Essays on the Informativeness of Earnings

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Certificate of Original Authorship

I, Alex Tong, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Accounting Discipline Group at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Abstract

This dissertation consists of three stand-alone but related essays in the broad area of earnings information and capital markets. The first paper examines the speed with which earnings information (as proxied by analysts' earnings forecast updates) finds its way into the market place. Rather than examining the efficiency of the stock market per se, this essay effectively provides novel evidence on the extent to which the market for Australian firms' earnings-related information is efficient. The second essay considers the extent to which statutory financial reporting provides timely information for Australian firms. This essay uses a method which has the important advantage of avoiding the need to specify ex-ante earnings expectations and is therefore focussed around how much periodic stock price variability is attributable to the specific windows (i.e., periods) around which earnings are released. The third and final essay applies this same methodology to considering whether the frequency of statutory reporting (i.e., semi-annual versus quarterly) is systematically associated with the informativeness of these disclosures and uses data from member countries of the G20.

Chapter One: Introduction

The aim of this thesis is to provide novel and economically important evidence on the relation between financial reporting and capital markets, with a specific (but not exclusive) focus on the Australian capital market. The first essay measures the efficiency in which accounting information flows into capital markets rather than the use of price movements which have an obvious aggregation problem with respect to measuring earnings information. Following Marshall (2018), I design a measure based on the speed with which sell-side analysts correctly anticipate annual earnings. My results show widespread variation and generally faster information flow when earnings news is "bad". Further, I find that earnings information flow timeliness is greater for street earnings measures which is consistent with the exclusion of transitory earnings components from these measures. The study provides a basis for subsequent research on the Australian market.

The second essay examines the extent to which earnings announcements convey new information to the market. Using a method that avoids the need to specify earnings expectations (Ball and Shivakumar 2008), I show that earnings announcements generally provide little new information to the market. Consistent with the view that earnings announcements complement (rather than substitute) other form of information, I observe that earnings announcements convey a substantially larger proportion of information for larger firms. This is also the case where analyst coverage is more extensive. I also find that reported profits convey a larger proportion of information than reported losses, consistent with losses being more likely to be pre-empted by other disclosures (i.e., a substitution effect). Finally, I also show that my results vary considerably across industries. Overall, my results suggest caution against prematurely concluding that earnings announcements typically convey little new information.

The third essay present the first evidence on the extent to which earnings announcements convey new information across international markets, with a specific focus on whether this is impacted by reporting frequency. There has been long standing debate as to whether shorter reporting intervals (i.e., quarterly reporting) are associated with an improvement in the timeliness of periodic financial information. Given conflicting claims about the costs of shorter intervals (especially the claimed increase is "short termism" it is important to establish whether the primary claimed benefit of shorter reporting intervals really exists. I use the same basic method as essay two, namely the approach outlined by Ball and Shivakumar (2008) which does not require the ex-ante specification of earnings expectations. This enables me to use a large sample of firm-years across a large number of countries which are G20 members. The results suggest that the frequency of statutory financial reporting (i.e., quarterly versus semi-annual) does not have any discernible impact on the generally low level of timeliness of periodic financial reports. This conclusion is robust to including controls for cross-country differences in economic and institutional factors which might be expected to influence the timeliness of periodic financial reporting.

1.1 References

Ball, R. and Shivakumar, L. (2008). How much new information is there in earnings? *Journal of Accounting Research,* vol. 46, no. 5, pp. 975-1016.

Marshall, N. T. (2018). The speed of earnings anticipation: Evidence from daily analyst forecasts. Available: http://dx.doi.org/10.2139/ssrn.2795160.

Chapter Two: How Efficient is the Market for Australian Firms' Earnings Information?

2.1 Introduction

Beginning with the pioneering research of Ball and Brown (1968) and Beaver (1968), the role of earnings information in influencing stock prices has long been recognised. That subsequent research focuses on the link between accounting information and share prices is not surprising, given concerns with the informational efficiency of stock prices, as well as increasing recognition that "value relevance" is a desirable property of external financial reporting (IASB 2018). However, as market participants have access to a wide variety of earnings-related information throughout the financial period, most of the "news" in accounting information is reflected in stock prices prior to its release (Ball and Brown 1968), and earnings releases are not, of themselves, especially important information events (Ball and Shivakumar 2008). In addition, attempting to identify the efficiency of the market for periodic earnings information via price movements is likely confounded by the aggregation problem. Price changes reflect not just changes in current period expectations but also the implications of current period expectations for future performance and hence, valuation. My aim is to provide evidence which explicitly speaks to the efficiency of the market for accounting information, rather than the informational efficiency of equity markets per se.

Attempts to directly observe information flow often identify firms' production of information via measures such as document counts (Brown et al. 1999; Beekes and Brown 2006; Hsu 2009; Beekes et al. 2016). However, these measures capture only the release of information by firms themselves and ignore the myriad of other channels through which information related to expected earnings outcomes can be sourced. To examine the efficiency of the market for earnings information among Australian firms, I employ a modified version of the measure suggested by Marshall (2018) which I label as *earnings information flow timeliness* (EIFT). Put simply, this measure captures the speed with which analysts' earnings forecasts adjust to more accurately reflect firms' earnings outcomes.[1] Assuming that unobservable shocks to earnings occur randomly throughout the financial year (Kothari et al. 2009), EIFT reflects the

[1] Earlier versions of Marshall (2018) use the EIFT label, and I follow this approach. However, my EIFT measure has at least some fundamental differences from the SPEED measure outlined by Marshall (2018). I explain these differences in detail in section 2.

extent to which analysts recognise all sources of information about future earnings and update their forecasts accordingly.[2]

EIFT is the summation of the daily ratio of consensus forecast estimate (less first estimate of the fiscal year) to actual reported earnings (less first estimate of the fiscal year). The differencing of both numerator and denominator by the first consensus estimate of the fiscal year allows the EIFT to capture only new earnings-related information not initially available at the start of the fiscal period. EIFT therefore jointly reflects the extent to which information about future earnings is available, regardless of source, and the degree to which sell-side analysts recognise this information. Most importantly, EIFT only measures the extent to which current earnings estimates are revised. This contrasts with price-based measures of information flow which suffer from an aggregation problem, namely that they reflect all forward-looking implications of information beyond just the current period financial result.

I initially identify considerable variation in the speed with which annual earnings information is reflected in analysts' forecasts for Australian firm-years from 1995 through 2016, with some evidence that the overall efficiency of the market for earnings-related information has improved over time. Turning to cross-sectional variation in EIFT, I initially consider the sign and size of earnings news. I find that the sign of earnings news affects the flow of earnings information, as EIFT is significantly higher for firm-years where the final result is "bad news" (i.e., the earnings result is less than the initial consenus forecast). This is consistent with the argument that managers have incentives to disclose bad news relatively more quickly (Skinner 1994; Donelson et al. 2012), but is not consistent with regulations that are premised on symmetrical timeliness of disclosure regardless of whether the information is good or bad news. However, while the sign of earnings news is associated with EIFT differences, I find no evidence that the magnitude of the annual earnings news is associated with differences in EIFT.

In additional analysis, I also show that EIFT is higher for firms with higher market-to-book ratios and for larger firms. The extent of analyst following is also associated with higher EIFT values; consistent with the argument that earnings-related information is more likely to be explicitly captured when a firm is followed by a deeper pool of sell-side analysts. Finally, I consider whether EIFT is affected by the definition of earnings reflected in analysts' forecasts. It is common for analysts to forecast earnings measures which exclude some GAAP

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[2] Of course, the EIFT measure is subject to the process by which sell-side analysts incorporate information into their earnings forecasts. However, it is widely accepted that the resulting forecasts are an important and credible summary of earnings expectations that are reflected in market prices (Bradshaw et al. 2017).

components (i.e., non-GAAP or "street" earnings), and my analysis indicates that the faster reflection of "bad" earnings news is concentrated in those instances where analysts are more likely forecasting street earnings rather than GAAP. Given that street earnings forecasts are less likely to contain transitory items (Bradshaw et al. 2018), this suggests that firms may be more forthcoming with negative earnings news which is characterised as reflecting the underlying operations of the firm.

My paper makes several significant contributions. First, it provides novel Australian evidence about the speed (or "efficiency") with which annual earnings-related information is reflected by sell-side analysts, with substantial variation in this measure. Second, I contribute to the broader disclosure literature by demonstrating that the sign of earnings news is associated with this measure of information efficiency, consistent with managers having incentives to disclose bad news on a timelier basis than good news. Third, I contribute to the growing debate about the regulation of earnings measurement by showing that the increased efficiency with which bad news earnings-related information is impounded by analysts is concentrated among those instances where analysts are forecasting earnings which exclude some components required by GAAP, most notably transitory losses. Fourth, I extend the prior literature examining sell-side security analysts' behaviour. Prior research typically focuses on the response of analysts to identifiable existing information (e.g. prior price movements or earnings releases) or focuses on cross-sectional differences in the properties of analysts' earnings forecasts.[3] In contrast, I examine the evolution of analysts' earnings forecasts over the fiscal period and construct a measure of the speed with which such forecasts correctly anticipate the outcome. Finally, I provide evidence that investors trading prior to earnings announcements face widely varying degrees to which earnings information is already recognised by market participants.

2.2 Research Design

2.2.1 Measurement of EIFT

In recognizing the pre-emption of much of the news reflected in annual earnings announcements, both Ball and Brown (1968) and Ball and Shivakumar (2008) argue that market participants seek out information beyond that which is firm-initiated. Such information helps formulate earnings expectations for the fiscal period. I am not concerned with what these

[3] Early examples of such research include Brown et al. (1985), who documented how properties of analysts' forecast change as earnings releases approach, and Lys and Sohn (1990) who were primarily concerned with the extent to which analysts' earnings forecasts efficiently reflect existing stock prices.

sources of information are.[4] They may be macro-economic (Hugon et al. 2015), press initiated (Bushee et al. 2010; Li et al. 2011; Drake et al. 2014) or social media-based (Drake et al. 2012; Blankespoor et al. 2013), to name just a few. My approach is also consistent with the existence of statutory requirements to continuously update the market that have been in place since at least 1994 (Brown et al. 1999). Most pertinently, ASX Listing Rule 3.1 requires firms to notify the market operator whenever they anticipate that "earnings will be materially different from market expectations".

Testing the speed with which information for a given period is recognised by market participants faces the chellenge of seperating current and future implications. Market prices reflect not just curent expectations but also those far into the future. Hence, price-based measures of information flow face a substantial aggregation dilemma, in that prices reflect the future implications of information about current period performance and not just the current period performance by itself. To avoid this problem, Marshall (2018) outlines a method for measuring the speed with which earnings-related information is recognised. EIFT is the sum of the daily ratios of forecast revision relative to the initial forecast error. For a forecast revision period that ends 3-months following fiscal year-end (approximately 320 trading days), EIFT is computed as a series of trapezoids:

$$EIFT = \frac{1}{2}\sum_{m=1}^{320}\frac{(FR_{m-1} + FR_m)}{FE} = \sum_{m=1}^{319}\frac{FR_m}{FE} + \frac{1}{2} \quad (1)$$

where FR_m is forecast revision (consensus estimate at m trading days into the fiscal period less consensus estimate at beginning of period) and FE is forecast error (IBES actual reported EPS less consensus estimate at the beginning of period). The differencing of both numerator and denominator by the first consensus estimate of the fiscal year allows the EIFT to capture only new earnings information flows into the market that were not initially available to analysts at the start of the fiscal period.

Over the course of an accounting period, analysts receive and incorporate earnings-related information into their forecasts. A $\frac{FR_m}{FE}$ ratio of 1 suggests analysts have received sufficient earnings-related information to correctly preempt reported earnings for the fiscal year. Firms with greater earnings information timeliness will observe a faster trajectory towards a ratio of

[4] I do not suggest that specific identification of which news releases and events influence analysts' forecasts is not of importance. However, I am only concerned with the speed with which analysts react to all available information, not the specific identification of those information sources.

1, while those characterised by a less efficient information market will take longer before analysts incorporate all available earnings information. Further, analyst optimism can drive forecast estimates beyond actual reported earnings (i.e. $\frac{FR_m}{FE}$ greater than 1).[5]

If the ratio $\frac{FR_m}{FE}$ deviates from 1 (regardless of the direction), analysts are yet to fully (or "completely") incorporate all earnings-related information into their estimates. Yet, there is a positive correlation between FR_m and EIFT even when FR_m exceeds actual reported earnings. Consequently, Marshall (2018)'s EIFT suggests stock-days where analysts overestimate earnings have greater earnings information flow timeliness than days when analysts underestimate their forecasts, even if the magnitudes of forecast accuracy across both days are identical. I therefore utilise an augmented EIFT measure that penalises the information flow of stock-days when FR_m exceeds actual reported earnings by the extent of overestimation relative to reported earnings:

$$EIFT = \sum_{m=1}^{319} \min\left\{\frac{FR_m}{FE}, 2 - \frac{FR_m}{FE}\right\} + \frac{1}{2} \tag{2}$$

I present a stylised application of my augmented EIFT measure in Appendix A. In contrast to Marshall (2018), my measure does not assume earnings information flow timeliness increases when analysts revise their earnings estimates beyond actual reported earnings.

My EIFT measure uses daily analyst earnings revisions leading up to earnings announcement day. IBES captures earnings announcement dates as the publication date of the first piece of annual earnings information publicly-disclosed by ASX-listed companies, most typically what is termed the preliminary final report (also known as the Appendix 4E).[6] While Marshall (2018) measures EIFT for quarterly U.S. earnings reports, I focus on annual earnings results and so examine a time horizon that spans 320 trading days following the first day of the fiscal year and which includes the maximum 3-month regulatory requirement window for annual earnings to be disclosed. Although Australian firms disclose earnings on a half-yearly basis (on top of quarterly activity reports for some mining firms), IBES coverage of half-yearly analyst estimates provided by Australian analysts only begins in 2007.

[5] For example, analysts may issue biased estimates to improve future employment prospects at the banks (Horton et al. 2017). Similarly, analysts may provide optimistic forecasts to generate increased trading commissions for the firm (Jackson 2005).
[6] Prior to 1 January 2003, this preliminary report was known as the Appendix 4B.

2.2.2 Sample selection

My sample begins on 1 January 1995, shortly after legislative changes took effect that provided civil and criminal penalties for breach of ASX disclosure rules (Brown et al. 1999), and concludes with fiscal years ending 2016. Australian companies are identified from the IBES Detailed History International File. I require the currency of forecast estimates to be the same as the currency of reported earnings, to remove the effect of currency fluctuations over time. For brokerage houses that issued multiple forecasts on the same day, I only consider the latest estimate.

The initial sample begins with 11,651 Australian firm-years with available annual EPS estimates on IBES for fiscal years 1995 to 2016. I exclude 1,184 firm-years where the earnings announcement date is more than 3 months past fiscal year-end, the maximum time a public reporting entity is allowed by legislation to lodge annual earnings with ASIC.[7] I also remove 14 invalid firm-years with forecasts made after earnings announcement date. To reduce any analyst selection effects (McNichols and O'Brien 1997), I follow Marshall (2018) and hold constant the analyst pool for each firm-year. This means an analyst must hold an active forecast since the start of the fiscal period until earnings announcement date. Forecasts more than six-months old are assumed expired unless the estimate is confirmed accurate by IBES. As a result, a further 3,616 firm-years are removed.

I also require the initial forecast error (i.e., the difference between actual reported earnings and first consensus estimate of the fiscal period) to be at least $0.01 per share. This restriction discards a further 1,289 firm-years. Finally, firm-years must also have the control variables necessary to run the main regression model. After trimming the dependent variable EIFT by the extreme 0.5% of the distribution by each fiscal year, 4,871 firm-years remain in the final sample. I obtain analyst estimates from the IBES Detailed History International File. Accounting variables are extracted from Morningstar Aspect Huntley. For market-based variables (e.g. market-to-book), security prices are sourced from SIRCA AusEquities database. Table 1 summarises the sample selection procedure.

[Insert Table 1]

My analysis of the IBES database for fiscal years 1995 to 2016 reveals analysts provided earnings estimates for 29.52% of ASX-listed companies. However, my sample is more

[7] See section 319 of the *Corporations Act 2001 (Cth)*.

restrictive and covers approximately 14.37% of listed Australian firms over the 22-year sample period, with an average analyst following between 4 to 5 analysts per firm-year. The primary factor behind the lower coverage in my sample is driven by my restriction that analysts must hold active forecasts from the beginning of the fiscal period up to the earnings announcement date. The motivation for this criterion is to control for analysts that initiate or stop coverage after fiscal-start and prior to fiscal year-end (Jackson 2005). However, the economic significance of the firm-years I examine exceeds the number of firms, given the heavy bias of analyst coverage towards larger firms. Even though stocks with analyst coverage in my sample represent on average 14% of ASX-listed securities for the financial year, the economic value of the firms make up two-thirds of public Australian equity capital (66.30%) over the entire sample period.[8]

2.2.3 EIFT dispersion

Figure 1 provides an overview of my augmented EIFT measure. For each trading day since the start of the fiscal period until 3 months past fiscal year-end, I derive the ratio of consensus analyst estimate (less first consensus estimate of the fiscal year) to actual EPS (less first consensus estimate of the fiscal year). The differencing of both numerator and denominator by the first consensus estimate of the fiscal year allows the EIFT to capture only new earnings information flows into the market that were not initially available to analysts at the start of the fiscal period.

The dashed (blue), dotted (green) and solid (red) lines illustrate the daily 25th percentile, median and 75th percentiles of consensus forecast estimates (less first consensus estimate of the fiscal year). There are considerable differences in the rate that analysts incorporate earnings-related information into their forecasts. For example, analysts that follow firm-years in the 25th percentile of the EIFT distribution (dashed line) receive the first piece of new earnings-related information for the fiscal year approximately 85 days into the fiscal period. In contrast, analysts following firms at the median (dotted line) and 75th percentile (solid line) have already incorporated approximately 30% and 65% respectively of earnings-related information by that same time.

[Insert Figure 1]

[8] Source: SIRCA Share Prices and Price Relatives (SPPR)

There is also some evidence of temporal variation in the EIFT values. Annual values of EIFT are summarised in Table 2, with median, lower quartile and upper quartile values reported for each year during my sample period. When I estimate a simple time trend regression, I find that the median EIFT value increases significantly (at the 5% level), as does the upper quartile (at the 1% level). These results are consistent with faster incorporation of earnings-related news in more recent years.

[Insert Table 2]

2.2.4 Methodology

To examine the effect of the sign and magnitude of earnings news on EIFT, I utilise an OLS regression approach. The use of an OLS regression model is appropriate given that analyst forecast revisions are typically a relatively smooth trajectory (Marshall 2018). I estimate the following regression model:

$$EIFT = GOOD_{NEWS} + GOOD_{NEWS} * LN(ABSFE) + BAD_{NEWS} * LN(ABSFE) + LN(DISPERSION + 1) + LN(FOLLOWING) + LN(MTB) + LN(EALAG) + LN(MARKETCAP) \quad (3)$$

I identify the effect of earnings news sign by using an indicator variable, GOOD_NEWS, which equals one if the difference between actual earnings per share and the consensus estimate at the beginning of the fiscal period is positive, and zero otherwise. The incentives which managers face to directly disclose earnings-related information has long been subject to extensive debate. Litigation risk can motivate managers to disclose bad news more promptly (Skinner 1994; Donelson et al. 2012; Tang et al. 2015), while Hsu (2009) finds that Australian firms with earnings declines make more voluntary price-sensitive announcements to the market than firms with earnings increases. However, Kothari et al. (2009) argue career concerns can incentivise managers to delay disclosures of bad news, obstructing the flow of earnings information into the market.

The magnitude of the earnings news is captured by the absolute difference between actual earnings per share and the consensus forecast estimate at the beginning of the fiscal period, scaled by the stock price at beginning of the fiscal period (ABSFE). To reduce skewness, I take the natural logarithm of these values. To understand whether any effect on EIFT attributable to the size of the earnings news is also dependent on the sign of the earnings news, I include separate interaction effects for both good and bad earnings news. Hence, I include $\mathrm{GOOD\_NEWS} * \mathrm{LN(ABSFE)}$ and $\mathrm{BAD\_NEWS} * \mathrm{LN(ABSFE)}$ in the regression model.

In addition to my examination of the effect on EIFT of the sign and magnitude of the earnings news, I also include several control variables (Marshall 2018). Analysts' earnings estimates can diverge due to differences in skills and experiences, a problem that is exaggerated when they are covering firms with extreme balance sheet fundamentals (Clement 1999; Joos et al. 2016). Barron and Stuerke (1998) find analyst forecast dispersion is positively associated with the magnitude of price reaction at the earnings announcement which suggests a larger flow of earnings information upon earnings release relative to preceding days. An uneven distribution of earnings information over the fiscal period indicates low earnings information timeliness. DISPERSION is the average daily standard deviation of analyst estimates from the beginning of the fiscal period to the earnings announcement date, scaled by the stock price at beginning of the fiscal period.

Yu (2008) argues that the monitoring role of analysts can improve the quality of firm communications by lowering the risk of earnings management. Greater analyst coverage can also improve the timeliness with which information is distributed to market participants (Gleason and Lee 2003; Shroff et al. 2014), as well as higher forecast accuracy (Merkley et al. 2017). FOLLOWING is the average number of active analyst estimates from the beginning of the fiscal period to the earnings announcement date. Analysts also tend to follow larger firms.[9] This trend suggests larger firms in the market may experience greater earnings information timeliness because of more comprehensive analyst coverage around business activities. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Likewise, analyst following and/or managers' strategic disclosure objectives may be related to firms' growth opportunities. I therefore control for the market-to-book ratio as an indicator for firm growth opportunities (Fama and French 1995; Skinner and Sloan 2002). MTB is the market-to-book ratio as of first date of the fiscal period.

Bagnoli et al. (2002) suggest the market generally favours firms that disclose earnings earlier than expected. Givoly and Palmon (1982) argue that the informativeness of earnings announcements declines as the reporting lag increases which is consistent with the argument by Ball and Shivakumar (2008) that the market employs alternative channels of information to pre-empt earnings information. Therefore, firms that report earnings promptly may likely have higher-quality reporting policies that can improve the flow of earnings information in the market. EALAG is the earnings announcement lag, calculated as the difference between the

[9] See, for example, Lang and Lundholm (1996), Kasznik and McNichols (2002) and Matolcsy and Wyatt (2006).

announcement date of the prior fiscal period's earnings and the first date of the current fiscal period.[10]

2.3 Results

2.3.1 Descriptive statistics

Table 3 reports Pearson correlations between EIFT and all variables in my regression analysis. These correlations are generally weak. However, the correlation between EIFT and key variable GOOD_NEWS is negative and statistically significant at the 99% level which provides preliminary evidence that "bad" earnings information flows to the market on a timelier basis than "good" news.

[Insert Table 3]

I further explore the univariate relations by splitting firm-years at the median EIFT value. Firm-years with an EIFT value above the median are categorised into the high EIFT group. Conversely, firm-years with an EIFT that is equal to or less than median EIFT are sorted into the low EIFT group. Mean and median differences between the two EIFT groups are compared using a bootstrap methodology to assess statistical significance. I begin by finding the observed absolute difference in mean (median) difference between firms in the low and high EIFT groups. Then, I pool the two samples, shuffle them and create two equal-sized test groups of shuffled values. I repeat this process 10,000 times and derive a test statistic that is equal to one minus the proportion of simulations where the absolute actual mean (median) difference of the two subsamples is greater than the simulated absolute mean (median) difference of the two test groups.

My bootstrap procedure yields evidence consistent with high EIFT firm-years being more likely to reflect relatively bad earnings news, as well as being more likely to occur when the overall level of earnings news is lower. Further, I observe that high EIFT firm-years are, on average, larger firms, have a higher market-to-book ratio and a smaller reporting lag. High EIFT firm-years are also those with a larger analyst following. These differences reinforce the need to assess the effects of earnings news sign and magnitude using a multivariate design as outlined by Equation (3).

[Insert Table 4]

[10] Detailed variable definitions are provided in Appendix B.

2.3.2 Effect of earnings news sign and magnitude on EIFT

My estimate of Equation (3) is reported in Table 5. In Model (1), I focus solely on the effect of the sign of earnings news on EIFT, controlling for the variables discussed above. There is evidence of a statistically significant relation between the sign of earnings news and EIFT, with a negative coefficient for the "GOOD_NEWS" coefficient, consistent with EIFT being higher for instances of bad earnings news (i.e., reported earnings are less than initial expectations). Hence, it appears that bad earnings news is reflected more quickly in terms of analysts' progressive adjustment of expectations.

In Model (2) of Table 5, I include the separate interaction terms "GOOD_NEWS * LN(ABSFE)" and "BAD_NEWS * LN(ABSFE)". These terms reflect whether the absolute size of good and bad earnings-related news can influence EIFT. My results show their associated coefficients are statistically insignificant which suggests the absolute size of analyst forecast error does not drive the timeliness of earnings information flow. Key variable "GOOD_NEWS" continues to be negative and statistically significant. The coefficient associated with LN(FOLLOWING) in both models is positive and statistically significant, indicating increased analyst coverage is associated with improved EIFT. However, it is also noteworthy that my estimates of Equation (3) have relatively low explanatory power, consistent with most of the variation in firm-year EIFT being idiosyncratic.

[Insert Table 5]

Given the large variation in EIFT demonstrated in Figure 1, I subsequently estimate Equation (3) separately for each EIFT quartile. For each sample year, I sort firms into EIFT quartile size groups, ranging from the lowest (quartile 1) to the largest (quartile 4). The estimations of Equation (3) are reported in Models (1) to (4) of Table 6, beginning with the smallest EIFT quartile and concluding with the largest. In contrast to the pooled results reported in Table 5, the coefficient associated with the "GOOD_NEWS" indicator is statistically insignificant within each of the EIFT quartiles. In Model (1), I observe a positive and statistically significant coefficient for the interaction term "BAD_NEWS * LN(ABSFE)" which suggests bad news arrives on a timelier basis as the initial forecast error increases. In contrast, Model (4) shows bad news become less timely as the magnitude of the surprise increases, as indicated by a negative and statistically significant coefficient for "BAD_NEWS * LN(ABSFE)". Hence, it appears that some caution is needed before assuming consistent results across the EIFT distribution, and the generally (far) higher explanatory power of these EIFT quartile-specific estimations reinforces this conclusion.

[Insert Table 6]

2.4 Additional Analyses

2.4.1 Firm size effect

Large firms attract frequent media scrutiny due to their economic significance in the marketplace.[11] To improve transparency and alleviate public concerns, large firms may employ higher-quality accounting and auditing. Consequently, investors may benefit from higher quality and/or more timely signals about expected earnings. Further, greater coverage by the financial press and analysts may reduce market reaction upon earnings announcements due to a flood of pre-emptive information prior to earnings release. These supply-side factors may improve the arrival of earnings-related information into the market.

For ASX-listed firms, Brown et al. (1999) find the number of disclosed price sensitive documents is positively correlated with firm size. In Figure 2 (Panel A) I summarise all firm announcements distributed through the ASX ComNews service on an annual basis to assess the financial reporting frequency across extreme firm sizes. In Figure 2 (Panel B) I contrast the percentage of individual documents that are classified as price sensitive. My finding is consistent with the firm size effect described in Brown et al. (1999). Across all sample years except 2013 and 2016, I find a positive correlation between firm size and the number of price-sensitive documents disclosed by ASX-listed companies.

[Insert Figure 2]

I recognise that firms also provide many disclosures that are not necessarily market-sensitive but can help improve reporting transparency. These include periodic updates to regulators and presentation materials used for investor calls. In all but 2 sample years (1995 and 1997), I find small firms report a higher proportion of total announcements that are price-sensitive compared to larger firms. This trend is consistent with my assertion that larger firms have additional disclosure responsibilities that are not necessarily classified as market-sensitive. Further, fixed costs associated with information disclosures could encourage smaller firms to only speak when necessary (Verrecchia 1983; Lang and Lundholm 1996).

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[11] For example, Li et al. (2011) find firms included in Standard and Poor's market indices are more likely to receive a Dow Jones news alert.

I define firm size as the outstanding market capitalisation at the end of the prior year. I then measure EIFT for each firm size quintile group. Without assuming the theoretical distribution of the arrival of earnings information, I employ a bootstrapping approach to test for any statistical difference in the distribution of EIFT for the largest and smallest firm quintiles.[12] Based on two equal sized groups from 10,000 reshuffled observations, I find that the EIFT value for the largest firm size quintile is significantly larger than the smallest firm size quintile, and that the pattern of differences in EIFT values is monotonically increasing with firm size quintiles.

Figure 3 reinforces this evidence by charting the median rate of earnings information arrival across each firm size group. The first piece of earnings-related information arrives first in the market of the largest group of firms (quintile 5) and last for the smallest firms (quintile 1). In fact, the delay increases monotonically with each lower order firm size quintile group. Similarly, the market receives the full-set of earnings information earliest for the largest group of firms (quintile 5) and last for the smallest group of firms (quintile 1).

[Insert Figure 3]

Table 7 reports regression results by firm size quintile, analogous to my overall sample results reported in Table 5. For each fiscal year, firms are sorted into a firm size quintile group based on the market capitalisation at the beginning of the fiscal period. Control variables remain identical to prior analyses. My key variable of interest "GOOD_NEWS" is negative and statistically significant at a meaningful level for all firm size quintile groups. The interaction term "GOOD_NEWS * LN(ABSFE)" is only statistically significant in Model (4). The positive coefficient and coupled with the negative estimate for "GOOD_NEWS" suggests good news becomes timelier as the earnings magnitude increases. Model (2) has a negative coefficient for the interaction term "BAD_NEWS * LN(ABSFE)" that is statistically significant at the 5% level. This suggests that bad news becomes less timely as the magnitude of the earnings news increases. In contrast, Model (5) shows bad news becomes more timely as earnings magnitude increases, as indicated by the negative coefficient for "BAD_NEWS * LN(ABSFE)". Overall,

12 I begin by finding the observed absolute difference in mean (median) difference between firms in the low and high EIFT groups. Then, I pool the two samples, shuffle them and create two equal-sized test groups of shuffled values. I repeat this process 10,000 times and derive a test statistic that is equal to one minus the proportion of simulations where the absolute actual mean (median) difference of the two subsamples is greater than the simulated absolute mean (median) difference of the two test groups.

I characterise the results reported for individual firm size quintiles as failing to demonstrate any consistent pattern of earnings news magnitude influencing EIFT.

[Insert Table 7]

2.4.2 The role of non-GAAP earnings disclosures

In recent years, Australian firms have steadily increased their supply of non-GAAP earnings information (Coulton et al. 2016a). Hence, I consider whether differences in EIFT arise where the earnings "information" is not measured as earnings that are GAAP compliant. I first identify where GAAP earnings information is of primary interest to analysts for each firm-year. This is represented by a GAAP EPS value in the "ACTUAL" field which I infer as analysts providing GAAP earnings forecasts.[13] On the other hand, I characterise instances where analysts are more interested in non-GAAP earnings information as those characterised by an "ACTUAL" field that does not equal the firm-year's GAAP EPS (i.e., street earnings forecasts).[14] As Figure 4 illustrates, this latter scenario represents most observations. As IBES coverage of GAAP EPS measures are limited prior to 2004, my comparison of GAAP and non-GAAP results examines firm-years from 2004 onwards.

[Insert Figure 4]

Figure 5 illustrates the 25th, 50th and 75th percentiles of daily realised forecast error for firm-years where IBES "ACTUAL" value equals their statutory EPS and compares the results with those firm-years where analysts are forecasting non-GAAP EPS (i.e., IBES "ACTUAL" does not equal statutory EPS). Both figures illustrate similar trajectories for the highlighted percentile values.

[Insert Figure 5]

Table 8 reports summary statistics for firm-years where analysts forecast street earnings and those with statutory EPS forecasts for the fiscal period. On average, firm-years with street earnings forecasts have lower EALAG, higher FOLLOWING, lower propensity of a positive forecast error (GOOD_NEWS), higher MARKETCAP and lower MTB compared to firm-years with statutory EPS forecasts. Median differences indicate firm-years with non-GAAP forecasts have higher DISPERSION, higher FOLLOWING, higher MARKETCAP and lower

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[13] GAAP EPS values are flagged by the "Measure" field in the "IBES Detail History – Actuals" file.

[14] In the "Variable Descriptions" section of the "IBES Detail History – Actuals" product page, Wharton Research Data Service claims actual earnings "ACTUAL" are entered into the IBES database "on the same basis as analysts' forecasts.". This may not necessarily correspond to a GAAP measure.

MTB. The distribution of EIFT is not significantly different between firm-years with street earnings forecasts and statutory EPS forecasts.

[Insert Table 8]

I further create two subsamples to observe whether the sign of earnings news affects earnings information flow timeliness in a multivariate setting. Model (1) contains firm-years where performance is benchmarked against street earnings (i.e., IBES actual EPS does not equal statutory EPS). The negative coefficient of "GOOD_NEWS" suggests bad news are provided to the market on a timelier basis than good news. Model (2) focuses on firm-years where the market is forecasting statutory earnings (i.e. IBES actual EPS equals statutory EPS). The coefficient of key variable "GOOD_NEWS" is statistically insignificant.

Overall, my results show news sentiment has a significant effect on the arrival of street earnings information to the market but does not affect GAAP earnings information timeliness. Specifically, bad news arrives on a timelier basis for street earnings information. I infer the finding to be consistent with the view that managers are asymmetrically forthcoming with bad earnings news where the bad news is related to on-going operations.

[Insert Table 9]

2.4.3 Robustness tests

I conduct several additional tests to ensure the robustness of my primary results. These relate to the choice of initial forecast measurement date, and the definition of good and bad news.

Fiscal period's annual earnings results are required by statutes to be publicly released within 3 months of period-end. This means forecast revisions in the 3 months after fiscal period begins may consist of earnings information flows that pertain to prior period's earnings. To reduce the extent that analyst earnings revisions in the current period relate to prior period's earnings performance, I recalibrate my model to begin 3 months into the current fiscal period. As with my primary tests reported earlier, I require the absolute value of the forecast error to be at least $0.01. The key variable of interest "GOOD_NEWS" is negative and remains statistically significant at 99% level for both models. In Model (2), I do not find significant coefficients associated with the interaction terms "GOOD_NEWS * LN(ABSFE)" and "BAD_NEWS * LN(ABSFE)". Overall, my conclusions are robust to commencing measurement of analyst revisions from three months into the fiscal period.

[Insert Table 10 here]

For robustness, I replace my key measure of positive earnings news GOOD_NEWS with an indicator PROFIT that equals one if the IBES reported EPS (field "ACTUAL") is positive for the fiscal-year and zero otherwise. These results show the key dummy variable PROFIT is negative and statistically significant which indicates greater earnings information flow timeliness for firm-years with a net loss. When I include two interaction terms between profitability and absolute size of forecast error ("PROFIT * LN(ABSFE)" and "LOSS * LN(ABSFE)"), their associated coefficients are statistically insignificant.

[Insert Table 11]

Another measure of news sentiment is whether the firm fiscal-year delivered higher earnings than the prior year. I examine this measure in regression results where INCREASED_EPS is a dummy variable that equals one if there has been a positive change in IBES reported EPS (field "ACTUAL") relative to prior fiscal year and zero otherwise. Both models show a negative and statistically significant coefficient for the key variable of interest "INCREASED_EPS" which suggests firm-years that see a fall in profitability relative to prior fiscal year have greater earnings information flow timeliness. Once again, the results support conclusions from my primary analysis that negative earnings news is more rapidly reflected in analysts' earnings forecasts.

[Insert Table 12]

2.5 Conclusion

I provide the first Australian evidence of which I am aware of the speed with which earnings information is incorporated into sell-side analysts' forecasts of annual earnings results. I characterise this as a measure of the efficiency of the market for accounting information, as compared to market efficiency with respect to prices. My measure of earnings information flow timeliness (EIFT) reflects all disclosures relevant to earnings expectations, regardless of whether they are disclosures made by the firms in question or information from other sources, including analysts' private information. All such sources are likely relevant to the speed (i.e., efficiency) with which earnings expectations reflect actual outcomes.

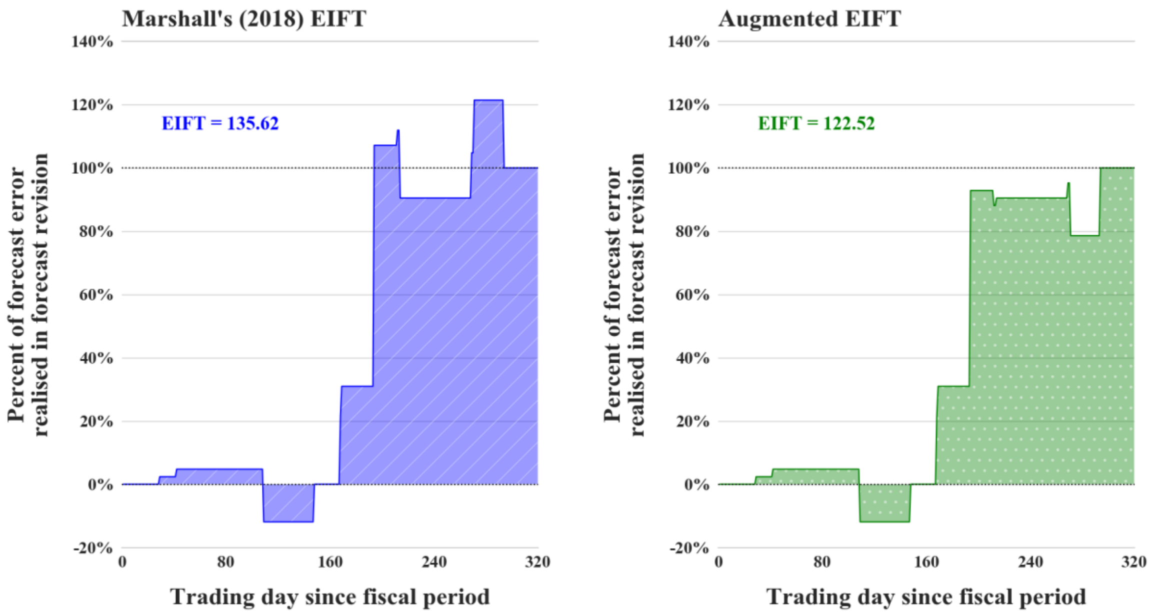
My initial analysis indicates a very high degree of variation in the EIFT measure. While some firms have relatively fast incorporation of earnings news into analysts' annual earnings forecasts, for at least some firms this process appears to be far slower. Overall, there is some evidence that EIFT has improved over time, although this effect is strongest among the upper quartile of EIFT values. When I turn to examining EIFT variation, I find that the sign of earnings news affects the flow of earnings information arrival in the market. Consistent with Marshall (2018) and managerial disclosure incentives Donelson et al. (2012), I find bad earnings news is reflected by analysts' forecasts on a timelier basis than good news. However, in subsequent tests I show that this effect is concentrated in instances where analysts forecast street earnings rather than GAAP earnings which suggest that bad news is more readily available when it relates to earnings from firms' underlying operations. In addition, I also show that analyst coverage is positively associated with EIFT.

Of course, my EIFT measure captures the joint effects of information availability and the extent to which analysts incorporate this information without delay. However, sell side analysts are typically viewed as a major user of accounting information, and earnings forecasts are arguably their most significant output. Hence, I view my EIFT measure as a good proxy for the extent to which information about future earnings becomes available which in turn captures the efficiency of the market for information about annual earnings. There is clearly an opportunity for further research to identify how the efficiency of the market for accounting information varies, as distinct from the efficiency of the share market, although I also expect these two concepts are closely related.

2.6 Appendices

Appendix A: Augmented EIFT

Using analyst revisions for ASX-listed security NEC.AX over the 2016 fiscal year, I illustrate a bias towards earnings information flow timeliness using Marshall (2018)'s EIFT. I then demonstrate my augmented EIFT measure that addresses this weakness in the Marshall (2018) measure.



The left-hand diagram illustrates Marshall (2018)'s EIFT which is the summation of the daily ratio of consensus forecast estimate (less first estimate of the fiscal year) to actual reported earnings (less first estimate of the fiscal year). When analysts revise forecasts beyond actual reported earnings (approximately 200 trading days into the fiscal period), I observe a positive relationship between the overestimation and EIFT. A theoretical EIFT value of 319.5 indicates the median analyst estimate represents actual reported EPS up to 319 days since the beginning of the fiscal period. In the above example, Marshall (2018)'s EIFT calculation of 135.62 implies analysts provide earnings information flows equivalent to 135.4 trading days (= 135.62 / 319.5 * 319) of accurate earnings estimate for the firm-year.

However, analyst overestimation is simply forecast error akin to analyst underestimation (but in the opposite direction), thus they should not contribute to a positive flow of earnings information into the market. This gap is an artefact of lowered earnings information timeliness in the market.

The right-hand diagram illustrates my EIFT design that rectifies the bias that can permeate in Marshall (2018)'s original EIFT measure. For forecast revisions that exceed actual reported earnings, my augmented EIFT measure penalises the magnitude of overestimation relative to actual reported earnings. For example, approximately 200 trading days into the fiscal year, analysts' forecast revision equated to 120% of the forecast error. My augmented EIFT reduces that day's realised forecast error to 80% which implies analyst underestimation and overestimation (relative to actual reported earnings) of the same magnitude share the same reduction in earnings information flow timeliness. In my augmented EIFT calculation that provides an unbiased treatment of analyst forecast error, the firm in my current example receives earnings information flows equivalent to 122.3 trading days (= 122.52 / 319.5 * 319) of accurate earnings estimate over the year, almost 10% less than indicated by Marshall (2018)'s EIFT measure.

My augmentation treatment resembles that of Beekes and Brown (2006), who focus on the absolute value of share price changes to understand the timeliness with which share prices reflect all relevant information over a year. However, an absolute transformation is not directly applicable to mitigate the biased effect of analyst overestimation on Marshall (2018)'s EIFT measure, because the sign of the forecast error contains relevant information in the interpretation of EIFT. An example is a stock-day m trading days into the fiscal period with a scaled forecast revision variable $\frac{FR_m}{FE}$ that is negative and represents less timely earnings information flow (i.e. reduce overall EIFT). If an absolute transformation is applied to this variable, overall EIFT increases, which in turn leads to a false representation of forecasting accuracy.

Coulton et al. (2016b) provides a measure of the timeliness of analyst' earnings forecasts in their U.S study. The study resonates with my current research, namely a pursuit to understand the flow of earnings-related information in the market. Their timeliness metric is applied to a sample of analysts' earnings forecasts to understand the speed in which forecast revisions are made (relative to the total revision over a fiscal period). However, it does not enable an interpretation of how much revision is still required to close the gap between contemporaneous analyst estimate and firms' actual reported earnings which is ultimately the benchmark of earnings estimates. This shortfall is addressed in my augmented EIFT calculation by scaling the forecast revision variable by the difference between actual reported earnings and the first consensus estimate of the fiscal period.

Appendix B: Variable definitions

Variable	Definition
ABSFE	ABSFE is the absolute difference between actual earnings per share and the consensus forecast estimate at the beginning of the fiscal period, scaled by the stock price at beginning of the fiscal period.
DISPERSION	DISPERSION is the average daily standard deviation of analyst estimates from the beginning of the fiscal period to earnings announcement date, scaled by the stock price at beginning of the fiscal period. Firm-years with a single analyst following are assumed to have a DISPERSION value of 0.
EALAG	EALAG is the earnings announcement lag, calculated as the difference between the announcement date of the prior fiscal period's earnings and the first date of the current fiscal period.
EIFT	EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. $$EIFT = \sum_{m=1}^{319} \min\left\{\frac{FR_m}{FE}, 2 - \frac{FR_m}{FE}\right\} + \frac{1}{2}$$ Where: forecast revision FR_m is consensus estimate at m trading days into the fiscal period less consensus estimate at beginning of period; forecast error FE is IBES actual reported EPS less consensus estimate at beginning of fiscal period To reduce the effect of extreme values, EIFT is trimmed at the 0.5% and 99.5% percentiles of the distribution by fiscal year.
FOLLOWING	FOLLOWING is the average number of active analyst estimates from the beginning of the fiscal period to earnings announcement date.
GOOD_NEWS	GOOD_NEWS is an indicator that equals one if the difference between actual earnings per share and the consensus estimate at the beginning of the fiscal period is positive, and zero otherwise.
INCREASED_EPS	INCREASED_EPS is an indicator variable that equals one if year-on-year change in IBES reported actual EPS is positive, and zero otherwise.
MARKETCAP	MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period.
MTB	MTB is the market-to-book ratio as of first date of the fiscal period.
PROFIT	PROFIT is an indicator variable that equals one if IBES reported actual EPS is positive, and zero otherwise.

2.7 Figures

Figure 1: Distribution of augmented EIFT

Forecast revision at trading day m is consensus estimate at m trading days into the fiscal period less consensus estimate at beginning of period. Forecast error is IBES actual reported EPS less consensus estimate at the beginning of period. I penalise the information flow of stock-days when FR_m exceeds actual reported earnings, by the extent of overestimation relative to reported earnings.

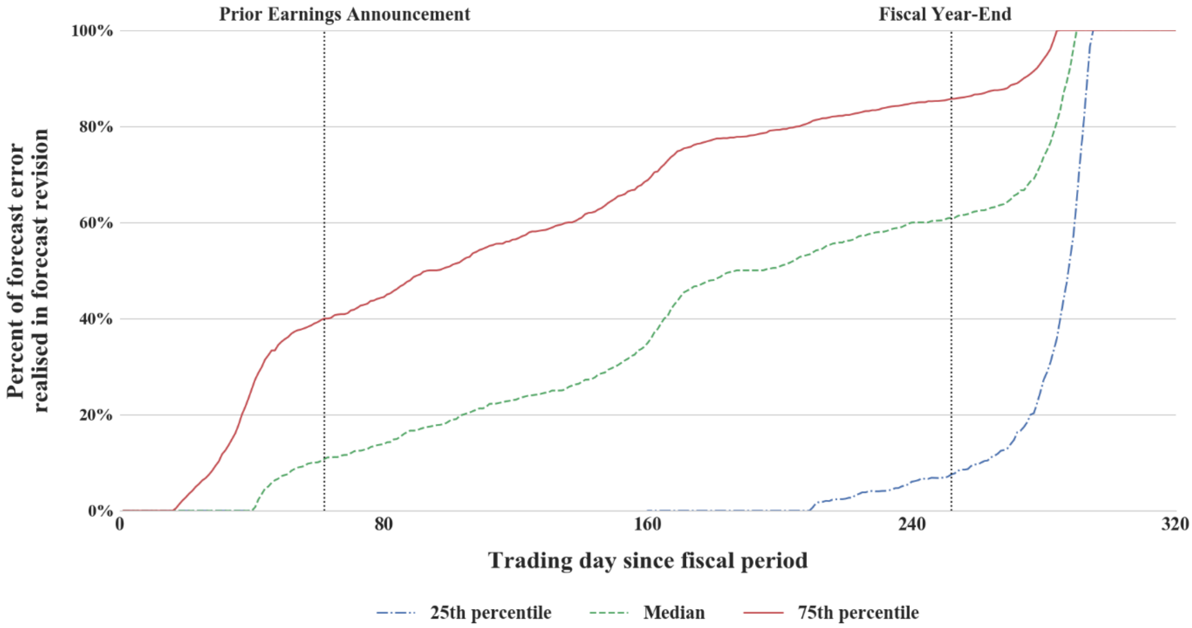
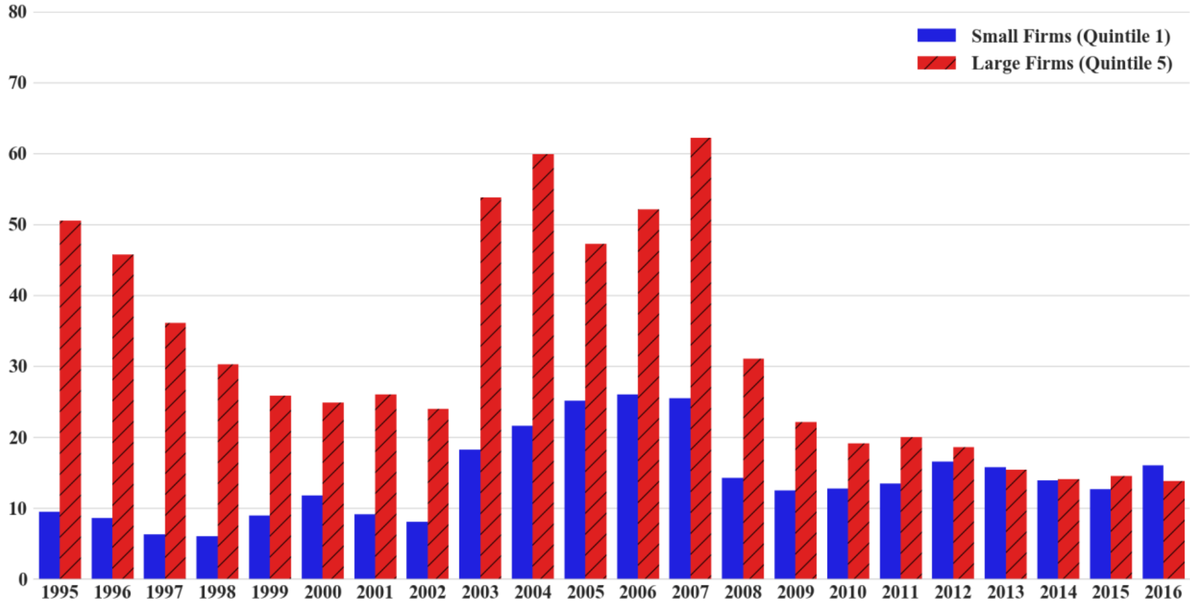


Figure 2: Company announcements disclosed on ASX

Panel A: Average price-sensitive announcements disclosed on ASX

Company announcements are distributed through the ASX ComNews service. At each year-end, I find the average count of company announcements that are flagged by the ASX ComNews service as price-sensitive, across companies. Firm quintile groups are determined by the market capitalisation as at prior year-end.



Panel B: Average proportion of announcements that are price-sensitive

Company announcements are distributed through the ASX ComNews service. At each year-end, I find the proportion of total announcements that are flagged by the ASX ComNews service as price-sensitive, across companies. Firm quintile groups are determined by the market capitalisation as at prior year-end.

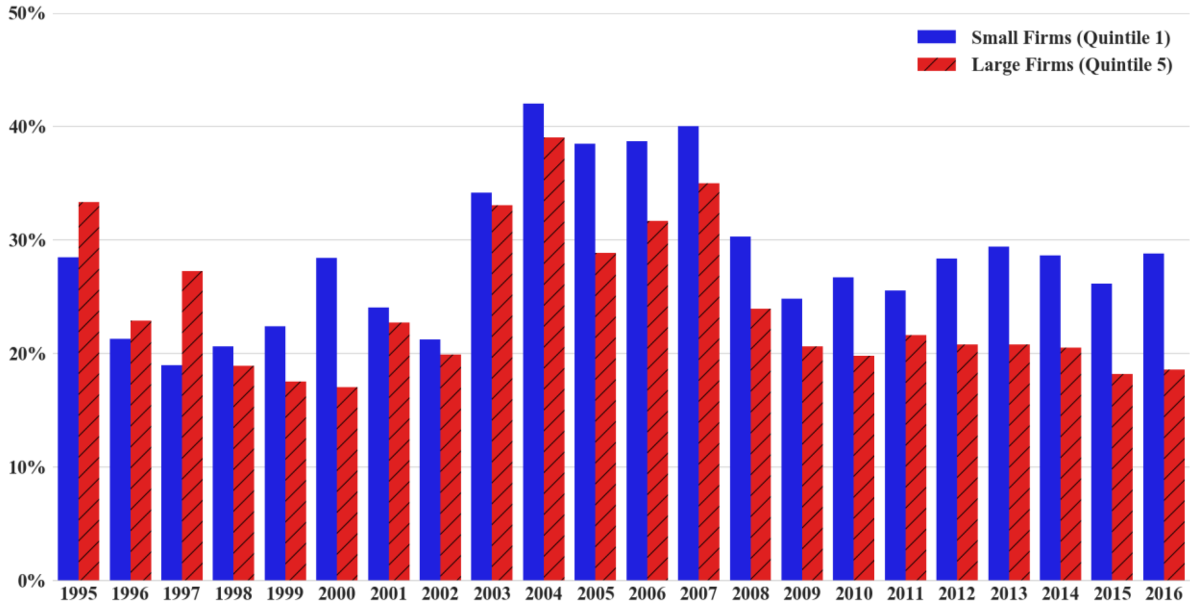


Figure 3: Distribution of augmented EIFT by firm size

Forecast revision at trading day m is consensus estimate at m trading days into the fiscal period less consensus estimate at beginning of period. Forecast error is IBES actual reported EPS less consensus estimate at the beginning of period. I penalise the information flow of stock-days when FR_m exceeds actual reported earnings, by the extent of overestimation relative to reported earnings. Firm quintile groups are determined by the market capitalisation as at prior year-end.

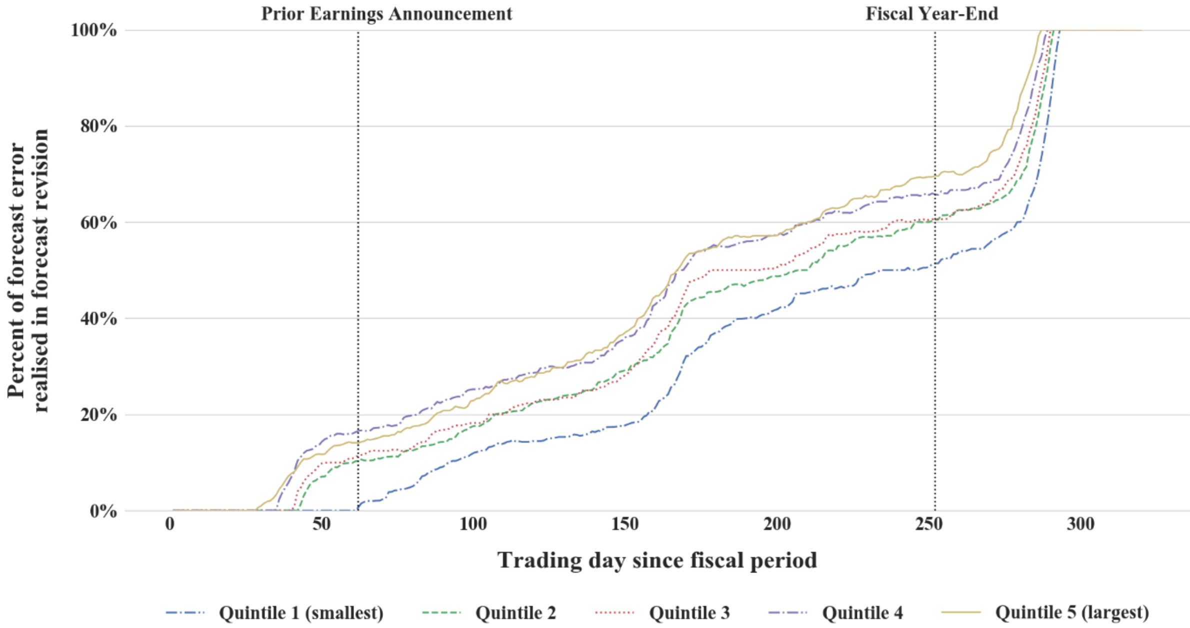


Figure 4: IBES coverage of GAAP EPS in sample

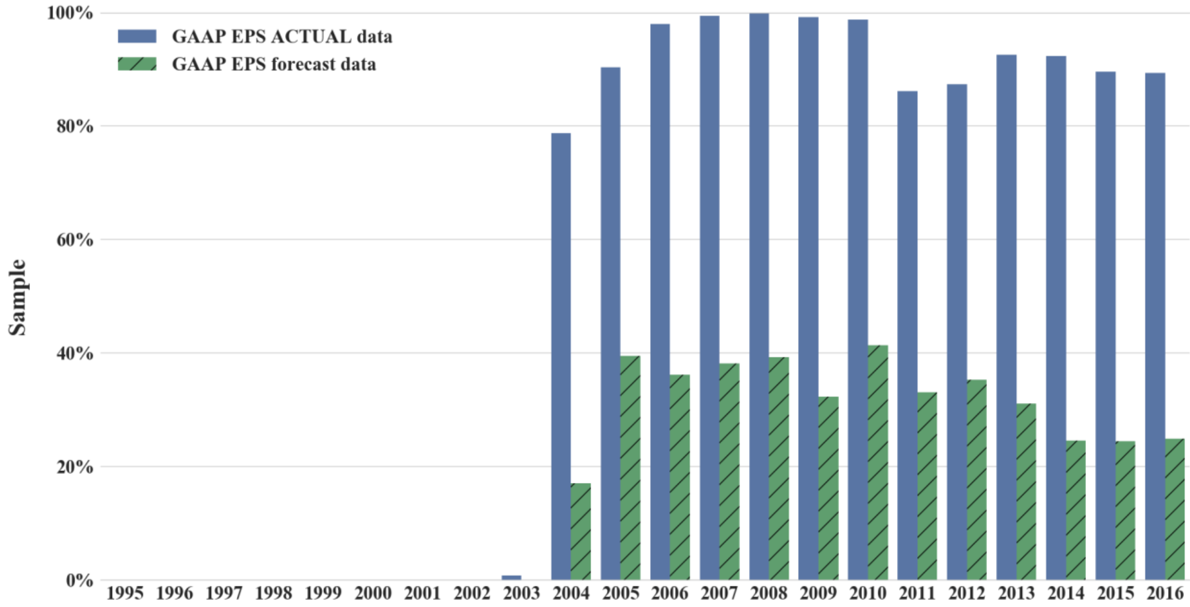
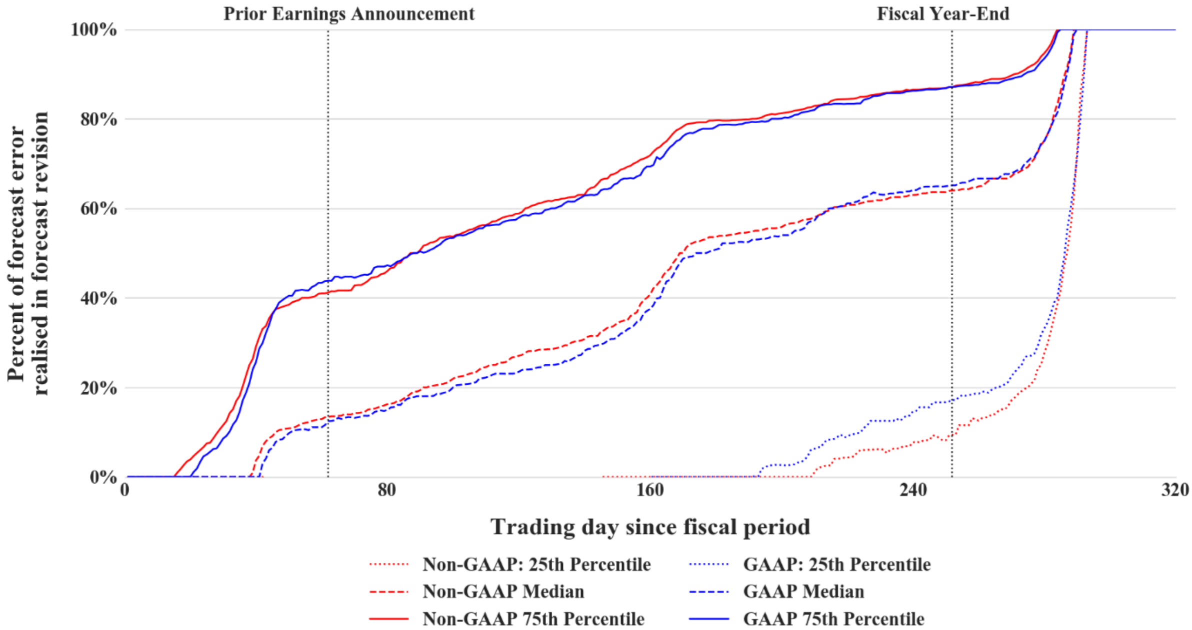


Figure 5: Distribution of augmented EIFT by non-GAAP and GAAP information

GAAP (non-GAAP) information markets are characterised by analysts providing GAAP (non-GAAP) earnings forecasts. The GAAP status of information markets are determined by an "ACTUAL" field in the IBES "Detail History – Actuals" file that does not equal the firm-year's GAAP EPS (i.e. street earnings forecasts).



2.8 Tables

Table 1: Sample selection

Criteria	**Total**	**Exclusions**
Step 1: Firm-ears with annual EPS estimates on IBES for fiscal years 1995 to 2016 for firms domiciled in Australia.	11,651	
Step 2: Earnings must be announced within 3 months of fiscal year-end.		(1,184)
Step 3: Remove forecasts made after earnings announcement		(14)
Step 4: Analysts must hold active forecasts since start of fiscal period until earnings announcement date. Estimates more than 180 days old are assumed expired unless confirmed accurate.		(3,616)
Step 5: Forecast error must be at least $0.01		(1,289)
Step 5: Available variables in main regression model		(677)
Final sample	**4,871**	

Table 2: EIFT distribution by sample years

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day.

Year	25th Percentile	Median	75th Percentile
1995	67.37	117.64	166.00
1996	120.74	154.94	191.99
1997	92.33	157.56	188.10
1998	84.96	144.82	192.19
1999	70.53	127.27	176.14
2000	42.82	116.82	163.95
2001	37.50	86.18	135.27
2002	36.35	114.01	177.67
2003	55.65	123.93	181.24
2004	78.21	144.57	189.55
2005	74.90	132.06	193.58
2006	62.11	142.83	196.02
2007	91.64	154.96	194.65
2008	47.79	127.33	183.11
2009	81.62	159.38	208.22
2010	83.44	160.16	207.30
2011	93.90	152.74	194.99
2012	100.82	159.62	196.46
2013	101.12	158.91	205.39
2014	74.99	155.61	202.37
2015	66.57	138.11	189.85
2016	79.42	145.55	195.21

Table 3: Pearson correlation matrix

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) EIFT	1.0000							
(2) GOOD_NEWS	-0.1110***	1.0000						
(3) LN(ABSFE)	-0.0256*	-0.1048***	1.0000					
(4) LN(DISPERSION + 1)	-0.0106	-0.0251*	0.5471***	1.0000				
(5) LN(FOLLOWING)	0.1022***	0.0331**	-0.0819***	0.0201	1.0000			
(6) LN(MTB)	0.0177	0.0569***	-0.0470***	-0.1275***	0.1287***	1.0000		
(7) LN(EALAG)	-0.0516***	-0.0384***	0.0952***	0.0412***	-0.2570***	-0.0913***	1.0000	
(8) LN(MARKETCAP)	0.0496***	0.0661***	-0.1017***	-0.0503***	0.7272***	0.2637***	-0.2944***	1.0000
Observations	4,871							

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Summary statistics of firms in low and high EIFT groups

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period.

Firm-years sorted into low (high) EIFT group if EIFT for the fiscal period is below (above) median EIFT for each fiscal year. Test statistic for the differences are computed using a bootstrap methodology. I begin by finding the observed absolute difference in mean (median) difference between the HIGH EIFT and LOW EIFT sample firms. Then, I pooled together the two samples, shuffle them and create two equal-sized test groups of shuffled values. I repeat this process 10,000 times and derive a test statistic that is equal to one minus the proportion of simulations where the absolute actual mean (median) difference of the two subsamples is greater than the simulated absolute mean (median) difference of the two test groups. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal-year.

	Low EIFT		**High EIFT**		**Difference**	
	Mean	Median	Mean	Median	Mean	Median
LN(ABSFE)	0.0000	-0.0635	-0.0638	-0.0627	-0.0638***	0.0007
LN(DISPERSION + 1)	0.0386	0.0034	0.0248	0.0038	-0.0138*	0.0004**
LN(EALAG)	3.9801	3.9890	3.9493	3.9703	-0.0308***	-0.0187
LN(FOLLOWING)	1.1717	1.0986	1.4096	1.6094	0.2379***	0.5108***
GOOD_NEWS	0.3844	0.0000	0.3085	0.0000	-0.0759***	0.0000
LN(MARKETCAP)	19.9706	19.7758	20.3508	20.1944	0.3802***	0.4187***
LN(MTB)	0.5034	0.4599	0.6052	0.5494	0.1018***	0.0895***
Observations	2,440	2,440	2,431	2,431		

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Earnings information flow timeliness

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

	(1)	(2)
GOOD_NEWS	-37.9150***	-39.4587***
	(5.9160)	(6.2531)
LN(ABSFE)	-7.4704	
	(10.0133)	
LN(DISPERSION + 1)	12.3812	9.4142
	(14.8518)	(13.4624)
LN(FOLLOWING)	19.5912***	19.7377***
	(6.5243)	(6.5238)
LN(MTB)	-5.2270	-4.9183
	(5.5284)	(5.5642)
LN(EALAG)	8.3923	8.5903
	(17.1675)	(17.1717)
LN(MARKETCAP)	-3.0208	-2.9486
	(5.2184)	(5.2107)
GOOD_NEWS * LN(ABSFE)		-17.6597
		(15.5032)
BAD_NEWS * LN(ABSFE)		-1.0945
		(10.5516)
Constant	117.1931	114.9219
	(121.6767)	(121.5359)
Observations	4,871	4,871
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year
Adjusted R^2	0.0269	0.0272

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Earnings information flow timeliness of EIFT quartile groups

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. For each fiscal year, firms are sorted into an EIFT quartile group based on the EIFT for the fiscal year. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

EIFT Quartile Group	(1)	(2)	(3)	(4)
GOOD_NEWS	-25.4936	0.1539	0.3909	0.6520
	(17.4035)	(2.0283)	(1.4425)	(2.1076)
GOOD_NEWS * LN(ABSFE)	-40.5915	-3.1779	4.5826	3.5575
	(29.5318)	(3.4703)	(3.0288)	(3.5428)
BAD_NEWS * LN(ABSFE)	57.4000**	-0.1833	2.8598	-8.3235**
	(22.3320)	(3.0903)	(3.2296)	(3.5855)
LN(DISPERSION + 1)	5.6737	4.0955	-10.4619	16.9253**
	(21.2608)	(4.5669)	(10.7279)	(6.8538)
LN(FOLLOWING)	58.0678***	-1.4174	1.2465	-2.5855
	(20.5607)	(1.9495)	(1.5693)	(2.0502)
LN(MTB)	4.9392	1.7088	1.1774	0.9607
	(20.2422)	(2.2376)	(1.1828)	(1.9702)
LN(EALAG)	17.4072	-6.2408	3.8166	-3.9307
	(55.9456)	(5.5698)	(3.8474)	(6.9721)
LN(MARKETCAP)	-22.6018	0.1021	0.5858	-2.3908
	(17.8707)	(1.9204)	(1.2646)	(1.7800)
Constant	313.9369	136.7287***	112.7169***	265.6733***
	(396.6219)	(39.5472)	(29.9938)	(41.5355)
Observations	1,227	1,231	1,211	1,220
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year	Firm, Fiscal-year	Firm, Fiscal-year
Adjusted R^2	0.0780	0.4629	0.5609	0.2443

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Earnings information flow timeliness of firm size quartile groups

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. For each fiscal year, firms are sorted into a firm size quintile group based on the market capitalisation at the beginning of the fiscal period. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

Firm Size Quintile Group	(1)	(2)	(3)	(4)	(5)
GOOD_NEWS	-48.5428***	-43.6663**	-37.7874**	-30.2026*	-56.9014***
	(17.0066)	(17.6891)	(16.7235)	(15.7403)	(11.0187)
GOOD_NEWS * LN(ABSFE)	-37.8226	12.2524	-16.4510	89.7707*	-4.4778
	(44.2278)	(35.0836)	(26.3600)	(50.2494)	(15.7457)
BAD_NEWS * LN(ABSFE)	-19.3393	-31.5270**	11.8204	90.6362	171.3059**
	(14.8018)	(14.3787)	(30.9375)	(76.5252)	(71.0757)
LN(DISPERSION + 1)	52.3627	52.0571	24.0355	159.4979	87.6344
	(62.0770)	(42.8139)	(33.0084)	(135.3479)	(86.9294)
LN(FOLLOWING)	12.4718	16.5282	-12.9535	52.7074*	27.8583
	(16.3420)	(11.8128)	(14.1697)	(28.1348)	(20.1112)
LN(MTB)	-3.5210	-9.7547	1.8774	-16.1041	-1.5313
	(16.8830)	(18.0200)	(18.1879)	(17.0366)	(15.8736)
LN(EALAG)	51.2789	58.4132	11.3141	-54.2888	11.8070
	(56.5999)	(35.5508)	(44.0888)	(44.8427)	(43.3197)
LN(MARKETCAP)	1.2084	0.5305	-16.8967	-15.0486	-21.2246
	(19.8587)	(28.0825)	(26.7491)	(20.8763)	(13.5297)
Constant	-174.2635	-157.5819	556.9946	591.8227	511.3359
	(357.0685)	(590.9311)	(510.1813)	(512.5446)	(345.2966)
Observations	982	972	969	972	976
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year	Firm, Fiscal-year	Firm, Fiscal-year	Firm, Fiscal-year
Adjusted R^2	0.0542	0.0556	0.0212	0.0502	0.0216

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Summary statistics of firms with non-GAAP and GAAP EPS forecasts

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period.

Analysts provide statutory (non-GAAP) forecasts if IBES actual EPS conform (does not conform) to GAAP reporting. Test statistic for the differences are computed using a bootstrap methodology. I begin by finding the observed absolute difference in mean (median) difference between the two subsamples. Then, I pooled together the two samples, shuffle them and create two equal-sized test groups of shuffled values. I repeat this process 10,000 times and derive a test statistic that is equal to one minus the proportion of simulations where the absolute actual mean (median) difference of the two subsamples is greater than the simulated absolute mean (median) difference of the two test groups. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

	Non-GAAP EPS forecast		**Statutory EPS forecast**		**Difference**	
	Mean	Median	Mean	Median	Mean	Median
LN(ABSFE)	-0.0515	-0.0645	-0.0247	-0.0635	-0.0268	-0.0009
LN(DISPERSION + 1)	0.0273	0.0040	0.0294	0.0027	-0.0021	0.0013***
LN(EALAG)	3.9380	3.9703	3.9604	3.9703	-0.0224***	0.0000
EIFT	113.1678	152.0868	116.8067	146.8125	-3.6389	5.2743
LN(FOLLOWING)	1.3317	1.4979	1.0988	1.0986	0.2329***	0.3993***
GOOD_NEWS	0.3187	0.0000	0.3827	0.0000	-0.0640***	0.0000
LN(MARKETCAP)	20.3629	20.1996	19.8287	19.5307	0.5342***	0.6688***
LN(MTB)	0.4188	0.4109	0.8359	0.8139	-0.4171***	-0.4030***
Observations	2.504	2,504	1,189	1,189		

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Earnings information flow timeliness of non-GAAP and GAAP information

Model (1) contains firm-years where earnings per share are reported on an "analyst basis". Model (2) contains firm-years where earnings per share conform to GAAP earnings. EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast at the beginning of the period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year. Sample begins in fiscal year 2004 and ends in fiscal year 2016.

	(1)	(2)
GOOD_NEWS	-50.9175***	-12.3301
	(10.1137)	(12.9617)
GOOD_NEWS * LN(ABSFE)	3.3279	-19.0980
	(17.3595)	(27.8726)
BAD_NEWS * LN(ABSFE)	13.3991	8.6295
	(21.6557)	(20.5377)
LN(DISPERSION + 1)	6.6642	-68.8664
	(18.0923)	(52.6733)
LN(FOLLOWING)	27.3849**	9.1590
	(10.9458)	(15.6059)
LN(MTB)	-7.6916	-25.9459
	(8.2649)	(29.0954)
LN(EALAG)	-30.9876	66.8303
	(37.9239)	(44.2443)
LN(MARKETCAP)	-9.7213	8.4316
	(8.6395)	(25.7532)
Constant	425.6457**	-337.6129
	(184.0334)	(530.5238)
Observations	2,504	1,189
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year
EPS Type	Non-GAAP	GAAP
Adjusted R^2	0.0399	0.0101

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Earnings information flow timeliness three months into fiscal year

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from three months into the fiscal year until earnings announcement day. GOOD_NEWS is an indicator variable that equals one if the difference between actual earnings per share and the consensus forecast three months into the fiscal period is positive, and zero otherwise. BAD_NEWS is one minus GOOD_NEWS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast three months into the fiscal period, scaled by the stock price three months into the fiscal period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at three months into the fiscal period. FOLLOWING is the average number of analysts providing earnings forecasts from three months into the beginning of the period to the earnings announcement. MTB is the market-to-book ratio three months into the fiscal period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count three months into the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

	(1)	(2)
GOOD_NEWS	-29.0922***	-30.2701***
	(4.9421)	(4.9957)
GOOD_NEWS * LN(ABSFE)		-10.9719
		(7.8385)
BAD_NEWS * LN(ABSFE)		3.9158
		(4.6072)
LN(ABSFE)	-1.2297	
	(4.1963)	
LN(DISPERSION + 1)	10.2886	8.6272
	(7.5180)	(7.8362)
LN(FOLLOWING)	14.7622***	14.8175***
	(5.0890)	(5.0886)
LN(MTB)	7.2111	7.5487
	(4.6273)	(4.6456)
LN(EALAG)	-4.6869	-4.4565
	(16.5177)	(16.5962)
LN(MARKETCAP)	-2.6470	-2.4446
	(4.3935)	(4.4101)
Constant	134.6890	130.0354
	(123.9408)	(124.5801)
Observations	4,614	4,614
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year
Adjusted R^2	0.0306	0.0310

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Earnings information flow timeliness of profit and loss-making firms

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. PROFIT is an indicator variable that equals one if IBES reported actual EPS is positive, and zero otherwise. LOSS is one minus PROFIT. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

	(1)	(2)
PROFIT	-22.8899**	-23.7592**
	(9.8516)	(9.6875)
PROFIT * LN(ABSFE)		-1.9582
		(13.8884)
LOSS * LN(ABSFE)		-11.9062
		(13.9572)
LN(ABSFE)	-5.4143	
	(10.5312)	
LN(DISPERSION + 1)	13.6532	15.4441
	(15.6255)	(16.5679)
LN(FOLLOWING)	20.3080***	20.3098***
	(6.5093)	(6.5047)
LN(MTB)	-7.4814	-7.7192
	(5.4770)	(5.5522)
LN(EALAG)	4.9689	4.9344
	(17.2245)	(17.2274)
LN(MARKETCAP)	2.7780	2.6410
	(5.2838)	(5.2482)
Constant	23.3657	27.6811
	(122.8443)	(121.5758)
Observations	4,871	4,871
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year
Adjusted R^2	0.0145	0.0144

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Earnings information flow timeliness of increased and decreased EPS firms

EIFT is the sum of the area under the curve that plots the ratio of forecast revision to forecast error and penalises analyst overestimation, from the start of the fiscal year until earnings announcement day. INCREASED_EPS is an indicator variable that equals one if there has been a positive year-on-year change in IBES reported actual EPS, and zero otherwise. DECREASED_EPS is one minus INCREASED_EPS. ABSFE is the absolute value of the difference between actual earnings per share and the consensus forecast at the beginning of the period, scaled by the stock price at the beginning of the period. DISPERSION is the average daily standard deviation of analyst forecasts, scaled by the stock price at the beginning of the period. FOLLOWING is the average number of analysts providing earnings forecasts from the beginning of the period to the earnings announcement. MTB is the market-to-book ratio as of the beginning of the period. EALAG is the difference between earnings announcement date of prior fiscal period and the start of the current fiscal period. MARKETCAP is the product of share price and outstanding common share count at the beginning of the fiscal period. Regression controls for firm and year fixed effects. Standard errors are White (1980) heteroskedasticity-consistent standard errors. EIFT is trimmed at extreme 0.5% of the distribution, by fiscal year.

	(1)	(2)
INCREASED_EPS	-35.3784***	-35.5769***
	(4.7427)	(4.7392)
INCREASED_EPS * LN(ABSFE)		-10.0290
		(11.1229)
DECREASED_EPS * LN(ABSFE)		-4.2499
		(10.8954)
LN(ABSFE)	-7.5051	
	(10.1178)	
LN(DISPERSION + 1)	15.1071	12.7695
	(15.7975)	(15.0095)
LN(FOLLOWING)	19.8957***	20.0145***
	(6.5199)	(6.5301)
LN(MTB)	-4.2735	-4.2646
	(5.4809)	(5.4829)
LN(EALAG)	7.9334	7.8757
	(17.3905)	(17.3843)
LN(MARKETCAP)	-2.1021	-2.1586
	(5.2033)	(5.1968)
Constant	105.4525	106.6391
	(122.1045)	(121.8761)
Observations	4,871	4,871
Fixed effects	Firm, Fiscal-year	Firm, Fiscal-year
Adjusted R^2	0.0276	0.0275

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Chapter Three: How Informative Are Australian Firms' Earnings?

3.1 Introduction

How informative are earnings releases? Since Ball and Brown (1968), it has typically been argued that earnings announcements convey little new information to market participants.[15] This conclusion has often formed the basis for criticism of accounting conventions and standards (Lev 1989; Lev and Zarowin 1999). Yet at the same time, the business press typically places great weight on covering the release of earnings results. Moreover, while standard setters argue that "value relevance" is the overriding objective of external financial reporting (IASB 2018), many researchers point to the absence of new information in earnings releases to argue that external financial reporting primarily serves a stewardship role, and a focus on value relevance by standard setters is therefore misplaced (Ball and Shivakumar 2008).

Conclusions that earnings announcements convey little in the way of new information are not surprising. It is well understood that there are extensive sources of information available that likely pre-empt earnings announcements as a source of new information (Beyer et al. 2010). Exchanges and securities regulations require dissemination of company communications to the public. Informed investors act on new information to capitalise on asymmetrical understanding of security fundamentals in the market. Advancements in communication technologies have widened the reach of information into more public hands. Newswires such as Thomson Reuters and Bloomberg represent important sources of real-time information to traders. Improved accessibility to security markets enable wider audience to contribute to the price discovery process. Social media has also been argued to be a timely source of new information about firms' performance (Drake et al. 2014). Yet recent research also suggests that there is very wide disparity in the speed with which sell-side analysts correctly anticipate earnings results in the US Marshall (2018) and also in Australia (Chapter Three).

I provide new evidence on the extent to which new information is provided via an examination of Australian firms' earnings announcements. I utilise the method suggested by Ball and Shivakumar (2008) which relies on the R^2 from a regression of calendar-year returns on the two (i.e., half-yearly) earnings announcement windows. This method has the advantage of

[15] A recent retrospective (Ball and Brown 2019) reiterates this primary conclusion.

avoiding the need to specify earnings expectations which itself has been the subject of extensive debate and research over a long period (Kothari 2001; Bradshaw et al. 2018). It provides a direct and intuitive interpretation of the information content contributed to the annual information environment by earnings announcements. In contrast to the US (and many other countries) where quarterly reporting occurs, Australian reporting rules require publicly listed companies to disclose earnings results on a half-yearly basis. However, while Australian firms report earnings less frequently than in many other countries, the Australian Securities Exchange (ASX) oversees a continuous disclosure regime that requires all companies listed on its platform 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).[16,17]

Using a large sample of ASX-listed firm-years between 1995 and 2016, my results initially suggest a conclusion similar to Ball and Shivakumar (2008) for US firms, namely that, on average, there is relatively little new information evident in the release of Australian firms' earnings results. While there is considerable variation year-to-year, there is no evidence of any systematic time trend. Regardless of whether I utilise arithmetic or logarithmic returns, my overall result suggests that earnings releases by Australian firms provide relatively little new information. However, following Basu et al. (2013), I recognise that these results reflect an information 'event' with an unconditional probability of one, while many events thought to be important sources of information have a much lower probability of occurring. Even more importantly, the overall results I report potentially reflect significant within-sample variation, and so I explore this issue more fully.

My analysis of within-sample variation in the earnings informativeness measure yields several important insights. First, I observe a strong positive relation between the information content of earnings releases and firm size. Although large firms generally have a wider variety of information sources, my results suggest that these at least partially complement earnings releases, rather than serving as complete substitutes. Perhaps not surprisingly, given a strong correlation with firm size, I observe a similar pattern using a measure of analyst following. When I examine the effect of economic conditions, I find that reported profits are more informative than reported losses, a result which is consistent with negative earnings news being pre-empted more often than good earnings news. However, I am unable to find any difference

[16] See ASX Listing Rules Chapter 3, Rule 3.1. Also see sections 674 and 675 of the *Corporations Act 2001 (Cth)*
[17] 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".

in my informativeness measure between firm-years where economic news is predominantly good or bad. Finally, I also observe considerable variation in earnings informativeness across industries, while still typically observing a firm size effect regardless of whether the firm is in an industry with relatively more or less informative earnings releases.

My primary results are robust to a variety of additional tests. In addition to using a three-day event window consistent with prior research, I define a far narrower event window as the three trading hours surrounding the earnings release. Using this narrower window which reduces noise due to possible bid-ask bounce, I show that the evidence of new information in earnings releases is substantially stronger, consistent with any reaction to earnings releases occurring far more quickly than the "standard" three-day window would suggest. Further, I recognise that the extent to which earnings releases are viewed as informative must be considered in light of the unconditional nature of these events (Basu et al. 2013). In contrast to earnings announcements – which are statutory requirements –, many high-information days may be a result of relatively unpredictable, highly conditional circumstances, such as a takeover announcement or a discovery of valuable resources. I consider both randomly selected three-day windows, as well as specific (ex-post) identification of high information three-day windows and show that my initial conclusions are robust. Finally, I also consider the robustness of my results to outlier effects and alternate measurements, and typically find results that are consistent with those of my primary tests.

My paper makes several important contributions. I provide the first evidence of which I am aware that examines the timeliness of Australian firms' earnings announcements as a source of new information, absent assumptions about the way in which earnings expectations are formed. My analysis suggests that although earnings releases do not appear, on average, to be an especially timely source of new information, this conclusion has several important caveats. In particular, industry differences and firm size effects suggest that it is premature to conclude that Australian firms' earnings announcements are uniformly lacking in any new information.

I 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). My results provide some support for both perspectives, 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 3.2 describes my data sources and the approach I use to quantify the extent of new information in earnings releases. Section 3.3 provides some initial evidence on earnings informativeness. Section 3.4 reports additional tests to address variation in my initial results, as well as robustness analysis. Section 3.5 concludes.

3.2 Data and Methodology

3.2.1 Sample selection

My sample begins on 1 January 1995, shortly after legislative changes took effect on 5 September 1994 that provided civil and criminal penalties for the existing ASX disclosure rules. My sample period ends on 31 December 2016. Public announcements lodged with the ASX are distributed by service provider ASX ComNews on a real-time basis. Each announcement contains the following key descriptive attributes to assist with information accessibility: announcement number, ASX code, announcement type, date of announcement, and time of announcement (timestamped to the millisecond). I focus my analysis on the first earnings announcement for the reporting period.[18] Consequently, even if an announcement amendment arises after its initial release, I remain focused on the announcement time of the original document. This research design ensures I do not capture the arrival of stale information into the market.

Table 1 describes the sample selection process. The full sample begins with 35,359 firm-years from 1995 to 2016 of ASX securities having both half-yearly and annual earnings information available on the ASX ComNews service. I require a close price in each day of the earnings announcement window which results in the removal of 2,092 firm-years. I also exclude illiquid securities (defined as zero total trading volume in either event windows in a calendar year). This eliminates a further 7,211 firm-years. I require securities to have a traded price anytime in the prior year and in the current year for my annual return calculations. This removes another 274 firm-years. The final sample consists of 25,782 firm-years from 1995 to 2016, representing more than 70% of the available population. Annual sample sizes across the twenty-two-year

[18] 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).

sample period averages 1,172 firms per year, ranging from a minimum of 732 in 1995 to a maximum of 1,480 in 2007.[19]

[Insert Table 1]

3.2.2 Methodology

Following Ball and Shivakumar (2008), I utilise the following regression model to obtain my measure of earnings informativeness:

$$r\_annual_i = \alpha + \beta_1 r\_window_1 + \beta_2 r\_window_2 + e_i \qquad (1)$$

where r_window_n is the three-day window around the nth earnings announcement of the calendar-year. Consistent with Australia's half-yearly reporting requirements, n equals either 1 or 2. The measure of earnings informativeness is the adjusted R^2 statistic.[20] The adjusted R^2 statistic represents the total information output (relative to the annual information environment) conveyed by the earnings announcement events. A narrow window length akin to the one studied by Ball and Shivakumar (2008) minimises the risk of external factors contaminating my interpretation of earnings informativeness.

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 (total information output) less the baseline value associated with the event windows (expected information output).

The approach I use has the advantage of enabling identification of the extent to which earnings releases are a source of new information absent the need to specify earnings expectations so as to measure the extent of "earnings surprise". However, although my 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 to vary from one, and in so doing

[19] Although my sample firm coverage is just over 70% of the ASX listings, the economic significance of my sample is far higher, representing almost 95% of market capitalisation. Source: SIRCA SPPR database

[20] While Ball and Shivakumar (2008) provide a specific application to measuring the importance of quarterly earnings releases, I recognise that measuring earnings information output based on the regression adjusted R^2 is not a new development. One of the earliest studies is Roll (1988) who investigates the information effects of firm-specific news on stock returns. Shortly after, Lev (1989) 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".

the estimations 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 I use 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 window length applied.

End-of-day price data is sourced from the ASX and maintained in the AusEquities database by Securities Industry Research Centre of Asia-Pacific (SIRCA). Annual return (r_annual_i) 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.

Earnings announcement returns (i.e. r_window_1 and r_window_2) are the daily-compounded return over the event window period. 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. The window ends one trading day after the event to give investors ample time to evaluate the economic value of disclosed information. Daily price adjustment factor for corporate actions are provided by ASX.

3.3 Results

3.3.1 Summary statistics

I initially follow Ball and Shivakumar (2008), and report results using both arithmetic and logarithmic return measures. Panel A of Table 2 reports summary statistics using arithmetic returns, while Panel B reports similar descriptive results using logarithmic return measures. Looking first at arithmetic returns, mean and median annual returns of sample firm-years are 20.47% and 13.59%, respectively. A considerable right skew is observed in the distribution of annual sample returns, consistent with the effect of a small number of very large annual returns. Stock returns around earnings announcements are generally muted. Mean cross-sectional returns of the three-day event windows around the first and second earnings release dates are 0.74% and 0.93% respectively which are both statistically significantly different from zero at the one percent level, but economically quite small.

From Panel B of Table 2, mean and median logarithmic returns of the sample firm-years are -7.17% and -3.94%, respectively. While the average loss in 2008 exceeds 100%, there is a simple explanation. 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 construction attempts to impound normality on data by exaggerating small values while compressing large values to improve the generalisability of mean estimates. Hence, an observed -117% loss in 2008 is a caveat of using logarithmic computation for returns analysis in a period of heightened market volatility that sees the onset of the global financial crisis in the third quarter of 2008. However, use of logarithmic returns does not change the conclusion that, on average, the returns associated with the two earnings announcement windows of each year remain low. Three-day returns around the first earnings release are -0.28%, while the return for the second release is 0.29%. Both estimates are statistically indifferent from nil return.

[Insert Table 2]

3.3.2 Average informativeness of earnings release

As discussed above, I perform cross-sectional multivariate regression analysis across all sample years to analyse informativeness of earnings releases. The dependent variable in my model is the firm-year stock return. The explanatory variables are the returns of two three-day event windows centred on the half-yearly and annual earnings announcement dates. Table 3 reports the results for estimates of Equation (1) using arithmetic returns (Panel A) and logarithmic returns (Panel B).

Turning first to the results using arithmetic returns (Panel A), the average annual slope coefficients associated with the first and second earnings announcement windows α_1 and α_2 are 0.7361 and 0.8101, respectively. If I infer a mean estimate of one as the implied state of market efficiency (Malkiel and Fama 1970), a simple t-test shows the former estimate is marginally significantly different from 1, while the latter estimate is not statistically significantly different from one at a meaningful level (i.e., at least 90% significance). Hence there is limited evidence of market overreaction to half-yearly earnings releases, but this is not the case for the release of annual results.

When I estimate Equation (1) using logarithmic returns (Panel B), the average annual slope coefficients associated with the first and second earnings announcements are 0.9375 and 0.8950, respectively. Both these values are statistically indistinguishable from one. Hence, I initially conclude that the evidence is largely consistent with the conclusion that, on average, there is no systematic market mispricing at earnings announcements.

However, my primary interest is in the ability of this simple model to explain a greater than random proportion of the variability in daily stock returns. Hence, I report the abnormal R^2 value averaged across the test-years, as well as from a pooled estimation. Regardless of whether I use arithmetic or logarithmic returns, the results reported in Table 3 suggest that the incremental explanatory power of earnings release windows is very small. In this respect my conclusions are similar to those of Ball and Shivakumar (2008) using quarterly windows for US firms, namely that earnings releases appear, on average, to contain relatively little new information. For arithmetic returns (Panel A) the average annual abnormal adjusted R^2 is zero, while for logarithmic returns the pooled average is 2.5%. Neither result supports the conclusion that earnings announcements are an important source of new information.

[Insert Table 3]

However, it is noteworthy that inspection of the abnormal adjusted R^2 values in Table 3 reveals substantial annual variation. Figure 1 depicts the abnormal adjusted R^2 values across the sample years. The solid (dashed) line depicts results using arithmetic (logarithmic) returns. There is clear evidence in Figure 1 that regardless of whether arithmetic or logarithmic returns are used, there is substantial fluctuation from year-to-year in the extent to which earnings releases are incrementally informative. However, the result pattern is very similar regardless of whether arithmetic or logarithmic returns are used.

[Insert Figure 1]

Taken together, the results in Table 3 and Figure 1 present consistent results that suggest earnings releases make a low marginal contribution to firms' annual information environment. Overall, up to 95% of stock price variation is conveyed by sources other than statutory earnings reports. My initial conclusions are therefore similar to prior research.[21] However, I further explore this result below by portioning my sample firm-years on a number of potentially important characteristics.

3.4 Additional Analysis

[21] Ball and Brown (1968) suggests "most of [the annual income report] content (about 85 to 90 per cent) is captured by more prompt media…". Similarly, Ball and Shivakumar (2008) find quarterly earnings announcements in a year explain between 10% to 15% of annual price movements.

3.4.1 Firm size

The likely effect of firm size on the relative importance of earnings announcements as a timely source of new information is unclear. On the one hand, it is commonly shown that larger firms release more information, and this is effectively competing with earnings announcements. Brown et al (1999) show that the number of price sensitive disclosures made by ASX-listed firms is positively associated with firm size.[22] To the extent these disclosures are competing with statutory earnings announcements as a source of information, I would expect firm size to be negatively correlated with the relative importance of earnings announcements. Prior US evidence Atiase (1985) supports this conjecture.

Alternatively, the extent to which investors find earnings useful may be dependent on their ability to understand reported information, as well as its integrity. Large firms may attract frequent media scrutiny due to their economic significance in the marketplace. To improve transparency and alleviate public concerns, they may employ higher accounting quality. Consequently, investors benefit from higher earnings quality signals disclosed in companies' earnings releases. 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). Hence, it is also possible that firm size may be positively correlated with the extent to which earnings releases convey new information to the market.

I use market capitalisation (the product of the closing price and outstanding common shares at prior year-end) as my proxy for firm size. Price data is gathered from the AusEquities database maintained by SIRCA. Stock capitalisation changes data is sourced from SPPR. Share count information is retrieved from SPPR. The entire sample is partitioned into five size quintiles by ranking companies per their size from the smallest ("1") to largest ("5") across each sample year. I employ the main regression model (Equation (1)) with annual stock returns as dependent variable and the daily compounded returns around the two three-day earnings announcement dates as my independent variables.

In Table 4 I report the cross-sectional abnormal adjusted R^2 for each size quintile averaged across all years. Using arithmetic returns, Panel A of Table 4 shows that the largest group of companies (quintile 5) displays the highest mean abnormal adjusted R^2 value of 8.96%. In fact,

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

the abnormal R^2 increases monotonically from the smallest size quintile (-1.02%) all the way to the largest firm size group. To assess the statistical difference between the adjusted R^2 for the smallest group of companies (quintile 1) and the largest size group (quintile 5), I construct a nonparametric test statistic to compare the central tendency of the two unpaired samples. Specifically, I use a two-sided Wilcoxon rank-sum test (Wilcoxon 1945; Mann and Whitney 1947) to determine whether the distribution of one variable is independent from another distribution.[23] The result indicates that the difference is statistically significant at the 99% level.

I repeat my analysis using logarithmic returns in Panel B of Table 4. As with the results for arithmetic returns reported in Panel A, it is noteworthy that the mean abnormal adjusted R^2 increases monotonically from the smallest quintile to largest size quintile. A Wilcoxon rank-sum test rejects the null hypothesis that the estimated median R^2 of the smallest and largest size quintiles are equal at the 99% level (p = 0.0000).

Based on the results in Table 4, I am able to reject the null hypothesis that the estimated median R^2 of the smallest and largest quintile size groups are the same at the 99% significance level (p = 0.0000), and this conclusion is robust to the use of either arithmetic or logarithmic return measurement. In unreported analysis, I confirm that this result holds in 19/22 calendar years (arithmetic returns) and 20/22 calendar years (logarithmic returns). Hence, I conclude that, for relatively large firms, earnings releases are an important source of new information. More importantly, it appears that the role of earnings releases as a source of new information diminishes noticeably as firm size decreases.

[Insert Table 4]

I provide further evidence of firm size effects by computing the variance ratio, namely the cross-sectional variance of earnings announcement window returns normalised by the cross-sectional variance of calendar-year returns (Ball and Shivakumar 2008). It describes the relative informativeness of earnings announcement returns in a calendar year. Table 5 Panel A (Panel B) describes the average arithmetic (logarithmic) return variance ratio associated with three-day windows around the two main earnings reporting dates across firm size quintile. Size quintiles are formed in the manner described above.

[23] A related statistical test for significant difference between two samples is the Welch's t-test (Welch 1947). Adapted from the Student's t-test, the Welch's t-test is designed to enable statistical tests between two unpaired samples with unequal variances. However just like that Student's t-test, it assumes that population distributions for the test samples are normally distributed. In contrast, the Wilcoxon rank-sum test (also known as the Mann-Whitney U test) relaxes the requirement of normality in the distribution of the test samples.

Inspection of the results summarised in Table 5 suggest there is no clear evidence of a return/risk relationship across different firm size groups. For example, in Panel A, for the first earnings release of the year the largest group of firms (quintile 5) demonstrates a similar event window variance to the smallest group of firms (quintile 1) even though mean return over its three-day event window (0.36%) is much lower compared its smaller counterparts (2.60%). In addition, although event window volatility for the second earnings release decreases monotonically larger firm size, there is no clear association between risk and mean returns for each size group. For the first half-year earnings announcement, small-cap stocks display normalised price variation around earnings announcement windows of 23.21%, compared to 15.22% for the largest firm size quintile group. However, a Wilcoxon rank-sum test fails to reject the null hypothesis that the estimated median variance ratios of the two groups are equal ($p = 0.2405$). The second earnings release window also a higher variance ratio for the smallest firm size quintile group (21.35%) than the largest size group (15.18%), and the difference is statistically significant at the 95% level ($p = 0.0201$).

[Insert Table 5]

When logarithmic returns are used, similar results arise. In Panel B of Table 5, for the first earnings announcement window, mean variance ratio of the smallest firm size quintile group (22.52%) is greater than the largest group of firms (15.45%). A Wilcoxon rank-sum test rejects the null hypothesis that the estimated median variance ratios of the two groups are equal at the 99% statistical level ($p = 0.0004$). The second earnings window also sees a higher variance ratio for small firms (19.70%) compared to the large firms (15.144%), and distributions between the two subsamples are independent from each other at the 99% level ($p = 0.0003$).

I interpret relatively higher variance ratios as the arrival of unexpected (i.e. new) information to the market. Although I observe that firms in the largest firm size quintile group demonstrate higher abnormal adjusted R^2 than the smallest size group, my variance ratio analysis reveals earnings window fluctuations are generally greater for small-cap stocks. Overall, I find small firms experience greater return variations around earnings release dates even after controlling for their annual price volatility profile. This finding does not explain the heightened abnormal adjusted R^2 values I observe for large firms relative to small firms.

3.4.2 Firm-specific news

I next explore firm-level sentiment effects on earnings informativeness. The specification of my regression model remains the same as prior analyses. The "good" subsample contains firm-years with positive calendar-year returns, while the “bad” subsample contains firm-years with negative returns. Both samples are evenly split, with 12.558 firm-years show positive firm-level sentiment while 12,975 firm-years show negative firm-level sentiment. 249 firm-years with zero annual returns (0.96% of total sample) are excluded. I report the results in Table 6.

Using arithmetic returns (Panel A), the average, abnormal adjusted R^2 of the “good” subsample is -0.20, compared to -1.03% of the “bad” subsample. However, a Wilcoxon rank-sum test fails to reject the null hypothesis that the distributions of both variables are independent of each other (p = 0.7072). When I perform a pooled regression analysis, the abnormal adjusted R^2 for the “good” and “bad” subsamples are -1.83 % and -2.02%, both of which suggest little if any incremental news from earnings announcements.

Using logarithmic return variables, average informativeness of earnings reported by firms in the “bad” subsample (abnormal adjusted R^2 = 0.30%) contains relatively more information content than the “good” subsample (abnormal adjusted R^2 = 0.019%). However, the Wilcoxon rank-sum test fails to distinguish between the two distributions (p = 0.7424). Pooled analysis using logarithmic return variables show earnings announcements provided by “bad” firm-years (abnormal adjusted R^2 = -0.22%) are generally more informative than reports of “good” firm-years (abnormal adjusted R^2 = -1.13%). Overall, I find no evidence to support the conclusion that the relative importance of earnings releases as a source of new information is influenced by firm-specific sentiment.

[Insert Table 6]

3.4.3 Profits versus losses

Conservatism is a fundamental aspect of statutory financial reporting (Basu 1997). I therefore consider whether the sign of the earnings outcome (i.e., profit versus loss) has an impact on my measure of earnings informativeness. I partition my observations based on net profit after tax, where this measure is obtained from Morningstar DatAnalysis Premium. For each sample year, firm-years are categorised into a “good” subsample if the firm reported a positive net profit after tax and into a “bad” subsample if a loss is reported. The subsamples are evenly split: the “good” subsample consists of 8,266 firm-years while the “bad” subsample has 7,451 firm-years over the sample period. 10,018 firm-years (38.86% of sample) with no accounting information and 47 firm-years (0.18% of sample) with reported zero profit (rounded to nearest dollar) are excluded from this analysis. Table 7 reports the results using arithmetic returns (Panel A) and logarithmic returns (Panel B).

Both sets of results indicate that the abnormal adjusted R^2 is significantly greater for firms reporting profits compared to losses. A Wilcoxon rank-sum test suggests the difference is statistically different from zero at the 99% level (p = 0.0002). Moreover, I find that firms reporting profits show greater average earnings informativeness than firms reporting losses in 18 (17) out of the 22 sample-years when arithmetic (logarithmic) returns are used. Pooled regressions reported in Table 7 also support the same conclusion, namely that the incremental importance of earnings releases as a source of new information is significantly greater when the result is positive (i.e., reported profits) than when it is negative (i.e., reported losses).

[Insert Table 7]

3.4.4 Industry effects

I next extend analysis of earnings releases to the extent to which results differ by industry. Companies are classified into industry sectors according to Global Industry Classification Standard (GICS). GICS information are provided in the SPPR database maintained by SIRCA. 277 firm-years in with undefined industry information are excluded as their operating environments are not meaningfully recognised. Prior to the introduction of GICS codes company classification in Australia in July 2001, ASX-listed stocks were classified by the legacy ASX industry classification system. To promote continuous research before GICS implementation, SIRCA has developed its own industry classification system available in the SPPR 2016 database. Before the transition into the GICS system in July 2001, the field "past SIRCA sector" is a consistent mapping of established GICS sector codes that recognises correspondence relationships between the GICS system and ASX industry classification system. After the introduction of GICS, the field's values represent GICS sector codes. Table 8 reports the results of industry specific analysis using arithmetic returns (Panel A) and logarithmic returns (Panel B). I report year-by-year results, as well as overall averages.

The most obvious point highlighted by the results reported in Table 8 is that there is very considerable variation in the informativeness of earnings announcements across industry sector groups. Using the results in Panel A (i.e., arithmetic returns), earnings informativeness in the "Energy" sector (average abnormal adjusted R^2 = -1.16%) and "Materials" sector (average abnormal adjusted R^2 = -1.53%) is very low. One possibility is that operations of these firms are highly sensitive to commodity prices, and investors can easily re-calibrate their earnings forecast models with market prices for these raw inputs almost in real-time. In addition, for some companies in these sectors, a further plausible reason for their low earnings informativeness is mandatory quarterly reporting for mining and oil and gas exploration (but not production) companies as prescribed under ASX Listing Rules 5.1 and 5.2[24]. These additional disclosures do not necessarily provide earnings for the quarter period, although they inform investors with various operational updates such as production rate and projected outputs that be leading indicators of future earnings. Greater information available in the market may reduce investors' reliance on companies' earnings results for these types of firms. Further, the performance of these companies is usually highly sensitive to commodity prices that are closely followed by investors and analysts around the world. The results also offer support that earnings are not entirely comparable across industries due to differences in the value relevance of earnings (Barth et al. 2012).

I am cautious about drawing inferences from results in the early sample years due to small sample sizes. For example, the sample only contains 4 firm-years in 1995 for "Telecommunications" which is insufficient to operate an OLS model. Further, I note the regression for "Utilities" from 1995 to 2000 (inclusive) contains fewer than ten observations each year. I conjecture these extreme abnormal adjusted R^2 values are more likely to be statistical artefacts of low observation inputs in the OLS model rather than evidence of extreme earnings information content in the early sample years.

In contrast to industry groups such as energy and materials, earnings informativeness for "Utilities" companies are highest among the sample. Results in Panel B using logarithmic returns show similar variations in earnings informativeness persist across industry sector groups. Earnings content of the "Energy" and "Materials" sector groups remain the least useful sources of information across all major GICS sector groups. Pooled regression results (not reported) also support the notion that there are differential outcomes in the application of reporting standards across sector groups. Observations that were excluded earlier in cross-sectional analyses are included in the pooled sample. Abnormal adjusted R^2 for "Materials" is -1.77%, the lowest among major GICS sectors in the economy. On the other hand, earnings content provided by "Consumer Discretionary" companies contribute almost 8% (= 5.47 + 2.38) of information content to the annual information environment for the industry group.

[Insert Table 8]

3.4.5 Length of announcement window

[24] See ASX (2014a).

The use of a three-day event window over which to assess the impact on stock prices of earnings releases follows prior literature (Ball and Shivakumar 2008). However, the modern trading climate can encourage investors to potentially process information well within this timeframe. Investors are incentivised to respond quickly to new material information to crystallise potential economic benefits; their ability to quickly move in-and-out of stock positions is assisted by liquidity growth in the Australian equity market over the years. The timely distribution of information by newswires also enables investors to react promptly to the arrival of new information. I therefore extend analysis of earnings releases by using a three-hour event window centred on the earnings announcement time. This is expected to yield a more precise estimate of investor's immediate response to earnings announcements.

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 a market state (i.e. after-hours disclosure), then the event window ends on the next day. The price upon earnings announcement event is the prevailing 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 market opens the next trading day. As the actual opening time that securities are available for continuous trading is randomised by the ASX, I 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 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 specifications of my regression model remain identical to prior analyses. The smaller event windows capture abnormal trading behaviours around earnings announcements with greater precision. 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. I source ASX intraday price data from the AusEquities database maintained by SIRCA. Table 9 reports the results using arithmetic (Panel A) and logarithmic (Panel B) returns.

The results are striking. Using arithmetic returns, the mean annual abnormal adjusted R^2 is 1.15%, compared to -0.08% when three-day event windows are employed (Table 3 Panel A). A Wilcoxon rank-sum rejects the null hypothesis that the distributions of both variables are identical at the 99% significance level (p = 0.0036). The change in the direction of earnings informativeness estimate suggests investors can derive useful information content shortly after earnings release, but the information turns into noise over the passage of six trading days (i.e. two three-day event windows). Presumably, security prices have already internalised the economic implications of the news signals. Investors that are late to react can no longer derive economic benefits from the information. Earnings releases deliver four times (= 1.5488% / 0.3968%) the expected level of information over a random six-hour period (0.3968%) assuming hourly returns are i.i.d. Broadly similar results are evident when logarithmic returns are used (Panel B), although the shorter (i.e., three-hour) window does not explain as much of the longer (three-day) window.

[Insert Table 9]

Using logarithmic returns, Figure 2 shows the abnormal adjusted R^2 across the sample years based on the longer three-day event window closely tracks the corresponding values based on the shorter three-hour event window. Hence, it appears that the time-series variation in the importance of earnings releases is largely independent of the window length used to measure market reaction.

[Insert Figure 2]

3.4.6 Intersection of firm size and industry effects

The evidence so far shows significant variations in earnings informativeness across both firm size and industry group. My firm size effect findings reveal earnings of large firms contain relatively more useful information content than earnings provided by small firms. I therefore also consider whether the firm size effect is robust across industry groups. As with my earlier industry analysis, all firms are categorised into one of eleven major GICS sector groups. Then, for each industry-year, firms are grouped into one of three firm size terciles, ranging from "1" (firm size below the 33rd firm size percentile based on prior year's market capitalisation as at end of year) to "3" (firms above the 66th percentile). I then calculate the abnormal adjusted R^2 for each firm size tercile group in each industry-year. Finally, I summarise my results by taking the mean abnormal adjusted R^2 of each firm size tercile group across the industry-years. Firm-years with undefined GICS sector information are excluded (n=277).

Figure 3 summarises my analysis of the extent to which firm size effects are robust across industry groups. I continue to see a persistent firm size effect on the variation in earnings informativeness across industries. Across all industries (excluding "Real Estate"), the average annual abnormal adjusted R^2 of the largest group of firms (i.e. tercile 3) dominates the corresponding value for the smallest firms (i.e. tercile 1). Further, in untabulated analysis I observe that earnings informativeness increases monotonically across firm size tercile groups for seven out of the ten industry sector groups where firm size appears positively associated with earnings informativeness. Overall, I find firm size is a key factor in driving the intensity of earnings usefulness. Across the market-level and industry sector-level, I document consistent evidence of large firms reporting relatively higher earnings information content than small firms and substantial variations in earnings informativeness across industries.

[Insert Figure 3]

3.4.7 High-information days

My baseline earnings informativeness value over 6 random trading days of 2.38% assumes daily returns are i.i.d. I simulate historical returns to determine the extent this baseline value represents actual information distribution in my sample period. For each firm-year, I randomly select two days (without replacement) as my "earnings announcement" days and regress annual firm-year returns on the three-day returns centred on these two days of interest to obtain the adjusted R^2 statistic. This procedure is repeated 1,000 times to generate an annual adjusted R^2 distribution. Including earning announcement dates into my sampling process, the mean annual adjusted R^2 based on arithmetic return measures indicates an adjusted R^2 of 0.11%%, lower than my baseline value of 2.38%. This suggests the assumption that returns are i.i.d. is somewhat questionable. Excluding earnings announcement dates provides a mean annual adjusted R^2 of 0.12%. A Wilcoxon rank-sum test does not reject the null hypothesis that the exclusion of earnings announcement dates has a statistically significant effect on the distributions of adjusted R^2 between the two groups (p-value: 0.8611).

When logarithmic return measures are used to conduct the same analysis, the mean annual adjusted R^2 is 1.45%. Excluding earnings announcement dates provides a slightly higher adjusted R^2 of 1.57%. A Wilcoxon rank-sum test rejects the null hypothesis that two distributions are independent at each other at the 95% significance level (p-value: 0.0196).

Although my 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), I define an informationally important trading day as a high-information arrival day where I observe large absolute price volatility. Therefore, these high-information arrival days may coincide with an earnings announcement (or any/no disclosure at all). I construct a sample that contains three-day returns around these two informationally value-relevant days in a firm-year. Daily stock price adjustment factor information is sourced from SIRCA. Table 10 reports the results of this analysis for arithmetic returns (Panel A) and logarithmic returns (Panel B).

Using arithmetic returns, Table 10 (Panel A) shows the mean annual abnormal adjusted R^2 of the subsample of high-information arrival days is 1.68%. By comparison, additional analysis shows that if I exclude earnings announcement days, the result is an abnormal adjusted R^2 of 1.62% which is indistinguishable from the result in Panel A of Table 10. Using logarithmic returns, (Panel B of Table 10) I observe a qualitatively similar result. When I examine the overlap between the high information arrival days used in tests reported in table 10 with earnings announcement days, I find only a very small overlap. Only 3.72% of the sample have both earnings announcement days captured as the two high-information arrival days, and only 10.63% of the sample have either of the two announcement days representing a high-information arrival day. It therefore appears that although earnings announcement days are not necessarily stand-out "high information" days, these days are not substantially more important than earnings announcements. Given the unconditional nature of earnings announcements (Basu et al. 2013), this suggests caution in dismissing earnings announcements as being relatively unimportant events.

[Insert Table 10]

3.4.8 Analyst coverage

Sell-side research analysts are a central group of stakeholders that facilitate efficient information flows in capital markets (Bradshaw et al. 2017). I therefore consider the extent to which analyst coverage is associated with variation in the relative importance of earnings announcements as a source of new information. I use analyst information from the IB/E/S Summary File. Similar to He and Tian (2013), I define analyst coverage as the 12-month arithmetic mean of the monthly number of earnings forecasts for firm *i* over fiscal year *t*. For 834 firm-years with more than 12 months of IBES summary data[25], analyst coverage is defined as the arithmetic mean of earnings forecasts for the total months of summary data for the fiscal period. Firm periods with no IBES data are assumed to have zero analyst activity.

Table 11 Panel A presents results of estimating Equation (1) separately for firm-years with either no analyst coverage, or at least one analyst coverage. I note that 60% 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. My measure of earnings informativeness indicates firms with some analyst coverage provide more useful information content in their earnings announcements compared to firms with no analyst coverage. Specifically, the average annual abnormal adjusted R^2 based on arithmetic returns measures for firms with no analyst coverage and some analyst coverage is -0.67% and 6.83%, respectively. Similar (unreported) results occur if I use logarithmic returns, as the R^2 measure for firms with no coverage is 0.84%, but this increases to 10.00% for firms with some analyst coverage.

I provide further evidence on the effect of analyst following by focussing solely on those firm-years where analyst following is observed. Conditional on having at least one analyst following, I categorise firm-years into three equal-sized analyst coverage groups by sample year and find the annual average abnormal adjusted R^2 across tercile groups. The results are reported in Panel B of Table 11. I observe lowest earnings informativeness for firm-years in the lowest analyst coverage tercile group (i.e. tercile 1). On the other hand, firm-years with a large analyst following (i.e. tercile 3) have the highest earnings information content.

[Insert Table 11]

3.4.9 Robustness tests

[25] Firms are allowed up to three months after fiscal-year to release earnings.

While OLS regression analysis lends a relatively straightforward inference of causal relationships between explanatory variables and the dependency, estimates only hold statistical validity to the extent the model inputs conform to OLS assumptions. One fundamental assumption necessary to instil reliability on estimates is normality in the estimated errors which I recognise early in this study is not necessarily the case when predicting stock returns. I am cautious about applying any filters to the sample unless necessary, to preserve the generalisability of projected results. However, to ensure my results are not due to the effect of outliers, I re-perform all my primary analysis after excluding the top and bottom percentile of returns. These (untabulated) results show that outliers do not drive my results.

3.5 Conclusion

I provide the first Australian evidence on the informativeness of firms' earnings announcements, using a method independent of the need to specify earnings expectations (Ball and Shivakumar 2008). There are many plausible reasons to explain why earnings might appear to deliver a trivial amount of new information to investors (or in some cases, a net marginal noise contribution). First, I note the Australian regulatory environment, by design, strives to minimise earnings surprises. For example, the ASX has enforced a set of continuous disclosure reporting policies for all securities listed on its venue that have been in place since 5th September 1994 (Brown et al. 1999). In effect, companies are obligated to disclose to the exchange any material information as they arise. ASX Listing Rule 3.1 advises companies to notify the market operator when they anticipate "earnings will be materially different from market expectations" (ASX 2014b). Second, Ball and Shivakumar (2008) argue that earnings is, by construction, backward looking and its primary purpose is to serve a stewardship, rather than valuation, role. Conservatism in accounting also potentially reduces the extent to which earnings contains new information, and some support for this reasoning can be found in the propensity with which "non-GAAP" earnings metrics are promoted, and the extent to which these metrics appear to undo the effects of conservatism (Ribeiro et al. 2019).

My initial analysis indicates low information content in earnings announcements. However, caution is warranted before concluding that earnings releases are generally not incrementally informative. First, "on average" results hide very substantial variation which I observe across firm characteristics. Overall, larger firms provide greater information content in earnings announcements than smaller firms. In addition, I observe considerable variation in the level of information content across industries as well as a persistent firm size effect among industries.

Analyst coverage is also associated with greater information content of earnings releases, as is the accounting outcome itself (i.e., profits versus losses).

Further caution is warranted in light of Basu et al. (2013), who recognise that earnings releases are unconditional, that is they occur with complete certainty (absent delisting). On the other hand, corporate events that potentially give rise to significant price movements such as takeover announcements or share buybacks have a probability significantly less than one (i.e., they do not occur unconditionally). My analysis suggests that even when hindsight is applied to section of the most important information days (as proxied by price variation), the extent to which such days explain the overall price movement within the year is hardly any different from earnings release days.

Overall, the findings suggest it is premature to conclude that Australian firms' earnings announcements uniformly lack useful information content. The role of earnings announcements as a timely source of information not already reflected in the stock price is sensitive to many other factors, including the firm's information environment and accounting outcomes themselves. I suggest that this is an area warranting further examination, particularly using a measure such as applied in this paper that avoids the need to specify earnings expectations.

3.6 Figures

Figure 1: Annual abnormal adjusted R^2

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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

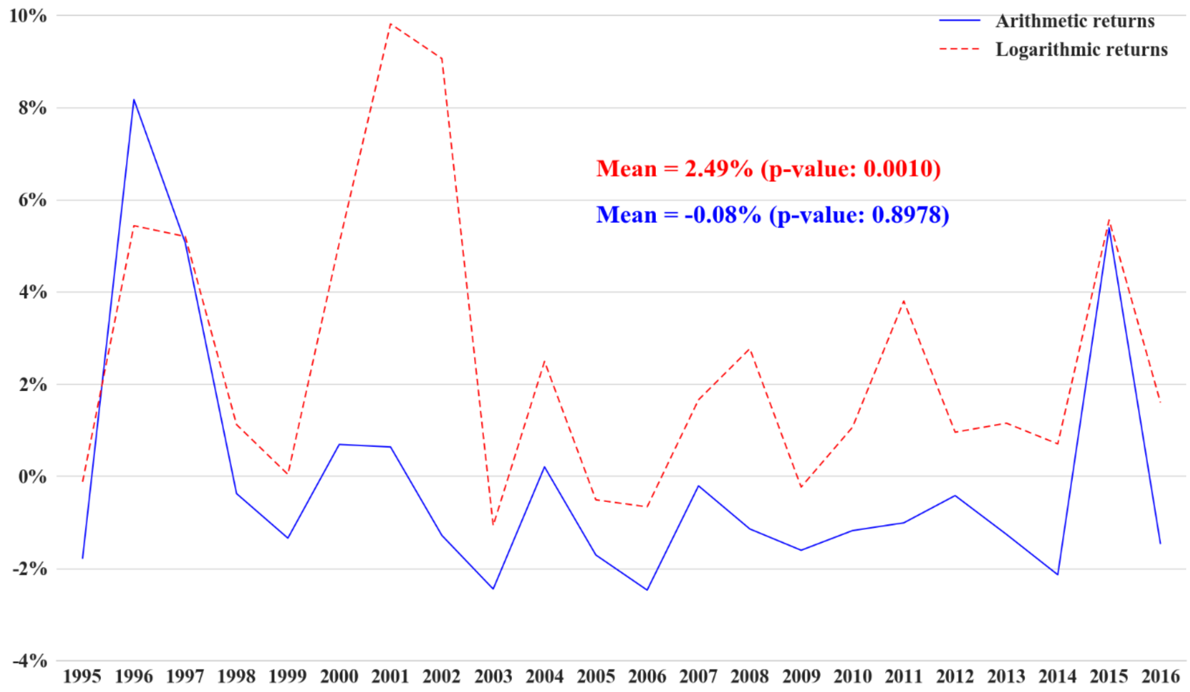


Figure 2: Annual abnormal adjusted R^2: three-day vs. three-hour event windows

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of six trading days (hours) assuming daily (hourly) stock returns are i.i.d. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day (intraday) price data are provided by ASX and maintained by SIRCA. Returns variables are logarithmic.

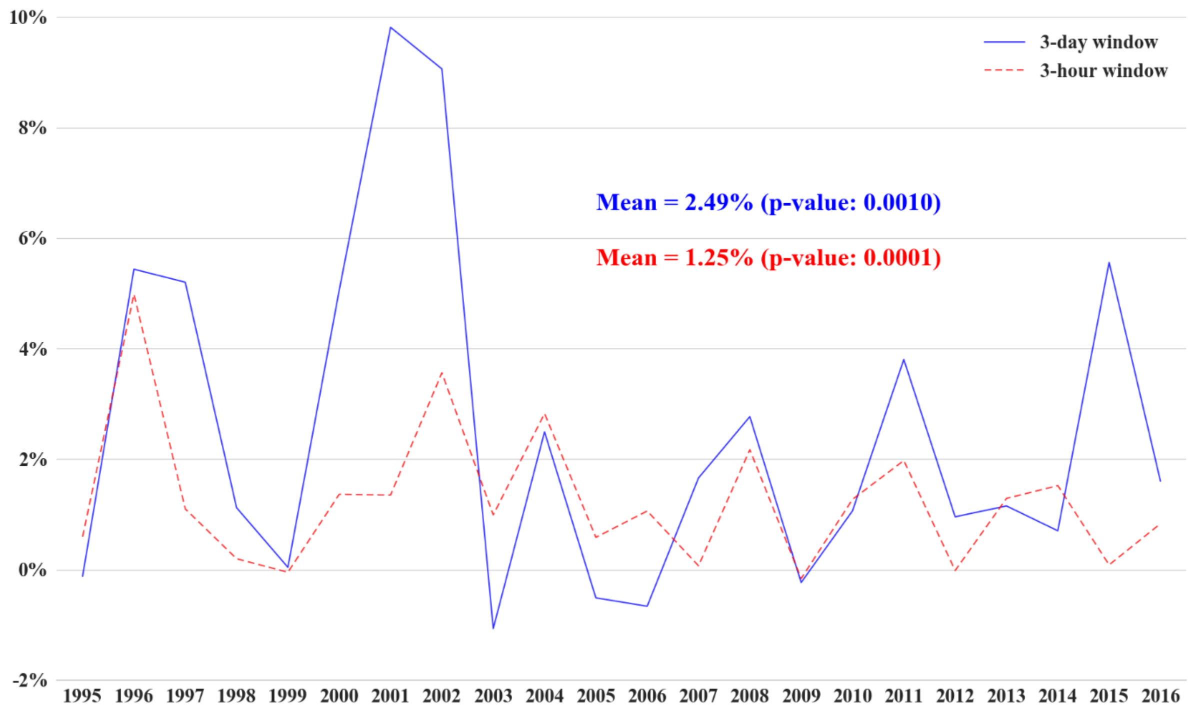
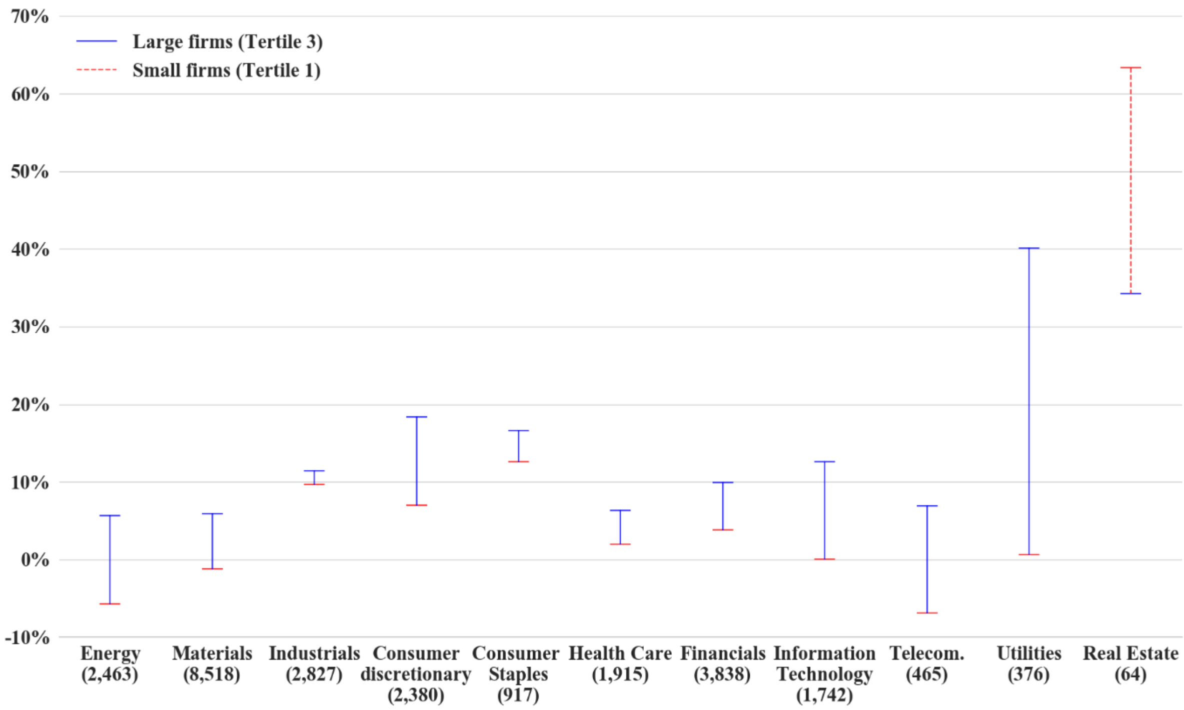


Figure 3: Mean annual abnormal adjusted R^2 across firm size and industry

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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. Industry classification information is from SPPR. Firm size tercile group is based on prior year's market capitalisation data as at end of year. Market capitalisation is the product of close price and outstanding common shares at prior year-end. Share count information is sourced from SPPR. Returns variables are logarithmic.



3.7 Tables

Table 1: Sample selection

Criteria	**Total**	**Exclusions**
Step 1: Firm-years with half-annual and annual earnings announcements on ASX ComNews from 1995 to 2016.	35,359	
Step 2: Valid close price on each day of the three-day event window around earnings announcement date.		(2,092)
Step 3: Non-zero trading volume in both three-day event windows of the calendar-year.		(7,211)
Step 4: Valid close price in prior year for annual return calculation.		(274)
Final sample	**25,782**	

Table 2: Earnings announcement window returns
Panel A: Arithmetic annual and three-day window returns
Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns is the three-day return around the date of announcement sourced from ASX ComNews. End-of-day price data is sourced from ASX.

Year	Annual returns (%)	First window returns (%)	Second window returns (%)	Observations
1995	15.08	0.58	0.53	732
1996	46.62	1.85	0.99	818
1997	-4.79	-0.05	0.45	870
1998	-1.76	0.35	1.29	798
1999	68.54	0.28	1.39	858
2000	-3.77	1.23	-0.18	949
2001	-0.97	-1.35	-1.73	977
2002	5.93	0.41	0.56	975
2003	56.14	0.78	2.11	1,020
2004	24.92	3.25	0.72	1,115
2005	12.10	-0.39	1.25	1,265
2006	58.40	1.25	1.88	1,345
2007	24.74	-0.93	2.40	1,480
2008	-57.20	-0.56	0.17	1,464
2009	117.70	0.91	2.30	1,334
2010	32.10	0.46	2.26	1,466
2011	-20.79	-1.04	0.42	1,451
2012	7.58	1.18	0.64	1,315
2013	7.33	1.83	1.07	1,362
2014	-3.07	0.53	0.44	1,402
2015	28.18	1.97	1.11	1,324
2016	37.27	3.83	0.51	1,462
Mean	20.47	0.74	0.93	25,782
Median	13.59	0.55	0.85	25,782

Table 2: Earnings announcement window returns (cont'd)
Panel B: Logarithmic annual and three-day window returns
Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns is the three-day return around the date of announcement sourced from ASX ComNews. End-of-day price data is sourced from ASX.

Year	Annual returns (%)	First window returns (%)	Second window returns (%)	Observations
1995	-0.11	0.26	0.05	732
1996	23.30	0.70	0.75	818
1997	-25.80	-0.26	0.17	870
1998	-16.18	-0.14	0.74	798
1999	25.98	-0.17	0.97	858
2000	-26.31	0.65	-0.54	949
2001	-22.32	-1.96	-2.58	977
2002	-16.49	-0.11	0.12	975
2003	27.85	-0.86	1.00	1,020
2004	8.32	0.25	0.32	1,115
2005	-2.82	-0.67	0.71	1,265
2006	23.32	0.81	1.06	1,345
2007	3.60	-1.29	1.90	1,480
2008	-116.66	-1.14	-0.83	1,464
2009	52.73	-0.37	1.53	1,334
2010	2.80	-0.06	1.34	1,466
2011	-40.70	-2.51	-0.12	1,451
2012	-15.53	0.58	0.02	1,315
2013	-19.92	-0.37	0.30	1,362
2014	-24.66	-0.16	-0.54	1,402
2015	-5.07	0.37	0.19	1,324
2016	6.93	0.39	-0.10	1,462
Mean	-7.17	-0.28	0.29	25,782
Median	-3.94	-0.15	0.25	25,782

Table 3: Annual earnings informativeness

Panel A: Regressions of arithmetic annual returns on three-day event window returns

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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

Year	α	β_1	β_2	Abnormal adjusted R^2 (%)	Observations
1995	0.1431	1.3573	-0.0164	-1.78	732
1996	0.4309	0.9516	1.8006	8.17	818
1997	-0.0528	2.2986	1.3159	5.07	870
1998	-0.0216	1.0337	0.0329	-0.38	798
1999	0.6553	-0.3221	2.2224	-1.34	858
2000	-0.0438	0.6969	1.3839	0.69	949
2001	0.0177	1.0996	0.7291	0.64	977
2002	0.0495	1.6203	0.5669	-1.28	975
2003	0.5586	-0.0342	0.1445	-2.45	1,020
2004	0.2395	0.0009	1.3549	0.20	1,115
2005	0.1190	0.4982	0.3154	-1.71	1,265
2006	0.5771	0.3989	0.1026	-2.47	1,345
2007	0.2293	0.9249	1.1158	-0.21	1,480
2008	-0.5700	0.4072	0.1420	-1.14	1,464
2009	1.1489	1.1115	0.7817	-1.61	1,334
2010	0.3109	1.4006	0.1647	-1.18	1,466
2011	-0.2104	0.0180	0.6376	-1.01	1,451
2012	0.0592	0.7072	1.2919	-0.42	1,315
2013	0.0633	0.0332	0.8764	-1.26	1,362
2014	-0.0325	0.2039	0.1649	-2.14	1,402
2015	0.2336	1.7888	1.1660	5.39	1,324
2016	0.3649	0.0003	1.5281	-1.46	1,462
Mean	0.1941	0.7361	0.8101	-0.08	1,172
P-value (H_0=1)		0.0869	0.1804		
Pooled	0.1938	0.1327	0.5665	-1.81	25,782
P-value (H_0=1)		0.0000	0.0006		

Table 3: Annual earnings informativeness (cont'd)
Panel B: Regressions of logarithmic annual returns on three-day event window returns
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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

Year	α	β_1	β_2	Abnormal adjusted R^2 (%)	Observations
1995	-0.0033	0.7742	0.5522	-0.12	732
1996	0.2162	0.9745	1.3309	5.44	818
1997	-0.2537	2.5009	1.3059	5.20	870
1998	-0.1628	0.9450	0.3261	1.12	798
1999	0.2494	0.2446	1.1223	0.04	858
2000	-0.2581	0.8960	2.0128	5.06	949
2001	-0.1639	1.7869	0.9418	9.81	977
2002	-0.1639	1.9807	0.9545	9.06	975
2003	0.2748	0.1908	0.5341	-1.07	1,020
2004	0.0784	0.4393	1.1243	2.49	1,115
2005	-0.0260	0.8200	0.4768	-0.51	1,265
2006	0.2225	0.7226	0.4610	-0.66	1,345
2007	0.0309	1.0077	0.9554	1.66	1,480
2008	-1.1439	1.3752	0.8409	2.77	1,464
2009	0.5231	0.5595	0.4084	-0.23	1,334
2010	0.0182	0.9245	0.7648	1.06	1,466
2011	-0.3831	0.9039	0.9891	3.80	1,451
2012	-0.1614	1.0244	0.6841	0.95	1,315
2013	-0.1993	0.6679	0.8635	1.15	1,362
2014	-0.2410	0.3578	0.9419	0.70	1,402
2015	-0.0567	1.0605	1.0793	5.56	1,324
2016	0.0684	0.4683	1.0207	1.60	1,462
Mean	-0.0698	0.9375	0.8950	2.49	1,172
P-value (H_0=1)		0.6071	0.2083		
Pooled	-0.0858	0.8857	0.9995	1.84	25,782
P-value (H_0=1)		0.1551	0.9935		

Table 4: Earnings informativeness across firm sizes

Panel A: Average abnormal adjusted R^2 of market capitalisation quintiles from annual regressions of arithmetic annual returns on three-day event window returns

Sample is partitioned into market capitalisation size quintiles across years. Market capitalisation is product of close price and outstanding common shares at prior year-end. Average abnormal adjusted R^2 of size quintile is the average annual regression adjusted R^2 less the expectation of six trading days assuming daily stock returns are i.i.d. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

Quintile	Average market cap ($M)	Average abnormal adjusted R^2 (%)	Observations
1	5	-1.02	5,163
2	15	-0.54	5,153
3	42	3.44	5,152
4	154	5.94	5,153
5	3,642	8.96	5,161

Panel B: Average abnormal adjusted R^2 of market capitalisation quintiles from annual regressions of logarithmic annual returns and three-day event window returns

Quintile	Average market cap ($M)	Average abnormal adjusted R^2 (%)	Observations
1	5	-0.01	5,163
2	15	0.72	5,153
3	42	5.74	5,152
4	154	9.29	5,153
5	3,642	11.19	5,161

Table 5: Variance of earnings announcement window returns

Panel A: Averages of annual mean arithmetic event window returns, annual mean variance and variance ratios across years by market capitalisation quintiles

Estimates are averages of the annual mean event window returns and annual mean event window return variance, and the average annual variance ratio across firm size quintiles. Variance ratio is the cross-sectional variance of stock return divided by variance of calendar-year return. Sample is partitioned into market capitalisation size quintiles. Market capitalisation is outstanding at prior year-end. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

	Quintile	Return (%)	Return variance	Annual return (%)	Annual return variance	Variance ratio (%)
Window 1	1	2.60	0.40	48.24	1.95	23.21
	2	0.05	0.15	15.72	1.05	16.74
	3	-0.17	0.09	11.46	0.81	12.44
	4	0.87	0.17	14.21	0.63	32.35
	5	0.36	0.06	12.65	0.41	15.22
	Quintile	**Return (%)**	**Return variance**	**Annual return (%)**	**Annual return variance**	**Variance ratio (%)**
Window 2	1	1.69	0.21	48.24	1.95	12.53
	2	0.72	0.13	15.72	1.05	16.29
	3	0.52	0.10	11.46	0.81	14.78
	4	1.01	0.09	14.21	0.63	15.01
	5	0.73	0.06	12.65	0.41	15.59

Panel B: Averages of annual mean logarithmic event window returns, annual mean variance and variance ratios by market capitalisation quintiles

	Quintile	Return (%)	Return variance	Annual return (%)	Annual return variance	Variance ratio (%)
Window 1	1	-0.13	0.17	-2.67	0.76	22.52
	2	-0.76	0.11	-16.44	0.69	15.36
	3	-0.60	0.09	-13.95	0.66	13.57
	4	-0.04	0.09	-4.92	0.57	15.60
	5	0.15	0.06	2.10	0.43	15.45
	Quintile	**Return (%)**	**Return variance**	**Annual return (%)**	**Annual return variance**	**Variance ratio (%)**
Window 2	1	0.29	0.15	-2.67	0.76	19.70
	2	-0.02	0.12	-16.44	0.69	16.72
	3	0.03	0.09	-13.95	0.66	14.08
	4	0.66	0.08	-4.92	0.57	13.41
	5	0.51	0.06	2.10	0.43	15.14

Table 6: Earnings informativeness across good and bad stock return years
Panel A: Abnormal adjusted R^2 of good and bad firm-years from regressions of arithmetic annual returns on three-day event window returns

"Good" firm-year is positive stock annual return. "Bad" firm-year is negative stock annual return. Abnormal adjusted R^2 is the annual regression adjusted R^2 less than the expectation of six trading days assuming daily stock returns are i.i.d. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. 210 firm-years with zero annual returns (0.88% of sample) are excluded.

	Good		**Bad**	
Year	**Abnormal adjusted R^2 (%)**	**Observations**	**Abnormal adjusted R^2 (%)**	**Observations**
1995	-1.67	374	-2.86	348
1996	8.13	602	-1.98	207
1997	2.61	386	-1.12	482
1998	-2.52	339	-1.19	454
1999	-1.70	564	-1.27	286
2000	-0.86	391	0.66	554
2001	-1.70	432	1.23	532
2002	-2.45	429	2.40	532
2003	-2.53	769	-2.13	241
2004	1.43	700	-0.89	406
2005	0.68	660	-1.77	598
2006	-2.55	941	-2.27	389
2007	-1.07	806	1.27	665
2008	4.61	65	2.10	1,397
2009	-1.99	1,098	-2.64	231
2010	-1.77	760	-1.47	690
2011	-2.51	344	-1.22	1,097
2012	2.26	607	-2.06	697
2013	-1.74	616	-1.84	733
2014	-2.42	560	-2.52	815
2015	5.27	655	-0.83	651
2016	-1.83	877	-2.36	553
Mean	-0.20	12,975	-1.03	12,558
Pooled	-1.83	12,975	-2.02	12,558

Table 6: Earnings informativeness across good and bad stock return years (cont'd)
Panel B: Abnormal adjusted R^2 of good and bad firm-years from regressions of logarithmic annual returns on three-day event window returns

"Good" firm-year is positive stock annual return. "Bad" firm-year is negative stock annual return. Abnormal adjusted R^2 is the annual regression adjusted R^2 less than the expectation of six trading days assuming daily stock returns are i.i.d. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. 210 firm-years with zero annual returns (0.88% of sample) are excluded.

	Good		Bad	
Year	**Abnormal adjusted R^2 (%)**	**Observations**	**Abnormal adjusted R^2 (%)**	**Observations**
1995	-1.92	374	-2.05	348
1996	3.90	602	-0.60	207
1997	4.14	386	-1.61	482
1998	-1.65	339	-1.10	454
1999	-1.44	564	0.42	286
2000	-1.10	391	2.90	554
2001	-1.22	432	5.25	532
2002	-0.12	429	7.96	532
2003	-2.22	769	-2.47	241
2004	0.56	700	1.30	406
2005	-0.70	660	-1.29	598
2006	-2.47	941	-1.61	389
2007	-0.35	806	1.53	665
2008	3.34	65	3.32	1,397
2009	-1.26	1,098	-2.27	231
2010	-1.59	760	-0.74	690
2011	-2.70	344	1.48	1,097
2012	6.15	607	-2.19	697
2013	0.05	616	-1.04	733
2014	-2.24	560	-0.90	815
2015	4.26	655	2.06	651
2016	-1.00	877	-1.77	553
Mean	0.02	12,975	0.30	12,558
Pooled	-1.13	12,975	-0.22	12,558

Table 7: Earnings informativeness in good and bad profitability years

Panel A: Abnormal adjusted R^2 of profit and loss firm-years from regressions of arithmetic annual returns on three-day event window returns

"Good" firm-year is positive reported net profit after tax. "Bad" firm-year is negative reported net profit after tax. Abnormal adjusted R^2 is the annual regression adjusted R^2 less than the expectation of six trading days assuming daily stock returns are i.i.d. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. Profit data are from Morningstar DatAnalysis Premium. 10,018 firm-years (38.86% of sample) with no accounting information and 47 firm-years (0.18% of sample) with reported zero profit (rounded to nearest dollar) are excluded from this analysis.

	Good		**Bad**	
Year	**Abnormal adjusted R^2 (%)**	**Observations**	**Abnormal adjusted R^2 (%)**	**Observations**
1995	4.19	212	-3.80	67
1996	8.65	255	5.71	72
1997	4.25	261	6.09	83
1998	1.49	264	3.77	73
1999	0.00	249	1.73	96
2000	7.81	259	-2.57	122
2001	2.56	263	-2.44	152
2002	11.78	271	-3.30	180
2003	7.06	297	-3.31	190
2004	13.13	367	-1.56	207
2005	0.33	410	-0.35	284
2006	-0.65	438	-2.85	299
2007	1.62	469	-0.72	377
2008	-1.14	422	-2.74	448
2009	1.83	345	-2.63	512
2010	2.62	483	0.82	504
2011	5.80	466	0.98	572
2012	8.08	444	-1.15	539
2013	1.81	465	-0.76	614
2014	1.23	506	-2.18	629
2015	0.87	512	4.44	652
2016	0.44	608	-1.18	779
Mean	3.81	8,266	-0.36	7,451
Pooled	-1.25	8,266	-1.85	7,451

Table 7: Earnings informativeness in good and bad profitability years (cont'd)
Panel B: Abnormal adjusted R^2 of profit and loss firm-years from regressions of logarithmic annual returns on three-day event window returns

"Good" firm-year is positive reported net profit after tax. "Bad" firm-year is negative reported net profit after tax. Abnormal adjusted R^2 is the annual regression adjusted R^2 less than the expectation of six trading days assuming daily stock returns are i.i.d. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. Profit data are from Morningstar DatAnalysis Premium. 10,018 firm-years (38.86% of sample) with no accounting information and 47 firm-years (0.18% of sample) with reported zero profit (rounded to nearest dollar) are excluded from this analysis.

	Good		Bad	
Year	**Abnormal adjusted R^2 (%)**	**Observations**	**Abnormal adjusted R^2 (%)**	**Observations**
1995	6.98	212	4.68	67
1996	8.47	255	12.61	72
1997	5.86	261	10.08	83
1998	1.96	264	3.42	73
1999	6.44	249	2.80	96
2000	19.04	259	-0.60	122
2001	3.50	263	3.45	152
2002	7.74	271	-2.13	180
2003	7.40	297	-1.30	190
2004	13.14	367	0.57	207
2005	2.48	410	-1.36	284
2006	5.06	438	-2.35	299
2007	5.05	469	1.58	377
2008	-1.50	422	0.58	448
2009	4.08	345	-1.89	512
2010	6.64	483	3.83	504
2011	8.78	466	5.10	572
2012	4.39	444	-0.23	539
2013	3.71	465	-0.11	614
2014	0.46	506	-1.38	629
2015	4.80	512	5.01	652
2016	6.91	608	2.36	779
Mean	5.97	8,266	2.03	7,451
Pooled	2.78	8,266	1.01	7,451

Table 8: Earnings informativeness across industry groups

Panel A: Abnormal adjusted R^2 of industry groups from regressions of arithmetic annual returns on three-day event window returns

Sample is grouped into GICS sector groups. Industry classification information is from SPPR. 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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement dates are from ASX ComNews. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. Values with a strikethrough are computed with fewer than ten observations and excluded from industry mean calculations and observation count.

Year	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health Care	Financials	Information Technology	Telecommunications	Utilities
1995	9.51	-2.99	18.35	34.24	-4.57	0.32	-1.56	1.40		~~-58.40~~
1996	0.11	-2.00	56.99	13.30	10.44	9.10	8.84	-8.15	7.78	~~-117.87~~
1997	13.32	0.32	8.16	40.53	16.59	10.17	10.19	-3.19	-30.71	~~-164.68~~
1998	-5.84	-2.56	2.82	1.50	9.77	-6.45	4.94	28.03	-17.67	~~82.30~~
1999	-5.96	-2.61	2.87	16.19	20.06	-2.60	-0.55	-6.00	-14.02	~~86.22~~
2000	-4.57	-2.35	2.97	1.92	10.69	4.56	0.78	15.25	6.32	~~8.83~~
2001	4.67	-2.49	9.89	7.06	10.86	10.80	9.65	0.03	-7.83	30.51
2002	-5.46	-2.35	11.75	15.79	2.97	0.73	5.95	0.75	-8.50	58.86
2003	-2.47	-1.25	8.07	4.13	5.21	-4.57	-1.50	-4.25	14.92	20.63
2004	-4.74	1.64	19.80	12.99	-1.50	0.29	27.09	10.34	-8.32	24.58
2005	-0.75	-0.99	-2.54	-2.61	7.06	-3.72	-3.11	6.03	45.37	32.29
2006	-3.37	-2.10	0.73	0.04	-5.39	1.69	0.19	-1.18	-4.05	46.54
2007	-0.95	-2.05	-0.09	6.33	-1.79	-1.58	2.46	1.06	5.45	8.21
2008	-3.44	-1.31	1.41	1.01	-3.44	-3.33	-1.06	1.76	8.27	3.09
2009	-2.49	-2.55	5.89	0.27	40.21	-3.43	-3.12	8.73	30.22	-5.38
2010	-1.42	0.36	4.93	6.04	12.44	-2.21	1.20	-3.35	16.93	-1.13
2011	-0.19	-2.53	5.82	8.50	8.68	1.71	1.72	10.60	24.15	14.46
2012	-3.15	-1.18	10.60	5.26	27.59	5.54	0.33	7.82	-12.06	9.74
2013	-2.50	-0.90	14.90	17.99	22.78	1.54	5.16	-5.59	-14.19	13.77
2014	-2.75	-2.66	8.60	4.46	15.35	-0.43	3.73	-3.97	12.93	-5.12
2015	-1.48	0.64	7.22	4.81	28.79	1.95	-2.32	51.91	-4.69	39.59
2016	-1.59	-1.85	-0.45	14.27	17.87	17.39	9.19	-3.54	-3.18	17.13
Mean	-1.16	-1.53	9.03	9.73	11.39	1.70	3.55	4.75	2.24	19.24
Obs.	2,463	8,518	2,827	2,380	917	1,915	3,838	1,742	462	344

Table 8: Earnings informativeness across industry groups (cont'd)

Panel B: Abnormal adjusted R^2 of industry groups from regressions of logarithmic annual returns on three-day event window returns

Sample is grouped into GICS sector groups. Industry classification information is from SPPR. 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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement dates are from ASX ComNews. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX. Values with a strikethrough are computed with fewer than ten observations and excluded from industry mean calculations and observation count.

Year	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health Care	Financials	Information Technology	Telecommunications	Utilities
1995	9.66	-3.07	20.71	17.71	-4.64	29.54	-0.44	1.85		~~-81.47~~
1996	4.40	-0.21	23.18	12.88	13.37	14.47	12.95	-5.42	12.16	~~-133.48~~
1997	-4.40	1.55	6.26	26.75	25.26	5.34	6.28	-2.71	-25.80	~~-168.72~~
1998	-5.13	-1.39	2.18	6.48	3.94	-8.15	4.25	20.78	-7.37	~~88.43~~
1999	-6.26	-1.60	0.75	21.73	26.95	-7.70	-1.30	-5.93	-12.68	~~93.07~~
2000	-5.56	-1.37	7.82	5.21	3.95	6.45	4.84	22.23	4.62	~~29.32~~
2001	6.54	1.68	17.54	8.54	14.72	14.24	14.69	6.33	-6.54	23.22
2002	-5.91	10.09	23.93	20.08	9.44	15.71	7.05	2.16	-8.77	49.57
2003	0.94	-1.76	6.72	2.49	22.48	-4.25	0.49	-2.01	6.15	13.09
2004	-5.79	-0.47	29.24	12.82	-3.28	3.25	22.79	17.45	-6.38	20.69
2005	-0.34	-1.65	-1.28	1.04	15.57	-2.50	-3.37	12.55	8.77	80.66
2006	-3.10	-1.09	5.45	3.30	-4.30	5.47	1.40	3.89	-2.37	38.68
2007	2.73	-1.39	3.58	10.50	-5.85	-0.86	1.58	5.64	-0.09	-1.16
2008	1.46	-0.94	4.92	0.28	-2.49	-3.16	8.30	4.46	1.00	15.14
2009	-3.17	-2.02	6.19	6.80	23.98	-3.54	-3.12	16.33	32.77	26.96
2010	0.21	-0.28	21.79	10.09	11.83	5.85	-1.14	5.40	-8.76	11.62
2011	3.76	-1.46	22.39	18.86	20.63	-0.78	3.35	4.96	12.29	25.83
2012	0.17	0.77	9.90	6.02	21.11	2.57	2.58	3.62	0.49	11.99
2013	-1.21	0.59	8.79	16.60	28.25	-0.08	14.69	-4.81	-15.95	22.91
2014	0.00	-1.82	15.52	0.58	37.79	-2.18	1.27	-2.49	22.95	-9.84
2015	0.81	3.71	15.98	10.56	25.14	3.33	-2.21	11.51	-7.20	28.03
2016	-2.35	-0.67	8.98	18.83	10.62	17.66	12.16	-3.55	-6.37	30.62
Mean	-0.57	-0.13	11.84	10.82	13.39	4.12	4.87	5.10	-0.34	24.25
Obs.	2,463	8,518	2,827	2,380	917	1,915	3,838	1,742	462	344

Table 9: Annual earnings informativeness using smaller event windows
Panel A: Abnormal adjusted R^2 from regressions of arithmetic annual returns on three-hour event window returns

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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are the three-hour returns around the time of announcement sourced from ASX ComNews. Price at each hourly interval is the last trade price up to the time interval. Intraday price data are provided by ASX and maintained by SIRCA.

Year	Adjusted R^2 (%)	Abnormal adjusted R^2 (%)	Observations
1995	0.65	0.25	732
1996	10.95	10.55	818
1997	2.08	1.68	870
1998	0.42	0.02	798
1999	-0.16	-0.56	858
2000	0.07	-0.32	949
2001	0.32	-0.07	977
2002	0.47	0.07	975
2003	0.15	-0.25	1,020
2004	2.85	2.45	1,115
2005	0.13	-0.27	1,265
2006	-0.02	-0.42	1,345
2007	0.40	0.00	1,480
2008	0.33	-0.07	1,464
2009	0.11	-0.29	1,334
2010	0.15	-0.25	1,466
2011	1.41	1.01	1,451
2012	0.81	0.42	1,315
2013	0.74	0.35	1,362
2014	11.50	11.10	1,402
2015	0.08	-0.32	1,324
2016	0.64	0.24	1,462
Mean	1.55	1.15	25,782
Pooled	0.35	-0.05	25,782

Table 9: Annual earnings informativeness using smaller event windows (cont'd)
Panel B: Abnormal adjusted R^2 from regressions of logarithmic annual returns on three-hour event window returns

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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are the three-hour returns around the time of announcement sourced from ASX ComNews. Price at each hourly interval is the last trade price up to the time interval. Intraday price data are provided by ASX and maintained by SIRCA.

Year	**Adjusted R^2 (%)**	**Abnormal adjusted R^2 (%)**	**Observations**
1995	0.99	0.59	732
1996	5.38	4.98	818
1997	1.50	1.10	870
1998	0.59	0.20	798
1999	0.35	-0.05	858
2000	1.76	1.36	949
2001	1.75	1.35	977
2002	3.96	3.56	975
2003	1.39	0.99	1,020
2004	3.22	2.82	1,115
2005	0.98	0.58	1,265
2006	1.46	1.06	1,345
2007	0.46	0.07	1,480
2008	2.57	2.17	1,464
2009	0.23	-0.16	1,334
2010	1.67	1.27	1,466
2011	2.37	1.97	1,451
2012	0.38	-0.02	1,315
2013	1.68	1.29	1,362
2014	1.92	1.52	1,402
2015	0.48	0.09	1,324
2016	1.23	0.83	1,462
Mean	1.65	1.25	25,782
Pooled	1.04	0.64	25,782

Table 10: Informativeness of high price volatility days

Panel A: Abnormal adjusted R^2 from regressions of arithmetic annual returns on three-day event window returns with the largest and second largest three-day absolute price volatility days

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. Regression model is calendar-year stock returns on the returns of the largest and second largest three-day absolute price volatility days. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. End-of-day price data is sourced from ASX.

Year	Adjusted R^2 (%)	Abnormal adjusted R^2 (%)	Observations
1995	66.02	63.64	732
1996	2.88	0.50	818
1997	-0.11	-2.49	870
1998	0.87	-1.51	798
1999	2.97	0.59	858
2000	-0.17	-2.55	949
2001	1.28	-1.10	977
2002	7.44	5.06	975
2003	-0.15	-2.53	1,020
2004	0.02	-2.36	1,115
2005	0.52	-1.86	1,265
2006	-0.12	-2.50	1,345
2007	-0.09	-2.47	1,480
2008	0.07	-2.31	1,464
2009	-0.08	-2.46	1,334
2010	-0.13	-2.51	1,466
2011	-0.08	-2.46	1,451
2012	0.06	-2.32	1,315
2013	0.23	-2.15	1,362
2014	0.33	-2.05	1,402
2015	5.03	2.65	1,324
2016	2.47	0.09	1,462
Mean	4.06	1.68	25,782
Median	0.15	-2.23	25,782

Table 10: Informativeness of high price volatility days (cont'd)
Panel B: Abnormal adjusted R^2 from regressions of logarithmic annual returns on the three-day event window returns with the largest and second largest three-day absolute price volatility days

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. Regression model is calendar-year stock returns on the returns of the largest and second largest three-day absolute price volatility days. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. End-of-day price data is sourced from ASX.

Year	Adjusted R^2 (%)	Abnormal adjusted R^2 (%)	Observations
1995	-0.01	-2.39	732
1996	1.48	-0.90	818
1997	6.40	4.02	870
1998	8.30	5.92	798
1999	8.46	6.08	858
2000	4.68	2.30	949
2001	14.10	11.72	977
2002	6.65	4.27	975
2003	-0.06	-2.44	1,020
2004	1.58	-0.81	1,115
2005	3.98	1.60	1,265
2006	0.01	-2.37	1,345
2007	-0.06	-2.44	1,480
2008	8.36	5.97	1,464
2009	0.57	-1.81	1,334
2010	1.16	-1.22	1,466
2011	2.12	-0.26	1,451
2012	5.68	3.29	1,315
2013	4.89	2.51	1,362
2014	3.04	0.66	1,402
2015	0.05	-2.33	1,324
2016	0.53	-1.86	1,462
Mean	3.72	1.34	25,782
Median	2.58	0.20	25,782

Table 11: Earnings informativenss across analyst following

Panel A: Abnormal adjusted R^2 of analyst coverage groups from regressions of annual returns on three-day event window returns

Analyst information comes from IBES Summary File. Following He and Tian (2013), analyst coverage is defined as the 12-month arithmetic mean of the monthly earnings forecasts for firm *i* over fiscal year *t*. For 834 firm-years with more than 12 months of IBES summary data, analyst coverage is defined as the arithmetic mean of the total months of summary data for the fiscal period. Firm periods with no IBES 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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

	Nil coverage	**>= 1 coverage**
Mean analyst coverage	0.00	4.81
Median analyst coverage	0.00	3.00
Abnormal adjusted R^2 (%) (Arithmetic Returns)	-0.67	6.83
Abnormal Adjusted R^2 (%) (Logarithmic Returns)	0.84	10.00
Observations	15,958	9,824

Panel B: Abnormal adjusted R^2 of analyst coverage tercile groups with at least one analyst following from regressions of annual returns on three-day event window returns

Analyst information comes from IBES Summary File. Following He and Tian (2013), analyst coverage is defined as the 12-month arithmetic mean of the monthly earnings forecasts for firm *i* over fiscal year *t*. For 834 firm-years with more than 12 months of IBES summary data, analyst coverage is defined as the arithmetic mean of the total months of summary data for the fiscal period. Firm periods with no IBES 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. Regression model is calendar-year stock returns on earnings announcement window returns. Calendar-year returns are adjusted for dividends and stock capitalisation changes sourced from SPPR. Earnings announcement window returns are daily compounded returns of the three days around the date of release sourced from ASX ComNews. End-of-day price data is sourced from ASX.

	Nil coverage	**Coverage tercile group**		
		1	**2**	**3**
Abnormal Adjusted R^2 (%) (Arithmetic Returns)	-0.67	6.65	9.09	10.35
Abnormal Adjusted R^2 (%) (Logarithmic Returns)	0.84	8.80	12.30	13.03
Observations	15,958	3,347	3,215	3,262

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Chapter Four: Earnings Informativeness Around the World

4.1 Introduction

The frequency with which statutory earnings measures are reported varies across countries. I therefore examine and contrast the informativeness of earnings announcements using a cross-country application of Ball and Shivakumar (2008)'s R^2 measure. The appeal of the R^2 measure is three-fold. First, it enables a direct and intuitive interpretation of the information content contributed to the annual information environment by earnings announcements. Second, data requirements to derive the measure are available on the public domain. Third, unlike the seminal works of Ball and Brown (1968) and Beaver (1968) we do not need to estimate an earnings expectations model.

I study earnings announcements of firms domiciled in the 19 countries of the G20 block of economies. The G20 forum of major economies is made up of 19 countries and the European Union. It is an economically significant bloc of countries in the global economy, representing 86% of global GDP in 2016 (The World Bank 2018). For countries that adopt IFRS financial reporting guidelines, the International Accounting Standards Board (IASB) does not set the frequency that interim reports need to be reported. Rather, the disclosure interval is determined by "national governments, securities regulators, stock exchanges, and accountancy bodies" (IASB 2014).

Whether there is an optimal reporting frequency is a matter of debate among regulators and market commentators. For example, the European Union switched from semi-annual earnings reporting to quarterly reporting mandates in the early 2000s before reverting back to semi-annual reporting shortly thereafter. The initial 2004/109/EC Transparency Directive required all listed companies of European member states to provide quarterly "Interim Management Statements" (IMS) commencing no later than 20th January 2007 for the first and third quarter of the fiscal year[26] (European Commission 2004). Amid additional focus on short-term results, management of firms that transitioned to a higher reporting frequency due to the Transparency Directive may engage in myopic behaviours such as overproduction and a reduction in discretionary spending to increase short-term reported performance at the expense of long-term

[26] Guidance on the information content of IMS is not as exhaustive as US-style quarterly earnings reports because the reporting entity is only required to provide a general narrative on firm performance since the last quarterly interim statement. Importantly, reporting entities are not obligated to provide financial statements in IMS.

results (Ernstberger et al. 2017). In the revised 2013/50/EU Transparency Directive, quarterly reporting in the European Union was abolished "to reduce short-term pressure on issuers and give investors an incentive to adopt a longer-term vision" (European Commission 2013). Nevertheless, member states and market operators have final discretion to enforce stricter guidelines[27].

The corporate reporting environment is composed of mandatory disclosures, voluntary disclosures and information from intermediaries (Beyer et al. 2010). Consequently, information flows in the corporate reporting environment can influence the usefulness and necessity of mandatory information disclosures. Earnings announcements are mandatory disclosures that are subject to widespread attention in the media (Drake et al. 2014). However, the literature shows the usefulness of earnings announcements – at least to equity investors – arguably fall short of the attention they receive in the business media and elsewhere. Ball and Shivakumar (2008) design a novel informativeness metric that measures the contribution of earnings announcements to firms' annual information environment. They find that quarterly earnings reports in the U.S. provides between 10 – 15% of the annual information content, with the balance presumably received from other channels of information sources. Their finding corroborates studies in the U.S. (Ball and Brown 1968; Lev 1989; Marshall 2018) and Australia (Chapters Three and Four) that suggest the usefulness of mandatory earnings announcements is low because they are not a timely source of information.

The debate on an optimal reporting frequency is ongoing. A stream of literature supports frequent financial reporting to reduce information asymmetry. Consequently, equity investors expect a lower cost of capital (Diamond and Verrecchia 1991), reduced bid-ask spread and a moderation in stock price impact (Fu et al. 2012). In addition, information flow timeliness is greater among quarterly earnings reporters than semi-annual reporters, indicated by higher stock price volatility (Mensah and Werner 2008). However, increased disclosure frequency can carry proprietary costs (Verrecchia 1983) and incentivise management to emphasise short-term

[27] For example, pursuant to section 50 of the Exchange Rules for the Frankfurter Wertpapierbörse, the Frankfurt Stock Exchange continues to require companies with listed securities on its premier "Prime Standard" listing board to provide Quarterly Statements that "outline the crucial events and transactions of the issuer's company within the period covered by the statement and their effects on the issuer's financial situation as well as describe the issuer's financial situation and operating results within the period covered by the statement" (Deutsche Börse Cash Market 2018). On the other hand, the Financial Conduct Authority (FCA) of the United Kingdom pushed forward the removal of quarterly reporting requirement in November 2014, a year before the 26th November 2015 deadline imposed for EU member states. In addition, at the time of writing the London Stock Exchange only requires periodic financial reporting on a semi-annual basis for listed companies on its "Main" and "AIM" boards (including securities that are admitted as a "Premium Listing") (London Stock Exchange 2016).

reported results at the expense of long-term firm performance (Ajinkya et al. 2005). For example, when the U.S. transitioned from annual reporting to semi-annual reporting over the period 1950 to 1970, firms reduced expenditures in capital expenditures and net fixed assets as management sacrificed long-term investments in favour of short-term performance (Kraft et al. 2017).

I recognise that nation's legislated disclosure requirements tend to represent the minimum reporting standard for companies; market operators may necessitate greater information disclosures beyond statutory mandates. For example, in the U.S., Butler et al. (2007) find the majority of stocks listed on the New York Stock Exchange in the 1950s reported earnings on a quarterly basis even though the SEC only mandated semi-annual reporting at that time. In addition, the authors find earnings exhibit greater timeliness when firms increase their reporting frequency voluntarily. In Japan, the Financial Instrument and Exchange Act introduced a mandatory quarterly reporting system that required listed companies to submit quarterly financial reports for the accounting period beginning on or after 1 April 2008[28] (Financial Services Agency 2006). However, by the time of statutory enactment quarterly reporting has already become a familiar reporting interval among stock issuers in Japan. For instance, the establishment of the Tokyo Stock Exchange section for emerging companies "Mothers"[29] required firms listed in this precinct to release quarterly earnings as of November 1999 (Kubota and Takehara 2016). Beginning 1st April 2004, quarterly reporting was enforced among all stocks listed on the First and Second Sections of the Tokyo Stock Exchange[30] (Kubota and Takehara 2016).

Despite academic and regulatory claims that increased financial reporting frequency can have negative effects on firm value, major economies around the world continue to demonstrate an overwhelming preference for higher reporting intensity. For 15 out of the 19 country states in the G20, local legislations mandate quarterly financial reporting of earnings as at 2016 calendar year-end. My results suggest markets with higher reporting frequency do not deliver more new information to investors around the world. Consequently, the preference for greater financial reporting among many major economies may seek to satisfy the needs of other users in the market that do not enjoy the wealth of information access as shareholders (Givoly et al. 2017).

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[28] Joichi Masuda – then Chairman and President of the Japanese Institute of Certified Public Accountants – describes the intention of increased frequency "to enhance disclosure" (JICPA 2010).
[29] Stands for "Market of the high-growth and emerging stocks".
[30] Firms listed in these sections (common referred as the "Main Markets") are primarily large and mid-sized companies from Japan and overseas.

The remainder of the paper is structured as follows. Section 2 describes the approach we use to quantity the extent of new information in earnings releases and my data sources. Section 3 provides some evidence on earnings informativeness as well as factors associated with cross-country variation. Section 4 reports some additional robustness analysis and section 5 concludes.

4.2 Methodology

4.2.1 Earnings informativeness

My measure of earnings informativeness is the adjusted R^2 from the main regression model in Ball and Shivakumar (2008), with annual stock return as the dependent variable and the three-day event window returns as the exogenous variables. The adjusted R^2 statistic from the regression output describes the total information value of earnings reports that contributes to annual price returns. The baseline information output across the event window days in a calendar year is 2.38% (=6 / 252) and 4.76% (= 12/252) of the annual information environment for countries with semi-annual and quarterly financial reporting mandates, respectively. To facilitate a like-for-like comparison in the informativeness of earnings announcements provided by semi-annual and quarterly reporters, I divide the overall abnormal adjusted R^2 by the reporting frequency in a calendar-year to obtain the average abnormal adjusted R^2 of an earnings announcement.

$$r\_annual_i = \alpha + \beta_1 r\_window_1 + \cdots + \beta_n r\_window_n + e_i \quad (1)$$

The dependent variable in my model r_annual_i is the arithmetic calendar-year stock returns. The explanatory variables are the stock returns around earnings announcements, where r_window_n is the three-day return window around the nth earnings announcement in the calendar-year.

An adjusted R^2 value of 100% occurs when the returns around half-yearly and annual earnings announcements fully drive stock returns in a calendar year. In general, when stock prices are informative, there should be less extreme price movements upon earnings release because less new information is being impounded into stock price (Dasgupta et al. 2010).

4.2.2 Data sample

The sample focuses on the 19 country constituents of the G20: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United States and United Kingdom. Consistent with many prior cross-country studies[31], I employ Bloomberg and IBES earnings announcements data for my study sample. Bloomberg data is sourced from the Bloomberg Terminal while IBES data is retrieved from the IBES "Detail History – Actuals" database maintained by WRDS. Although Bloomberg has greater coverage of earnings announcement records than IBES[32], I recognise it suffers from a survivorship bias as only information of active securities is maintained and updated. On the other hand, IBES continues to preserve historical records of dead securities. Although, there may be noise associated with IBES earnings announcement timestamps for non-North American markets as they can be sourced from a variety of internal and external sources (Thomson Financials 2008).

My sample commences in January 1999 because WRDS claims on the "Variable Descriptions" section of its IBES "Detail History – Actuals" product page that there is some concern about the reliability of recorded announcement dates prior to this time[33]. For some announcement dates, recorded dates are effectively the date of data entry (i.e., the "activation date") which may not necessarily be the actual earnings announcement date. If earnings record for the same firm-year appears in both databases, I use the Bloomberg information[34]. My primary qualifier to identify firms common in both databases is the SEDOL code. The sample ends in 2016.

My initial sample consists of 360,866 firm-years for all 19 of the G20 countries from 1999 to 2016 with calendar-year earnings announcement dates for securities that are either semi-annual earnings reporters or quarterly earnings reporters domiciled in their home country. By requiring the home country and the country in which the security is traded are the same, I exclude foreign securities that may be subject to a different reporting environment due to their foreign status. I also remove 19 firm-years where there is no valid SEDOL code information which is a unique country-level security identifier necessary to match securities between the Bloomberg and Datastream databases[35].

Daily returns are derived from Datastream adjusted price data (datatype P). Following Karolyi et al. (2012), I discard non-trading days defined as days on Datastream where 90% or more of the stocks listed on a given exchange have a return equal to zero as non-trading days. I remove 52,298 firm-years where there is no returns information in any of the event window days in a

[31] E.g. Barber et al. (2013); Beaver et al. (2018)
[32] See Griffin et al. (2011); Barber et al. (2013)
[33] WRDS product page claims "the date reflected on this file prior to January 1999 is the activation date. After January 1999, the announce date is used.".
[34] Refer to Appendices 1 and 2 for a detailed methodology on consolidating information from both databases.
[35] Seven-character SEDOL codes that begin with the letter "B" must be prefixed with the letters "UK" to be valid for use on Datastream.

calendar year. I also exclude 31,874 firm-years with illiquid trading environments, defined as zero trading volume (datatype VO) or zero price change (datatype P) in any of the earnings announcement event windows in a calendar year[36]. Finally, I remove 1,144 firm-years where there is no close price in the prior year, necessary to calculate annual security return. The final sample stands at 275,531 firm-years of semi-annual or quarterly earnings reporters from 1999 to 2016 calendar-years. Most (94%) firm-years in the sample are attributable to Bloomberg with the balance sourced from IBES. Table 1 presents a summary of the sample selection criteria.

[Insert Table 1]

4.3 Results

4.3.1 Description statistics

Table 2 provides a detailed overview of my sample. Panel A tabulates the distribution of firm-years that are either semi-annual or quarterly earnings reporters by sample years. Panel B illustrates the sample composition by G20 countries across every year. Numbers in parentheses summarise the proportion of the sample year's observations count attributable to the country. Panel C measures the proportion of firm-years in each country that are semi-annual earnings reporters (the inverse being quarterly earnings reporters).

Despite a single legislated financial reporting frequency enacted in countries, I generally observe a mix of semi-annual and quarterly reporters across nations. For example, although the local accounting board at Japan introduced a quarterly reporting system on 2008, publicly-listed companies on the Tokyo Stock Exchange were already required by the exchange to disclose quarterly earnings reporters from 2003 (Kubota and Takehara 2016). Similarly, Italy observes a statutory semi-annual reporting regime yet companies on the "premium" board of the Milan Stock Exchange face additional disclosure requirements, one of these being the publication of quarterly earnings reports. In summary, statutory financial reporting guidelines at the country-level generally represent the minimum level of compliance necessitated by public companies; local stock exchanges have discretion to impose additional reporting responsibilities upon listed constituents.

[36] I observe multiple instances (particularly in the early sample years) where a non-zero price change is not accompanied with any turnover activity on the day. Similarly, past studies also document coverage issues of volume data in Datastream (e.g. Griffin et al. (2011)).

[Insert Table 2]

Across stock exchanges, I recognise firms generally have the discretion to increase the level of information disclosures beyond the local mandate. As noted above, larger listed firms are more likely to face greater reporting requirements because of their economic significance. Panel A of Table 3 tabulates a classification of reporting frequency for each country-year based on the most common reporting frequency of the top 50 largest firms (by market capitalisation) for each country-year (minimum ten firm-years). Australia is dominated by semi-annual reporters over the sample period, consistent with the reporting frequency of firms. For China, semi-annual reporters dominate from 2000 to 2002 while quarterly reporters prevail from 2003 from onwards which aligns with a change in statutory reporting frequency beginning fiscal year 2003 (OECD 2002).

On the other hand, earnings announcements of the 50 largest firms in UK show earnings are predominantly reported on a quarterly basis between 2010 and 2013, inclusive. However, I recognise that quarterly reports disclosed between semi-annual and annual earnings reports are IMSs that do not necessarily contain the three core financial statements that represent the foundation of a typical earnings announcement (European Commission 2004). In another example, large firms in Turkey predominantly report earnings on a semi-annual basis in 2004 but demonstrated quarterly-reporting regimes in 2001 and 2005.

Table 3 Panel B measures the proportion of all firms in each country-year that are semi-annual reporters regardless of firm size. The classified reporting frequency is generally identical to Panel A with two notable exceptions. Panel A classifies the year 2003 in Japan as quarterly earnings reporting regime while Panel B summaries the country-year as having semi-annual reporting frequency. Since the TSE required quarterly reporting from fiscal year 2004 onwards, we interpret the results in Panel A as reflecting larger firms having adopted quarterly reporting on an earlier, voluntary basis. Second, for the United Kingdom over the years 2010 to 2013 inclusive, Panel A classifies the country-years as quarterly earnings reporting environments while Panel B indicates they are semi-annual reporters. However, as noted earlier these quarterly reports are IMSs that do not necessarily contain the three core financial statements.

[Insert Table 3]

4.3.2 Earnings informativeness

I report my estimates of Equation (1) in Table 4. Following Ball and Shivakumar (2008), I present estimates using both arithmetic return measures (Panel A) and logarithmic return measures (Panel B) based on pooled data and averages of annual cross-sectional estimates. For each country, I require a minimum of ten firm-years in the pooled sample and ten firm-years for each sample-year in the cross-sectional sample. For each country, I report the abnormal adjusted R^2, mean annual abnormal adjusted R^2 and the standard deviation associated with the country's annual abnormal adjusted R^2. To facilitate a meaningful comparison across countries, the R^2 value measures the earnings informativeness of an average earnings announcement in a calendar-year. [37] The standard deviation of abnormal adjusted R^2 highlights the variability of the earnings informativeness measure across country-years. Low standard deviation suggests the mean annual abnormal adjusted R^2 estimate is a reliable representation of the country's average earnings informativeness.

The last column in each panel of Table 4 is "weighted abnormal adjusted R^2". This is a country-level summary of the informativeness of earnings announcements provided by semi-annual and quarterly reporters. I begin by finding the mean cross-sectional R^2 of an earnings announcement provided by semi-annual and quarterly reporters separately, then find the average of the two mean measures weighted by the firm-years count of the reporting frequency group.

Overall, the results reported in Panels A and B of Table 4 are relatively consistent, suggesting my overall synthesis is not particularly sensitive to whether arithmetic or logarithmic method of returns computation is used. In general, I observe relatively low informativeness for periodic earnings releases and see no immediate evidence to suggest that either form of periodic reporting (i.e. quarterly vs. semi-annual) conveys more informative earnings releases. Although there is evidence of variation across countries, I do not observe results that suggest earnings announcements convey timely new information (except for South Africa). These results do not consider potentially important institutional and legal differences across countries. I address these issues in more detail below.

[Insert Table 4]

I carefully compare the results for quarterly and half-yearly reporting windows and report the results in Table 5 using arithmetic returns (Panel A) and logarithmic returns (Panel B). For semi-annual disclosers, I find the abnormal adjusted R^2 associated with the annual earnings announcement is 0.34% compared to 2.76% for the interim (i.e. semi-annual) announcement.

[37] Hence, the average earnings announcement R^2 for a semi-annual reporter is calculated as the calendar-year R^2 (derived from main regression model) divided by two. Similarly, the average earnings announcement R^2 for a quarterly reporter is represented by the calendar-year R^2 divided by four.

Cross-sectional analysis also reveals greater earnings informativeness for the interim announcement (abnormal adjusted R^2 = 4.08%) than the annual announcement (abnormal adjusted R^2 = 1.60%). However, a Wilcoxon rank-sum test suggests they statistically insignificant from each other (p-value: 0.4864).

For quarterly disclosers, I find the abnormal adjusted R^2 associated with the annual earnings announcement is -0.76% compared to -0.70% for the average interim (i.e. quarterly) announcement. However, cross-sectional analysis reveals greater earnings informativeness for the annual announcement (abnormal adjusted R^2 = 0.70%) than the average interim announcement (abnormal adjusted R^2 = -0.11%). Although, the Wilcoxon rank-sum test indicates the distribution between the two variables are indifferent (p-value: 0.2821).

Turning to logarithmic returns (Panel B), for semi-annual disclosers, the abnormal adjusted R^2 associated with the annual earnings announcement is 2.11% compared to 3.44% for the average interim announcement. Cross-sectional also reveals higher abnormal adjusted R^2 for the average interim announcement (abnormal adjusted R^2 = 3.63%) than the annual announcement (abnormal adjusted R^2 = 2.70%). However, the Wilcoxon rank-sum test suggests the difference is insignificant (p-value: 0.1211).

For quarterly disclosers, the abnormal adjusted R^2 associated with the annual earnings announcement is 1.41% compared to 1.50% for the average interim announcement. Cross-sectional shows higher abnormal adjusted R^2 for the annual announcement (abnormal adjusted R^2 = 2.10%) than the average interim announcement (abnormal adjusted R^2 = 1.87%). The Wilcoxon rank-sum test indicates the difference between the variables is not significant (p-value: 0.9748).

Overall, I find that abnormal adjusted R^2 of pooled regressions indicate greater earnings informativeness for interim earnings announcements than annual announcements. However, cross-sectional analysis does not suggest there is a statistical difference in earnings informativeness between two releases.

[Insert Table 5]

4.3.3 Country-specific institutional factors

The informativeness of earnings announcements is inevitably affected by environmental factors in the local reporting regime. First, the enforcement of financial reporting regulations varies across countries (La Porta et al. 1998; Bushman and Piotroski 2006). Second, financial statements may lack cross-border comparability because 1) accounting guidelines are enacted by local regulatory bodies; and 2) initiatives to standardise the framework for the preparation of financial statements (e.g. IFRS) are yet to gain international acceptance. For example, as of end of 2017, the U.S. SEC does not permit public companies to comply with the IFRS framework (IFRS Foundation 2017).

Leuz and Wysocki (2016) argue countries with larger public markets necessitate greater investor protection. Similarly, in a study of 23 OECD countries Beekes et al. (2016) find that better-governed firms make more frequent disclosures to the market. In addition, they also find that firms of common law countries provide greater disclosures to the market, consistent with greater investor protection among common law countries (La Porta et al. 1998). I hypothesise the integrity of financial markets can affect the extent information is trusted and relied upon by market participants. Consequently, local governments are incentivised to attract equity capital to stimulate domestic economic growth by investing in local regulatory infrastructure to enhance investor confidence. As the public market expands, there is heightened necessity to invest in the regulatory infrastructure as the economic costs associated with a market failure increase. Therefore, I would expect to observe variations in earnings informativeness in relation to the size of countries' public markets.

I initially explain the contribution of country factors in explaining earnings informativeness of countries by regressing the abnormal adjusted R^2 measure on country factors sourced from *Economic Freedom of the World.*[38] The key dependent variable "weighted cross-sectional abnormal adjusted R^2 is a cross-sectional average of abnormal adjusted R^2 of semi-annual reporters and quarterly reporters weighted by firm-years count. Proportion of semi-annual reporters is the ratio of total firm-years that are semi-annual reporters. Minority market cap is the fraction of the stock market held by minority shareholders, defined as the average total shareholdings held by investors with less than 5% shareholding of the ten largest firms of the year and excludes firms with more than 5% government shareholding. Country's market capitalisation data is from WorldBank. Information on minority and government shareholdings are from Datastream. GNI is the gross national income of the country, from WorldBank. Dummy for English Law and French are indicator variables that equals one if the legal origin of the country is English and French, respectively. Legal origin of countries is extracted from

[38] The *Economic Freedom of the World* index "measures the consistency of the institutions and policies of various countries with voluntary exchanges and the other dimensions of economic freedom" (Cato Institute 2018). The survey has been updated annually since publication in 1975 and has been cited in hundreds of academic articles (Hall and Lawson 2014). A summary of variables' definition is provided in Appendix C.

La Porta et al. (1997) and La Porta et al. (1998).[39] Except for the dummy variables, the average mean of time-series variables is computed for each country. Hence, the observation count of the model is 19, representing the 19 country states in the G20 group of companies. Except for the dummy variables, all independent variables are transformed using a logarithmic function.

In Table 6, I present two sets of results for weighted cross-sectional abnormal adjusted R^2 based on the arithmetic (Models (1) and (2)) and logarithmic return measures (Models (3) and (4)), respectively. Models (1) and (3) contain individual country index items that make up the overall economic freedom index. Models (2) and (4) contain a single overall index of the country's economic freedom.

When arithmetic returns are used, I note that the key variable of interest "proportion of semi-annual reporters" is statistically in Models (1) and (2) at the 90% significance level. However, when using logarithmic returns (Models (3) and (4)), the coefficient is not statistically significantly different from zero. This suggest the informativeness of earnings from semi-annual reporters and quarterly reporters are largely indistinguishable.

[Insert Table 6]

To further assess the robustness of the results discussed above, I use an alternate set of country factors sourced from *Index of Economic Freedom*.[40] These results are reported in Table 7. Results using arithmetic returns are reported in Models (1) and (2) while results using logarithmic returns are reported in Models (3) and (4). Using arithmetic returns measures, the key variable of interest "proportion of semi-annual reporters" in Models (1) and (2) is statistically significant at the 10% level. However, as with the results reported in Table 6, when using logarithmic returns, the coefficient attached to the reporting frequency distinction is again statistically indistinguishable from zero insignificant. Overall, the results from Tables 6 and 7 suggest – after controlling for relevant cross-country differences – relatively little evidence to that quarterly earnings reporting contains more timely information for market participants.

[Insert Table 7]

4.4 Additional Analysis

[39] See Appendix D.

[40] The *Index of Economic Freedom* "focuses on four key aspects of the economic and entrepreneurial environment over which governments typically exercise policy control: 1) rule of law; 2) government size; 3) regulatory efficiency; and 4) market openness (The Heritage Foundation 2019). A summary of variables' definition is provided in Appendix E.

4.4.1 Analysis of largest firms

My primary analysis relies on the frequency of earnings announcements disclosed by a firm-year to determine its reporting frequency. The reporting frequency of companies is largely determined by periodic reporting guidelines stipulated by the stock exchange (which align closely with statutory guidelines) the security is listed on. However, I recognise that listing exchanges are generally private operators that can enforce additional reporting requirements to further the transparency of capital markets. This suggests there may be systematic differences in the characteristic of firms that comply with the statutory reporting frequency, and firms that choose to report at a higher frequency.

This section identifies the influence of the country's dominant reporting frequency on the usefulness of earnings announcement. I assume that a higher reporting frequency (i.e. quarterly reporting) is associated with higher reporting quality standard if the statutory reporting frequency is semi-annual. If statutory reporting frequency is quarterly, I assert that firms cannot achieve a greater reporting standard by solely lowering their reporting frequency.

I focus on the informativeness of earnings announcements provided by firms that comply with each country-year's dominant reporting frequency. I determine the dominant reporting frequency for a country-year by observing the most common earnings announcement reporting frequency of up to the 50 largest firms (Table 3 Panel A). For country-years where I do not have 50 firms, I settled for at least ten firms.[41]

The results reported in Panels A and B of Table 8 are broadly consistent with my primary results and suggest the dominant reporting frequency has little in the way of substantive effects on the results. I therefore conclude that the absence of clear evidence supporting either quarterly or half yearly reporting as being more informative is not due to the difference between statutory and voluntary reporting frequencies.

[Insert Table 8]

4.4.2 A case study of Japan

[41] Earnings announcements of the 50 largest firms in UK show earnings are predominantly reported on a quarterly basis between 2010 and 2013, inclusive. However, I recognise that quarterly reports disclosed between semi-annual and annual earnings reports are IMSs that do not necessarily contain the three core financial statements that represent the foundation of a typical earnings announcement (European Commission 2004). Therefore, I classify these country-years as periods of semi-annual reporting regime. In another example, Turkey is dominated by semi-annual reporters in 2004 while 2001 (immediate prior country-year with at least 10 firms) and 2005 are quarterly reporters. Since I do not have insight into the reporting frequency of the country or the country's primary exchange, I remain conservative and only consider Turkey data from 2005 onwards.

Beginning 1st April 2004, quarterly reporting was enforced among all stocks listed on the First and Second Sections of the Tokyo Stock Exchange (Kubota and Takehara 2016). Firms listed in these sections are primarily large and mid-sized companies from Japan and overseas. The First and Second Sections are commonly referred to as the "Main Markets". This phenomenon can be observed in Figure 1 where the frequency of semi-annual reporters is almost reduced to nil post-2004 while quarterly reporting became the most common reporting frequency among stocks in the TSE.

[Insert Figure 1]

Since its establishment in November 1999, the "Mothers" section of the Tokyo Stock Exchange for emerging companies required all listed companies to provide quarterly earnings. Information on the reporting frequency of JASDAQ and the TOKYO PRO Market are unavailable. However, they are small markets that do not hold much economic significance.

The Financial Instrument and Exchange Act introduced a quarterly reporting system that required all listed companies to submit quarterly financial reports for the accounting period beginning on or after 1st April 2008 (Financial Services Agency 2006). However, I do not observe any structural shift in reporting frequency around 2008. Rather, my sample is likely proliferated by larger-sized issuers that belong to the "Main Markets" section that were mandated by the TSE to report earnings at a quarterly interval on or after 1st April 2004 (Kubota and Takehara 2016).

The shift in reporting regime in 2004 provides a natural environment to design a direct comparison of the informativeness of earnings announcements under a semi-annual and a quarterly reporting regime. To do this, I compare the average informativeness of an earnings announcement for the four years prior to 2004, to the four years beginning 2005. I exclude the transition year 2004 to allow time for the market environment to adjust to the new reporting regime. The informativeness of an earnings announcement is measured by the abnormal adjusted R^2.

The results of my Japan-only test are reported in Table 9. I report full-sample results in Panel A and constant sample comparison in Panel B. For the full sample results containing 23,218 firm-years (4,479 unique firms), Panel A shows that average abnormal adjusted R^2 is higher in the quarterly reporting period compared to the semi-annual regime (regardless of method of returns measurement). A Wilcoxon rank-sum test rejects the null hypothesis that the subsample samples are independent from each other (regardless of method of returns measurement).

The results in Panel B use a constant sample, consisting 589 unique firms in both the ex-ante and ex-post subsamples. The results indicate marginally higher average abnormal adjusted R^2 in the semi-annual reporting period. However, Wilcoxon rank-sum test suggests earnings informativeness in either period is indistinguishable (regardless of method of returns measurement). Hence, I conclude that the relatively unique natural experiment offered by the change in Japanese reporting requirements offers no substantive evidence in favour of quarterly versus half yearly reporting.

[Insert Table 9]

4.5 Conclusion

The impact of statutory reporting frequency has been the subject of considerable debate. One line of reasoning is that more frequent (i.e., quarterly) reporting results in more useful (i.e., timely) information for investors. However, prior evidence Ball and Shivakumar (2008) suggests that even in a setting where quarterly reporting is mandatory, such reports contain relatively little new information. I therefore extend this analysis to consider the extent to which there is any evidence to support the contention that investors receive more timely information when financial reports are required at quarterly intervals.

Focussing on countries from the G20, and using a method that avoids the need to specify earnings expectations Ball and Shivakumar (2008), I find very little in the way of substantive evidence that superior timeliness results from quarterly reporting. These results hold when I examine cross-country differences in timeliness and control for economic and institutional factors likely to impact the timeliness of periodic financial reporting. My results also hold when a specific country is examined where a clear switch occurred from half yearly to quarterly reporting (i.e., Japan). Overall, it appears that statutory financial reporting is not particularly timely, and in general this supports the view that the primary role of financial reporting is related to the contractual use of accounting numbers, rather than as a source of new information for investors.

4.6 Appendices

Appendix A: Bloomberg earnings announcements data

I search on Bloomberg Terminal for earnings announcements data using the function "EVTS ER". For each country, I limit my search to securities that also share the same country of domicile. This ensures I exclude securities of firms that are incorporated overseas which may be subject to different reporting requirements due to their foreign status. For example, the ASX Guidance Note 4 permits foreign entities to only comply with reporting standards of their home exchange and forgo most of its Listing Rules that are applicable to domestic issuers.

I define a semi-reporter as a firm with two unique earnings announcement dates (field "Date") for the calendar year. The firm-year must have one earnings record with the field "Period" value of "S1" (first semi-annual report) and a second record with a "Period" value of either "S2" (second semi-annual report)" or "Y" (annual report).

I define a quarterly-reporter as a firm with only four unique earnings announcements dates (field "Date") for the calendar year. For the firm-year, it must have disclosed one earnings record with the field "Period" value of "Q1" (first quarter report), a record with either "Q2" (second quarter report)" or "S1" (first semi-annual report), a record denoted "Q3" (third quarter report) and a report assigned either "Q4" (fourth quarter report) or "Y" (annual report).

I rely on Datastream for market data in my R^2 metric calculation. However, the provided Bloomberg ticker that accompanies the earnings announcements data is not recognised by Thomson Reuters. To facilitate data retrieval across different databases, I source the seven-digit SEDOL code associated with the Bloomberg ticker using the Bloomberg Excel Add-In. For SEDOL codes that begin with "B", they must be prefixed with "UK" to be compatible with Datastream.

Appendix B: IBES earnings announcements data

I search on IBES for earnings announcements data on the IBES "Detail History – Actuals" file. I begin by classifying securities into their home country. For non-U.S. and non-Canadian firms, the first two characters of the field "CUSIP" corresponds to the home country of the firm. I perform a two-step process to identify home country classification of U.S. and Canadian firms[42]. First, my initial sample of U.S. firms consists of all observations in the "US File". To find Canadian firms, I rely on the "International File" and seek IBES tickers that are not preceded by "@". Then, I search the IBES provided CUSIP code (augmented per below description) of both groups of firms on Datastream for datatype "GEOGN" to identify firms with a home country of either "United States" or "Canada". Although laborious, the correct home country identification of securities ensures I exclude securities of firms that are incorporated overseas that may be subject to different reporting requirements due to their foreign status.

I define a semi-reporter as a firm with only two unique earnings period-end dates (field "PENDS") for the calendar year. For the calendar-year, it must have disclosed one earnings record with the field "PDICITY" value of "SAN" (semi-annual report) and one with "ANN" (annual report)[43].

I define a quarterly-report as a firm with only four unique earnings period-end dates for the calendar year. For the calendar-year, it must have disclosed three earnings record with the field "PDICITY" value of "QTR" (quarterly report) and one with "ANN" (annual report)[44].

Market and reference data of securities are retrieved from Datastream. Datastream recognises SEDOL and CUSIP codes for data queries. For U.S. firms, the CUSIP code provided by IBES (field "CUSIP") must be preceded by "U" to be compatible with Datastream. For Canadian firms, the required prefix is "Q".

[42] Previously, firms that appear in the "U.S. File" were incorporated in the U.S. Since August 2014, this policy was changed so that only firms that trade in the U.S. would appear in the "U.S. File".

[43] Annual earnings announcement may have two record entries one with PDICITY value of "SAN" (semi-annual) and a second with value "ANN" (annual). I only consider the "ANN" record.

[44] Annual earnings announcement may have two record entries one with PDICITY value of "QTR" (fourth quarter) and a second with value "ANN" (annual). I only consider the "ANN" record.

Appendix C: World Economic Freedom of The World (The Fraser Institute)

Variable	Definition
Size of Government	Size of government focuses on how government expenditures and tax rates affect economic freedom. Taken together, the four components of Area 1 measure the degree to which a country relies on personal choice and markets rather than government budgets and political decision-making. Countries with low levels of government spending as a share of the total, a smaller government enterprise sector, and lower marginal tax rates earn the highest ratings in this area.
Legal System and Property Rights	Legal system and property rights focuses on the importance of the legal system as a determinant of economic freedom. Protection of persons and their rightfully acquired property is a central element of economic freedom. Many would argue that it is the most important function of government. The key ingredients of a legal system consistent with economic freedom are rule of law, security of property rights, an independent and unbiased judiciary, and impartial and effective enforcement of the law. The nine components of Area 2 are indicators of how effectively the protective functions of government are performed.
Sound Money	Sound money focuses on the importance of money and relative price stability in the exchange process. Sound money—money with relatively stable purchasing power across time—reduces transaction costs and facilitates exchange, thereby promoting economic freedom. The four components of this area provide a measure of the extent to which people in different countries have access to sound money. In order to earn a high rating in Area 3, a country must follow policies and adopt institutions that lead to low (and stable) rates of inflation and avoid regulations that limit the ability to use alternative currencies.
Freedom to Trade Internationally	Freedom to trade internationally focuses on exchange across national boundaries. In our modern world, freedom to trade with people in other countries is an important ingredient of economic freedom. When governments impose restrictions that reduce the ability of their residents to engage in voluntary exchange with people in other countries, economic freedom is diminished. The components in Area 4 are designed to measure a wide variety of trade restrictions: tariffs, quotas, hidden administrative restraints, and controls on exchange rates and the movement of capital. In order to get a high rating in this area, a country must have low tariffs, easy clearance and efficient administration of customs, a freely convertible currency, and few controls on the movement of physical and human capital.
Regulation	Regulation measures how regulations restrict entry into markets and interfere with the freedom to engage in voluntary exchange reduce economic freedom. The components of Area 5 focus on regulatory restraints that limit the freedom of exchange in credit, labor, and product markets.

Appendix D: Legal origin of countries

Country	Legal Origin Per La Porta et al. (1997) and La Porta et al. (1998)
Argentina	French
Australia	English
Brazil	French
Canada	English
China	German
France	French
Germany	German
India	English
Indonesia	French
Italy	French
Japan	German
Mexico	French
Russia	French
South Africa	English
Saudi Arabia	English
South Korea	German
Turkey	French
United Kingdom	English
United States	English

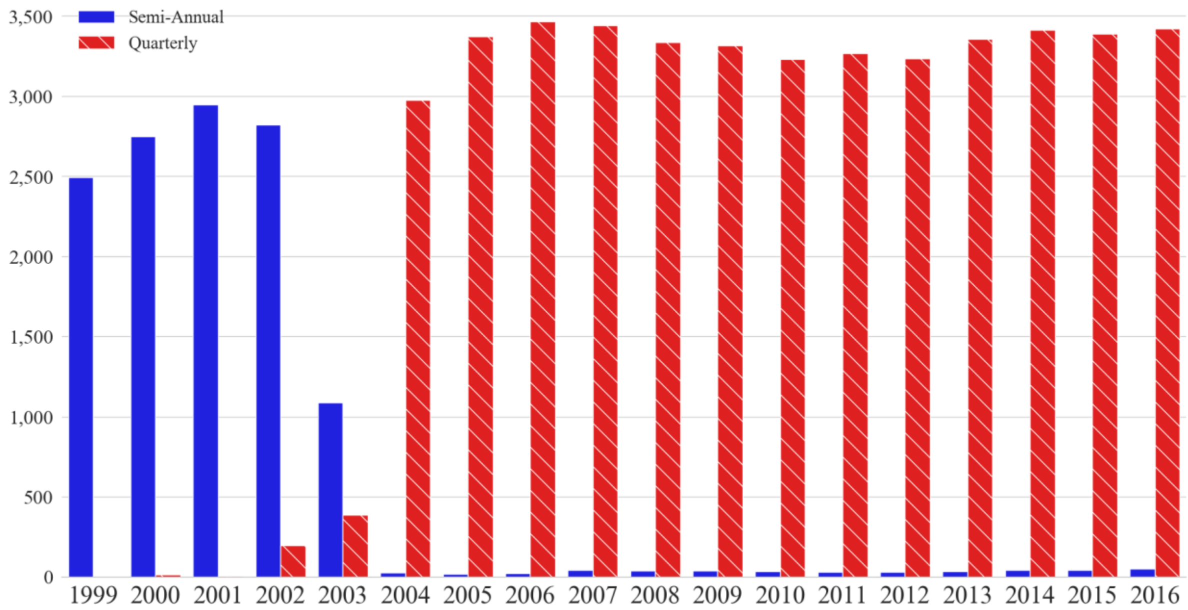
Appendix E: Index of Economic Freedom (The Heritage Foundation 2019)

Variable	Definition
Property Rights	The property rights component assesses the extent to which a country's legal framework allows individuals to acquire, hold, and utilise private property, secured by clear laws that the government enforces effectively. Relying on a mix of survey data and independent assessments, it provides a quantifiable measure of the degree to which a country's laws protect private property rights and the extent to which those laws are respected. It also assesses the likelihood that private property will be expropriated by the state.
Government Integrity	Corruption erodes economic freedom by introducing insecurity and coercion into economic relations. Of greatest concern is the systemic corruption of government institutions and decision-making by such practices as bribery, extortion, nepotism, cronyism, patronage, embezzlement, and graft. The lack of government integrity caused by such practices reduces public trust and economic vitality by increasing the costs of economic activity.
Judicial Effectiveness	Well-functioning legal frameworks are essential for protecting the rights of all citizens against unlawful acts by others, including governments and powerful private parties. Judicial effectiveness requires efficient and fair judicial systems to ensure that laws are fully respected and appropriate legal actions are taken against violations.
Tax Burden	Tax burden is a composite measure that reflects marginal tax rates on both personal and corporate income and the overall level of taxation (including direct and indirect taxes imposed by all levels of government) as a percentage of gross domestic product (GDP).
Government Spending	The government spending component captures the burden imposed by government expenditures, which includes consumption by the state and all transfer payments related to various entitlement programs.
Fiscal Health	Widening deficits and a growing debt burden, both of which are caused by poor government budget management, lead to the erosion of a country's overall fiscal health. Deteriorating fiscal health, in turn, is associated with macroeconomic instability and economic uncertainty.
Business Freedom	The business freedom component measures the extent to which the regulatory and infrastructure environments constrain the efficient operation of businesses. The quantitative score is derived from an array of factors that affect the ease of starting, operating, and closing a business.
Labor Freedom	The labor freedom component is a quantitative measure that considers various aspects of the legal and regulatory framework of a country's labor market, including regulations concerning minimum wages, laws inhibiting layoffs, severance requirements, and measurable regulatory restraints on hiring and hours worked, plus the labor force participation rate as an indicative measure of employment opportunities in the labor market
Monetary Freedom	Monetary freedom combines a measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without microeconomic intervention is the ideal state for the free market.
Trade Freedom	Trade freedom is a composite measure of the extent of tariff and nontariff barriers that affect imports and exports of goods and services.

Investment Freedom	In an economically free country, there would be no constraints on the flow of investment capital. Individuals and firms would be allowed to move their resources into and out of specific activities, both internally and across the country's borders, without restriction. Such an ideal country would receive a score of 100 on the investment freedom component of the Index.
Financial Freedom	Financial freedom is an indicator of banking efficiency as well as a measure of independence from government control and interference in the financial sector. State ownership of banks and other financial institutions such as insurers and capital markets reduces competition and generally lowers the level of access to credit.

4.7 Figures

Figure 1: Number of semi-annual and quarterly earnings reporters on TSE



4.8 Tables

Table 1: Sample selection

Criteria	**Total**	**Exclusions**
Step 1: Bloomberg and IBES earnings announcements for semi-annual and quarterly reporters for the 19 countries in G20.	360,866	
Step 2: Match with Datastream SEDOL code.		(19)
Step 3: Available returns information for every day of three-day event windows in a calendar year.		(52,298)
Step 3: Each three-day event window in a calendar year must have trading activity (i.e. positive trading volume or non-zero price return).		(31,874)
Step 4: Firm-year must have a traded price in prior year for annual return derivation.		(1,144)
Total	**275,531**	

Table 2: Distribution of firm-years

Panel A: Observations by sample years

Year	**Firm-Years**
1999	7,686
2000	11,922
2001	12,027
2002	12,993
2003	11,677
2004	13,308
2005	14,361
2006	15,409
2007	17,003
2008	16,439
2009	16,364
2010	16,688
2011	18,112
2012	18,599
2013	18,230
2014	18,096
2015	17,819
2016	18,798
Total	**275,531**

Table 2: Distribution of firm-years (cont'd)
Panel B: Observations across country-years
Values in parentheses are proportion of countries' firm-years for the sample year

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007
Argentina	2 (0.03%)	21 (0.18%)	23 (0.19%)	2 (0.02%)	16 (0.14%)	27 (0.2%)	20 (0.14%)	28 (0.18%)	26 (0.15%)
Australia	258 (3.36%)	373 (3.13%)	624 (5.19%)	728 (5.6%)	724 (6.2%)	805 (6.05%)	990 (6.89%)	1,173 (7.61%)	1,276 (7.5%)
Brazil	90 (1.17%)	93 (0.78%)	87 (0.72%)	60 (0.46%)	62 (0.53%)	113 (0.85%)	108 (0.75%)	117 (0.76%)	159 (0.94%)
Canada	308 (4.01%)	570 (4.78%)	549 (4.56%)	593 (4.56%)	584 (5.0%)	610 (4.58%)	696 (4.85%)	822 (5.33%)	922 (5.42%)
China		837 (7.02%)	14 (0.12%)	668 (5.14%)	598 (5.12%)	622 (4.67%)	625 (4.35%)	431 (2.8%)	610 (3.59%)
France	13 (0.17%)	270 (2.26%)	387 (3.22%)	425 (3.27%)	341 (2.92%)	371 (2.79%)	367 (2.56%)	423 (2.75%)	500 (2.94%)
Germany	5 (0.07%)	133 (1.12%)	199 (1.65%)	141 (1.09%)	274 (2.35%)	281 (2.11%)	290 (2.02%)	376 (2.44%)	522 (3.07%)
India		132 (1.11%)	173 (1.44%)	326 (2.51%)	372 (3.19%)	335 (2.52%)	315 (2.19%)	309 (2.01%)	795 (4.68%)
Indonesia				23 (0.18%)	44 (0.38%)	142 (1.07%)	108 (0.75%)	139 (0.9%)	119 (0.7%)
Italy	5 (0.07%)	12 (0.1%)	117 (0.97%)	142 (1.09%)	178 (1.52%)	176 (1.32%)	168 (1.17%)	230 (1.49%)	256 (1.51%)
Japan	2,495 (32.46%)	2,763 (23.18%)	2,957 (24.59%)	3,017 (23.22%)	1,476 (12.64%)	3,005 (22.58%)	3,391 (23.61%)	3,490 (22.65%)	3,484 (20.49%)
Mexico	37 (0.48%)	54 (0.45%)	33 (0.27%)	33 (0.25%)	31 (0.27%)	50 (0.38%)	52 (0.36%)	51 (0.33%)	57 (0.34%)
Russia							1 (0.01%)	8 (0.05%)	23 (0.14%)
Saudi Arabia					3 (0.03%)	2 (0.02%)	4 (0.03%)	19 (0.12%)	38 (0.22%)
South Africa	224 (2.91%)	378 (3.17%)	306 (2.54%)	271 (2.09%)	234 (2.0%)	200 (1.5%)	218 (1.52%)	218 (1.41%)	245 (1.44%)
South Korea		113 (0.95%)	209 (1.74%)	283 (2.18%)	819 (7.01%)	546 (4.1%)	816 (5.68%)	1,133 (7.35%)	1,285 (7.56%)
Turkey			15 (0.12%)	6 (0.05%)	8 (0.07%)	41 (0.31%)	59 (0.41%)	189 (1.23%)	276 (1.62%)
United Kingdom	840 (10.93%)	1,083 (9.08%)	1,297 (10.78%)	1,283 (9.87%)	1,001 (8.57%)	1,116 (8.39%)	1,233 (8.59%)	1,169 (7.59%)	1,366 (8.03%)
United States	3,409 (44.35%)	5,090 (42.69%)	5,037 (41.88%)	4,992 (38.42%)	4,912 (42.07%)	4,866 (36.56%)	4,900 (34.12%)	5,084 (32.99%)	5,044 (29.67%)

Table 2: Distribution of firm-years (cont'd)
Panel B: Observations across country-years (cont'd)
Values in parentheses are proportion of countries' firm-years for the sample year

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Argentina	25 (0.15%)	47 (0.29%)	56 (0.34%)	51 (0.28%)	47 (0.25%)	50 (0.27%)	47 (0.26%)	54 (0.3%)	36 (0.19%)
Australia	1,236 (7.52%)	1,184 (7.24%)	1,339 (8.02%)	1,346 (7.43%)	1,316 (7.08%)	1,251 (6.86%)	1,292 (7.14%)	1,196 (6.71%)	1,314 (6.99%)
Brazil	209 (1.27%)	168 (1.03%)	143 (0.86%)	176 (0.97%)	194 (1.04%)	232 (1.27%)	242 (1.34%)	180 (1.01%)	163 (0.87%)
Canada	770 (4.68%)	774 (4.73%)	860 (5.15%)	1,138 (6.28%)	1,424 (7.66%)	1,280 (7.02%)	1,104 (6.1%)	1,139 (6.39%)	1,295 (6.89%)
China	749 (4.56%)	1,077 (6.58%)	1,101 (6.6%)	1,315 (7.26%)	1,529 (8.22%)	1,373 (7.53%)	1,374 (7.59%)	1,356 (7.61%)	1,645 (8.75%)
France	444 (2.7%)	445 (2.72%)	480 (2.88%)	516 (2.85%)	476 (2.56%)	443 (2.43%)	444 (2.45%)	469 (2.63%)	482 (2.56%)
Germany	591 (3.6%)	553 (3.38%)	565 (3.39%)	628 (3.47%)	627 (3.37%)	623 (3.42%)	629 (3.48%)	639 (3.59%)	666 (3.54%)
India	1,059 (6.44%)	1,041 (6.36%)	1,125 (6.74%)	1,527 (8.43%)	1,757 (9.45%)	1,577 (8.65%)	1,481 (8.18%)	1,080 (6.06%)	1,178 (6.27%)
Indonesia	140 (0.85%)	143 (0.87%)	144 (0.86%)	165 (0.91%)	237 (1.27%)	241 (1.32%)	272 (1.5%)	317 (1.78%)	309 (1.64%)
Italy	177 (1.08%)	157 (0.96%)	158 (0.95%)	173 (0.96%)	200 (1.08%)	239 (1.31%)	184 (1.02%)	205 (1.15%)	216 (1.15%)
Japan	3,375 (20.53%)	3,356 (20.51%)	3,265 (19.56%)	3,298 (18.21%)	3,267 (17.57%)	3,393 (18.61%)	3,454 (19.09%)	3,432 (19.26%)	3,472 (18.47%)
Mexico	55 (0.33%)	57 (0.35%)	74 (0.44%)	73 (0.4%)	71 (0.38%)	72 (0.39%)	91 (0.5%)	88 (0.49%)	96 (0.51%)
Russia	31 (0.19%)	47 (0.29%)	51 (0.31%)	80 (0.44%)	63 (0.34%)	81 (0.44%)	91 (0.5%)	91 (0.51%)	107 (0.57%)
Saudi Arabia	24 (0.15%)	50 (0.31%)	51 (0.31%)	67 (0.37%)	37 (0.2%)	30 (0.16%)	68 (0.38%)	77 (0.43%)	112 (0.6%)
South Africa	250 (1.52%)	249 (1.52%)	261 (1.56%)	258 (1.42%)	259 (1.39%)	260 (1.43%)	250 (1.38%)	249 (1.4%)	268 (1.43%)
South Korea	1,402 (8.53%)	1,444 (8.82%)	1,423 (8.53%)	1,561 (8.62%)	1,486 (7.99%)	1,627 (8.92%)	1,613 (8.91%)	1,670 (9.37%)	1,778 (9.46%)
Turkey	243 (1.48%)	177 (1.08%)	186 (1.11%)	154 (0.85%)	124 (0.67%)	130 (0.71%)	168 (0.93%)	180 (1.01%)	302 (1.61%)
United Kingdom	1,479 (9.0%)	1,528 (9.34%)	1,478 (8.86%)	1,475 (8.14%)	1,462 (7.86%)	1,412 (7.75%)	1,355 (7.49%)	1,380 (7.74%)	1,348 (7.17%)
United States	4,180 (25.43%)	3,867 (23.63%)	3,928 (23.54%)	4,111 (22.7%)	4,023 (21.63%)	3,916 (21.48%)	3,937 (21.76%)	4,017 (22.54%)	4,011 (21.34%)

Table 2: Distribution of firm-years (cont'd)
Panel C: Earnings reporting frequency of countries

Country	Firm-Years	Semi-annual reporters (%)
Argentina	578	0.00
Australia	18,425	99.37
Brazil	2,596	0.00
Canada	15,438	0.04
China	15,924	10.25
France	7,296	87.03
Germany	7,742	26.84
India	14,582	0.03
Indonesia	2,543	0.00
Italy	2,993	8.49
Japan	56,390	22.29
Mexico	1,075	0.00
Russia	674	12.46
Saudi Arabia	582	0.00
South Africa	4,598	96.32
South Korea	19,208	0.01
Turkey	2,258	1.95
United Kingdom	23,305	95.02
United States	79,324	0.01

Table 3: Distribution of semi-annual earnings reporters

Panel A: Proportion of top 50 largest firms in country-years that are semi-annual earnings reporters

Country-year must have at least ten firms. Parentheses describe the most common reporting frequency of top 50 largest for the country-year.

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007
Argentina		0% (Quarter)	0% (Quarter)		0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Australia	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)
Brazil	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Canada	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
China		100% (Semi)	100% (Semi)	100% (Semi)	14% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	18% (Quarter)
France	100% (Semi)	100% (Semi)	88% (Semi)	84% (Semi)	76% (Semi)	84% (Semi)	70% (Semi)	66% (Semi)	68% (Semi)
Germany		20% (Quarter)	14% (Quarter)	12% (Quarter)	6% (Quarter)	2% (Quarter)	4% (Quarter)	4% (Quarter)	6% (Quarter)
India		0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Indonesia				0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Italy			12% (Quarter)	4% (Quarter)	6% (Quarter)	2% (Quarter)	0% (Quarter)	2% (Quarter)	4% (Quarter)
Japan	100% (Semi)	94% (Semi)	100% (Semi)	82% (Semi)	38% (Quarter)	2% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Mexico	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Russia									100% (Semi)
Saudi Arabia								0% (Quarter)	0% (Quarter)
South Africa	100% (Semi)	100% (Semi)	90% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)
South Korea		0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Turkey			0% (Quarter)			100% (Semi)	0% (Quarter)	0% (Quarter)	0% (Quarter)
United Kingdom	100% (Semi)	78% (Semi)	72% (Semi)	78% (Semi)	76% (Semi)	76% (Semi)	72% (Semi)	66% (Semi)	66% (Semi)
United States	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)

Table 3: Distribution of semi-annual earnings reporters (cont'd)

Panel A: Proportion of top 50 largest firms in country-years that are semi-annual earnings reporters (cont'd)

Country-year must have at least ten firms. Parentheses describe the most common reporting frequency of top 50 largest for the country-year.

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Argentina	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Australia	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	96% (Semi)	98% (Semi)	96% (Semi)	96% (Semi)	96% (Semi)
Brazil	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Canada	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
China	20% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
France	68% (Semi)	62% (Semi)	60% (Semi)	58% (Semi)	60% (Semi)	66% (Semi)	60% (Semi)	62% (Semi)	62% (Semi)
Germany	14% (Quarter)	14% (Quarter)	10% (Quarter)	6% (Quarter)	6% (Quarter)	8% (Quarter)	10% (Quarter)	14% (Quarter)	14% (Quarter)
India	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Indonesia	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Italy	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	2% (Quarter)	0% (Quarter)	2% (Quarter)
Japan	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Mexico	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Russia	58% (Semi)	46% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Saudi Arabia	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
South Africa	86% (Semi)	100% (Semi)	88% (Semi)	86% (Semi)	88% (Semi)	92% (Semi)	94% (Semi)	100% (Semi)	100% (Semi)
South Korea	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Turkey	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
United Kingdom	60% (Semi)	54% (Semi)	46% (Quarter)	48% (Quarter)	48% (Quarter)	48% (Quarter)	52% (Semi)	52% (Semi)	52% (Semi)
United States	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)

Table 3: Distribution of semi-annual earnings reporters (cont'd)
Panel B: Proportion of firms in country-years that are semi-annual earnings reporters
Country-year must have at least ten firms. Parentheses describe the most common reporting frequency for the country-year.

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007
Argentina		0% (Quarter)	0% (Quarter)		0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Australia	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)
Brazil	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Canada	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
China		100% (Semi)	100% (Semi)	100% (Semi)	2% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	3% (Quarter)
France	100% (Semi)	100% (Semi)	95% (Semi)	93% (Semi)	93% (Semi)	92% (Semi)	88% (Semi)	87% (Semi)	89% (Semi)
Germany		21% (Quarter)	20% (Quarter)	7% (Quarter)	6% (Quarter)	9% (Quarter)	10% (Quarter)	12% (Quarter)	22% (Quarter)
India		0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Indonesia				0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Italy			19% (Quarter)	16% (Quarter)	5% (Quarter)	6% (Quarter)	7% (Quarter)	6% (Quarter)	8% (Quarter)
Japan	100% (Semi)	99% (Semi)	100% (Semi)	93% (Semi)	73% (Semi)	0% (Quarter)	0% (Quarter)	0% (Quarter)	1% (Quarter)
Mexico	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Russia									100% (Semi)
Saudi Arabia								0% (Quarter)	0% (Quarter)
South Africa	100% (Semi)	100% (Semi)	96% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)	100% (Semi)
South Korea		0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Turkey			0% (Quarter)			100% (Semi)	0% (Quarter)	0% (Quarter)	0% (Quarter)
United Kingdom	100% (Semi)	97% (Semi)	95% (Semi)	96% (Semi)	96% (Semi)	96% (Semi)	96% (Semi)	94% (Semi)	95% (Semi)
United States	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)

Table 3: Distribution of semi-annual earnings reporters (cont'd)
Panel B: Proportion of firms in country-years that are semi-annual earnings reporters (cont'd)
Country-year must have at least ten firms. Parentheses describe the most common reporting frequency for the country-year.

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Argentina	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Australia	100% (Semi)	100% (Semi)	100% (Semi)	99% (Semi)	98% (Semi)	98% (Semi)	98% (Semi)	98% (Semi)	98% (Semi)
Brazil	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Canada	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
China	2% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
France	89% (Semi)	86% (Semi)	84% (Semi)	85% (Semi)	78% (Semi)	84% (Semi)	83% (Semi)	77% (Semi)	79% (Semi)
Germany	30% (Quarter)	30% (Quarter)	32% (Quarter)	30% (Quarter)	30% (Quarter)	32% (Quarter)	31% (Quarter)	34% (Quarter)	33% (Quarter)
India	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Indonesia	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Italy	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	9% (Quarter)	12% (Quarter)	20% (Quarter)
Japan	1% (Quarter)	1% (Quarter)	1% (Quarter)	1% (Quarter)	0% (Quarter)	1% (Quarter)	1% (Quarter)	1% (Quarter)	1% (Quarter)
Mexico	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Russia	58% (Semi)	46% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Saudi Arabia	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
South Africa	95% (Semi)	100% (Semi)	95% (Semi)	94% (Semi)	94% (Semi)	95% (Semi)	94% (Semi)	100% (Semi)	100% (Semi)
South Korea	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
Turkey	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)
United Kingdom	94% (Semi)	94% (Semi)	93% (Semi)	93% (Semi)	93% (Semi)	93% (Semi)	93% (Semi)	94% (Semi)	95% (Semi)
United States	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)	0% (Quarter)

Table 4: Earnings informativeness across countries

Panel C: Abnormal adjusted R^2 from regressions of arithmetic annual returns on three-day event window returns

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of total trading days across event windows assuming daily stock returns are i.i.d. Regression model is calendar year stock returns on earnings announcement window returns. Stock-returns are adjusted for corporate actions. Earnings announcement window returns are daily compounded returns of the three days around the date of release, as reported by Bloomberg or IBES. Price data are sourced from Datastream. Sample period is 1999 to 2016. Pooled summaries must have at least ten firm-years. Cross-sectional summaries are averages of country-year regressions with at least ten observations. Weighted abnormal adjusted R^2 is average of semi-annual and quarterly abnormal adjusted R^2 weighted by firm-years count of the reporting frequency group for the country.

Country	Semi-annual reporters					Quarterly reporters					Weighted ab. adj. R^2	
	Pooled		Cross-sectional			Pooled		Cross-sectional				
	Ab. adj. R^2	% total	Ab. adj. R^2	Std. dev.	% total	Ab. adj. R^2	% total	Ab. adj. R^2	Std. dev.	% total	Pooled	Cross-sectional
Argentina						0.91	0.28	0.60	3.82	0.28	0.91	0.60
Australia	-0.31	26.97	0.44	1.82	27.03	-0.35	0.06	3.19	7.20	0.04	-0.31	0.45
Brazil						0.31	1.25	1.20	1.57	1.25	0.31	1.20
Canada						-0.31	7.43	0.63	1.04	7.44	-0.31	0.63
China	2.04	2.41	2.86	8.42	2.32	0.18	6.88	0.74	1.23	6.89	0.37	0.95
France	2.21	9.35	3.20	3.42	9.37	2.96	0.46	3.67	4.46	0.45	2.31	3.26
Germany	0.40	3.06	1.38	4.75	3.06	0.96	2.73	1.30	1.21	2.73	0.81	1.32
India						-0.72	7.02	0.51	0.90	7.03	-0.72	0.51
Indonesia						-0.30	1.22	0.98	2.50	1.23	-0.30	0.98
Italy	-1.06	0.37	0.24	9.73	0.30	-0.80	1.32	2.09	1.86	1.32	-0.82	1.96
Japan	-0.80	18.51	3.05	7.00	18.56	0.31	21.11	0.66	3.04	21.12	0.06	1.19
Mexico						0.08	0.52	2.49	3.39	0.52	0.08	2.49
Russia	1.67	0.12	-1.21	1.70	0.08	0.75	0.28	2.37	3.19	0.28	0.87	2.06
Saudi Arabia						1.73	0.28	1.12	2.28	0.28	1.73	1.12
South Africa	19.36	6.52	3.99	11.07	6.54	-0.48	0.08	1.37	6.86	0.04	18.63	3.93
South Korea						-0.35	9.25	0.32	1.12	9.26	-0.35	0.32
Turkey	6.37	0.06	11.83		0.05	0.41	1.07	0.46	1.09	1.06	0.52	0.63
United Kingdom	1.53	32.62	3.01	3.53	32.69	1.90	0.56	4.47	5.29	0.56	1.54	3.08
United States						-0.62	38.20	0.45	1.62	38.24	-0.62	0.45

Table 4: Earnings informativeness across countries (cont'd)

Panel D: Abnormal adjusted R^2 from regressions of logarithmic annual returns on three-day event window returns

Abnormal adjusted R^2 is the regression adjusted R^2 less the expectation of total trading days across event windows assuming daily stock returns are i.i.d. Regression model is calendar year stock returns on earnings announcement window returns. Stock-returns are adjusted for corporate actions. Earnings announcement window returns are daily compounded returns of the three days around the date of release, as reported by Bloomberg or IBES. Price data are sourced from Datastream. Sample period is 1999 to 2016. Pooled summaries must have at least ten firm-years. Cross-sectional summaries are averages of country-year regressions with at least ten observations. Weighted abnormal adjusted R^2 is average of semi-annual and quarterly abnormal adjusted R^2 weighted by firm-years count of the reporting frequency group for the country.

Country	Semi-annual reporters					Quarterly reporters					Weighted ab. adj. R^2	
	Pooled		Cross-sectional			Pooled		Cross-sectional				
	Ab. adj. R^2	% total	Ab. adj. R^2	Std. dev.	% total	Ab. adj. R^2	% total	Ab. adj. R^2	Std. dev.	% total	Pooled	Cross-sectional
Argentina						0.74	0.28	0.86	3.90	0.28	0.74	0.86
Australia	1.23	26.97	2.06	2.03	27.03	1.54	0.06	-0.44	10.12	0.04	1.23	2.04
Brazil						1.55	1.25	1.22	1.56	1.25	1.55	1.22
Canada						1.46	7.43	2.20	1.40	7.44	1.46	2.20
China	0.97	2.41	3.26	8.45	2.32	0.37	6.88	0.96	1.32	6.89	0.43	1.19
France	3.20	9.35	4.95	2.53	9.37	2.99	0.46	4.99	4.46	0.45	3.17	4.95
Germany	1.29	3.06	1.92	3.89	3.06	2.12	2.73	2.52	1.48	2.73	1.90	2.36
India						1.03	7.02	1.53	1.06	7.03	1.03	1.53
Indonesia						0.72	1.22	1.76	1.85	1.23	0.72	1.76
Italy	-0.18	0.37	2.10	13.34	0.30	1.69	1.32	2.45	1.39	1.32	1.53	2.43
Japan	0.62	18.51	3.08	6.62	18.56	0.84	21.11	1.36	3.27	21.12	0.79	1.74
Mexico						1.25	0.52	4.05	4.80	0.52	1.25	4.05
Russia	3.69	0.12	-0.60	4.32	0.08	1.56	0.28	2.16	2.54	0.28	1.82	1.92
Saudi Arabia						2.79	0.28	1.15	2.43	0.28	2.79	1.15
South Africa	1.31	6.52	2.35	2.52	6.54	-0.01	0.08	1.90	7.96	0.04	1.26	2.34
South Korea						0.39	9.25	1.12	1.56	9.26	0.39	1.12
Turkey	1.06	0.06	3.69		0.05	0.65	1.07	0.18	1.11	1.06	0.66	0.23
United Kingdom	5.07	32.62	5.70	1.80	32.69	4.15	0.56	5.99	5.15	0.56	5.02	5.71
United States						1.92	38.20	2.30	0.48	38.24	1.92	2.30

Table 5: Earnings informativeness of interim and annual earnings announcements

Panel E: Abnormal adjusted R^2 from regressions of arithmetic annual returns on three-day event window returns

Reporting frequency	**Annual earnings announcement**		**Average interim earnings announcement**		**P-value H$_0$: (1) – (2) = 0**
	Pooled	**Cross-sectional (1)**	**Pooled**	**Cross-sectional (2)**	
Semi-annual	0.34%	1.60%	2.76%	4.08%	0.4864
Quarterly	-0.76%	0.70%	-0.70%	-0.11%	0.2821

Panel F: Abnormal adjusted R^2 from regressions of logarithmic annual returns on three-day event window returns

Reporting frequency	**Annual earnings announcement**		**Average interim earnings announcement**		**P-value H$_0$: (1) – (2) = 0**
	Pooled	**Cross-sectional (1)**	**Pooled**	**Cross-sectional (2)**	
Semi-annual	2.11%	2.70%	3.44%	3.63%	0.1211
Quarterly	1.41%	2.10%	1.50%	1.87%	0.9748

Table 6: Regression results of weighted cross-sectional abnormal adjusted R^2 on *Economic Freedom of the World* factors

Weighted cross-sectional is average of semi-annual and quarterly abnormal adjusted R^2 weighted by firm-years count of the reporting frequency group for the country. Proportion of semi-annual reporters is the ratio of total firm-years that are semi-annual reporters. Size of government, legal system & property rights, sound money, freedom to trade internationally and regulation are from *Economic Freedom of the World*. Minority market cap is the fraction of the stock market held by minority shareholders, defined as the average total shareholdings held by investors with less than 5% shareholding of the ten largest firms of the year and excludes firms with more than 5% government shareholding. GNI is the gross national income of the country. Dummy for English Law and French are indicator variables that equals one if the legal origin of the country is English and French, respectively. EFW summary index is a single estimate of economic freedom for the country-year. Except for the dummy variables, all control variables are transformed using a logarithmic function. Parentheses are White's (1989) heteroskedasticity-consistent standard errors.

	Weighted cross-sectional abnormal adjusted R^2			
	Arithmetic return measures		Logarithmic return measures	
	(1)	(2)	(3)	(4)
Proportion of Semi-Annual Reporters	1.9178*	2.2526*	1.3528	1.7734
	(1.0440)	(1.1931)	(1.3626)	(1.3333)
Size of Government	-1.7118		-0.5126	
	(1.6648)		(1.7420)	
Legal System & Property Rights	-4.0406		-2.3612	
	(2.3337)		(3.5297)	
Sound Money	-5.0955		-3.8778	
	(4.4112)		(8.1064)	
Freedom to Trade Internationally	4.5308		7.1471	
	(3.9077)		(4.9679)	
Regulation	3.4280		4.8665	
	(2.8635)		(4.7792)	
Minority Market Cap / GNI	1.1412	0.9646	0.6807	0.5314
	(0.6755)	(0.7216)	(0.9157)	(0.6309)
Dummy for English Law Origin	-1.5058	-0.6344	-0.9005	-0.1008
	(1.0159)	(0.4779)	(1.6024)	(0.5962)
Dummy or French Law Origin	0.4450	1.1292*	0.6736	1.2942*
	(0.8036)	(0.5514)	(0.7768)	(0.7094)
EFW Summary Index		-3.7974		4.8014
		(3.9858)		(2.8806)
Constant	2.9341	4.6774	-10.6664	-9.9782**
	(5.1146)	(5.5979)	(7.3786)	(4.1538)
Observations	19	19	19	19
R^2	0.7362	0.5762	0.6355	0.5140
Adjusted R^2	0.4724	0.4132	0.2711	0.3270

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Regression results of weighted cross-sectional abnormal adjusted R^2 on *Index of Economic Freedom* factors

Weighted cross-sectional is average of semi-annual and quarterly abnormal adjusted R^2 weighted by firm-years count of the reporting frequency group for the country. Proportion of semi-annual reporters is the ratio of total firm-years that are semi-annual reporters. Property rights, government integrity, tax burden, government spending, business freedom, monetary freedom, trade freedom, investment freedom and financial freedom are from *Index of Economic Freedom*. Minority market cap is the fraction of the stock market held by minority shareholders, defined as the average total shareholdings held by investors with less than 5% shareholding of the ten largest firms of the year and excludes firms with more than 5% government shareholding. GNI is the gross national income of the country. Dummy for English Law and French are indicator variables that equals one if the legal origin of the country is English and French, respectively. EFW summary index is a single estimate of economic freedom for the country-year. Except for the dummy variables, all control variables are transformed using a logarithmic function. Parentheses are White's (1989) heteroskedasticity-consistent standard errors.

	Weighted cross-sectional abnormal adjusted R^2			
	Arithmetic return measures		**Logarithmic return measures**	
	(1)	(2)	(3)	(4)
Proportion of Semi-Annual Reporters	1.6995	1.9648*	2.0723	2.0055
	(1.5544)	(1.0420)	(2.4848)	(1.5015)
Property Rights	-7.7673		-1.3356	
	(5.9101)		(10.5001)	
Government Integrity	-8.1829		-5.6903	
	(7.9957)		(11.2793)	
Tax Burden	11.8097		16.2792	
	(10.9702)		(23.2898)	
Government Spending	-4.5542		-5.5945	
	(2.3903)		(4.8512)	
Business Freedom	-8.5076		-0.5557	
	(12.2838)		(15.1017)	
Monetary Freedom	-3.4069		52.2123	
	(24.2061)		(31.3791)	
Trade Freedom	20.8800		-3.8520	
	(17.6244)		(20.1691)	
Investment Freedom	16.9892		2.3154	
	(8.7089)		(15.1050)	
Financial Freedom	-9.2223		6.9441	
	(10.6130)		(18.0795)	
Minority Market Cap / GNI	1.7940	0.7136	-0.7052	0.4946
	(0.9779)	(0.5678)	(1.7449)	(0.7413)
Dummy for English Law Origin	-0.2266	-0.2929	1.0867	-0.0959
	(1.1558)	(0.5176)	(1.3511)	(0.6181)
Dummy for French Law Origin	0.4513	1.0431**	0.3209	1.1987*
	(1.0502)	(0.4420)	(1.4299)	(0.6492)
IEF Overall Score		-9.9888		12.0721
		(9.6637)		(12.2976)
Constant	-18.5723	12.3387	-85.2989	-17.6811
	(44.7055)	(12.2075)	(61.0859)	(15.4477)
Observations	19	19	19	19
R^2	0.7640	0.5583	0.6844	0.5133
Adjusted R^2	0.1503	0.3884	-0.1361	0.3260

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Earnings informativeness of firms that comply with the reporting frequency of the 50 largest firms of the country-year
Panel A: Abnormal adjusted R^2 from regressions of arithmetic annual returns on three-day window returns

Country-year must have at least ten firms.

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Argentina		2.93	6.22		6.43	-4.83	-5.26	-1.84	1.34	-4.96
Australia	-1.32	5.23	4.43	1.11	0.43	1.94	-0.76	-1.08	0.13	-0.64
Brazil	-1.92	-1.24	2.13	2.36	0.12	2.48	0.51	-0.09	-0.81	1.71
Canada	0.71	-0.47	1.51	0.49	2.06	0.64	3.29	-1.17	1.54	0.69
China		2.46	-3.53	-1.00	2.71	2.51	2.66	0.61	-0.15	-0.61
France	-1.82	-0.18	1.15	1.44	1.70	6.45	4.00	0.90	6.26	3.15
Germany		0.49	0.53	1.20	0.11	3.23	3.64	1.82	1.25	-0.35
India		0.01	1.44	0.65	2.34	0.29	1.07	1.53	0.93	-0.50
Indonesia				-2.10	2.98	-0.23	-0.20	7.08	-0.73	-0.98
Italy			0.60	2.15	2.86	1.56	1.43	1.13	4.85	1.03
Japan	-0.94	0.55	0.80	-0.10	1.44	1.98	1.31	2.14	2.28	0.28
Mexico	-2.07	2.68	3.21	10.28	2.71	6.57	-0.42	1.11	1.39	-1.67
Russia									-1.06	-2.99
Saudi Arabia								-1.37	-0.46	4.03
South Africa	-1.42	45.26	-1.06	15.61	4.00	4.84	0.57	-0.93	-0.06	1.29
South Korea		3.56	-0.77	-0.40	1.44	0.57	-1.05	-0.31	0.17	0.46
Turkey			-0.92			11.83	-1.51	-0.50	0.90	1.85
United Kingdom	0.56	3.19	5.20	3.07	0.66	3.57	2.57	2.20	-0.09	2.27
United States	-0.29	0.35	0.86	-0.41	0.45	-0.30	1.75	-1.13	1.62	-0.92

Table 8: Earnings informativeness of firms that comply with the reporting frequency of the 50 largest firms of the country-year (cont'd)
Panel A: Abnormal adjusted R^2 from regressions of arithmetic annual returns on three-day window returns (cont'd)
Country-year must have at least ten firms.

Country	2009	2010	2011	2012	2013	2014	2015	2016	Mean	Std. dev.
Argentina	-1.38	5.91	1.49	1.94	-1.64	1.68	2.47	-0.93	0.60	3.82
Australia	-1.01	-0.30	1.12	-0.12	-0.42	-0.88	-0.10	0.06	0.44	1.82
Brazil	0.69	1.85	4.48	1.63	1.96	2.60	1.89	1.31	1.20	1.57
Canada	0.05	0.03	0.86	-0.43	0.21	1.06	0.54	-0.29	0.63	1.04
China	-1.00	1.47	0.34	0.98	0.90	0.46	0.27	-0.72	0.49	1.63
France	1.47	4.61	0.96	1.75	7.51	-0.12	6.55	11.78	3.20	3.42
Germany	0.85	0.66	0.88	2.05	2.16	3.23	-0.11	0.50	1.30	1.21
India	0.01	-0.06	-1.09	0.77	-1.02	0.67	0.80	0.84	0.51	0.90
Indonesia	0.34	1.04	4.04	-1.39	4.13	0.21	0.78	-0.24	0.98	2.50
Italy	6.23	2.24	3.11	-0.49	4.61	-0.43	1.25	1.31	2.09	1.86
Japan	0.58	0.87	0.81	0.54	-0.46	2.27	2.14	2.76	1.07	1.04
Mexico	1.81	-1.75	2.06	4.58	4.62	5.99	5.50	-1.83	2.49	3.39
Russia	0.00	1.39	-0.82	-1.76	0.53	4.81	6.20	4.01	1.03	3.04
Saudi Arabia	3.65	1.30	-0.33	2.90	-0.89	-0.93	-0.29	4.72	1.12	2.28
South Africa	0.20	-1.13	0.26	0.88	5.26	-0.94	0.17	-1.04	3.99	11.07
South Korea	-0.48	1.58	0.02	-0.44	0.43	1.13	-0.26	-0.19	0.32	1.12
Turkey	0.44	0.62	0.76	1.85	0.08	-0.24	2.15	0.44	1.27	3.22
United Kingdom	-1.10	15.63	4.24	2.72	3.43	3.59	1.47	0.98	3.01	3.53
United States	0.01	0.76	6.06	0.18	0.35	-0.88	-0.88	0.53	0.45	1.62

Table 8: Earnings informativeness of firms that comply with the reporting frequency of the 50 largest firms of the country-year (cont'd)
Panel B: Abnormal adjusted R^2 from regressions of logarithmic annual returns on three-day window returns

Country-year must have at least ten firms.

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Argentina		2.22	5.50		8.02	-5.23	-6.15	-0.71	1.16	-4.18
Australia	2.25	7.38	5.44	4.43	0.86	3.31	-0.37	-0.17	1.79	1.63
Brazil	-1.75	-1.15	1.19	2.42	0.19	3.06	0.18	-0.22	0.27	1.80
Canada	2.55	1.48	4.29	2.61	3.51	2.41	4.65	2.06	4.91	2.48
China		2.05	-2.16	-1.11	2.63	3.32	2.89	1.04	-0.07	-0.48
France	5.75	0.82	4.83	2.47	3.27	6.69	6.81	4.03	7.86	4.72
Germany		4.55	2.77	3.46	0.64	4.90	4.69	1.47	2.33	0.23
India		0.05	4.04	1.01	2.12	1.94	1.49	1.39	3.22	-0.21
Indonesia				-0.97	2.23	0.41	1.61	6.27	1.43	0.06
Italy			2.09	2.98	1.74	1.01	2.20	1.81	4.02	2.29
Japan	-0.11	1.37	3.90	-0.05	4.68	0.83	1.40	3.08	3.01	1.07
Mexico	-0.92	3.40	7.87	15.56	2.33	5.41	0.42	1.82	1.42	-2.40
Russia									4.38	-2.84
Saudi Arabia								-2.37	-0.41	4.28
South Africa	-0.89	2.92	-0.39	7.86	3.82	4.10	1.87	0.21	4.63	2.24
South Korea		6.02	-0.59	0.75	2.30	0.61	-0.31	0.75	0.47	1.26
Turkey			-2.83			3.69	-0.95	-0.20	0.30	0.58
United Kingdom	6.32	6.51	8.91	5.96	2.50	5.15	6.82	5.26	3.26	4.22
United States	1.61	2.39	2.26	2.43	1.73	3.20	2.74	2.56	2.47	1.82

Table 8: Earnings informativeness of firms that comply with the reporting frequency of the 50 largest firms of the country-year (cont'd)
Panel B: Abnormal adjusted R^2 from regressions of logarithmic annual returns on three-day window returns (cont'd)
Country-year must have at least ten firms.

Country	2009	2010	2011	2012	2013	2014	2015	2016	Mean	Std. dev.
Argentina	-1.64	5.09	1.69	3.23	-0.46	1.65	3.38	0.22	0.86	3.90
Australia	1.34	0.96	3.03	0.58	0.36	0.47	1.81	1.92	2.06	2.03
Brazil	0.35	1.74	3.63	1.37	0.63	3.35	3.42	1.46	1.22	1.56
Canada	0.83	1.34	0.94	0.19	0.52	2.10	1.83	0.89	2.20	1.40
China	-1.02	1.86	0.49	1.29	0.83	0.75	0.40	-0.47	0.72	1.52
France	0.83	5.14	2.52	4.04	8.33	3.57	8.02	9.36	4.95	2.53
Germany	1.53	1.79	1.26	1.82	2.72	3.31	1.08	4.35	2.52	1.48
India	2.07	1.04	1.96	1.34	1.96	1.41	0.24	0.98	1.53	1.06
Indonesia	1.99	2.02	4.07	-0.14	3.65	0.21	1.64	1.93	1.76	1.85
Italy	5.27	2.54	3.87	0.94	4.02	-0.42	2.43	2.47	2.45	1.39
Japan	1.16	1.31	1.18	1.33	-0.22	2.62	4.36	3.33	1.90	1.52
Mexico	1.25	1.15	4.87	7.48	12.17	4.88	8.08	-1.92	4.05	4.80
Russia	0.59	0.58	1.01	0.07	1.13	2.34	3.34	2.05	1.27	1.97
Saudi Arabia	2.34	0.55	0.84	3.78	-1.82	-0.06	0.51	5.05	1.15	2.43
South Africa	0.59	1.00	1.55	1.48	5.24	-0.38	6.42	0.02	2.35	2.52
South Korea	1.37	3.21	1.14	0.00	0.44	0.98	0.47	0.22	1.12	1.56
Turkey	1.18	0.19	0.35	1.85	0.36	0.69	0.32	0.49	0.43	1.42
United Kingdom	2.64	6.48	7.22	6.21	6.55	7.30	7.59	3.68	5.70	1.80
United States	1.72	2.13	1.86	2.33	2.12	3.35	2.37	2.24	2.30	0.48

Table 9: Earnings informativeness of Japanese firms

Panel A: Abnormal adjusted R^2 from regressions of annual returns on three-day window returns of full sample

Returns computation	**Ex-ante (semi-annual reporting)**						**Ex-post (quarterly reporting)**					
	2000	**2001**	**2002**	**2003**	**Mean**	**Std. dev.**	**2005**	**2006**	**2007**	**2008**	**Mean**	**Std. dev.**
Arithmetic	0.55	0.80	-0.10	1.66	0.73	0.63	1.31	2.14	2.28	0.28	1.50	0.80
Logarithmic	1.37	3.90	-0.05	2.42	1.91	1.44	1.40	3.08	3.01	1.07	2.14	0.91

Panel B: Abnormal adjusted R^2 from regressions of annual returns on three-day window returns of constant sample

Returns computation	**Ex-ante (semi-annual reporting)**						**Ex-post (quarterly reporting)**					
	2000	**2001**	**2002**	**2003**	**Mean**	**Std. dev.**	**2005**	**2006**	**2007**	**2008**	**Mean**	**Std. dev.**
Arithmetic	-0.21	1.93	2.35	3.29	1.84	1.28	2.30	2.13	2.89	-0.01	1.83	1.10
Logarithmic	1.37	2.50	1.36	3.42	2.16	0.86	2.30	2.24	2.61	-0.28	1.71	1.61

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