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Corporate investments: Learning from restatements*

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Abstract

This study analyzes the information conveyed by the restatements of financial reports. We argue that restatements contain news about the investment projects of the restating firms' competitors. This news causes competitors to revise their beliefs about the projects' value, and to modify their subsequent investment decisions. Accordingly, we hypothesize that changes in competitors' investments after restatement announcements are related to news in the restatements. Consistent with our prediction, we find that changes in competitors' investments following restatement announcements are significantly related to various proxies for news in the restatements, such as competitors' and restating firms' abnormal returns at the restatement announcements. We conclude that restatements convey information about the investment projects of restating firms' competitors.

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1 Introduction

This paper examines whether restatements of financial reports convey information about corporate investments. Restatements occur when financial reports are discovered not to be consistent with Generally Accepted Accounting Principles (GAAP).[1] Announcements of restatements convey new information, since restating firms experience a significant decline in their market value (e.g., Palmrose et al. [2004]). Furthermore, information is transferred from restating firms to competitors in their industry, because competitors also sustain significantly negative abnormal returns when restating firms announce a restatement (Xu et al. [2006], Kravet and Shevlin [2007], Gleason et al. [2008]). The nature of the information being transferred from restating firms to their competitors at the restatement announcement is currently not well understood. Existing studies link this information transfer to contagion, whereby restatements signal that accounting information in the restating firms' industry is of lower quality than previously thought (Xu et al. [2006], Kravet and Shevlin [2007], Gleason et al. [2008]). We extend our understanding of the information transfer between restating firms and their competitors by proposing a novel explanation for this information transfer.

Specifically, we posit that restatements of financial reports provide new information to competitors about the payoffs of their investment projects. We consider a model where the payoff of a competitor's investment project is unknown. This lack of knowledge can be due to uncertainties about strategic choices of other firms in the competitor's industry and about industry-level demand and cost conditions. A restatement is assumed to be an exogenous signal that conveys information to the competitor about its project's unknown payoff. Restatements of other firms' financial reports are informative for the competitor's investment decision, because financial reports themselves are inputs into this investment decision. Other firms' financial reports can help competitors mitigate uncertainty about demand and cost

[1] Once a firm detects a prior accounting error, it has to disclose (in the period when the error is identified and corrected) both the nature of the error and the effect of its correction (if material) on each financial statement line item and any per share amounts affected. The correction of the prior error implies a "prior-period adjustment" to the beginning balance in retained earnings, as well as a restatement of previously issued financial statements (see APB Opinion No. 20 (APB [1971]), replaced by SFAS No. 154 in 2005 (FASB [2005])).

conditions, since these conditions are interrelated within industries (Mitchell and Mulherin [1996]). Moreover, financial reports can help competitors mitigate uncertainty about other firms' strategic choices, by providing external information about these other firms. Competitors rely on such external information for their strategic decisions, such as pricing and benchmarking (Simmonds [1982], Cardinaels et al. [2004], Maiga and Jacobs [2006]). Financial reports are considered a cost-effective source of other firms' external information (Lord [1996], Palepu et al. [2000]), and are used as such (Simons [1990], Guilding [1999], Guilding et al. [2000]). Accordingly, Moon and Bates [1993] argue that "the published annual report [of another firm] is an excellent source document from which to estimate and extrapolate such data [for strategic decisions] whilst avoiding prohibitive collection costs".

We contend that competitors' investment decisions are affected not only by a firm's financial reports in general, but by the restatement of these financial reports in particular. Extant evidence suggests that restatements release considerable information about restating firms. For instance, Palmrose et al. [2004] document that restating firms sustain mean abnormal returns of about -9% during the two days surrounding the restatement announcement. The majority of restatements involve sales and operating expenses, with sales generally being the most frequently restated account Palmrose and Scholz [2004]. These are core accounts that reflect continuing business activities and are considered particularly salient by financial statement users such as investors, boards of directors and financial analysts (Abarbanell and Lehavy [2002], Lougee and Marquardt [2004], Bushman et al. [2006]). More importantly in our context, information involving core accounts, such sales, market share and costs, is useful to competitors for their strategic decisions (Simmonds [1982], Simons [1990], Guilding [1999], Guilding et al. [2000]). Since the majority of restatements involve core accounts, they likely are informative for competitors' investments.

The preceding discussion suggests that financial reports in general, and restatements of financial reports in particular, provide useful information for a competitor's investment de-

cisions.[2] Accordingly, in our model, a restatement announcement causes the restating firm's competitor to revise its prior beliefs about the unknown payoffs of its investment project, using Bayesian updating. This revision of the competitor's beliefs leads to a subsequent change in its investments. Thus our main hypothesis is that changes in competitors' investments after a restatement announcement are related to the news in the restatement. To test this hypothesis, we consider the competitors of 713 firms that announce restatements between 1997 and 2002, using data from the General Accounting Office (GAO) [2003]. This period is particularly interesting in our setting, because financial reports appear to contain more proprietary information since 1997 when the implementation of SFAS No. 131 led to increasingly detailed segment reporting (FASB [1997], Botosan and Stanford [2005], Berger and Hann [2007]). Many firms worried that the more detailed reporting required by SFAS No. 131 would put them at a competitive disadvantage (Ettredge et al. [2002]). Compared to selected benchmark companies, competitors invest significantly less after restatement announcements. Their average benchmark-adjusted investment decreases by between 3% and 16% in each one of three years after a restatement announcement. To examine whether these changes in competitors' investments are related to news in the restatement, we use three news proxies.

The first news proxy is competitors' abnormal returns at the restatement announcement. If a restatement conveys news about competitors' projects, its announcement leads investors to revise their beliefs about the value of these projects. Consequently, competitors' stock prices at the restatement announcement impound this news. As hypothesized, we find that changes in competitors' investments during the three years after a restatement announce-

[2]Consider WorldCom, which revealed in June 2002 that it overstated net income by $3.8 billion in 2001 and the first quarter of 2002 (Sandberg et al. [2002]). This inflated net income was mostly due to line costs that were erroneously capitalized for $3.055 billion in 2001 and for $797 million in the first quarter of 2002 (WorldCom [2002]). Using the reported WorldCom financial data, other telecommunication companies likely overestimated the value of acquiring additional customers, and overpaid for new customers (Sidak [2003]). WorldCom's restatement announcement in June 2002 revealed that line costs were higher than expected, and thus likely affected the value of its competitors' investments (see also Sadka [2006]). According to William Esrey, Sprint's former chairman and CEO, WorldCom's overstated net income had a substantial impact on industry investment (Cowley [2002]). Similarly, C. Michael Armstrong, the former CEO of ATT, attributed his decision to sell off ATT's cable unit to WorldCom's accounting fraud (Blumenstein and Grant [2004]).

ment are significantly related to their abnormal returns at the restatement announcement. Specifically, when their abnormal returns at the restatement announcement decrease by one standard deviation (2.5%), competitors subsequently lower their investment by 0.85%, which is 5.9% of their mean investment. Our results hold after controlling for other factors that affect competitors' investments, such as external financing, cash, growth options, market share, size, and prior-year performance.

Our next two news proxies are restating firms' abnormal returns at the restatement announcement and the restatement amounts. Consistent with our prediction, changes in competitors' investments during the three years after a restatement announcement are significantly related to restating firms' abnormal returns at the restatement announcement and to the restatement amounts. Moreover, we find that these two measures are better proxies for the news in the restatement about competitors' projects when the economic interdependencies between competitors and restating firms are larger, consistent with the information transfer literature (Pyo and Lustgarten [1990], Frost [1995]). Specifically, subsequent changes in competitors' investments are more strongly related to restating firms' abnormal returns and to the restatement amounts when the correlations between restating firms' and competitors' returns are bigger, and when the restating firms' market shares are higher.

Finally, we analyze which one of our three news proxies is more strongly related to subsequent changes in competitors' investments, and thus constitutes a more powerful proxy for news in restatements about competitors' projects. In a regression of subsequent changes in competitors' investments on the three news proxies, we find that all three news proxies yield significantly positive coefficients, with competitors' abnormal returns having the highest economic and statistical significance. This evidence offers two insights. First, competitors' abnormal returns constitute the most powerful of our three news proxies. Second, competitors' and restating firms' abnormal returns as well as restatement amounts are not equivalent as proxies for the news in the restatement about competitors' projects. Rather, they appear to capture different aspects of this news. Moreover, it is possible that competi-

tors' and restating firms' abnormal returns do not just proxy for the news in the restatement, but provide additional information to competitors beyond the news in the restatement. This conjecture is consistent with the finance literature, which shows that stock markets can provide new information that affects investments (Morck et al. [1990], Chen et al. [2007]).

Overall, our evidence shows that changes in competitors' investments after restatement announcements are significantly related to information released at restatement announcements, consistent with the hypothesis that restatements convey news about competitors' projects. This study is the first to document such a relation, thus adding to a vast information transfer literature in accounting starting with Foster [1981]. Closest to our work are the studies arguing that the information transfer between restating firms and their competitors reflects contagion (Xu et al. [2006], Kravet and Shevlin [2007], Gleason et al. [2008]). Our study offers a novel explanation, and suggests that the information transfer at least partly occurs because restatements have implications for competitors' investments. While this explanation does not preclude restatements from also carrying other information and reflecting contagion, we are careful to control for any contagion effects in our empirical analysis.

The present study also extends an increasing literature showing that financial reports provide incremental information for investments, and affect the allocation of resources in the economy (e.g., Ball and Shivakumar [2005]). The relation between errors in financial reports and investments is not well understood at this point (Healy and Wahlen [1999]), because few papers to date have analyzed it. The first such study uses a theoretical model to link errors in financial reports to competitors' investments via competitors' external financing (Bar-Gill and Bebchuk [2003]). Specifically, errors in financial reports allow low quality firms that end up restating to pool with their high quality competitors that do not restate, so that the cost of external financing falls for restating firms and rises for their competitors. Restating firms then overinvest whereas their competitors underinvest. We extend the work of Bar-Gill and Bebchuk [2003] by abstracting away from external financing. Instead, we contend that errors in financial reports affect competitors' investments directly, since financial reports are one of

competitors' information sources for their investment decisions. We nevertheless recognize that our empirical results could be driven by external financing and therefore use various empirical controls for the impact of external financing on competitors' investments.

The second set of studies links errors in financial reports to competitors' investments via restating firms' real decisions (Sadka [2006], Kedia and Philippon [2007]).[3] Specifically, restating firms make real decisions to hide their intentional fraudulent accounting. Competitors in turn adjust their investments in response to restating firms' real decisions (Sadka [2006]). We add to these papers by considering a different and more immediate link between restating firms' financial reports and their competitors' investments, according to which restating firms' financial reports are a direct input to competitors' investment decisions. We use various measures to empirically control for the strategic relations between competitors and restating firms. Finally, Chen and Lai [2007] analyze vertical information transfers along the supply chain and suggest that customers as well as suppliers in upstream and downstream industries change their investments following a restatement. We extend their work by focussing on competitors in the same industry as restating firms, and not on the customers and suppliers of restating firms.

The rest of this paper is organized as follows. Section 2 develops the hypotheses, Section 3 presents the data, Section 4 discusses the main findings, Section 5 considers sensitivity tests, and Section 6 concludes.

2 Hypotheses development

This section develops our testable hypotheses regarding the link between news in restatements and competitors' investments. These hypotheses are derived from a model that illustrates how restatements influence competitors' investments by providing a signal about

[3]Sadka [2006] develops a theoretical model, using WorldCom to illustrate the model's implications. Kedia and Philippon [2007] also build a model. Furthermore, they empirically analyze the investment and hiring decisions of restating firms and their competitors. They do not link these decisions to news in restatements.

their investments' unknown payoffs, as further described below.

2.1 Model setup

We use a two-period setup to show how restatements affect changes over time in a competitor's optimal investments. A risk-neutral competitor considers investing I_t at the start of both $t = 1$ and $t = 2$. Each investment I_t yields a payoff $\tilde{P}_t = \tilde{p}_t f(I_t)$ at end of period t, where $f(\cdot)$ is a known and concave function. The random variable $\tilde{p}_t$ captures the uncertainty about the payoff of the investment, reflecting the competitor's lack of knowledge about factors such industry-level demand and cost conditions, or strategic choices of other firms in its industry. We assume that $\tilde{p}_t$ is normally distributed as $N(\theta, \sigma_\epsilon^2)$, and can be written as $\tilde{p}_t = \theta + \tilde{\epsilon}_t$, where $\tilde{\epsilon}_t \sim N(0, \sigma_\epsilon^2)$, and $\tilde{\epsilon}_1$ and $\tilde{\epsilon}_2$ are independent. The distinguishing feature of our setup is that the payoff parameter θ is not known. Rather, the competitor has a prior about θ that is normally distributed as $N(\theta_1, \sigma_1^2)$ and reflects its information set Ω_1 at $t = 1$.

The timeline is as follows. The competitor optimally invests I_1^* at the start of $t = 1$, using its prior information Ω_1. At the end of $t = 1$, the project's payoff $\tilde{P}_1$ is realized, and the competitor updates its prior about the unknown payoff parameter θ based on this payoff. Right at the start of $t = 2$, an exogenous restatement $\tilde{r}$ occurs that is informative about θ. The competitor updates its beliefs about θ based on the restatement. The competitor then optimally invests I_2^* at the start of $t = 2$. We analyze how the news about θ in the restatement $\tilde{r}$ affects the change in the optimal investments between $t = 1$ and $t = 2$, $I_2^* - I_1^*$.

The competitor's information set Ω_1 can include information from other firms' finan-

cial reports for two reasons.[4] First, competitors can use other firms' financial reports to mitigate their uncertainty about demand and cost conditions, because these conditions are interrelated to various degrees within industries (Mitchell and Mulherin [1996]). Second, competitors can use other firms' financial reports to mitigate their uncertainty about other firms' strategic choices which in turn affect their own strategic decision-making and control activities.[5] For instance, competitors rely on other firms' financial reports for strategic activities such as pricing (Simmonds [1982]), monitoring other firms' strategic positions via their costs or market shares (Simmonds [1986], Shank and Govindarajan [1988], Bromwich [1990], Ittner and Larcker [1997]), and benchmarking against other firms (Elnathan and Kim [1995], Elnathan et al. [1996], Biers et al. [1999], Cardinaels et al. [2004], Maiga and Jacobs [2006]). Evidence shows that in practice competitors use other firms' published financial reports for strategic decisions (Simons [1990], Guilding [1999], Guilding et al. [2000]).[6]

Competitors' use of other firms' financial reports as an information source for their investment decisions is subject to two qualifications. First, other firms anticipate that competitors rely on their financial reports, and thus consider proprietary concerns in their accounting choices (Choi and Levich [1990], Harris [1998], Berger and Hann [2003], Graham et al. [2005], Botosan and Stanford [2005], Berger and Hann [2007]). Second, financial reports involve

[4]An large theoretical literature argues that financial reports contain proprietary information, or non-proprietary information correlated with the former. References include studies on disclosure starting with Verrecchia [1983], where financial reports provide proprietary information (Dye [1985, 1990]) depending on: the costs of entering the rival's market and prior information (Darrough and Stoughton [1990]), the correlation between non-proprietary and proprietary information (Dye [1986]), the type of information (Gal-Or [1985, 1986], Feltham and Xie [1992], Clinch and Verrecchia [1997], Darrough [1993], Hayes and Lundholm [1996], Richardson [2001]), the type of the competition (Clarke [1983], Gal-Or [1986], Darrough [1993]), financial data aggregation (Feltham et al. [1992], Hayes and Lundholm [1996]), the type of agents interested in disclosure (Wagenhofer [1990], Feltham and Xie [1992], Newman and Sansing [1993], Gigler [1994]), external financing needs (Bhattacharya and Ritter [1983]) and product differentiation (Vives [1984]).

[5]Strategic decision-making and control involves setting strategic objectives, implementing these objectives, monitoring the realized performance against the objectives, and providing feedback on the realized performance (Goold and Quinn [1990], Ittner and Larcker [1997], Guilding et al. [2000]). The role of knowledge about other firms' strategic choices is complicated in more oligopolistic markets where competitors anticipate other firms' strategies. Companies may then have incentives to share information voluntarily in order to collude, or to conceal it. References regarding the role of information in oligopolistic industries include Milgrom and Roberts [1982] and Gal-Or [1986] for cost uncertainty, Vives [1984] and Gal-Or [1985] for demand uncertainty, and Clarke [1983] for both cost and demand uncertainty.

[6]We do not take into account information acquisition costs. Papers considering costly information acquisition for capital budgeting include Harris and Raviv [1996] and Kim [2006].

historical costs and are thus to a large extent backward-looking. In our context, backward-looking information can still be informative for investment decisions if it correlates with post-investment demand and cost conditions, or if it provides strategic information.

Given Ω_1, the value V_1 of the competitor's project at the beginning of $t = 1$ is $V_1 = E_1[-I_1^* + \tilde{p_1} f(I_1^*) - \frac{I_2^*}{1+k} + \frac{\tilde{p_2} f(I_2^*)}{1+k} | \Omega_1] = -I_1^* + \theta_1 f(I_1^*) - \frac{I_2^*}{1+k} + \frac{\theta_1 f(I_2^*)}{1+k}$, where I_t^* denotes the optimal investment in t, θ_1 is the mean of the prior distribution at $t = 1$ for the unknown θ (that is, $E_1[\tilde{p_t}|\Omega_1] = E_1[\theta|\Omega_1] = \theta_1$), and k is the constant risk-adjusted discount rate. We now derive the optimal investment in $t = 1$ in order to show (in the next section) how the change in optimal investments between $t = 1$ and $t = 2$ is affected by the news in the restatement. The optimal investment decision in $t = 1$ is given by $\frac{\partial V_1}{\partial I_1^*} = 0$, which yields $f'(I_1^*) = \frac{1}{\theta_1}$, or $I_1^* = F(\frac{1}{\theta_1})$, where $f'(I_1^*) = \frac{\partial f(I_1^*)}{\partial I_1^*}$ and $F(\cdot)$ is the inverse function of $f'(\cdot)$. Thus, the optimal investment I_1^* in $t = 1$ depends on the competitor's prior θ_1 about θ.

We next derive the competitor's beliefs about the unknown θ at the start of $t = 2$, which reflect its information set Ω_2 before the restatement occurs. After the realization of the investment's payoff $\tilde{P_1}$ at the end of $t = 1$, the competitor updates its prior about θ based on this payoff. The resulting posterior at the beginning of $t = 2$ is normally distributed as $N(\theta_2, \sigma_2^2)$, where $\theta_2 = (1 - z_1)\theta_1 + z_1 p_1$, $z_1 = \frac{\sigma_1^2}{\sigma_\epsilon^2 + \sigma_1^2}$, and $\sigma_2^2 = \frac{\sigma_\epsilon^2 \sigma_1^2}{\sigma_\epsilon^2 + \sigma_1^2}$ (Lee [1989]). The value of the projet at the start of $t = 2$ is then $V_2 = -I_2^* + \theta_2 f(I_2^*)$.

2.2 Learning from restatements

At time $t = \tau$ shortly after the start of $t = 2$ and before the investment I_2^* is made, an exogenous restatement is announced that carries information about the unknown parameter θ.[7] Restatements contain such information on two conditions. First, restatement have

[7]We assume that the restatement announcement is an exogenous signal that does not result from the restating firm's optimal disclosure strategies, since restatements are oftentimes not initiated by the restating firm itself, but by the SEC or the restating firm's external auditor. Existing studies as well as the evidence in Table 3 suggest that between 14% and 25% of the restatements are initiated by the SEC or the FASB, between 5% and 18% by the external auditor, with the remainder being initiated by the restating firm or unattributed (Palmrose et al. [2004], Kravet and Shevlin [2007], Chen and Lai [2007], Gleason et al. [2008]).

implications for the competitors' projects. Existing evidence indicates that restatements provide significant information about restating firms. On average, restating firms in our sample experience abnormal returns of -8.2% during the two days surrounding the restatement announcement, consistent with the literature (Kinney and McDaniel [1989], Dechow et al. [1996], GAO [2002], Palmrose et al. [2004], Xu et al. [2006], Gleason et al. [2008]). The amounts restated are quite large; in our sample they represent on average about 9% of the restating firms' total assets (see also Palmrose and Scholz [2004]). The most commonly restated items are sales and operating expenses, with sales representing about 40% of all restated accounts (Palmrose and Scholz [2004], Kravet and Shevlin [2007], Gleason et al. [2008], Wilson [2008]). Sales and operating expenses are core accounts that embody continuing and repetitive business activities and likely persist into the future (Lev [1983], Penman [2004]). Core accounts yield stronger investor reactions than non-core accounts (Kormendi and Lipe [1987], Easton and Zmijewski [1989], Elliott and Hanna [1996]), are more intensively used in executive pay contracts (Natarajan [1996], Baber et al. [1998], Bushman et al. [2006]), are the central focus of financial analysts' activity (Abarbanell and Lehavy [2002]), and may explain companies' pro forma earnings releases (Bradshaw and Sloan [2002], Bhattacharya et al. [2003], Lougee and Marquardt [2004]). Furthermore, within core accounts, sales yield a stronger investor reaction than expenses (Ertimur et al. [2003]). Users of financial reports thus appear to attach particular attention to core items, especially to revenues. More importantly in our context, information involving other firms' core accounts, such as sales, return on sales, costs and market shares, is used by competitors for their strategic decision-making and control activities (Simmonds [1982], Simons [1990], Guilding [1999], Guilding et al. [2000]). Since restatements for the most part involve core accounts, they likely matter for the investment decisions of restating firms' competitors.

Second, the restatement is not perfectly expected and entirely captured by the prior information set Ω_2 at the beginning of $t = 2$. The literature suggests that this condition holds. Restating firms and their competitors generally experience negative abnormal returns

at the restatement announcement (Palmrose et al. [2004], Xu et al. [2006], Kravet and Shevlin [2007], Gleason et al. [2008]). Moreover, financial analysts and institutional investors do not appear to fully anticipate restatements (Griffin [2003], Hribar et al. [2005]). The only group of investors able to predict restatements are insiders and short-sellers (Dechow et al. [1996], Desai et al. [2002], Griffin [2003], Efendi et al. [2005]).

Let the public restatement $\tilde{r}$ thus constitute a noisy signal about the unknown payoff parameter θ, $\tilde{r} = \gamma\theta + \tilde{e}$. The known parameter γ captures the impact of θ on the restatement, which depends on economic factors such as the interdependencies between restating firms and their competitors, as well as on accounting factors, such as conservatism and the restated accounts (Dye and Sridhar [2004]). The random variable $\tilde{e}$ is noise that is unrelated to θ, not separably observable from θ, independent from $\tilde{\epsilon_t}$, and normally distributed as $N(0, \sigma_e^2)$. The competitor uses the observed restatement to update its beliefs about the unknown payoff parameter θ, leading to a posterior that is normally distributed as $N(\theta_\tau, \sigma_\tau^2)$, where $\theta_\tau = (1 - z_\tau)\theta_2 + z_\tau \frac{r}{\gamma}$, $z_\tau = \frac{\sigma_2^2}{\frac{\sigma_e^2}{\gamma^2} + \sigma_2^2}$, and $\sigma_\tau^2 = \frac{\frac{\sigma_e^2}{\gamma^2}\sigma_2^2}{\frac{\sigma_e^2}{\gamma^2} + \sigma_2^2}$ (see Appendix A for the derivation). The value of the project at the start of $t = 2$, after the restatement, is $V_\tau = -I_2^* + \theta_\tau f(I_2^*)$.

The optimal investment in $t = 2$ is $I_2^* = F(\frac{1}{\theta_\tau})$ and depends on the competitor's posterior mean θ_τ about the unknown payoff parameter θ. The change in optimal investments between $t = 2$ and $t = 1$ is then:

$$\Delta I^* = I_2^* - I_1^* \quad = \quad F(\frac{1}{(1 - z_\tau)\theta_2 + z_\tau \frac{r}{\gamma}}) - F(\frac{1}{\theta_1}). \tag{1}$$

Equation (1) shows that the change over time in optimal investments ΔI^* is affected by two pieces of news. The first piece is the news about the unknown payoff parameter θ in the realized payoff at the end of $t = 1$, which leads the competitor to update its beliefs about θ from θ_1 in $t = 1$ to θ_2 at the start of $t = 2$. The second piece is the news about θ in the restatement at the beginning of $t = 2$, which causes the competitor to update its beliefs about θ from θ_2 at the start of $t = 2$ to θ_τ shortly thereafter. Equation (1) shows that if the

restatement conveys news that leads the competitor to update its beliefs about the payoff of its investment project, then the change in optimal investments ΔI^* is affected by this news in the restatement. Our main testable implication is therefore that changes in competitors' investments after the restatement announcement are related to news in the restatement. The next section discusses our three empirical news proxies and develops testable predictions.

2.3 News proxies

Our three news proxies are: competitors' abnormal returns at the restatement announcement, restating firms' abnormal returns at the restatement announcement, and the restatement amounts, as explained further below.

2.3.1 Competitors' abnormal returns

We rely on five assumptions to discuss our first news proxy: (1) the competitor and investors have the same information set Ω_2 before the restatement announcement, (2) the competitor and investors have the same learning process about the unknown payoff parameter θ, (3) the competitor and investors have the same information set Ω_τ after the restatement announcement, (4) the competitor has no projects other than the investments I_t in $t = 1$ and $t = 2$, and (5) there are no other news before the competitor invests I_2^* in $t = 2$ after the restatement announcement. When the restatement conveys news about the competitor's project, investors revise their beliefs about the value of this project, based on their updated posterior $N[\theta_\tau, \sigma_\tau^2]$. Given our five assumptions above, the change in the competitor's value at the restatement announcement then reflects this revision in investors' belief, if markets are efficient. We thus use competitors' abnormal returns at the restatement announcement as our first news proxy.

We make no prediction for the sign of the relation between the change in the competitor's investments ΔI^* as given by equation (1) and our first news proxy. This relation depends on various factors, such as nature of the information conveyed by the restatement and the

investment function $f(\cdot)$, and can be positive or negative.[8] As an example, consider a restatement signaling to the competitor that raising the investment in $t = 2$, compared to the investment in $t = 1$, is optimal and enhances firm value. The increase in investments between $t = 2$ and $t = 1$ is then accompanied by positive abnormal returns. However, it is possible that the news is such that reducing the investment in $t = 2$, compared to the investment in $t = 1$, is optimal and enhances firm value. The competitor's positive abnormal returns are then accompanied by a decrease in investments between $t = 2$ and $t = 1$.

The assumptions made at the start of this section may not hold, for four reasons. First, we ignore the market structure, which may impact the competitor's abnormal returns at the restatement announcement (Chamley [2004]). Second, competitors and investors may not have the same information set before and after the restatement announcement, nor learn from this announcement in a similar fashion. Third, the competitor's returns may reflect news not only about its investment projects, but also about other factors, such as the quality of its financial reports (Xu et al. [2006], Kravet and Shevlin [2007], Gleason et al. [2008]). Fourth, the competitor may have projects other than the two investments in $t = 1$ and $t = 2$. If the assumptions do not hold, then the competitor's abnormal returns measure the news in the restatement about its projects with error. This implies that the slope coefficient in a regression of scaled changes in competitors' investments on competitors' abnormal returns is biased away from its true value.[9] Our first testable hypothesis is as follows.

Hypothesis 1. Ceteris paribus, the scaled changes in competitors' investments following restatement announcements are related to competitors' abnormal returns at the restatement

[8]The change in the competitor's value ΔV_τ^C at the restatement announcement is $\Delta V_\tau^C = (-I_2^* + I_1^*) + (-I_1^* + E_2[I_2^*]) + \theta_\tau f(I_2^*) - \theta_2 f(E_2[I_2^*])$. The first two terms in this expression, $-I_2^* + I_1^*$, are the change the actual investments between $t = 2$ and $t = 1$, and correspond to the (negative of the) change in the competitor's optimal investments in equation (1). The second two terms, $-I_1^* + E_2[I_2^*]$, are the change between the actual investment in $t = 1$ and the investment in $t = 2$ before the restatement announcement, as expected by investors. The last two terms, $\theta_\tau f(I_2^*) - \theta_2 f(E_2[I_2^*])$, reflect the change in the investment's expected payoff between $t = \tau$ and $t = 2$ before the restatement announcement. The sign of the relation between the change in the competitor's investments ΔI^* and the change in its value ΔV_τ^C thus depends on the covariance between ΔI^* and the various terms in ΔV_τ^C, which can be positive or negative.

[9]If the error in our news proxy is independent from the news in the restatement about competitors' investments, then the slope coefficient is biased towards zero.

announcements.

2.3.2 Restating firms' abnormal returns

The change in the restating firm's value at the restatement announcement can be related to the change in the competitor's value via the covariance between the competitor's cash flows and the restating firm's earnings, as follows: $\Delta V_\tau^C = \frac{\sigma_{RC}}{\sigma_R^2} \Delta V_\tau^R$, where σ_{RC} is the covariance between the restating firm's earnings and the competitor's cash flows, and σ_R^2 is the variance of the restating firm's earnings (see also Pyo and Lustgarten [1990]).

We argue in the previous section that the change in the competitor's value ΔV_τ^C reflects news in the restatement about its projects. The extent to which the change in the restating firm's value ΔV_τ^R proxies for the news in the restatement about the competitor's projects then depends on the covariance σ_{RC} between the restating firm and the competitor. All else being equal, when this covariance is higher, the relation between the competitor's and the restating firm's change in value at the restatement announcement is stronger. Restating firm's abnormal returns then are a better proxy for the news in the restatement about the competitor's projects.

Restating firms' abnormal returns thus measure news in the restatement about competitors' investments with error, since they do not consider the covariance between the competitor and the restating firm. We discuss the effect of the covariance below, in Section 2.3.4. An error in the news proxy affects the estimated slope coefficient in a regression of scaled changes in competitors' investments on restating firms' abnormal returns, and biases it away from its true value. In the absence of errors, we do not make a prediction for the sign of this slope coefficient, because this sign depends on the covariance between the change in the competitor's investments ΔI^* and $\frac{\sigma_{RC}}{\sigma_R^2} \Delta V_\tau^R$, which can be positive or negative, as discussed in Section 2.3.1. We thus obtain our second testable hypothesis.

Hypothesis 2. Ceteris paribus, the scaled changes in competitors' investments following

restatement announcements are related to restating firms' abnormal returns at the restatement announcements.

2.3.3 Restatement amounts

Equation (1) shows that the change in the competitor's investments is related to the restatement amount r. The form of this relation depends on four other factors: (1) the marginal effect γ of the unknown payoff parameter θ on the restatement amount, (2) the weight z_τ assigned to the restatement amount in the learning process, (3) the form of the investment function $f(\cdot)$, and (4) the priors θ_1 and θ_2 for the unknown payoff parameter θ. Depending on the values of these four factors, the relation between the change in the competitor's investments and the restatement amount can be positive or negative. We thus do not make a prediction about the sign of this relation, so that our third hypothesis obtains.

Hypothesis 3. Ceteris paribus, the scaled changes in competitors' investments following restatement announcements are related to restatement amounts.

2.3.4 Cross-sectional predictions

Our discussion above suggests that changes in the competitor's investments are more strongly related our two news proxies based on restating firms (i.e. the restating firms' abnormal returns and the restatement amounts) when there are more interdependencies between restating firms and their competitors. Regarding the restating firm's abnormal returns, more interdependencies imply a larger covariance between the restating firm and its competitor. Our discussion in Section 2.3.2 suggests that a restating firm's abnormal returns are then more likely to capture news in the restatement about the competitor's projects. Regarding the restatement amount, recall that its link to the changes in the competitor's investments depends on four factors, including the marginal effect γ of the unknown θ on the restatement amount. All else being equal, when the interdependencies between the restating firm and its competitor are larger, this marginal effect γ likely is higher too. As a result, the restatement

amount reflects more information about the competitor's projects.

Empirically, we use two measures for the interdependencies between the restating firm and its competitor. The first one is the correlation between the restating firm and its competitor. The interdependencies between the restating firm and its competitor are larger when competitors and restating firms are more correlated. The evidence in Pyo and Lustgarten [1990] and Bannister [1994] suggests that this correlation is generally positive. We use competitors' and restating firms' raw returns in the fiscal year before the year of the restatement announcement to measure their correlation. Our fourth testable hypothesis follows.

Hypothesis 4. Ceteris paribus, the relation between the scaled changes in competitors' investments following restatement announcements and restating firms' abnormal returns as well as restatement amounts is stronger when competitors' and restating firms' returns are more correlated.

Next, we consider the restating firm's market share as a measure of the interdependencies between the restating firm and its competitor. Industries where restating firms have a higher market share may be more concentrated, so that companies in these industries are more homogenous, and interdependencies between the restating firm and its competitors are higher (Foster [1981], Frost [1995]). This effect is however offset by the fact that the restating firm's market share influences its disclosure incentives through proprietary costs, although in a theoretically ambiguous manner.[10] Empirically, extant studies suggest that restating firms with a higher market share disclose less proprietary information (Harris [1998], Botosan and Stanford [2005]), thus making is less likely that their restatements contain news about competitors' projects. Given these two offsetting effects, we do not predict a sign for the impact of restating firms' market shares on the link between the change in competitors'

[10]Proprietary costs may be higher when the restating firm's market share is lower and the number of competitors is higher. Alternatively, proprietary costs may be higher when the restating firm's market share is higher and rents are larger. Models predicting less disclosure when proprietary costs are higher include Verrecchia [1983], Dye [1985], Darrough and Stoughton [1990], Darrough [1993], Wagenhofer [1990], Feltham and Xie [1992], Newman and Sansing [1993], Hayes and Lundholm [1996], and Richardson [2001]. Models predicting more disclosure when proprietary costs are higher include Darrough and Stoughton [1990], Newman and Sansing [1993], and Gigler [1994].

investments and our two news proxies based on restating firms. Our fifth testable hypothesis obtains.

Hypothesis 5. Ceteris paribus, the relation between the scaled changes in competitors' investments following restatement announcements and restating firms' abnormal returns as well as restatement amounts depends on restating firms' market shares.

3 Sample

Table 1 details the sample selection. Data on restatements are obtained from the General Accounting Office from January 1, 1997 through June 30, 2002 (GAO [2003]). The GAO focusses on restatements due to accounting irregularities, such as "aggressive" accounting practices, intentional and unintentional misuse of facts applied to financial statements, oversight or misinterpretation of accounting rules, and fraud. The GAO database contains 916 restatement announcements by 839 firms. We do not consider restatements beyond 2002 since we measure competitors' investments over various intervals, such as three years, after a restatement announcement. Accounting data are from COMPUSTAT, and stock price data from CRSP. Eliminating observations without information on COMPUSTAT or CRSP leaves 836 restatements by 758 firms. Instances where firms modify their fiscal year end during the restatement year are also excluded, which results in a final sample of 785 restatements by 713 firms.

Table 2 presents the number and percentage of the 785 restatements by 2-digit SIC industry. The highest percentage of restatements occurs in the following industries: Business Services (17.58%); Industrial And Commercial Machinery And Computer Equipment (7.64%); Electronic And Other Electrical Equipment And Components, Except Computer Equipment (7.01%). Table 3 shows descriptive statistics for the restatements. Our findings are consistent with the evidence in the literature (Palmrose et al. [2004], Kravet and Shevlin [2007], Gleason et al. [2008]). Panel A indicates that the number of restatements has steadily

increased between 1997 and 2002. Panel B shows that about 14% of the sample restatements are initiated by the SEC or some other agency, 7% by the auditor, and 42% by the restating firm, with the remaining being largely unattributed. The accounts most frequently restated involve revenues (38.85%), followed by restructuring, assets and inventory (13.63%), as well as expenses (12.48%). Restatements thus frequently implicate core accounts. Furthermore, the data suggest that SAB 101 "Revenue Recognition in Financial Statements", issued in December 1999, plays a role in our sample restatements, since restatements become more numerous after 1999, and involve many firms in the Business Services' industry. We control for any time effects due to regulations such as SAB 101 in our empirical analysis.

All companies in the same fiscal year and 4-digit industry as a restating firm are retained as competitors for that particular restating firm and restatement announcement date. The restating firms themselves are excluded, so that there are no restating firms amongst the competitors. This procedure results in a final competitor sample of 73,667 firm-years (8,500 firms) on the 4-digit SIC level.

4 Results

We start by providing descriptive statistics on changes in competitors' investments around the restatement announcement, and on our three proxies for the news in the restatement. Then we examine whether the changes in competitors' investments following restatement announcements are related to the news proxies. Moreover, we analyze cross-sectional variation in the extent to which our two proxies based on restating firms capture news in the restatement about competitors' projects. Finally, we investigate which one of the three news proxies is most strongly related to changes in competitors' investments.

4.1 Descriptive statistics

4.1.1 Changes in competitors' investments

We examine whether competitors show systematic changes in their investments for the five years before the restatement announcement (year -5 to year -1), the year of the restatement announcement (year 0), and the five years after the restatement announcement (year 1 to year 5) in Table 4. In our discussion, we focus on the years after the restatement announcement; the preceding years are included for comparison in Table 4. We use two measures for competitors' investments. The first one is the raw scaled annual change in a competitor's investment I between fiscal years $t-1$ and t, $\frac{I_t - I_{t-1}}{I_{t-1}}$. Investment I is capital expenditure (COMPUSTAT #128) plus R&D expense (COMPUSTAT #46), scaled by prior-year total assets (COMPUSTAT #6), following Baker et al. [2003] and Chen et al. [2007]. Our second measure is the benchmark-adjusted scaled annual change in a competitor's investment, defined as the difference between raw scaled annual change in investment for a competitor and its benchmark firm. The benchmark-adjusted change controls for the normal change in a competitor's investment, absent any news in restatements about its projects. Our choice of benchmark firms is complicated by the fact that competitors are in the same 4-digit industry as restating firms. We thus are not able to rely on the traditional approach of using benchmark firms in the same industry as restating firms, since, by definition, these benchmark firms would be competitors. Benchmark firms are therefore those firms that belong to 4-digit industries without a restatement in our sample period of 1997 to 2002. This choice of benchmark firms is problematic, because benchmark firms operating in different industries are inherently distinct from competitors. Industries without restatements may attract more capital if investors shift their funds away from industries with restatements. The multivariate analysis in Section 4.2 addresses this concern by controlling for the competitors' ability to raise external financing.

Panel A (Panel B) of Table 4 shows the raw (benchmark-adjusted) changes in competitors' investments. Column (3) of Panel A indicates that mean competitor investment increases

by 12.7% in year 0, decreases by 4.3% in year 1, and rises again by 2.5% in year 2, and declines by 15.0% in year 3. As Panel B shows, benchmark firms increase their investments during those years, and do so to a larger extent than competitors. Accordingly, the mean benchmark-adjusted change in competitors' investments is significantly negative at −5.6% in year 0, −5.2% in year 1, −2.6% in year 2 and −16.2% in year 3. The findings for the medians confirm that competitors experience declining investments starting in year 0 compared to benchmark firms. Hence, relative to benchmark firms, competitors of restating firms appear to significantly lower their investments after restatement announcements. This result is consistent with our argument that competitors modify their investments as a result of news in restatements. We provide a formal test of our argument in Section 4.2.

4.1.2 News in the restatement

Table 5 provides descriptive statistics for the three news proxies: (1) competitors' abnormal returns at the restatement announcement $CAR_{i,-\tau,+\tau}$, (2) restating firms' abnormal returns at the restatement announcement $CAR_{j,-\tau,+\tau}$, and (3) the restatement amount $Restat_{j,t}$. The restatement announcement day is obtained from the GAO [2003]. Abnormal returns are market-adjusted returns, based on the CRSP equally-weighted market index. Market-adjusted returns are used because competitors are generally associated with more than one restatement announcement, which are oftentimes no more than two weeks apart. The CAPM or the Fama-French three-factor model parameters are therefore difficult to estimate out of sample. The market-adjusted model has the same ability as the CAPM or the Fama-French three-factor model to detect abnormal returns (Brown and Warner [1985], Kothari and Warner [1997]).

Both Panel A and Panel B of Table 5 confirm that restatements announcements convey news to investors, since competitors' and restating firms' cumulative abnormal returns are significantly negative, as in the literature (Palmrose et al. [2004], Xu et al. [2006], Kravet and Shevlin [2007], Gleason et al. [2008]). For example, during the three days $[-1, +1]$

around the restatement announcement, competitors' mean cumulative abnormal returns are -0.34% (Patell $Z = -8.80$). This translates into an aggregate loss of about 581 million U.S. dollars.[11] Restating firms experience mean cumulative abnormal returns of -8.28% (Patell $Z = -8.16$) during $[-1, +1]$, implying an aggregate loss of about 141 million U.S. dollars, which is about 25% of the competitors' aggregated loss. Finally, Panel C provides descriptive statistics on the restatement amount scaled by prior-year total assets (COMPUSTAT #6). Data on restatement amounts are hand-collected from restatement announcements obtained via Lexis Nexis. Starting with the 785 sample firm-years, we identify restatement amounts for 634 firm-years. The average restatement is -9.15% of prior-year assets.

4.2 Changes in investments and restatement news

This section tests whether changes in competitors' investments following restatement announcements are related to the three news proxies, using the following setup:

$$\Delta I_{i,p} \quad = \quad \beta News + \Gamma' C + FixedEffects + \varepsilon_{i,p}, \tag{2}$$

where $\Delta I_{i,p}$ is the scaled change in a competitor's investments following the restatement announcement, $\frac{I_{i,P} - I_{i,P-1}}{I_{i,P-1}}$. Period P $(P-1)$ refers to the three years $+1$, $+2$, $+3$ after (the three years -1, -2, -3 before) year 0 of the restatement announcement. The variable $I_{i,P}$ $(I_{i,P-1})$ is average investment during period P $(P-1)$. We measure average investment over three years because investment may take time to react to news, as suggested by Table 4. Investment I is as defined in Section 4.1.1. The variable $News$ captures news in the restatement, based on the three news proxies: (1) competitors' abnormal returns at the restatement announcement, $CAR_{i,-\tau,+\tau}$, (2) restating firms' abnormal returns at the restatement announcement, $CAR_{j,-\tau,+\tau}$, and (3) the restatement amount $Restat_{j,t}$, as defined in Section 4.1.2. The period $[-\tau, +\tau]$ is either $[-1, +1]$ or $[-5, +5]$. According to

[11] The 581 million dollar loss is obtained by multiplying each competitor's market value at the beginning of $\tau = -1$ with that competitor's abnormal returns between $\tau = -1$ and $\tau = +1$. The resulting dollar change in the market value per competitor is then summed across all competitors in the sample.

Hypotheses 1, 2, and 3, changes in competitors' investments $\Delta I_{i,p}$ following restatement announcements are related to their abnormal returns $CAR_{i,-\tau,+\tau}$, to restating firms' abnormal returns $CAR_{j,-\tau,+\tau}$, and to restatement amounts $Restat_{j,t}$. Hence, we test the null that $\beta = 0$ against the alternative that $\beta \neq 0$.

The vector C captures factors other than news in the restatement that affect changes in competitors' investments, and the vector Γ represents the estimated slope coefficients on these factors. To address the concern that changes in competitors' investments are driven by contagion, external financing or the strategic relation between restating firms and competitors, we explicitly control for contagion and external financing, using $Hazard_{i,P}$ and $\Delta ExtFin_{i,p}$, as well as for the strategic relation between restating firms and competitors, using $\Delta MS_{i,p}$. All controls are explained in the list below (where averages are used for periods P and $P-1$) and detailed in Appendix B.

- The likelihood that a competitor restates, $Hazard_{i,P}$, directly controls for contagion, since competitors with lower quality accounting information are more likely to restate. Contagion can influence competitors' investments through two channels. First, a competitor with lower quality accounting information may have a higher cost of external financing (Hribar and Jenkins [2004], Kravet and Shevlin [2007]), and thus invest less. Second, a competitor with lower quality accounting information may make real decisions that allow it to hide this low quality accounting information (Sadka [2006], Kedia and Philippon [2007]). $Hazard_{i,P}$ is the estimated probability that a competitor restates its financial reports in P. This probability is obtained from a probit model with the following explanatory variables.
  - The quality of corporate governance. A competitor with lower quality corporate governance is more likely to restate (Kedia and Philippon [2007]). Governance scores come from Gompers et al. [2003], and the original data are from the Institutional Investor Research Center (IIRC).
  - Competitor size, defined as the natural logarithm of total assets (COMPUSTAT

#6). A larger competitor may be more likely to restate because of size-related agency problems.

- Competitor growth, measured by Tobin's Q and defined as total assets (COMPUSTAT #6) plus market value of equity (COMPUSTAT #24 × COMPUSTAT #199) minus book value of equity (COMPUSTAT #60), all scaled by total assets. A competitor may rely on more aggressive accounting practices when its investment growth potential is lower.
- A dummy variable that equals 1 if the competitor's restatement is not the first restatement in its industry, and 0 otherwise. A competitor's financial reports may be subject to higher scrutiny once a restatement has occurred in its industry.
- The change in the dispersion of analysts' forecasts for restating firms' one year ahead earnings during the 45 days after the restatement announcement. The change in the dispersion of analysts' forecasts captures increased uncertainty.

We include 4-digit industry and year fixed effects, and estimate the probit regression on a company level between 1996 and 2002. The estimated coefficients on the following explanatory variables are significant and positive: the competitor's size, the dummy variable that equals 1 if it is not the first restatement in the 4-digit industry and 0 otherwise, and the change in the dispersion of analysts' forecasts. We use the regression's fitted values turned into probabilities as the estimated probability of a restatement.

- The change in a competitor's external financing, $\Delta ExtFin_{i,p}$, can affect its investments, since a competitor raising more external financing is more likely to have the necessary capital for investments. Changes in external financing can be due to various factors, such as market timing (Baker and Wurgler [2002]) and restatements in the industry (Hribar and Jenkins [2004], Kravet and Shevlin [2007]). $\Delta ExtFin_{i,p}$ is the scaled change in the external financing, $\frac{ExtFin_{i,P}-ExtFin_{i,P-1}}{ExtFin_{i,P-1}}$. External financing $ExtFin_{i,P}$ is the sum of equity issues and debt issues in P, divided by total assets (COMPUSTAT #6) in $P-1$, following Baker et al. [2003]. Equity issues in P is the change in

book equity (COMPUSTAT #60) between $P-1$ and P minus the change in retained earnings (COMPUSTAT #36) between $P-1$ and P. Debt issues in P is the change in assets (COMPUSTAT #6) between $P-1$ and P, minus the change in book equity (COMPUSTAT #60) between $P-1$ and P.

- The change in a competitor's cash, $\Delta Cash_{i,p}$, can affect its investments in two ways. First, a competitor with more cash faces fewer liquidity constraints for investments, since it needs less external financing, especially if it has financing constraints (Fazzari et al. [1988]). Second, a competitor with more cash may have higher agency costs of free cash flows, and overinvest. $\Delta Cash_{i,p}$ is the scaled change in the cash, $\frac{Cash_{i,P}-Cash_{i,P-1}}{Cash_{i,P-1}}$. Cash is net income (COMPUSTAT #18) plus depreciation and amortization (COMPUSTAT #14), scaled by prior-year total assets (COMPUSTAT #6).

- The change in a competitor's Tobin's q, $\Delta Q_{i,p}$, is included because stock prices reflect the marginal product of capital, and can thus affect investment (Tobin [1969]). $\Delta Q_{i,p}$ is the scaled change in Tobin's q, $\frac{Q_{i,P}-Q_{i,P-1}}{Q_{i,P-1}}$. Following Chen et al. [2007], Q is total assets (COMPUSTAT #6) plus market value of equity (COMPUSTAT #24 $\times$ COMPUSTAT #199) minus book value of equity (COMPUSTAT #60), all scaled by total assets.

- The change in a competitor's market share, $\Delta MS_{i,p}$, may impact its investments because it reflects changes in the strategic relation between the competitor and the restating firm as well as changes in the competitor's investment opportunities (Jaffe [1986], Smit and Ankum [1993]). Furthermore, competition affects agency costs and uncertainty about economic conditions (Karuna [2007]), both of which can influence investment. $\Delta MS_{i,p}$ is the scaled change in market share, $\frac{MS_{i,P}-MS_{i,P-1}}{MS_{i,P-1}}$. Market share is the ratio of the competitor's sales (COMPUSTAT #12) to the sales of its 4-digit SIC industry.[12]

[12]Using COMPUSTAT data is problematic to calculate market shares, because COMPUSTAT only considers public companies and exclude private companies. The Census Bureau has market share data for both public and private firms. However, we cannot use Census Bureau data, because they are reported only every five years, and so we are not able to compute changes in market shares.

- The change in a competitor's size, $\Delta Size_{i,p}$, may influence its investments because of factors such as empire-building and diversification (Jensen [1986], Stein [2003]). Furthermore, a larger competitor is less likely to be affected by information asymmetry problems and has easier access to capital. $\Delta Size_{i,p}$ is the scaled change in size, $\frac{Size_{i,P}-Size_{i,P-1}}{Size_{i,P-1}}$. Size is the natural logarithm of total assets (COMPUSTAT #6).

- Competitor stock price performance prior to a restatement announcement can influence its investments because a competitor may time the market when raising capital and because stock prices reflect investment opportunities (Baker and Wurgler [2002], Baker et al. [2003]). Stock price performance is defined as buy-and-hold returns over the 120 days preceding the restatement announcement, $BH_{i,120}$.

Finally, we include company and year fixed effects (in $FixedEffects$) to control for unobservable company and time characteristics. Reported standard errors are clustered by 4-digit industry to account for potential within-industry error correlation, and are robust to heteroscedasticity. Descriptive statistics for the variables in regression (2) are shown in Table 6 and correlation coefficients in Table 7. Changes in competitors' investments $\Delta I_{i,p}$ are significantly correlated with the three news proxies.

The results from estimating equation (2) are shown in Table 8. Columns (1) and (2) consider competitors' abnormal returns at the restatement announcement, $CAR_{i,-\tau,+\tau}$. Columns (3) and (4) focus on restating firms' abnormal returns at the restatement announcement, $CAR_{j,-\tau,+\tau}$. Column (5) centers on restatement amounts, $Restat_{j,t}$. The evidence is consistent with our first three hypotheses: changes in competitors' investments after restatement announcements are significantly positively related to the three news proxies. For instance, in column (1), which shows the results for competitors' abnormal returns cumulated during $[-1,+1]$, the coefficient β on the new proxy is 0.338 (t-statistic of 4.11). Economically, a decrease in competitors' abnormal returns by one standard deviation (which is 0.025, from Table 6) is accompanied by a subsequent decline in competitors' investments of 0.85%

$(= -0.025 \times 0.338)$, which is 5.9% of the mean change in competitor investment of 14.4%. Overall, the evidence in Table 8 supports our argument that restatements contain news that cause competitors to subsequently modify their investments.

Our results hold after controlling for other factors that impact competitors' investments, especially contagion and external financing (captured by $Hazard_{i,P}$ and $\Delta ExtFin_{i,p}$). The evidence shows that competitors invest more when they are less likely to restate, their external financing rises, their cash growth is higher, and they have more investment opportunities (as captured by $\Delta Q_{i,p}$).

4.3 Cross-sectional variation

We argue in Hypotheses 4 and 5 that the two proxies based on restating firms are more likely to reflect news in the restatement about competitors' projects if the interdependencies between restating firms and competitors are higher. We capture these interdependencies using the correlation between competitors and restating firms, and the restating firms' market shares. We test the two hypotheses using the following setup:

$$\begin{aligned} \Delta I_{i,p} &= \beta_1 News_R + \beta_2 News_R Corr_{i,j,t-1} + \beta_3 News_R MS_{j,t-1} \\ &\quad + \beta_4 Corr_{i,j,t-1} + \beta_5 MS_{j,t-1} + \Gamma' C + FixedEffects + \varepsilon_{i,p}. \end{aligned} \tag{3}$$

The variable $News_R$ is either restating firms' abnormal returns $CAR_{j,-\tau,+\tau}$, or the restatement amounts $Restat_{j,t}$. The variable $Corr_{i,j,t-1}$ is the correlation between competitors' and restating firms' daily raw returns during the year preceding the restatement announcement year. Panel C of Table 6 shows that competitors' and restating firms' returns have an average correlation of 0.117. We predict in Hypothesis 4 that as this correlation increases, changes in competitors' investments $\Delta I_{i,p}$ are more strongly related to the two news proxies in $News_R$. This implies that $\beta_2 > 0$ if $\beta_1 > 0$ and $\beta_2 < 0$ if $\beta_1 < 0$. For both restating firms' abnormal returns and the restatement amounts, we make no prediction about the sign of β_1,

and hence no prediction for β_2. We therefore test whether $\beta_2 = 0$ against the alternative that $\beta_2 \neq 0$. The variable $MS_{j,t-1}$ captures a restating firm's market share in its 4-digit industry, measured using sales (COMPUSTAT #12). Restating firms make up on average 0.6% of their industry's sales, according to Table 6. Hypothesis 5 predicts that this market share affects the link between changes in competitors' investments and the two news proxies in $News_R$. We thus test whether the null that $\beta_3 = 0$ against the alternative that $\beta_3 \neq 0$. All other variables are defined as in equation (2).

The results are presented in Table 9. Columns (1) through (3) include only $Corr_{i,j,t-1}$, columns (4) through (6) consider $MS_{j,t-1}$ alone, and columns (7) through (9) incorporate both $Corr_{i,j,t-1}$ and $MS_{j,t-1}$. While our findings are similar across all columns, we focus on column (7), where the news proxy is $CAR_{j,-1,+1}$. First, we consider the effect of the correlation $Corr_{i,j,t-1}$. Consistent with Hypothesis 4, the coefficient β_2 on the interaction term $News_R Corr_{i,j,t-1}$ is significantly positive at 0.177 (t-statistic of 2.07). Economically, when the correlation $Corr_{i,j,t-1}$ increases by one standard deviation, the sensitivity of competitors' investments to restating firms' abnormal returns $CAR_{j,-1,+1}$ rises by about 45%.[13] Next, we turn to the effect of restating firms' market share $MS_{j,t-1}$. Consistent with Hypothesis 5, the coefficient β_3 is significantly different from zero, at 0.144 (t-statistic of 1.97). Economically, when restating firms' market shares rise by one standard deviation, the sensitivity of competitors' investments to restating firms abnormal returns increases by about 62%.[14] Overall, this evidence indicates that when the correlations between restating firms and their competitors are larger and restating firms' market shares higher, changes in competitors' investments are more strongly related to the two news proxies in $News_R$. The correlations between competitors and restating firms as well as the restating firms' market shares thus

[13] At the average correlation between restating firms and their competitors of $Corr_{i,j,t-1} = 0.117$ and at the average restating firms' market share of $MS_{j,t-1} = 0.006$ (from Table 6), competitors' investment has a sensitivity of $0.011 + 0.177 \times 0.117 + 0.144 \times 0.006 = 0.033$ to restating firms' abnormal returns $CAR_{j,-1,+1}$. When the correlation between competitors and restating firms increases by one standard deviation to $0.117 + 0.083 = 0.200$, the sensitivity of competitors' investments to restating firms' abnormal returns $CAR_{j,-1,+1}$ rises to $0.011 + 0.177 \times 0.200 + 0.144 \times 0.006 = 0.047$.

[14] When the market share rises by one standard deviation from its average of 0.006 to $0.006 + 0.140 = 0.146$, the sensitivity of competitors' investments to restating firms' abnormal returns increases from 0.033 to $0.011 + 0.177 \times 0.117 + 0.144 \times 0.146 = 0.053$.

affect the extent to which $News_R$ captures news in restatements about competitors' projects.

4.4 Horserace regressions

We examine the relative performance of each one of the three news proxies, using the following regression.

$$\begin{aligned} \Delta I_{i,p} &= \beta_1 CAR_{i,-5,+5} + \beta_2 CAR_{j,-5,+5} + \beta_3 Restat_{j,t} + \Gamma' C \\ &\quad + FixedEffects + \varepsilon_{i,p}, \end{aligned} \tag{4}$$

where all variables are defined as in equation (2). For brevity, we display the results for cumulative abnormal returns measured over the $[-5, +5]$ interval; the findings are similar when we focus on the $[-1, +1]$ interval.

Table 10 shows the findings. We focus on column (4) which includes all three news proxies, and provides two insights. First, competitors' and restating firms' abnormal returns as well as the restatement amounts are significantly positively related to competitors' subsequent investments. Our three news proxies thus appear to capture not the same but different information about the restatement. It is in fact possible that competitors' and restating firms' abnormal returns do more than just capture news in the restatement, and provide new information to competitors about the value of their projects. Extant evidence indeed suggests that stock prices impound information from which companies learn for their investment decisions (Durnev et al. [2004], Chen et al. [2007]). Second, competitors' abnormal returns have the strongest relation of all three proxies to subsequent changes in competitors' investments, both economically and statistically. We conclude that competitors' abnormal returns represent the most powerful of our three news proxies.

5 Sensitivity analysis

This section discusses the sensitivity of the main results to various research settings.

5.1 Investment measure

In our tests, we measure the changes in a competitor's investments $\Delta I_{i,p} = \frac{I_{i,P} - I_{i,P-1}}{I_{i,P-1}}$ over the $[-3, +3]$ period. Specifically, we average a competitor's scaled investment over the three years $+1$, $+2$, $+3$ after the restatement announcement year 0 to obtain $I_{i,P}$. Similarly, we average a competitor's scaled investment over the three years -1, -2, -3 before year 0 to obtain $I_{i,P-1}$. We use various intervals other than the $[-3, +3]$ period, that is $[-1, +1]$, $[-2, +2]$, $[-5, +5]$, and our results hold.

Next, we modify the definition of competitors' investments $\Delta I_{i,p} = \frac{I_{i,P} - I_{i,P-1}}{I_{i,P-1}}$, in four ways. First, rather than using the raw scaled change in investment $\Delta I_{i,p}$, we rely on (1) the benchmark-adjusted scaled change in investment, described in Section 4.1.1, (2) the scaled level of investment $I_{i,P}$, (3) the change in the competitor's total assets over two subsequent periods, $\frac{\Delta A_{i,P} - \Delta A_{i,P-1}}{\Delta A_{i,P-1}}$, where A are total assets (COMPUSTAT #6), and (4) the level of the competitor's total assets, $\frac{A_{i,P} - A_{i,P-1}}{A_{i,P-1}}$.[15] Second, our investment measure I does not include Sales, General and Administrative (SG&A) expenses, because these expenses are often considered operational outlays rather than capital investments (Armstrong et al. [2006]). We modify I to also include SG&A expenses (COMPUSTAT #189), following Baker et al. [2003]. SG&A expenses may create intangible assets because they include expenditures such as those for product promotion and customer satisfaction (Banker et al. [2006]). Moreover, the components of SG&A expenses vary amongst companies and industries (Mintz [1994], Lazere [1995]). Third, we exclude the $R\&D$ expense from our investment measure I, following Chen et al. [2007]. Our results hold with these alternative investment measures.

Fourth, we examine the growth in a competitor's total employment, $E_{i,p} = \frac{E_{i,P} - E_{i,P-1}}{E_{i,P-1}}$, where E is total employment (COMPUSTAT #29), scaled by prior-year total assets (COMPUSTAT #6), following Kedia and Philippon [2007]. Our results are in general weaker than those for other investment measures. This is because we are not able to adequately control for other factors that determine a competitor's employment decisions, such as changes in rel-

[15] In case (4), we do not include the percentage change in assets, $\Delta Size_{i,p}$, as a control in the regressions.

ative costs of factors of production. Furthermore, news in restatements may not important enough to justify large changes in a competitor's employment policies.

5.2 News proxies

One of our three news proxies is the scaled restatement amount, $Restat_{j,t}$. This measure assumes that the competitor expects other firms in its industry not to restate, otherwise not all information in the restatement amount is news. A competitor may expect a non-zero restatement, for instance if restatements occur in waves. Consistent with this possibility, our discussion of the $Hazard_{i,P}$ variable suggests that a company is more likely to restate if there has already been a restatement in its industry. If not all of the information in the restatement is news, the competitor will put less weight on the restatement in its investment decision (all else being equal), as suggested in equation (1). Our estimated slope coefficient on the simple restatement amount may capture this effect, assuming that the weight put on the restatement amount is the same across all competitors. This assumption may not hold. To address this concern, we use the scaled restatement adjusted for the average scaled restatement of firms in the same 4-digit industry as restating firms. Our results hold with the industry-adjusted restatement amount, except for the last column in Table 10, where the coefficient on the industry-adjusted restatement loses statistical significance.

We argue that the two proxies based on restating firms are more likely to capture news in restatements about competitors' projects if the interdependencies between competitors and restating firms are stronger. One of our measures of these interdependencies is the correlation of their stock returns. We use two different measures, following the discussion in Section 2.3.2. First, we rely on the covariance between restating firms' and competitors' stock returns, scaled by the variance of restating firms' stock returns. The covariance and the variance are measured using daily raw returns over the year preceding the sample year. Second, we use the covariance between the restating firm's earnings and the competitor's cash flows, scaled by the variance of the restating firm's earnings. The covariance and the

variance are measure using ten annual data points prior to the sample year. We lose 25% of our sample because of this data requirement. We redo the tests in Table 9 using these two scaled covariance measures and our results hold. Our findings are weaker with the scaled covariance measure based on cash flows and earnings due to the reduction in sample size.

Our cross-sectional tests in Table 9 use the restating firms' market share, calculated using COMPUSTAT data. Since COMPUSTAT does not have the entire universe of firms but only publicly traded firms, some industries may be disproportionately represented in COMPUSTAT, which could lead to incorrect market shares. To address this concern, we use U.S. Census Bureau data, since they include both private and public firms. Census Bureau data are reported every five years (i.e. 1992, 1997, and 2002) and are aggregated across firms. Hence we cannot focus on restating firms alone. We thus use the 4-firm concentration ratio, which is available for manufacturing and non-manufacturing industries on a 4-digit level. Moreover, we use the Herfindahl index, which is available only for manufacturing industries. Our results are consistent with what we find in Table 9, and indicate that when industries are more concentrated, news proxies based on restating firms are more strongly related to changes in competitors' investments.

5.3 Other tests

Outliers can affect the empirical results. We use the method in Hadi [1992] to detect outliers. In addition, all regressions are re-estimated after winsorizing the main variables at the 1% and 99% levels. Furthermore, we calculate clustered standard errors by company, rather than by industry. Next, we drop financial and banking industries (which represent less than 5% of the sample), since accounting data for these industries are not widely available, which may affect regressions relying on accounting-based control variables. Moreover, we modify two control variables. First, rather than the change in assets $\Delta Size_{i,p}$, we use the level of assets $Size_{i,P-1}$ as a control for size. Second, instead of the change in the competitor's market share $\Delta MS_{i,p}$ as a control for the strategic relations between competitors and restating firms, we

use the restating firm's market share as well as the correlation between the competitor's and the restating firm's stock returns during the year preceding the sample year. In all of the above tests, the results of our study hold. Moveover, they are not driven by any particular industry; they remain unaltered if any 2-digit SIC industry is removed from the sample.

6 Conclusion

This study examines whether restatements convey news about the investment projects of restating firms' competitors. If so, restatement announcements cause competitors to update their beliefs about the value of these projects, and to modify their subsequent investment decisions. We therefore predict that subsequent changes in competitors' investments are associated with news in the restatements. Overall, the evidence supports our contention. First, competitors significantly reduce their investments starting in the year of the restatement announcement, compared to benchmark companies. Second, changes in competitors' investments following restatement announcements are significantly linked to three proxies for news in the restatement: (1) competitors' abnormal returns at the restatement announcement, (2) restating firms' abnormal returns at the restatement announcement, and (3) the restatement amounts. The extent to which the two latter measures are adequate news proxies depends on the interdependencies between restating firms and their competitors. Accordingly, we document that the link between subsequent changes in competitors' investments and restating firms' abnormal returns as well as the restatement amounts is stronger in two circumstances: (1) when the correlation between restating firms and competitors is more important, and (2) when the restating firms' market share is higher.

Our work indicates that there is an information transfer from restating firms to their competitors at restatement announcements, involving information about competitors' projects. This finding suggests a novel explanation for the negative abnormal returns that competitors of restating firms experience at restatement announcements. Specifically, competitors' abnormal returns appear at least partly driven by news in the restatement about their projects.

This explanation does not preclude competitors' abnormal returns from also impounding other news, such as information about the quality of their financial reports. We conclude that restatements of financial reports have direct implications for corporate investments, and affect the allocation of resources in the economy.

A Posterior for the unknown profitability θ

This appendix provides the proof that the posterior for the unknown payoff parameter θ of the competitor's investment project is normally distributed, with a mean of $\theta_\tau = (1 - z_\tau)\theta_2 + z_\tau \frac{r}{\gamma}$, where $z_\tau = \frac{\sigma_2^2}{\frac{\sigma_\epsilon^2}{\gamma^2}+\sigma_2^2}$, and a variance of $\sigma_\tau^2 = \frac{\frac{\sigma_\epsilon^2}{\gamma^2}\sigma_2^2}{\frac{\sigma_\epsilon^2}{\gamma^2}+\sigma_2^2}$.

The investment I_t pays off $\tilde{P}_t = \tilde{p}_t f(I_t)$ at the end of t, with $t = 1, 2$, where $f(\cdot)$ is a known and concave function. The variable $\tilde{p}_t$ is normally distributed as $N(\theta, \sigma_\epsilon^2)$, and can be written as $\tilde{p}_t = \theta + \tilde{\epsilon}_t$, where $\tilde{\epsilon}_t$ is normally distributed as $N(0, \sigma_\epsilon^2)$ and $\tilde{\epsilon}_1$ is independent from $\tilde{\epsilon}_2$. The parameter θ is unknown, all other parameters are known. At the start of $t = 1$, the competitor has a prior about the unknown θ that is normally distributed as $N(\theta_1, \sigma_1^2)$. After the realization of $\tilde{P}_1$ at the end of $t = 1$, the competitor updates its prior about θ, and obtains a posterior that is normally distributed as $N(\theta_2, \sigma_2^2)$, where $\theta_2 = (1 - z_1)\theta_1 + z_1 p_1$, $z_1 = \frac{\sigma_1^2}{\sigma_\epsilon^2+\sigma_1^2}$, and $\sigma_2^2 = \frac{\sigma_\epsilon^2\sigma_1^2}{\sigma_\epsilon^2+\sigma_1^2}$ (Lee [1989]). This posterior reflects the competitor's information set Ω_2 at the beginning of $t = 2$.

Shortly after the start of $t = 2$, and before the optimal investment decision in $t = 2$ is made, a restatement occurs, which is a noisy signal of the unknown θ, and can be written as $\tilde{r} = \gamma\theta + \tilde{e}$, where $\tilde{e}$ is normally distributed as $N(0, \sigma_e^2)$ and independent from ϵ_t. The variance σ_e^2 and the parameter γ are known. The scaled restatement $\tilde{R} = \theta + \frac{\tilde{e}}{\gamma}$ is normally distributed as $N(\theta, \sigma^2)$, where $\sigma^2 = \frac{\sigma_e^2}{\gamma^2}$. The probability density function (henceforth "pdf") for θ, given R and Ω_2, is $p(\theta|R, \Omega_2) \propto p(\theta|\Omega_2)p(R|\theta)$ since $\tilde{\epsilon}_t$ and $\tilde{e}$ are independent. The pdf for θ given Ω_2 is $p(\theta|\Omega_2) = \frac{1}{\sqrt{2\Pi\sigma_2^2}} exp[-\frac{(\theta-\theta_2)^2}{2\sigma_2^2}]$ and the pdf for R given θ is $p(R|\theta) = \frac{1}{\sqrt{2\Pi\sigma^2}} exp[-\frac{(R-\theta)^2}{2\sigma^2}]$. Hence, the posterior pdf $p(\theta|R, \Omega_2)$ is:

$$\begin{aligned} p(\theta|R, \Omega_2) &\propto \frac{1}{(\sqrt{2\Pi\sigma_2^2})(\sqrt{2\Pi\sigma^2})} exp[-\frac{1}{2}(\frac{(\theta - \theta_2)^2}{\sigma_2^2} + \frac{(R - \theta)^2}{\sigma^2})] \\ &\propto exp[-\frac{1}{2}\theta^2(\frac{\sigma^2 + \sigma_2^2}{\sigma^2\sigma_2^2}) + \theta(\frac{\theta_2}{\sigma_2^2} + \frac{R}{\sigma^2})]. \end{aligned}$$

Let $\sigma_\tau^2 = \frac{\sigma^2\sigma_2^2}{\sigma^2+\sigma_2^2}$ and $\theta_\tau = (\frac{\theta_2}{\sigma_2^2} + \frac{R}{\sigma^2})\sigma_\tau^2$. Substitute both preceding expressions into the posterior pdf

$p(\theta|R,\Omega_2)$ and add the constant $-\frac{1}{2}\frac{\theta_\tau^2}{\sigma_\tau^2}$ to obtain:

$$\begin{aligned} p(\theta|R,\Omega_2) &\propto exp[-\frac{1}{2}\frac{\theta^2}{\sigma_\tau^2}+\theta\frac{\theta_\tau}{\sigma_\tau^2}-\frac{1}{2}\frac{\theta_\tau^2}{\sigma_\tau^2}] \\ &\propto exp[-\frac{1}{2}\frac{(\theta-\theta_\tau)^2}{\sigma_\tau^2}]. \end{aligned}$$

Since a density must integrate to 1, it follows that:

$$p(\theta|R,\Omega_2) = \frac{1}{\sqrt{2\Pi\sigma_\tau^2}}exp[-\frac{(\theta-\theta_\tau)^2}{2\sigma_\tau^2}].$$

Thus, the posterior for θ is distributed normally with a mean $\theta_\tau = (1-z_\tau)\theta_2 + z_\tau\frac{r}{\gamma}$, where $z_\tau = \frac{\sigma_2^2}{\frac{\sigma_\epsilon^2}{\gamma^2}+\sigma_2^2}$, and a variance $\sigma_\tau^2 = \frac{\frac{\sigma_\epsilon^2}{\gamma^2}\sigma_2^2}{\frac{\sigma_\epsilon^2}{\gamma^2}+\sigma_2^2}$.

B Definitions of Variables

Subscript j refers to a restating firm. Subscript i refers to a competitor in the same 4-digit SIC code as restating firm j during the fiscal year t of the restatement announcement. Restating firms are excluded from the sample of competitors. The variables are listed in alphabetical order. The subscript p refers to the difference between period P and period $P-1$. Period P refers to the three years +1, +2, +3 after year 0 of the restatement announcement, while period $P-1$ refers to the three years -1, -2, -3 before year 0. Averages are used for periods P and $P-1$. Period $[-\tau, +\tau]$ refer to number of days before and after the restatement announcement by a restating firm; it ranges from -1 to $+1$ or from -5 to $+5$. Accounting data is from COMPUSTAT, and stock price data from CRSP.

- $BH_{i,120}$: Competitor i's buy-and-hold returns during the 120 days prior to the restatement announcement.
- $CAR_{i,-\tau,+\tau}$: Competitor i's cumulative abnormal returns, calculated as market-adjusted returns cumulated during $[-\tau, +\tau]$.
- $CAR_{j,d-\tau,d+\tau}$: Restating firm j's cumulative abnormal returns, calculated as market-adjusted returns cumulated during $[-\tau, +\tau]$.
- $Corr_{i,j,t-1}$: correlation between competitor i's and restating firm j's daily raw returns during the fiscal year preceding the fiscal year of the restatement announcement.
- $\Delta Cash_{i,p}$: Rate of change in competitor i's cash, $\frac{Cash_{i,P}-Cash_{i,P-1}}{Cash_{i,P-1}}$. Cash is net income (COMPUSTAT #18) plus depreciation and amortization (COMPUSTAT #14), scaled by prior-year total assets (COMPUSTAT #6).
- $\Delta ExtFin_{i,p}$: Rate of change in competitor i's external financing, $\frac{ExtFin_{i,P}-ExtFin_{i,P-1}}{ExtFin_{i,P-1}}$. External financing $ExtFin_{i,P}$ is the sum of equity issues and debt issues in P, divided by total assets (COMPUSTAT #6) in $P-1$, following Baker et al. [2003]. Equity issues in P is the change in book equity (COMPUSTAT #60) between $P-1$ and P minus the change in retained earnings (COMPUSTAT #36) between $P-1$ and P. Debt issues in P is the change in assets (COMPUSTAT #6) between $P-1$ and P minus the change in book equity (COMPUSTAT #60) between $P-1$ and P.
- $\Delta I_{i,p}$: Rate of change in competitor i's investment I, $\frac{I_{i,P}-I_{i,P-1}}{I_{i,P-1}}$. Investment I is capital expenditure (COMPUSTAT #128) plus R&D expense (COMPUSTAT #46), scaled by prior-year total assets (COMPUSTAT #6).
- $\Delta MS_{i,p}$: Rate of change in competitor i's market share, $\frac{MS_{i,P}-MS_{i,P-1}}{MS_{i,P-1}}$. The market share is the ratio of the competitor's sales (COMPUSTAT #12) to the sales of its 4-digit SIC industry.

- $\Delta Q_{i,p}$: Rate of change in competitor i's Tobin's q, $\frac{Q_{i,P}-Q_{i,P-1}}{Q_{i,P-1}}$. Following Chen et al. [2007], Q is assets (COMPUSTAT #6) plus market value of equity (COMPUSTAT #24 $\times$ COMPUSTAT #199) minus book value of equity (COMPUSTAT #60), all scaled by total assets.

- $\Delta Size_{i,p}$: Rate of change in competitor i's size, $\frac{Size_{i,P}-Size_{i,P-1}}{Size_{i,P-1}}$. Size is the natural logarithm of total assets (COMPUSTAT #6).

- $Hazard_{i,P}$: Estimated probability that competitor i restates its financial reports in P, obtained from a probit model with the following explanatory variables: change in the dispersion of analysts' forecasts around the restatement announcement, quality of corporate governance, competitor size, competitor growth, a dummy variable that equals 1 if it is not the first restatement in the 4-digit industry and 0 otherwise, industry and year fixed effects, following Kedia and Philippon [2007]. This regression is estimated on a competitor level between 1996 and 2002, using maximum likelihood. The regression's fitted values (turned into probabilities) are used as the estimated probability of a restatement.

- $MS_{j,t-1}$: Market share of restating firm j in fiscal year $t-1$ prior to the fiscal year of the restatement. The market share is the ratio of the restating firm's sales to the sales of its 4-digit SIC industry.

- $Restat_{j,t}$: Restating firm j's restatement amount in year t, scaled by prior-year total assets (COMPUSTAT #6).

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Table 1: Sample selection for competitors of restating firms, from 1997 to 2002

	Firms	Firm-years
GAO database, 1997 - 2002	839	916
No data on CRSP or COMPUSTAT	(81)	(82)
	758	836
Fiscal year changes	(45)	(51)
Final sample of restatement firms	713	785
Final sample of competitors at the 4-digit SIC level	8,500	73,667

This table shows the sample selection details for the competitors of firms that announce a restatement of their financial reports between 1997 and 2002. Restatements are from the General Accounting Office (GAO) [2003]. Competitors are in the same fiscal year and 4-digit industry as restating firms. Restating firms are excluded from the sample of competitors. Numbers in parentheses are observations that are dropped.

Table 2: Number and percentage of sample restatements by 2-digit SIC industry

SIC Code	Industry	Number (1)	Percent (%) (2)
10	Metal Mining	3	0.38
13	Oil And Gas Extraction	11	1.40
14	Mining And Quarrying Of Nonmetallic Minerals, Except Fuels	3	0.38
15	Building Construction General Contractors And Operative Builders	3	0.38
16	Heavy Construction Other Than Building Construction Contractors	4	0.51
17	Construction Special Trade Contractors	2	0.25
20	Food And Kindred Products	15	1.91
21	Tobacco Products	1	0.13
22	Textile Mill Products	2	0.25
23	Apparel And Other Finished Products Made From Fabrics And Similar Materials	7	0.89
25	Furniture And Fixtures	6	0.76
26	Paper And Allied Products	6	0.76
27	Printing, Publishing, And Allied Industries	11	1.40
28	Chemicals And Allied Products	42	5.35
29	Petroleum Refining And Related Industries	2	0.25
30	Rubber And Miscellaneous Plastics Products	7	0.89
32	Leather And Leather Products	6	0.76
33	Stone, Clay, Glass, And Concrete Products	10	1.27
34	Fabricated Metal Products, Except Machinery And Transportation Equipment	5	0.64
35	Industrial And Commercial Machinery And Computer Equipment	60	7.64
36	Electronic And Other Electrical Equipment And Components, Except Computer Equipment	55	7.01
37	Transportation Equipment	14	1.78
38	Measuring, Analyzing, And Controlling Instruments	49	6.24
39	Miscellaneous Manufacturing Industries	6	0.76
41	Railroad Transportation	1	0.13
42	Motor Freight Transportation And Warehousing	3	0.38
44	Water Transportation	1	0.13
45	Transportation By Air	7	0.89
47	Transportation Services	3	0.38
48	Communications	28	3.57
49	Electric, Gas, And Sanitary Services	21	2.68
50	Wholesale Trade-durable Goods	12	1.53
51	Wholesale Trade-non-durable Goods	11	1.40
52	Building Materials, Hardware, Garden Supply, And Mobile Home Dealers	1	0.13
53	General Merchandise Stores	9	1.15
54	Food Stores	6	0.76
55	Automotive Dealers And Gasoline Service Stations	4	0.51
56	Apparel And Accessory Stores	14	1.78
57	Home Furniture, Furnishings, And Equipment Stores	7	0.89
58	Eating And Drinking Places	6	0.76
59	Miscellaneous Retail	12	1.53
60	Depository Institutions	42	5.35
61	Non-depository Credit Institutions	12	1.53
62	Security And Commodity Brokers, Dealers, Exchanges, And Services	9	1.15
63	Insurance Carriers	21	2.68
64	Insurance Agents, Brokers, And Service	1	0.13
65	Real Estate	2	0.25
67	Holding And Other Investment Offices	18	2.29
70	Hotels, Rooming Houses, Camps, And Other Lodging Places	4	0.51
72	Personal Services	1	0.13
73	Business Services	138	17.58
76	Miscellaneous Repair Services	2	0.25
78	Motion Pictures	7	0.89
79	Amusement And Recreation Services	8	1.02
80	Health Services	15	1.91
82	Educational Services	5	0.64
83	Social Services	3	0.38
87	Engineering, Accounting, Research, Management, And Related Services	15	1.91
99	Nonclassifiable Establishments	6	0.76
	Total	785	100.00

"Number" pertains to the number of sample restatements; "Percent (%)" refers to the percentage of sample restatements.

Table 3: Descriptive statistics for sample restatements

	Number	Percent (%)
Panel A. Breakdown by fiscal year		
1997	83	10.57
1998	91	11.59
1999	153	19.49
2000	164	20.89
2001	192	24.46
2002	102	12.99
Total	785	100.00
Panel B. Prompter		
Company	330	42.04
SEC/FASB/Other agency	110	14.01
Auditor	59	7.52
Other external	5	0.64
Unattributed	281	35.80
Total	785	100.00
Panel C. Accounting issues		
Revenue recognition	305	38.85
Restructuring, assets, or inventory	107	13.63
Cost or expense	98	12.48
Acquisitions and mergers	47	5.99
Securities related	42	5.35
Reclassification	32	4.08
IPR&D	30	3.82
Related-party transactions	26	3.31
Loan loss	9	1.15
Tax related	9	1.15
Other	53	6.75
Unspecified	27	3.44
Total	785	100.00

This table shows descriptive statistics for the 785 sample restatements, from the General Accounting Office (GAO) [2003]. "Number" pertains to the number of sample restatements; "Percent (%)" refers to the percentage of sample restatements. Panel A reports the calendar year when the restatement is announced. Panel B displays the party that prompted the restatement. Panel C shows the accounts that are restated, as detailed by the GAO for the following items. "Revenue recognition" refers to improper revenue accounting and includes instances in which revenue was improperly recognized, questionable revenues were recognized, or any other number of mistakes or improprieties were made that led to misreported revenue. "Restructuring, assets, or inventory" is for asset impairments, errors relating to accounting treatment of investments, timing of asset write-downs, goodwill, restructuring activity and inventory valuation, and inventory quantity issues. "Cost or expense" refers to improper cost accounting and includes instances of improperly recognizing costs or expenses, improperly capitalizing expenditures, any other number of mistakes or improprieties that led to misreported costs, improper treatment of tax liabilities, income tax reserves, and other tax-related items. "Acquisitions and mergers" is for acquisitions or mergers that were improperly accounted for or not accounted for at all, including cases in which the wrong accounting method was used or losses or gains related to the acquisition were understated or overstated. This category does not include in-process research and development or restatements for mergers, acquisitions, and discontinued operations when appropriate accounting methods were employed. "Securities related" refers to improper accounting for derivatives, warrants, stock options, and other convertible securities. "Reclassification" is for improperly classified accounting items, such as debt payments being classified as investments. "IPR&D" refers to instances in which improper accounting methodologies were used to value in-process research and development at the time of an acquisition. "Related-party transactions" is for inadequate disclosure or improper accounting of revenues, expenses, debts, or assets involving transactions or relationships with related parties, including those involving special-purpose entities. "Other" refers to any restatement not covered by the above listed categories. Cases included in this category include restatements due to inadequate loan-loss reserves, delinquent loans, loan write-offs, improper accounting for bad loans and restatements due to fraud, and accounting irregularities that were left unspecified. The GAO [2003] does not give explicit descriptions for the following items: "Loan loss", "Tax related", and "Unspecified". If a restatement involves more than one account, we use the first account indicated by the GAO [2003].

Table 4: Annual changes in competitors' investments around restatement announcements

Year t relative to the restatement announcement (1)	Number of obs. (2)	Mean (%) (3)	p-value for Student t-statistic (4)	Median (%) (5)	p-value for Wilcoxon statistic (6)
Panel A. Raw investment changes, ΔI, between $t-1$ and t					
-5	41,623	9.9	0.000	7.1	0.000
-4	43,874	6.8	0.000	8.1	0.000
-3	45,212	24.3	0.000	13.7	0.000
-2	48,902	18.7	0.000	11.6	0.000
-1	50,823	24.6	0.000	13.8	0.000
0	51,918	12.7	0.000	7.0	0.000
+1	49,101	-4.3	0.000	-5.4	0.000
+2	47,183	2.5	0.000	1.7	0.021
+3	44,902	-15.0	0.000	-19.6	0.000
+4	41,311	5.6	0.000	4.6	0.000
+5	40,311	9.4	0.000	5.6	0.000
Panel B. Benchmark-adjusted investment changes, $\Delta I'$, between $t-1$ and t					
-5	41,623	5.3	0.000	2.3	0.000
-4	43,874	6.9	0.000	4.2	0.000
-3	45,212	9.0	0.000	-1.0	0.117
-2	48,902	-6.0	0.000	0.4	0.280
-1	50,823	17.5	0.000	6.0	0.000
0	51,918	-5.6	0.000	-7.2	0.000
+1	49,101	-5.2	0.000	-6.5	0.000
+2	47,183	-2.6	0.000	-3.2	0.000
+3	44,902	-16.2	0.000	-12.7	0.000
+4	41,730	8.0	0.000	2.6	0.000
+5	40,311	1.1	0.000	1.7	0.000

This table shows descriptive statistics for the annual changes in competitors' investments around the year of the restatement announcement (year $t = 0$). Competitors are in the same fiscal year and 4-digit industry as restating firms. Restating firms are excluded from the sample of competitors. Panel A displays raw scaled changes in competitors' investments between two subsequent years $t-1$ and t, $\Delta I = \frac{I_t - I_{t-1}}{I_{t-1}}$. Investment I is capital expenditure (COMPUSTAT #128) plus R&D expense (COMPUSTAT #46), scaled by prior-year total assets (COMPUSTAT #6). Panel B shows benchmark-adjusted scaled changes in competitors' investments $\Delta I'$, defined as the difference between raw annual changes in investments for competitors and for benchmark firms that belong to 4-digit SIC industries without a restatement between 1997 and 2002. The Student t and the Wilcoxon statistics test the hypothesis that the mean and median changes in competitors' investments are significantly different from zero.

Table 5: Proxies for news in the restatement

Panel A. Competitors' abnormal returns at the restatement announcement

Period $[-\tau, +\tau]$ (1)	Number of obs. (2)	Mean (%) (3)	Median (%) (4)	Positive:Negative (5)	Patell Z (6)	Generalized Sign Z (7)
$[-10, +10]$	67,443	−1.08	−1.05	30,451:36,992***	−20.68***	−5.11***
$[-5, +5]$	67,440	−0.79	−0.54	30,248:37,192***	−15.56***	−6.67***
$[-3, +3]$	67,439	−0.48	−0.32	30,379:37,060***	−11.82***	−5.65***
$[-1, +1]$	67,436	−0.34	−0.29	30,754:36,682***	−8.80***	−2.75***
$[-3, 0]$	67,435	−0.44	−0.34	30,464:36,971***	−11.33***	−4.98***
$[-1, 0]$	67,434	−0.26	−0.24	30,624:36,810***	−7.96***	−3.74***

Panel B. Restating firms' abnormal returns at the restatement announcement

Period $[-\tau, +\tau]$ (1)	Number of obs. (2)	Mean (%) (3)	Median (%) (4)	Positive:Negative (5)	Patell Z (6)	Generalized Sign Z (7)
$[-10, +10]$	698	−13.10	−7.69	231:467	−8.38***	−5.76***
$[-5, +5]$	698	−10.40	−5.55	225:473	−8.31***	−5.62***
$[-3, +3]$	698	−9.20	−7.16	222:476	−8.16***	−5.57***
$[-1, +1]$	694	−8.28	−3.85	221:473	−8.16***	−5.55***
$[-3, 0]$	693	−8.40	−6.33	233:460	−8.07***	−5.52***
$[-1, 0]$	693	−8.20	−6.12	240:453	−7.89***	−5.47***

Panel C. Scaled restatement amounts

Number of obs. (1)	Mean (%) (2)	Median (%) (3)	Standard Deviation (%) (4)	Minimum (%) (5)	Maximum (%) (6)
634	−9.15	−3.41	12.19	−19.39	16.81

This table shows descriptive statistics for the three proxies for news in the restatement: (1) competitors' abnormal returns at the restatement announcement (in Panel A), (2) restating firms' abnormal returns at the restatement announcement (in Panel B) and (3) the scaled restatement amount (in Panel C). Competitors are in the same fiscal year and 4-digit industry as restating firms. Restating firms are excluded from the sample of competitors. Abnormal returns are market-adjusted returns, based on the CRSP equally-weighted market index. The restatement amount is scaled by prior-year total assets (COMPUSTAT #6). The Patell Z test is a parametric test of whether abnormal returns are zero. The Generalized Sign Z is a nonparametric test of whether the proportion of positive or negative abnormal returns is different in the sample period than in the estimation period. The period $[-\tau, +\tau]$ measures the day relative to the restatement announcement. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 6: Descriptive statistics for restating firms j and their competitors i

Variable	Mean	Std. Dev.	Min	Median	Max	Number
Panel A. Competitors						
$\Delta I_{i,p}$	-0.144	0.407	-0.863	-0.197	0.403	51,918
$CAR_{i,-1,+1}$	-0.003	0.025	-0.151	-0.003	0.207	67,436
$CAR_{i,-5,+5}$	-0.008	0.056	-0.278	-0.005	0.340	67,440
$Hazard_{i,P}$	0.032	0.009	0.001	0.014	0.124	42,450
$\Delta ExtFin_{i,p}$	0.123	0.009	0.001	0.073	0.124	46,396
$\Delta Cash_{i,p}$	-0.147	0.999	-0.783	-0.083	1.832	51,973
$\Delta Q_{i,p}$	-0.025	0.324	-0.553	-0.025	0.626	53,280
$\Delta MS_{i,p}$	0.442	1.447	-0.847	0.067	9.437	62,460
$\Delta Size_{i,p}$	0.239	2.688	-0.986	0.088	7.809	62,400
$BH_{i,120}$	0.056	0.367	-0.659	0.025	1.789	62,460
Panel B. Restating firms						
$Restat_{j,t}$	-0.092	0.122	-0.194	-0.034	0.168	634
$CAR_{j,-1,+1}$	-0.083	0.177	-0.486	-0.039	0.472	694
$CAR_{j,-5,+5}$	-0.103	0.256	-0.362	-0.056	1.361	698
$MS_{j,t-1}$	0.006	0.140	0.000	0.007	0.092	672
Panel C. Competitors and Restating firms						
$Corr_{i,j,t-1}$	0.117	0.083	0.000	0.107	0.476	51,434

This table presents descriptive statistics for competitors of restating firms (Panel A), restating firms (Panel B), and both competitors and restating firms (Panel C). Competitor i belongs to the same 4-digit industry as restating firm j in the fiscal year t of the restatement announcement. Restating firms are excluded from the sample of competitors. The subscript p refers to the scaled change in the variable between period P (the three years +1, +2, +3 after the restatement announcement) and period $P-1$ (the three years -1, -2, -3 before the restatement announcement). All variables are defined in Appendix B.

Table 7: Pearson correlation coefficients for restating firms j and their competitors i

	$CAR_{i,-1,+1}$	$CAR_{i,-5,+5}$	$CAR_{j,-1,+1}$	$CAR_{j,-5,+5}$	$Restat_{j,t}$	$Hazard_{i,P}$	$\Delta ExtFin_{i,p}$	$\Delta Cash_{i,p}$	$\Delta Q_{i,p}$	$\Delta MS_{i,p}$	$\Delta Size_{i,p}$	$BH_{i,120}$	$Corr_{i,j,t-1}$	$MS_{j,t-1}$
$\Delta I_{i,p}$	0.031***	0.045***	0.03***	0.03***	0.03***	-0.17***	-0.24***	0.02***	0.14***	-0.20***	-0.165***	-0.01***	-0.11***	0.05***
$CAR_{i,-1,+1}$		0.64***	0.06***	0.11***	0.06***	-0.04***	-0.04***	-0.01***	-0.06***	-0.03***	-0.02***	-0.04***	-0.02***	0.02***
$CAR_{i,-5,+5}$			0.06***	0.21***	0.02***	-0.00	-0.03***	-0.03***	-0.07***	-0.01*	0.01**	0.12***	-0.02***	0.03***
$CAR_{j,-1,+1}$				0.57***	0.09***	-0.01***	-0.03***	0.01***	-0.04***	-0.03***	-0.02***	0.00	-0.02***	0.03**
$CAR_{j,-5,+5}$					0.54***	-0.02***	-0.01**	0.00	-0.03***	-0.01**	0.00	0.00	-0.02***	-0.01*
$Restat_{j,t}$						0.08***	-0.01**	0.01	0.02***	-0.01**	0.00	0.00	-0.02***	-0.01*
$Hazard_{i,P}$							0.05***	-0.03***	-0.10***	0.10***	0.11***	0.13***	0.15***	0.08***
$\Delta ExtFin_{i,p}$								-0.05***	0.23***	0.43***	0.41***	0.13***	0.17***	-0.07***
$\Delta Cash_{i,p}$									-0.01***	0.03***	-0.08***	-0.05***	0.02***	-0.00
$\Delta Q_{i,p}$										0.08***	0.14***	0.15***	0.02***	-0.02***
$\Delta MS_{i,p}$											0.31***	0.08***	0.13***	-0.01***
$\Delta Size_{i,p}$												-0.16***	-0.08***	-0.03***
$BH_{i,120}$													0.06***	-0.07***
$Corr_{i,j,t-1}$														-0.07***

This table presents the Pearson correlation coefficients for main variables. Competitor i belongs to the same 4-digit industry as restating firm j in the fiscal year t of the restatement announcement. Restating firms are excluded from the sample of competitors. The subscript p refers to the difference between period P (the three years +1, +2, +3 after the restatement announcement) and period $P-1$ (the three years −1, −2, −3 before the restatement announcement). All variables are defined in Appendix B. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 8: Changes in competitors' investments $\Delta I_{i,p}$ as a function of the news in the restatement, $News$

$$\begin{aligned}\Delta I_{i,p} &= \boldsymbol{\beta}\mathbf{News} + \gamma_1 Hazard_{i,P} + \gamma_2 \Delta ExtFin_{i,p} + \gamma_3 \Delta Cash_{i,p} + \gamma_4 \Delta Q_{i,p} + \gamma_5 \Delta MS_{i,p} \\ &\quad + \gamma_6 \Delta Size_{i,p} + \gamma_7 BH_{i,120} + FixedEffects + \varepsilon_{i,p}\end{aligned}$$

		News =				
		$CAR_{i,-1,+1}$	$CAR_{i,-5,+5}$	$CAR_{j,-1,+1}$	$CAR_{j,-5,+5}$	$Restat_{j,t}$
Coefficient	Independent Variable	(1)	(2)	(3)	(4)	(5)
$\boldsymbol{\beta}$	**News**	**0.338*** **	**0.191*** **	**0.032*** **	**0.026*** **	**0.043*** **
		(4.11)	**(4.59)**	**(3.16)**	**(3.02)**	**(2.88)**
γ_1	$Hazard_{i,P}$	-5.288***	-5.603***	-20.851***	-20.781***	-20.835**
		(-17.92)	(-14.83)	(-19.33)	(-19.27)	(-19.32)
γ_2	$\Delta ExtFin_{i,p}$	0.157***	0.163***	0.056***	0.056***	0.056***
		(22.85)	(23.62)	(9.79)	(9.66)	(9.78)
γ_3	$\Delta Cash_{i,p}$	0.014***	0.015***	0.016***	0.016***	0.016***
		(7.01)	(7.33)	(9.95)	(10.07)	(9.95)
γ_4	$\Delta Q_{i,p}$	0.185***	0.200***	0.066***	0.066***	0.066***
		(30.05)	(31.40)	(14.64)	(14.57)	(14.64)
γ_5	$\Delta MS_{i,p}$	-0.006**	-0.005*	0.000	0.000	0.000
		(-2.16)	(-1.82)	(-0.13)	(-0.17)	(-0.13)
γ_6	$\Delta Size_{i,p}$	0.011***	0.011***	-0.001	-0.001	-0.001
		(7.58)	(7.38)	(-0.86)	(-0.89)	(-0.87)
γ_7	$BH_{i,120}$	0.015***	0.012*	-0.007*	-0.007*	-0.007*
		(2.64)	(1.85)	(-1.77)	(-1.77)	(-1.80)
Firm fixed effects		s	s	s	s	s
Year fixed effects		s	s	s	s	s
Adjusted R^2		54.3%	54.4%	54.1%	54.1%	54.1%
# of observations		27,590	27,590	24,345	24,455	24,013

$\Delta I_{i,p}$ is the scaled change in the investment I of competitor i, $\frac{I_P - I_{P-1}}{I_{P-1}}$. Competitors are in the same fiscal year and 4-digit industry as restating firms. Restating firms are excluded from the sample of competitors. $I_{i,P}$ ($I_{i,P-1}$) is the average investment during period P ($P-1$). Investment I is capital expenditure (COMPUSTAT #128) plus $R\&D$ expense (COMPUSTAT #46), scaled by prior-year total assets (COMPUSTAT #6). Period P is the three years +1, +2, +3 after the year 0 of the restatement announcement, while period $P-1$ is the three years −1, −2, −3 before year 0. $News$ is either competitors' abnormal returns at the restatement announcement ($CAR_{i,-1,+1}$,$CAR_{i,-5,+5}$), restating firms' abnormal returns at the restatement announcement ($CAR_{j,-1,+1}$,$CAR_{j,-5,+5}$), or the scaled restatement amount $Restat_{j,t}$. All variables are defined in Appendix B. The regressions are estimated from 1997 to 2002 in the pooled cross-section, and use firm and year fixed effects (in $FixedEffects$). The t-statistics in all regressions are based on standard errors that are robust to heteroscedasticity and are clustered by 4-digit SIC industry (to control for within-industry error correlation). *** (**) [*] denotes significance at the 1% (5%) [10%] level. "s" ("ns") stands for significant (non-significant).

Table 9: The impact of the correlation $Corr_{i,j,t-1}$ between restating firms and their competitors, and of the restating firms' market share $MS_{j,t-1}$ on the relation between changes in competitors' investments $\Delta I_{i,p}$ and restating firms abnormal returns $CAR_{j,-\tau,+\tau}$ as well as the restatement amount $Restat_{j,t}$

$$\begin{aligned}\Delta I_{i,p} &= \beta_1 News_R + \boldsymbol{\beta_2 News_R Corr_{i,j,t-1}} + \boldsymbol{\beta_3 News_R MS_{j,t-1}} + \beta_4 Corr_{i,j,t-1} + \beta_5 MS_{j,t-1} + \gamma_1 Hazard_{i,P} \\ &\quad + \gamma_2 \Delta ExtFin_{i,p} + \gamma_3 \Delta Cash_{i,p} + \gamma_4 \Delta Q_{i,p} + \gamma_5 \Delta MS_{i,p} + \gamma_6 \Delta Size_{i,p} + \gamma_7 BH_{i,120} + FixedEffects + \varepsilon_{i,p}\end{aligned}$$

			$News_R =$			$News_R =$			$News_R =$	
		$CAR_{j,-1,+1}$	$CAR_{j,-5,+5}$	$Restat_{j,t}$	$CAR_{j,-1,+1}$	$CAR_{j,-5,+5}$	$Restat_{j,t}$	$CAR_{j,-1,+1}$	$CAR_{j,-5,+5}$	$Restat_{j,t}$
Coefficient	Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
β_1	$News_R$	0.028***	0.022**	0.014	0.031***	0.021*	0.041***	0.011	0.027	0.016
		(3.30)	(2.27)	(1.08)	(3.26)	(1.76)	(2.88)	(0.67)	(0.63)	(0.27)
$\boldsymbol{\beta_2}$	$\mathbf{News_R Corr_{i,j,t-1}}$	**0.141****	**0.157*****	**0.154****				**0.177****	**0.164*****	**0.133****
		(2.31)	**(2.76)**	**(2.33)**				**(2.07)**	**(2.83)**	**(2.39)**
$\boldsymbol{\beta_3}$	$\mathbf{News_R MS_{j,t-1}}$				**0.143*****	**0.149****	**0.147***	**0.144***	**0.160***	**0.164****
					(2.57)	**(2.44)**	**(1.86)**	**(1.97)**	**(1.63)**	**(2.05)**
β_4	$Corr_{i,j,t-1}$	-0.114***	-0.115***	-0.105***				-0.138***	-0.102***	-0.113**
		(-3.32)	(-4.09)	(-3.62)				(-3.31)	(-2.91)	(-2.42)
β_5	$MS_{j,t-1}$				0.036	0.029	0.045	0.079**	0.083**	0.079**
					(0.69)	(0.56)	(0.87)	(2.22)	(2.32)	(2.22)
γ_1	$Hazard_{i,P}$	-22.370***	-22.276***	-22.337***	-20.871***	-20.816***	-20.906***	-24.829***	-24.731***	-24.775***
		(-19.58)	(-19.49)	(-19.56)	(-19.34)	(-19.30)	(-19.35)	(-20.03)	(-19.95)	(-20.00)
γ_2	$\Delta ExtFin_{i,p}$	0.052***	0.052***	0.052***	0.056***	0.056***	0.056***	0.049***	0.048***	0.049***
		(8.85)	(8.75)	(8.85)	(9.77)	(9.66)	(9.77)	(7.86)	(7.74)	(7.86)
γ_3	$\Delta Cash_{i,p}$	0.018***	0.018***	0.018***	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***
		(10.72)	(10.84)	(10.72)	(9.96)	(10.09)	(9.96)	(9.38)	(9.56)	(9.38)
γ_4	$\Delta Q_{i,p}$	0.064***	0.063***	0.064***	0.066***	0.066***	0.066***	0.055***	0.055***	0.055***
		(13.58)	(13.48)	(13.59)	(14.55)	(14.48)	(4.49)	(11.33)	(11.23)	(11.33)
γ_5	$\Delta MS_{i,p}$	0.001	0.001	0.001	-0.000	-0.000	-0.000	0.003	0.002	0.003
		(0.29)	(0.24)	(0.29)	(-0.14)	(-0.21)	(-0.11)	(0.97)	(0.90)	(0.98)
γ_6	$\Delta Size_{i,p}$	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	-0.000	-0.000
		(-0.86)	(-0.87)	(-0.86)	(-0.85)	(-0.86)	(-0.87)	(-0.03)	(-0.04)	(-0.04)
γ_7	$BH_{i,120}$	-0.007*	-0.007*	-0.007*	-0.007*	-0.007*	-0.007*	-0.007*	-0.007*	-0.007*
		(-1.78)	(-1.78)	(-1.80)	(-1.80)	(-1.76)	(-1.78)	(-1.76)	(-1.74)	(-1.77)
Firm fixed effects		s	s	s	s	s	s	s	s	s
Year fixed effects		s	s	s	s	s	s	s	s	s
Adjusted R^2		55.2%	55.2%	55.2%	55.2%	55.2%	57.1%	58.1%	58.3%	59.3%
# of observations		22,120	22,220	21,018	21,591	21,701	20,591	19,639	19,739	18,639

$\Delta I_{i,p}$ is the scaled change in the investment I of competitor i, $\frac{I_P - I_{P-1}}{I_{P-1}}$. Competitors are in the same fiscal year and 4-digit industry as restating firms. Restating firms are excluded from the sample of competitors. $I_{i,P}$ ($I_{i,P-1}$) is the average investment during period P ($P-1$). Investment I is capital expenditure (COMPUSTAT #128) plus $R\&D$ expense (COMPUSTAT #46), scaled by prior-year total assets (COMPUSTAT #6). Period P is the three years +1, +2, +3 after the year 0 of the restatement announcement, while period $P-1$ is the three years −1, −2, −3 before year 0. $News_R$ is restating firms' abnormal returns at the restatement announcement ($CAR_{j,-1,+1}$,$CAR_{j,-5,+5}$), or the scaled restatement amount $Restat_{j,t}$. $Corr_{i,j,t-1}$ is the correlation between competitors' and restating firms' raw returns during the fiscal year preceding the fiscal year of the restatement announcement. $MS_{j,t-1}$ is the market share of restating firm j in its 4-digit SIC industry, with market shares calculated using sales (COMPUSTAT #12). All variables are defined in Appendix B. The regressions are estimated from 1997 to 2002 in the pooled cross-section, and use firm and year fixed effects (in $FixedEffects$). The t-statistics in all regressions are based on standard errors that are robust to heteroscedasticity and are clustered by 4-digit SIC industry (to control for within-industry error correlation). *** (**) [*] denotes significance at the 1% (5%) [10%] level. "s" ("ns") stands for significant (non-significant).

Table 10: Horserace between the various proxies for news in the restatement

$$\Delta I_{i,p} = \boldsymbol{\beta_1}\mathbf{CAR_{i,-5,+5}} + \boldsymbol{\beta_2}\mathbf{CAR_{j,-5,+5}} + \boldsymbol{\beta_3}\mathbf{Restat_{j,t}} + \gamma_1 Hazard_{i,P} + \gamma_2 \Delta ExtFin_{i,p} + \gamma_3 \Delta Cash_{i,p} + \gamma_4 \Delta Q_{i,p} + \gamma_5 \Delta MS_{i,p} + \gamma_6 \Delta Size_{i,p} + \gamma_7 BH_{i,120} + FixedEffects + \varepsilon_{i,p}$$

Coefficient	Independent Variable	(1)	(2)	(3)	(4)
$\boldsymbol{\beta_1}$	$\mathbf{CAR_{i,-5,+5}}$	**0.132****		**0.130*****	**0.138*****
		(2.13)		**(3.11)**	**(3.15)**
$\boldsymbol{\beta_2}$	$\mathbf{CAR_{j,-5,+5}}$		**0.032*****	**0.054*****	**0.022****
			(3.30)	**(3.01)**	**(2.31)**
$\boldsymbol{\beta_3}$	$\mathbf{Restat_{j,t}}$	**0.022****	**0.025***		**0.025***
		(1.97)	**(1.77)**		**(1.77)**
γ_1	$Hazard_{i,P}$	-20.829***	-20.813***	-20.780***	-20.813***
		(-19.32)	(-19.28)	(-19.27)	(-19.28)
γ_2	$\Delta ExtFin_{i,p}$	0.056***	0.056***	0.056***	0.056***
		(9.78)	(9.79)	(9.66)	(9.79)
γ_3	$\Delta Cash_{i,p}$	0.016***	0.016***	0.016***	0.016***
		(9.95)	(9.95)	(10.07)	(9.95)
γ_4	$\Delta Q_{i,p}$	0.066***	0.066***	0.066***	0.066***
		(14.64)	(14.64)	(14.57)	(14.64)
γ_5	$\Delta MS_{i,p}$	-0.000	-0.000	-0.000	-0.00
		(-0.13)	(-0.13)	(-0.17)	(-0.13)
γ_6	$\Delta Size_{i,p}$	-0.001	-0.001	-0.001	-0.001
		(-0.87)	(-0.86)	(-0.89)	(-0.87)
γ_7	$BH_{i,120}$	-0.007*	-0.007*	-0.007*	-0.007*
		(-1.87)	(-1.80)	(-1.77)	(-1.80)
Firm fixed effects		s	s	s	s
Year fixed effects		s	s	s	s
Adjusted R^2		56.4%	56.1%	56.9%	57.2%
# of observations		23,345	23,345	24,455	23,345

$\Delta I_{i,p}$ is the scaled change in the investment I of competitor i, $\frac{I_P - I_{P-1}}{I_{P-1}}$, during the interval p. Competitors are in the same fiscal year and 4-digit industry as restating firms. Restating firms are excluded from the sample of competitors. $I_{i,P}$ ($I_{i,P-1}$) is the average investment during period P ($P-1$). Investment I is capital expenditure (COMPUSTAT #128) plus $R\&D$ expense (COMPUSTAT #46), scaled by prior-year total assets (COMPUSTAT #6). Period P is the three years +1, +2, +3 after the year 0 of the restatement announcement, while period $P-1$ is the three years −1, −2, −3 before year 0. $CAR_{i,-5,+5}$ is competitors' abnormal returns during the 10 days surrounding the restatement announcement, $CAR_{j,-5,+5}$ is restating firms' abnormal returns during the 10 days surrounding the restatement announcement, and $Restat_{j,t}$ is the scaled restatement amount. All variables are defined in Appendix B. The regressions are estimated from 1997 to 2002 in the pooled cross-section, and use firm and year fixed effects (in $FixedEffects$). The t-statistics in all regressions are based on standard errors that are robust to heteroscedasticity and are clustered by 4-digit SIC industry (to control for within-industry error correlation). *** (**) [*] denotes significance at the 1% (5%) [10%] level. "s" ("ns") stands for significant (non-significant).