Why Are Investors Paying (More) Attention to Free Cash Flows?*

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Abstract

The stock market reacts incrementally to free cash flow news, and the price reaction has been increasing over time. This reaction is stronger for firms with higher levels of asymmetric information as measured by firm size and bid-ask spreads. It is also stronger for young firms and firms in high technology industries, suggesting that free cash flow is more informative in firms for which earnings are less relevant. The market response is incrementally associated with a firm's decision to disclose free cash flow. This result reflects differences in the types of firms that disclose free cash flow rather than a response to disclosure itself. Finally, the time trend in market reaction to free cash flow news reflects an overall trend in free cash flow responsiveness which is especially strong for firms with high asymmetric information and firms for which earnings are less relevant.

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1. Introduction

One of the central questions in finance is the extent to which security prices reflect information. Although free cash flow has long been touted as fundamental to valuation and thus price formation, little evidence exists as to how market participants respond to the information in free cash flow. We address this gap in the literature.

Our research begins by documenting that there is a significant stock market response to innovations in free cash flow. We examine the market reaction to the unexpected component of free cash flow (which we refer to as the free cash flow response coefficient, or *FRC*) around the earnings announcement date.[1] The market reacts positively to free cash flow surprises, and this reaction is incremental to the earnings surprise; the market responds to innovations in both earnings and free cash flows. The reaction to free cash flow has been increasing over time, but we find no significant corresponding trend in the market response to earnings. Furthermore, more firms are voluntarily disclosing free cash flow in their earnings announcements.

In this paper, we address three related research questions. First, why does the market react to free cash flow news? Second, how, if at all, does disclosure of free cash flow affect the market response? And finally, why is the market reaction increasing over time?

To address the first question, we explore two alternative (non-mutually exclusive) hypotheses. Presumably, the market reacts to free cash flow news because it contains incremental information. In an asymmetric information model, signals should be more informative when investors face greater uncertainty [e.g, Yeung (2009)]. The information in free cash flow news may be particularly valuable for firms with higher asymmetric information. Our first hypothesis is

[1] For much of our analysis, we use a simple definition of free cash flow: cash from operations minus capital expenditures. This definition is used frequently on investing websites and by firms that disclose free cash flow; also, the components are readily available on Compustat. We define the *FRC* more formally in Section 4 (equation (1)).

therefore that the market reaction to free cash flow is greater for firms with higher levels of asymmetric information.

Prior research notes that the overall economy has shifted toward young, research-intensive technology firms for which accounting variables such as earnings may be less relevant [e.g., Francis and Schipper (1999); Core, Guay, and Van Buskirk (2003)]. Free cash flow may be more important for this type of firm. Our second hypothesis is that the market reaction to free cash flow is stronger in firms for which earnings are less value relevant.

To test these predictions, we examine the relation between 3-day cumulative abnormal returns on the earnings announcement day and unexpected free cash flow and (for comparison) unexpected earnings. The coefficient on unexpected earnings is the well-known earnings response coefficient [*ERC*, e.g., Kormendi and Lipe (1987)]. The coefficient on the free cash flow surprise is the free cash flow response coefficient (*FRC*), which we use to measure the market response to information in free cash flow. We estimate this relation separately for subsets of firms based on proxies for asymmetric information (firm size, analyst coverage, the dispersion of analyst forecasts, and bid-ask spreads) and the relevance of earnings (firm age, profitability, research and development intensity, and industry). We find evidence consistent with the prediction that the market reaction to free cash flow is stronger for firms with higher levels of asymmetric information. The *FRC* is significantly larger for small firms and for firms with high bid-ask spreads. We also find evidence that the market reaction is stronger in firms for which earnings are less relevant: the *FRC* is statistically significantly larger for young firms and firms in high technology industries as defined by Brown, Fazzari, and Petersen (2009).

Is the market reaction to free cash flow related to the decision to disclose it? Prior research shows that more managers are voluntarily disclosing free cash flow in their earnings

announcements [Adame, Koski, Lem, and McVay (2019); see also Table 1]. If voluntary disclosure of free cash flow is an indicator of the importance of free cash flow for the firm, we expect that the market reaction to free cash flow will be stronger when firms disclose it. Our results support this prediction; the market reaction is greater in firm-years with a free cash flow disclosure than it is in non-disclosure firm-years. The direction of causation is unclear, however. It is possible that firms for which free cash flow is more important are more likely to voluntarily disclose this metric. It is also possible that investors pay more attention to free cash flow when it is provided as a summary metric in the earnings announcement. We find evidence in support of the former prediction; for firms that eventually disclose free cash flow, there is no significant difference in the market reaction during firm-years when they disclose free cash flow and firm-years when they do not. In other words, these results suggest that the market reaction is not specifically related to the disclosure of free cash flow; rather it reflects differences between the types of firms that disclose and those that do not.

Finally, as noted previously, the market response to free cash flow news been increasing over time (see Figure 1). Why? We explore several potential explanations, including: a.) increases in the information content of free cash flow for all firms, b.) increases in information content in certain subsets of firms which we can a priori identify, and c.) changing firm characteristics, with a shift toward firms (such as small firms or high tech firms) for which free cash flow is relatively more important. We find evidence of an increase in the information content of all firms, but the trend is particularly strong in firms for which free cash flow is especially informative—firms with high asymmetric information and firms for which earnings are less relevant. We also document a decrease in the fraction of firms in these groups for our sample.[2] Therefore, the overall trend of

[2] Changes in the fraction of informationally-sensitive firms may reflect our sample selection, which focuses on Standard and Poor's 1500 firms.

increasing *FRC*s occurs despite a shift in the population away from the most free cash flow sensitive firms in our sample. Overall, free cash flow news is becoming more informative to the market.

Collectively, our results suggest that free cash flow may be increasingly important for market participants going forward. By demonstrating that market participants respond incrementally to information in free cash flow, our research contributes to the literature on the information content of free cash flow. Extensive prior research documents that stock prices incorporate information in earnings [e.g., Ball and Brown (1968); Kormendi and Lipe (1987)]. We provide evidence that free cash flow offers incremental information to earnings, especially for specific firms. Given the broader changes in the economy, our results suggest free cash flow will continue to increase in relevance going forward.

The remainder of this paper is organized as follows. In Section 2, we discuss our theoretical predictions and related literature. In Section 3, we describe our sample. We describe our methodology in Section 4 and present results in Section 5. In Section 6, we conclude.

2. Theory and Empirical Predictions

Although many accounting researchers and practitioners focus on earnings, in finance the emphasis is on free cash flow. Accrual accounting is designed so that revenues are reported when income is earned and expenses are matched with related revenues. So, for example, although a company may make a large capital expenditure to buy equipment in one period, this cost is charged as depreciation expense over several years to reflect the fact that the company will derive benefits from this equipment for an extended period of time. In this way, earnings as defined in the context

of accrual accounting reflect earned revenues minus the cost to produce those revenues, regardless of the timing of cash flows.

In contrast, (unlevered) free cash flow provides a measure of how much cash is available to the debt and equity holders after cash operating costs and current period investments in operating working capital and capital expenditures. One reason free cash flow differs from earnings is that free cash flow attempts to account for the actual timing of cash inflows and outflows. Adjustments in the free cash flow calculation related to "undoing" accrual accounting (such as non-cash charges, capital expenditures, and change in working capital) are made for this reason. Free cash flow is viewed as more difficult to manipulate, provides insight into the company's business model, and demonstrates whether the firm has excess cash that could be used to pay down debt, expand further, or make a payout.[3]

Finance theory defines unlevered free cash flow as:[4]

$$FCF = EBIT \times (1\text{-}Tax\ Rate) + Depreciation\ (and\ Other\ Non\text{-}Cash\ Charges) - Net\ Capital\ Expenditures - Change\ in\ Net\ Working\ Capital,$$

or equivalently:

$$FCF = Operating\ Cash\ Flow\ (OCF) + Interest\ Expense \times (1\text{-}Tax\ Rate) - Net\ Capital\ Expenditures.$$

In practice, however, when firms voluntarily disclosure a measure of free cash flow, they do not typically follow this definition [Adame, Koski, Lem, and McVay (2019)]. The most common definition of free cash flow disclosure in earnings announcements is *Operating Cash Flow– Gross*

[3] See, for example, https://www.fool.com/investing/dividends-income/2005/08/12/why-free-cash-flow-matters.aspx
[4] Berk and DeMarzo, Corporate Finance (2017, Chapter 8), Higgins, Koski, and Mitton (2019, Chapter 9) and Welch (2009, Chapter 13).

Capital Expenditures, with almost 40 percent of firm-year disclosures presenting this definition (see Table 2 of Adame et al. (2019)).

Why does the market react to free cash flow? To address this question, we develop and test two (non-mutually exclusive) hypotheses. Our first hypothesis builds on the signaling literature. Any market reaction to free cash flow news suggests that free cash flow contains incremental information. Yeung (2009) argues that investors should rely more on signals such as earnings announcements when there is greater ex ante uncertainty about future earnings. In a world with asymmetric information, we expect that information in free cash flow news should be particularly valuable for firms with higher asymmetric information. To test this hypothesis, we compare *FRC*s for subsamples of firms sorted based on several proxies for asymmetric information used previously in the literature: firm size [see, e.g., Chae (2005)], the level of analyst coverage [Hong, Lim and Stein (2000)], dispersion in analysts' earnings forecasts [Thomas (2002)], and bid-ask spreads [Glosten and Milgrom (1985)]. We anticipate that asymmetric information should be greater for small firms with low analyst coverage, high dispersion in analyst forecasts, and high bid-ask spreads.

During the period of the stock market internet bubble, research began to explore the possibility that traditional financial statements may not be as relevant for newer technology firms. Francis and Schipper (1999), for example, show a decline in the relevance of earnings information and an increase in the relevance of book value information from the balance sheet. Core, Guay, and Van Buskirk (2003) use subsamples of high technology firms, young firms, and young firms with losses to examine whether traditional valuation metrics are still valid in the "new economy" period. Corrado and Hulten (2010), among others, note that the technological revolution has resulted in a shift of the U.S. population of firms from industrial to knowledge-based firms.

Srivastava (2014) shows that the decline in earnings quality over time is consistent with a shift toward firms in knowledge-intensive industries with high intangible assets. More broadly, Brown, Fazzari, and Petersen (2009) explore the relation between research and development expenses and economic growth, with particular focus on young, high tech firms.

Collectively, this literature suggests that accounting numbers such as earnings may be less relevant for young, research and development-intensive technology firms. Free cash flow may be more important for these types of firms. Our second hypothesis is therefore that the market reaction to free cash flow (the *FRC*) is larger in firms for which earnings are less value relevant. To test this hypothesis, we compare *FRC*s for subsamples of firms sorted by firm age, profitability (in particular, for young firms), research and development intensity, and industry. We note that some of our proxies for asymmetric information may also be correlated with proxies for earnings relevance. We address this issue in more detail in our tests.

As noted above, prior research shows that more managers are voluntarily disclosing free cash flow in their earnings announcements [Adame, Koski, Lem, and McVay (2019)]. We expect that *FRC*s will be higher for firms that choose to disclose free cash flow in their earnings announcements relative to those that do not. In other words, we view the voluntary disclosure of the metric as an indicator of the importance of free cash flow for the firm. It is possible that firms for which free cash flows are more important are more likely to voluntarily disclose this metric. It is also possible that investors pay more attention to free cash flow when it is provided as a summary metric in the earnings announcement. We implement a test to identify the direction of causation in this relation (see Section 5.3). Finally, as noted above, almost 40% of the free cash flow disclosures in our sample use a simple definition, *Operating Cash Flow– Gross Capital Expenditures*, but the remaining 60% make some incremental adjustments, which are largely idiosyncratic. Is there

information in these adjustments? To address this issue, we explore the market reaction to different definitions of disclosed free cash flow.

As shown in Figure 1, the market reaction to free cash flow is increasing over time. Why? One potential explanation is that free cash flow is becoming a more important metric for all firms. Alternatively, free cash flow may be growing in relevance for certain subsets of firms which we can *a priori* identify. In particular, free cash flow may be increasing in importance for firms with high asymmetric information or for firms for which earnings are becoming less relevant. Finally, it may be that *FRC*s are higher for some types of firms and that the composition of firms has shifted over time toward these firms. To test these predictions, we compare changes in *FRCs* over time for various subsets of firms and also changes in the proportion of firms in these subsets.

3. Methodology

3.1 Earnings and Free Cash Flow Response Coefficients

Our main empirical approach is to relate abnormal stock returns around the earnings announcement day to the unexpected component of free cash flow (the free cash flow surprise) and, for comparison, the earnings surprise. To test for the information content in free cash flow, we regress three-day cumulative abnormal returns (*CAR*) around the earnings announcement date on the earnings surprise and the free cash flow surprise,

$$CAR_i = \beta_0 + \beta_1(Earnings\ Surprise_i) + \beta_2(FCF\ \ Surprise_i) + \varepsilon_i \qquad (1)$$

for earnings announcement event i, where

$$CAR_i = \sum_{j=t-1}^{t+1} AR_{i,j}$$

is measured over a 3-day window around the earnings announcement day t = 0, and abnormal returns ($AR_{i,j}$) are computed relative to the CRSP value-weighted index. All independent variables

are divided by weighted average diluted shares outstanding and scaled by beginning of period price. We implement this analysis using both the decile-rank of each of our independent variables by year [Bernard and Thomas (1989) and Doyle, Lundholm, and Soliman (2003)] and continuous independent variables. For parsimony, we only report the decile-ranked results in the tables; our main results using continuous variables are available in the online appendix. We estimate equation (1) for our full sample and also for subsamples based on theoretically relevant partitions of the sample as described in Section 2.

Some of the firms in our sample voluntarily disclose a free cash flow number in their earnings announcements. For firms with voluntary disclosures, we use the disclosed free cash flow number as the value for free cash flow. The most popular definition of free cash flow disclosed by firms is operating cash flow minus capital expenditures (hereafter *Simple FCF*). This definition also appears frequently on financial websites.[5] For firms that do not have voluntary disclosures of free cash flow in the earnings announcement, we use Compustat data to calculate *Simple FCF*:

Simple FCF = Operating Cash Flow (OANCF) – Gross Capital Expenditures (CAPX) (2)

Thus, for each firm-year we have "realized" free cash flow as the amount disclosed, if available, and *Simple FCF* otherwise.[6]

Current research typically measures earnings surprises relative to the consensus analyst forecast of earnings per share immediately before the earnings announcement [e.g., Doyle, Lundholm, and Soliman (2003)]. However, a comparable measure for free cash flow surprise based on analyst forecasts of the components of free cash flow is only available for a subset of our

[5] See, for example, Investopedia (http://www.investopedia.com/terms/f/freecashflow.asp). However, firms and analysts use a number of different definitions, as detailed in Adame et al. (2019) and summarized here: http://archives.cpajournal.com/2002/0102/features/f013602.htm.

[6] Results are very similar if we use *Simple FCF* as the realized free cash flow value for all firms. We report our main results using this definition in the online appendix.

firm-years (27.6 percent). Consequently, to measure the information content of earnings and free cash flow on an equal footing, we calculate both surprises relative to expectations based on trailing-twelve-months' results (TTM) for the same figure computed as of the prior quarter end to calculate a quarterly earnings surprise. This figure is effectively the seasonally-adjusted quarterly change. *Earnings Surprise* is therefore defined as current year earnings minus trailing-twelve-months earnings, and *FCF Surprise* is defined as *FCF* as described above minus trailing-twelve-months simple free cash flow:

$$FCF\ Surprise_i = FCF_i - TTM\ \ Simple\ FCF_i \qquad (3)$$

where *FCF* is the disclosed free cash flow from the earnings announcement, if available, and the Compustat-generated *Simple FCF* from equation (2) otherwise.

The coefficient on *Earnings Surprise* (β_1) is the well-known earnings response coefficient [*ERC*, e.g. Kormendi and Lipe (1987)]. The coefficient on *FCF Surprise* (β_2) allows us to identify the market's incremental reaction to information contained in free cash flows. We refer to this coefficient as the free cash flow response coefficient (*FRC*).

3.2 Proxies for Asymmetric Information and Earnings Relevance

Our first hypothesis is that *FRC*s should be larger for firms with higher asymmetric information. To test this prediction, we partition our firms into subsets based on firm size (*Small/Large*), analyst following (*Low AF/ High AF*), dispersion of analysts' earnings forecasts (*Low Dispersion/High Dispersion*), and bid-ask spread (*Low Spread/High Spread*). Partitions are based on firm-years below versus above the pooled sample median. Firm size is based on total assets, measured as of the beginning of the firm-year. Analyst following is from the IBES summary statistics file as of the most recent forecast date prior to the earnings announcement. Dispersion of analyst forecasts

and percentage bid-ask spreads (calculated relative to the quote midpoint) are measured over the 30-day period ending ten days prior to the earnings announcement. (See the appendix for more detailed definitions of all variables.) We expect that free cash flow news is especially informative for high asymmetric information firms: small firms and firms with low analyst coverage, a high dispersion of analyst coverage, and high bid-ask spreads.

Our second hypothesis is that free cash flow is more relevant for firms for which earnings are less relevant. To test this hypothesis, we estimate equation (1) separately for subsamples of firms based on firm age, research and development intensity, and industry. We construct subsamples of *Young* and *Old* firms, where *Young* firms are defined as those that have been publicly traded for 15 years or less, and *Old* firms are the remaining firms. To address the possibility that earnings are losing relevance especially for young firms with losses, we further partition young firms into subsets of unprofitable (*Young/Loss*) versus profitable (*Young/Profitable*) firms based on whether or not contemporaneous net income is negative or positive. We also partition our firms into *Low RD* and *High RD*, where *Low RD* (*High RD*) firms have research and development expenses divided by sales (both measured as of the prior year) below (above) the pooled sample median. We use two alternative definitions to identify high-tech industries. First, following Brown, Fazzari, and Petersen (BFP, 2009), we use three-digit SIC codes for the high-tech industries they consider: drugs, office equipment and computers, electronic components, communication equipment, scientific instruments, medical instruments, and software (see p. 152). Using these industries, we sort firms into *High Tech (BFP)* industries and *Other (BFP)* industries. Ouimet and Zarutskie (OZ, 2014) define high-tech industries as computers, electronics, biotech, and telecom based on 4-digit SIC codes. Using this definition, we partition our firms into *High Tech (OZ)* and *Other (OZ)*.

4. Sample and Descriptive Statistics

Our sample begins with all firms listed in the Standard and Poor's [S&P] 1500 at any point during the period 2004 through 2016.[7] We require non-missing data from the Center for Research in Security Prices (CRSP) and Compustat data for our analysis. The resulting sample consists of 19,484 firm-years for 2,217 unique firms. The number of firm-years in our sample ranges from a maximum of 1,651 in 2009 to 938 in 2016, see Table 1.[8] We provide a list of variable definitions in the appendix. In Table 1, we also report the percentage of firm-years in which free cash flow is disclosed in a firm's earnings announcement. This percentage increases from 9.7% in 2004 to 20.7% by 2016.

In Table 2, Panel A, we present descriptive statistics for the main variables used in our analysis. Mean (median) earnings surprise, scaled by beginning market value of equity, is 0.010 (0.001) and mean (median) free cash flow surprise, scaled by market value of equity) is 0.002 (0.001). The mean (median) three-day cumulative abnormal return around the earnings announcement is 0.005 (0.003). *Time Trend* is defined as the year minus 2004 (the first year of the sample) and ranges from zero to 12. Finally, as also illustrated in Table 1, 14.3% of firm-years have a free cash flow disclosure in their annual earnings announcement.

In Table 2, Panel B, we present a correlation matrix for our sample. Earnings and free cash flow surprises are positively correlated at 0.134 and both are positively correlated with the three-day cumulative abnormal return, consistent with a stock price reaction to information in both

[7] We identify S&P 1500 firms as those firms with an *SPMIM* (S&P Major Market Index Identifier) value on Compustat equal to 10 (S&P 500), 91 (S&P Midcap 400), or 92 (S&P Midcap 600).

[8] By construction there is a general, although not monotonic, decline in the number of firm-years in our sample over time. We have data available for many S&P 1500 additions from the beginning of our sample period, but we lose S&P 1500 firms from our sample as they merge or are delisted, most notably following the financial crisis.

earnings and free cash flow. Results also show that some of our proxies for asymmetric information are significantly correlated with the proxies for earnings relevance. For example, the correlation between *Large* firms (a proxy for asymmetric information) and *High Tech (BFP)* firms (which we use to measure earnings relevance) is -0.210. We design tests to attempt to disentangle these effects.

5. Results

5. 1 Full Sample

Table 3, Panel A, reports the results of the regression in equation (1). In column (1) we first include only *Earnings Surprise* as the explanatory variable. We confirm that unexpected earnings are positively associated with earnings announcement returns on average, consistent with prior research. Column (2) reports results with *FCF Surprise* as the only explanatory variable. The coefficient on *FCF Surprise* is significant. In column (3), we combine both surprises and both are positively associated with earnings announcement returns. Our results are consistent with the idea that these two performance measures capture different facets of performance. Earnings are meant to capture the economic performance of the period, abstracting away from cash, and free cash flow is meant to capture the cash position of the firm—does the firm generate enough cash to pay for operations and reinvest in the firm?

As previously noted, free cash flow is often measured as operating cash flows minus capital expenditures. In Table 3, Panel B, we decompose the free cash flow surprise into these components. In column (2), we examine the earnings surprise relative to the *Operating Cash Flow Surprise* and *Capital Expenditures Surprise*.[9] Both *Earnings Surprise* and *Operating Cash Flow*

[9] See the appendix for more formal definitions of these variables.

Surprise are significantly positive, whereas the coefficient on *Capital Expenditures Surprise* is negative and significant. Similar results hold in column (3) where we further decompose the earnings surprise into its cash component (*Operating Cash Flow Surprise*) and non-cash component (*Accruals Surprise*).

Collectively these results suggest that *FCF Surprise* contains information that is incremental to that provided by unexpected earnings; free cash flow is not merely a redundant repackaging of the components of earnings.

5.2 Results: Why Does the Market React to Free Cash Flow?

Why does the market react to free cash flow surprises? To address this question, we re-estimate equation (1) separately for the theoretically relevant subsets of firms as discussed in Section 2. Our first hypothesis is that the market reaction to free cash flow surprises should be stronger for firms with greater levels of asymmetric information. In Panel A of Table 4, we report results for subsets of firms based on firm size (*Small/Large*), analyst following (*Low AF/ High AF*), dispersion of analyst coverage (*Low Dispersion/High Dispersion*), and percentage bid-ask spread (*Low Spread/High Spread*). The *FRC* is 0.0039 for *Small* firms (column (1)) and 0.0019 for *Large* firms (column (2)). This difference is economically and statistically significant (p-value for an F-test = 0.0003). The *FRC* is also significantly greater for firms with higher bid-ask spreads (*High Spread*).

In Table 4, Panel A, we also report tests comparing ERCs for asymmetric information subsets. Prior evidence regarding earnings announcement returns and asymmetric information has been mixed, at least partly because proxies for asymmetric information may capture noise in current earnings rather than information about future earnings [Yeung (2009)]. Our results show that *ERC*s are significantly larger for *Small* firms and for firms with low analyst coverage (*Low*

AF) and *High Spread* firms. The market reaction to earnings surprises is consistently related to our proxies for asymmetric information. One potential explanation for our results relative to the prior literature is that we use different proxies which may not capture noise in current earnings. Alternatively, noise in current earnings may not be as much of a concern in the sample of larger, S&P 1500 firms we analyze.

Our general conclusion is that the market reacts more strongly to earnings news and to free cash flow news for firms with higher asymmetric information, consistent with predictions if this type of news is more informative for firms with higher asymmetric information.

Our second hypothesis is that the market reaction to free cash flow is stronger in firms for which earnings are less value-relevant—young, research and development-intensive technology firms. In Panel B of Table 4 we report results of equation (1) estimated separately for these subsamples of firms. We also subdivide young firms based on profitability. We find evidence consistent with our hypothesis. The market reaction to free cash flow surprises is greater for young firms than old firms. The *FRC* for *Young* firms (column (2)) is 0.0037, compared to 0.0025 for *Old* firms (column (1)); these numbers are statistically different (p-value = 0.0236). When we further partition *Young* firms into *Loss* firms and *Profitable* firms, we see that FRC is greater for young firms with losses (0.0050 in column (3)) relative to those that are profitable (0.0033 in column (4)) although this difference is not statistically significant.[10] The *FRC* is also larger for *High Tech* firms (columns (8) and (10)) than *Other* firms (columns (7) and (9)), although the difference is only statistically greater for firms in high tech industries based on the Brown, Fazzari, and Petersen (2009) definitions (*High Tech (BFP)*). Results for subsamples based on research and development intensity (columns (5) and (6)) show no significant difference in the market response.

[10] When we partition the full sample into *Loss* versus *Profitable* firms, we find no significant differences in either the *ERC* or the *FRC* between subsamples.

One potential concern is that our proxies for asymmetric information may be correlated with our proxies for earnings relevance. Although these two theories are not mutually exclusive, it would be nice to disentangle them. To address this issue, we also estimate equation (1) for subsamples of firms partitioned simultaneously on both an asymmetric information proxy and a proxy for earnings relevance. We double-sort our firms into subsamples based on bid-ask spreads (*High Spread/Low Spread*) or firm size (*Large/Small*) to capture asymmetric information and industry (*High Tech (BFP)/Other (BFP)*) to capture earnings relevance. As we saw in Table 4, *FRC*s for the subsamples using single sorts differ significantly for each of these characteristics. Industry has the additional advantage of being a discrete classification rather than a continuous variable.

In Table 5 we report results for subsets using a double sort based on bid ask spreads and industry (Panel A) or firm size and industry (Panel B). Holding industry constant, differences in *FRC*s between *High Spread* and *Low Spread* firms will likely reflect asymmetric information. Conversely, holding spread category constant, differences in industry groups reflect earnings relevance. Results from Panel A show that *FRC*s for *High Tech (BFP)* firms are very similar across spread classifications (columns (1) and (2)); they are also similar to the *FRC* for *High Spread* firms in other industries (column (3)). In contrast, *FRC*s for *Other (BFP)/Low Spread* firms in column (4) are significantly lower than the other categories. Similar results hold in Panel B when we sort simultaneously on firm size and industry. The only statistically significantly difference in *FRC*s is for large, non-high-tech firms (column (3)). These *FRC*s are significantly lower than large high-tech firms (column (1)) and also than small firms in other industries (column (4)).

Our conclusion from this analysis is that, although they are correlated, these proxies for asymmetric information and for earnings relevance seem to be capturing different effects. The

market responds more strongly to free cash flow news either for firms with high asymmetric information (as measured by spreads or firm size) or for firms with lower earnings relevance (proxied by high tech firms). When neither of these conditions hold, the *FRC*s are significantly lower.

Overall, our results show that the market reaction to free cash flow surprises is stronger for firms with high asymmetric information as measured by firm size and bid-ask spreads. It is also larger for firms for which earnings are less relevant, measured as young firms and firms in high technology industries.

5.3 Results: Market Reaction to Disclosure

Does the decision to disclose a free cash flow number in the earnings announcement affect the market reaction to free cash flow news? To address this question, in Table 6, Panel A, we partition the sample into firm-years with and without a corresponding voluntary free cash flow disclosure. As noted previously, just under 15 percent of the firm-years in our sample contain such disclosures. Free cash flow surprises are statistically significant for both non-disclosers (column (2)) and disclosers (column (3)). The coefficient on free cash flow surprise is weakly statistically larger for the subsample of firms with free cash flow disclosure (p-value = 0.0967).

Although the "simple" definition of free cash flow (operating cash flows minus capital expenditures) is the most common, reported in almost 40 percent of firm-year disclosures, the remaining firms report a wide variety of definitions. Is there incremental information in the choice of definition to disclose? In columns (4) and (5), we partition firm-years with voluntary free cash flow disclosures into those disclosing simple free cash flow versus those voluntarily disclosing some other definition of free cash flow. On the one hand, it may be easier to interpret the

information in simple free cash flow; on the other hand, the decision to make specific adjustments and disclose other free cash flow definitions may provide more comprehensive information to the market. We provide evidence of the former, with the *FRC* for *Simple FCF* disclosers in column (4) increasing to 0.0065 (relative to 0.0038 for all disclosers in column (3)). An F-test comparing *Simple FCF* disclosers (column (4)) to non-disclosers (column (2)) is highly significant (p-value = 0.0017). In contrast, the coefficient on free cash flow surprise for firms disclosing some other definition of free cash flow (column (5)) is smaller than for the full sample of disclosers (although the difference is not statistically significant).

Overall, the market reaction to free cash flow surprises is stronger in firm-years with voluntary disclosure of a free cash flow number (and in particular, for those that disclose *Simple FCF*) than it is for non-disclosure firm-years. Does the market react more strongly because a firm chooses to highlight free cash flow by disclosing it in the earnings announcement? Or do firms for which free cash flow is more important decide to disclose free cash flow? To address this question, we focus on firms that eventually disclose free cash flow and compare the market reaction in non-disclosure years to the market reaction in disclosure years for these same firms. If the market reacts more strongly because a firm chooses to highlight free cash flow in its disclosure, we expect an incremental reaction for these firms in the disclosure years. In contrast, if firms for which free cash flow is more important eventually choose to disclose it, we expect a similar reaction in the disclosure and non-disclosure years for these firms.

We report results of this test in Panel B of Table 6. In columns (1) and (2), we focus specifically on firms that eventually disclose free cash flow and estimate equation (1) separately in their disclosure versus non-disclosure years. The *FRC*s are very similar for these two subsamples (0.0038 and 0.0041) and are not significantly different. We also separately estimate

equation (1) using all firm-years for firms that never disclose free cash flow (column (3)). The *FRC* for these firm-years is only 0.0025, which is statistically lower (p-value = 0.0478) than for the non-disclosure years of the eventual disclosers in column (2).

From this analysis, we conclude that the market reacts more strongly to firms that disclose free cash flow. This reaction is stronger for firms that disclose *Simple FCF* than for those that use another definition. The market reaction is consistent with the idea that firms for which free cash flow is more important voluntarily decide to disclose it.

5.4 Time Trend Analysis

In Figure 1, Panel A, we graph the mean and median *FRC* formed by year. In order to analyze the time series for individual firms, the *FRC*s in Figure 1 are the results of estimating firm-specific regressions of equation (1) over the trailing eight quarters.[11] Results show a fairly steady upward trend in each of these measures. A regression of *FRC* on a time trend variable is highly significant (Table 7, Panel A, column (2)). There is no similar trend in *ERC* (Table 7, Panel A, column (1)). We would like to understand why the average *FRC* is increasing over time. Is the information content of free cash flow increasing for all firms? Is the trend concentrated in a subset of firms, for example those identified previously as being associated with higher market reactions in general? Or does the trend reflect changing firm characteristics, with a shift toward characteristics (such as firms with high bid-ask spreads or high technology firms) for which free cash flow is relatively more important? We next conduct tests to address these questions.[12]

[11] For example, the firm specific *FRC* for Q4 2018 is estimated using equation (1) over the window [Q3 2016, Q3 2018]. The mean (median) *FRC* for 2018 is the cross-sectional average of all firm-specific *FRC*s for Q4 2018.

[12] It is also possible that the increase in *FRC* reflects a change in the efficiency with which investors impound this information (Sloan (1996)]. Untabulated tests of future abnormal returns do not provide evidence of a change in mispricing over time.

We begin to address these questions by considering the role of free cash flow disclosure. As discussed previously, more and more firms are disclosing free cash flow in their earnings announcement; this trend is statistically significant (column (1) of Table 8, Panel A). Trends in *FRC*s for subsamples based on disclosure reveal some interesting results. In Panel A of Table 7, we document a significant increase in *FRC*s for firm-years in the *No Disclosure* subsample but no trend for the *Disclosure* subsample of firm-years. In contrast, the constant term in these regressions is 0.0013 for *No Disclosure* firm-years (column (3)) versus 0.0042 for *Disclosure* firm years (column (4)), and this difference is highly significant (p-value = 0.0024). Consistent with results in Table 6, *Disclosure* firm-years are associated with a higher market reaction. However, the trend in *FRC*s is concentrated in firm-years without a free cash flow disclosure.

To illustrate the net effect of these different factors, in Figure 2 we plot the percent of firms disclosing free cash flow every year, along with the yearly *FRC* for subsamples firm-years for *Disclosers* and *Non-Disclosers*. It is clear from Figure 2 that voluntary disclosures of free cash flows have increased over time. The *FRC* is generally higher for disclosing firms than non-disclosing firms, suggesting that disclosure is associated with the relevance of free cash flow. However, the increase in *FRC* over time is greater in the non-disclosing firms; they are "catching up" in relevance.

To shed light on the role of asymmetric information and earnings relevance in understanding why free cash flows are becoming more important over time, we estimate the *FRC* by year for the subsamples of firms motivated as theoretically important in Section 2. In Table 7, we report regressions of the time series of *FRC*s on a time trend for subsets based on our proxies for asymmetric information (Panel B) and earnings relevance (Panel C). The time trend coefficients are statistically significantly positive for all of the subgroups in both panels. These

results suggest that the increase in *FRC* over time is at least partly attributable to an increase in the information content of free cash flow for all firms.

Comparing asymmetric information subgroups in Panel B, the time trend coefficient for *Small* firms in column (1) is 0.0004, compared to 0.0001 for *Large* firms (column (2)). This difference is highly statistically significant. Similarly, the time trend is significantly larger for firms with low analyst following (*Low AF*) and for firms with high bid-ask spreads (*High Spread*). Although trends are present for both low- and high-asymmetric information firms, we see that the trends are significantly larger for high-asymmetric information firms based on three of our four proxies. In Panel C we report similar results for the earnings-relevance subsets. These results show that the time trends are significantly greater for young firms with losses (relative to profitable young firms) and for high technology firms based on either of our industry classifications.

Finally, we consider the role that changes in the proportion of firms in these various subsets may play. If, for example, the population of firms shifts over time toward small firms or high technology firms, both of which have higher *FRC*s from Table 4, we would expect to see an overall increase in *FRC*s even holding constant time trends in any particular subset of firms. Regarding asymmetric information subgroups, results in Panel A of Table 8 show decreases (or no significant changes) in the fraction of firms in all of the high asymmetric information subgroups. Similar results hold in Panel B for subgroups based on earnings relevance. Some of these downward trends may reflect our research design. For example, bid-ask spreads have been declining steadily, and we sort firms based on the pooled median. Our focus on S&P 1500 firms might also influence trends in characteristics such as size or industry. However, our results show that the fraction of firms in our sample is generally declining in subsamples of firms for which *FRC*s are the highest.

Our takeaway from this analysis is that several factors contribute to the time trend in *FRC*s. This trend is present in most types of firms, suggesting that free cash flow is becoming more informative in general. The trend is particularly strong in firms for which free cash flow is more informative: high asymmetric information firms and firms for which earnings are less relevant. The overall trend of increasing *FRC* occurs despite a shift in our sample away from firms for which free cash flow is more informative. In general, the value-relevance of free cash flow is increasing in the market.

6. Conclusion

We begin by documenting that the stock market reacts incrementally to free cash flow news and that this reaction has been increasing over time. To determine why the market reacts, we explore two alternative hypotheses. First, free cash flow may be particularly informative for firms with high asymmetric information: small firms with low analyst coverage, high dispersion of analyst forecasts and high bid-ask spreads. Second, free cash flow may be more informative in firms for which earnings are less informative: young, research and development-intensive technology firms. We find evidence in support of both of these predictions. *FRC*s are higher for small firms and in firms with higher bid-ask spreads. They are also higher for young firms and for firms in high technology industries. The market reaction is also greater for firms that disclose free cash flow in their earnings announcements. Our evidence suggests that firms for which free cash flow is more value relevant decide to disclose it. Finally, the time trend in market reaction reflects an overall trend of increasing informativeness of free cash flows which is especially strong for certain types of firms. Our results provide evidence of the growing importance of free cash flow as a source of information to market participants.

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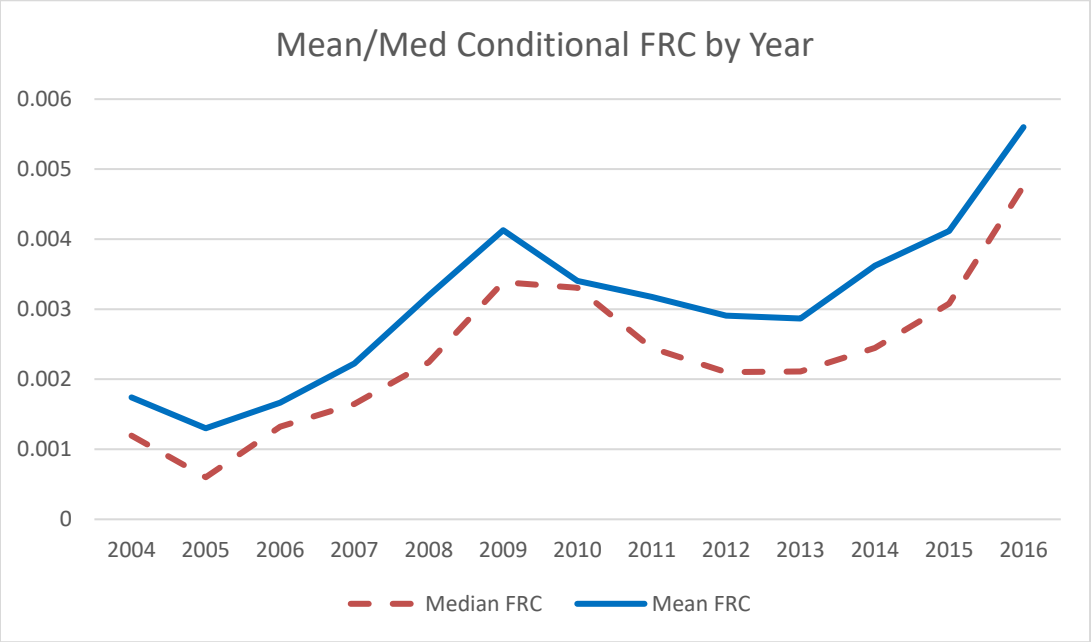
Appendix. Variable Definitions

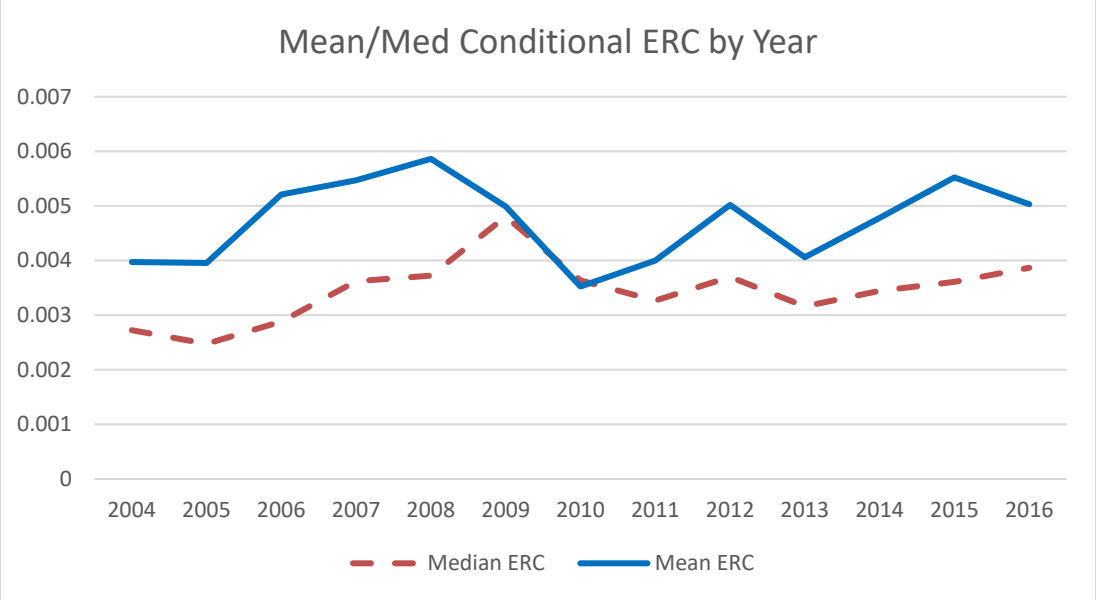
Variable	Description
CAR	Cumulative abnormal returns over the t-1 to t+1 earnings announcement window, where t is the day of the earnings announcement (using CRSP RET and VWRETD).
Accruals Surprise	Current year accruals (Compustat NI minus OANCF) less trailing twelve months' accruals (the sum of accruals for Q1, Q2, and Q3 of the current year and Q4 of the prior year); scaled by shares outstanding (Compustat CSHO) and price as of the beginning of the fiscal year (lagged PRCC_F).
Capital Expenditures Surprise	Current year capital expenditures (Compustat CAPX) less trailing twelve months' capital expenditures (the sum of CAPXQ for Q1, Q2, and Q3 of the current year and Q4 of the prior year); scaled by shares outstanding (Compustat CSHO) and price as of the beginning of the fiscal year (lagged PRCC_F).
Earnings Surprise	Current year net income (Compustat NI) less trailing twelve months' net income (the sum of NIQ for Q1, Q2, and Q3 of the current year and Q4 of the prior year); scaled by shares outstanding (Compustat CSHO) and price as of the beginning of the fiscal year (lagged PRCC_F).
FCF Disclosure	Indicator variable equal to one if a company discloses an annual free cash flow value in the earnings announcement and zero otherwise.
FCF Surprise	Current year dislcosed free cash flow or simple free cash flow (Compustat OANCF - CAPX) if not disclosed less trailing twelve months' simple free cash flow (the sum of free cash flow for Q1, Q2, and Q3 of the current year and Q4 of the prior year); scaled by shares outstanding (Compustat CSHO) and price as of the beginning of the fiscal year (lagged PRCC_F).
FRC	Free cash flow "response coefficient"; calculated as the coefficient from firm-specific rolling regressions of earnings announcement returns (3-day EA CAR) on Earnings Surprise and FCF Surprise over eight-quarter windows.
High (Low) Analyst Following	Indicator variable equal to one if analyst following is greater (less) than the pooled median value for all periods and zero otherwise. Analyst following is defined as the number of annual earnings estimates (NUMEST) from the IBES summary statistics file as of the most recent period before the earnings announcement.
High (Low) Dispersion	Indicator variable equal to one if analyst forecast dispersion is greater (less) than the pooled median value for all periods and zero otherwise. Analyst forecast dispersion is defined as the standard deviation of annual earnings forecasts made by analysts during the period [EA-41, EA-11], where EA is the earnings announcement date.
High (Low) Spread	Indicator variable equal to one if bid-ask spread is greater (less) than the pooled median value for all periods and zero otherwise. Bid-ask spread the average of CRSP BID - ASK / the midpoint of the spread during the period [EA-41, EA-11], where EA is the earnings announcement date.
High (Low) RD	Indicator variable equal to one if RD scaled by Sales is greater (less) than the pooled median value for all periods and zero otherwise.
High Tech (Other) - BFP	Indicator variable equal to one if the firm operates (does not operate) in the following SIC industries: 283, 357, 366, 367, 382, 384, 737, following Brown, Fazzari, and Petersen (BFP, 2009).
High Tech (Other) - OZ	Indicator variable equal to one if the firm operates (does not operate) in the following SIC industries: 2830 - 2839, 3826, 3841 - 3851, 5047, 5048, 5122, 6324, 7352, 8000 - 8099, 8730 - 8739, 3660 - 3669, 4810 - 4899, 3570 - 5379, 5044, 5045, 5734, 7370 - 7379, 3600 - 3629, 3643, 3644, 3670 - 3699, 3825, 5065, 5063, following Ouimet and Zarutskie (OZ, 2014).
Large (Small)	Indicator variable equal to one if Ln(Compustat AT) is greater (less) than the pooled median value for all periods and zero otherwise.
Loss (Profitable)	Indicator variable equal to one if net income (Compustat NI) is greater (less) than zero.
Operating Cash Flow Surprise	Current year operating cash flow (Compustat OANCF) less trailing twelve months' operating cash flow (the sum of OANCFQ for Q1, Q2, and Q3 of the current year and Q4 of the prior year); scaled by shares outstanding (Compustat CSHO) and price as of the beginning of the fiscal year (lagged PRCC_F).
Time Trend	Year of Compustat DATADATE minus 2004; e.g. equals 0 for observations with a fiscal year-end during 2004 and equals 12 for observations with a fiscal year-end during 2016.
Young (Old)	Indicator variable equal to one if the firm has been publicly traded for less (greater) than or equal to 15 years (year - CRSP CBEGDT) and zero otherwise.

Figure 1. *FRC* and *ERC* by Year

In Panel A, we report the mean (median) free cash flow surprise response coefficient (*FRC*) by year. In Panel B, we report the mean (median) earnings surprise response coefficient (*ERC*) by year. Regressions are estimated with both free cash flow surprise and earnings surprise as explanatory variables. The yearly *FRC*s and *ERC*s are the results of estimating firm-specific regressions of equation (1) over the trailing eight quarters.



Panel A. *FRC*s.



Panel B. *ERC*s.

Figure 2. Percent Disclosers and *FRC* for Disclosers and Non-Disclosers

The proportion of firms voluntarily disclosing free cash flows in their 4th quarter earnings announcement is represented by the dashed line, with the corresponding percentage provided on the left-hand axis. The free cash flow surprise response coefficient (*FRC*) is provided in blue (orange) for firms contemporaneously providing (not providing) a voluntary disclosure of free cash flows. The *FRC* is presented on the right axis.

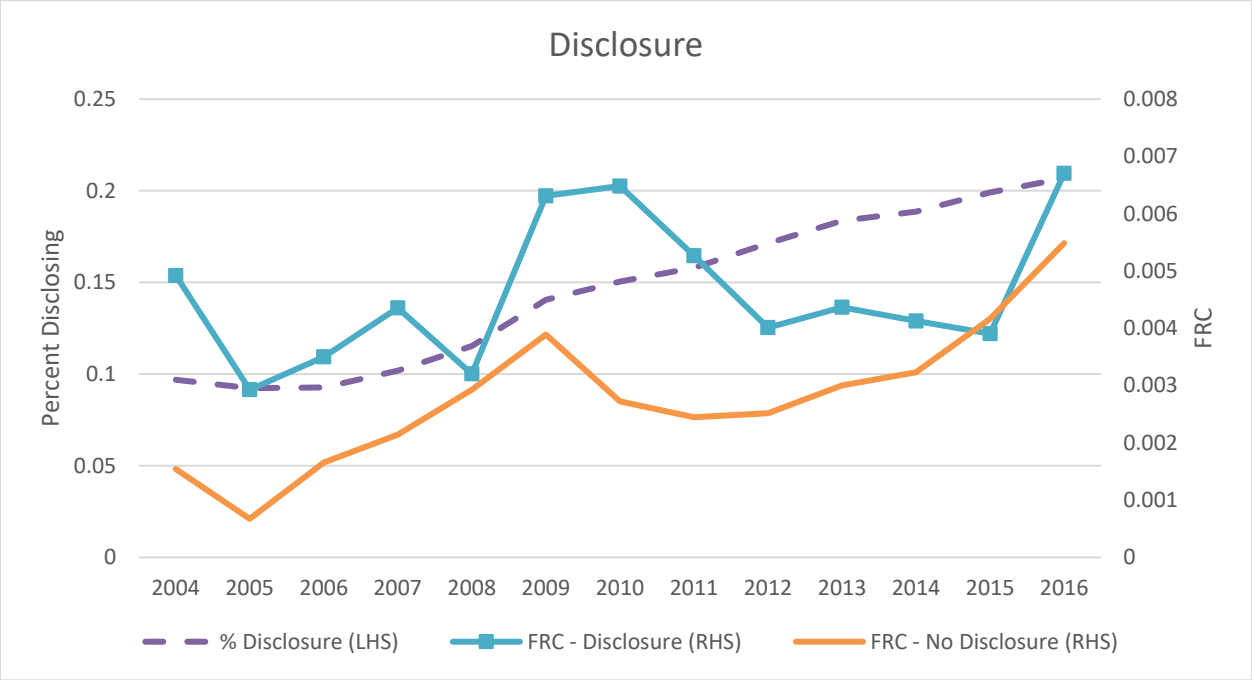


Table 1
Summary Statistics

In this table, we provide descriptive statistics rearding the number of observations in our sample by year. We also report the number of firms disclosing free cash flow in their earnings announcement each year.

		FCF Disclosure	
Year	Total Firm Years	Firm Years	% of Firm Years
2004	1,033	100	9.7%
2005	1,624	150	9.2%
2006	1,629	151	9.3%
2007	1,630	166	10.2%
2008	1,622	187	11.5%
2009	1,651	232	14.1%
2010	1,615	243	15.0%
2011	1,589	251	15.8%
2012	1,576	270	17.1%
2013	1,552	285	18.4%
2014	1,538	290	18.9%
2015	1,487	296	19.9%
2016	938	194	20.7%
	19,484	2,815	14.3%

Table 2
Panel A. Descriptive Statistics

In Panel A of this table, we report descriptive statistics for all of the variables used in our analysis for the firm-years in our sample. In Panel B, we report a correlation matrix for these variables. Variables are defined in the appendix.

Variable	N	Mean	Std Dev	Minimum	25th Pctl	50th Pctl	75th Pctl	Maximum
Earnings Surprise	19,484	0.010	0.147	-0.527	-0.005	0.001	0.007	3.189
FCF Surprise	19,484	0.002	0.063	-0.629	-0.011	0.001	0.014	0.747
OCF Surprise	19,484	0.002	0.059	-0.626	-0.009	0.002	0.014	0.775
Accruals Surprise	19,484	0.008	0.165	-0.529	-0.015	-0.001	0.013	3.358
Capex Surprise	19,484	0.000	0.014	-0.179	-0.002	0.000	0.003	0.070
CAR	19,484	0.005	0.086	-0.978	-0.034	0.003	0.043	2.713
Time Trend	19,484	5.897	3.538	0.000	3.000	6.000	9.000	12.000
FCF Disclosure	19,484	0.143	0.350	0.000	0.000	0.000	0.000	1.000
Asymmetric Information Proxies:								
Ln(Total Assets)	17,267	7.802	1.688	3.586	6.583	7.691	8.897	12.727
Ln(Analyst Following)	19,484	2.146	0.755	0.000	1.609	2.197	2.708	3.611
Analyst Forecast Dispersion	13,528	0.103	0.214	0.000	0.015	0.035	0.091	2.341
Bid Ask Spread	19,484	0.001	0.002	0.000	0.000	0.001	0.001	0.034
Earnings Relevance Proxies:								
Age	19,484	27.178	17.081	1.000	14.000	22.000	40.000	67.000
RD Intensity	9,605	0.068	0.106	0.000	0.000	0.023	0.097	0.957
Hightech (BFP)	19,484	0.230	0.421	0.000	0.000	0.000	0.000	1.000
Hightech (OZ)	19,484	0.456	0.498	0.000	0.000	0.000	1.000	1.000

Table 2, Continued
Panel B. Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *Earnings Surprise*	1.000															
(2) *FCF Surprise*	0.134	1.000														
	0.000															
(3) *OCF Surprise*	0.169	0.871	1.000													
	0.000	0.000														
(4) *Accruals Surprise*	0.436	-0.593	-0.648	1.000												
	0.000	0.000	0.000													
(5) *Capex Surprise*	0.066	-0.200	0.070	-0.017	1.000											
	0.000	0.000	0.000	0.018												
(6) *CAR*	0.132	0.112	0.111	-0.008	-0.014	1.000										
	0.000	0.000	0.000	0.243	0.054											
(7) *Time Trend*	-0.001	0.000	0.000	0.000	-0.002	-0.007	1.000									
	0.943	0.995	0.994	0.987	0.780	0.306										
(8) *FCF Disclosure*	-0.004	0.019	0.006	-0.007	-0.003	0.013	0.109	1.000								
	0.540	0.008	0.384	0.298	0.689	0.063	0.000									
(9) *Young*	0.004	0.019	0.019	-0.011	0.006	0.022	-0.226	-0.023	1.000							
	0.550	0.008	0.009	0.144	0.419	0.002	0.000	0.001								
(10) *High RD*	0.014	-0.003	-0.001	0.016	-0.003	-0.002	-0.029	0.034	0.064	1.000						
	0.166	0.803	0.957	0.110	0.760	0.817	0.005	0.001	0.000							
(11) *High Tech (BFP)*	-0.004	0.007	0.000	0.010	-0.026	0.011	-0.022	0.034	0.089	0.688	1.000					
	0.574	0.361	0.971	0.173	0.000	0.132	0.002	0.000	0.000	0.000						
(12) *High Tech (OZ)*	-0.003	0.002	0.004	0.001	0.020	0.008	-0.019	0.083	-0.002	0.574	0.598	1.000				
	0.702	0.830	0.569	0.866	0.006	0.250	0.007	0.000	0.780	0.000	0.000					
(13) *Loss*	-0.164	-0.018	-0.066	-0.093	-0.115	-0.025	0.016	-0.011	0.011	0.099	0.091	0.037	1.000			
	0.000	0.010	0.000	0.000	0.000	0.001	0.022	0.115	0.141	0.000	0.000	0.000				
(14) *Large*	-0.026	-0.013	-0.019	0.000	-0.008	-0.037	0.117	0.103	-0.206	-0.135	-0.210	-0.135	-0.077	1.000		
	0.001	0.081	0.014	0.967	0.276	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
(15) *High Analyst Following*	-0.015	-0.005	0.006	-0.008	0.029	-0.013	0.063	0.105	-0.027	0.047	0.004	0.045	-0.128	0.379	1.000	
	0.037	0.484	0.435	0.239	0.000	0.071	0.000	0.000	0.000	0.000	0.590	0.000	0.000	0.000		
(16) *High Analyst Forecast Dispersion*	-0.042	-0.022	-0.016	-0.022	0.005	-0.015	0.039	-0.034	-0.069	-0.009	-0.105	-0.071	0.136	0.142	-0.040	1.000
	0.000	0.012	0.059	0.009	0.582	0.082	0.000	0.000	0.000	0.487	0.000	0.000	0.000	0.000	0.000	
(17) *High Bid Ask Spread*	0.002	0.003	-0.008	-0.001	-0.027	0.016	-0.381	-0.124	0.169	0.079	0.064	0.033	0.224	-0.369	-0.363	-0.023
	0.813	0.681	0.242	0.911	0.000	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008

Table 3
Announcement Return Regressions

Panel A reports regressions of equation (1) for the full sample. In Panel B, we decompose *Free Cash Flow Surprise* into *Operating Cash Flow Surprise* and *Capital Expenditures Surprise* (column (2)). We also decompose *Earnings Surprise* into *Operating Cash Flow Surprise* and *Accruals Surprise* (column (3)). All surprises are calculated as the annual value minus the trailing twelve months value scaled by beginning of period market value of equity. Variables are defined in the appendix. Explanatory variables are decile ranked. All regressions include industry and year fixed effects. Standard errors are clustered by firm.

Panel A. Full Sample

	(1)	(2)	(3)
VARIABLES	Full Sample	Full Sample	Full Sample
Earnings Surprise	0.0039***		0.0035***
	(0.0000)		(0.0000)
FCF Surprise		0.0033***	0.0029***
		(0.0000)	(0.0000)
Constant	-0.0193***	-0.0145***	-0.0324***
	(0.0000)	(0.0000)	(0.0000)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Errors Clustered by Firm	Yes	Yes	Yes
Observations	19,484	19,484	19,484
R-squared	0.0220	0.0173	0.0309
p-value for equality of *ERC* and *FRC*			0.0827

Panel B. Decomposition of Independent Variables

Variables	(1) Full Sample	(2) Full Sample	(3) Full Sample
Earnings Surprise	0.0035***	0.0035***	
	(0.0000)	(0.0000)	
Operating Cash Flow Surprise		0.0028***	0.0055***
		(0.0000)	(0.0000)
Accruals Surprise			0.0033***
			(0.0000)
Free Cash Flow Surprise	0.0029***		
	(0.0000)		
Capital Expenditures Surprise		-0.0008***	-0.0007***
		(0.0007)	(0.0030)
Constant	-0.0324***	-0.0277***	-0.0408***
	(0.0000)	(0.0000)	(0.0000)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Errors Clustered by Firm	Yes	Yes	Yes
Observations	19,484	19,484	19,484
R-squared	0.0309	0.0308	0.0246

Table 4
Announcement Return Regressions by Subsets Based on Asymmetric Information and Earnings Relevance

This table reports regressions of equation (1) for subsets based on proxies for asymmetric information (Panel A) and earnings relevance (Panel B). In Panel A we partition our sample by firm size into *Small* and *Large* firms (columns (1) and (2)), based on analyst coverage into *Low AF* versus *High AF* (columns (3) and (4)), the dispersion of analyst forecasts into *Low Dispersion* and *High Dispersion* firms (columns (5) and (6)), and based on bid ask spreads into *Low Spread* and *High Spread* subsets (columns (7) and (8)). In Panel B we partition our sample by firm age into *Old* and *Young* firms (columns (1) and (2)), research and development intensity into *Low RD* and *High RD* firms (columns (5) and (6)), by the Brown, Fazzari and Petersen (2009) industry classifications for *Other (BFP)* and *High Tech (BFP)* industries (columns (7) and (8)), and by the Ouimet and Zarutskie (2014) industry classifications into *Other (OZ)* and *High Tech (OZ*) industries (columns (9) and (10)). We also subdivide *Young* firms into young firms with losses (*Young/Loss*) and profitable young firms (*Young/Profitable*) in columns (3) and (4). All surprises are calculated as the annual value minus the trailing twelve months value scaled by beginning of period market value of equity. Variables are defined in the appendix. Explanatory variables are decile ranked. All regressions include industry and year fixed effects. Standard errors are clustered by firm.

Panel A. Asymmetric Information Subsets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Small	Large	Low AF	High AF	Low Dispersion	High Dispersion	Low Spread	High Spread
Earnings Surprise	0.0044***	0.0026***	0.0045***	0.0024***	0.0035***	0.0027***	0.0028***	0.0041***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Free Cash Flow Surprise	0.0039***	0.0019***	0.0031***	0.0026***	0.0026***	0.0022***	0.0024***	0.0033***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	-0.0420***	-0.0285***	-0.0402***	-0.0217***	-0.0268***	-0.0265***	-0.0257***	-0.0380***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
Observations	8,701	8,566	9,031	10,452	6,740	6,788	9,741	9,742
R-squared	0.0371	0.0292	0.0425	0.0218	0.0295	0.0262	0.0338	0.0334
p-value for difference in *ERC*	0.0008		0.0000		0.1345		0.0125	
p-value for difference in *FRC*	0.0003		0.3152		0.5074		0.0577	

Panel B. Earnings Relevance Subsets

VARIABLES	(1) Old	(2) Young	(3) Young/ Loss	(4) Young/ Profitable	(5) Low RD	(6) High RD	(7) Others (BFP)	(8) High Tech (BFP)	(9) Others (OZ)	(10) High Tech (OZ)
Earnings Surprise	0.0035***	0.0035***	0.0042***	0.0032***	0.0031***	0.0036***	0.0037***	0.0031***	0.0035***	0.0036***
	(0.0000)	(0.0000)	(0.0003)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FCF Surprise	0.0025***	0.0037***	0.0050***	0.0033***	0.0038***	0.0031***	0.0026***	0.0042***	0.0025***	0.0033***
	(0.0000)	(0.0000)	(0.0003)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	-0.0337***	-0.0303***	-0.0290	-0.0295***	-0.0357***	-0.0511***	-0.0305***	-0.0919***	-0.0301***	-0.0435***
	(0.0000)	(0.0000)	(0.2012)	(0.0000)	(0.0000)	(0.0095)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,539	5,945	917	5,028	4,834	4,771	14,994	4,490	10,609	8,875
R-squared	0.0322	0.0338	0.0472	0.0318	0.0363	0.0280	0.0330	0.0340	0.0305	0.0355
p-value for difference in *ERC*	0.9823		0.4329		0.5854		0.3564		0.9342	
p-value for difference in *FRC*	0.0236		0.2250		0.4096		0.0233		0.1481	

Table 5
Announcement Return Regressions by Double Sorts Based on Asymmetric Information and Earnings Relevance

This table reports regressions of equation (1) for subsets of firms based on both a proxy for asymmetric information and a proxy for earnings relevance. In Panel A, we double-sort firms into *High Spread*/*Low Spread* and *High Tech (BFP)*/*Other (BFP)* subsets. In Panel B, we double sort firms into *Large*/*Small* and *High Tech (BFP)/Other (BFP)* subsets. All surprises are calculated as the annual value minus the trailing twelve months value scaled by beginning of period market value of equity. Variables are defined in the appendix. Explanatory variables are decile ranked. All regressions include industry and year fixed effects. Standard errors are clustered by firm.

Panel A. Industry versus Bid-Ask Spread

VARIABLES	(1) High Tech (BFP)/ High Spread	(2) High Tech (BFP)/ Low Spread	(3) Other (BFP)/ High Spread	(4) Other (BFP)/ Low Spread
Earnings Surprise	0.0030***	0.0030***	0.0044***	0.0028***
	(0.0002)	(0.0000)	(0.0000)	(0.0000)
FCF Surprise	0.0043***	0.0043***	0.0031***	0.0020***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	-0.0882***	-0.1562***	-0.0369***	-0.0238***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster by Firm	Yes	Yes	Yes	Yes
Observations	2,509	1,981	7,233	7,761
R-squared	0.0358	0.0472	0.0366	0.0345

Within Industry, High vs Low Spread:	(1) versus (2)	(3) versus (4)
p-value for difference in *ERC*	0.9985	0.0038
p-value for difference in *FRC*	0.9844	0.0450
Within Spread, High Tech vs Other Industry:	(1) versus (3)	(2) versus (4)
p-value for difference in *ERC*	0.1447	0.7542
p-value for difference in *FRC*	0.2583	0.0088

Panel B. Industry versus Size

VARIABLES	(1) High Tech BFP/ Large	(2) High Tech BFP/ Small	(3) Other BFP/ Large	(4) Other BFP/ Small
Earnings Surprise	0.0008	0.0039***	0.0028***	0.0046***
	(0.2958)	(0.0000)	(0.0000)	(0.0000)
FCF Surprise	0.0055***	0.0037***	0.0015***	0.0039***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	-0.0345***	-0.0919***	-0.0226***	-0.0357***
	(0.0027)	(0.0000)	(0.0000)	(0.0000)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster by Firm	Yes	Yes	Yes	Yes
Observations	1,382	3,108	8,360	6,634
R-squared	0.0565	0.0362	0.0320	0.0415

Within Industry, High vs Low Spread:	(1) versus (2)	(3) versus (4)
p-value for difference in *ERC*	0.0025	0.0025
p-value for difference in *FRC*	0.1564	0.0000
Within Spread, High Tech vs Other Industry:	(1) versus (3)	(2) versus (4)
p-value for difference in *ERC*	0.0147	0.4379
p-value for difference in *FRC*	0.0000	0.8729

Table 6
Announcement Return Regressions Based on Free Cash Flow Disclosure

In Panel A we report regressions of equation (1) for subsets of firms based on whether or not the firm-year includes a free cash flow disclosure. We report results for the subsamples with *No Free Cash Flow Disclosure* and *Free Cash Flow Disclosure* in columns (2) and (3). We further split the *Free Cash Flow Disclosure* sample into those firm-years which include a *Free Cash Flow Simple Disclosure* (column (4)) versus those which disclose another definition (*Free Cash Flow Other Disclosure*, column (5)). In Panel B we focus on the subset of firms that disclose free cash flows at some point during our sample period, and separately report results for the subsample of firm-years when they disclose free cash flow (column (1)) and when they don't (column (2)). In column (3) we report results for firm-years of firms that never disclose free cash flow. All surprises are calculated as the annual value minus the trailing twelve months value scaled by beginning of period market value of equity. Variables are defined in the appendix. Explanatory variables are decile ranked. All regressions include industry and year fixed effects. Standard errors are clustered by firm.

Panel A. Disclosers vs. Non-Disclosers

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Full Sample	No Free Cash Flow Disclosure	Free Cash Flow Disclosure	Free Cash Flow Simple Disclosure	Free Cash Flow Other Disclosure
Earnings Surprise	0.0035***	0.0036***	0.0034***	0.0035***	0.0033***
	(0.0000)	(0.0000)	(0.0000)	(0.0014)	(0.0000)
Free Cash Flow Surprise	0.0029***	0.0027***	0.0038***	0.0065***	0.0028***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Constant	-0.0324***	-0.0308***	-0.0319**	-0.0452	-0.0247**
	(0.0000)	(0.0000)	(0.0169)	(0.2141)	(0.0445)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Errors Clustered by Firm	Yes	Yes	Yes	Yes	Yes
Observations	19,484	16,695	2,789	1,042	1,747
R-squared	0.0309	0.0302	0.0426	0.0749	0.0463
p-value for difference in *ERC* (vs. col. 2)			0.8570	0.9730	0.7733
p-value for difference in *FRC* (vs. col. 2)			0.0967	0.0017	0.8412

Panel B. Eventual Disclosers versus Never Disclosers

	(1)	(2)	(3)
	Eventual Disclosers		
VARIABLES	Disclosure Years	Non-Disclosure Years	Never Disclosers
Earnings Surprise	0.0034***	0.0043***	0.0034***
	(0.0000)	(0.0000)	(0.0000)
FCF Surprise	0.0038***	0.0041***	0.0025***
	(0.0000)	(0.0000)	(0.0000)
Constant	-0.0319**	-0.0418***	-0.0290***
	(0.0169)	(0.0001)	(0.0000)
Observations	2,789	2,459	14,236
R-squared	0.0426	0.0563	0.0273
		(1) vs. (2)	(2) vs. (3)
p-value for difference in *ERC*		0.3123	0.2237
p-value for difference in *FRC*		0.8030	0.0478

Table 7
Time Trends in *FRC*s

In this table we report results of tests of time trends in *FRC*s. Panel A reports results for the full sample and for subsamples of firm-years based on free cash flow disclosure of firms. Panel B reports results for subsamples based on asymmetric information proxies. Panel C reports results for subsamples based on earnings relevance proxies. The dependent variables are the results of firm-specific regressions of equation (1) over the trailing eight quarters for each firm. We regress these values on a time trend.

Panel A. Full Sample and Disclosure Subsamples

	(1)	(2)	(3)	(4)
	ERC		FRC	
			No	
VARIABLES	Full Sample	Full Sample	Disclosure	Disclosure
Time Trend	0.0000	0.0002***	0.0002***	0.0001
	(0.4324)	(0.0000)	(0.0000)	(0.4868)
Constant	0.0045***	0.0016***	0.0013***	0.0042***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	18,480	18,480	15,795	2,685
R-squared	0.0000	0.0023	0.0025	0.0002
p-value for Time Trend			0.0911	
p-value for Constant			0.0024	

Panel B. Asymmetric Information Subsamples

VARIABLES	(1) Small	(2) Large	(3) Low AF	(4) High AF	(5) Low Dispersion	(6) High Dispersion	(7) Low Spread	(8) High Spread
Time Trend	0.0004***	0.0001*	0.0003***	0.0002***	0.0002***	0.0002***	0.0002***	0.0004***
	(0.0000)	(0.0872)	(0.0000)	(0.0002)	(0.0085)	(0.0042)	(0.0003)	(0.0000)
Constant	0.0013***	0.0017***	0.0014***	0.0017***	0.0026***	0.0015***	0.0017***	0.0013***
	(0.0069)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0005)	(0.0001)	(0.0002)
Observations	8,433	8,365	8,528	9,951	6,322	6,522	9,414	9,065
R-squared	0.0050	0.0003	0.0040	0.0013	0.0011	0.0013	0.0014	0.0039
p-value for Time Trend	0.0000		0.0987		0.9845		0.0306	
p-value for Constant	0.4435		0.4873		0.0897		0.4302	

Panel C. Earnings Relevance Subsamples

VARIABLES	(1) Old	(2) Young	(3) Young/ Loss	(4) Young/ Profitable	(5) Low RD	(6) High RD	(7) Other (BFP)	(8) High Tech (BFP)	(9) Other (OZ)	(10) High Tech (OZ)
Time Trend	0.0003***	0.0002***	0.0007***	0.0002*	0.0003***	0.0004***	0.0002***	0.0003***	0.0002***	0.0003***
	(0.0000)	(0.0041)	(0.0031)	(0.0581)	(0.0002)	(0.0001)	(0.0000)	(0.0005)	(0.0001)	(0.0000)
Constant	0.0014***	0.0018***	-0.0003	0.0021***	0.0017***	0.0010	0.0016***	0.0014**	0.0018***	0.0013***
	(0.0000)	(0.0003)	(0.8356)	(0.0001)	(0.0019)	(0.1655)	(0.0000)	(0.0331)	(0.0000)	(0.0009)
Observations	13,274	5,206	833	4,373	4,749	4,672	14,190	4,290	9,945	8,535
R-squared	0.0029	0.0016	0.0105	0.0008	0.0030	0.0033	0.0023	0.0028	0.0016	0.0032
p-value for Time Trend	0.3908		0.0278		0.1790		0.0608		0.0461	
p-value for Constant	0.7049		0.0786		0.7110		0.3011		0.2299	

Table 8
Time Trends in Composition of Firms

This table reports results for time trends in the composition of firms. We compute the fraction of firms in each subset by year and regress this fraction on a time trend. Panel A reports results for subsamples based on free cash flow disclosure and asymmetric information proxies and Panel B reports results for earnings relevance subsamples.

Panel A. Discloser and Asymmetric Information Subsamples

	(1)	(2)	(3)	(4)	(5)
		Asymmetric Information			
VARIABLES	% Disclosers	% Small	% Low AF	% High Dispersion	% High Spread
Time Trend	0.0105***	-0.0180***	-0.0087***	0.0061	-0.0514***
	(0.0000)	(0.0000)	(0.0002)	(0.1439)	(0.0006)
Constant	0.0817***	0.6194***	0.5141***	0.4615***	0.8007***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	13	12	13	13	13
R-squared	0.9649	0.9754	0.7242	0.1838	0.6698

Panel B. Earnings Relevance Subsamples

	(1)	(2)	(3)	(4)	(5)
VARIABLES	% Young	% Young/ Loss	% High RD	% High Tech (BFP)	% High Tech (OZ)
Time Trend	-0.0301***	-0.0042**	-0.0043***	-0.0023***	-0.0026***
	(0.0000)	(0.0124)	(0.0016)	(0.0002)	(0.0020)
Constant	0.4813***	0.0709***	0.5252***	0.2445***	0.4721***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	13	13	12	13	13
R-squared	0.9685	0.4475	0.6478	0.7230	0.5957

Online Appendix for

Why Are Investors Paying (More) Attention to Free Cash Flows?
January 31, 2020

Table A1. Table 3 Panel A Using Continuous Explanatory Variables

Results in the paper use decile-ranked explanatory variables. In this robustness test, we use continuous explanatory variables.

	(1)	(2)	(3)
VARIABLES	Full Sample	Full Sample	Full Sample
Earnings Surprise	0.0227***		0.0179***
	(0.0006)		(0.0086)
FCF Surprise		0.0999***	0.0953***
		(0.0000)	(0.0000)
Constant	0.0032	0.0031	0.0031
	(0.3151)	(0.3197)	(0.3317)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Errors Clustered by Firm	Yes	Yes	Yes
Observations	19,484	19,484	19,484
R-squared	0.0064	0.0103	0.0112
p-value for equality of *ERC* and *FRC*			0.0000

Table A2. Table 3, Panel A Using Compustat Data For FCF

Results in the paper use realized cash flow as the amount disclosed if available and Simple FCF from Compustat otherwise. In this robustness test we use Compustat Simple FCF for all firms.

	(1)	(2)	(3)
VARIABLES	Full Sample	Full Sample	Full Sample
Earnings Surprise	0.0039***		0.0035***
	(0.0000)		(0.0000)
FCF Surprise		0.0033***	0.0029***
		(0.0000)	(0.0000)
Constant	-0.0193***	-0.0145***	-0.0323***
	(0.0000)	(0.0000)	(0.0000)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Errors Clustered by Firm	Yes	Yes	Yes
Observations	19,484	19,484	19,484
R-squared	0.0220	0.0173	0.0310
p-value for equality of *ERC* and *FRC*			0.0888

Table A3. Table 4 Using Continuous Explanatory Variables

Results in the paper use decile-ranked explanatory variables. In this robustness test, we use continuous explanatory variables.

Panel A. Asymmetric Information Subsets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Small	Large	Low AF	High AF	Low Dispersion	High Dispersion	Low Spread	High Spread
Earnings Surprise	0.0094	0.0283***	0.0195**	0.0088	0.0481***	0.0055	0.0090	0.0194**
	(0.3268)	(0.0050)	(0.0221)	(0.4469)	(0.0049)	(0.6269)	(0.3554)	(0.0217)
Free Cash Flow Surprise	0.1306***	0.0668***	0.0824***	0.1223***	0.1309***	0.0825***	0.0973***	0.0954***
	(0.0000)	(0.0003)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.0030	-0.0054	0.0014	0.0061*	0.0080	0.0014	0.0027	0.0032
	(0.6450)	(0.1672)	(0.8412)	(0.0880)	(0.2139)	(0.7376)	(0.4897)	(0.5420)
Observations	8,701	8,566	9,031	10,452	6,740	6,788	9,741	9,742
R-squared	0.0114	0.0185	0.0149	0.0106	0.0138	0.0133	0.0124	0.0130
p-value for difference in *ERC*	0.1730		0.4607		0.0373		0.4220	
p-value for difference in *FRC*	0.0461		0.1644		0.0994		0.9379	

Panel B. Earnings Relevance Subsets

VARIABLES	(1) Old	(2) Young	(3) Young/ Loss	(4) Young/ Profitable	(5) Low RD	(6) High RD	(7) Others (BFP)	(8) High Tech (BFP)	(9) Others (OZ)	(10) High Tech (OZ)
Earnings Surprise	0.0216**	0.0115	0.0114	0.0082	0.0068	0.0004	0.0216***	-0.0011	0.0151*	0.0231*
	(0.0161)	(0.2713)	(0.5083)	(0.4785)	(0.5975)	(0.9788)	(0.0038)	(0.9363)	(0.0563)	(0.0625)
FCF Surprise	0.0874***	0.1127***	0.0947**	0.1195***	0.1713***	0.1161**	0.0832***	0.2100***	0.0827***	0.1226***
	(0.0000)	(0.0000)	(0.0185)	(0.0000)	(0.0000)	(0.0126)	(0.0000)	(0.0001)	(0.0000)	(0.0000)
Constant	-0.0009	0.0100*	0.0160	0.0083	-0.0011	-0.0114	0.0046	-0.0506***	0.0046	-0.0064
	(0.8147)	(0.0627)	(0.4525)	(0.1281)	(0.8757)	(0.5456)	(0.1385)	(0.0002)	(0.1735)	(0.4167)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,539	5,945	917	5,028	4,834	4,771	14,994	4,490	10,609	8,875
R-squared	0.0137	0.0113	0.0187	0.0124	0.0212	0.0079	0.0128	0.0162	0.0119	0.0144
p-value for difference in *ERC*	0.4691		0.8762		0.7555		0.1382		0.5848	
p-value for difference in *FRC*	0.3644		0.5812		0.3463		0.0178		0.2402	

Table A4. Table 6 Using Continuous Explanatory Variables

Results in the paper use decile-ranked explanatory variables. In this robustness test, we use continuous explanatory variables.

Panel A. Disclosers vs. Non-Disclosers

VARIABLES	(1) Full Sample	(2) No Free Cash Flow Disclosure	(3) Free Cash Flow Disclosure	(4) Free Cash Flow Simple Disclosure	(5) Free Cash Flow Other Disclosure
Earnings Surprise	0.0179***	0.0192**	0.0103	0.0026	0.0063
	(0.0086)	(0.0101)	(0.5290)	(0.9485)	(0.6910)
Free Cash Flow Surprise	0.0953***	0.0915***	0.1229***	0.1849**	0.1066**
	(0.0000)	(0.0000)	(0.0048)	(0.0135)	(0.0249)
Constant	0.0031	0.0041	0.0047	0.0050	0.0061
	(0.3317)	(0.2110)	(0.7128)	(0.8963)	(0.6022)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Errors Clustered by Firm	Yes	Yes	Yes	Yes	Yes
Observations	19,484	16,695	2,789	1,042	1,747
R-squared	0.0112	0.0117	0.0153	0.0319	0.0242
p-value for difference in *ERC* (vs. col. 2)			0.6184	0.6765	0.4567
p-value for difference in *FRC* (vs. col. 2)			0.4939	0.2108	0.7620

Panel B. Eventual Disclosers vs. Never Disclosers

VARIABLES	(1) Eventual Disclosers: Disclosure Years	(2) Eventual Disclosers: Non-Disclosure Years	(4) Never Disclosers
Earnings Surprise	0.0103	0.0291	0.0174**
	(0.5290)	(0.1294)	(0.0303)
FCF Surprise	0.1229***	0.0940**	0.0908***
	(0.0048)	(0.0432)	(0.0000)
Constant	0.0047	0.0051	0.0040
	(0.7128)	(0.5435)	(0.2583)
Observations	2,789	2,459	14,236
R-squared	0.0153	0.0223	0.011
		(1) vs. (2)	(2) vs. (3)
p-value for difference in *ERC*		0.4438	0.5699
p-value for difference in *FRC*		0.6487	0.9498