The power of accounting information in explaining stock returns

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ABSTRACT

Prior literature shows that earnings have come to explain less stock price movement over time, suggesting that firm fundamental information has become less important. In this paper, we replace earnings with earnings announcement returns as a measure of earnings information and find that earnings news has come to explain more price movement over time. In the years after 2003, earnings announcement returns explain roughly 20% of the annual return—twice as much as they did before, indicating that fundamental information has become more important, not less in explaining stock returns. This pattern occurs for other forms of firm fundamental information. Collectively, the returns around earnings announcements, analyst forecast revisions and recommendations, and 8-K filings went from explaining 15% of annual returns in the 1990s to 35% in the 2010s. In exploring possible explanations for the increase in the explanatory power of fundamental information, we find evidence consistent with regulatory changes, such as Sarbanes-Oxley and the Global Settlement, collectively making disclosures more informative. In contrast, neither pre-announcement information leaks, sample composition changes, changes in preemptive disclosures, nor concurrent information events (e.g., management forecasts) explain the increase in explanatory power.

Keywords:

JEL: M40, M41, G12, G14

1. Introduction

Stock prices can move in response to firm-specific fundamental news, such as earnings announcements and business acquisitions; market-level fundamental news, such as treasury rates and commodity prices; or non-fundamental factors, such as noise trading and irrational investor behavior. How much of the movement in stock prices is explained by firm fundamental news, as opposed to non-fundamental factors? And how has the amount that is explained by firm fundamentals changed over time? These questions are important to the accounting and finance literature, because the accounting profession focuses on firm fundamental variables reflected in the accounting system, and standard theory suggests that stock prices should converge towards fundamental values in equilibrium. Yet, the accounting literature has lamented the low relevance of summary fundamental variables, such as earnings, to stock prices (Ball and Brown 1968; Lev 1989) and has suggested that the primary role of accounting is perhaps not to provide new information to the capital markets, but to play important contracting and confirming roles (Ball and Shivakumar 2008; Beyer et al. 2010). In this paper, we try to quantify the importance of firm fundamental information in explaining stock returns and to examine how the relative importance of this information has changed over time.

Starting from Ball and Brown (1968), the literature has focused on earnings to examine the relationship between firm fundamental information and stock returns. Although earnings is, conceptually, a good measure of firm performance, the literature shows that the correlation between returns and earnings has declined in the past 50 years (Collins, Maydew, and Weiss, 1997; Francis and Schipper, 1999; Lev and Zarowin, 1999). Recent work also shows that one-time and non-operating items have become a larger part of earnings, making earnings a noisier measure of firm performance (Bushman, Lerman, and Zhang, 2016). Confronted with these results, some might conclude that firm fundamental information has become less important in explaining stock returns over time. However, a low correlation between earnings and stock returns does not prove that investors ignore firm fundamentals. Maybe earnings is just a poor summary measure of firm fundamental news.

In this paper, we define firm fundamental information as all value-relevant information related to firm fundamentals, including information disclosed by firm, analysts, and other market participants. We do not use earnings as a summary measure of firm fundamental news. Rather, in the vein of Ball and Shivakumar (2008), we measure firm fundamental news as the return at the time the news is announced. We start with quarterly earnings announcements and then expand to information events, such as analyst reports, management guidance, and SEC filings. Intuitively, there are three reasons why announcement-date returns provide a better summary measure of firm fundamental news. First, announcement returns capture the market's surprise with less measurement error than earnings changes and analyst forecast errors do. Second, announcement returns contain different types of fundamental news—both quantitative and qualitative financial information, and both current and future fundamental news. Finally, the relationship between annual returns and announcement returns is more homogeneous across firms than the relationship between annual returns and earnings surprises. Such homogeneity is necessary to accurately measure the explanatory power of firm fundamentals in a linear regression framework.

When we use earnings announcement returns to proxy for firm fundamental news, we find that fundamental information explains a large chunk of annual stock returns. And, contrary to tests that use earnings as a proxy, we find that this chunk has recently become much larger. The power of earnings announcement returns to explain annual returns almost doubled around 2004, and has remained high ever since (other than during the financial crisis). We explore various potential reasons for this large increase and propose regulatory changes—such as the Sarbanes-Oxley Act (SOX) and the Global Settlement—as a likely cause that makes disclosures more informative.

To begin our tests, we replicate the finding in the prior literature that earnings now explain less stock price movement than they used to. When we regress annual returns on earnings changes, we find that adjusted R^2's have gradually declined over time. This decline has been dramatic—earnings changes went from explaining 18% of annual returns in 1973 to only about 2% of annual returns in recent years. On its face, this finding suggests two possibilities: either earnings has become a worse summary measure of fundamental news, or fundamental news has become less important to investors. Our results support the first possibility, since we find evidence in later tests that fundamental news has recently become more important, not less.

When we regress annual returns on earnings announcement returns, instead of earnings changes, the adjusted R^2's follow a different pattern. Rather than gradually decreasing, the R^2's remain flat at about 10% from 1973 to 2003, and then jump to about 20% in the years after 2004 (other than during the financial crisis).[1, 2] This evidence suggests that firm fundamentals, if anything, are more important now than in 1973. It also suggests that accounting disclosures, as a whole, convey a large amount of value-relevant information. After 2003, the four earnings announcements alone explain 20% of the variation in annual returns. Earnings changes, in contrast, explain only 2%. So while returns indicate that earnings announcement disclosures are quite informative (in total), the earnings number itself does not capture much of this information.

[1] These numbers come from our preferred specification, which uses logarithmic returns. We also report results for arithmetic returns.
[2] The lower R^2 around the financial crisis reflects the fact that stock prices move in response to market-wide news, such as changes in the risk-free rate and market risk premium. Market-wide news is mostly captured by the intercept of our cross-sectional regression. In other words, co-movement in stock prices across firms is much higher around the financial crisis because of market-wide news.

The increase in explanatory power is not restricted to earnings announcements. We also find it with 8-K filings and analyst reports. Thus, the explanatory power of firm-specific fundamental news appears to be increasing in general. Altogether, earnings announcements, analyst reports, and 8-K filings explain about 35% of the annual return in the 2010s as opposed to 15% in the 1990s. We posit that 35% serves as a lower bar for firm fundamentals to explain stock returns as we do not include all value relevant information events in our analysis, which is empirically impossible to do.

The observed pattern of fundamental news explaining the annual stock return suggests a regime shift in the early 2000s. In a series of exploratory tests, we examine a variety of potential reasons for the increase in explanatory power including (1) regulatory changes, including SOX 404 that targets a group of firms, the Global Settlement that targets analysts' forecasts, and SOX 409 that targets firms' 8-K filings; (2) a drop in information leaks prior to earnings announcements; (3) a change in sample composition; (4) a drop in the preemption of earnings announcement information from other disclosures, such as analyst forecasts and management guidance; and (5) an increase in concurrent information events, such as management guidance. We find support for the first of these potential reasons. Our findings on three regulatory changes all point to the same explanation, which is that regulatory changes in the early 2000s make disclosures more informative. In contrast, we do not find consistent evidence that the increase in explanatory power came from changes in information leaks, the sample of firms, preemptive disclosures, or concurrent information events. We recognize that there might be other explanations that we have not considered, and regulatory changes might not be the exclusive explanation.

This paper's main takeaway is as follows. Although earnings, as a summary measure, has become less useful over time due to increased noise and one-time items (Bushman, Lerman, and

Zhang 2016), firm fundamental information is still important to capital markets. In fact, it has recently become much more important. Before 2003, the four earnings announcements explained roughly 10% of the annual return. Now they explain roughly 20% of it. And that is when we restrict the analysis to earnings announcement news. When we construct a broad measure of fundamental news that includes earnings announcements, analyst forecast revisions and stock recommendations, and 8-K filings, the percentage of annual returns explained by fundamental news increases from about 15% in the 1990s to 35% in the 2010s. Based on this result, we believe that researchers should reevaluate the prevailing view in the literature that accounting disclosures do not provide much new information to capital markets. Echoing Kinney et al. (2002), Ball and Shivakumar (2008), and Basu et al. (2013), we also promote the use of earnings announcement returns as a summary measure of earnings news. The near-zero adjusted R^2's of earnings-return regressions in recent years indicate that the earnings number is not a good summary measure. Subsequent papers, such as Thomas, Zhang, and Zhu (2018a), use earnings announcement returns as a measure of earnings news.

Our paper follows Ball and Shivakumar (2008), who examine R^2's from regressions of annual returns on earnings announcement returns. Using a long historical window, they find that the abnormal R^2 is between 5 and 9 percent.[3] They do notice higher values in the last three years of their data, 2004 to 2006, although their limited sample period restricts their ability to draw definitive conclusions. Our first incremental contribution is to show that the increase in 2004-2006 is not a temporary shift, but a permanent one. We estimate that earnings announcements contribute about 20 percent of the year's price-relevant information in the post-2004 period, if we exclude

[3] The abnormal R^2 is the difference between the regression adjusted R^2 value and its expected value of 4.76% under the null hypothesis that daily returns are i.i.d. The regression adjusted R^2 is between about 10% and 14%, which is similar to what we document in the pre-2006 period.

the crisis years of 2008 and 2009. This is substantially higher than the headline estimate in Ball and Shivakumar (2008). We go further, and estimate the collective explanatory power of earnings announcements, analyst reports, and 8-K filings, which explain about 35% of the annual return in recent years. Our second incremental contribution is to explore a number of potential explanations for the recent increase in explanatory power and to identify a likely explanation for it. We suggest that regulatory changes, such as SOX and the Global Settlement, make disclosed fundamental information more informative.

Our study complements Beaver et al. (2018a, 2018b), Hand et al. (2018), and Thomas et al. (2018b), which focus on abnormal return volatility at earnings announcements (i.e., the U-statistic) to study earnings informativeness. While both Beaver et al. (2018a) and our paper suggest that earnings announcements have become more informative since the 2000s, they do so by studying different underlying constructs. The U-statistic captures the information that is *immediately* impounded into the stock price at the time of the earnings announcement. In contrast, our R^2 measure captures both this information and the information incorporated into the price during post-earnings-announcement drift. Any decrease in post-earnings-announcement drift will increase the U-statistic, whereas it should not affect the R^2. In a similar vein, the U-statistic picks up both permanent and transitory price changes around the earnings announcement, whereas only permanent price changes increase the R^2. Transitory price changes are related to noise trading, liquidity trading, and other non-fundamental reasons that we try to exclude in our R^2 measure. Not surprisingly, the time-series patterns of earnings informativeness documented in these two papers do not exactly overlap.[4] Our R^2 approach and the U-statistic approach in Beaver et al. (2018a) are analogous to different perspectives in Ball and Brown (1968) and Beaver (1969) on the value

[4] While our regression analysis suggests a region shift in R^2 around 2004, Beaver et al. (2018a) and other papers document an increasing trend of U-statistic since 2000.

relevance of earnings. In addition, our R^2 approach has the benefit of quantifying the percentage of annual returns explained by fundamental information, which is particularly important as we aim to answer the broad question of how much variation in stock returns can be explained by firm fundamentals, whereas the U-statistic approach does not. Finally, we explore a different perspective – regulatory changes, which complements increasing concurrent disclosures in Beaver et al. (2018b) and increasing dissemination of value relevant information in analysts' forecasts in Hand et al. (2018) to explain the observed time-series patterns.

The rest of the paper is organized as follows: Section 2 discusses related literature, Section 3 discusses the data, Section 4 discusses our research design and main empirical findings, Section 5 explores potential explanations, and Section 6 concludes.

2. Related Literature and Empirical Predictions

2.1 Related Literature

Capital markets research in accounting has long focused on the role of earnings in explaining stock returns. The literature, starting from Ball and Brown (1968), shows that stock prices respond to earnings. Since then, a huge literature has developed on the earnings-return relationship (e.g., the earnings response coefficient). The focus on earnings makes intuitive sense, as earnings are a summary performance measure that captures the profit attributable to shareholders. One strand of earnings-return research related to our paper investigates changes in the value-relevance of earnings and other financial metrics over time. This literature generally finds that the value-relevance of earnings has decreased over time, though it finds mixed evidence on changes in the value-relevance of book values.

Collins, Maydew, and Weiss (1997) explore the power of earnings and book values to explain prices from 1953 to 1993. While they find, as we do, that the value-relevance of earnings has declined, they also find that the value-relevance of book values has increased. They attribute this to the increasing frequency of losses and one-time items. Francis and Schipper (1999) extend these results by utilizing a different measure—returns from portfolios with perfect foresight of financial statement information. Like Collins, Maydew, and Weiss (1997), they find that the value-relevance of earnings declined from 1952 to 1994, but the value-relevance of balance sheet information increased. Brown, Lo, and Lys (1999) call the Collins, Maydew, and Weiss (1997) results into question, demonstrating that per-share scaling and the use of levels rather than changes drive the increase in balance sheet value-relevance, as measured by R^2's. Once they control for scale effects, they find that the value-relevance decreased over time. Furthermore, Lev and Zarowin (1999) demonstrate that, even without this adjustment, balance sheet value-relevance decreased from 1977 to 1996, meaning that the increase found in prior studies was driven by the 1950s, 1960s, and early 1970s. Core, Guay, and Van Buskirk (2003) also find declining value-relevance in the late twentieth century. They demonstrate that traditional financial variables explain less equity value variation during the second half of the 1990s than in earlier periods.

More recently, a number of papers examine the time-series pattern of accounting properties. For example, Dichev and Tang (2008) document a continuous and pronounced decline in the contemporaneous correlation between revenues and expenses from 1967 to 2003. Bushman, Lerman, and Zhang (2016) find that the negative correlation between accruals and cash flows has dramatically declined from about 70% in the 1960s to near zero in more recent years. A key property of accrual accounting is to smooth temporary timing fluctuations in operating cash flows, so a reduction in the negative correlation suggests a reduction in smoothing. Bushman, Lerman, and Zhang (2016) find that increases in one-time and non-operating items, as well as the frequency of loss firm-years, explain the majority of the overall decline. These changes in accounting properties are consistent with the decline in the power of earnings to explain stock returns.

Another line of research uses abnormal trading volume and abnormal return volatility (the "U-statistic") around earnings announcements to measure the information content of earnings. Beaver (1968) shows that both volume and return volatility are higher during earnings announcements than during non-earnings announcement periods. Landsman and Maydew (2002) find that their three-day U-statistic increases over time, indicating that earnings have become more informative. Francis, Schipper, and Vincent (2002) conclude that this increase in information content comes from more concurrent disclosure in earnings announcements, whereas Collins, Li, and Xie (2009) show that the increase is related to the intensity of the market's reaction to Street earnings. More relevant to our study, Beaver, McNichols, and Wang (2018a) show that their three-day cumulative U-statistic experiences a dramatic increase from 2001 onward. Beaver et al. (2018b) show that increases in U-statistic are associated with concurrent disclosures—management guidance, analyst forecasts, and disaggregated financial statement line items—being more frequently bundled with earnings announcements over time. Hand et al. (2018) show that analyst forecast data feeds have become richer and deeper over time, and this change in analyst forecasts helps to explain abnormal squared returns and abnormal trading volume around earnings announcements. Thomas et al. (2018b) provide a framework to understand what drives the U-statistic, and they show that the ratio also reflects variation in trading noise, normal information arrival, and investor under/overreaction. We complement these studies by using a different approach to study earnings informativeness and to answer a broader question of how much variation in stock returns can be explained by firm fundamentals.[5]

2.2 Empirical Specification and Predictions

Conceptually, stock prices could change because of fundamental news or non-fundamental reasons. Non-fundamental reasons include liquidity trading, noise trading, investor irrational behavior, and other factors that are not related to firm fundamentals. Fundamental news includes all value relevant information released by firms, analysts, and other market participants regarding firm fundamentals. In this paper, we estimate the proportion of total stock price movement that is driven by firm fundamental news, as opposed to non-fundamental factors.

Firm fundamental news includes both hard and soft financial information regarding a firm's fundamentals, such as sales, earnings, cash flows, and growth. This news can relate to both information about the current period and adjustments to expectations about future periods. Since our main empirical specification is to regress annual returns on earnings announcement returns following Ball and Shivakumar (2008), we essentially examine how much annual stock returns can be explained by firm fundamental news released during earnings announcements. We also expand our analysis to other fundamental information events, such as analyst earnings forecasts and 8-K filings.

Given that annual logarithmic returns are just the sum of daily logarithmic returns, our empirical specification has intuitive predictions. If daily returns are i.i.d.,[6] then the adjusted R^2 of

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[5] Bird et al. (2017) uses the increasing explanatory power of earnings announcement returns as a motivation for their paper, which studies the benefits of accounting regulations. They use firms' own pre-adoption mentions of accounting standards as a measure of treatment intensity and find that accounting standards increase absolute earnings announcement returns. Consistent with standards reducing discretionary disclosure, they show that this increase is explained by the increasing informativeness of negative earnings news.

[6] Independent identically-distributed (i.i.d.) returns imply either that investors do not value accounting information, or that accounting disclosures do not provide any new information. As a result, returns during earnings announcements are similar to those during non-announcement periods.

the regression is just the fraction of trading days included in the explanatory variables. Therefore, when we regress annual returns on earnings announcement returns, the adjusted R^2 should be 4.76% (= 12/252) given that there are 252 trading days on average and four quarterly earnings announcements have 12 trading days. If earnings announcements contain new fundamental information and investors value it, then we can partition trading days into information days and non-information days. We predict that the adjusted R^2 of the regression is larger than 4.76% for information days. When we construct pseudo earnings announcements from non-information days, we expect the adjusted R^2 to be smaller than 4.76%.

One advantage of our regression specification is to transform a non-linear relationship between stock returns and fundamental news into a linear one. Specifically, as logarithmic annual returns are the sum of logarithmic daily returns, the relationship between logarithmic annual returns and logarithmic earnings announcement returns is linear, as opposed to a potentially non-linear relationship between stock returns and traditional earnings surprise measures, such as seasonally differenced earnings and analyst forecast errors. Another advantage of our specification is that earnings announcement returns capture not only earnings surprises but also other fundamental news, such as expanded disclosure of the income statement and the balance sheet or guidance of next quarter performance, released upon earnings announcements. In that sense, earnings announcement returns are a more comprehensive measure of fundamental news than earnings surprises, which is the focus of the prior literature.

In subsequent analysis, we consider other announcements of fundamental news, such as analyst earnings forecasts and SEC filings. In a similar vein, we regress annual returns on announcement returns for each type of information and use the fraction of trading days in the announcement window as the R^2 benchmark. To the extent that such announcements are informative to the market, we expect the R^2 from the regression to be larger than the fraction of trading days in the announcement window.

3. Data

Returns data, which we use in each of our tests, come from CRSP. Annual earnings and earnings announcement dates are from Compustat and are available starting in 1973. The sample for our main tests consists of 181,462 firm-years from 1973 to 2015. Descriptive statistics for this sample are in Panel A of Table 1. Panel B of Table 1 contains correlations of some key variables in the data. The correlation between annual returns and earnings announcement returns is higher than the correlation between annual returns and earnings changes. Both of these correlations are higher than the correlation between earnings changes and the earnings announcement return.

Some of the tests examine announcement dates for other types of information. Data on analyst forecast revisions come from I/B/E/S, and are available beginning in 1982. For our tests that use analyst forecast revision dates, we have 140,123 firm-years from 1982 to 2015.

Data on filing dates for SEC filings come from the SEC's EDGAR website. The filing dates can be downloaded directly, but we had to scrape the filing time-stamps, which we use to determine whether filings were filed after trading hours. If a filing was filed after trading hours, then we treated it as if it occurred on the following day. There is sufficient EDGAR data starting in 1994, and we scraped time-stamps up to the end of 2014. For tests using 10-K and 10-Q filing dates, we have 99,118 firm-years from 1994 to 2014. For tests using 8-K filing dates, we have 87,073 firm-years over that same period.

4. Main Empirical Analysis

In our main analysis, we focus on earnings, which may be the most-important piece of firm fundamental news. It is certainly the piece that is most central to accounting. We consider two proxies for earnings news. One is earnings changes, a traditional measure of earnings surprises that is widely used in the literature.[7] The other is earnings announcement returns. We measure the importance of earnings news as the R^2 from a regression of annual stock returns on either earnings changes or earnings announcement returns. For each regression, this R^2 can be thought of as the fraction of annual stock returns that is explained by earnings or by fundamental information released in the four earnings announcements. We run these regressions on the cross-section of firms each year to see how the R^2 has changed over time. In the earnings announcement return regressions, we use both arithmetic returns and logarithmic returns, though we prefer logarithmic returns, since the annual logarithmic return is a linear function of the daily logarithmic returns. As discussed earlier, if the daily returns were i.i.d., then we would expect the R^2 to equal the fraction of the year's trading days that are in the announcement window. In the tests of earnings announcements, the fraction of a year's days that are earnings announcement days is fixed. Whenever the number of announcement days changes across firm-years in other tests, we use this fraction as a benchmark.

4.1. Changes in the Explanatory Power of Earnings over Time

We begin by confirming that earnings changes have become less important in explaining stock returns over time. Each year from 1973 to 2015, we run the following cross-sectional regression:

$$RET_{i,t} = \beta_0 + \beta_1 \Delta E_{i,t} + e_{i,t} \quad (1)$$

[7] The literature also uses analyst forecast errors, measured as actual earnings minus the analyst forecast. We stick to earnings changes to preserve our long sample period.

RET is a firm's annual return starting three months after the prior fiscal year end.[8] ΔE is earnings changes, measured as earnings before extraordinary items in year t minus earnings before extraordinary items in year t-1, scaled by average total assets. Results from each annual cross-sectional regression are in Table 2, Panel A, and the adjusted R^2's from these regressions are plotted in Figure 1. Consistent with prior literature, the R^2 has decreased steadily from about 18% in the 1973 to about 2% in recent years, indicating that earnings changes explain less of the annual return than it used to. Panel B of Table 2 confirms this with a time-series regression of the adjusted R^2's on a time trend variable counting the number of years since 1973. This regression estimates that the adjusted R^2 decreased by an average of 0.33 percentage points each year from 1973 to 2015.

4.2. Changes in the Explanatory Power of Earnings Announcement Returns over Time

In this section, we use the earnings announcement return as a summary measure of earnings news revealed during an earnings announcement. We run the following cross-sectional regression each year from 1973 to 2015:

$$RET_{i,t} = \beta_0 + \beta_1 ARET_{i,t} + e_{i,t} \qquad (2)$$

As before, *RET* is a firm's annual return starting three months after the prior fiscal year end. *ARET* is the earnings announcement return, measured as the sum of three-day [-1, 1] announcement window returns across the four quarterly earnings announcements, where day 0 is earnings announcement date. Panel A of Table 3 shows the results for this regression each year. We include this specification with arithmetic returns in order to match the regression in Table 2.

In Panel B, we show regression results for our preferred specification, which uses logarithmic returns:

[8] We measure annual returns starting three months after the prior fiscal year end so that they do not include the prior year's earnings announcements but include the current year's four earnings announcements.

$$\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET_{i,t}) + e_{i,t} \quad (3)$$

The left-hand side is simply the annual logarithmic return. On the right-hand side, $\log(1 + ARET)$ is the sum of three-day window logarithmic returns across the four earnings announcements. As logarithmic annual returns equal the sum of logarithmic daily returns, Equation (3) is a linear regression with a natural interpretation.

Figure 2 plots the adjusted R^2's from these regressions. Panel A shows the R^2's from the arithmetic return specification, and Panel B shows them from the logarithmic return specification. Unlike the R^2's from the yearly change-in-earnings regressions, these R^2's do not change significantly between 1973 and 2003. This suggests that even as the importance of earnings diminishes over the years, the importance of fundamental information released during earnings announcements does not. Even more striking, both Panel A and Panel B show that the explanatory power of earnings announcement returns almost doubles in 2004. The increase also appears to be permanent, since it has persisted to the present. In the logarithmic return specification, the R^2's are higher every year after 2004 than they were in any year before, other than in the 2008-2009 financial crisis period.

We believe that the short-lived drop in R^2 during the financial-crisis years should receive little weight when assessing whether the increase in R^2 is permanent. The financial crisis was an uncommon event where market conditions were very different from normal. The explanatory power of earnings announcements could be lower during the crisis because of conditions that do not exist outside of the crisis. The crisis may have caused larger shifts in market sentiment that moved stock prices in the same direction, leaving less room for firm fundamental information to explain stock price changes. Alternatively, the crisis may have caused earnings to contain larger transitory items, which might reduce the usefulness of earnings information and reduce its explanatory power. However, in either case, these conditions would go away once the crisis ended. In Figure 2, we see that the high post-2003 R^2 prevails both before and after the crisis.

Ball and Shivakumar (2008) also notice an R^2 increase in 2004, but their data only runs up to 2006, so it is unclear whether they are witnessing a temporary or permanent change. Figure 2 shows that the change appears to be permanent.

In Panel C of Table 3, we regress the adjusted R^2's from Panels A and B on *Time*, a trend variable that counts the number of years since the beginning of the sample. For both the arithmetic return and logarithmic return specifications, we find that the R^2's increase significantly over time. In a separate regression, we add an indicator, *POST2003*, that turns on for all years after 2003. This indicator has a significant positive coefficient in both specifications, estimating an increase in R^2's of over 7% after 2003. The coefficient on *Time* becomes insignificant or marginally negative, indicating there is no general increasing trend other than a region shift caused by some events in early 2000s.

In order to confirm that our earnings announcement return results are not driven by a change in the cross-correlation of daily returns within a year, we re-perform our main analysis with pseudo earnings announcement days that are either 35 days before the earnings announcement or 35 days after (exactly five weeks in either direction to ensure the same weekday). Each year from 1973 to 2015, we perform the following regression:

$$RET_{i,t} = \beta_0 + \beta_1 ARET\_PSEUDO_{i,t} + e_{i,t} \quad (4)$$

RET is a firm's annual returns starting three months after the prior fiscal year end. *ARET_PSEUDO* is pseudo earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date plus or minus 35 days.

Panel A of Table 4 and Figure 3 report the adjusted R^2's from these regressions. The figure shows no clear trend over time, indicating that the main earnings announcement return results are not driven by a change in the cross-correlation of daily returns. We confirm this in Panel B of Table 4, where we regress the adjusted R^2 on *Time*. These regressions show that there is no significant change in the adjusted R^2 over the years.

4.3. The Total Explanatory Power of Firm Fundamental Information

In this section, we estimate the amount of stock return variation that is explained by all firm fundamental information. We examine the information that is released in earnings announcements, analyst forecast revisions and recommendations, and 8-K filings. Arguably, there are many other sources of fundamental information released to the market, so our estimates in this section serve as a lower bar regarding the importance of firm fundamental information in explaining stock returns. We perform the following cross-sectional regression each year from 1994 to 2015:[9]

$$log(1 + RET_{i,t}) = \beta_0 + \beta_1 log(1 + ARET\_all_{i,t}) + e_{i,t} \qquad (5)$$

As before, *RET* is a firm's calendar annual return. log(1+$ARET\_all$) is the sum of announcement day logarithmic returns on information event days, which include days in the three-day earnings announcement window as well as days with analyst forecast revisions, analyst recommendations, and 8-K filings.

We show the R^2's from the annual regressions in Table 5, and we plot them in Figure 4. We also report the average fraction of days in the firm-year that contain information events, and the difference between the R^2 and this benchmark. This difference is the amount in excess of what the R^2 would be if daily returns were i.i.d., so it estimates the proportion of annual returns

[9] Note that 8-K time-stamps were only collected up to November 6, 2015, so 2015 contains a partial year of 8-K disclosures.

that these fundamental disclosures explain. Figure 4 shows that the R^2 for all fundamental information increased around 2004 from between 20 and 25 percent to between 30 and 40 percent (other than during the crisis). The difference with the benchmark indicates that between 20 and 25 percent of the annual return is explained by news that comes out on these event days. Overall, an impressive portion of variation in stock returns is explained by firm fundamental information, highlighting the importance of this information in capital markets.

5. Potential Reasons for the Increased Importance of Fundamental Information

To explain an increasing trend in the U-statistic, Beaver et al. (2018b), Hand et al. (2018), and Thomas et al. (2018b) consider a number of factors including increasing concurrent disclosures around earnings announcements, increasing dissemination of value relevant information in analysts' forecasts, and trading noise. While these factors are certainly possible explanations, we focus on potential explanations for the regime shift in explanatory power that we observe in the early 2000s, as opposed to the increasing trend in the U-statistic.[10]

We explore a number of potential explanations for the higher R^2's in the post-2003 period. One possibility is that information released during earnings announcements becomes more informative because of regulatory changes in the early 2000s. The second possibility is that less information was leaked before earnings announcements, making earnings announcement returns more useful in explaining annual returns in the post-2003 period. Other possibilities include changes in the sample composition, and concurrent management forecasts.

5.1. Regulatory changes

[10] While these explanations are not mutually exclusive, another reason for us to examine regulatory changes is that they have not been examined before, implying greater contribution to the literature.

There was a tsunami of accounting scandals at the beginning of millennium. The list includes Adelphia, AOL, Bristol-Myers Squibb, Computer Associates, Dynegy, Enron, HealthSouth, Qwest, Rite Aid, Sunbeam, Tyco, Waste Management, WorldCom, and Xerox, with Enron and WorldCom being the most familiar due to the scope and audacity of their deficient reporting. In response, the U.S. introduced the most substantial increase in the regulation of public financial reporting in 75 years, under the Sarbanes-Oxley Act of 2002, and created the Public Company Accounting Oversight Board (PCAOB) with almost unfettered powers to adopt and enforce rules governing the audit industry and to discipline audit firms and employees. These regulatory changes aimed to improve the quality of financial disclosure and the information environment in the capital markets. We posit that these regulatory changes made disclosures more informative and thus increased the explanatory power of earnings announcement returns.

With so many regulatory changes in the early 2000s, it is difficult to pinpoint a specific discrete event that led to the increase in the R^2. Aiming to shed some light on causality, we first focus on SOX 404, which targets firms with public floats above $75 million, and construct a difference-in-differences test. SOX 404 is one of the largest changes brought about by SOX (Prentice, 2007; Singer and You, 2011), and its implementation was costly (Iliev, 2010; Alexander et al, 2013). It requires every company to include a report from its managers on the company's internal controls over financial reporting. Within the report, managers have to assess, and auditors must attest to, the effectiveness of the company's internal controls. In testimony concerning the impact of the Sarbanes-Oxley Act, SEC Chairman William Donaldson said, "The requirements of Section 404 may have the greatest long-term potential to improve financial reporting by public companies by helping to identify potential weaknesses and deficiencies in internal controls."

Because implementation was expected to be costly, firms are only required to comply with SOX 404 if they are classified as accelerated filers. In general, a firm becomes an accelerated filer in the first fiscal year when its public float exceeds $75 million on the last day of its second quarter. We use this rule to conduct a difference-in-differences to explore whether SOX 404 is related to the increase in the explanatory power of earnings announcement returns. We begin by performing the same yearly cross-sectional regressions of logarithmic annual returns on logarithmic earnings announcement returns as we did in Section 4.2, but now we conduct regressions separately for firms with market values above the $75 million threshold and firms with market values below it.[11]

Panel A of Table 6 shows the results each year from these regressions, and Figure 5 separately plots the adjusted R^2's over time for both groups. From just examining the plot, both groups of firms experience an increase in R^2's around 2004, but the firms above the threshold appear to have a larger increase. Furthermore, the increase for firms below the threshold does not appear to be as permanent, since the adjusted R^2's for 2013 through 2015 are similar to pre-2004 levels.

We formally test this in a regression. Treating each R^2 value in Figure 5 as an observation, we run the following difference-in-differences:

$$Adj. R^2 = b_0 + b_1 D + b_2 POST2003 + b_3 D * POST2003 + \varepsilon \qquad (6)$$

POST2003 is an indicator that turns on for all years after 2003, when SOX 404 was implemented, and *D* is an indicator that turns on for the group of firms with market values above the threshold. In Panel C of Table 6, the results show that b_3 is significantly positive. This

[11] Consistent with the rule that determines accelerated filer status, we measure market values as of the end of the firm's second fiscal quarter. We use market values instead of public floats because floats are not available in a machine-readable database.

provides evidence that SOX 404 is partially responsible for the increase in R^2 in the post-2003 period. The coefficient b_2 is also significantly positive, so the firms below the threshold also see an increase, suggesting that other factors also play a role here.

To provide further evidence that regulatory changes can collectively make disclosure more informative and thus increase the explanatory power of announcement day returns, we now turn to two other regulatory changes that each specifically target a different non-earnings information release. There is a straightforward link between each of these regulations and their corresponding information releases, so showing that R^2's increase after adoption will provide further evidence that regulations can increase the informativeness of disclosures.

The first regulatory change we examine is the Global Analyst Research Settlement, an agreement which was reached between ten of the U.S.'s largest investment firms and U.S. regulatory bodies on April 28, 2003 to address analysts' conflicts of interest. This regulation contained provisions to insulate analysts from the investment banking arms of their financial firms, with the goal of preventing them from biasing their reports in order to serve clients' interests.

We expect the Global Settlement to increase the informativeness of analyst reports. There is evidence that analyst forecasts and recommendations were biased by investment banking relationships prior to the Global Settlement (Lin and McNichols, 1998), so if the rules effectively remove the influence of investment bankers, then analyst reports should become less biased and more informative. To test whether analyst disclosures become more informative after 2003, we run the following cross-sectional regression each year from 1982 to 2015:

$$log(1 + RET_{i,t}) = \beta_0 + \beta_1 log(1 + ARET\_analyst_{i,t}) + e_{i,t} \qquad (7)$$

where *RET* is a firm's calendar annual return. log(1+*ARET_analyst*) is the sum of logarithmic returns on days when analysts revise their forecasts for the firm's upcoming quarterly or annual earnings-per-share.[12]

The first column of Table 7, Panel A, shows the R^2's from running this regression each year from 1982 to 2015. As a benchmark, the second column shows the ratio_info_days, which is the average fraction of days that contained analyst forecasts each year. This provides a null hypothesis—what we would expect the R^2 to be if the logarithmic daily returns were i.i.d. random variables. Panel A of Figure 6 plots the R^2's and the ratio_info_days. The plot shows that the R^2's increase in 2004 after the introduction of the Global Settlement, and they stay elevated in subsequent years, other than during and right after the financial crisis (2008 to 2010), when they fall back to their pre-Global Settlement levels. In Panel B of Table 7, we regress the difference between the year's adjusted R^2 and ratio_info_days on *Time*, which counts the number of years since the beginning of the sample, and find that the difference significantly increased by about 0.5 percentage points on average each year. We then add *POST2003*, an indicator for years after 2003, to the regression. Its coefficient estimates a 1.2 percentage point increase in the period after 2003. While the coefficient is positive, it is statistically insignificant, although visually the R^2 plot appears to increase after 2003. Overall, this analysis provides some limited evidence that the Global Settlement increased the informativeness of analyst reports.[13]

The R^2 increase for analyst forecasts raises another possibility. Many forecasts occur right after the earnings announcement, within the three-day announcement window, so the

[12] Returns for forecast days are excluded from *ARET_analyst* if the forecast occurs during the earnings announcement window, as we do not want to pick up effects from the change in the explanatory power of earnings announcements.

[13] However, there is always a possibility that some other factor drives the increase in analyst forecast R^2's. There is some evidence that other measures of analyst disclosure quality did not improve after the Global Settlement (Kadan, Madureira, Wang, and Zach, 2009; Begley, Gao, and Cheng, 2009).

increase in earnings announcement R^2's may be caused by the analyst forecasts.[14] We find evidence that this is not the case. In untabulated tests, we re-run the earnings announcement returns regressions with the sample restricted to analyst-covered firm-years that do not have a single analyst forecast in any earnings announcement window. We find that these firms still experience an increase in the explanatory power of earnings announcement returns after 2003, suggesting that concurrent information provided by analysts cannot be the sole explanation for our results.

The next regulatory change we examine is SOX Section 409, which called for an expansion in 8-K disclosures. The SEC implemented this expansion in August of 2004. This regulation added new events that needed to be disclosed with an 8-K filing, and it shortened the filing deadline to four business days after an event. The additional disclosure items may have increased the amount of information in the 8-K, and the shortened filing deadline may have decreased preemption of the information by news and leaks.

We run the same cross-sectional regressions as with the analyst forecasts, except the right-hand-side variable is the sum of logarithmic returns on all 8-K filing days during the calendar year:

$$log(1 + RET_{i,t}) = \beta_0 + \beta_1 log(1 + ARET\_8K_{i,t}) + e_{i,t} \qquad (8)$$

We run separate regressions from 1994 to 2014, all of the years where we have 8-K filing dates and times. As with analyst forecast revisions, log(1+*ARET_8K*) is the sum of announcement day logarithmic returns on days when an 8-K was filed, and an 8-K filing day is excluded if it occurs during the earnings announcement. Column 3 of Table 7, Panel A, shows the R^2's of each annual cross-sectional regression, and column 4 shows the ratio_info_days, which is the fraction of days

[15] In an untabulated regression of the yearly R^2 on *Time* and *POST2003*, we find that the coefficient on *POST2003* is insignificant.

in a firm-year that contain 8-K filings. Panel B of Figure 6 plots these numbers. The figure shows that the R^2's increased in 2004 when the new 8-K requirements went into effect. As with the earnings announcement, the R^2's fall during the crisis, but increase again afterwards, indicating that this is a permanent change. In Panel B of Table 7, a regression of the yearly difference between the adjusted R^2 and ratio_info_days on *Time* and *POST2003* shows that there was a significant increase in the explanatory power of 8-Ks after 2003, since *POST2003* has a significant positive coefficient. This provides additional evidence that regulatory changes can increase a disclosure's informativeness to capital markets.

In sum, we examine three regulatory changes: SOX 404, which targets a group of firms; the Global Settlement, which targets analysts' forecasts; and SOX 409, which targets firms' 8-K filings. While each test has its limitations, the results from these three tests all point to the same direction and are consistent with the view that regulatory changes in the early 2000s made disclosures more informative.

5.2. Information leakage or better information processing

A second potential explanation for the increase in earnings announcement R^2's is less preemption of the announcement's information. If less information is leaked beforehand, then more of the earnings announcement's information will be news, which would increase the explanatory power of earnings announcement returns. Such a reduction in information leakage may come from Regulation Fair Disclosure (Reg FD). To test this potential explanation, we regress the annual logarithmic return on the sum of pre-earnings announcement logarithmic returns during the year, where the pre-announcement period runs from the 4^{th} day before the earnings announcement to the 2^{nd} day before. Table 8 and Figure 7, Panel A, contain the R^2's from this regression each year. The figure shows that the R^2's associated with pre-earnings announcement returns have slightly decreased over the years. However, crucially, there was no dramatic decrease in 2004 or the following years.[15] This indicates that the increase in R^2's for earnings announcement day returns was likely not driven by a decrease in information leaks.

We then check whether there is a post-2003 reduction in analyst leaks. We regress the logarithmic annual return on the sum of logarithmic returns for the day before all analyst forecasts.[16] We present the R^2's from running this regression each year in Table 8 and Figure 7, Panel B. As with the pre-earnings announcement returns, the explanatory power of the pre-analyst forecast returns does not decrease in 2004. The R^2 is largely flat over time.

Reducing preemption would move some of the price response from the pre-announcement period to the earnings announcement. Other forces could move some of it from the post-announcement period as well. If disclosures take time to digest, then the full price response may not happen on the day of the disclosure. It is possible that investors became much faster at processing information in the post-2003 period, moving more of the price response to the earnings announcement day. We do not find any evidence consistent with this explanation. In Table 7 and Figure 6, Panel C, we report results from regressing annual returns on 10-K and 10-Q filing date returns (excluding filing dates that occur during the earnings announcement window). The R^2's do not increase at all around 2004. Under the assumption that the 10-K and 10-Q have useful information that is difficult to process quickly, better information processing should lead to higher R^2's. We also use the post-announcement returns as the explanatory variable and find no region shift around 2004.

5.3. Changes in sample composition

[15] In an untabulated regression of the yearly R^2 on *Time* and *POST2003*, we find that the coefficient on *POST2003* is insignificant.

[16] We exclude any days that have another analyst forecast, or that fall during the earnings announcement.

We next consider whether changes in sample composition explain our results. Srivastava (2014) examines whether shifts in the real economy, and specifically the growth in prominence of firms with high intangible intensity, explain the bulk of the temporal changes in earnings properties. He finds that such sample composition changes are significantly responsible for the decrease in the relevance of earnings and the matching between revenues and expenses documented respectively by Collins et al. (1997) and Dichev and Tang (2008). We examine this hypothesis by repeating the regressions of annual returns on earnings changes and the earnings announcement return each year, but running them separately for different cohorts of firms. All of the firms are divided into four listing cohorts in the following steps. The first year in which a firm's data are available in Compustat is referred to as the "listing year". All of the firms with a listing year in 2000 or later are classified as "2000s". The remaining firms listed in a common decade are referred to as a wave of newly-listed firms in the 1970s, 1980s, and 1990s.

The adjusted R^2's from these regressions are shown in Table 9, which tells us two things. First of all, changes in sample composition do not drive the gradual decline in the explanatory power of earnings. The decline occurs for each cohort. Secondly, changes in sample composition also do not cause the post-2003 increase in the explanatory power of earnings announcement returns, since firms from the 1970s, 1980s, and 1990s cohorts all experience the increase.

5.4. Concurrent disclosures and analysts' dissemination of information

To explain an increasing trend in the U-statistic, Beaver et al. (2018b) propose increasing concurrent disclosures around earnings announcements, such as management guidance, whereas Hand et al. (2018) suggest analysts' dissemination of value relevant information. While both concurrent disclosures and analysts' dissemination of information are potentially credible explanations for the increase in R^2, they are unlikely to be the whole story for three reasons.

First, both Beaver et al. (2018b) and Hand et al. (2018) observe a gradual increase in concurrent disclosures and analysts' dissemination of value relevant information, a pattern consistent with the graduate increase in U-statistics from 2001 to 2016, whereas we observe a regime shift around 2003, suggesting that other factors, such as regulatory changes, also play a role.

Second, our information events are not limited to earnings announcements, but extend to analyst forecasts and 8-K filings. Whereas concurrent disclosures and analysts' dissemination apply to earnings announcements, they do not equally apply to other information events that we study.

Finally, we conduct empirical tests by limiting our sample to firms with either no management guidance or no analyst following. Specifically, we re-perform the regressions of logarithmic annual returns on the sum of logarithmic earnings announcement returns, but we restrict the sample to firm-years that have no management guidance (results untabulated).[17] We find that firms without any voluntary manager guidance still experience an R^2 increase around 2004. The yearly R^2's in these tests are almost the same as the results with the full sample in Table 3, Panel B. The average R^2 from 2004 to 2010 is 18% for the sample with no voluntary guidance, compared to 19% for the full sample. This demonstrates that the increase in R^2's for earnings announcements cannot be fully explained by an increase in manager guidance on the earnings announcement day.[18] In another untabulated test, we re-run the earnings announcement returns regressions with the sample restricted to firm-years that do not have a single analyst forecast in any earnings announcement window. We find that these firms still experience an

[17] We have data on management guidance from the CIG database from 1994 to 2010. We exclude a firm-year during this period if any manager guidance is recorded in the CIG database for that firm during the year.

[18] Ball and Shivakumar (2008) also examined this with their limited sample period, and determined that management forecasts could not explain the increase in the last three years of their sample.

increase in the explanatory power of earnings announcement returns after 2003. This demonstrates that the increase in explanatory power for earnings announcements cannot be fully explained by an increase in analyst forecasts during the earnings announcement window.

In sum, we test a variety of possible explanations for the increase in the explanatory power of earnings announcements in the post-2003 period. We do not find evidence suggesting that it was caused by a decrease in information leakage or a change in sample composition. We also find that our results hold for firms with no management guidance and for firms with no analyst coverage. We find evidence consistent with the idea that regulatory changes, such as the SOX and the Global Settlement, make disclosure more informative and thus increase the market's response to such disclosure.

5.5 Firm size, growth, profitability, and industry effects

Although Section 5.3 shows that changes in sample composition do not explain our results, there could still be systematic differences in listed firms over time. In this section, we carry out a battery of additional tests to explore whether our results vary with firm characteristics, such as firm size, growth, profitability, and industry effects.

We first consider the effect of firm size by partitioning our sample into three size terciles each year and run equation (3) for each resulting tercile each year. Finally, we take the adjusted R^2 from equation (3) as the dependent variable and regress it on TIME and POST2003. Panel A of Table 10 shows that the coefficients on POST2003 are significantly positive whereas the coefficients on TIME are indistinguishable from zero across all three size terciles, suggesting a region shift in the adjusted R^2 regardless of firm size. Then we perform similar analyses on growth and profitability, where growth is the market-to-book ratio and profitability is earnings scaled by book value of equity. The results in Panels B and C of Table 10 again show a region shift, with significant coefficients on POST2003 and insignificant coefficients on TIME. Finally, we conduct empirical analysis for each 1-digit SIC code industry. Panel D of Table 10 shows that the coefficients on TIME are uniformly insignificant whereas the coefficients on POST2003 are significantly positive for most industries.

Taken together, Table 10 illustrates the robustness of our results across firm size, growth, profitability, and industry effects. Partitions based on these dimensions all suggest a region shift in the informativeness of earnings announcements around 2003.

6. Conclusion

In this paper, we demonstrate that firm fundamental information, including the information provided by both firms and analysts, is still important to capital markets. Even though earnings have come to explain less of the annual return over time, we find that firm fundamental information still explains a significant amount of it when we proxy for the information with earnings announcement returns. Indeed, the explanatory power of earnings announcement returns almost doubled around 2004; they now explain around 20% of the annual return. So even though earnings are becoming less important, firm fundamental information is becoming more so. This pattern occurs for other forms of firm fundamental information. Collectively, the returns around earnings announcements, analyst forecast revisions and recommendations, and 8-K filings went from explaining 15% of annual returns in the 1990s to 35% in the 2010s.

We explore a variety of potential explanations for the increase in the explanatory power of firm fundamental information. We find evidence consistent with the view that regulatory changes in the early 2000s are related to the regime shift. SOX 404, the Global Settlement, and SOX 409 all increase the explanatory power of their respective disclosures. Collectively, these regulatory changes are likely to make disclosures more informative, resulting in larger responses from the market. We find no evidence that the increase was driven by less information leakage or by changes in sample composition. We also find that our results hold for firm-years with no management guidance and for firm-years with no analyst coverage.

References

Alexander, C. R., S. W. Bauguess, G. Bernile, Y. A. Lee, and J. Marietta-Westberg. 2013. Economic effects of SOX Section 404 compliance: A corporate insider perspective. *Journal of Accounting and Economics 56* (2–3):267-290.

Ball, Ray and Lakshmanan Shivakumar, 2008, "How Much New Information is there in Earnings?", *Journal of Accounting Research*, 46(5), 975-1016.

Basu, S., T. Duong, S. Market, and E. Tan. 2013. How important are earnings announcements as an information source? *European Accounting Review* 22(2), 221-256.

Beaver, W. 1968. The information content of annual earnings announcements. *Journal of Accounting Research* 6, 67-92.

Beaver, W., M. McNichols, and Z. Wang. 2018a. The information content of earnings announcements: New insights from intertemporal and cross-sectional behavior. Review of Accounting Studies, 23(1), 95-135.

Beaver, W., M. McNichols, and Z. Wang. 2018b. Increased Information Content of Earnings Announcements in the 21st Century: An Empirical Investigation. Stanford University and UIUC, working paper.

Begley, J., Gao, Y. and Cheng, Q., 2008, August. Changes in analysts' information environment following Sarbanes-Oxley Act and the Global Settlement. AAA.

Beyer, A., D. Cohen, T. Lys, and B. Walther. 2010. The financial reporting environment: Review of the recent literature. *Journal of Accounting and Economics* 50(2-3), 296-343.Brown, S., Lo, K. and Lys, T., 1999. Use of R 2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting and Economics,* 28(2), 83-115.

Bushman, R. A. Lerman, and X.F. Zhang. 2016. The changing landscape of accrual accounting. *Journal of Accounting Research*, 56(1), 41-77.

Collins, D.W., Maydew, E.L. and Weiss, I.S., 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of accounting and economics*, *24*(1), 39-67.

Collins, D., Li, O., and H. Xie. 2009. What drives the increased informativeness of earnings announcements over time? *Review of Accounting Studies* 14, 1-30.

Core, J.E., Guay, W.R. and Van Buskirk, A., 2003. Market valuations in the new economy: An investigation of what has changed. *Journal of Accounting and Economics*, *34*(1), 43-67.

Dichev, I. and V. Tang. 2008. Matching and the changing properties of accounting earnings over the last 40 years. *The Accounting Review* 83(6), 1425-1460.

Fama, E. and K. French. 2004. New lists: fundamentals and survival rates. *Journal of Financial Economics* 72, 229-269.

Francis, J. and Schipper, K., 1999. Have financial statements lost their relevance? *Journal of accounting Research*, *37*(2), 319-352.

Francis, J., Schipper, K., and L. Vincent. 2002. Expanded disclosures and the increased usefulness of earnings announcements. *The Accounting Review* 77, 515-546.

Givoly, D. and C. Hayn. 2000. The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative. *Journal of Accounting and Economics* 29(3), 287-320.

Hand, J.R., Laurion, H., Lawrence, A., and Martin, N., 2018. Analyst Forecast Data Feeds Are Not What They Used to Be. UNC, working paper.

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

Bird, A., Karolyi, S.A. and Ruchti, T., 2017. Regulating information. CMU, working paper.

Kadan, O., Madureira, L., Wang, R. and Zach, T., 2009. Conflicts of interest and stock recommendations: The effects of the global settlement and related regulations. *Review of Financial Studies*, *22*(10), 4189-4217.

Kinney, W., D. Burgstahler, and R. Martin. 2002. Earnings surprises “materiality” as measured by stock returns. *Journal of Accounting Research* 40(5), 1297-1329.

Landsman, W. and E. Maydew. 2002. Has the information content of quarterly earnings announcements declined in the past three decades? *Journal of Accounting Research* 40, 797-808.

Lev, B., 1989. On the usefulness of earnings and earnings research: Lessons and directions from two decades of empirical research. *Journal of accounting research*, pp.153-192.

Lev, B. and Zarowin, P., 1999. The Boundaries of Financial Reporting and How to Extend Them. *Journal of Accounting Research*, *37*(2), 353-385.

Lin, H.W. and M.F. McNichols. 1998. Underwriting relationships, analysts' earnings forecasts and investment recommendations. *Journal of Accounting and Economics 25*(1), 101-127.

Prentice, R., 2007. Sarbanes-Oxley: The Evidence Regarding the Impact of SOX 404. *Cardozo L. Rev.*, *29*, p.703.

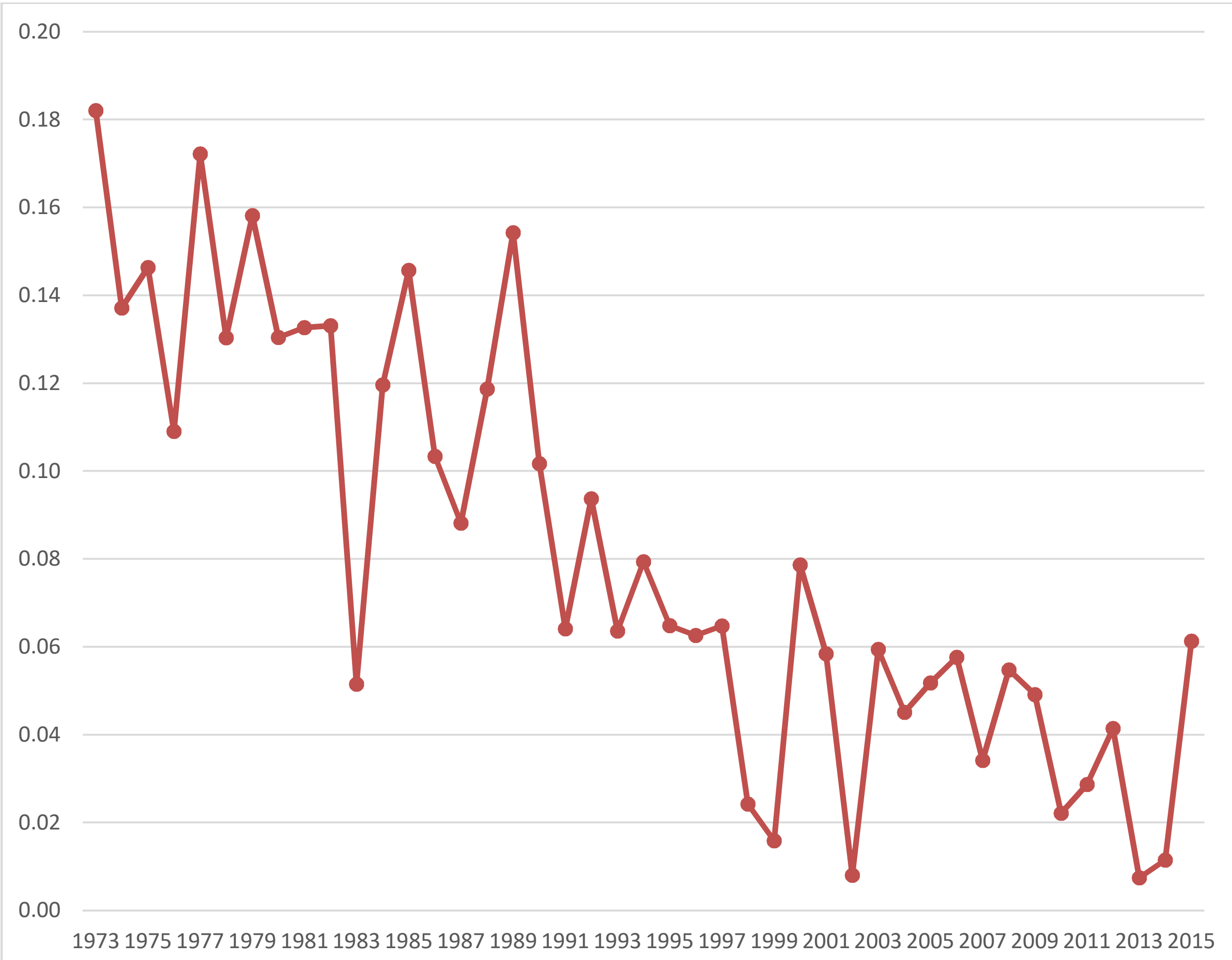
Thomas, J., F. Zhang, and W. Zhu. 2018a. Off-exchange trading and post earnings announcement drift. Yale University and UIUC, working paper.

Thomas, J., F. Zhang, and W. Zhu. 2018b. Measuring the information content of accounting disclosures. Yale University and UIUC, working paper.

Singer, Z., and H. You. 2011. The Effect of Section 404 of the Sarbanes-Oxley Act on Earnings Quality. *Journal of Accounting, Auditing & Finance* 26 (3):556-589.

Srivastava, A. 2014. Why have measures of earnings quality changed over time? *Journal of Accounting and Economics* 57(2-3), 196-217.

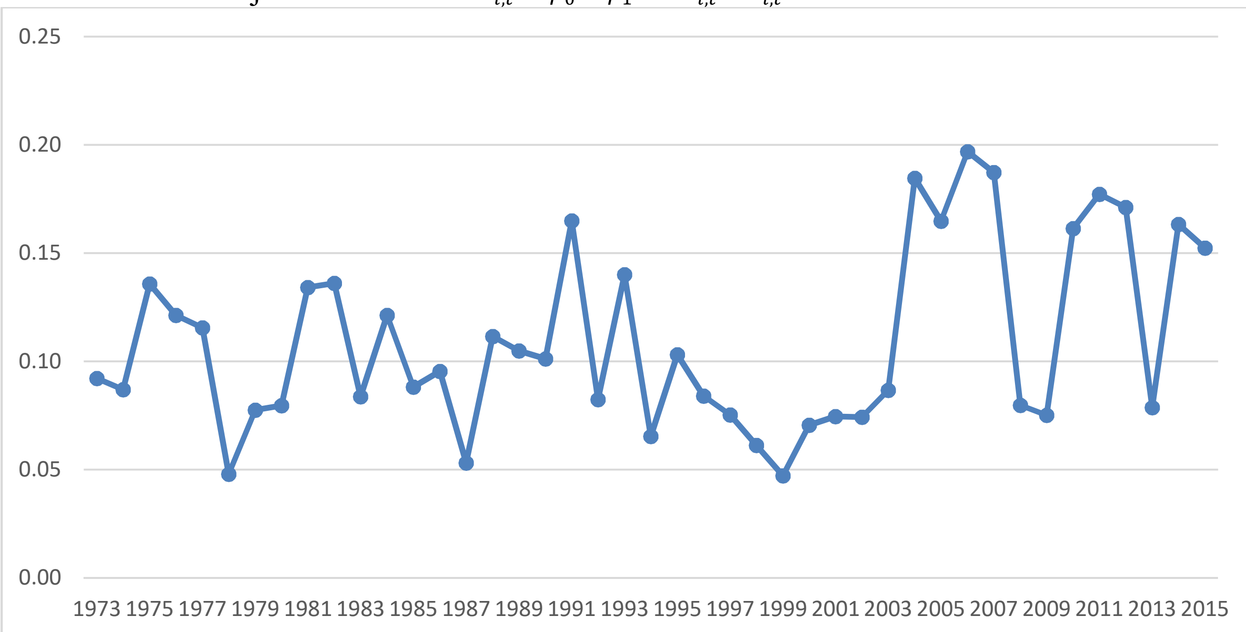
Figure 1
The relation between annual returns and earnings changes



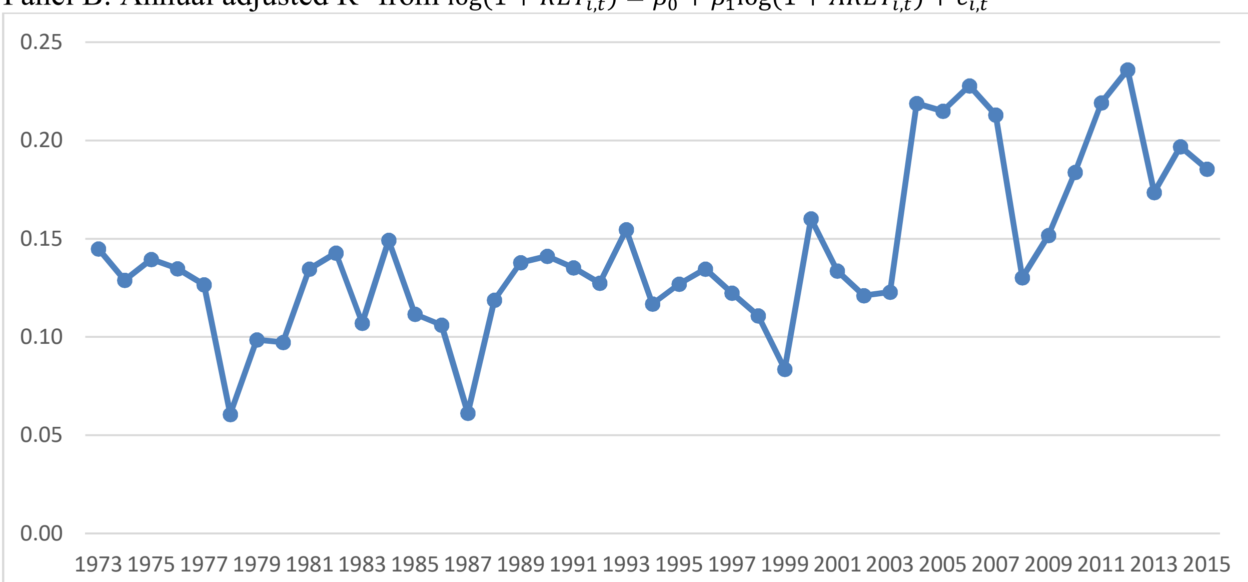
This figure plots the adjusted R^2 from $RET_{i,t} = \beta_0 + \beta_1 \Delta E_{i,t} + e_{i,t}$, which is estimated annually. *RET* is a firm's annual returns starting three months after the prior fiscal year end. ΔE is earnings changes, measured as earnings before extraordinary items in year t minus earnings before extraordinary items in year t-1 scaled by average total assets. The sample includes 181,462 firm-year observations with non-missing *RET*, *ARET*, and ΔE from 1973 to 2015. Each year, all variables except for returns are Winsorized at 1% and 99%. Table 2 contains regression results.

Figure 2
The relation between annual returns and earnings announcement returns

Panel A: Annual adjusted R^2 from $RET_{i,t} = \beta_0 + \beta_1 ARET_{i,t} + e_{i,t}$

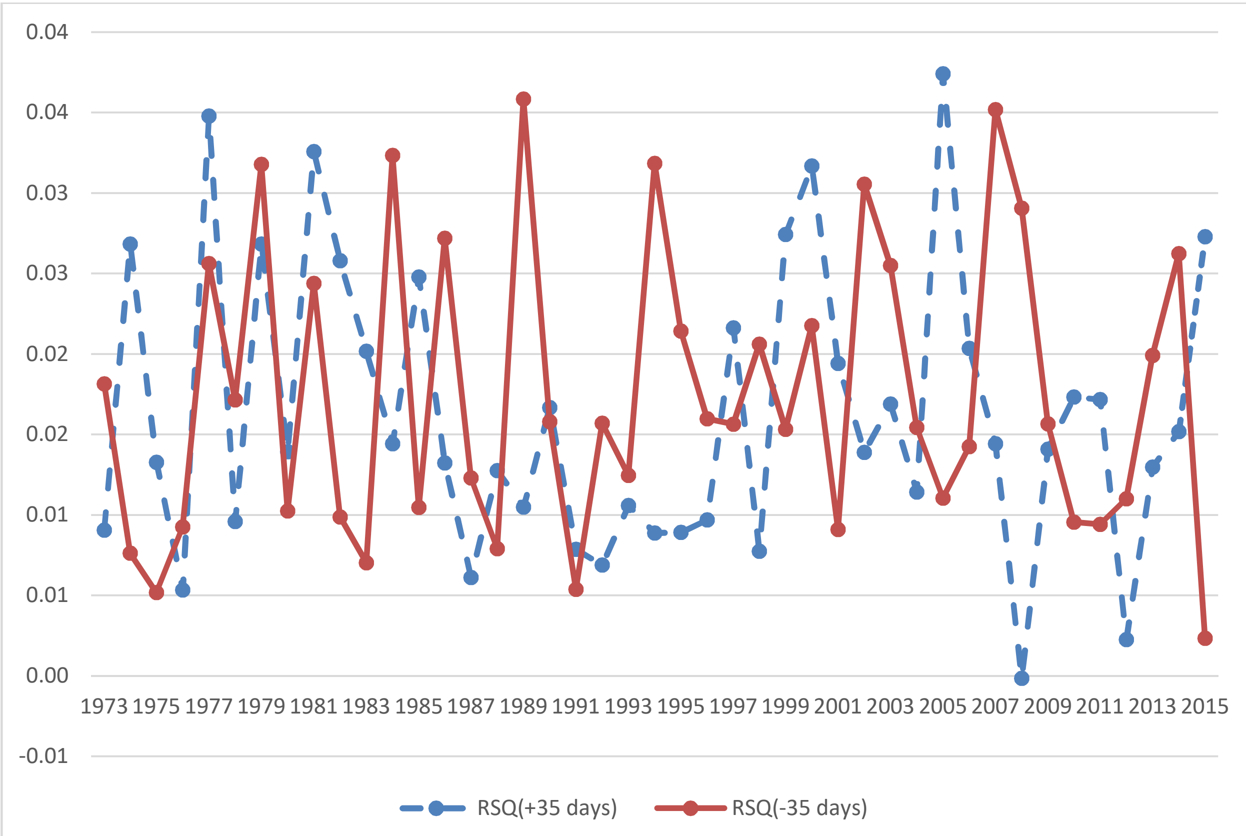


Panel B: Annual adjusted R^2 from $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET_{i,t}) + e_{i,t}$



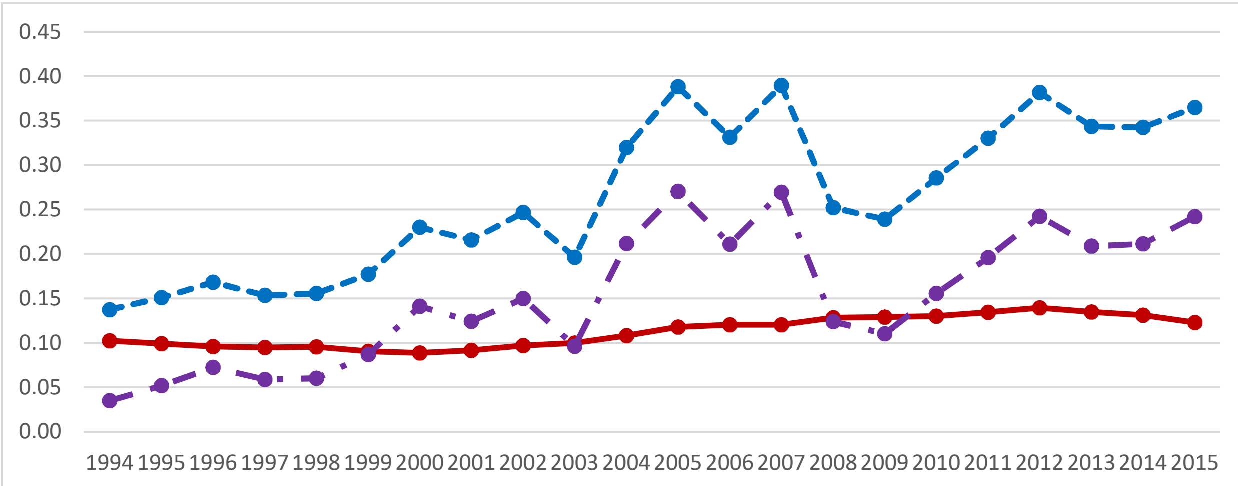
Panel A plots the annual adjusted R^2 from $RET_{i,t} = \beta_0 + \beta_1 ARET_{i,t} + e_{i,t}$, whereas Panel B plots the annual adjusted R^2 from $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET_{i,t}) + e_{i,t}$. *RET* is a firm's annual returns starting three months after the prior fiscal year end. *ARET* is earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date. In the logarithmic specification (Panel B), log(1 + *ARET*) is the sum of logarithmic returns across the four quarterly announcement windows. The sample includes 181,462 firm-year observations with non-missing *RET*, *ARET*, and ΔE from 1973 to 2015. Table 3 contains regression results.

Figure 3
The adjusted R^2 from regression annual returns on pseudo earnings announcement returns



We examine two pseudo earnings announcement dates: +35 and -35 days (+/- 5 weeks to ensure the same weekday) from the actual earnings announcement date. *RET* is a firm's annual returns starting three months after the prior fiscal year end. *ARET_PSEUDO* is pseudo earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date plus or minus 35 days. The figure plots the adjusted R^2 from $RET_{i,t} = \beta_0 + \beta_1 \text{ARET\_PSEUDO}_{i,t} + e_{i,t}$, estimated annually for windows around the earnings announcement +35 or -35 days. The sample includes 181,462 firm-year observations with non-missing *RET* and *ARET_PSEUDO* from 1973 to 2015.

Figure 4
Regressions of annual returns on returns during all information days



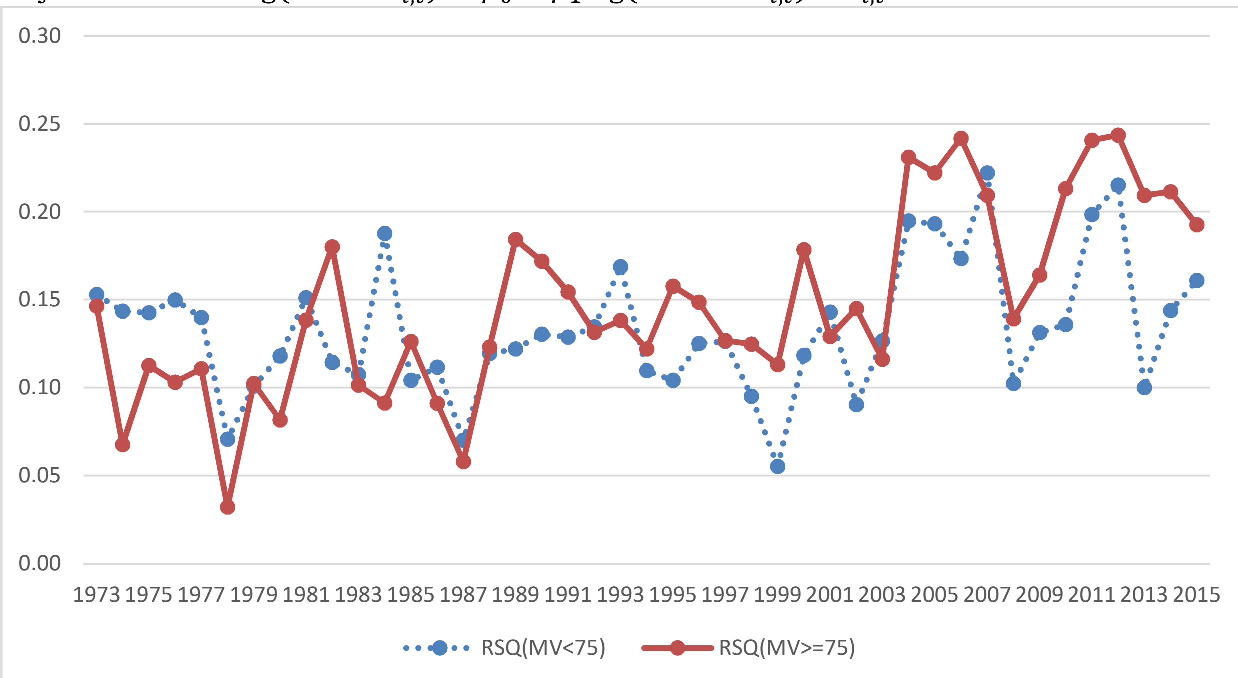
The blue line reports the adjusted R^2 from the following regression, which is estimated each year:

$$\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_all_{i,t}) + e_{i,t}.$$

RET is a firm's calendar annual return. log(1+*ARET_all*) is the sum of announcement day logarithmic returns on days that contain an information event, which includes the earnings announcement window (day -1 to day +1) and days with analyst forecast revisions, analyst recommendations, and 8-K filings. The red line plots ratio_info_days, the average fraction of information event days in a year. The purple line plots the difference between the blue line and the red line, and represents the proportion of annual returns explained by the fundamental information disclosed on event days. The sample has 147,157 firm-years from 1994 to 2015 with non-missing data. Table 9 contains regression results.

Figure 5
The effect of SOX 404 on the relation between annual returns and earnings announcement returns

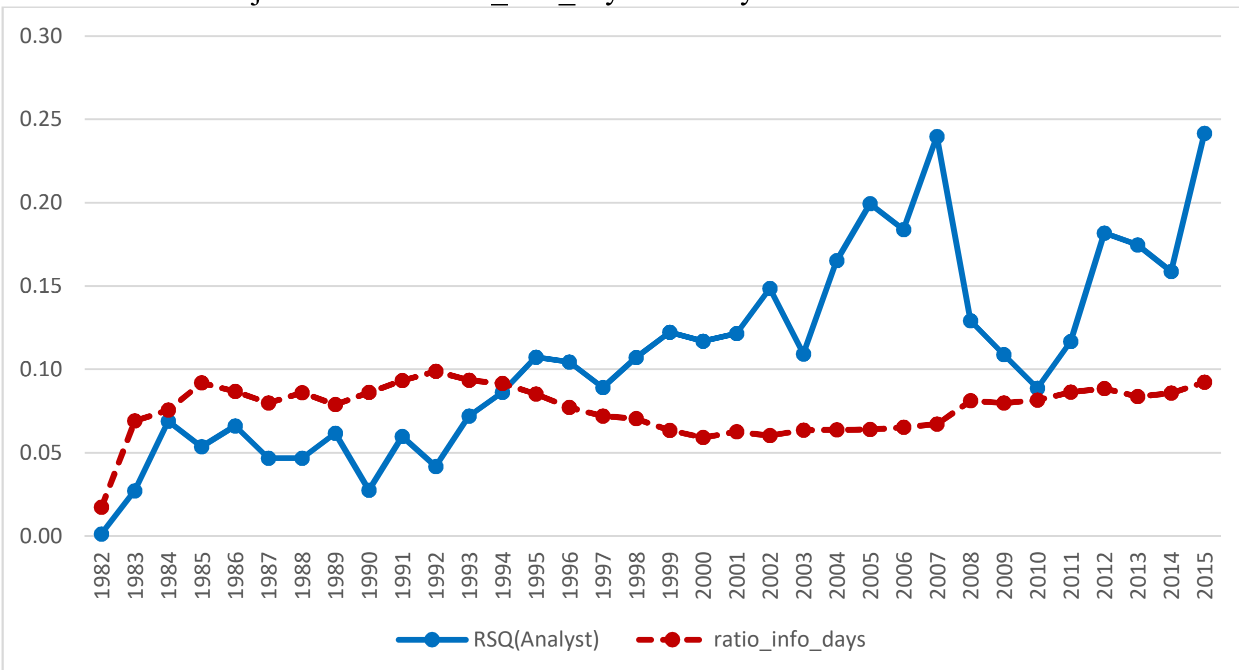
Adjusted R^2 from $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET_{i,t}) + e_{i,t}$



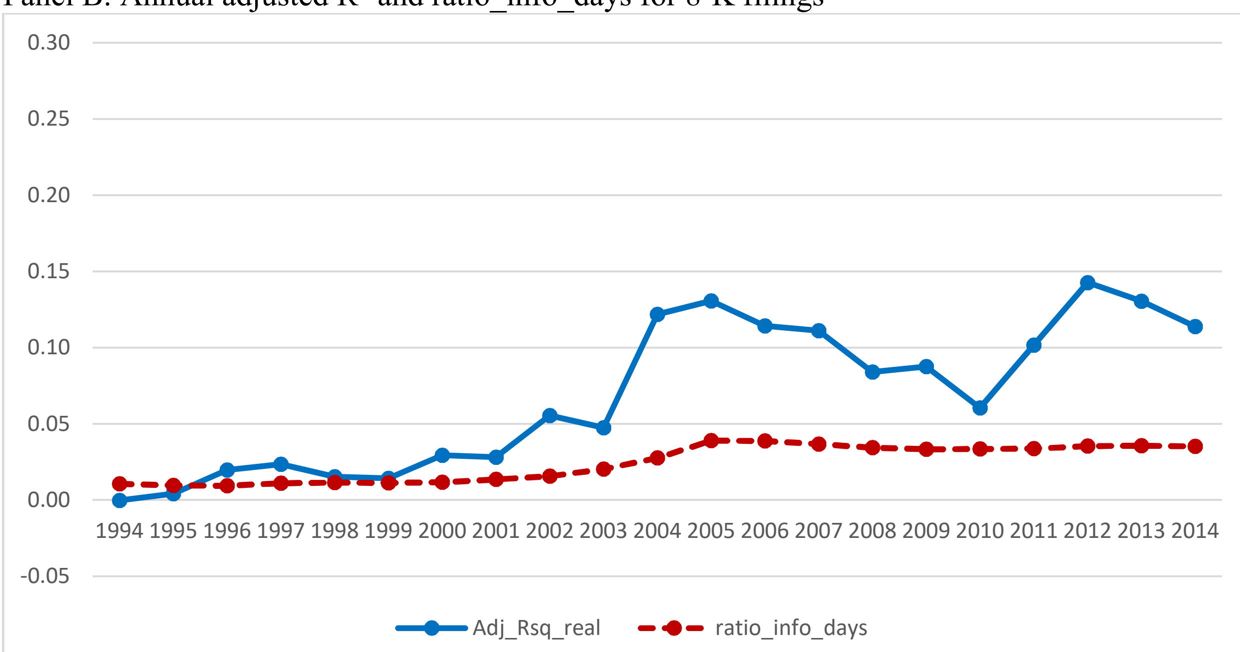
This figure separates the sample each year into firms with market capitalizations above $75 million and firms below. Within each sub-sample, we run the following regression: $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET_{i,t}) + e_{i,t}$. Variables are defined as in Figure 2. The figure plots the adjusted R^2 each year for each sub-sample. Table 5 contains regression results.

Figure 6
The relation between annual returns and returns for other disclosures

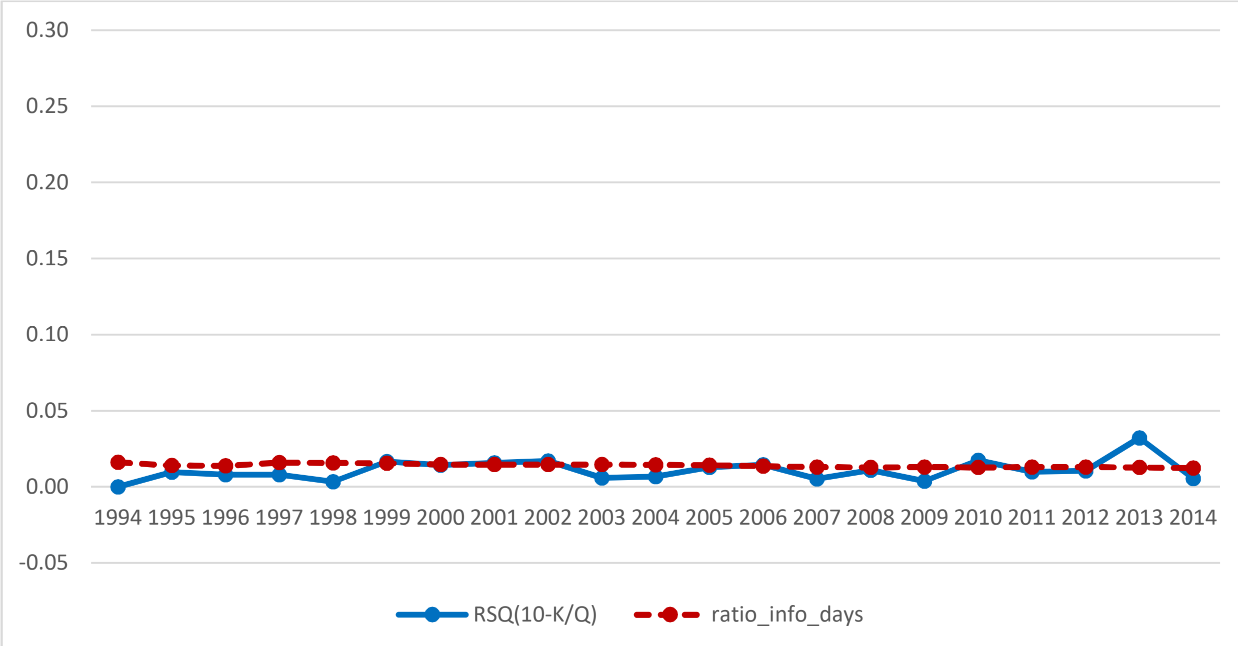
Panel A: Annual adjusted R^2 and ratio_info_days for analyst revisions



Panel B: Annual adjusted R^2 and ratio_info_days for 8-K filings



Panel C: Annual adjusted R^2 and ratio_info_days for 10-K and 10-Q filings



This figure reports the adjusted R^2 and its ratio_info_days from the following three regressions, which are estimated annually:

Panel A, RSQ(Analyst): $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_analyst_{i,t}) + e_{i,t}$,

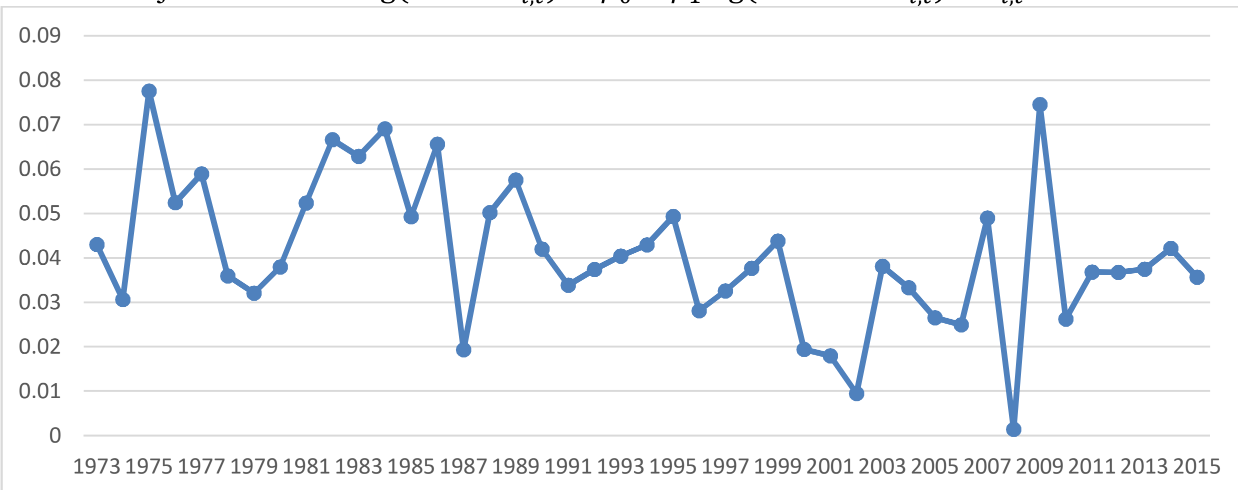
Panel B, RSQ(8-K): $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_8K_{i,t}) + e_{i,t}$,

Panel C, RSQ(10-K/Q): $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_10K_{i,t}) + e_{i,t}$,

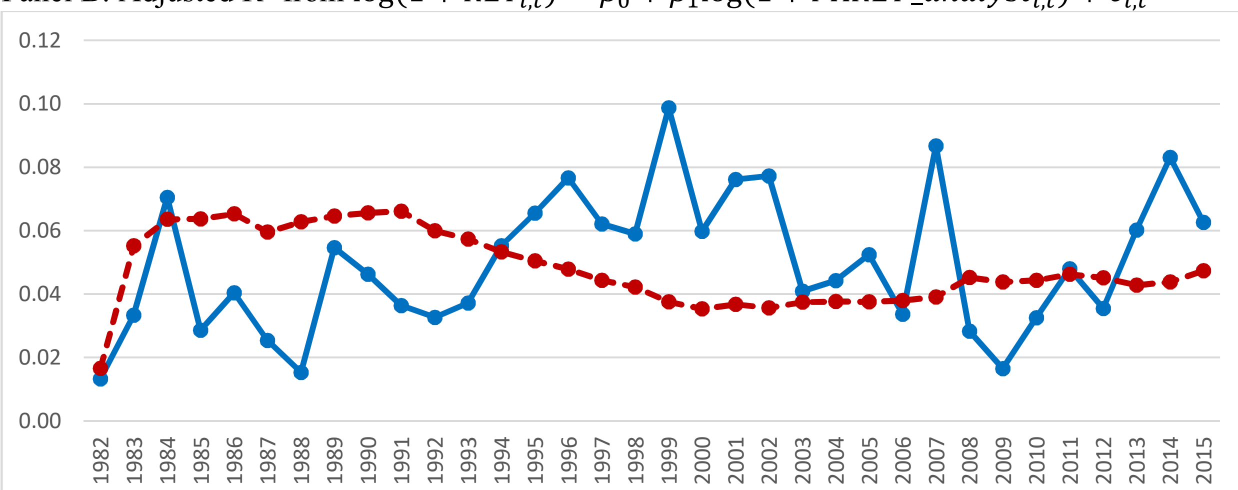
RET is a firm's annual returns for the calendar year. log(1 + *ARET_analyst*) is the sum of logarithmic returns across all dates when analysts change their earnings forecasts during the year. Analyst's ratio_info_days is the average cross-sectional fraction of the year's trading days that are analyst forecast revision days. log(1 + *ARET_8K*) is the sum of logarithmic returns across all dates when a firm files an 8-K during the year. 8-K's ratio_info_days is the average cross-sectional fraction of the year's trading days that are 8-K filing days. log(1 + *ARET_10K*) is the sum of logarithmic returns across all dates when firms file a 10-K, 10-Q, or a variant of these (i.e., 10-K/A, 10-Q/A, 10-K405, 10-K405/A, 10-KSB, 10-KSB/A, 10-QSB, and 10-QSB/A) during the year. 10-K/Q's ratio_info_days is the average cross-sectional fraction of the year's trading days that are 10-K or 10-Q filing days. The analyst sample includes 140,123 firm-year observations from 1982 to 2015, the 8-K sample includes 87,860 firm-year observations from 1994 to 2014, and the 10-K/Q sample includes 99,118 firm-year observations from 1994 to 2014. Observations are only omitted if missing variables. Table 6 contains regression results.

Figure 7
The adjusted R^2 from regressing annual returns on pre-announcement returns

Panel A: Adjusted R^2 from $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + PARET_{i,t}) + e_{i,t}$



Panel B: Adjusted R^2 from $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + PARET\_analyst_{i,t}) + e_{i,t}$



Panel A reports adjusted R^2's from the following cross-sectional regression each year: $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + PARET_{i,t}) + e_{i,t}$. *RET* is a firm's annual return starting three months after the prior fiscal year end. $\log(1 + PARET)$ is the sum of all pre-earnings announcement day logarithmic returns (days [-4,-2] across all four quarterly earnings announcements, where day 0 is the earnings announcement date). The sample includes 180,444 firm-year observations with non-missing *RET* and *PARET* from 1973 to 2015.
Panel B reports adjusted R^2's (the blue line) and ratio_info_days (the red line) from the following cross-sectional regression each year: $log(1 + RET_{i,t}) = \beta_0 + \beta_1 log(1 + PARET\_analyst_{i,t}) + e_{i,t}$. Here, *RET* is a firm's annual calendar year return. $\log(1 + PARET\_analyst)$ is the sum of logarithmic returns for each day before an analyst forecast revision during the year. The ratio_info_days (the red line) is the average fraction of the year's trading days that are a day before a forecast revision. The sample includes 136,576 firm-year observations with non-missing *RET* and *PARET_analyst* from 1982 to 2015.
Table 7 contains regression results.

Table 1
Descriptive statistics

Panel A: Descriptive statistics

Variable	N	Mean	Stdev	Min	Q1	Median	Q3	Max
RET	181462	0.159	0.776	-0.998	-0.207	0.063	0.356	53.663
ARET	181462	0.015	0.195	-0.934	-0.076	0.005	0.089	11.956
ΔE	181462	0.001	0.123	-0.984	-0.018	0.004	0.026	1.518
ΔS	181248	0.094	0.258	-1.241	-0.003	0.049	0.181	1.425
ΔGP	181235	0.031	0.109	-0.652	-0.007	0.017	0.069	0.557
ΔOI	181238	0.005	0.090	-0.627	-0.016	0.006	0.033	0.731
MV	180671	2601	13508	0.01	48	199	933	626550

Panel B: Correlation matrix for key variables. Pearson (Spearman) correlations are shown above (below) the main diagonal.

	RET	*ARET*	ΔE	ΔS	ΔGP	ΔOI
RET		0.28**	0.20**	0.09**	0.16**	0.22**
ARET	0.33**		0.18**	0.11**	0.16**	0.21**
ΔE	0.30**	0.25**		0.15**	0.38**	0.74**
ΔS	0.12**	0.14**	0.34**		0.69**	0.33**
ΔGP	0.21**	0.20**	0.53**	0.77**		0.62**
ΔOI	0.30**	0.26**	0.77**	0.49**	0.71**	

** Significant at the 1% level.

RET is a firm's annual returns starting three months after the prior fiscal year end. *ARET* is earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date. ΔE is earnings changes, measured as earnings before extraordinary items in year t minus earnings before extraordinary items in year t-1 scaled by average total assets. ΔS is changes in sales measured as net sales in year t minus net sales in year t-1 scaled by average total assets. ΔGP is changes in gross profit (sales minus cost of goods sold) measured as gross profit in year t minus gross profit in year t-1 scaled by average total assets. ΔOI is changes in operating income, measured as operating income after depreciation in year t minus operating income after depreciation in year t-1 scaled by average total assets. $MV_{i,t}$ is the market value of equity at a firm's fiscal year end. The sample includes 181,462 firm-year observations with non-missing *RET*, *ARET*, and ΔE from 1973 to 2015. Each year, all variables except for returns and MV_t are Winsorized at 1% and 99%.

Table 2
Regression of annual returns on earnings changes

Panel A: Regression results for $RET_{i,t} = \beta_0 + \beta_1 \Delta E_{i,t} + e_{i,t}$

Year	β_0	β_1	Adj. R^2	Year	β_0	β_1	Adj. R^2
1973	-0.23	4.50	0.18	1995	0.31	1.93	0.06
1974	-0.08	3.66	0.14	1996	0.12	1.37	0.06
1975	0.45	4.94	0.15	1997	0.36	1.42	0.06
1976	0.13	3.27	0.11	1998	-0.12	0.78	0.02
1977	0.16	5.11	0.17	1999	0.51	1.56	0.02
1978	0.20	5.23	0.13	2000	-0.01	1.20	0.08
1979	0.08	4.82	0.16	2001	0.20	0.97	0.06
1980	0.49	5.65	0.13	2002	-0.13	0.24	0.01
1981	-0.08	3.05	0.13	2003	0.80	2.30	0.06
1982	0.64	5.47	0.13	2004	0.10	0.96	0.05
1983	0.15	2.10	0.05	2005	0.22	1.26	0.05
1984	0.09	2.27	0.12	2006	0.10	0.95	0.06
1985	0.30	2.66	0.15	2007	-0.13	0.66	0.03
1986	0.15	1.76	0.10	2008	-0.40	0.54	0.05
1987	-0.09	1.40	0.09	2009	0.80	1.90	0.05
1988	0.12	1.93	0.12	2010	0.22	0.61	0.02
1989	0.08	2.27	0.15	2011	-0.04	0.61	0.03
1990	0.02	2.14	0.10	2012	0.17	0.88	0.04
1991	0.31	2.70	0.06	2013	0.31	0.60	0.01
1992	0.17	1.99	0.09	2014	0.03	0.40	0.01
1993	0.15	1.36	0.06	2015	-0.09	0.64	0.06
1994	0.06	1.41	0.08				

Panel B: Regression results for $Adj.R^2 = b_0 + b_1 Time + \varepsilon$

Regression	b_0 (t-stat)	b_1 (t-stat)	R^2	Fitted value year 1973	Fitted value year 2015
$Adj.R^2$	0.154 (19.63)	-0.0033 (-10.57)	0.732	0.151	0.012

Panel A reports results from the regression $RET_{i,t} = \beta_0 + \beta_1 \Delta E_{i,t} + e_{i,t}$, estimated annually. *RET* is a firm's annual returns starting three months after the prior fiscal year end. ΔE is earnings changes, measured as earnings before extraordinary items in year t minus earnings before extraordinary items in year t-1 scaled by average total assets. In Panel B, $Adj.R^2$ is the adjusted R^2 each year from the regression in Panel A. *Time* is the number of years since 1973. The sample includes 181,462 firm-year observations with non-missing *RET* and ΔE from 1973 to 2015. Each year, all variables other than returns are Winsorized at 1% and 99%.

Table 3
Regression of annual returns on earnings announcement returns

Panel A: Regression results for $RET_{i,t} = \beta_0 + \beta_1 ARET_{i,t} + e_{i,t}$

Year	β_0	β_1	Adj. R^2	Year	β_0	β_1	Adj. R^2
1973	-0.18	0.61	0.09	1995	0.29	1.47	0.10
1974	-0.09	0.71	0.09	1996	0.09	1.03	0.08
1975	0.42	1.21	0.14	1997	0.32	1.03	0.08
1976	0.15	1.07	0.12	1998	-0.14	0.81	0.06
1977	0.19	1.20	0.12	1999	0.45	1.60	0.05
1978	0.25	0.83	0.05	2000	-0.06	0.80	0.07
1979	0.12	1.00	0.08	2001	0.14	0.85	0.07
1980	0.48	1.28	0.08	2002	-0.13	0.74	0.07
1981	-0.08	0.99	0.13	2003	0.82	1.98	0.09
1982	0.55	1.87	0.14	2004	0.11	1.17	0.18
1983	0.15	1.12	0.08	2005	0.22	1.33	0.16
1984	0.10	1.16	0.12	2006	0.10	1.10	0.20
1985	0.26	1.16	0.09	2007	-0.11	0.95	0.19
1986	0.13	1.01	0.10	2008	-0.41	0.34	0.08
1987	-0.07	0.56	0.05	2009	0.77	1.34	0.08
1988	0.12	1.00	0.11	2010	0.24	1.18	0.16
1989	0.07	0.98	0.10	2011	-0.03	0.84	0.18
1990	0.00	0.92	0.10	2012	0.16	1.14	0.17
1991	0.25	1.68	0.16	2013	0.29	1.15	0.08
1992	0.15	0.82	0.08	2014	0.03	1.07	0.16
1993	0.13	1.21	0.14	2015	-0.10	0.76	0.15
1994	0.07	0.78	0.07				

Panel B: Regression results for $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET_{i,t}) + e_{i,t}$

Year	β_0	β_1	Adj. R^2	Year	β_0	β_1	Adj. R^2
1973	-0.27	0.94	0.14	1995	0.16	1.02	0.13
1974	-0.17	0.90	0.13	1996	-0.02	1.08	0.13
1975	0.30	0.85	0.14	1997	0.17	1.03	0.12
1976	0.10	0.96	0.13	1998	-0.31	0.97	0.11
1977	0.13	0.98	0.13	1999	0.10	0.94	0.08
1978	0.18	0.64	0.06	2000	-0.38	1.56	0.16
1979	0.05	0.94	0.10	2001	-0.06	1.14	0.13
1980	0.34	0.90	0.10	2002	-0.30	0.99	0.12
1981	-0.14	1.14	0.13	2003	0.48	0.90	0.12
1982	0.36	1.22	0.14	2004	0.03	1.14	0.22
1983	0.06	1.05	0.11	2005	0.13	1.10	0.21
1984	0.02	1.30	0.15	2006	0.04	1.12	0.23
1985	0.16	1.12	0.11	2007	-0.21	1.20	0.21
1986	0.06	0.94	0.11	2008	-0.70	0.91	0.13
1987	-0.16	0.64	0.06	2009	0.40	0.94	0.15
1988	0.05	1.00	0.12	2010	0.15	1.00	0.18

1989	-0.03	1.21	0.14	2011	-0.10	1.04	0.22
1990	-0.12	1.04	0.14	2012	0.09	1.18	0.24
1991	0.13	0.93	0.14	2013	0.18	0.94	0.17
1992	0.04	0.89	0.13	2014	-0.05	1.24	0.20
1993	0.05	1.02	0.15	2015	-0.17	1.17	0.19
1994	-0.02	0.93	0.12				

Panel C: Regression results for $Adj.R^2 = b_0 + b_1 Time + b_2 POST2003 + \varepsilon$

Regression	b_0 (t-stat)	b_1 (t-stat)	b_2 (t-stat)	R^2
$Adj.R^2$ from RET regressions	0.085 (6.84)	0.0011 (2.26)		0.110
$Adj.R^2$ from RET regressions	0.112 (9.35)	-0.001 (-1.73)	0.079 (4.42)	0.403
$Adj.R^2$ from log(1+RET) regressions	0.096 (9.30)	0.0021 (5.12)		0.390
$Adj.R^2$ from log(1+RET) regressions	0.121 (12.62)	0.000 (0.18)	0.072 (4.99)	0.624

Panel A reports regression results of $RET_{i,t} = \beta_0 + \beta_1 \text{ARET}_{i,t} + e_{i,t}$, estimated annually. Panel B reports regression results with logarithmic returns. *RET* is a firm's annual returns starting three months after the prior fiscal year end. *ARET* is earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date. In the logarithmic specification (Panel B), log(1 + *ARET*) is the sum of logarithmic returns across the four quarterly announcement windows. In Panel C, $Adj.R^2$ is the adjusted R^2 from the regressions in Panel A or B. *Time* is the number of years since 1973. *POST2003* is an indicator for years after 2003. The sample includes 181,462 firm-year observations with non-missing *RET* and *ARET* from 1973 to 2015.

Table 4
Pseudo analysis on earnings announcement returns

Panel A: The adjusted R^2 from annual regressions: $RET_{i,t} = \beta_0 + \beta_1 ARET_{i,t} + e_{i,t}$

Year	RSQ(+35 days)	RSQ(-35 days)	Year	RSQ(+35 days)	RSQ(-35 days)
1973	0.01	0.02	1995	0.01	0.02
1974	0.03	0.01	1996	0.01	0.02
1975	0.01	0.01	1997	0.02	0.02
1976	0.01	0.01	1998	0.01	0.02
1977	0.03	0.03	1999	0.03	0.02
1978	0.01	0.02	2000	0.03	0.02
1979	0.03	0.03	2001	0.02	0.01
1980	0.01	0.01	2002	0.01	0.03
1981	0.03	0.02	2003	0.02	0.03
1982	0.03	0.01	2004	0.01	0.02
1983	0.02	0.01	2005	0.04	0.01
1984	0.01	0.03	2006	0.02	0.01
1985	0.02	0.01	2007	0.01	0.04
1986	0.01	0.03	2008	0.00	0.03
1987	0.01	0.01	2009	0.01	0.02
1988	0.01	0.01	2010	0.02	0.01
1989	0.01	0.04	2011	0.02	0.01
1990	0.02	0.02	2012	0.00	0.01
1991	0.01	0.01	2013	0.01	0.02
1992	0.01	0.02	2014	0.02	0.03
1993	0.01	0.01	2015	0.03	0.00
1994	0.01	0.03			

Panel B: Regression results for $Adj.R^2 = b_0 + b_1 Time + \varepsilon$

Regression	b_0 (t-stat)	b_1 (t-stat)	R^2	Fitted value year 1973	Fitted value year 2015
RSQ(+35 days)	0.0175 (6.29)	-0.0001 (-0.52)	0.02	0.0174	0.0132
RSQ(-35 days)	0.0167 (5.90)	0.0000 (0.30)	0.02	0.0167	0.0167

We examine two pseudo earnings announcement dates: +35 and -35 days (+/- 5 weeks to ensure the same weekday) from the actual earnings announcement dates. *RET* is a firm's annual return starting three months after the prior fiscal year end. *ARET* is earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date plus or minus 35 days. In Panel B, $Adj.R^2$ is the adjusted R^2 from the annual regressions in Panel A: $RET_{i,t} = \beta_0 + \beta_1 \text{ARET}_{i,t} + e_{i,t}$. *Time* is the number of years since 1973. The sample includes 181,462 firm-year observations with non-missing *RET* and ΔE from 1973 to 2015. Each year, all variables other than returns are Winsorized at 1% and 99%.

Table 5
Regressions of annual returns on returns during all information days

Regression adjusted R^2 from $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_all_{i,t}) + e_{i,t}$

Year	Adj. R2	Ratio info days	Difference
1994	0.14	0.10	0.03
1995	0.15	0.10	0.05
1996	0.17	0.10	0.07
1997	0.15	0.09	0.06
1998	0.16	0.10	0.06
1999	0.18	0.09	0.09
2000	0.23	0.09	0.14
2001	0.22	0.09	0.12
2002	0.25	0.10	0.15
2003	0.20	0.10	0.10
2004	0.32	0.11	0.21
2005	0.39	0.12	0.27
2006	0.33	0.12	0.21
2007	0.39	0.12	0.27
2008	0.25	0.13	0.12
2009	0.24	0.13	0.11
2010	0.29	0.13	0.16
2011	0.33	0.13	0.20
2012	0.38	0.14	0.24
2013	0.34	0.13	0.21
2014	0.34	0.13	0.21
2015	0.36	0.12	0.24

This table reports the adjusted R^2 from the following regression, which is estimated each year:

$$\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_all_{i,t}) + e_{i,t}.$$

RET is a firm's calendar annual return. log(1+*ARET_all*) is the sum of announcement day logarithmic returns on days that contain an information event, which includes the earnings announcement window (day -1 to day +1) and days with analyst forecast revisions, analyst recommendations, and 8-K filings. The ratio of info days is the average proportion of information event days in a year. Difference is the difference between the adjusted R^2 and the ratio of info days. The sample contains 147,157 firm-years from 1994 to 2015, and only omits observations with missing variables.

Table 6
The effect of SOX 404 on the variation of annual returns explained by earnings announcement returns

Panel A: The adjusted R^2 for firms above the $75 million threshold and firms below

Year	RSQ(MV<75)	RSQ(MV≥75)	Year	RSQ(MV<75)	RSQ(MV≥75)
1973	0.15	0.15	1995	0.10	0.16
1974	0.14	0.07	1996	0.13	0.15
1975	0.14	0.11	1997	0.13	0.13
1976	0.15	0.10	1998	0.10	0.12
1977	0.14	0.11	1999	0.06	0.11
1978	0.07	0.03	2000	0.12	0.18
1979	0.10	0.10	2001	0.14	0.13
1980	0.12	0.08	2002	0.09	0.14
1981	0.15	0.14	2003	0.13	0.12
1982	0.11	0.18	2004	0.19	0.23
1983	0.11	0.10	2005	0.19	0.22
1984	0.19	0.09	2006	0.17	0.24
1985	0.10	0.13	2007	0.22	0.21
1986	0.11	0.09	2008	0.10	0.14
1987	0.07	0.06	2009	0.13	0.16
1988	0.12	0.12	2010	0.14	0.21
1989	0.12	0.18	2011	0.20	0.24
1990	0.13	0.17	2012	0.22	0.24
1991	0.13	0.15	2013	0.10	0.21
1992	0.13	0.13	2014	0.14	0.21
1993	0.17	0.14	2015	0.16	0.19
1994	0.11	0.12			

Panel B: Regression results for $Adj.R^2 = b_0 + b_1 Time + \varepsilon$

Regression	b_0 (t-stat)	b_1 (t-stat)	R^2
$Adj.R^2$ for firms MV<75	0.115 (10.16)	0.0008 (1.82)	0.075
$Adj.R^2$ for firms MV>=75	0.081 (7.17)	0.0030 (6.79)	0.529

Panel C: Regression results for $Adj.R^2 = b_0 + b_1D + b_2POST2003 + b_3D * POST2003 + \varepsilon$

Regression	b_0 (t-stat)	b_1 (t-stat)	b_2 (t-stat)	b_3 (t-stat)	R^2
$Adj.R^2$	0.121 (20.14)	0.0015 (0.17)	0.043 (3.76)	0.044 (2.73)	0.480

This table separates the sample each year into firms with market capitalizations above $75 million and firms below. Within each sub-sample, we run the following regression: $\log(1 + RET_{i,t}) = \beta_0 + \beta_1\log(1 + ARET_{i,t}) + e_{i,t}$. Variables are defined as in Table 3. Panel A reports the adjusted R^2's each year. Panel B reports the following regression for each sub-sample: $Adj.R^2 = b_0 + b_1Time + \varepsilon$. The left-hand-side is the adjusted R^2 from each annual regression in Panel A. *Time* is the number of years since 1973. Panel C reports results from the following regression run on all of the adjusted R^2's reported in Panel A: $Adj.R^2 = b_0 + b_1D + b_2POST2003 + b_3D * POST2003 + \varepsilon$. *D* is an indicator set to 1 if the adjusted R^2 comes from the sample with market capitalizations above $75 million. *POST2003* is an indicator set to 1 for all years after 2003.

Table 7
The relation between annual returns and announcement returns of analyst forecast revisions or SEC filings

Panel A: The adjusted R^2 (RSQ) from analyst forecast or SEC filing regressions

Year	RSQ(Analysts)	Ratio info days	RSQ(8-K)	Ratio info days	RSQ(10-K/Q)	Ratio info days
1982	0.00	0.02				
1983	0.03	0.07				
1984	0.07	0.08				
1985	0.05	0.09				
1986	0.07	0.09				
1987	0.05	0.08				
1988	0.05	0.09				
1989	0.06	0.08				
1990	0.03	0.09				
1991	0.06	0.09				
1992	0.04	0.10				
1993	0.07	0.09				
1994	0.09	0.09	0.00	0.01	0.00	0.02
1995	0.11	0.09	0.00	0.01	0.01	0.01
1996	0.10	0.08	0.02	0.01	0.01	0.01
1997	0.09	0.07	0.02	0.01	0.01	0.02
1998	0.11	0.07	0.02	0.01	0.00	0.02
1999	0.12	0.06	0.01	0.01	0.02	0.02
2000	0.12	0.06	0.03	0.01	0.01	0.01
2001	0.12	0.06	0.03	0.01	0.02	0.01
2002	0.15	0.06	0.05	0.02	0.02	0.01
2003	0.11	0.06	0.05	0.02	0.01	0.01
2004	0.17	0.06	0.12	0.03	0.01	0.01
2005	0.20	0.06	0.13	0.04	0.01	0.01
2006	0.18	0.07	0.11	0.04	0.01	0.01
2007	0.24	0.07	0.11	0.04	0.01	0.01
2008	0.13	0.08	0.08	0.03	0.01	0.01
2009	0.11	0.08	0.09	0.03	0.00	0.01
2010	0.09	0.08	0.06	0.03	0.02	0.01
2011	0.12	0.09	0.10	0.03	0.01	0.01
2012	0.18	0.09	0.14	0.04	0.01	0.01
2013	0.17	0.08	0.13	0.04	0.03	0.01
2014	0.16	0.09	0.11	0.04	0.01	0.01
2015	0.24	0.09				

Panel B: Regression results for

$$(Adj.R^2 - ratio\_info\_days) = b_0 + b_1 Time + b_2 POST2003 + \varepsilon$$

Dependent variable	b_0 (t-stat)	b_1 (t-stat)	b_2 (t-stat)	R^2
RSQ(Analyst) – ratio_info_days	-0.048	0.005		0.60
	(3.66)	(7.07)		
RSQ(Analyst) – ratio_info_days	-0.044	0.004	0.012	0.59
	(2.87)	(3.53)	(0.47)	
RSQ(8-K) – ratio_info_days	-0.002	0.004		0.67
	(0.21)	(5.65)		
RSQ(8-K) – ratio_info_days	0.004	0.002	0.040	0.74
	(0.44)	(1.44)	(2.55)	
RSQ(10-K/Q) – ratio_info_days	-0.007	0.001		0.17
	(2.09)	(2.28)		
RSQ(10-K/Q) – ratio_info_days	-0.009	0.001	-0.010	0.21
	(2.48)	(2.33)	(1.35)	

Panel A reports the adjusted R^2 and its ratio_info_days from the following three regressions, which are estimated annually:

RSQ(Analyst): $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_analyst_{i,t}) + e_{i,t}$,

RSQ(8-K): $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_8K_{i,t}) + e_{i,t}$,

RSQ(10-K/Q): $\log(1 + RET_{i,t}) = \beta_0 + \beta_1 \log(1 + ARET\_10K_{i,t}) + e_{i,t}$,

RET is a firm's annual returns for the calendar year. log(1 + *ARET_analyst*) is the sum of logarithmic returns across all dates when analysts change their earnings forecasts during the year. Analyst's ratio_info_days is the average cross-sectional fraction of the year's trading days that are analyst forecast revision days. log(1 + *ARET_8K*) is the sum of logarithmic returns across all dates when a firm files an 8-K during the year. 8-K's ratio_info_days is the average cross-sectional fraction of the year's trading days that are 8-K filing days. log(1 + *ARET_10K*) is the sum of logarithmic returns across all dates when firms file a 10-K, 10-Q, or a variant of these (i.e., 10-K/A, 10-Q/A, 10-K405, 10-K405/A, 10-KSB, 10-KSB/A, 10-QSB, and 10-QSB/A) during the year. 10-K/Q's ratio_info_days is the average cross-sectional fraction of the year's trading days that are 10-K or 10-Q filing days. The analyst sample includes 140,123 firm-year observations from 1982 to 2015, the 8-K sample includes 87,860 firm-year observations from 1994 to 2014, and the 10-K/Q sample includes 99,118 firm-year observations from 1994 to 2014. Observations are only omitted if missing variables. Panel B reports regressions of the difference between the adjusted R^2 and the ratio_info_days on *Time*, which captures the number of years since the first year in the sample (i.e., the number of years since 1982 for analyst forecasts, and the number of years since 1994 for the SEC filings), and *POST2003*, an indicator that turns on for years after 2003.

Table 8
Regressions of annual returns on returns for days before earnings announcements and analyst forecasts

Year	RSQ(EA)	RSQ(Analyst)	Ratio info days	Year	RSQ(EA)	RSQ(Analyst)	Ratio info days
1973	0.04			1995	0.05	0.07	0.05
1974	0.03			1996	0.03	0.08	0.05
1975	0.08			1997	0.03	0.06	0.04
1976	0.05			1998	0.04	0.06	0.04
1977	0.06			1999	0.04	0.10	0.04
1978	0.04			2000	0.02	0.06	0.04
1979	0.03			2001	0.02	0.08	0.04
1980	0.04			2002	0.01	0.08	0.04
1981	0.05			2003	0.04	0.04	0.04
1982	0.07	0.01	0.02	2004	0.03	0.04	0.04
1983	0.06	0.03	0.06	2005	0.03	0.05	0.04
1984	0.07	0.07	0.06	2006	0.02	0.03	0.04
1985	0.05	0.03	0.06	2007	0.05	0.09	0.04
1986	0.07	0.04	0.07	2008	0.00	0.03	0.05
1987	0.02	0.03	0.06	2009	0.07	0.02	0.04
1988	0.05	0.02	0.06	2010	0.03	0.03	0.04
1989	0.06	0.05	0.06	2011	0.04	0.05	0.05
1990	0.04	0.05	0.07	2012	0.04	0.04	0.05
1991	0.03	0.04	0.07	2013	0.04	0.06	0.04
1992	0.04	0.03	0.06	2014	0.04	0.08	0.04
1993	0.04	0.04	0.06	2015	0.04	0.06	0.05
1994	0.04	0.06	0.05				

RSQ(EA) contains the adjusted R^2's from annual cross-sectional regressions of $\log(1 + RET)$ on $\log(1 + PARET)$. RET is a firm's annual return starting three months after the prior fiscal year end. $\log(1 + PARET)$ is the sum of the logarithm of all pre-earnings announcement day returns (days [-4,-2] across all four quarterly earnings announcements, where day 0 is the earnings announcement date). The sample includes 180,444 firm-year observations with non-missing RET and $PARET$ from 1973 to 2015. RSQ(Analyst) contains the adjusted R^2's from annual cross-sectional regressions of $\log(1 + RET)$ on $\log(1 + ARET\_analyst)$. $\log(1 + ARET\_analyst)$ is the sum of logarithmic returns for each day before an analyst forecast revision during the year. Ratio info days is the average proportion of days in a year that are the day before an analyst forecast revision. The sample contains 136,576 firm-years from 1982 to 2015.

Table 9
The changing sample – cohorts of newly-listed firms in each decade

	Number of firms				Adjusted R^2 from RET on ΔE				Adjusted R^2 from RET on ARET			
	1970s wave	1980s wave	1990s wave	2000s wave	1970s wave	1980s wave	1990s wave	2000s wave	1970s wave	1980s wave	1990s wave	2000s wave
1973	1928				0.18				0.09			
1974	2337				0.14				0.09			
1975	2348				0.15				0.14			
1976	2391				0.11				0.12			
1977	2358				0.17				0.12			
1978	2298				0.13				0.05			
1979	2251				0.16				0.08			
1980	2146	89			0.13	0.20			0.08	0.11		
1981	2036	197			0.14	0.11			0.13	0.17		
1982	1931	483			0.12	0.16			0.14	0.13		
1983	1845	1228			0.03	0.07			0.10	0.07		
1984	1723	1636			0.06	0.15			0.09	0.14		
1985	1608	1777			0.11	0.16			0.10	0.09		
1986	1482	1986			0.05	0.12			0.05	0.11		
1987	1402	2312			0.06	0.10			0.05	0.05		
1988	1294	2422			0.07	0.13			0.09	0.12		
1989	1216	2437			0.13	0.16			0.09	0.11		
1990	1172	2233	278		0.09	0.10	0.10		0.08	0.10	0.14	
1991	1152	2094	548		0.08	0.08	0.07		0.10	0.09	0.10	
1992	1142	1978	996		0.07	0.08	0.12		0.09	0.09	0.08	
1993	1129	1898	1512		0.05	0.08	0.05		0.08	0.18	0.12	
1994	1090	1800	2378		0.08	0.09	0.07		0.14	0.05	0.07	
1995	1063	1677	2826		0.04	0.06	0.07		0.09	0.12	0.10	
1996	1027	1566	3436		0.04	0.06	0.06		0.17	0.09	0.08	
1997	974	1436	3911		0.04	0.09	0.06		0.09	0.10	0.07	
1998	916	1325	4142		0.03	0.05	0.02		0.13	0.04	0.06	
1999	849	1212	4226		0.03	0.05	0.01		0.05	0.05	0.05	
2000	783	1132	3714	959	0.04	0.04	0.07	0.09	0.10	0.07	0.07	0.06
2001	731	1025	3192	1139	0.05	0.06	0.06	0.07	0.09	0.12	0.07	0.04
2002	697	960	2857	1191	0.01	0.05	0.02	0.00	0.08	0.08	0.13	0.02
2003	681	916	2609	1236	0.05	0.10	0.05	0.05	0.12	0.15	0.10	0.09
2004	659	864	2412	1469	0.06	0.13	0.05	0.03	0.12	0.17	0.20	0.18
2005	628	822	2217	1705	0.11	0.14	0.06	0.03	0.19	0.17	0.16	0.17
2006	614	758	2034	1885	0.01	0.02	0.06	0.07	0.17	0.29	0.23	0.14
2007	571	707	1847	2079	0.10	0.09	0.04	0.02	0.22	0.27	0.21	0.15
2008	546	675	1705	2129	0.11	0.06	0.07	0.04	0.10	0.06	0.11	0.06
2009	528	641	1585	2015	0.07	0.06	0.04	0.05	0.15	0.03	0.10	0.10

2010	514	613	1479	2046	0.03	0.08	0.04	0.01	0.10	0.19	0.17	0.16
2011	496	588	1396	2143	0.05	0.09	0.05	0.01	0.19	0.16	0.22	0.15
2012	480	561	1309	2180	0.15	0.09	0.02	0.04	0.18	0.22	0.18	0.16
2013	466	533	1249	2292	0.08	0.02	0.04	0.00	0.18	0.11	0.12	0.07
2014	458	509	1197	2558	0.04	0.06	0.02	0.00	0.20	0.27	0.16	0.15
2015	417	439	1050	2425	0.07	0.15	0.09	0.05	0.18	0.21	0.21	0.13

This table reports the number of firm-year observations from the successive listing cohorts in each year from 1973 to 2015. All of the firms are divided into four listing cohorts in the following steps. The first year in which a firm's data are available in Compustat is referred to as the "listing year". All of the firms with a listing year in 2000 or thereafter are classified as "2000s". The remaining firms listed in a common decade are referred to as a wave of newly-listed firms in the 1970s, 1980s, and 1990s. The adjusted R^2 from regression RET on ΔE is based on the regression: $RET_{i,t} = \beta_0 + \beta_1 \Delta E_{i,t} + e_{i,t}$, which is estimated annually for each cohort. The adjusted R^2 from regression RET on ARET is based on the regression: $RET_{i,t} = \beta_0 + \beta_1 ARET_{i,t} + e_{i,t}$, which is estimated annually for each cohort. *RET* is a firm's annual returns starting three months after the prior fiscal year end. ΔE is earnings changes, measured as earnings before extraordinary items in year t minus earnings before extraordinary items in year t-1 scaled by average total assets. *ARET* is earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date. The sample includes 181,462 firm-year observations with non-missing *RET*, ΔE, and *ARET* from 1973 to 2015. Each year, ΔE is Winsorized at 1% and 99%.

Table 10
Subsample analysis on firm size, growth, profitability, and industry

Panel A: Subsamples based on firm size

Regression	*Intercept* (t-stat)	*Time* (t-stat)	*POST2003* (t-stat)	R^2
Small firm size	0.139	-0.000	0.058	
	(10.33)	(-0.79)	(2.86)	0.213
Medium firm size	0.126	-0.000	0.079	
	(11.82)	(-0.15)	(4.94)	0.575
Large firm size	0.082	0.001	0.048	
	(5.89)	(1.95)	(2.30)	0.485

Panel B: Subsamples based on growth

Regression	*Intercept* (t-stat)	*Time* (t-stat)	*POST2003* (t-stat)	R^2
Low growth	0.153	-0.001	0.089	
	(12.11)	(-1.92)	(4.71)	0.399
Medium growth	0.120	0.000	0.083	
	(7.53)	(0.21)	(3.47)	0.428
High growth	0.097	0.001	0.055	
	(8.87)	(1.34)	(3.39)	0.539

Panel C: Subsamples based on profitability

Regression	*Intercept* (t-stat)	*Time* (t-stat)	*POST2003* (t-stat)	R^2
Low profitability	0.105	-0.001	0.082	
	(11.76)	(-1.91)	(6.10)	0.569
Medium profitability	0.100	0.000	0.087	
	(7.88)	(0.29)	(4.57)	0.571
High profitability	0.095	0.001	0.058	
	(6.69)	(1.49)	(2.71)	0.476

Panel D: Subsamples based on 1-digit SIC code

Regression	*Intercept* (t-stat)	*Time* (t-stat)	*POST2003* (t-stat)	R^2	Number of obs
0100<=SIC<=0999	0.237	-0.005	0.141		
	(2.32)	(-0.86)	(0.93)	-0.027	554
1000<=SIC<=1999	0.105	-0.001	0.034		
	(6.22)	(-0.72)	(1.36)	0.004	11,420
2000<=SIC<=2999	0.137	-0.001	0.065		
	(9.85)	(-1.90)	(3.09)	0.163	28,025
3000<=SIC<=3999	0.134	0.001	0.096		
	(8.66)	(0.21)	(4.15)	0.518	45,904
4000<=SIC<=4999	0.087	0.001	0.074		
	(4.84)	(1.30)	(2.77)	0.460	18,024
5000<=SIC<=5999	0.145	-0.001	0.127		
	(5.88)	(-0.15)	(3.45)	0.384	17,458
6000<=SIC<=6999	0.086	0.001	0.020		
	(4.27)	(1.22)	(0.68)	0.128	33,428
7000<=SIC<=7999	0.135	0.000	0.122		
	(6.58)	(0.05)	(3.96)	0.477	19,481
8000<=SIC<=8999	0.055	0.002	0.112		
	(1.87)	(1.41)	(2.55)	0.445	5,952
9000<=SIC<=9999	0.185	-0.004	0.123		
	(4.05)	(-1.53)	(1.80)	0.030	1,533

In each subsample, we run the return regression of $\log(RET_{i,t}) = \beta_0 + \beta_1 \log(\text{ARET}_{i,t}) + e_{i,t}$, estimated annually. Then we use the adjusted R^2 from the return regression and run $dj.R^2 = b_0 + b_1 Time + b_2 POST2003 + \varepsilon$. The table reports these regression results. *RET* is a firm's annual returns starting three months after the prior fiscal year end. *ARET* is earnings announcement returns, measured as the sum of three-day [-1,1] returns across four quarterly earnings announcements, where day 0 is the earnings announcement date. log(1 + *ARET*) is the sum of logarithmic returns across the four quarterly announcement windows. *Time* is the number of years since 1973. *POST2003* is an indicator for years after 2003. We partition the sample into three terciles by the market value of equity (firm size), the market-to-book ratio (growth), earnings scaled by book value of equity (profitability), and 1-digit SIC code. The sample includes 181,462 firm-year observations with non-missing *RET* and *ARET* from 1973 to 2015.