How important are semi-annual earnings announcements? An information event perspective

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Abstract

Using a method that avoids the need to specify earnings expectations (Ball and Shivakumar 2008), we demonstrate that the period surrounding the semi-annual announcement of Australian firms' earnings is, on average, an important source of information. Although there is substantial year-to-year variation, we observe no evidence of any significant time trend, and also conclude that a shift from Australian domestic GAAP to IFRS did not impact the association between earnings announcement windows and stock returns. We also find no evidence that the informativeness of earnings announcements varies systematically with firm size, analyst following or economic news (i.e., positive versus negative stock returns, profits versus losses), although we do observe significant variation across industries. Our conclusion is further supported by contrasting the earnings release date with the days immediately prior to release, or high information days other than earnings announcement windows. Using a more precise event window relative to prior studies (i.e., three hours versus three days), we confirm that earnings announcements contain significant new information about fundamentals.

1. **Introduction**

How informative are earnings releases? On the one hand, the business press typically gives significant attention to the release of earnings results, and there is a clear theoretical link between expected earnings and valuation. However, since Ball and Brown (1968), it has typically been argued that earnings announcements convey little new information to market participants, and a recent retrospective reiterates this conclusion (Ball and Brown 2019). Moreover, a number of studies have demonstrated a declining association between stock returns and contemporaneous earnings (Collins et al. 1997, Francis and Schipper 1999, Francis et al. 2002, Barth et al. 2019). The absence of a strong relationship between measures of earnings 'news' and short-window stock returns, combined with a declining association between earnings and contemporaneous periodic returns has led some to question whether earnings and, by definition, earnings-related information is relevant for valuation.

At the same time, it has long been recognized that tests of the informativeness of earnings releases that rely on a measure of "earnings surprise" are joint tests of earnings informativeness and the ability to reliably identify earnings "news" (Kothari 2001; Bradshaw et al. 2018).[1] Using a method that avoids the need to specify earnings expectations, Ball and Shivakumar (2008) argue that quarterly earnings announcements are of relatively little importance, and point to a contracting role for accounting earnings rather than as a timely source of new information.[2] However, at least two important caveats arise in respect of this conclusion, which serve as motivation for our analysis.

First, Ball and Shivakumar effectively measure the informativeness of *all* information released during the three-day event window, not just news reflected solely in the announced earnings result.[3] Following Beaver et al. (2020), Shao et al. (2020) and Lu and Skinner (2020), we explicitly recognize that the term "earnings announcement period" reflects the disclosure of much more than a periodic earnings result. Earnings announcements are typically released in

[1] An alternative approach is to consider the speed with which stock prices anticipate all of the information released during the year (Beekes and Brown 2006; Beekes et al. 2016). However, our interest is in what happens specifically at the time of the earnings release, rather than the broader flow of information. Of course, the two concepts are related, as significant reaction to an earnings release likely reflects a lack of pre-emption from other forms of disclosure.

[2] Ball and Shivakumar (2008, p. 975) conclude that their results are consistent with "the view that the primary economic role of reported earnings is not to provide timely information to the share market, By inference, that role lies elsewhere, for example, in settling debt and compensation contracts and in disciplining prior information"

[3] A similar interpretation is applicable to the "U-statistic" outlined by Beaver et al. (2020).

conjunction with significant financial statement detail, management commentary and rapidly updated earnings forecasts and recommendations from analysts. It would seem self-evident that these are all likely to add to the extent of any market response. Wide distribution of such information by electronic means (including social media) likely exacerbates any information effect (Drake et al. 2014). Indeed, Shao et al. (2020) and Beaver et al. (2020) conclude that the overall importance of US quarterly earnings announcements has increased, and attribute this to an increase in information associated with earnings announcements. Such conclusions are at odds with Ball and Shivakumar's interpretation of their results.

Second, the extent to which informative earnings announcements should "dominate" other forms of timely information is unclear. Earnings release windows occur unconditionally, while many other sources of information are conditional on certain events, which would be expected to have a significant impact on investors' assessment of stock prices, but only if they occur (e.g., a takeover offer is announced). It is common for firms to pre-commit to a specific date on which they will announce their results, so analysts and others are aware in advance of the timing. Put simply, firms have no choice but to report their results by a statutory due date, or face some form of trading suspension or delisting. In reviewing the conclusion of Ball and Shivakumar (2008), Basu et al. (2013) caution against comparing the unconditional significance of quarterly earnings announcements with the (highly) conditional importance of any other forms of informative disclosure, such as takeover announcements, management forecasts and so on.

Given these concerns, we replicate and extend prior analysis of earnings announcement windows in a number of ways. First, we examine an environment (Australia) where periodic reporting occurs half yearly, rather than quarterly. To the extent that half-yearly reporting is less "timely" than quarterly reporting, we expect substitution between earnings releases and other forms of (more) timely disclosure. Moreover, the Australian Securities Exchange (ASX) oversees a continuous disclosure regime that requires all listed companies to inform the exchange of material information as it occurs, and this regime has the support of statutory civil and criminal sanctions (Brown et al. 1999).[4,5] Given that Australian disclosure laws are

[4] See ASX Listing Rules Chapter 3, Rule 3.1. Also see sections 674 and 675 of the *Corporations Act 2001 (Cth)*
[5] The Australian continuous disclosure requirements are analogous to Form 8K requirements in the United States, although the allowed timeframe for 8K filings is typically 4 days, whereas the Australian requirement is "immediate".

generally comparable to those in the US, our results have the potential to highlight how reporting frequency may impact the importance of earnings announcement windows as a source of information for investors. Second, we explicitly recognize that our tests capture all information within the announcement window, which in the case of a three-day window length goes far beyond just the announcement of a simple earnings number. However, at the same time we expect that as the window length narrows substantially around the actual release of earnings, so it is likely that the event window captures information more attributable to the announcement itself.

Using a large sample of ASX-listed firm years between 1998 and 2016, our results initially suggest that, on average, earnings announcement windows are a significant source of information for investors. While there is considerable variation year-to-year, there is no evidence of any systematic time trend. There is also no discernible effect associated with the switch from Australian GAAP to IFRS standards in 2005. We likewise do not observe evidence of any consistent variation with firm size, analyst following or the nature of economic news (i.e., positive versus negative annual stock returns, profits versus losses). Our conclusion that earnings announcement windows are, broadly speaking, an important source of information for investors is further supported by analysis of the days immediately prior to these windows, where we find little evidence of these days being abnormally informative. Following Basu et al. (2013), we also explicitly recognize the unconditional nature of earnings announcements, which are a statutory requirement. We consider both randomly selected three-day windows, as well as specific (ex-post) identification of high information three-day windows and show that our initial conclusions are robust. Finally, we also consider the robustness of our results to outlier effects and alternate measurements, and typically find results that are consistent with those of our primary tests.

Our primary tests are best interpreted as evidence that fundamental information reflected in earnings announcement windows is important to investors (Shao et al. 2020), and we caution against interpreting such evidence as being specifically about the importance of information contained in the earnings announcements per se. However, we also address this concern to some degree by re-estimating our analysis using a far narrower event window to measure the news contained in earnings announcements, which is restricted to the three trading hours surrounding the earnings release. Using this much narrower window eliminates the effect of associated information sources such as press coverage and social media commentary about the

results, and also reduces noise due to possible bid-ask bounce. However, it also restricts the time available for investors to react, and so provides a lower bound for the market's reaction to information contained in the earnings announcement. We find that the evidence of new information in earnings releases is generally less than for the equivalent three-day period, but significantly higher than the proportionate decrease in the time interval would suggest. Our results therefore support the view that earnings releases are, of themselves, an important source of information about fundamentals.

Our paper makes several important contributions. Using Australian data, we provide the first evidence of which we are aware that examines the importance of half-yearly (as distinct from quarterly) earnings announcement windows as a source of new information about fundamentals, absent any assumptions about the way in which earnings expectations are formed. Our analysis suggests that half yearly announcement windows are an important source of new information. We also show that the use of a more precise event window (three-hour versus three-day) yields results consistent with the actual announcement of earnings (as distinct from other sources of information such as analysts' revisions and media commentary) conveying new information.

We also contribute to the broader debate about the objectives of financial reporting. Advocates of the value-relevance perspective maintain that financial reporting (most obviously measures of earnings) should be informative for external stakeholders wanting to value the firm. However, there are also arguments that the primary purpose of external financial reporting is stewardship, and to that extent it may be "backward looking" or conservative. Indeed, there are many aspects of financial reporting and audit regulations that lead to accounting measures that are conditionally or unconditionally conservative (Barker and McGeachin 2015). Our results are consistent with periodic financial reporting being associated with the production of significant new information, whether in isolation or as a result of the immediate analysis and attention that occurs at such times. We conclude that caution is needed before concluding that periodic accounting reports are not responsible in some ways for the identification of important new information, while at the same time likely reflecting the challenges facing a single performance measure in satisfying multiple objectives (Kothari et al. 2010).

The remainder of the paper proceeds as follows. Section 2 provides background discussion and identifies our primary research questions, while section 3 describes the approach we use to

quantify the extent of new information in earnings release windows, as well as our data sources. Section 4 reports our primary results, including examination of factors associated with variation in firms' information environment and the use of a far more precise earnings announcement window. Section 5 reports additional tests designed to assure the robustness of our conclusions, including an examination of trading days identified ex-post as "high importance", as well as the days immediately prior to the announcement window. Section 6 concludes.

2. Background and research questions

2.1 Prior evidence

Since Ball and Brown (1968), there is a large literature addressing the information content of earnings releases, and accounting information more broadly. In their pioneering analysis, Ball and Brown concluded that earnings releases contained relatively little new information, as evidenced by the fact that most of the information reflected in the sign of the earnings change was reflected in stock returns prior to the month in which earnings was released. Following this early evidence, researchers focussed on developing a more sophisticated proxy for the expected earnings outcome, as well as more narrowly identifying the period (i.e., window length) in which earnings are released (Kothari 2001). Much of this evidence suggests that "news" about periodic earnings appears to explain relatively little of the stock price change around the time of its release. Many explanations have been offered for this result, including the lack of persistence in earnings and increasingly, volatility in earnings created by increasing use of mark-to-market measures.

In a similar manner, researchers have also demonstrated that the contemporaneous correlation between stock returns and earnings is relatively low, at least for measurement periods such as a quarter or even a year (Dechow 1994). Regardless of whether a short run (i.e., announcement window) approach is taken, or a longer run analysis of contemporaneous correlation between earnings and returns, there has been repeated criticism of the "value relevance" of earnings (Lev 1989, Lev and Zarowin 1999). This has naturally led to suggestions that the primary role of earnings is something other than the timely revelation of information about fundamentals relevant to value. The most likely alternative is a contracting role, which is also consistent with the argument that accounting measurement and recognition rules result in "backward looking" performance measures (Beyer et al. 2010, Ball and Shivakumar 2008).

However, recent studies have raised questions about the extent to which earnings (or at least, earnings announcement windows) can be dismissed as a timely source of new information about fundamentals. Beaver et al. (2018, 2020) show that earnings announcement windows have become an increasingly important information source for US investors, and also that at least some of this increase can be attributed to the increasing amount of additional information that accompanies the announcement of earnings results. This includes both additional historical accounting information (e.g. disaggregated financial statement data), as well as management guidance and analyst forecast updates. When the focus is instead on contemporaneous stock returns, Barth et al. (2019) demonstrate that extending the set of accounting information to include a variety of accounting measures that reflect (albeit imperfectly) intangible assets, growth opportunities and alternative accounting-based performance measures results in an increasing (rather than decreasing) trend in value relevance. They suggest that a more "nuanced" approach is required to understand any positive or negative change in the usefulness of periodic accounting reports for investors. A complimentary conclusion is demonstrated by Sadka et al. (2020), who show that any decline in value relevance of earnings in the cross-section (or time series) is offset by an increase in the firm-level association between aggregate earnings and returns.

The value relevance of earnings has primarily been measured as either the contemporaneous correlation with returns, or the extent to which earnings "news" causes an immediate stock price change. The latter approach has typically been viewed as capturing the extent to which earnings announcement events are a timely source of information beyond whatever else is known to market participants (Kothari 2001). However, such tests invariably rely on a maintained assumption about the appropriate means to capture "news" about earnings, and this has continued to prove challenging for researchers (Bradshaw et al. 2018). Ball and Shivakumar (2008) therefore suggest an alternative measure, whereby the extent of new information in earnings announcements is captured by regressing annual stock returns on the returns from the four three-day quarterly announcement windows occurring during that calendar-year. The measure of earnings informativeness is the adjusted R^2 statistic, which represents the total information output conveyed by the earnings announcement events relative to the annual information environment.[6] This approach has the advantage of enabling

[6] While Ball and Shivakumar (2008) provide a specific application to measuring the importance of quarterly earnings releases, we recognise that their approach was not an entirely new development. One of the earliest studies is Roll (1988) who investigates the information effects of firm-specific news on stock returns. Lev (1989)

identification of the extent to which earnings releases are a source of new information, without also having to specify earnings expectations so as to measure the extent of "earnings surprise". Using this approach, Ball and Shivakumar conclude that earnings releases are not particularly important as a source of new information, and therefore argue that the primary role of periodic accounting measures is to facilitate contracting, rather than valuation.[7]

While the method outlined by Ball and Shivakumar has some intuitive appeal, there are at least two important caveats. First, it is not clear ex ante what the minimum value needs to be for the abnormal R^2 to constitute evidence of earnings releases being an "important" source of information. Ball and Shivakumar argue that abnormal R^2 values in the range of 6% are relatively unimpressive, concluding that this is evidence of a "modest, but not overwhelming amount of incremental information to the market". Yet, as Basu et al. (2013) note, it is difficult to identify unconditional events that demonstrate more importance than earnings releases. They argue that Ball and Shivakumar's comparison of earnings releases with events such as voluntarily disclosed management earnings forecasts is misleading, as earnings releases occur unconditionally, while management forecasts are discretionary and only occur for some firms. Similar issues arise in terms of other "important" events such as takeover announcements, major capital raisings and other significant corporate events. Indeed, Basu et al. demonstrate that it is difficult to identify pre-specified event windows which demonstrate greater information effect than those for the four quarterly earnings releases during a calendar year. Overall, it is clear that the extent of new information in event windows such as earnings announcements may be significantly limited relative to ad-hoc announcements that occur conditionally as a result of uncertain events whose unconditional probability is far below one.[8]

A second, and possibly more fundamental issue in Ball and Shivakumar's (2008) interpretation of their results, is the difficulty in attributing stock price movements in the three-day earnings announcement window solely to the actual information in the earnings number itself. As noted by Beaver et al. (2020), earnings announcements are accompanied by a large amount of

reviews research on the earnings/returns relationship to assess the usefulness of earnings to investors. He interprets the R^2 from these models as a "measure of the information contribution of earnings to investors".

[7] Ball and Shivakumar (2008) acknowledge a marked increase in the importance of earnings announcements in the last three years of their sample period (i.e., 2004 through 2006). They argue that this could reflect a number of factors, including chance (pg. 1011). Hence, this apparent jump in informativeness has little impact on the implications they draw from their evidence.

[8] Although they do not interpret it as such, Ball and Shivakumar's (2008) finding of significant new information in the last analyst forecast update before quarterly earnings releases is consistent with earnings announcement windows having an upwardly limited amount of new information due to the certainty of their occurrence.

additional information, and this is particularly so when a three-day window is used to capture the extent of any new information. The authors show that a substantial rise in the amount of new information in US firms' quarterly earnings releases can be attributed to factors such as management guidance, immediate updates of analysts' forecasts, and disaggregated line items. Consistent with these conclusions, Lu and Skinner (2020) also argue that statutory earnings disclosures have become much "richer" information events over time, and point to the importance of management earnings guidance released contemporaneously with earnings.

Given the evidence in Beaver et al. (2020) and Lu and Skinner (2020), we follow the approach in Shao et al. (2020), whereby three-day earnings release windows are seen as a source of a variety of information about fundamentals, including earnings. They argue that the abnormal R^2 measure is a powerful means of capturing the importance of news about fundamentals, as it reflects firm-specific effects while excluding the effect of firm-specific information leaked prior to the announcement window. Moreover, announcement window returns capture the "surprise" with less measurement error than traditional measures of earnings surprise, such as earnings changes or analysts' forecast errors. Finally, the relationship between announcement returns and annual returns is more homogeneous than that between annual returns and earnings surprises.[9] Hence, we use the Ball and Shivakumar (2008) measure, but interpret evidence using three-day windows as indicative of the importance of earnings announcement windows, rather than the announcement of earnings per se.

2.2 Research questions

Following increasing amounts of evidence that US quarterly announcement windows are an important source of new information (Beaver et al. 2020), we initially extend this analysis to a different setting, where periodic reporting is less frequent. Firms listed on the Australian Stock Exchange (ASX) are required to report half-yearly, rather than the quarterly requirement applicable in the US. We characterize other aspects of the Australian reporting regime (i.e., disclosure rules, assurance requirements) as being similar to the US, subject to differences between US GAAP and Australian GAAP. Lower reporting frequency may be associated with an increase or decrease in the extent of any market reaction (Butler et al. 2007). To the extent that quarterly reporting results in timelier earnings information, we expect that half-yearly

[9] Homogeneity across firms is important in accurately measuring the extent of new information using a linear regression framework.

earnings announcement windows are a relatively less important source of information. However, if earnings releases and other forms of disclosure (whether originating from the firm or from others such as analysts or news media) serve as substitutes, then it is not clear that half yearly reporting will result in less informative earnings release windows. Finally, if semi-annual reporting results in a lower rate of income shifting between sub-periods, it is also possible that half yearly earnings announcements will be more informative than their quarterly counter-parts. Hence, we make no specific prediction, and focus on the following research question:

RQ 1: Are semi-annual earnings announcement windows an important source of new information?

There is a well-established literature suggesting that firms' information environments vary in systematic ways (Beyer et al. 2010), so we expect that the importance of earnings announcement windows may vary by characteristics such as firm size, economic news, accounting outcomes (loss versus profit), analyst coverage and business type (i.e., industry). Such variation could also extend to accounting standards, and Australia provides an opportunity to observe such an effect, with the switch from A-GAAP to A-IFRS in 2005 (Lai et al. 2013). We therefore consider the extent to which evidence of new information in earnings announcement windows is robust to variation in several cross-sectional and temporal characteristics, and examine the following research question:

RQ 2: Does the importance of earnings announcement windows as a source of new information vary with observable characteristics of the firm's information environment?

Our final research question is explicitly motivated by the limitations that a three-day earnings announcement window imposes on assessing the importance of earnings news per se, as distinct from the role of fundamental information more broadly (Shao et al. 2020). Much of the observable reaction within a three-day window likely reflects the vast amount of additional disclosure as well as press and analyst commentary that accompanies (i.e., surrounds) earnings releases. One way of at least partially separating these effects is to create a significantly more precise earnings announcement window, which limits the extent to which post-announcement

commentary and analysis could itself drive market reaction.[10] While not attempting to measure earnings news per se, replication of the Ball and Shivakumar (2008) method on a much finer announcement window provides a lower bound for the extent to which market reaction can be said to be a response to information contained in the earnings release, rather than other sources of information such as press coverage, social media commentary and so on. Hence, we address the following research question:

RQ 3: At the actual time of an earnings release, is there evidence of significant new information?

3. Data and method

3.1 Method

Following Ball and Shivakumar (2008), we estimate the following regression model to obtain our measure of earnings informativeness:

$$r_i annual = a_0 + a_1 ret\_window_1 + a_2 ret\_window_2 + e_i \quad (1)$$

where ret_window_n is the three-day window around the nth earnings announcement in the calendar-year. The event window is centred on the earnings announcement date over trading days -1 to +1. It begins one trading day prior to the event date to capture potential information leakage effects. Consistent with Australia's half-yearly reporting requirements, n equals either 1 or 2. Assuming daily stock returns are i.i.d., the expected level of information provided in the two three-day windows around earnings announcement is 2.38% (= 6/252) of the annual information environment. This baseline value represents the normal information output over six random days in a 252 trading-day calendar. Consequently, the amount of *new* information conveyed by earnings reports is the abnormal adjusted R^2, defined as the regression adjusted R^2 (i.e., total information output) less the baseline value associated with the event windows (i.e., expected information output).

Although our primary focus is the abnormal adjusted R^2, this approach also provides useful evidence on the extent of market mispricing. The regression coefficients (i.e., slopes) are able

[10] Of course, to the extent that a narrower event window also eliminates any gradual reaction process (e.g., short run post earnings announcement drift), it potentially understates the reaction attributable to information contained in the earnings release.

to vary from one, and in so doing the estimation procedure allows for the price reaction within the earnings release window to "spill" into movements in stock price outside that window. In this respect, the method does not explicitly impose market efficiency conditions on the test of information effects. Rather, the method allows for possible market mispricing, whereby a slope coefficient greater than one indicates a degree of under-reaction, while a slope coefficient less than one suggests market over-reaction to earnings releases. If the slope coefficient is not significantly different from one then the result is consistent with markets efficiently impounding earnings news, subject to the period being limited to the length of the announcement window.

3.2 Sample selection and data

We initially identify firm-years from the ASX 500 for the years 1998 to 2016 having both half-yearly and annual earnings information available on the ASX ComNews service. We restrict our analysis to firms classified within the ASX 500 due to the very large number of small firms with ASX listings, so as to aid comparability of our results with other countries.[11] After eliminating firm years without an available closing price on each day of the announcement windows, as well as firms without trading volume in the announcement window (i.e., illiquid securities), the final sample comprises 8,076 firm years from 1998 to 2016.[12] All observations also occur after legislative changes took effect that provided civil and criminal penalties for the existing ASX disclosure rules (Brown et al. 1999).

All public announcements lodged with the ASX are distributed by service provider ASX ComNews on a real-time basis, timestamped to the millisecond. We focus our analysis on the first earnings announcement for the reporting period.[13] Consequently, even if an earnings announcement is subsequently amended, our measure of earnings informativeness is based on the original announcement. End-of-day price data is sourced from the ASX and maintained in

[11] Following Ball and Shivakumar (2008), we calculate returns using both arithmetic and logarithmic measures. Although logarithmic returns are approximately equal to arithmetic returns for small returns, the two values can diverge substantially when the absolute price difference is large. Logarithmic returns measurement imposes normality on the data by exaggerating small values while compressing large values to improve the generalizability of mean estimates. All results reported use logarithmic returns, while results using arithmetic returns (available from the authors) yield qualitatively similar results.

[12] Although our sample firm coverage averages less than 50% of ASX listings, the economic significance of our sample is far higher, representing almost 95% of market capitalisation. Source: SIRCA SPPR database

[13] For half-yearly earnings information, the ASX ComNews RepType codes of interest are "03004" (half-yearly report) and "03015" (half-year accounts). For annual earnings information, the relevant announcement codes are "03001" (annual report)", "03003" (preliminary final report) and "03011" (full-year accounts).

the AusEquities database by Securities Industry Research Centre of Asia-Pacific (SIRCA). Annual return ($r_i annual$) is the ratio of the end-of-day price on the final trading day of the current year on the prior year's close price, adjusted for capitalisation changes and the re-investment of dividends (and associated franking credits) over the calendar year. This adjustment factor is sourced from the Australian Share Price/Price Relatives (SPPR) database maintained by SIRCA.

The mean (median) annual return is 14.03% (7.13%), reflecting a considerable right skew in the distribution of annual returns. Stock returns around earnings announcements average 0.87%, which we characterize as being broadly consistent with prior evidence. We note that there is significant annual variation in average stock returns, with a large average decline in 2008 followed by a large increase in 2009, consistent with the effects of the global financial crisis. However, in unreported tests, we verify that none of our primary results are sensitive to the exclusion of these years.

4. Results

4.1 Average earnings release informativeness

Our first research question (RQ1) focuses on the extent to which, on average, semi-annual earnings announcement windows reflect new information. Table 1 reports the results for estimates of equation (1). Our primary interest is in the ability of this simple model to explain a greater than random proportion of the variability in daily stock returns. We report annual estimates of the abnormal adjusted R^2 value, as well as the value averaged across the test-years, and finally from a single pooled estimation. The results suggest that the two earnings announcement windows (defined as three days centred on the earnings announcement day) are a major source of new information relative to randomly occurring trading days. The average abnormal R^2 reported in Table 1 exceeds 10%, and even in a pooled test this is approximately 6%. However, there is considerable variation in the annual abnormal adjusted R^2 values reported in Table 1. When we estimate a time trend regression to identify any specific time series pattern in earnings informativeness, we observe a positive but statistically insignificant trend over the test period (p-value of 0.16).[14] The absence of any clear time trend contrasts with

[14] Time trend regressions are problematic when the sample is not constant. For a small sample of firms constantly represented within the ASX 500, we confirm that there is no discernible time trend in the results. For brevity we do not report these results. Full details are available from the authors.

US-based evidence suggesting that the information associated with earnings releases has in creased in recent years (Beaver et al. 2018; Shao et al. 2020).

[Insert Table 1]

The average annual slope coefficients associated with the first and second earnings announcement windows α_1 and α_2 are 1.63 and 1.57, respectively. If we infer a mean estimate of one as the implied state of market efficiency (Malkiel and Fama 1970), a simple t-test shows these estimates as significantly different from one. Hence there is evidence of market underreaction to earnings release windows, which would also be consistent with the well-documented PEAD anomaly. However, we also note that in a pooled regression, only the second announcement window is associated with a statistically significant underreaction.[15]

Although there is considerable year-to-year variation, overall results support the view that earnings announcement windows are relatively important events for ASX-listed firms. In this respect, our initial conclusions are somewhat different from Ball and Shivakumar (2008), although we explicitly recognize that this is a test of all new information associated with earnings releases, rather than solely measuring the information content in the earnings result itself.[16]

4.2 Cross-sectional analysis

Our second research question (RQ2) is directed towards understanding the extent to which evidence of significant new information in earnings announcement windows is robust to several characteristics of firms' information environment. The characteristics we examine are firm size, economic news, accounting outcomes (profit versus loss) and analyst coverage, as well as considering the extent of any industry-specific differences. In additional analysis we also examine the extent of any change around the switch from A-GAAP to A-IFRS.[17]

[15] As the majority of ASX-listed firms have June 30 year ends, the first earnings announcement in a calendar year will typically be the release of the first half-year (rather than annual) earnings.
[16] Our results are robust to a winsorizing of the top and bottom 1% of return values.
[17] Our analysis is not intended as a test of specific theories about information environments, but rather represents an initial attempt to identify the degree to which our overall results can be said to be relatively (in)consistent. Hence, we view these results as largely descriptive.

4.2.1 Firm size

The expected effect of firm size on the relative importance of earnings announcement widows as a timely source of new information is unclear. On the one hand, larger firms generally release more information, at least some of which may be a substitute for earnings announcements (or at least, a more timely source of earnings information). Brown et al (1999) show that the number of price sensitive disclosures made by ASX-listed firms is positively associated with firm size.[18] Alternatively, the extent to which investors find earnings disclosures and associated information about fundamentals useful may be dependent on their ability to understand reported information, as well as its integrity. Large firms may attract greater media scrutiny due to their economic significance in the marketplace. Relatedly, larger firms may display higher reporting quality because of their appointment of reputable auditors to verify their accounting records, which may improve the informativeness of reported earnings (Behn et al. 2008; He et al. 2019). This effect has also been shown to extend to voluntary disclosures (Dunn and Mayhew, 2004). Hence, there are multiple reasons why firm size may be positively (rather than negatively) correlated with the extent to which earnings announcement windows are an important source of information.

We use market capitalisation (the product of the closing price and outstanding common shares at prior year-end) as our proxy for firm size, and rank firm-years into size quintiles from the smallest ("1") to largest ("5") within each sample year.[19] We then estimate equation (1) separately for each size quintile, using observations pooled across calendar years. The results are reported in Table 2. We observe no consistent pattern between the informativeness measure and firm size. Indeed, while the lowest abnormal adjusted R^2 occurs for the largest firm size quintile, the second lowest occurs for the smallest firm-size quintile. Hence, we conclude that the importance of earnings releases as a source of new information is largely independent of any firm size effects.

[Insert Table 2]

[18] We confirm that a similar result holds for our sample firm-years. When we examine all announcements distributed through the ASX ComNews service, we find that the largest size quintile of firms releases more documents flagged as price sensitive than the smallest size quintile in every year of our sample period.

[19] The use of total assets as a size proxy yields similar results.

4.2.2 Good versus bad economic news

We next explore the effect of economic news on the informativeness of earnings releases. It is well understood that the "timeliness" with which earnings reflects economic news is asymmetric, reflecting conditional conservatism (Basu 1997). However, economic news may itself be associated with the timing of disclosures about fundamentals, including earnings, thereby impacting on the extent to which earnings announcements are associated with significant amounts of news. Table 3 reports tests of this possible "economic news" effect. We classify economic news as "good" or "bad" based on whether the annual stock return is positive or negative. The specification of our regression model remains the same as prior analyses. The "good news" subsample contains firm-years with positive calendar-year returns (n = 4,685), while the "bad news" subsample contains firm-years with negative returns (n = 3,377). We exclude a small number of firm-years with zero annual returns.

For year-specific regressions, Table 3 shows that the average abnormal adjusted R^2 of the "good news" subsample is 3.18%, compared to 5.72% for the "bad news" subsample. Using a Wilcoxon rank-sum test, the difference in these values is not statistically significant. This is further supported by the equivalent number of calendar years where our measure of new information is greater for good news firms compared to bad news firms (10) and vice versa (9). Finally, pooled regression analysis yields a similar relativity between the good and bad economic news. Overall, we conclude that the relative importance of information released in earnings announcement windows as a source of new information is not systematically associated with the sign of contemporaneous economic news.

[Insert Table 3]

4.2.3 Reported profits versus losses

As an alternative to distinguishing observations based on economic news (i.e., stock return), we consider whether the sign of the earnings outcome (i.e., profit versus loss) has an impact on our measure of earnings announcement window informativeness. We partition our observations based on annual net profit after tax, where this measure is obtained from Morningstar DatAnalysis Premium. Hence, each firm-year is classified according to whether net profit after tax announced during that calendar year is positive or negative. This results in 4,503 firm-years that report a positive net profit after tax, and 1,521 firm-years that report net

losses after tax. We exclude firm-years (25% of sample) with no accounting information available from Morningstar.

Table 4 reports the results, which indicate that the sign of reported net income is not associated with differences in the extent to which earnings announcement windows are an important source of new information. Using annual regressions, the average abnormal adjusted R^2 for firms reporting net profits is 8.92%, compared to 7.94% for firms reporting losses. The absence of any systematic effect is reinforced by our finding that firms reporting profits (losses) show greater average earnings announcement window informativeness in 10 (9) years. Pooled regressions reported in Table 4 also support the same conclusion, namely that the relative importance of earnings announcement windows as a source of new information is not systematically associated with the sign of the earnings result.

[Insert Table 4]

4.2.4 Analyst coverage

Sell-side analysts are a central group of stakeholders that facilitate efficient information flows in capital markets (Bradshaw et al. 2017). We therefore consider the extent to which analyst coverage is associated with variation in the relative importance of earnings announcement windows as a source of new information. Following He and Tian (2013), we define analyst coverage as the 12-month arithmetic mean of the monthly number of earnings forecasts for firm *i* over fiscal year *t* reported on the IBES Summary File. Using this method, we note that just less than 20% of the sample does not have any analyst activity, which is consistent with past literature that that analysts tend to only cover firms that are economically significant.

Table 5 reports the abnormal R^2 from estimates of equation (1) performed separately for firm-years with no analyst coverage, and those with coverage by at least one analyst. The results indicate that analyst coverage per se does not affect the average informativeness. For firms with no (some) analyst coverage, the average annual abnormal adjusted R^2 is 6.84% (5.80%). Hence, there is no evidence of analyst coverage itself being associated with more informative earnings announcement windows.

We conduct additional analysis by ranking the firm-years with some analyst coverage into tertiles, and Table 5 also reports these results. Although there is evidence of a monotonic

increase in informativeness as our measure of analyst coverage increases, the differences between tertiles are small, consistent with the initial binary comparison based on some analyst coverage versus none.

Given the positive correlation between firm size and the extent of analyst coverage, we conduct further analysis to separate any coverage effect from firm size.[20] As in Table 5, we create tertile ranks based on analyst coverage for those firm-years with some coverage, and treat firm-years with no evidence of coverage as a single group. We then rank firm years within each of the four groups (i.e., zero coverage and coverage tertiles) by firm size, and allocate observations into tertiles based on firm size. The average explanatory power based on year-specific regressions restricted to each sub-group is then compared. We are unable to identify any pattern across either size of analyst coverage, and conclude that, on average, neither has any consistent impact on our informativeness measure.

[Insert Table 5]

4.2.5 Industry effects

We next extend our analysis of earnings announcement windows to consider the extent to which results differ by industry. Industry classification is expected to capture differences in the flow of information throughout the year that reflects substantial variation in types of economic activity. However, we also note that as ASX-listed firms, all our sample firms are subject to the same statutory requirements to maintain a fully-informed market (Brown et al. 1999). Companies are classified into industry sectors according to Global Industry Classification Standard (GICS). GICS information is provided in the SPPR database maintained by SIRCA. The number of observations varies substantially across GICS codes, and we further require a minimum of 10 observations per industry-year. This has the primary effect of limiting the number of firm-years for the Telecommunications and Utilities GICS groups. Our year-specific regression results are reported by GICS classification in Table 6.

The most obvious point highlighted by the results reported in Table 6 is that, within GICS sectors, there is considerable variation in the informativeness of earnings announcement windows from year to year. More importantly, for all industry sectors for which we have

[20] These results are available on request from the authors.

sufficient data for each sample year, the average result from annual regressions supports the view that earnings announcement windows are an important source of information. Excluding telecommunications (for which we lack sufficient data to conduct half of all annual estimations), the average abnormal adjusted R^2 varies from a high of 17.27% (Consumer Staples) to a low of 8.43% (Energy). We recognize that the Energy GICS classification includes firms that have values highly sensitive to commodity prices. In addition, there is mandatory quarterly reporting for mining and oil and gas exploration (but not production) companies (ASX Listing Rules 5.1 and 5.2). Such companies are found in the Energy and Materials classifications.

[Insert Table 6]

4.3 Short announcement windows

Our third research question (RQ3) is directed towards identification of an earnings announcement effect versus the impact of a variety of other information sources that are typically part of the earnings announcement event period, such as press coverage and commentary (Shao et al. 2020). The use of a three-day event window is common in tests of the informativeness of earnings releases (Ball and Shivakumar 2008; Basu et al. 2013). However, as noted by Shao et al. (2020), such tests are effectively a measure of earnings announcement returns, not earnings news per se. A three-day window reflects a large amount of other information beyond just the earnings result (i.e., information about fundamentals). As a result, tests such as those we report above provide a measure of the informativeness of all information released in the earnings announcement window, rather than just earnings news per se. Yet there continues to be a strong focus on the extent to which earnings results yield significant "value relevant" information in isolation from other information about fundamentals (Sadka et al. 2020)

As Ball and Shivakumar (2008) note, tests which explicitly link stock price movements to measures of earnings "surprise" face the difficulty of defining ex ante a measure of earnings surprise. We suggest an alternative approach, which is to dramatically narrow the announcement window length to focus more precisely on stock price movements around the release of earnings. While we caution this is not a direct test of "earnings news", it reduces the extent to which other sources of information (e.g., analyst' reports, press discussion, etc) are evident. It also reduces more generally any "noise" related to events outside the specific

earnings release, such as earnings releases of other firms, economic announcements and so on. We therefore replicate our analysis of earnings release windows by using a three-hour event window centred on the exact earnings announcement time. This is expected to yield a significantly more precise estimate of investors' immediate response to the release of an earnings announcement by reducing the extent to which the announcement window captures information other than the periodic accounting results.

Normal continuous trading hours for the ASX are 10am to 4pm Australian Eastern Standard Time (AEST). However, not all securities begin trading upon the market open. Securities open for continuous trading in a staggered order per the starting letter of their ASX ticker code. Normal opening time for Group 1 (digits "0" to "9" and "A" to "B") is 10:00:00am, Group 2 ("C" to "F") is 10:02:15am, Group 3 ("G" to "M") is 10:04:30am, Group 4 ("N" to "R") is 10:06:45am and finally Group 5 ("S" to "Z") is 10:09:00am. Actual opening time can occur up to 15 seconds on either side of the normal opening times e.g. Group 1 securities can open for continuous trading anytime between 9:59:45am and 10:00:15am.

The price at each hourly interval is the prevailing last traded price up to the interval time. If the one-hour preceding announcement time is a closed market state, then the event window begins on the previous trading day (e.g. the event window for an announcement event at 10:30:00am on day t will begin at 3:00:00pm on day t-1 and ends at 12:00:00am on the same day t). If the hour after announcement time is a closed market state (i.e., after-hours disclosure), then the event window ends on the next day. The price at the start of the announcement window is the last trade price leading up to the announcement time. For announcements reported after normal trading hours, the price associated with announcement time is the opening price when the market opens on the next trading day. As the actual opening time that securities are available for continuous trading is randomised by the ASX, we define opening price as the prevailing last traded price at the maximum time of the normal opening time threshold. For example, event time for a Group 1 security that announced earnings before the market opens would be 10:00:15am, with the event window beginning in the prior day at 2:30:00pm and ending 11:30:15am on the day of earnings announcement.

Except for a shortening in event window length from three days to three hours, the specification of our regression model remains unchanged. The expected level of earnings information conveyed by two three-hour windows over a 252-trading day calendar with a normal six-hour

trading day is 0.3968% (= 2 * 3 / 1,512), assuming hourly returns are i.i.d. We source ASX intraday price data from the AusEquities database maintained by SIRCA. Table 7 reports the results.

The results from using a much more precise earnings announcement window are reported in Table 7. The mean annual abnormal adjusted R^2 is 5.67%, which is approximately 50% of that reported in Table 2 for three-day announcement windows. In additional tests we confirm that the temporal variation in the results using a three-hour event window closely mirrors those arising from a three-day window (i.e., the pattern is also reported via the dotted line in Figure 1). This increases our confidence that the abnormal R^2 using a three-hour window reflects substantial new information contained in earnings release documents themselves, as distinct from a much broader set of other information sources reflected in a three-day announcement window.

[Insert Table 7]

5. Additional analysis

5.1 High information days

To further understand the relative importance of earnings announcement windows as a source of new information, we consider how our primary results compare to results that use windows selected based on ex-post evidence of high information effects. Although our main results suggest earnings announcements do not provide large flows of new information to the market, they are clearly more informative than random days in a calendar-year. Given that many other information "events" are likely conditional on uncertain corporate actions, the unconditional nature of earnings releases warrants further consideration. Following Basu et al. (2013) and Francis et al. (2002), we define an informationally important trading day as a high-information arrival day where we observe large absolute price volatility. Therefore, these high-information arrival days may coincide with an earnings announcement (or any/no disclosure at all). We construct a sample that contains three-day returns around these two informationally value-relevant days in a firm-year. Table 8 reports the results.

For our sample of ex-post identified high information arrival days, Table 8 shows the mean annual abnormal adjusted R^2 of the subsample of high-information arrival days is 6.60%. This is noticeable lower than the results reported specifically for earnings announcement windows

in Table 2. When we examine the overlap between the high information arrival days used in tests reported in Table 8 with earnings announcement days, we find only a very small overlap. Less than 4% of the sample firm-years have both earnings announcement days captured as the two high-information arrival days, while approximately 10% of the sample have at least one announcement day identified as a high-information day. It therefore appears that although earnings announcement windows are not necessarily the absolute stand-out "high information" periods (i.e., the biggest price movements), they are, on average, more informative about annual returns. Given the unconditional nature of earnings announcements (Basu et al. 2013), the results reported in Table 8 give further weight to the view that earnings announcement windows are, on average, an important source of new information.

[Insert Table 8]

5.2 Pre-announcement returns

Our primary results support the view that earnings announcement windows are relatively important sources of news, most likely because they reflect release of a wide amount of information about fundamentals that would be expected to impact investors' valuations. To further highlight the extent to which these periods are indeed "special", we repeat our analysis using three-day event windows that are centred on day t-2 (i.e., the day before the start of the actual three-day earnings announcement window). To the extent there is (by construction) some overlap between these quasi-announcement windows and the actual earnings announcement windows, and also where information leakage occurs, our analysis will be biased towards finding similar results to our primary analysis reported in Table 2.

The results of our analysis of pre-announcement windows are reported in Table 9. It is apparent that these pre-announcement windows are of greater than random importance, but at a level substantially less than for actual earnings announcement windows. The average annual abnormal R^2 for our estimate of equation (1) using pre-announcement windows is 2.62%, which is substantially lower than that for actual earnings announcement windows as reported in Table 2 (10.09). Given that the use of an overlapping window reduces the likelihood of such differences, we conclude that despite any information leakage, actual three day earnings announcement windows yield a substantial amount of value-relevant information.

[Insert Table 9]

5.3 IFRS effects

The final research question which we consider is the extent to which mandatory adoption of IFRS is associated with a change in the informativeness of earnings announcement windows. For Australian firms, the switch from Australian GAAP (A-GAAP) to IFRS was mandatory for financial periods beginning on or after January 1, 2005. While the switch impacted accounting treatments for a number of different types of transactions (Lai et al. 2013), we have no particular reason to believe that the total amount of information about fundamentals contained in an earnings announcement window would change significantly. To the extent a change in accounting treatment may have resulted in accounting results that are less informative, we would expect firms to address this via disclosures associated with earnings releases. One example would be the use of non-GAAP earnings disclosures, which have been shown to increase following mandatory adoption of IFRS by Australian firms (Coulton et al. 2016). Further, the construction of powerful tests of regulatory change effects that occur at a single calendar time for all observations is problematic. Hence, we view our analysis of "IFRS effects" as descriptive at best, and caution that changes in broader economic circumstances may influence temporal differences in the importance of earnings announcement windows.

In order to avoid issues associated with differing firm characteristics, we identify a constant sample of firms (n = 91) for whom the necessary data is available from 2000 through 2010. We classify the years 2000-2004 as pre IFRS, and the years 2006-2010 as post IFRS. The annual abnormal adjusted R^2 for our estimation of equation (1) is reported in Table 10. While the average annual abnormal adjusted R^2 is somewhat lower for the post IFRS years (5.98%) versus pre-IFRS years (10.54%), a time trend regression observes no discernible effect for this constant sample of firms. We also note that the post IFRS period is centred around the global financial crisis. Overall, we find no systematic evidence of a sustained decrease in the informativeness of earnings announcement windows following the switch from A-GAAP to IFRS.

[Insert Table 10]

6. Conclusion

We provide the first evidence of which we are aware of the extent to which Australian firms' earnings announcement windows provide new information, absent the need to specify earnings

expectations (Ball and Shivakumar 2008; Basu et al. 2013). Unlike prior US-based evidence which examines quarterly reporting intervals, Australian firms are subject to a semi-annual financial reporting regime, with a. strong emphasis on continuous disclosure. Our analysis addresses three primary research questions, namely the importance of earnings announcement windows as a timely source of new information (RQ1), the extent to which this is associated with possible differences in firms' information environments (RQ2), and whether a narrower (than typical) announcement window yields evidence consistent with the earnings release itself being of some importance (RQ3).

Using semi-annual earnings announcements for Australian listed firms from 1998 through 2016, we demonstrate that these earnings announcement windows reflect a significant amount of new information, and this result is robust to variation in characteristics such as firm size, economic news, accounting outcomes (i.e., losses versus profits), analyst following and changes in accounting standards. However, we do observe considerable variation between broad industry groups. In contrast to recent US evidence suggesting that the extent to which earnings announcements are associated with an increase in new information, any increase over time for Australian firms is very modest, and not statistically significant. We also confirm that the amount of new information in these three-day windows is higher than the period immediately preceding the earnings release.

While our primary results lead us to conclude that earnings announcement windows are an important source of new information for investors, we stress that this measure captures far more information than just the earnings number per se. Earnings announcement windows contain a large amount of information beyond the actual announcement of earnings. However, when we focus on a far narrower window (i.e., the three hours centred around the time of the earnings release), we still observe significant new information beyond what would be regarded as random. Hence, our results suggest that there is important new information about fundamentals associated with the earnings announcement itself, and that evidence of new information across a broader (three-day) window by no means primarily reflects other sources of information such as media discussion and analysis around the event.

Based on Australian evidence with semi-annual reporting, we suggest that caution may is warranted before concluding that earnings releases themselves are generally not incrementally informative. While recognizing that accounting performance measures face conflicting

objectives (Kothari et al. 2010), it is evident that the contracting demands do not entirely preclude the announcement of periodic accounting results from yielding important insights about changes in fundamentals, and these are relevant for investors' valuations. However, we recognize that there is much that can be done to better understand the relative importance of earnings per se versus associated information such as media and analyst commentary in better understanding the importance of earnings announcement windows as a source of new information.

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Table 1

Regressions of annual returns on three-day event window returns around earnings announcement date

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns for the three days centered on the earnings release date.

Year	Intercept	First window	Second window	Abnormal adjusted R^2 (%)	Observations
1998	-0.0258	2.4677	0.5207	8.97	230
1999	0.0812	1.3548	3.8473	16.91	218
2000	-0.1659	2.3259	3.2693	19.69	422
2001	-0.0274	2.2866	1.9676	25.37	428
2002	-0.1526	2.1579	1.7504	15.07	427
2003	0.2372	1.0967	1.0305	4.33	441
2004	0.1716	0.1500	2.2971	7.70	438
2005	0.0491	1.6944	1.0173	5.29	450
2006	0.1966	1.4281	1.6102	9.18	441
2007	0.0387	2.5359	1.6332	10.37	444
2008	-1.0622	2.0279	1.5142	6.14	458
2009	0.4731	0.9427	0.3400	1.69	449
2010	0.0423	1.4929	2.0093	8.58	469
2011	-0.2747	1.8866	1.9453	21.06	453
2012	-0.0363	2.0991	1.0838	6.42	477
2013	-0.0822	0.5780	1.1672	3.30	463
2014	-0.1557	1.3264	0.4633	0.65	457
2015	-0.0452	1.7579	1.1202	6.36	459
2016	0.0520	1.4125	1.3510	14.61	452
Mean	-0.0361	1.6327	1.5757	10.09	8,076
P-value (H_0=1)		0.0005	0.0113		
Pooled	-0.0450	1.2621	1.5816	5.95	8,076
P-value (H_0=1)		0.3442	0.0023		

Table 2

Abnormal adjusted R^2 for market capitalization quintiles from regressions of annual returns on three-day event window returns around earnings announcement date

The sample is partitioned into market capitalisation size quintiles across years. Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns centered on the three days around the earnings release date.

Quintile	Mean market cap ($M)	Abnormal adjusted R^2 (%)	Observations
1	102	4.45	1,623
2	185	7.26	1,610
3	369	6.63	1,612
4	1017	7.84	1,610
5	9,836	3.15	1,621

Table 3

Abnormal adjusted R^2 for firm-years classified as having good or bad economic news from regressions of annual returns on three-day event window returns around earnings announcement date

Firm-years with positive returns are classified as "Good economic news", and firm-years with negative returns are classified as "Bad economic news". Abnormal adjusted R^2 is the annual regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns, centered on the three days around the date of release.

	Good Economic News		Bad Economic News	
Year	**Abnormal adjusted R^2 (%)**	**Observations**	**Abnormal adjusted R^2 (%)**	**Observations**
1998	14.20	130	1.00	100
1999	1.88	133	26.27	85
2000	1.99	207	16.26	214
2001	5.08	257	18.23	169
2002	6.66	206	10.74	218
2003	6.27	359	-4.88	80
2004	9.99	345	-1.40	91
2005	-1.71	282	-2.50	168
2006	-0.23	358	9.42	83
2007	6.23	271	0.08	172
2008	-8.67	22	6.75	436
2009	1.55	386	-4.30	63
2010	-1.29	267	7.85	202
2011	-1.73	132	17.92	321
2012	6.32	281	-1.08	195
2013	7.77	260	0.47	203
2014	2.80	232	-2.74	225
2015	2.83	269	-1.63	190
2016	0.38	288	12.31	162
Mean	3.18	4,685	5.72	3,377
Pooled	0.97	4,685	2.19	3,377

Table 4

Abnormal adjusted R^2 of profit and loss firm-years from regressions of annual returns on three-day event window returns around earnings announcement date

Firm-years are classified according to whether annual net profit reported in that calendar years is positive or negative. Abnormal adjusted R^2 is the annual regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns for the three days centered on the date of release.

	Profit		Loss	
Year	**Abnormal adjusted R^2 (%)**	**Observations**	**Abnormal adjusted R^2 (%)**	**Observations**
1998	14.99	124	-8.02	15
1999	7.84	110	36.16	19
2000	35.81	188	6.69	46
2001	9.10	194	13.01	56
2002	5.88	202	-4.62	61
2003	9.98	218	-4.59	67
2004	7.05	241	6.19	45
2005	7.18	254	2.28	55
2006	8.09	249	9.77	49
2007	9.75	241	12.78	60
2008	-1.91	245	12.71	81
2009	8.56	213	-1.00	128
2010	9.35	260	10.39	116
2011	5.03	266	25.15	111
2012	9.42	266	4.23	138
2013	4.36	286	7.26	128
2014	2.31	304	0.30	111
2015	1.74	305	11.54	129
2016	14.94	337	10.62	106
Mean	8.92	4,503	7.94	1,521
Pooled	2.72	4,503	3.75	1,521

Table 5

Abnormal adjusted R^2 of analyst coverage groups from regressions of annual returns on three-day event window returns around earnings announcement date

Analyst coverage is defined as the arithmetic mean of the total months of summary data for the fiscal period. Firm periods with no I/B/E/S data are assumed to have zero analyst activity. Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns for the three days centered on the date of earnings release.

	No coverage	**Coverage>0**	**Coverage tertile group**		
			1	**2**	**3**
Mean analyst coverage	0.00	5.90	1.48	5.18	11.37
Median analyst coverage	0.00	4.83	1.44	5.12	11.15
Abnormal adjusted R^2 (%)	6.84	5.80	5.75	6.23	7.73
Observations	1,542	6,534	2,216	2,150	2,168

Table 6

Abnormal adjusted R^2 of industry groups from regressions of annual returns on three-day event window returns around earnings announcement dates

Firm-years are classified by GICS sector group. Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns for the three days centered on the date of release.

Year	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health Care	Financials	Information Technology	Telecommunications	Utilities
1998	-18.57	-1.91	31.22	1.09	16.16	-11.78	6.83	-	-	-
1999	60.68	25.56	8.88	21.07	17.92	22.26	23.89	-	-	-
2000	22.17	13.47	16.53	11.58	6.20	14.20	14.14	32.36	-6.73	-
2001	40.15	34.34	30.03	20.90	15.48	41.42	24.94	31.39	-15.80	-
2002	-0.83	33.45	22.01	25.78	10.41	14.16	8.51	-6.24	-	50.39
2003	6.07	5.65	5.03	-3.71	12.39	4.36	27.71	-4.15	-	-19.04
2004	-2.66	-2.40	19.14	43.06	12.79	17.37	8.35	23.23	-30.58	-
2005	17.36	14.26	7.37	9.33	-8.93	4.60	10.28	4.30	-23.13	51.00
2006	14.41	2.93	18.66	0.45	-12.42	22.80	8.15	1.29	-	-
2007	16.92	5.96	13.52	16.08	59.50	6.50	0.61	12.89	-	8.11
2008	-3.38	0.97	5.39	-6.63	9.92	-12.40	12.70	25.35	-	42.45
2009	13.22	-0.12	7.47	5.56	-8.57	-4.20	-4.58	9.19	-	-15.24
2010	-0.41	-1.02	39.12	24.11	-4.61	11.69	19.42	10.06	-	-19.93
2011	20.93	8.14	45.15	36.99	19.80	2.46	-3.43	-2.12	-	43.41
2012	-3.32	8.65	13.56	20.50	49.51	4.35	18.76	27.48	38.83	19.20
2013	-2.35	11.86	2.90	23.19	23.89	8.94	3.74	26.66	12.86	9.35
2014	-4.90	7.33	1.06	11.21	49.49	14.13	-1.54	0.52	0.74	17.98
2015	-6.82	1.03	15.92	6.61	24.66	-5.06	-3.08	0.89	20.18	-15.51
2016	-8.47	8.85	-2.19	34.30	34.63	20.55	20.84	9.22	-7.55	-14.91
Mean	8.43	9.32	15.83	15.87	17.27	9.28	10.33	11.90	-1.24	12.10
Observations	634	1,643	1,135	1,110	405	578	1,666	479	109	154

Table 7

Abnormal adjusted R^2 from regressions of annual returns on three-hour event window returns around earnings announcement time

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading hours assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are the hourly compounded returns for the three hours centered on the time of earnings release.

Year	First window returns (%)	Second window returns (%)	Abnormal adjusted R^2 (%)	Observations
1998	0.21	0.74	3.40	230
1999	0.26	0.09	4.00	218
2000	0.28	-0.36	4.33	422
2001	-0.13	0.07	5.78	428
2002	0.02	0.28	9.86	427
2003	-0.09	0.28	10.74	441
2004	2.20	-0.04	8.89	438
2005	0.09	-0.08	0.89	450
2006	0.07	0.35	10.51	441
2007	-0.18	1.53	0.35	444
2008	0.36	-5.90	10.05	458
2009	-0.51	3.45	4.19	449
2010	-0.09	0.66	6.31	469
2011	0.00	0.67	2.75	453
2012	0.33	-2.21	8.19	477
2013	0.53	-1.21	9.33	463
2014	0.38	0.20	-0.36	457
2015	1.87	-0.34	-0.27	459
2016	-0.14	-0.39	8.78	452
Mean	0.29	-0.12	5.67	8,076
Pooled			3.49	8,076

Table 8

Abnormal adjusted R^2 from regressions of annual returns on three-day event window returns around the days with the largest and second largest absolute daily return for the firm-year

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on the three-day returns of the largest and second largest absolute daily return for the firm-year. Calendar-year returns are adjusted for dividends and stock capitalisation changes.

Year	First window returns (%)	Second window returns (%)	Abnormal adjusted R^2 (%)	Observations
1998	4.74	3.31	-0.10	230
1999	5.54	3.18	15.82	218
2000	1.13	2.25	-0.29	422
2001	3.68	2.64	0.52	428
2002	0.22	1.45	1.51	427
2003	5.27	3.41	3.08	441
2004	5.03	3.83	0.37	438
2005	2.28	3.18	-0.37	450
2006	2.90	2.35	12.02	441
2007	1.73	1.25	15.51	444
2008	1.44	-3.16	6.40	458
2009	10.78	7.55	12.13	449
2010	7.19	2.57	2.31	469
2011	5.88	-0.12	7.96	453
2012	5.96	1.78	-0.17	477
2013	2.49	-2.61	1.07	463
2014	0.52	1.39	21.06	457
2015	3.18	1.05	14.26	459
2016	0.71	2.23	12.24	452
Mean	3.72	1.98	6.60	8,076
Pooled			1.76	8,076

Table 9

Abnormal adjusted R^2 from regressions of annual returns on three-day event window returns around the day two-days prior to earnings announcement

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on the three-day returns centred on day *t-2* where *t* is earnings announcement date. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns for the three days centered on the earnings release date.

Year	First window returns (%)	Second window returns (%)	Abnormal adjusted R^2 (%)	Observations
1998	0.42	-0.26	0.88	230
1999	0.80	0.67	-0.71	218
2000	0.77	0.02	-2.62	422
2001	-0.97	-0.87	18.07	428
2002	0.16	0.35	7.26	427
2003	-0.45	1.16	3.42	441
2004	1.01	0.79	-0.06	438
2005	-0.11	0.37	3.50	450
2006	0.52	0.30	0.46	441
2007	0.47	1.51	4.53	443
2008	-0.35	-0.76	2.69	458
2009	-1.33	0.80	0.87	449
2010	0.25	0.40	-1.62	469
2011	-1.53	-0.56	5.46	453
2012	1.17	-0.01	0.17	475
2013	-0.66	0.21	9.38	462
2014	0.33	0.57	-1.48	457
2015	0.69	-1.07	-2.57	459
2016	0.91	-0.16	2.14	452
Mean	0.11	0.18	2.62	8,072
Pooled			0.42	8,072

Table 10

Abnormal adjusted R^2 of constant sample of pre- and post-IFRS firms from regressions of annual returns on three-day event window returns around earnings announcement date

The analysis uses a constant sample of 91 firms from year 2000 to 2010. Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Calendar-year stock returns are regressed on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes. Earnings announcement window returns are daily compounded returns for the three days centered on the earnings release date.

	Pre-IFRS					**Post-IFRS**				
	2000	**2001**	**2002**	**2003**	**2004**	**2006**	**2007**	**2008**	**2009**	**2010**
Abnormal adjusted R^2 (%)	15.28	21.15	1.35	15.45	-0.51	0.43	13.91	-2.74	5.86	12.44
Mean			10.54					5.98		
Median			15.28					5.86		
Pooled			6.58					0.87		