the context of Bernanke, Gertler, and Gilchrist (1999), the financial friction used in this paper is based on the costly state verification theory of Townsend (1979). Monitoring costs are certainly not the only source of financial friction, neither in the real world nor in our theoretical models. While the BGG framework is chosen due to its popularity and its clean definition of the constraint, it would also be interesting to analyze and test the implications of other types of financial constraints on the relationship between stock prices and monetary policy. Continuing this ambitious research agenda is left to future work.

7 References

Agrawal, Anup and Sahiba Chadha. 2005. "Corporate Governance and Accounting Scandals." *Journal of Law and Economics* 48(20): 371–406.

Amihud, Yakov. 2002. "Illiquidity and Stock Returns: Cross-section and Time-series Effects." *Journal of Financial Markets* 5(1): 31–56.

Ammer, John, Clara Vega, and Jon Wongsman. 2010. "International Transmission of U.S. Monetary Policy Shocks: Evidence from Stock Prices." *Journal of Money, Credit and Banking* 42(s1): 179–198.

Anantharaman, Divya, and Yong Gyu Lee. 2014. "Managerial Risk Taking Incentives and Corporate Pension Policy." *Journal of Financial Economics* 111(2): 328–351.

Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Avarmov, Doron, Tarun Chordia, Gergana Jostova, and Alexander Philipov. 2007. "Momentum and Credit Rating." *Journal of Finance* 62(5): 2503–2520.

Bernanke, Ben S., Mark Gertler, and Simon Gilchrist. 1996. "The Financial Accelerator and the Flight to Quality." *Review of Economics and Statistics* 78(1): 1–15.

Bernanke, Ben S., Mark Gertler, and Simon Gilchrist. 1999. "The Financial Accelerator in a Quantitative Business Cycle Framework." In *Handbook of Macroeconomics*, Vol. 1C, ed. John B. Taylor and Michael Woodford. 1341–1393. Amsterdam: North-Holland.

Bernanke, Ben S., and Kenneth N. Kuttner, 2005. "What Explains the Stock Market's

Reaction to Federal Reserve Policy?" *Journal of Finance* 60(3): 1221–1257.

Bjørnland, Hilde C., and Kai Leitemo. 2009. "Identifying the Interdependence between U.S. Monetary Policy and the Stock Market." *Journal of Monetary Economics* 56(2): 275–282.

Bomfim, Antulio N. 2003. "Pre-Announcement Effects, News Effects, and Volatility: Monetary Policy and the Stock Market." *Journal of Banking and Finance* 27(1): 133–151.

Bomfin, Antulio N., and Vincent R. Reinhart. 2000. "Making News: Financial Market Effects of Federal Reserve Disclosure Practices." Finance and Economic Discussion Series Paper No. 14. Washington, DC: Board of Governors of the Federal Reserve System. Available at http://www.federalreserve.gov/pubs/feds/2000/200014/200014pap.pdf.

Campbell, John. Y., Jens Hilscher, and Jan Szilagyi. 2008. "In Search of Distress Risk." *Journal of Finance* 63(6): 2899–2939.

Cameron, A. Colin, and Pravin K. Trivedi. 2010. *Microeconometrics Using Stata*. Revised Edition. College Station, Texas: Stata Press

Chaney, Paul K., Debra C. Jeter, and Lakshmanan Shivakumar. 2004. "Self Selection of Auditors and Audit Pricing in Private Firms." *Accounting Review* 79(1): 51–72.

Chang, Xin, Sudipto Dasgupta, and Gilles Hilary. 2009. "The Effect of Auditor Quality on Financing Decisions." *Accounting Review* 84(4): 1085–1117.

Christiano, Lawrence J., Mathias Trabandt, and Karl Walentin. 2011. "Introducing Financial Frictions and Unemployment into a Small Open Economy Model." *Journal of Economic Dynamics and Control* 35(12): 1999–2041.

Cochrane, John H., and Monika Piazzesi. 2002. "The Fed and Interest Rates – A High-Frequency Identification." *American Economic Review Papers and Proceedings* 92(2): 90–95.

Colla, Paolo, Filippo Ippolito, and Kai Li. 2013 "Debt Specialization." *The Journal of Finance* 68(5): 2117–2141.

Dyck, Alexander, Adair Morse, and Luigi Zingales, 2013. "How Pervasive is Corporate Fraud?" Working paper, University of Chicago.

Ehrmann, Michael, and Marcel Fratscher. 2004. "Taking Stock: Monetary Policy Transmission to Equity Markets." *Journal of Money, Credit and Banking* 36(4): 719 – 737.

Eisenberg, Theodore, and Jonathan Macey. 2004. "Was Arthur Andersen Different? An Empirical Examination of Major Accounting Firm Audits of Large Clients." *Journal of Empirical Legal Studies* 1: 263 – 300.

Evans, Charles L., 1998. "Real-Time Taylor Rules and the Federal Funds Futures Market." Federal Reserve Bank of Chicago, *Economic Perspectives* 22(3): 44–55.

Fama, Eugene F., and Kenneth R. French. 1992. "The Cross-Section of Expected Stock Returns." *Journal of Finance* 47, 427-465.

Faulkender, Michael, and Mitchell Petersen. 2006. "Does the Source of Capital Affect Capital Structure?" *Review of Financial Studies* 19(1): 45–79.

Fernandez-Villaverde, Jesus. 2010. "Fiscal Policy in a Model with Financial Frictions." *American Economic Review: Papers and Proceedings* 100(2): 35–40.

Francis, Jere R., Edward L. Maydew, and H. Charles Sparks. 1999. "The Role of Big 6

Auditors in the Credible Reporting of Accruals." *AUDITING: A Journal of Practice and Theory* 18(2): 17–34.

Fuhrer, Jeff, and Geoffrey Tootell. 2003. "Eyes on the Prize: How did the Fed Respond to the Stock Market?" *Journal of Monetary Economics* 55(4): 796–805.

Gertler, Mark, and Peter Karadi. 2011. "A Model of Unconventional Monetary Policy." *Journal of Monetary Economics* 58(1): 17–34.

Gertler, Mark, and Simon Gilchrist. 1994. "Monetary Policy, Business Cycles and the Behavior of Small Manufacturing Firms." *Quarterly Journal of Economics* 109(2): 309-340.

Geske, Robert, and Richard Roll. 1983. "The Fiscal and Monetary Linkage between Stock Returns and Inflation." *Journal of Finance* 38(1): 1–33.

Gleason, Cristi. A., Nicole T. Jenkins, and W. Bruce Johnson. 2008, "The Contagion Effects of Accounting Restatements." *Accounting Review* 83(1): 83–110.

Gomes, Joao F., and Lukas Schmid. 2010. "Levered Returns." *Journal of Finance* 65(2): 467-494.

Gürkaynak, Refet S., Brian Sack, and Eric T. Swanson. 2005. "Do Actions Speak Louder than Words? The Response of Asset Prices to Monetary Policy Actions and Statements." *International Journal of Central Banking* 1(1): 55–93.

Gürkaynak, Refet S., Brian Sack, and Eric T. Swanson. 2007. "Market-Based Measures of Monetary Policy Expectations." *Journal of Business and Economic Statistics* 25(2): 201–212.

Iacoviello, Matteo. 2005. "House Prices, Borrowing Constraints and Monetary Policy in the Business Cycle." *American Economic Review* 95(3): 739-764.

Kashyap, Anil K, Owen A. Lamont, and Jeremy C. Stein. 1994. "Credit Conditions and the Cyclical Behavior of Inventories." *Quarterly Journal of Economics* 109(3): 565–592.

Kaul, Gautam. 1997. "Stock Returns and Inflation: The Role of the Monetary Sector." *Journal of Financial Economics* 18(2): 253–276.

Kinney, William R., Zoe-Vonna Palmrose, and Susan Scholz. 2004. "Auditor Independence, Non-Audit Services, and Restatements: Was the U.S. Government Right?" *Journal of Accounting Research* 42(3): 561–588.

Kuttner, Kenneth N. 2001. "Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market." *Journal of Monetary Economics* 47 (3): 523–544.

Lamont, Owen, Christopher Polk, and Jesus Saá-Requejo. 2001. "Financial Constraints and Stock Returns." *Review of Financial Studies* 14(2): 529–554.

Laeven, Luc, and Hui Tong. 2012. "U.S. Monetary Shocks and Global Stock Prices." *Journal of Financial Intermediation*: 21(3) 530–547.

Lee, Bong-Soo. 1992. "Causal Relations Among Stock Returns, Interest Rates, Real Activity, and Inflation." *Journal of Finance* 47(4): 1591–1603.

Lemmon, Michael, Michael R. Roberts, and Jaime Zender, 2008. "Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structures." *Journal of Finance* 63(4): 1575–1608.

Lucca, David, and Emanuel Moench. Forthcoming. "The pre-FOMC Announcement Drift." *Journal of Finance*.

Oliner, Stephen D., and Glenn D. Rudebusch. 1996. "Is There a Broad Credit Channel forMonetary Policy?" Federal Reserve Bank of San Francisco *Economic Review* Winter: 3–13.

Ozdagli, Ali K. 2012. "Financial Leverage, Corporate Investment, and Stock Returns." *Review of Financial Studies* 25(4): 1033-1069.

Patelis, Alex D. 1997. "Stock Return Predictability and the Role of Monetary Policy." *Journal of Finance* 52(5): 1951-1972.

Perez-Quiros, Gabriel, and Allan Timmermann. 2000. "Firm Size and Cyclical Variations in Stock Returns." *Journal of Finance* 55(3): 1229–1262.

Piazzesi, Monika, and Eric T. Swanson. 2008. "Futures Prices as Risk-Adjusted Forecasts of Monetary Policy." *Journal of Monetary Economics* 55(4): 677–691.

Rigobon, Roberto, and Brian Sack. 2004. "The Impact of Monetary Policy on Asset Prices." *Journal of Monetary Economics* 51(8): 1553–1575.

Roberts, Michael R., and Toni M. Whited. 2013. "Endogeneity in Empirical Corporate Finance." In *Handbook of the Economics of Finance*, Vol 2A, ed. George M. Constantinides, Milton Harris and Rene M. Stulz. 493–572. Amsterdam: North Holland.

Santos, Joao A. C. and Andrew Winton. 2008. "Bank Loans, Bonds, and Information Monopolies across the Business Cycle." *Journal of Finance* 63(3): 1315–1359.

Sloan, Richard G. 1996. "Do Stock Prices Fully Reflect Information in Accruals and Cash flows?" *Accounting Review* Spring: 289–316.

Sufi, Amir. 2007. "Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans." *Journal of Finance* 62(2): 629–668.

Thorbecke, Willem. 1997. "On Stock Market Returns and Monetary Policy." *Journal of Finance* 52(2): 635–654.

Townsend, Robert M. 1979. "Optimal Contracts and Competitive Markets with Costly State Verification." *Journal of Economic Theory* 21(2): 265–293.

8 Appendix: Proof of Proposition 2

Using constraint (2), we can write

$$R\left(\frac{k-1}{k}\right) = \Gamma\left(\bar{w}\right) - \mu G\left(\bar{w}\right),$$

where

$$\Gamma\left(\bar{w}\right) - \mu G\left(\bar{w}\right) = \bar{w} + \int_0^{\bar{w}} \left(\left(1-\mu\right) w - \bar{w}\right) dF\left(w\right).$$

It is clear that for a given value of $\bar{w}$, k is decreasing in μ. Moreover, Bernanke, Gertler, Gilchrist (1999) show that

$$\begin{aligned} \Gamma'\left(\bar{w}\right) - \mu G'\left(\bar{w}\right) &= 1 - F\left(\bar{w}\right) - \mu \bar{w} f\left(\bar{w}\right) \\ &= \left[1 - F\left(\bar{w}\right)\right]\left[1 - \mu \bar{w} h\left(\bar{w}\right)\right] > 0 \end{aligned}$$

in equilibrium if $\bar{w}h(\bar{w})$ is increasing in $\bar{w}$. To summarize their argument, because $\bar{w}h(\bar{w})$ is increasing in $\bar{w}$, there exists a $\bar{w}^*$ so that $\Gamma'(\bar{w}) - \mu G'(\bar{w}) \gtreqless 0$ if $\bar{w} \gtreqless \bar{w}^*$, where $\bar{w}^*$ satisfies $1 - \mu\bar{w}^* h(\bar{w}^*) = 0$. Appendix A.1 of Bernanke, Gertler, Gilchrist (1999) shows that $\bar{w} > \bar{w}^*$ cannot be an equilibrium. In particular, if the lender gives the firm $K - N$, its expected payoff from this lending, $E(\mathbb{I}_{wK \geq B} B + \mathbb{I}_{wK<B}(1-\mu) wK) = [\Gamma(\bar{w}) - \mu G(\bar{w})] K$, will decrease in the face value of debt, $B = \bar{w}K$, for $\bar{w} > \bar{w}^*$ because $\Gamma''(\bar{w}) - \mu G''(\bar{w}) < 0$. Therefore, both the firm and the lender would benefit from a lower $\bar{w}$ when $\bar{w} > \bar{w}^*$. Hence, the equilibrium value of $\bar{w}$ cannot be in this region.

As a result, the final step only needs to establish that $d\bar{w}/d\mu < 0$. By substituting the incentive compatibility constraint (2) of the lender into the objective function of the firm (1), we obtain

$$v = \max_{\bar{w}} \frac{R\int_{\bar{w}}^{\infty}(w - \bar{w})\, dF(w)}{R - \left[\bar{w} + \int_0^{\bar{w}}((1-\mu)w - \bar{w})\, dF(\bar{w})\right]} = \frac{RP(\bar{w})}{R - [\Gamma(\bar{w}) - \mu G(\bar{w})]},$$

which has the first order condition

$$\Omega(\bar{w}, \mu) = P'(\bar{w})(R - [\Gamma(\bar{w}) - \mu G(\bar{w})]) + P(\bar{w})[\Gamma'(\bar{w}) - \mu G'(\bar{w})] = 0,$$

which should satisfy $\partial\Omega(\bar{w}, \mu)/\partial\bar{w} < 0$ at the equilibrium value of $\bar{w}$ because the second-order condition, $d^2v/d\bar{w}^2 < 0$, dictates that $\Omega(\bar{w} + \varepsilon, \mu) > 0$ and $\Omega(\bar{w} - \varepsilon, \mu) < 0$ for any positive value of ε at the equilibrium value of $\bar{w}$.

Full differentiation of both sides yields

$$\frac{\partial\Omega(\bar{w}, \mu)}{\partial\bar{w}} \frac{d\bar{w}}{d\mu} = P(\bar{w}) G'(\bar{w}) - P'(\bar{w}) G(\bar{w}).$$

It is straightforward to show that the right side is positive which, combined with $\partial\Omega\left(\bar{w},\mu\right)/\partial\bar{w} < 0$, gives $d\bar{w}/d\mu < 0$.

Table 1. Descriptive Statistics

ALL FIRMS

Variable	# Firms	Mean	Std. Dev.	Min	Max
Return %	1,388	0.84	3.23	-26.83	46.00
Market Lev	1,291	0.36	0.27	0.00	0.98
Book-to-Market	1,291	0.64	0.63	-1.28	5.91
Log(Total Assets)	1,388	6.61	1.92	1.62	13.71
Profitability	1,375	0.09	0.18	-1.58	0.77
CAPM Beta	1,387	0.90	0.87	-1.71	5.62

ARTHUR ANDERSEN CLIENTS

Variable	# Firms	Mean	Std. Dev.	Min	Max
Return %	269	0.79	2.97	-15.31	18.04
Market Lev	253	0.39	0.27	0.00	0.96
Book-to-Market	253	0.68	0.69	-0.32	5.91
Log(Total Assets)	269	6.65	1.79	2.07	13.04
Profitability	267	0.11	0.15	-0.87	0.69
CAPM Beta	269	0.85	0.84	-1.46	4.98

ERNST & YOUNG CLIENTS

Variable	# Firms	Mean	Std. Dev.	Min	Max
Return %	326	0.91	3.26	-26.83	24.69
Market Lev	303	0.32	0.27	0.00	0.98
Book-to-Market	303	0.58	0.61	-0.79	4.28
Log(Total Assets)	326	6.38	1.87	1.62	12.01
Profitability	323	0.05	0.23	-1.58	0.48
CAPM Beta	325	1.03	0.89	-1.36	4.79

DELOITTE & TOUCHE CLIENTS

Variable	# Firms	Mean	Std. Dev.	Min	Max
Return %	191	0.66	3.81	-12.01	46.00
Market Lev	176	0.40	0.26	0.01	0.95
Book-to-Market	176	0.68	0.57	-0.28	3.46
Log(Total Assets)	191	6.88	2.11	2.59	12.92
Profitability	190	0.13	0.13	-0.34	0.72
CAPM Beta	190	0.81	0.83	-1.30	4.61

KPMG CLIENTS

Variable	# Firms	Mean	Std. Dev.	Min	Max
Return %	216	0.85	3.29	-12.39	26.02
Market Lev	205	0.37	0.27	0.00	0.94
Book-to-Market	205	0.60	0.53	-0.64	3.63
Log(Total Assets)	216	6.58	1.95	2.34	13.71
Profitability	213	0.07	0.21	-1.15	0.60
CAPM Beta	216	0.90	0.88	-1.71	5.52

PRICEWATERHOUSECOOPERS CLIENTS

Variable	# Firms	Mean	Std. Dev.	Min	Max
Return %	333	0.95	2.80	-12.03	17.06
Market Lev	303	0.36	0.25	0.00	0.96
Book-to-Market	303	0.63	0.68	-1.28	5.20
Log(Total Assets)	333	6.91	1.85	1.99	12.63
Profitability	329	0.11	0.16	-0.78	0.77
CAPM Beta	333	0.94	0.89	-1.46	5.62

Table 2. The ENRON Scandal's Effect on Stock Price Sensitivity to Monetary Policy
Arthur Andersen Clients versus Other Firms:
May 15, 2001 versus November 6, 2001

	(1) OLS	(2) OLS	(3)	(4) IV	(5) IV	(6)	(7)	(8)
VARIABLES	No Controls	With Controls	BIG 5	AA1995	AA9899	INTRADAY	RATED	UNRATED
AAClient*After	-0.665**	-0.703**	-0.754**	-0.590*	-0.873***	-0.474**	-0.001	-1.235***
	(0.291)	(0.300)	(0.301)	(0.350)	(0.318)	(0.210)	(0.406)	(0.420)
							-1.235**	
							(0.584)	
AAClient	0.271	0.320	0.338*	0.361	0.476**	0.428***	-0.069	0.608**
	(0.190)	(0.203)	(0.201)	(0.257)	(0.222)	(0.135)	(0.258)	(0.291)
After	0.332**	0.270*	0.321**	0.236	0.266*	1.156***	0.373*	0.206
	(0.139)	(0.146)	(0.148)	(0.160)	(0.147)	(0.098)	(0.195)	(0.207)
Log(Asset)		0.020	0.022	-0.026	-0.010	0.039	-0.108*	0.138
		(0.042)	(0.039)	(0.047)	(0.042)	(0.026)	(0.056)	(0.086)
Book-to-Market		0.135	0.173	-0.036	0.121	0.087	0.170	0.067
		(0.158)	(0.156)	(0.158)	(0.167)	(0.120)	(0.221)	(0.220)
Market Lev.		-0.358	-0.425	0.242	-0.084	-0.511**	-0.627	-0.563
		(0.390)	(0.383)	(0.446)	(0.411)	(0.246)	(0.697)	(0.537)
Profitability		0.525	0.332	1.168	1.426***	-0.095	-0.527	0.369
		(0.512)	(0.509)	(0.868)	(0.525)	(0.314)	(1.440)	(0.571)
CAPM Beta		0.333***	0.336***	0.303**	0.380***	0.349***	0.339*	0.255*
		(0.114)	(0.115)	(0.138)	(0.137)	(0.075)	(0.200)	(0.141)
Constant	0.685***	0.251	0.240	0.299	0.146	-0.124	1.528**	-0.196
	(0.085)	(0.320)	(0.300)	(0.416)	(0.348)	(0.218)	(0.638)	(0.533)
Observations	2,776	2,554	2,452	1,725	2,199	1,902	970	1,584
R-squared	0.003	0.011	0.013	0.010	0.017	0.108	0.025	0.014

Notes: The dependent variable (returns) is expressed in percentage points. The entry between columns 7 and 8 is the estimate for the difference in the two subsamples. Heteroskedasticity-robust standard errors are in parentheses. Standard errors clustered at the auditor level and block-bootstrapped standard errors were smaller than heteroskedasticity-robust errors; hence, heteroskedasticity-robust errors are reported throughout. *** p<0.01, ** p<0.05, * p<0.1. After=1 refers to May 15, 2001, and After=0 refers to November 6, 2001. The dependent variable is the daily stock returns on May 15, 2001, and November 6, 2001, from CRSP. All balance sheet variables used for calculating control variables are from Compustat. Market Leverage is calculated by dividing the book value of debt by the sum of the book value of debt and the market value of common equity. The market value of common equity is the stock price times shares outstanding from CRSP as of December 31, 2000. The book value of debt is total assets minus book equity, where book equity is equal to the sum of common equity and deferred taxes (Compustat items CEQ and TXDITC, respectively). Book-to-Market is the book value of equity divided by the market value of equity. Assets is total assets (Compustat Item AT). Profitability is operating income (Compustat Item OIBDP) divided by total assets. CAPM Beta is calculated using the daily returns since the prior FOMC meeting. In column 3, BIG 5 refers to the subsample of Big Five auditing firms' clients listed in Table 1. Columns 5 and 6 are the instrumental variable regressions with the auditor choice of 1995, 1998, and 1999 used as the instruments.

Table 3. The ENRON Scandal's Effect on Stock Price Sensitivity to Monetary Policy
Arthur Andersen Clients versus Other Firms:
The Eight Scheduled FOMC Announcement Dates in 2001

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	ALL	RATED	UNRATED	BIG	SMALL	LOW R&D	HIGH R&D	ACCR <=0	ACCR >0	ACC2 <=0	ACC2 >0
EDF*Surprise*AAClient	-1.71	1.99	-4.30***	0.53	-3.87**	1.23	-8.43***	-0.71	-7.09**	-0.66	-8.12***
	(1.15)	(1.60)	(1.55)	(1.50)	(1.72)	(1.67)	(2.72)	(1.44)	(2.80)	(1.58)	(2.93)
		-6.29***		-4.40*		-9.66***		-6.38**		-7.46**	
		(2.23)		(2.28)		(3.19)		(3.14)		(3.33)	
Surprise*AAClient	-1.25	-0.51	-1.70	-2.48	-0.09	-0.02	-0.37	-1.18	-1.84	-1.87	-0.75
	(1.50)	(1.88)	(2.14)	(1.68)	(2.43)	(2.31)	(4.15)	(1.83)	(4.04)	(2.06)	(4.50)
EDF*AAClient	-4.59	-13.60*	1.72	-14.15*	4.54	-21.08*	15.39	-10.78	22.39	-13.04	35.04*
	(6.94)	(8.10)	(10.15)	(7.90)	(11.21)	(11.74)	(19.09)	(8.00)	(17.90)	(9.36)	(18.89)
EDF*Surprise	0.15	0.88	-0.24	1.25*	-0.88	0.99	2.22	-0.24	-0.01	-0.23	0.24
	(0.58)	(0.75)	(0.81)	(0.70)	(0.91)	(1.09)	(1.37)	(0.74)	(1.51)	(0.86)	(1.61)
Observations	11,382	4,037	7,345	5,371	6,011	2,880	3,121	6,913	2,112	5,681	1,923
R-squared	0.05	0.08	0.05	0.09	0.04	0.04	0.10	0.06	0.05	0.06	0.05
Number of permno	1,754	542	1,212	720	1,034	430	540	1,047	328	878	303

Notes: All regressions include firm and time fixed effects. Errors are clustered at the firm level. Both the dependent variable (returns) and the surprise component of the federal funds target rate change are expressed in basis points. The numbers between columns 2 and 3, 4 and 5, 6 and 7, 8 and 9, and 10 and 11 give the estimates for the difference between the two corresponding subsamples. Surprise is scaled so that positive surprises indicate expansionary shocks. To save space, the results for other control variables are not reported. The calculation of firm-level controls is discussed in Table 2. EDF is the 10-day moving average of the log of Moody's Expected Default Frequency for Enron. The AAClient dummy is absorbed by the firm fixed effect, and standalone EDF and Surprise are absorbed by the date fixed effects. ACCR is the ratio of accruals to total assets as in Sufi (2007), and ACC2 is the same object where accruals also include Equity in Earnings – Unconsolidated Subsidiaries (Compustat item ESUB). BIG vs. SMALL and HIGH R&D vs. LOW R&D are determined using the median of AT and XRD/AT from Compustat, respectively.

Table 4. Industry*Auditor Clustering and Interacted Industry Fixed Effects and Interacted Firm Controls
The ENRON Scandal's Effect on Stock Price Sensitivity to Monetary Policy
Arthur Andersen Clients versus Other Firms:
The Eight Scheduled FOMC Announcement Dates in 2001

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	ALL	RATED	UNRATED	BIG	SMALL	LOW R&D	HIGH R&D	ACCR <=0	ACCR >0	ACC2 <=0	ACC2 >0
EDF*Surprise*AAClient	-2.24*	1.20	-4.58**	-0.42	-3.95*	3.04	-9.13**	-1.20	-9.35***	-1.53	-8.99***
	(1.35)	(1.43)	(1.94)	(1.16)	(2.18)	(2.08)	(3.91)	(1.21)	(2.86)	(1.76)	(3.03)
Surprise*AAClient	-1.45	-0.96	-2.30	-2.68	-0.22	0.18	-0.42	-1.48	-2.85	-1.84	-3.07
	(1.90)	(1.99)	(2.76)	(1.93)	(2.84)	(2.37)	(5.46)	(1.64)	(5.45)	(2.03)	(6.36)
EDF*AAClient	1.26	-5.90	5.19	-7.17	11.40	-24.23**	12.45	-3.92	18.95	-4.45	28.42
	(6.49)	(7.66)	(9.36)	(6.74)	(11.48)	(9.89)	(21.63)	(7.26)	(16.45)	(9.91)	(21.28)
EDF*Surprise	-28.86**	6.59	53.90***	-4.41	185.16***	-25.83***	31.53	-30.60***	78.54***	173.89***	53.76***
	(11.58)	(7.49)	(4.67)	(5.28)	(6.37)	(8.75)	(29.61)	(11.58)	(13.65)	(4.68)	(14.12)
Observations	11,376	4,037	7,339	5,370	6,006	2,880	3,116	9,264	2,112	5,677	1,923
R-squared	0.09	0.17	0.09	0.18	0.08	0.13	0.15	0.10	0.12	0.12	0.12
Number of permno	1,754	542	1,212	720	1,034	430	540	1,426	328	878	303

Notes: All regressions include firm and time fixed effects, fully interacted SIC2 industry fixed effects (EDF∗IndDummy, Surprise∗IndDummy, EDF∗Surprise∗IndDummy) and fully interacted firm controls. Errors are clustered at the Industry(SIC2)*Auditor level. Both the dependent variable (returns) and the surprise component of the federal funds target rate change are expressed in basis points. Surprise is scaled so that positive surprises indicate expansionary shocks. To save space, the results for other control variables are not reported. The calculation of firm-level controls is discussed in Table 2. EDF is the 10-day moving average of the log of Moody's Expected Default Frequency for Enron. The AAClient dummy is absorbed by the firm fixed effect, and standalone EDF and Surprise are absorbed by the date fixed effects. ACCR is the ratio of accruals to total assets as in Sufi (2007), and ACC2 is the same object where accruals also include Equity in Earnings – Unconsolidated Subsidiaries (Compustat item ESUB). BIG vs. SMALL and HIGH R&D vs. LOW R&D are determined using the median of AT and XRD/AT from Compustat, respectively.

Table 5. Pseudo-Experiment with Pre-Scandal Data
The ENRON Scandal's Effect on Stock Price Sensitivity to Monetary Policy
Arthur Andersen Clients versus Other Firms:
The Eight Scheduled FOMC Announcement Dates in 2000

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	ALL	RATED	UNRATED	BIG	SMALL	LOW R&D	HIGH R&D	ACCR <=0	ACCR >0	ACC2 <=0	ACC2 >0
EDF*Surprise*AAClient	-0.67	6.86	-3.24	-1.08	0.91	-1.28	12.54	-3.25	12.35	-5.09	12.00
	(4.50)	(4.88)	(6.62)	(4.19)	(8.24)	(7.43)	(14.27)	(4.46)	(14.59)	(6.02)	(15.94)
Surprise*AAClient	0.13	4.95	-1.67	-0.16	1.10	-1.38	1.07	0.44	0.58	0.30	2.81
	(3.47)	(3.82)	(5.11)	(3.37)	(6.27)	(5.73)	(10.84)	(3.55)	(10.74)	(4.47)	(11.86)
EDF*AAClient	-2.08	24.06	-19.11	14.12	-17.58	-29.30	-9.31	-0.77	-10.64	38.32*	-24.06
	(16.93)	(19.74)	(23.82)	(17.91)	(28.61)	(26.52)	(45.94)	(18.45)	(42.00)	(21.36)	(46.85)
EDF*Surprise	22.74***	6.40**	30.67***	13.54***	32.55***	21.02***	54.88***	20.69***	31.41***	22.61***	32.57***
	(2.46)	(3.19)	(3.27)	(2.74)	(4.14)	(4.21)	(5.88)	(2.75)	(5.52)	(3.60)	(5.79)
Observations	13,019	4,096	8,923	6,224	6,795	3,222	3,576	10,463	2,556	6,401	2,258
R-squared	0.04	0.03	0.06	0.03	0.06	0.03	0.11	0.04	0.05	0.05	0.04
Number of permno	2,014	553	1,461	834	1,180	501	571	1,603	411	998	366

Notes: All regressions include firm and time fixed effects. Errors are clustered at the firm level. Both the dependent variable (returns) and the surprise component of the federal funds target rate change are expressed in basis points. Surprise is scaled so that positive surprises indicate expansionary shocks. To save space, the results for other control variables are not reported. The calculation of firm-level controls is discussed in Table 2. EDF is the 10-day moving average of the log of Moody's Expected Default Frequency for Enron. The AAClient dummy is absorbed by the firm fixed effect, and standalone EDF and Surprise are absorbed by the date fixed effects. ACCR is the ratio of accruals to total assets as in Sufi (2007), and ACC2 is the same object where accruals also include Equity in Earnings – Unconsolidated Subsidiaries (Compustat item ESUB). BIG vs. SMALL and HIGH R&D vs. LOW R&D are determined using the median of AT and XRD/AT from Compustat, respectively.