OPERATING CASH FLOWS ASYMMETRIC TIMELINESS IN AUSTRALIA

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ABSTRACT

This thesis is the first study in Australia that examines the presence and determinants of operating cash flows asymmetric timeliness. Several explanations for cash flows asymmetry documented in the US studies are tested, including product pricing, cost stickiness and firm's life cycle.

Using firm's stock return as the proxy for economic news and 23,203 firm-year observations within the period of 1992-2012, the empirical results indicate that product pricing and cost stickiness are valid explanations for operating cash flows asymmetric timeliness. However, although firm's life cycle has been found to have a significant effect on operating cash flows asymmetry in US studies, it is insignificant in Australia.

Compared to US firms, 40 per cent of Australian listed firms are mining and resource firms with low sales in their early stages of life. Accordingly, analytical comparisons between mining and non-mining firms are carried out in this thesis. Mining firms are found to exhibit less operating cash flows asymmetric timeliness than non-mining firms.

Given the important role of operating cash flows as the key indicator of firm performance and valuation, this research provides investors with an in-depth understanding of operating cash flows asymmetric timeliness, and contributes to the improvement of their forecasts and predictions of operating cash flows.

STATEMENT

I, **YIMENG YU**, certify that the work in this thesis entitled "**Operating Cash Flows Asymmetric Timeliness in Australia**" has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research and it has been written by me. Any help and assistance that I have received in my research work and the preparation of the thesis itself have been appropriately acknowledged.

In addition, I certify that all information sources and literature used are indicated in the thesis.

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CHAPTER 1 INTRODUCTION

1.1 Overview

Operating cash flow asymmetric timeliness is one type of accounting conservatism, in which operating cash flows fall more in response to bad economic news than they rise in response to good economic news.

Accounting conservatism, one of the key aspects of financial reporting, describes the understating of the book value of net assets, when the management recognises all possible losses but no future profits (Bliss, 1924). It is considered to be necessary for firms to protect themselves from potential risks. Beaver and Ryan (2005) give a clear definition that separates the theory of accounting conservatism into two parts: unconditional and conditional conservatism.

Unconditional conservatism is linked to accounting principles and is news-independent, while conditional conservatism is more related to manager's conservative behaviours and is news-dependent. Basu (1997) introduces the concept of earnings asymmetric timeliness to measure conditional conservatism, by capturing its news-dependent character. Being similar to the definition of operating cash flows asymmetric timeliness, earnings asymmetric timeliness indicate that earnings fall more in response to bad economic news than they increase in response to good economic news.

Since earnings are composed of operating cash flows and total accruals, earnings asymmetric timeliness also includes operating cash flows asymmetric timeliness. Basu

(1997) documents the existence of both earnings and cash flows asymmetry. Accruals are usually considered as the tool of conditional conservatism (Basu, 1997; Beaver and Ryan, 2005; Ball and Shivakumar, 2005), which could easily be manipulated by management. Operating cash flows, as the actual transactions, are deemed to be less likely to be adjusted by management. The explanations of operating cash flows asymmetric timeliness are therefore ignored in studies focusing on earnings asymmetric timeliness,

Resent US-based studies (Steele, 2011; Oded and Weiss, 2013; and Collins et al., 2014) investigate the reasons for operating cash flows asymmetric timeliness, and focus on explanations such as product pricing (Steele, 2011), cost intervention (Steele, 2011), firm's life cycle (Collins et al., 2014), and option-based compensation (Oded and Weiss, 2013). However, these studies contain conflicting and inconclusive results.

In Australia, a number of studies researching conditional conservatism also focus the accruals side of earnings asymmetric timeliness rather than operating cash flows (Ball et al., 2000; Balkrishna et al., 2007; and Lai and Stephen, 2008). However, there is a lack of research investigating the presence and reasons for operating cash flows asymmetric timeliness in Australia. In addition, the Australian market differs substantially from the US market, being a smaller market with smaller firms, around 40 per cent firms from mining industry, and Australian firms having relatively higher loss frequency (Balkrishna et al., 2007). US results for operating cash flows asymmetric timeliness might not be generalisable for Australia.

Furthermore, operating cash flows play a significant role for forecasting and prediction of share prices in Australia since Australian firms use the direct method of

statement of cash flows, which provides a purer source of data compared to US firms that use the indirect method. Krishnan and Largay III (2000) suggest that the direct method of operating cash flows provides more accurate information on cash flows than the indirect method calculated by the change in accruals. Moreover, operating cash flows are considered to have better predictive ability for future firm valuation than are earnings in the Australian market because they use the direct method of statement of cash flows (Farshadfar et al., 2008). Comprehending the explanations of operating cash flows asymmetry would therefore likely to improve the predictive ability of cash flows.

Due to the important role of operating cash flows in Australia, the absence of research in this particular area, and the differences between the Australian market and the US, this thesis addresses two important questions by testing the existence of operating cash flows asymmetric timeliness and finding possible explanations causing this phenomenon.

In this study, the existence of operating cash flows asymmetric timeliness is found for Australian firms by using the piecewise regression methods for testing operating cash flows in response to good or bad economic news. The main contribution of this study is to test whether there is evidence for the existing US explanations of product pricing, cost stickiness and firm's life cycle for Australian firms.

Empirical results find evidence for product pricing and cost stickiness as the explanations for operating cash flows asymmetric timeliness. Firm's life cycle, as a significant explanation for operating cash flows in US evidence, does not affect operating cash flow asymmetry significantly in Australia. Moreover, the differences between mining and non-mining firms are specifically examined since there are more than 40 per cent of

listed Australian firms being from the mining industry. Results indicate that mining firms also have weaker operating cash flows asymmetric timeliness than non-mining firms. These findings are useful for outsiders to have better knowledge to predict firm value using the information from the statement of cash flows.

As a conclusion, although there is evidence of the existence of operating cash flows asymmetric timeliness, this thesis is the first study examining the possible explanation for operating cash flows asymmetric timeliness in Australia. Furthermore, since there are different marketing settings in the US and Australia, the operating cash flow asymmetry differences between mining and non-mining firms is also examined. Because of the superior predictability of operating cash flows for future firm value and performance, understanding the reasons for operating cash flows asymmetry will improve forecasting and prediction for future firm valuation by using operating cash flows.

1.2 Motivation

Most previous studies (Basu 1997; Ball et al. 2000; Roychowdhury and Watts 2007; and Balkrishna et al. 2007) rely on earnings asymmetric timeliness in measuring conservatism, and there is limited research (Steele 2011; Collins et al. 2012; and Ball et al. 2013) analysing the causes for operating cash flow asymmetric timeliness. In addition, operating cash flows are considered to be objective and unbiased. However, operating cash flows also present greater asymmetric timeliness in response to bad news rather than good news. It is therefore important to understand operating cash flows asymmetric timeliness, as empirical inference of conditional conservatism based on the Basu (1997) model would be biased without considering asymmetric timeliness in cash flows (Collins et al., 2012).

Previous studies (Basu, 1997; Beaver and Ryan, 2005; and etc.) focus on earnings asymmetric timeliness, since earnings have better predictive ability for future firm values than operating cash flows according to the US evidence (Dechow et al., 1998; and Barth et al., 2001). However, Farshadfar et al. (2008) investigate the forecasting ability of future firm value between earnings and operating cash flows in the Australian market, and find that operating cash flows have more powerful ability for predicting future firm value than reported earnings in Australia. Thus, It is important to understand operating cash flows asymmetric timeliness due to operating cash flows' better predictive ability for future firm valuation of Australian firms.

Additionally, since 1992 after the commencement of Australian Accounting Standard Board (AASB) 1026 "Statement of Cash Flows", Australian firms use the direct method to report operating cash flows, rather than US firms' use of the indirect method. Collins et al. (2014) compare the results of operating cash flows asymmetric timeliness using the indirect method and the direct method in US samples and report that the indirect method of preparing the statement of cash flows is likely to have some accruals effects, which would bias the research results. In contrast to US firms, the direct method of statement of cash flows in Australia is probably used to avoid these accrual effects. It is worthwhile studying the Australian market after eliminating the accruals effects on operating cash flows asymmetric timeliness in comparison to the US market.

To the author's best knowledge, there is no other Australian study focusing on operating cash flows asymmetric timeliness. There are a few Australian studies (Balkrishna et al., 2007; Lai et al., 2013; and etc.) examining earnings asymmetric timeliness only. Based on the US studies of operating cash flows asymmetric timeliness, several

explanations, such as product pricing (Steele, 2011), option-based compensation (Oded and Weiss, 2013), and firm's life cycle (Collins et al., 2014), are found to affect operating cash flows asymmetric timeliness. However, there are differences between the Australian market and the US market. For instance, since less than 35 per cent of listed firms reward their CEOs using option-based compensation (Matolcsy and Wright, 2007), the explanation of option-based compensation affecting operating cash flows asymmetry might be insignificant in Australia.

This thesis aims to test the existence of operating cash flows asymmetric timeliness and to explore whether these prior explanations are applicable in Australian market.

1.3 Contributions

This study contributes to the literature on operating cash flows in Australia theoretically, empirically and practically in several ways.

First, this thesis is the first study based on the Australian market that examines the explanations of operating cash flows asymmetric timeliness. As reported above, existing study of the explanations of operating cash flows asymmetric timeliness is scarce in Australia. The majority of the previous studies in accounting conservatism consider operating cash flows asymmetric timeliness as a bias or confounding variable in measuring conditional conservatism using earnings asymmetric timeliness but ignore the causes of operating cash flows asymmetric timeliness. This thesis examines the possible explanations applicable in Australia and suggests that operating cash flows asymmetric timeliness is reflected by both product pricing and cost stickiness, which are related to the real economic behaviours.

Second, the study tests the explanations not only independently, but also mutually to find the interactions between different explanations and their mutual effects on operating cash flows asymmetry, this is because the previous US studies examine each explanation of operating cash flows asymmetric timeliness separately without considering their joint effects.

Third, this research uses Australian data sources, which are relatively purer than that of the US, since Australian firms use the direct method of statement of cash flows. All the cash flows related data can be accurately and directly observed, which eliminates the accruals effects of using the indirect method of statement of cash flows (Krishnan and Largay III 2000; and Collins et al. 2014). Therefore, the results are more accurate in presenting operating cash flows asymmetric timeliness and reducing the bias from accruals.

Fourth, the thesis presents empirical results showing that mining firms have less operating cash flows asymmetric timeliness than do non-mining firms by testing the differences between them. This is based on an important fact that around 40 per cent of Australian listed firms are part of the mining industry, which is unique compared to other countries.

Fifth, this study documents empirical results relating to the effect of firm's life cycle on operating cash flows asymmetric timeliness. Australian firms differ from their US counterparts in that younger firms do not have greater asymmetry on operating cash flows, which means US evidence is not generalisable to other countries. This is likely because the US market provides greater statistical samples, and has more multinational firms with greater market capitalisation.

Finally, operating cash flows is important since it is considered to be a less subjective distortion and is not affected by accounting conservatism compared to accounting accruals. It is believed that management cannot manipulate the figures of operating cash flows. Analysts and investors use future cash flows as a significant determinant of firms' valuation. A number of papers (Dechow et al., 1998; and Barth et al, 2001) claim that earnings have a superior predictive ability for future cash flow compared to current operating cash flows, and that operating cash flows are used as a good indicator to check the reliability of forecasting according to accounting earnings. Based on evidence of operating cash flows asymmetric timeliness, operating cash flows are also asymmetrically changed in response to bad or good news. Thus, operating cash flows are not totally unbiased. Understanding cash flows asymmetric timeliness can help analysts and investors to improve their forecasts and valuations of a firm's performance. In addition, understanding operating cash flows asymmetric timeliness would also be useful for firms' debt holders and creditors to better determine firms' liquidation and solvency risks.

1.4 Outline

The remainder of the thesis proceeds as follows. Chapter 2 describes the previous research findings regarding operating cash flows asymmetric timeliness and the related fields, and summarises possible explanations to operating cash flows asymmetric timeliness. Chapter 3 presents the hypotheses development. Methodology, sample selection, definition of variables, and descriptive statistics are outlined in Chapter 4. Chapter 5 describes the results and robustness checks. Finally, the conclusion and further implications are discussed in Chapter 6, together with the limitations and future research opportunities.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter discusses the current studies in operating cash flows and the related earnings asymmetric timeliness. In Section 2.2 and 2.3, the idea of accounting conservatism measured by earnings asymmetric timeliness is introduced. This is followed by evidence of earnings asymmetric timeliness in Australia and international reported in Section 2.4, and then the idea of operating cash flows asymmetric timeliness in Section 2.5. Finally, section 2.6 documents the possible explanations for operating cash flows asymmetric timeliness from the current literatures.

2.2 Accounting Conservatism

Accounting conservatism is a significant feature of financial reporting that constrains managerial opportunistic behaviour and offsets managerial biases in accounting practice (Watts, 2003a). Beaver and Ryan (2005) define conservatism as understating the book value of net assets compared to their market value. Although there is criticism that accounting conservatism understates the book value of net assets, which does not present a firm's value precisely, it is argued that it is far more useful for predicting potential risks and preventing firms from crisis.

Since the work of Watts (2003a, 2003b) and Beaver and Ryan (2005), accounting conservatism has been classified into two groups: unconditional conservatism and conditional conservatism. Unconditional conservatism is deemed to anticipate all losses and no profits, which is news-independent. For example, expenditures to build up reputation

and goodwill increase a firm's market value but are recorded as costs not intangible assets. In contrast, conditional conservatism refers to more stringent requirements to recognise profits than losses, and is news-dependent. For example, bad news as the market value of inventories falls would result in firms writing down the book value of inventories, but firms are not likely to write up the book value in response to good news as increased market value of inventories occurs.

2.3 Earnings Asymmetric Timeliness

To measure this news-dependent conditional conservatism, Basu (1997) introduces the concept of asymmetric timeliness in accounting earnings. Earnings asymmetric timeliness is based on the rationale that accounting earnings respond to bad news more quickly than to good news. Furthermore, bad news is less persistent than good news for affecting earnings because of the different verification of gains and losses.

Basu (1997) conducts empirical tests on both earnings asymmetric timeliness and operating cash flow asymmetric timeliness. By using positive and negative stock returns as proxies of good and bad news, he finds evidence that the fall in accounting earnings is much more timely when facing bad news than is the increase in the face of good news, which shows the conditional conservatism.

Basu (1997), however, also reports the phenomenon of operating cash flows asymmetric timeliness, which is that operating cash flows also respond more quickly to bad news than good news. In addition, earning-return relations are stronger than cash flows-return relations when there is bad news. Accounting earnings can be decomposed into two parts: accruals and operating cash flows, and accruals are deemed to be adjusted by

reporting. Conditional conservatism resulting in the understated book value of net assets is most likely to be caused by adjusting accruals. Operating cash flows is the actual amount firms received and spent, which is considered to be less subjective distortion since it cannot be adjusted easily by changing figures.

Therefore, the Basu model using earnings asymmetric timeliness captures not only conditional conservatism, but also the other effects of operating cash flows.

2.4 Evidence of Earnings Asymmetric Timeliness

As stated above, Basu (1997) firstly uses earnings asymmetric timeliness on different economic news to assess the existence of conditional conservatism. Following on from Basu (1997), Ball et al. (2000) use earnings asymmetric timeliness to examine the magnitude of conservatism in seven countries that include US, UK, Australia, German, Japan, France, and Canada. Results present that countries under common-law such as US, UK, Canada and Australia have more earnings asymmetric timeliness than countries under code-law such as German, France and Japan because of the litigation and regulatory costs. Ball et al. (2000) also test if good or bad news affects dividend payments and finds that, compared to US, Australia presents less timeliness on dividends. Ball et al (2000) point out that Australia uses the dividend imputation system but the US does not, which indicates earnings asymmetric timeliness related to dividend is greater in the US than in Australia. Ball and Shivakumar (2005) investigate the earnings asymmetric timeliness, especially the accruals part, among private and public firms in the UK. They find that private firms are not as timely as public firms in recognising their losses. Public firms present more earnings asymmetric timeliness as more regulations and market demands force public firms to have

higher financial reporting quality. Ball and Shivakumar (2006) subsequently focus on the accrual role in the earnings asymmetric timeliness, and use not only stock return but also level of cash flows, change in cash flows and industry-adjusted cash flows to identify if firms have economic gains (good news) or losses (bad news). By using level of cash flows, change in cash flows and industry-adjusted cash flows as proxies, results show that accruals and cash flows are related positively in response to bad news but negatively in response to good news. Therefore, in spite of the different proxies for bad or good economic news, the results are consistent that firms with bad news face greater earnings asymmetric timeliness.

Balkrishna et al. (2007) document Australian firms' earnings conservatism and timely losses recognition. In Australia, the portion of firms reporting losses is around 35–40 per cent and these losses appear to be common and persistent during the study period of 1993–2003. While testing loss and profit firms separately, loss firms have earnings asymmetric timeliness but profit firms do not. This indicates that firms with losses are more conservative and firms reporting profits do not present earnings asymmetric timeliness. Furthermore, Balkrishna et al. (2007) test the relations between accruals and operating cash flows using level of cash flows and change in cash flows as proxies for economic gain or loss, according to Ball and Shivakumar (2006), and find that accruals and operating cash flows are related negatively. This relationship will moderate when firms are in accounting losses.

Lai and Taylor (2008) conduct an Australian study on earnings asymmetric timeliness or conditional conservatism. Based on the Basu model, Lai and Taylor (2008) apply another firm-year-specific measurement as a control variable to examine the earnings asymmetric timeliness. This measurement is called C_Score and is a linear function of firm

size, leverage and market-to-book ratio since all of these characteristics are related to conditional conservatism (Khan and Watts, 2007; Lai and Taylor, 2008). Lai and Taylor (2008) document that the C_Score captures the changes in earnings asymmetric timeliness, and earnings asymmetric timeliness is negatively correlated with firm age, firm size and leverage. This therefore indicates that older firms with larger size and higher leverage are likely to have weaker earnings asymmetric timeliness.

US and European evidence shows the increase in accounting conservatism over time (Givoly and Hayn, 2000; Grambovas et al., 2006). However, conditional accounting conservatism in Australia does not have the same trend as in the US or Europe (Lai et al., 2013). Lai et al. (2013) apply earnings asymmetric timeliness, market-to-book ratio (Roychowdhury and Watts, 2007), loss frequency (Balkrishna et al., 2007) and return-on-asset (Givoly and Hayn, 2000) to measure the degree of conditional accounting conservatism. Their study indicates that conditional conservatism in Australia does not increase over time but has decreased since the adoption of International Financial Reporting Standards (IFRS) and unconditional conservatism has increased. The result is also consistent with the work of Barth et al. (2008) showing that the adoption of IFRS improves earnings quality.

Although a number of studies (Basu 1997; Ball and Shivakumar 2005, 2006; Balkrishna et al. 2007; Lai et al. 2013) focusing on conditional accounting conservatism capture not only the existence of earnings asymmetric timeliness but also operating cash flows asymmetric timeliness, none of them explains the reasons why this phenomenon happens.

2.5 Operating Cash Flows Asymmetric Timeliness

As discussed above, operating cash flows reflect bad news in a timelier manner than good news, which is not a result of conditional conservatism in financial reporting. Basu (1997) also finds evidence that operating cash flows also present asymmetric timeliness, which is that bad news causes more cash outflows than cash inflows with good news. In Ball and Shivakumar (2005)'s study on conservatism, the Basu model is improved to test the relation between accruals and stock returns and use operating cash flows as a control variable. Evidence shows that the degree of conditional conservatism measured by the Basu model has reduced after controlling operating cash flows effects. This is also consistent with the results of Steele (2011), Collins et al. (2013) and Oded and Weiss (2013) that operating cash flows asymmetric timeliness is deemed to be a confounding variable to bias or overstate the conditional conservatism measured by the earnings asymmetric timeliness model.

2.6 Possible Explanations of Operating Cash Flows Asymmetric Timeliness

A number of studies mention the phenomenon of operating cash flows asymmetric timeliness. However, there are limited US-based studies (Steele, 2011; Collins et al., 2013; and Oded and Weiss, 2013) that analyse the causes for operating cash flows asymmetric timeliness, but they provide alternative explanations with conflicting and inconclusive results. These explanations include pricing strategy, cost stickiness, firm's life cycle and some other explanations such as cost intervention and option-based compensation.

2.6.1 Product-pricing strategy

Steele (2011) proposes that cash flow asymmetric timeliness is a direct effect of managers' conservative behaviour. Steele (2011) argues that the product pricing explanation is the primary drive of asymmetric timeliness of operating cash flow according to the observation survey by Okun (1981) and Blinder et al. (1998). It is that when facing bad economic news causing negative demand shock that firms encounter the tradeoff between reducing product price and selling less quantity. When facing good economic news to have positive demand shock, firms also encounter the need to decide whether to increase selling quantity or to increase unit price.

Steele (2011) then explains that firms are more willing to decrease product price when facing bad economic news, and not likely to increase price in response to good economic news. First, Steele (2011) tests gross margin, which shows no significant asymmetric timeliness between facing bad or good news. Since gross margin includes operating cash flows and accruals, Steele (2011) then tests gross cash flows from sales activities (cash inflows from sales and cash outflows from inventory). Cash inflows from sales are found to present more sensitivity with respect to bad economic news. Then Steele (2011) tests cash flows from sales activities and other operating cash flows separately, and finds that cash flows from sales are the main reason causing asymmetric timeliness when facing bad news. Actually, when facing bad news as demand falls, reducing product price is not able to increase either sales revenue or cash inflows, since their competitors might also reduce their price to encourage sales. However, if firms decide not to reduce price to increase the quantity sold, sales revenue or cash inflows also fall. Therefore, bad economic news is more likely to cause the fall of cash flows, while good economic news might not

lead to cash flows rising—the effect of product pricing causes operating cash flows asymmetric timeliness.

2.6.2 Cost stickiness

Banker et al. (2013) conjecture that the confounding factor of cost stickiness in measuring conditional conservatism by using Basu's earnings asymmetric timeliness model. Some studies of cost management find that more costs are incurred with increased sales activity than costs reduce with sales fall (Cooper and Kaplan 1998; and Noreen and Soderstrom 1997). Anderson et al. (2003) define this phenomenon as cost stickiness, which is the asymmetric response of cost expenses to increased sales versus decreased sales. For example, because of the much higher adjustment costs, sales fall might lead managers to maintain their cost expenditure such as sales, general and administrative costs (hereafter SG&A) as usual to avoid more cash outflows. Consistent with the work of Anderson et al. (2003), Weiss (2010) also posits that cost stickiness is likely to be reduced when sales increase but not going away when sales decline. Furthermore, Weiss (2010) finds that not all cost expenditures are sticky. Cost of goods sold (hereafter COGS) is a non-sticky item, but other operating costs are sticky and overall cost expenditures are still sticky. Therefore, cost stickiness is considered as a cause of earnings asymmetric change.

Banker et al. (2013) consider that cost stickiness was omitted by previous studies on conditional conservatism, since cost stickiness is able to affect the asymmetric timeliness in earning and is not caused by conservatism. Therefore, Banker et al. (2013) argue the confounding factor of this cost stickiness in measuring conservatism using the asymmetric timeliness concept based on Basu's model. Based on Basu's model, Banker et al. (2013) add additional variables of sales and change in sales as a proxy of cost stickiness to

measure earnings asymmetric timeliness. Results show that cost stickiness is positive to lead to stronger asymmetric timeliness of earnings with bad economic news.

Nonetheless, Banker et al. (2013) concentrate only on earnings asymmetric timeliness, which can be decomposed to cash flows and accruals. Cost is sticky when sales fall because of the retention of resources such as employees and SG&A activities to avoid much higher adjustment costs. It is more likely that these sticky costs are mainly from cash activities rather than accruals. Therefore, cost stickiness might be an explanation affecting operating cash flows asymmetric timeliness.

2.6.3 Firm's life cycle

Collins et al. (2013) propose that firm's life cycle is an important factor that causes operating cash flow asymmetric timeliness. Operating cash flows represent a firm's fundamental earnings process, which could behave differently over a firm's life cycle (Basu, 1997; Dickinson 2011; and Ball et al., 2013). Collins et al. (2013) posit the dissimilar relations between operating cash flows asymmetric timeliness and firms in different stages of development. For instance, an early-stage firm might have more opportunities to face negative operating cash flows because of the growing expenditures (e.g., R&D, marketing and advertisement). Firm value for young firms is estimated by whether there are growth opportunities. Regardless of good or bad economic news, it is more likely that young firms will have negative operating cash flows. Moreover, when facing bad news, operating cash flows in growing firms are more determinate for firms' survival, which indicates that growing firms have stronger positive relations between negative operating cash flows and bad economic news. Therefore, under this circumstance, operating cash flows of growing firms will have more asymmetric timeliness when there is bad economic news. In contrast,

there would be weaker relations between operating cash flows and good economic news. Collins et al. (2013) then find evidence that firms in their early stage would show strong asymmetric timeliness of operating cash flows in response to bad news.

2.6.4 Other explanations

Except for product pricing, Steele (2011) also suggests that cost intervention is likely to be another significant cause of cash flows asymmetric timeliness. Cost intervention occurs when managers are likely to increase expenditure in existing product lines or other operating items such as research and development (hereafter, R&D) to redesign their products when facing bad economic news. Thus, more cash outflows occur due to the increased cost expenditures. Instead, it is probably for managers to do nothing when there is good economic news coming. Therefore, stronger operating cash flows asymmetric timeliness is expected if bad economic news occurs. Based on this cost intervention assumption, Collins et al. (2013) find insignificant results for cost intervention affecting operating cash flows asymmetric timeliness within good or bad economic news. Collins et al. (2013) argue that cost intervention varies for firms with different stages of firm's life cycle, and believes firm's life cycle is the determinant factor toward cost expenditures such as R&D, and advertising. Cost intervention itself is significant in affecting operating cash flows asymmetric timeliness. However, after adding the factor of firms' life cycle as the control variable, the effect of cost intervention becomes insignificant.

Oded and Weiss (2013) provide an alternative explanation for operating cash flows asymmetric timeliness. They argue that option-based compensation might affect the earnings and operating cash flows asymmetric timeliness. If managers receive stock option-based incentives, they are motivated to obtain higher profit with regard to good economic

news. In contrast, if bad news occurs such as demand falls, the option-based compensation would not be able to moderate a profit decline. Oded and Weiss (2013) find that option-based compensation, as real economic choices, leads to greater earnings and operating cash flows increases in good news than their decreases in response to bad news. Therefore, there is greater earning and operating cash flows asymmetric timeliness in good news, which is the inversed asymmetry.

Besides option-based compensation, Oded and Weiss (2013) also consider that monopolistic power is one of the explanations to affect operating cash flows asymmetric timeliness. Empirical test show that firms with higher monopolistic power reduce the operating cash flows asymmetric timeliness in response to bad news, while lower monopolistic power firms are expected to meet greater operating cash flows asymmetric timeliness in response to bad news. This is related to the explanations of product pricing (Steele, 2011) and firm's life cycle (Collins et al., 2013) as discussed in Section 2.6.1 and 2.6.3 respectively. Steele (2011) suggests that the asymmetry of cash inflow from sales is the primary driver for operating cash flows asymmetric timeliness. However, when facing bad news, firms with higher monopolistic power and more market power are not willing to reduce their price to encourage sales, resulting in less operating cash flows asymmetric timeliness. In addition, monopolistic or market power are also related to firm's life cycle. When firms are in their earlier stage, they are likely to have less market or monopolistic powers. Most of these explanations discussed above are tested independently from the previous studies, however they also affect each other mutually.

2.7 Conclusion

It is important to understand the causes of operating cash flows asymmetric timeliness, since operating cash flows are used as a good indicator to check the reliability of forecasting according to accounting earnings (Barth et al., 2001). Operating cash flows are deemed to be less subjective distortion and not easily adjusted by management; however; the asymmetric timeliness of operating cash flows still exists. In addition, operating cash flows are considered to have superior predictive ability for future firm value compared to earnings in Australia (Farshadfar et al., 2008). A number of previous studies suggest operating cash flows asymmetric timeliness as noises or biases to measure accounting conservatism using earnings asymmetric timeliness. Although operating cash flows asymmetric timeliness is not likely to be caused by accounting conservatism, among the potential explanations, it might be caused by managers' conservative behaviour, the real economic reaction and also characteristics of firms.

Asymmetric timeliness in operating cash flows has not previously been examined in Australian firms. To understand conditional conservatism as measured by earnings asymmetric timeliness, it is also important to know how asymmetric the operating cash flows movement will change the previous results of using earnings asymmetric timeliness as the measurement of conditional accounting conservatism. As discussed above, previous studies are exclusively US based, and there is little Australian evidence of the operating cash flow asymmetric timeliness. In addition, these studies test their explanations independently, which ignores their mutual effects among each other. More importantly, Australian firms provide a unique setting of using the direct method of statement of cash flows, which gives the more accurate data to measure operating cash flows and avoids the

accruals effects on operating cash flows that may arise from using the indirect method of the statement of cash flows (Collins et al., 2014).

Some explanations such as cost intervention, option-based compensation and monopolistic power as discussed in Section 2.6 are not examined in this study. Collins et al. (2013) examine the effect of cost intervention on operating cash flows asymmetric timeliness while controlling for firm's life cycle, and find insignificant effect. It is probably because of cost intervention focusing on the capital expenditure, which is also one of the main determinants for firm's life cycle. Monopolistic power is related to both product pricing and firm's life cycle that mature firms are likely to have more powers that would affect their product pricing. Since cost intervention and monopolistic power are related to product pricing and firm's life cycle, these are not tested.

Furthermore, the effect of option-based compensation on operating cash flows is not examined. Oded and Weiss (2013) suggest this explanation, which is based on the US market. In the US, most CEOs receive some form of option-based compensations; whereas in Australia, there are less than 35 per cent of CEOs receiving equity-based compensation (Matolcsy and Wright, 2007), which is less likely to be as significant in affecting operating cash flows asymmetric timeliness as it is in the US.

In conclusion, the existence of operating cash flows asymmetric timeliness in Australia is tested first in this study. The possible explanations of why there will be operating cash flows asymmetric timeliness is then examined, including: (1) product pricing (Steele, 2011); (2) cost stickiness (Banker et al., 2013); and (3) firm's life cycle (Collins et al., 2013). According to previous studies, I expect that operating cash flows

asymmetric timeliness will not only be because of the managers' behaviour (real activity) but also the characteristic of firms.

CHAPTER 3 HYPOTHESES DEVELOPMENT

3.1 Introduction

In this chapter, the development of hypotheses is reported. Section 3.2 explains the uniqueness in Australian market and why operating cash flows are expected to have asymmetric timeliness in Australian firms. Each explanation relating to operating cash flows in Australian markets and how they are expected to affect operating cash flows asymmetry are described in Section 3.3 to 3.5.

3.2 Existence of Operating Cash Flows Asymmetric Timeliness in Australia

Basu (1997) introduces the earnings asymmetric timeliness model, and also finds evidence of operating cash flows asymmetric timeliness. Operating cash flows will decrease more in response to bad news than they will increase in response to good news. In addition to the work of Basu (1997), Watts (2003a, 2003b), Beaver and Ryan (2005), Steele (2011), and Collins et al. (2012) also find the existence of operating cash flow asymmetric timeliness in US firms. However, there is little evidence of operating cash flows asymmetric timeliness in Australia, and no evidence that shows why there would be operating cash flows asymmetric timeliness.

In addition, Australian firms have choices to report the actual cash flows components under either the direct method or the indirect method, and most Australian firms use the direct method. In contrast, most US firms report using the indirect method statement of cash flow. Krishnan and Largay III (2000) deem that the direct method is more valuable to

provide accurate information of cash receipt and cash payments, compared to the indirect method that reports only changes in accruals. Krishnan and Largay III (2000) also report that statement of cash flow data using the direct method shows the higher ability to predict future earnings compared to those based on the indirect method. Collins et al. (2013) also suggest that the direct and indirect methods might obtain different results when testing operating cash flow asymmetric timeliness, because the indirect method of cash flows statement is likely to capture part of accrual asymmetric timeliness.

There are around 40 per cent of Australian listed firms in mining industry, which are unique and have different operating activities to firms in other industries. Furthermore, around 40 per cent of Australian firms report losses—a significantly higher percentage than the US market (Balkrishna et al., 2007 and Lai et al., 2013). The extent of cash flow asymmetric timeliness may thus differ from the US market, as Balkrishna et al. (2007) find that firms with losses demonstrate greater earnings asymmetric timeliness. Therefore, compared to the US findings, Australian firms offer a unique setting for testing asymmetric timeliness in operating cash flows. I therefore hypothesise the following:

***Hypothesis 1*:**

Operating cash flows are more sensitive to bad than good economic news.

3.3 Effect of Product Pricing on Operating Cash Flows Asymmetric Timeliness

Steele (2011) deems that product pricing is the main drive causing operating cash flows asymmetric timeliness. According to Okun's (1981) and Blinder et al.'s (1998)

observation and survey, firms are willing to adjust product price to encourage sales when facing bad news, and probably make no price changes when there is good news. However, when facing bad news, reducing product price cannot help firms to generate more sales since competitors will also be willing to reduce their price (Okun, 1981; and Blinder et al., 1998). Therefore, more sales fall occurs in response to bad news than sales rise in response to good news, which leads to operating cash flows asymmetric timeliness. In Australia, more than 40 per cent of listed firms are mining firms which are usually the price takers (Mahadevan, 2005). These firms are also more likely to remain the same price even though they experience good economic news. The effect of product pricing on operating cash flows asymmetric timeliness is hereby expected to be existing in Australia. Therefore, I hypothesise the following:

***Hypothesis 2*:**

Product-pricing strategy is one of the reasons affecting operating cash flows being more sensitive to bad than good economic news.

3.4 Effect of Cost Stickiness on Operating Cash Flows Asymmetric Timeliness

Banker et al. (2013) find that cost stickiness is one alternative factor affecting earnings asymmetric timeliness; however, as I discussed previously, earnings can be separated into total accruals and operating cash flows. Banker et al. (2013) concentrate on the earnings to measure accounting conservatism in reporting, but operating cash flows is more related to real business activities than total accruals. Therefore, in this study, I will investigate whether there is any asymmetric timeliness of operating cash flows affected by

cost stickiness. Furthermore, Anderson et al. (2003) suggests that it is likely that firms with more employees to support a given volume of sales will have higher degree of cost stickiness because of the higher adjustment costs for sales, general and administration costs. In Australia, it is unique that a large proportion of firms are in resources and mining areas, which rely more on resources than SG&A expenditures. Therefore, according to Anderson et al.'s (2003) findings, these mining firms are more likely to have cost stickiness resulting in cash flows asymmetric timeliness but to a lower degree. Thus I hypothesise the following:

***Hypothesis 3*:**

Cost stickiness is one of the reasons affecting operating cash flows being more sensitive to bad than good economic news.

3.5 Effect of Firm's Life Cycle on Operating Cash Flows Asymmetric Timeliness

Collins et al. (2012) present evidence that firm's life cycle is likely to affect the operating cash flow asymmetric timeliness. Here in Australia, the firm's life cycle is unique because a large proportion of listed firms (around 40 per cent of all Australian listed firms) are mining and resource firms with low or zero sales in their early stages of life, compared to their US peers. For these firms, their life cycles are different to those in other businesses and it is possible that these firms would have very low in sales in their beginning stage. Collins et al. (2012) suggest that firms in their early life stage have greater asymmetric timeliness while facing bad news. Due to survival problems of firms in their early stage, cash flows would respond more quickly when facing bad news. Thus, firm life cycle is

expected to be relatively important in determining operating cash flows asymmetric timeliness in Australia. I expect to find evidence that operating cash flows asymmetric timeliness would be influenced by firm's life cycle in the Australian market. Additionally, based on the work of Anthony and Ramesh (1992) and Collins et al. (2012), I will use firm size, age, capital expenditures, and sales growth to measure firm's life cycle, then to measure whether the characteristics of life cycle will influence operating cash flows asymmetric timeliness. Therefore, I hypothesise the following:

***Hypothesis 4*:**

The degree of operating cash flows asymmetric timeliness is higher for firms in their earlier life cycle stage and lower in their later stage.

3.6 Conclusion

In summary, this thesis tests three possible explanations of why there will be operating cash flows asymmetric timeliness; these include: (1) product pricing (Steele, 2011); (2) cost stickiness (Banker et al., 2013); and (3) firm's life cycle (Collins et al., 2012). Table 1 shows the summary of these existing explanations of operating cash flows asymmetric timeliness effects. I expect that operating cash flows asymmetric timeliness will be affected not only by the managers' behaviour (real activity) but also firms' characteristics.

Table 1 Relations Between Operating Cash Flows and the Possible Explanations of Operating Cash Flows Asymmetric Timeliness

Explanations	**Good news**	**Bad news**	**Operating cash flows asymmetric timeliness in literature**	**Expected operating cash flows asymmetric timeliness in Australia**
1. Product pricing	Higher cash inflows from sales	Lower or maintain cash inflows from sales	Decrease in cash inflows > increase in cash inflows Asymmetric timeliness exists	Large portion of Australian firms are within mining and resource areas, as the price takers in the market **Asymmetric timeliness exists**
2. Cost stickiness	Cash outflows from COGS, SG&A and R&D increase	Cash outflows from SG&A and R&D remain static	Operating cash outflow is less sensitive in response to bad news than good news. Asymmetric timeliness exists	Mining firms perform differently to firms in other industries **Asymmetric timeliness exists but is reduced in mining firms**
3. Firm's life cycle	Operating cash outflows > inflows for firms in their early stages	Operating cash outflows > inflows in all stages	Strong asymmetric timeliness in firms in early stage Weakened asymmetric timeliness in firms' mature stage	With large amount of mining and resource firms, firms' life cycle in Australia is unique. **Asymmetric timeliness exists** **Stronger in earlier stage firms** **Weaken in mature firms**
4. Cost intervention	Cash outflows from SG&A and R&D remain	Cash outflows from SG&A and R&D increase	Increased outflows in response to bad news > Increased outflows in good news Asymmetric timeliness exists	Capital expenditure is one consideration of measuring firms' life cycle Control of the factor of firms' life cycle will eliminate asymmetric timeliness made by cost intervention **No significant effect in Australia**
5. Option-based compensation	Much more earnings / cash flows increase	Less earnings/ cash flows decrease	Greater earnings in good news than bad news Inversed asymmetric timeliness	Small portion of firms receive option-based compensation **No significant effect in Australia**

CHAPTER 4 METHODOLOGY AND DATA COLLECTION

4.1 Introduction

This chapter presents the empirical models and data used to examine each hypothesis. Section 4.2 to 4.5 discuss the regression models to test the existence of operating cash flows asymmetric timeliness, effects of product pricing, cost stickiness and firm's life cycle on operating cash flows asymmetric timeliness, respectively. The sample data is reported in Section 4.6 and the variable definition and measurements are presented in Section 4.7. Descriptive statistics, correlations and univariate analysis are discussed in Section 4.8.

4.2 Operating Cash Flows Asymmetric Timeliness

The first hypothesis related to the existence of operating cash flows asymmetric timeliness in response to good or bad news is based on the following regression model according to Basu (1997):

$$CFO_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e \qquad (1)$$

Where:

CFO_t = operating cash flows in fiscal year t deflated by lagged market value of equity

$DRET_t$ is the dummy variable, when $DRET_t$ = 1 means negative stock return for year t, which is bad news; when $DRET_t$ = 0 means positive stock return for year t, which is good news

RET_t = buy-and-hold annual return in fiscal year t

Basu (1997) introduces this model to show the asymmetric timeliness of cash flows. To test whether there is operating cash flows asymmetric timeliness, the dependent variable CFO_t (operating cash flows deflated by lagged market value of equity) controls for heteroskedasticity. The independent variable RET_t and dummy variable $DRET_t$ are as the proxies for good or bad news. If the return was greater than zero, it is good news, and the dummy variable $DRET_t = 0$. Conversely, return that was less than zero represents bad news, and the dummy variable $DRET_t = 1$. In this model, the key coefficient of interest is b_1, where positive and significant b_1 indicate the existence of operating cash flows asymmetric timeliness.

4.3 Effect of Product-Pricing Strategies on Operating Cash Flows Asymmetric Timeliness

The second hypothesis tests whether product pricing will cause operating cash flow asymmetric timeliness based on the following regression model according to Steele (2011):

$$CASH\_SALE_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e \quad (2)$$

$$CASH\_SUP_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e \quad (3)$$

$$CASH\_DSALE_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e \quad (4)$$

Where

CFO_SALE_t = operating cash inflows in fiscal year t deflated by lagged market value of equity

CFO_SUP_t = operating cash outflows from employees and suppliers in fiscal year t deflated by lagged market value of equity

$CASH\_DSALE_t = CFO\_SALE_t - CFO\_SUP_t$ = operating cash flow margin in fiscal year t deflated by lagged market value of equity

These models are drawn from the work of Steele (2011), which are developed from the Basu model to measure whether good or bad news would affect the sales activities to explain the factor of product pricing. Steele (2011) uses cost of goods sold plus the change in inventory, less the change in accounts payable to represents the cash outflows for inventory. Since the direct method of the statement of cash flows provides more information than the indirect method, operating cash outflows from employees and suppliers could be easily found in Australia and avoid the accruals effects. In these models, b1 is also the key coefficient of interest to test whether product pricing can cause more operating cash flows asymmetric timeliness in response to bad news than to good news.

Model (2)–(4) regress from *CASH_SALE*, *CASH_SUP* and *CASH_DSALE* on negative stock returns to verify the effect of product pricing on operating cash flows. The effect of product pricing on earnings and accruals asymmetric timeliness could not be tested in the same way as the Basu model since here cash inflows from sales, cash outflows from employees and suppliers, and cash margin as dependent variables measure the product pricing on operating cash flows asymmetric timeliness. Therefore, the new model to examine the effect of product pricing on operating cash flows is generated so that the independent variable *PP1* and the alternative variable *PP2* are considered as proxy for the factors of product pricing, and operating cash flows become the dependent variable. This is another contribution in this study:

$$CFO_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_0PP1_t + c_1PP1_t*DRET_t + c_2PP1_t*RET_t + c_3PP1_t*RET*DRET_t + e \quad (5)$$

$$CFO_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_0PP2_t + c_1PP2_t*DRET_t + c_2PP2_t*RET_t + c_3PP2_t*RET*DRET_t + e \quad (6)$$

Where

$PP1_t$ = change in cash sales to total sales ratio from year t-1 to t

$PP2_t$ is the dummy variable, when $PP2_t = 1$ means the lowest quartile of change in cash margin ratio from t-1 to t, when $PP2_t = 0$ means the other three higher quartiles of change in cash margin ratio from t-1 to t

PP1 is applied as the proxy for factor of product pricing, and *PP2* is the alternative factor of product pricing. *PP1* reports the change in cash sales to total sales ratio from year t-1 to t, indicating how cash sales move. Model (5), the coefficient c_3 on $PP1_t*RET_t*DRET_t$, is predicted to be negative since negative change in cash sales to total sales ratio being likely to explain how product pricing changes, with the bad economic news likely to cause greater operating cash flows asymmetric timeliness compared to good economic news.

PP2, as the change in cash margin, is deemed to be an indicator for product pricing. For example, if managers reduce price in order to make more sales in response to bad economic news, the cash margin would reduce because of the lower sales price with unchanged cost of goods sold. Therefore, in Model (6) the dummy variable *PP2* indicates whether firms use lower prices to make more sales and reduce profit margins. While *PP2* = 1, firms are more likely to adjust product price in order to make more sales.

Consequently, the coefficient c_3 on $PP2_t*RET_t*DRET_t$ is expected to be positive to present the greater effect of product pricing on operating cash flows asymmetric timeliness in response to bad economic news.

4.4 Effect of Cost Stickiness on Operating Cash Flows Asymmetric Timeliness

The third hypothesis tests whether cost stickiness will cause more operating cash flow asymmetric timeliness when there is bad news based on the following regression model modified from Banker et al. (2013):

$$CFO_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_1SALES_t + c_2DSALES_t + c_3SALES\_CHG_t + c_4DSALES_{it}*SALES\_CHG_t + e \quad (7)$$

Where:

$SALES_t$ = sales in fiscal year t deflated by lagged market value of equity

$SALES\_CHG_t$ = the percentage one year sales change from year t-1 to t

$DSALES_t$ is the dummy variable, when $DSALES_t = 1$ means sales decreases for year t; when $DSALES_t = 0$ means sales increase for year t.

Since cost stickiness is correlated to sales changes, by replicating Banker et al.'s (2013) model on cost stickiness to measure earnings asymmetric timeliness, sales changes and the dummy variable of sales decrease or increase are tested to find the effect of cost stickiness on operating cash flows. In this model, the key coefficient of interest is c_4, while positive and significant c_4 indicates the existence of sticky cost, and greater operating cash flows asymmetric timeliness.

4.5 Effect of Firm's Life Cycle on Operating Cash Flows Asymmetric Timeliness

The fourth hypothesis tests whether firms' life cycle will be a significant factor causing operating cash flows asymmetric timeliness according to the following regression model from Collins et al. (2014):

$$CFO_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_1Z\_LIFE\_CYCLE_t + c_2Z\_LIFE\_CYCLE_t*DRET_t + c_3Z\_LIFE\_CYCLE_tRET_t + c_4Z\_LIFE\_CYCLE_t*RET_t*DRET_t + e \quad (8)$$

Where:

$Z\_LIFE\_CYCLE_t$ = combined z-score = $Z\_SG - Z\_AGE + Z\_CAPEX - Z\_SIZE$

Z_SG = z-score of the percentage two years' sales growth from year t-2 to t

Z_AGE = z-score of the logarithm of the number of month since the establishment date

Z_CAPEX = z-score of capital expenditures to total assets ratio

Z_SIZE = z-score of the logarithm of lagged total assets in fiscal year t-1

The factor of firms' life cycle is estimated by z-score, the composition of firm size, age, capital expenditures and sales growth in Anthony and Ramesh's (1992) study, and results will be ranked into five quintiles based on the value of combined z-score. Therefore, firms are ranked as 1 to 5 by scaled rank. Higher rank indicates that firms are younger and in their earlier stages. In contrast, firms with a lower rank indicate they are more mature. The Australian market, compared to US, is much smaller in size so that the firm's life cycle would be ranked into four quartiles instead of five quintiles in this study. In this model, the key coefficient of interest is c_4, while positive and significant c_4 indicates that younger

firms will face more operating cash flows asymmetric timeliness in response to bad news than will mature firms.

4.6 Sample

The sample data were primarily collected from the Aspect Huntley Financial Database for all Australian listed firms excluding all financial institutions, services and insurance firms, and combined with Share Prices and Price Relatives (SPPR) for market data over the period from 1993 to 2012. The Australian Accounting Standard Board (AASB) 1026 "Statement of Cash Flows" applies to financial years ending on or after 30 June 1992. Therefore, the study sample period starts from 1993 to obtain adequate information from the direct method of statement of operating cash flows. Firms with (i) missing data for any of the variables, (ii) negative book value of equity, (iii) or negative total assets are also excluded from the sample data. The final valid data consists of 23,203 firm-year observations over the period from 1993 to 2012.

4.7 Definitions of Independent and Dependent Variables

Table 2 displays all variables and measurements in the database. Operating cash flows and its components are collected from the statement of cash flows using the direct method, which is likely to avoid the accruals effects when the indirect method of statement of cash flows is used in the US market.

Table 2 Variable Definitions

Variables	Measurements
Operating cash flows from Statement of Cash Flows (**CFO**)	Net operating cash flows (#9100) deflated by the lagged market value of equity
Firm stock return (**RET**)	Annual buy-and-hold returns, calculated from the fiscal year end
Dummy variable for firm stock return (**DRET**)	Negative annual buy-and-hold returns with DRET = 1, otherwise DRET = 0
Dummy variable for operating cash flows from Statement of Cash Flows (**DCFO**)	Negative operating cash flows with DCFO = 1, otherwise DCFO = 0
Change in operating cash flows from Statement of Cash Flows ((**D1CFO**)	(Net operating cash flows – net operating cash flows of year t-1) / the lagged total asset (#5090)
Dummy variable for change in operating cash flows from Statement of Cash Flows (**DD1CFO**)	Negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0
Earnings (**EARN**)	Reported NPAT after abnormals (#8036) deflated by the lagged market value of equity
Accruals from Statement of Cash Flows (**TACC**)	(Reported NPAT after abnormals – net operating cash flows) deflated by the lagged market value of equity
Financing cash flows from Statement of Cash Flows (**FCF**)	Net financing cash flows (#9300) deflated by the lagged market value of equity
Investing cash flows from Statement of Cash Flow (**ICF**)	Total investing cash flows (#9200) deflated by the lagged market value of equity
Cash inflows from sales (**CASH_SALE**)	Cash inflows from sales (#9050) deflated by the lagged market value of equity
Cash outflows from employee and suppliers (**CASH_SUP**)	Cash outflows from employees and suppliers (#9055) deflated by the lagged market value of equity
Gross cash flows from selling activities (**CASH_DSALE**)	(Cash inflows from sales (#9050) - cash outflows from employees and suppliers (#9055)) deflated by the lagged market value of equity
Change in cash sales to total sales ratio (**PP1**)	Cash inflows from sales (#9050) / total sales (#7090) – cash inflow from sales of year t-1 / total sales of year t-1

Dummy variable for change in cash margin (**PP2**)	The lowest quartile of (Cash inflows from sales (#9050) / cash outflows from employees and suppliers (#9055) – cash inflows from sales of year t-1 / cash outflows from employees and suppliers of year t-1) with PP2 = 1, otherwise PP2 = 0
Total sales (**SALES**)	Total sales (#7090) deflated by the lagged market value of equity
Dummy variable for sales (**DSALES**)	Sales decreases for year t when DSALES = 1, otherwise DSALES = 0
One year sales growth (**SALES_CHG**)	(Sales – sales of year t-1) / sales of year t-1
Firm age (**AGE**)	The logarithm of the number of month since the establishment date
Firm size (**SIZETA**)	The logarithm of the lagged total assets (#5090)
Capital expenditure (**CAPEX**)	Capital expenditure from cash flow from investment (#9150) / total assets (#5090)
Two year sales growth (**SG**)	(Sales – sales of year t-2) / sales of year t-2
Firms life cycle (**LIFE_CYCLE**)	The combined z-Score = Z_SG - Z_AGE + Z_CAPEX – Z_SIZETA
Market-to-book ratio (**MTB**)	Market value of equity / common share equity (#7010 - #7015 - #7018)
Financial leverage (**LEV**)	Short-term debt and long-term debt (#6000+#6020) / total assets (#5090)
Operating expenses (**OPREXP**)	Total operating expenses (#7095) / total assets (#5090)
Special items (**SPECIAL**)	Profit (loss) from discontinued operations after tax (#8033) / total assets (#5090)
Firm size on sales (**SIZESALE**)	The logarithm of sales
Firm size on market value (**SIZEMV**)	The logarithm of market value

This table presents the definition of variables and measurements in the Aspect Huntley Financial Database.

4.8 Descriptive Statistics

Table 3 presents descriptive statistics for all variables, except dummy ones. All variables are winzorised at the top and bottom 1 per cent in order to reduce the effects of outliers. The mean and median annual stock return is 0.131 and -0.017 respectively, which is positive skewed and indicates that more than half of the Australian listed firms from 1993 to 2012 have negative annual stock returns. Mean and median for operating cash flows, earnings and accruals are all negative, indicating that there are large numbers of firms experiencing financial losses. However, both the 1-year sales change and 2-year sales growth rate are positive for mean and median showing at least 50 per cent listed firms have sales increases.

Since firm's life cycle is measured by firm size, age, capital expenditure and 2-year sales growth rate, the mean of the firm characteristics related variables by life cycle quartiles are provided in Appendix A. The lowest quartile indicates firms in the most mature stage and the higher quartile indicates firms in earlier stages. According to Anthony and Ramesh's (1992) measure on firm's life cycle, mature firms are likely to have larger firm size, older firm age, lower capital expenditures and 2-year sales growth rate. Reports showing that mature firms are likely to have higher operating cash flows, earnings and total accruals compared to younger firms are also included in Appendix A.

Table 3 Summary Statistics

Variable	Mean	Median	STD	Q1	Q3
RET	0.131	-0.017	0.752	-0.356	0.375
CFO	-0.016	-0.017	0.251	-0.128	0.107
D1CFO	0.019	-0.001	0.963	-0.060	0.057
EARN	-0.130	-0.041	0.369	-0.221	0.074
TACC	-0.119	-0.045	0.323	-0.164	0.004
CASH_SALE	1.196	0.270	2.194	0.000	1.376
CASH_SUP	1.180	0.351	2.062	0.105	1.273
CASH_DSALE	0.013	-0.015	0.408	-0.117	0.143
PP1	2.575	0	233.991	-0.045	0.074
SALES	1.260	0.394	2.185	0.024	1.472
SALES_CHG	2.031	0.082	10.213	-0.200	0.507
AGE	4.458	4.605	1.257	3.761	5.338
SIZETA	17.247	16.926	2.048	15.737	18.464
CAPEX	0.095	0.048	0.119	0.013	0.131
SG	5.523	0.173	28.325	-0.248	0.957
MTB	2.351	1.470	2.720	0.849	2.702
LEV	0.126	0.034	0.177	0.000	0.225
OPREXP	0.743	0.484	0.763	0.194	1.030
SIZEMV	17.191	16.847	1.973	15.710	18.419
SIZESALE	15.851	16.246	3.421	13.293	18.430

This table presents the means, medians, Q1 and Q3 for all variables except dummy variables for the samples for the period of 1993–2012.

Panel A of Table 4 reports descriptive statistics for the selected variable of interest in the mining industry. For mining firms, mean and median cash sales are 0.286 and 0.000, indicating mining firms are different to other firms in that less than 50 per cent of firms generate positive cash flows from sales. Earnings in Q3 is negative (-0.011) reports that more than 75 per cent of mining firms experience financial losses, which is significantly higher than in other non-mining firms. This is likely to make different operating cash flows asymmetric timeliness between mining and non-mining firms.

Since more than 40 per cent of the sample firms are in the mining industry, Panel B of Table 4 uses t-test to examine the difference between mining and non-mining firms. Results show significant differences (P-value<0.01) for most of the cash-related variables, except for mean total accruals between mining and non-mining firms. Average *CFO* are negative (-0.071) for mining firms and positive (0.027) for non-mining firms, and median *CFO* and *EARN* are both positive for non-mining firms but negative for mining firms, which indicates that more mining firms have cash flows and financial loss problems than non-mining firms.

Table 4 Summary Statistics for Mining and Non-Mining Firms

Panel A: Summary Statistics for Mining Firms, for Variables CFO, EARN, TACC, CASH_SALE, CASH_SUP, CASH_DSALE

Variable	Mean	Median	STD	Q1	Q3
CFO	-0.071	-0.058	0.222	-0.157	0.003
EARN	-0.193	-0.104	0.364	-0.274	-0.011
TACC	-0.122	-0.048	0.315	-0.175	0.001
CASH_SALE	0.286	0.000	0.921	0.000	0.186
CASH_SUP	0.331	0.128	0.756	0.057	0.293
CASH_DSALE	-0.049	-0.058	0.328	-0.137	0.000

Panel B: Two-Sample T Test with Equal Variances

Nonparametric Equality-of-Mean Test

	Non-Mining Firms		Mining Firms		Mean Diff
Variables	N	Mean	N	Mean	
CFO	11133	0.027	8666	-0.071	0.098***
EARN	11161	-0.081	8659	-0.193	0.112***
TACC	11160	-0.117	8692	-0.122	0.005
CASH_SALE	11167	1.911	8766	0.286	1.626***
CASH_SUP	11175	1.848	8776	0.331	1.517***
CASH_DSALE	11155	0.062	8756	-0.049	0.111***

Nonparametric Equality-of-Medians Test

	Non-Mining Firms		Mining Firms		Median Diff
Variables	N	Median	N	Median	
CFO	11133	0.055	8666	-0.058	0.113***
EARN	11161	0.039	8659	-0.104	0.143***
TACC	11160	-0.043	8692	-0.048	0.005***
CASH_SALE	11167	0.979	8766	0	0.979***
CASH_SUP	11175	0.928	8776	0.128	0.800***
CASH_DSALE	11155	0.078	8756	-0.058	0.136***

This table presents the summary statistics for mining and non-mining industries. Panel A is the summary statistics for the main variables, which can be compared to Table 1 for all the sample data. Panel B is the t-test to examine both mean and median for these main variables whether there are differences between mining and non-mining firms. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

In Table 5 the Pearson correlations among the main variables is presented. Panel A shows the relations among operating cash flows (*CFO*), earnings (*EARN*), total accruals (*TACC*), cash inflows from sales (*CASH_SALE*), cash outflows from employees and suppliers (*CASH_SUP*), cash margin (*CASH_DSALE*), annual stock return (*RET*), change in cash flows (*D1CFO*), and the dummy variables of stock return (*DRET*) and change in cash flows (*DD1CFO*). The *CFO* and *EARN* are highly positive correlated (coefficient = 0.518), and *CFO* and *TACC* are negatively correlated (coefficient = -0.147), which is consistent with Ball and Shivakumar's (2006) finding.

The *RET*, the annual stock return, as the proxy for economic news, has a positive relation to *CFO* (coefficient = 0.066). The DRET, which equals 1 for negative annual return, is negatively related to *CFO* (coefficient = -0.128), indicating that firms with negative annual return (proxy for bad economic news) would experience lower operating cash flows. The *D1CFO*, considered as an alternative proxy for economic news (Ball and Shivakumar, 2006), provides the consistent information that *D1CFO* and *CFO* are positively correlated (coefficient = 0.066). In addition, *DD1CFO*, which is the dummy variable and equal to 1 for negative change in operating cash flows, shows that firms with negative change in operating cash flows results in lower operating cash flows.

Panel B presents the correlations among firm's life cycle, its four components, *CFO*, *EARN* and *TACC*. The z-score of life cycle is considered to be higher for younger firms and lower for more mature firms. Therefore, firms that are older and larger in size are likely to be more mature firms since there are negative correlations between life cycle and age (coefficient = -0.482) and between life cycle and firm size (coefficient = -0.609). Additionally, the positive correlations between life cycle and capital expenditure

(coefficient = 0.540) and between life cycle and sales growth rate (coefficient = 0.561) indicate firms with higher capital expenditure and sales growth might be firms in earlier stages. Furthermore, the negative correlated life cycle and operating cash flows (coefficient = -0.251) indicate that mature firms are likely to carry more operating cash flows than firms in earlier stages. Not only operating cash flows, but earnings and total accruals also present as a negative correlation to life cycle.

Table 5 Pearson Correlations Among Main Variables

Panel A: Correlations among CFO, EARN, TACC, Cash Margin, Stock Return, Change in Cash Flows and their Dummy Variables Indicating Bad Economic News

	CFO	EARN	TACC	CASH_SALE	CASH_SUP	CASH_DSALE	RET	D1CFO	DRET	DD1CFO
CFO	1									
EARN	0.518*	1								
TACC	-0.148*	0.661*	1							
CASH_SALE	0.363*	0.137*	-0.144*	1						
CASH_SUP	0.277*	0.080*	-0.136*	0.983*	1					
CASH_DSALE	0.835*	0.420*	-0.113*	0.391*	0.215*	1				
RET	0.066*	0.082*	0.035*	0.068*	0.067*	0.047*	1			
D1CFO	0.066*	0.028*	-0.027*	0.013	0.014*	0.156*	-0.001	1		
DRET	-0.128*	-0.151*	-0.064*	-0.105*	-0.095*	-0.097*	-0.679*	-0.010	1	
DD1CFO	-0.286*	-0.098*	0.118*	-0.081*	-0.053*	-0.182*	-0.019*	-0.143*	0.0464*	1

Panel B: Correlations Among Firm's Life Cycle, Its Components, CFO, EARN, and TACC

	Z_LIFE_CYCLE	SIZETA	AGE	CAPEX	SG	CFO	EARN	TACC
Z_LIFE_CYCLE	1							
SIZETA	-0.609*	1						
AGE	-0.482*	0.199*	1					
CAPEX	0.540*	-0.066*	-0.097*	1				
SG	0.569*	-0.050*	-0.045*	0.086*	1			
CFO	-0.252*	0.410*	0.168*	0.014*	-0.059*	1		
EARN	-0.246*	0.349*	0.145*	-0.055*	-0.029*	0.519*	1	
TACC	-0.079*	0.072*	0.032*	-0.078*	0.010	-0.147*	0.661*	1

This table reports the Pearson correlations among these main variables and the life cycle components. * indicates significant at 5% level for two-tailed test.

4.9 Conclusion

The models in Section 4.2 to 4.5 have been presented to test the four hypotheses respectively. Model (5) and (6) is another contribution in this study that generates the new independent variables as proxies for product pricing in order to examine the effect of product pricing on operating cash flows directly. The sample in this study consists of 23,203 firm-year observations over the period of 1992 to 2012, which includes 10,175 mining firms. By the univariate analysis on the main variables, significant differences are found between mining and non-mining firms. Therefore, Chapter 5 provides the empirical results on models discussed in this chapter, and the differences between mining and non-mining firms are also documented.

CHAPTER 5 RESULTS AND ROBUSTNESS CHECK

5.1 Introduction

This chapter reports all the results for Hypothesis 1 to 4. Section 5.2 includes the results for Hypothesis 1, which tests whether operating cash flows asymmetric timeliness exists. Section 5.3 describes the regression analysis to identify the effect of product-pricing strategy on operating cash flows asymmetric timeliness. The results of Hypothesis 3 are discussed in Section 5.4 by examining the effect of cost stickiness on operating cash flows asymmetric timeliness. The influence of firm's life cycle on operating cash flows asymmetric timeliness, which is Hypothesis 4, is discussed in Section 5.5. Finally, the mutual effect of product pricing and cost stickiness on operating cash flows asymmetric timeliness is documented in Section 5.6, and the robustness checks are presented in Section 5.7.

5.2 Empirical Results for the Existence in Operating Cash Flows Asymmetric Timeliness

Table 6 reports the regression results of Hypothesis 1 that operating cash flows are more sensitive to bad news than good news, where *CFO*, *EARN*, and *TACC* are operating cash flows, earnings and total accruals deflated by lagged market value of equity, respectively. The *RET* is the annual buy-and-hold stock return. The *DRET* is the dummy variable for stock return where negative stock return with *DRET* = 1, otherwise *DRET* = 0. The t-statistics reported in parentheses is calculated using standard errors corrected for the effects of two-way clustering by firm and year. Using two-way clustering by firm and year

is considered as a way to reduce the bias on standard errors in panel dataset regressions. Therefore, all the following regression models are tested by two-way clustering t-statistics.

The results shown in Table 6 on Model (1) support Hypothesis 1 that operating cash flows are more sensitive to bad than good economic news. Columns (1) – (3) present the models by using operating cash flows (*CFO*), earnings (*EARN*) and total accruals (*TACC*) asymmetric timeliness as dependent variables, respectively. Column (1), the negative coefficient a_1 on *DRET* (a_1 = -0.033, P-value < 0.01), where *DRET* is the dummy variable to describe firms with bad economic news, indicates that firms with bad economic news would experience lower *CFO* than firms with good economic news. The positive significant coefficient b_1 (b_1 = 0.185, P-value < 0.01) reports the existence of operating cash flows asymmetric timeliness, since *DRET*RET* is a dummy variable to examine if *CFO* would reduce more in response to bad news than *CFO* increase in response to good news. Results also show that the coefficient b_1 on *DRET*RET* for all three dependent variables in Columns (1) – (3) are positive and strongly significant (P-value < 0.01). Since the coefficient b_1 for *CFO* (b_1 = 0.185, P-value < 0.01) is higher than b_1 for *TACC* (b_1 = 0.159, P-value < 0.01), this indicates a greater degree of asymmetric timeliness on operating cash flows than on total accruals. This is consistent to Steele's (2011) finding in the US market that operating cash flows are more sensitive than total accruals when facing bad economic news. In addition, since earnings are composed of operating cash flows and total accruals, the degree of the earnings asymmetric timeliness (b_1 = 0.355, P-value < 0.01) is higher than either operating cash flows or total accruals asymmetry.

Since Table 4 reports the significant difference between mining and non-mining firms, Columns (4) – (6) present the same model as Columns (1) – (3) but adds one set of dummy

variables for mining firms (*DMIN*) to test whether mining firms would perform significantly differently to non-mining firms. In testing the *CFO* asymmetric timeliness by controlling mining firms, Column (4) shows that mining firms have less *CFO* asymmetric timeliness than non-mining firms. The negative coefficient c_0 (c_0 = -0.113, P-value < 0.01) indicates that mining firms have less operating cash flows than non-mining firms, regardless of bad or good economic news response. The coefficient c_3 (c_3 = -0.143, P-value < 0.01) on *DMIN*DRET*RET* shows that operating cash flows for mining firms in response to bad news are less asymmetric than are non-mining firms. Columns (5) and (6) report consistent results to Column (4) in that the coefficient c_3 on *EARN* (c_3 = -0.266, P-value < 0.01) and *TACC* (c_3 = -0.135, P-value < 0.01) show less asymmetry timeliness of earning and total accruals for mining firms than non-mining firms.

Table 6 Test Existence of Asymmetric Timeliness

VARIABLES	(1) CFO	(2) EARN	(3) TACC	(4) CFO	(5) EARN	(6) TACC
Constant (a_0)	0.042***	-0.033***	-0.083***	0.078***	0.009	-0.076***
	(5.56)	(-3.61)	(-10.35)	(12.95)	(1.05)	(-9.45)
DRET (a_1)	-0.033***	-0.036***	-0.002	-0.023**	-0.017	0.006
	(-4.65)	(-2.99)	(-0.19)	(-2.49)	(-1.19)	(0.46)
RET (b_0)	-0.033***	-0.053***	-0.020***	-0.006	-0.021**	-0.025***
	(-5.17)	(-4.62)	(-3.24)	(-0.53)	(-1.97)	(-2.68)
DRET*RET (b_1)	0.185***	0.355***	0.159***	0.221***	0.447***	0.225***
	(11.03)	(11.77)	(6.94)	(9.35)	(13.12)	(9.52)
DMIN (c_0)				-0.113***	-0.136***	-0.018*
				(-6.95)	(-7.99)	(-1.65)
DMIN*DRET (c_1)				-0.001	-0.014	-0.013
				(-0.05)	(-0.88)	(-1.12)
DMIN*RET (c_2)				-0.024**	-0.027*	0.011
				(-2.08)	(-1.93)	(1.05)
DMIN*RET*DRET (c_3)				-0.143***	-0.266***	-0.135***
				(-5.77)	(-7.58)	(-5.56)
Obs.	19,385	19,412	19,433	19,385	19,412	19,433
Adj. R^2	0.032	0.047	0.010	0.071	0.073	0.011

This table displays results from regressing operating cash flows, earnings and total accruals on stock return and other variables

$$CFO_t/EARN_t/TACC_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + e$$

This regression model is from Basu (1997) where CFO, EARN and TACC are operating cash flows, earnings and total accruals deflated by lagged market value of equity, respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Columns (4) – (6) are the similar regression but adding another variable DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

5.3 Results of Product Pricing Affecting Operating Cash Flows Asymmetric Timeliness

Table 7 reports the regression equation for Hypothesis 2 whereby product-pricing strategy would affect operating cash flows to be more sensitive to bad economic news. T-statistics reported in parentheses are calculated using standard errors corrected for the effects of two-way clustering by firm and year. Panel A presents the regression result from Model (2) – (4) testing whether bad news is more sensitive in affecting cash margin (cash inflows from sales – cash outflows from supplier and employees), where *CASH_SALE*, *CASH_SUP*, and *CASH_DSALE* represent cash inflows from sales, cash outflows from suppliers and employees, and cash margin deflated by lagged market value of equity, respectively. Columns (1) – (3) test the product pricing explanation to operating cash flows asymmetric timeliness and Column (4) – (6) concentrate on the difference for mining firms by controlling the dummy variable for mining firms (*DMIN*).

Column (1), the negative coefficient a_1 on *DRET* (a_1 = -0.156, P-value < 0.05), indicates that firms with negative stock return would receive lower cash inflows from sales as compared to firms with positive stock return. The strongly significant coefficient b_1 on *DRET***RET* (b_1 = 1.213, P-value < 0.01) reports that firms with negative stock return are likely to have more cash sales decrease than firms with positive stock return to have cash sales increase.

The dependent variable *CASH_SUP* on Column (2) investigates the different effects of good or bad economic news on cash outflows from suppliers and employees. The

positive coefficient b_1 (b_1 = 0.982, P-value < 0.01) shows negative stock return is more timely to affect cash outflows from suppliers and employees than is positive stock return.

Column (3) the dependent variable *CASH_DSALE* is the cash margin that equates with *CASH_SALE* minus *CASH_SUP*. The positive coefficient a_1 (a_1 = -0.042, P-value < 0.01) on *DRET* indicates that firms with negative stock return would have lower cash margin than firms with positive stock return. The positive and significant coefficient b_1 on *DRET*RET* (b_1 = 0.220, P-value < 0.01) reports that cash margins decrease to a greater extent in negative stock return (bad economic news) than its increase in positive stock return (good economic news).

These results support Hypothesis 2 that product pricing explains why operating cash flows are more sensitive in response to bad economic news and is also consistent with Steele's (2011) findings on product pricing.

Columns (4) – (6), while controlling the dummy variable of mining firms, indicates that the effect of product pricing on operating cash flows asymmetric timeliness are weaker for mining firms than non-mining firms, since the coefficient c_3 on *DMIN*RET*DRET* (c_3 = -0.165, P-value < 0.01) is negative and strongly significant.

Table 7 Effect of Product Pricing on CFO, EARN, and TACC Asymmetric Timeliness

Panel A: Test Product-Pricing Effects on Cash Margin

VARIABLES	(1) CASH _SALE	(2) CASH _SUP	(3) CASH _DSALE	(4) CASH _SALE	(5) CASH _SUP	(6) CASH _DSALE
Constant (a_0)	1.532***	1.445***	0.083***	2.093***	1.956***	0.129***
	(18.57)	(19.45)	(6.48)	(19.41)	(19.34)	(9.45)
DRET (a_1)	-0.156**	-0.118*	-0.042***	-0.082	-0.048	-0.037**
	(-1.98)	(-1.67)	(-3.67)	(-0.75)	(-0.47)	(-2.24)
RET (b_0)	-0.132***	-0.080*	-0.042***	0.190**	0.238**	-0.018
	(-2.78)	(-1.70)	(-4.91)	(1.98)	(2.51)	(-1.26)
DRET*RET (b_1)	1.213***	0.982***	0.220***	0.894***	0.602**	0.263***
	(7.85)	(7.08)	(7.75)	(3.38)	(2.46)	(6.53)
DMIN (c_0)				-1.724***	-1.578***	-0.140***
				(-16.19)	(-16.34)	(-6.52)
DMIN*DRET (c_1)				0.057	0.046	0.013
				(0.52)	(0.44)	(0.61)
DMIN*RET (c_2)				-0.200**	-0.220**	-0.012
				(-2.09)	(-2.36)	(-0.75)
DMIN*RET*DRET (c_3)				-0.563**	-0.365	-0.165***
				(-2.15)	(-1.46)	(-4.35)
Obs.	19,501	19,517	19,479	19,501	19,517	19,479
Adj. R^2	0.019	0.015	0.018	0.151	0.146	0.038

This table presents results for whether positive or negative stock returns affect cash inflows, outflows and cash margin differently

$$CASH\_SALE_t/CASH\_SUP_t/CASH\_DSALE_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + e$$

This regression model is from Steele (2011) where CASH_SALE, CASH_SUP and CASH_DSALE are cash inflows from sales, cash outflows from suppliers and employees and cash margin (cash inflows from sales – cash outflows from suppliers and employees) deflated by lagged market value of equity respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Columns (4) – (6) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel B. Product-Pricing Effect on CFO, EARN and TACC Using PP1 as the Factor of Product-Pricing

VARIABLES	(1) CFO	(2) EARN	(3) TACC	(4) CFO	(5) EARN	(6) TACC
Constant	0.070***	-0.007	-0.082***	0.078***	0.010	-0.073***
	(10.72)	(-0.72)	(-8.52)	(12.65)	(1.15)	(-8.37)
DRET (a_1)	-0.165***	-0.163***	0.021	-0.153***	-0.151***	0.023
	(-4.19)	(-3.93)	(0.68)	(-3.97)	(-3.88)	(0.73)
RET (b_0)	-0.244***	-0.220***	0.029	-0.231***	-0.197***	0.029
	(-6.60)	(-5.62)	(1.58)	(-5.41)	(-4.48)	(1.40)
DRET*RET (b_1)	0.625***	0.592***	0.008	0.674***	0.651***	0.035
	(7.60)	(6.01)	(0.12)	(7.66)	(6.77)	(0.53)
PP1 (c_0)	-0.000	0.000**	0.000***	-0.000	0.000**	0.000***
	(-1.03)	(2.19)	(5.30)	(-1.06)	(2.16)	(5.30)
PP1*DRET (c_1)	0.067***	0.069***	-0.008	0.066***	0.069***	-0.008
	(3.31)	(3.55)	(-0.54)	(3.29)	(3.69)	(-0.53)
PP1*RET (c_2)	0.128***	0.107***	-0.025***	0.126***	0.104***	-0.025***
	(6.39)	(5.17)	(-3.31)	(6.23)	(5.04)	(-3.28)
PP1*RET*DRET (c_3)	-0.265***	-0.122**	0.116***	-0.270***	-0.125**	0.115***
	(-6.00)	(-2.36)	(3.50)	(-5.97)	(-2.55)	(3.58)
DMIN (d_0)				-0.043***	-0.089***	-0.042***
				(-2.89)	(-5.11)	(-2.73)
DMIN*DRET (d_1)				-0.029**	-0.025	-0.001
				(-2.10)	(-1.36)	(-0.10)
DMIN*RET (d_2)				-0.015	-0.021	0.009
				(-0.92)	(-1.11)	(0.69)
DMIN*RET*DRET (d_3)				-0.161***	-0.231***	-0.099***
				(-6.03)	(-6.52)	(-3.32)
DMIN*PP1 (d_4)				0.001**	0.002**	0.000
				(2.08)	(2.24)	(0.35)
DMIN*PP1*DRET (d_5)				-0.001*	-0.002**	-0.000
				(-1.78)	(-2.16)	(-0.45)
DMIN*PP1*RET (d_6)				-0.001***	-0.001***	-0.000
				(-3.64)	(-3.34)	(-0.76)
DMIN*PP1*RET*DRET (d_7)				0.001***	0.001	-0.000
				(3.27)	(1.63)	(-0.09)
Obs.	13,076	13,115	13,106	13,076	13,115	13,106
Adj. R^2	0.170	0.112	0.021	0.177	0.123	0.023

This table presents results for whether product price within positive or negative stock returns affects operating cash flows, earnings and total accruals differently

$$CFO_t/EARN_t/TACC_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_0PP1_t + c_1PP1*DRET_t + c_2PP1*RET_t + c_3PP1_t*RET*DRET_t + e$$

This model regresses from CFO, EARN and TACC on stock returns and PP1 as the proxy for product-pricing strategy to test whether product-pricing strategy in response to bad news would cause greater CFO, EARN and TACC asymmetric timeliness than in good news. CFO, EARN and TACC are operating cash flows, earnings and total accruals deflated by lagged market value of

equity respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. PP1 is the change in cash sales to total sales ratio from year t-1 to t to present the product pricing. Column (4) – (6) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel A of Table 7 reports results from regressing *CASH_DSALE* on negative stock return to estimate the effect of product pricing on operating cash flows asymmetric timeliness, which cannot be used to test *EARN* and *TACC* asymmetry. Therefore, Panel B presents a modified Basu's model from regressing *CFO*, *EARN* and *TACC* on negative stock return and the cash sales related variables *PP1* (the change in cash flows to sales ratio) to test the product pricing influence on *CFO*, *EARN* and *TACC* asymmetric timeliness, which is the regression results from model (5). Columns (1) – (3) test the effect of *PP1* on *CFO*, *EARN* and *TACC* asymmetric timeliness, and Columns (4) – (6) control the dummy variables of mining firms to examine the different effects of product pricing between mining and non-mining firms.

Column (1), the significant coefficient c_2 on *PP1*RET* (coefficient c_2 = 0.128, P-value < 0.01), indicates that *PP1* is positively related to *CFO*. The negative and significant coefficient c_3 on *PP1*RET*DRET* (c_3 = -0.265, P-value < 0.01) reports that *PP1* would affect more *CFO* fall in response to bad economic news, which causes greater operating cash flows asymmetric timeliness. In Column (2), the significant coefficient c_3 on *PP1*RET*DRET* (c_3 = -0.122, P-value < 0.01) and Column (3) the significant coefficient c_3 (c_3 = 0.116, P-value < 0.01) indicate that the effect of product pricing on earnings asymmetric timeliness are mostly caused by operating cash flows asymmetric timeliness, not the accruals.

Columns (4) – (6) add the dummy variables (*DMIN*) for mining firms, which documents the same results as Panel A of Table 7 that mining firms have weaker operating cash flows asymmetric timeliness influenced by product pricing, due to the negative d_3 on *DMIN*RET*DRET* (d_3 = -0.161, P-value < 0.01) and the positive d_7 on

*DMIN*PP1*RET*DRET* (d_7 = 0.001, P-value < 0.01) in Column (4). However, the insignificant d_7 in Column (5) (d_7 = 0.001, P-value > 0.1) and Column (6) (d_7 = -0.000, P-value > 0.1) indicate that product-pricing strategy is not likely to affect earnings and total accruals asymmetric timeliness differently between mining and non-mining firms.

Therefore, the result in Panel B of Table 7 is consistent to that of Panel A to support Hypothesis 2 that product-pricing strategy explains why operating cash flows are more sensitive in response to bad than good economic news. In addition, mining firms present less *CFO* asymmetry than non-mining firms caused by product pricing.

As discussed in Chapter 4, *PP2* (the indicator of lowest quartile for change in cash inflows from sales to cash outflows from supplier and employee ratio) is the alternative variable as the proxy for product pricing. The *PP2* is the dummy variable, when *PP2* = 1 indicates the lowest quartile for change in cash inflows from sales to cash outflows from supplier and employee ratio, and otherwise *PP2* = 0. The results from regressing *CFO*, *EARN* and *TACC* on negative stock return and the cash sales related variables *PP2* are shown in Appendix 3 Panel A, which provides approximate results compared to Panel B of Table 7.

5.4 Results of Cost Stickiness to Affect Operating Cash Flows Asymmetric Timeliness

Table 8 reports the regression model for Hypothesis 3, testing whether the impact of cost stickiness would affect operating cash flows to be more sensitive to bad economic news. The t-statistics reported in parentheses are calculated using standard errors corrected for the effects of two-way clustering by firm and year. As discussed in Chapter 2, costs are

expected to be sticky, which results in sales decreases affecting earnings more than sales increases (Banker et al., 2013).

Results shown in Table 8 from Model (7) support Hypothesis 3, that costs increase more in response to good economic news than they decrease in response to bad economic news. Following Banker et al.'s (2013) model on testing earnings asymmetric timeliness, Columns (1) – (3) examine operating cash flows, earnings and total accruals asymmetric timeliness, respectively. The coefficient b_1 (b_1 = 0.117, P-value < 0.01) on Table 8 Column (1) is lower than the coefficient b_1 (b_1 = 0.185, P-value < 0.01) on Table 6 Column (1) before controlling factors of cost stickiness, which indicates that cost stickiness would affect operating cash flows asymmetry. The coefficient c_1 on *SALES* is to control for the fixed and variable cost, c_2 on *DSALES* to capture if firms with sales decreases would have greater *CFO*, *EARN* or *TACC* asymmetric timeliness, and c_4 on *DSALES*SALES_CHG* to verify if costs are sticky and lead to *CFO*, *EARN* or *TACC* asymmetry.

Column (1), the positive coefficient c_1 (c_1 = 0.031, P-value < 0.01) on SALES, presents the positive relations between sales and operating cash flows. However, c_2 in Column (1) (c_2 = 0.004, P-value > 0.1) is insignificant, while in Column (2) (c_2 = -0.041, P-value < 0.01) and Column (3) (c_2 = -0.046, P-value < 0.01) are highly significant.

Results of the coefficient c_2 (coefficient c_2 = -0.041, P-value < 0.01) in Column (2) test the earnings asymmetric timeliness and are consistent with Banker et al. 's (2013) finding that earnings fall to a larger extent for sales decrease than they rise for sales increase. The coefficient c4 on *DSALES*SALES_CHG* presents the degree of cost stickiness. Column (1), the coefficient on c_4 (c_4 = 0.158, P-value < 0.01) is highly

significant compared to c_4 (c_4 = 0.005, P-value > 0.1) and Column (3) is insignificant, which presumes that cost is sticky and affects earnings asymmetry mostly on the operating cash flows side but not the accruals side. It is rational that firms are likely to retain slack resources in response to bad economic news, such as keeping employees to avoid much higher redundancy payments, which is also consuming cash flows.

Columns (4) – (6) present the cost stickiness on *CFO*, *EARN* and *TACC* asymmetry between mining and non-mining firms. The negative and significant d_3 on *DMIN*RET*DRET* and d_7 on *DMIN*DSALES*SALES_CHG* all in Columns (4) – (6) suggest that mining firms are much less asymmetric on *CFO*, *EARN* and *TACC* than non-mining firms. Column (4), the coefficient d_7 on *DMIN*DSALES*SALES_CHG* (d_7 = -0.080, P-value < 0.01), and c_4 on *DSALES*SALES_CHG* (c_4 = 0.211, P-value < 0.01) documents that the degree of cost stickiness for mining firms is significantly lower than non-mining firms in affecting operating cash flows asymmetric timeliness.

Table 8 Effect of Cost Stickiness on CFO, EARN and TACC Asymmetric Timeliness

VARIABLES	(1) CFO	(2) EARN	(3) TACC	(4) CFO	(5) EARN	(6) TACC
Constant (a_0)	0.025***	0.007	-0.020**	0.038***	0.041***	0.004
	(4.37)	(0.86)	(-2.46)	(6.18)	(4.84)	(0.43)
DRET (a_1)	-0.027***	-0.033***	-0.005	-0.020**	-0.016	0.004
	(-4.37)	(-2.76)	(-0.60)	(-2.52)	(-1.23)	(0.37)
RET (b_0)	-0.020***	-0.041***	-0.020***	-0.004	-0.011	-0.012
	(-3.42)	(-4.09)	(-3.21)	(-0.42)	(-1.34)	(-1.47)
DRET*RET (b_1)	0.117***	0.309***	0.184***	0.158***	0.383***	0.226***
	(7.00)	(9.70)	(7.52)	(7.67)	(10.80)	(8.51)
SALES (c_1)	0.031***	0.009***	-0.026***	0.028***	0.004	-0.026***
	(16.41)	(3.18)	(-10.46)	(15.45)	(1.44)	(-9.58)
DSALES (c_2)	0.004	-0.041***	-0.046***	0.008	-0.041***	-0.051***
	(0.49)	(-3.50)	(-6.20)	(0.71)	(-2.79)	(-4.77)
SALES_CHG (c_3)	-0.002***	-0.002***	-0.000	-0.003***	-0.004***	-0.002***
	(-5.95)	(-6.13)	(-1.31)	(-4.03)	(-5.67)	(-3.00)
DSALES*SALES_CHG (c_4)	0.158***	0.169***	0.005	0.211***	0.261***	0.046*
	(9.36)	(7.85)	(0.44)	(9.07)	(9.52)	(1.93)
DMIN (d_0)				-0.052***	-0.107***	-0.058***
				(-4.08)	(-5.94)	(-4.57)
DMIN*DRET (d_1)				-0.008	-0.024*	-0.016
				(-0.77)	(-1.79)	(-1.53)
DMIN*RET (d_2)				-0.025***	-0.036***	-0.001
				(-2.78)	(-2.63)	(-0.11)
DMIN*RET*DRET (d_3)				-0.110***	-0.211***	-0.118***
				(-4.87)	(-7.21)	(-5.29)

DMIN*SALES (d_4)				0.036***	-0.002	-0.039***
				(3.12)	(-0.24)	(-3.26)
DMIN*DSALES (d_5)				0.009	0.035*	0.029**
				(0.74)	(1.89)	(2.17)
DMIN*SALES_CHG (d_6)				0.001**	0.003***	0.002***
				(2.01)	(4.26)	(3.82)
DMIN*DSALES*SALES_CHG (d_7)				-0.080***	-0.130***	-0.048*
				(-3.47)	(-4.52)	(-1.77)
Obs.	17,406	17,414	17,423	17,406	17,414	17,423
Adj. R^2	0.179	0.098	0.047	0.191	0.114	0.061

This table presents results for whether positive or negative stock returns, and changes in sales causing sticky cost affect operating cash flows, earnings and total accruals

$$CFO_t/EARN_t/TACC_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_1SALES_t + c_2DSALES_t + c_3SALES\_CHG_t + c_4DSALES_t*SALES\_CHG_t + e$$

This regression model is from Banker et al. (2013) based on the Basu model but controlling sales and change in sales to test whether cost is more sticky and more asymmetric timeliness is incurred in response to bad economic news, where CFO, EARN and TACC are operating cash flows, earnings and total accruals deflated by lagged market value of equity respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. SALES, SALES_CHG, DSALES are total sales deflated by lagged market value of equity, change in sales and the dummy sales of sales increase or decrease, where sales decrease with DSALES = 1, otherwise DSALES = 0. Columns (4) – (6) are the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

5.5 Results of Firm's Life Cycle to Affect Operating Cash Flows Asymmetric Timeliness

Table 9 documents the regression equation of Model (8) for Hypothesis 4 testing whether firms in their earlier stage would have operating cash flows that are more sensitive in response to bad economic news than firms in a more mature stage. The t-statistics reported in parentheses are calculated using standard errors corrected for the effects of two-way clustering by firm and year. Firm life cycle is calculated by the combined z-scores of firm size, age, capital expenditure and 2-year sales growth rate according to Anthony and Ramesh (1992) and Collins et al. (2014). Therefore, a higher z-score of firm life cycle indicates firms in earlier stages and lower z-score represents more mature firms.

Columns (1) – (3) test the firm's life cycle on *CFO*, *EARN* and *TACC* asymmetric timeliness for the whole sample firms. The coefficient c_0 is negative and significant in all Columns (1) – (3), indicating that mature firms carry more *CFO*, *EARN* and *TACC* while younger firms have less *CFO*, *EARN* and *TACC*. All three coefficient c_4 (P-value < 0.01) in Columns (1) – (3) are negative, which are expected to be positive to support that younger firms have greater asymmetric timeliness on *CFO*, *EARN* and *TACC*. This result is not consistent with Collins et al.'s (2014) work examining the life cycle effect on operating cash flows asymmetric timeliness in the US. This result is likely because that US market is much bigger than Australia's, with more samples, bigger firm size, and greater market capitalisation so that the firm's life cycle effect in the US are more significant than that in Australia. In addition, this sample contains more than 40 per cent of firms from the mining industry, which might perform differently than other industries. Therefore, there is no

significant Australian evidence supporting that firms in an earlier stage would have greater operating cash flows asymmetric timeliness than mature firms.

Hence, Appendix 2 investigates the effect of firm's life cycle on operating cash flows asymmetric timeliness by using the Basu's model and sorting all sample firms by quartiles of firm's life cycle and four characteristics. In addition, the descriptive statistics for the main variables by life cycle quartiles is included in Appendix 1. Results present an inverted "v shape" that firms in the middle of the firm's life cycle (in quartile 2 and quartile 3) showing the greater operating cash flows asymmetric timeliness in response to bad economic news than that in response to good economic news. Firms in the either the earlier or more mature life cycle stages present less operating cash flows asymmetry, which confirms the unexpected negative coefficient c_4 in Table 9 Column (1).

In Table 9 Columns (4) – (6) test the differences between mining and non-mining firms from regressing *CFO*, *EARN* and *TACC* on negative stock return and the variable of a firm's life cycle. Column (4), the negative but insignificant coefficient c_4 (c_4 = -0.008, P-value > 0.1), indicates that the firm's life cycle for non-mining firms has insignificant effect on operating cash flows asymmetric timeliness in response to bad economic news. However, the negative and significant coefficient d_7 in Column (4) (d_7 = -0.020, P-value < 0.1) reports that firms' life cycle does affect mining firms' operating cash flows asymmetry, but again the coefficient d_7 is not positive as expected.

The coefficient c_4 in Column (5) (c_4 = -0.028, P-value < 0.05) and in Column (6) (c_4 = -0.025, P-value < 0.05) show that there is significant influence from firm's life cycle

for non-mining firms to *EARN* and *TACC* asymmetry, but not the expectation that firms in their earlier life cycle would have more *EARN* and *TACC* asymmetric timeliness.

The negative and insignificant coefficient d_3 in Column (4) on *DMIN*RET*DRET* (d_3 = -.022, P-value > 0.1) documents that there is no operating cash flows asymmetry between mining and non-mining firms while controlling for the firm's life cycle, but the significant d_3 in Column (5) (d_3 = -0.133, P-value < 0.01) and (6) (d_3 = -0.136, P-value < 0.01) present the different earnings and accruals asymmetry between mining and non-mining firms.

Therefore, firm's life cycle is more likely to affect non-mining firms' earnings and total accruals asymmetry, but mining firms' operating cash flows asymmetric timeliness. While controlling for firm's life cycle, mining and non-mining firms have insignificant differences in operating cash flows asymmetric timeliness, but mining firms present weaker earnings and total accruals asymmetry than non-mining firms.

Table 9 Effects of Firm's Life Cycle on CFO, EARN and TACC Asymmetric Timeliness

VARIABLES	(1) CFO	(2) EARN	(3) TACC	(4) CFO	(5) EARN	(6) TACC
Constant (a_0)	0.025***	-0.065***	-0.099***	0.037***	-0.056***	-0.103***
	(3.52)	(-5.73)	(-10.16)	(3.70)	(-3.44)	(-9.63)
DRET (a_1)	-0.020***	-0.010	0.015	-0.022**	-0.005	0.025
	(-2.81)	(-0.77)	(1.43)	(-2.06)	(-0.28)	(1.55)
RET (b_0)	-0.006	-0.011	-0.009	0.026**	0.019	-0.015
	(-0.73)	(-1.15)	(-1.35)	(2.05)	(1.45)	(-1.46)
DRET*RET (b_1)	0.126***	0.291***	0.161***	0.119***	0.329***	0.214***
	(7.00)	(9.12)	(6.33)	(5.59)	(8.13)	(6.49)
Z_LIFE_CYCLE (c_1)	-0.032***	-0.043***	-0.012***	-0.030***	-0.043***	-0.018***
	(-9.99)	(-9.97)	(-4.14)	(-6.01)	(-6.05)	(-3.93)
Z_LIFE_CYCLE*DRET (c_2)	0.001	-0.002	0.001	-0.007	-0.007	0.005
	(0.24)	(-0.48)	(0.20)	(-1.22)	(-0.90)	(0.88)
Z_LIFE_CYCLE*RET (c_3)	-0.002	-0.005	-0.003	-0.005	-0.009	-0.000
	(-0.64)	(-1.26)	(-1.00)	(-0.65)	(-1.03)	(-0.00)
Z_LIFE_CYCLE*RET*DRET (c_4)	-0.024***	-0.041***	-0.014***	-0.008	-0.028**	-0.025**
	(-4.09)	(-5.60)	(-2.58)	(-0.78)	(-1.97)	(-2.34)
DMIN (d_0)				-0.046***	-0.050**	0.000
				(-3.51)	(-2.47)	(0.01)
DMIN*DRET (d_1)				0.004	-0.004	-0.017
				(0.30)	(-0.24)	(-1.17)
DMIN*RET (d_2)				-0.050***	-0.046***	0.017
				(-3.65)	(-2.73)	(1.20)
DMIN*RET*DRET (d_3)				-0.022	-0.133***	-0.136***
				(-0.83)	(-3.89)	(-4.49)
DMIN*Z_LIFE_CYCLE (d_4)				0.005	0.013	0.014***
				(0.76)	(1.56)	(2.75)
DMIN*Z_LIFE_CYCLE*DRET (d_5)				0.012*	0.005	-0.008
				(1.96)	(0.57)	(-1.30)

DMIN*Z_LIFE_CYCLE*RET (d_6)				0.007	0.006	-0.008
				(0.81)	(0.58)	(-1.23)
DMIN*Z_LIFE_CYCLE*RET*DRET (d_7)				-0.020*	-0.004	0.034*
				(-1.66)	(-0.20)	(1.92)
Obs.	15,814	15,833	15,843	15,814	15,833	15,843
Adj. R^2	0.087	0.103	0.015	0.106	0.113	0.017

This table indicates results for whether positive or negative stock returns, and different firm's life cycle affect operating cash flows, earnings and total accruals

$$CFO_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_1LIFE\_CYCLE_t + c_2LIFE\_CYCLE_t*DRET_t + c_3LIFE\_CYCLE_tRET_t + c_4LIFE\_CYCLE_t*RET_t*DRET_t + e$$

This regression model is based on Collins et al. (2014) according to the Basu model but controlling firm's life cycle to test whether firms in different stages of life cycle would have different asymmetric timeliness incurred in response to bad economic news, where CFO, EARN and TACC are operating cash flows, earnings and total accruals deflated by lagged market value of equity respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Z_LIFE_CYCLE is the combined z-score of four firm's characteristic (firm age, size, capital expenditure and sales growth rate), and the detail of the measurement can be found in Table 1. Columns (4) – (6) are the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

5.6 Mutual Effects of Product Pricing and Cost Stickiness on Operating Cash Flows Asymmetric Timeliness

Since the insignificant results in testing firm's life cycle, Table 10 shows the effects of both product pricing and cost stickiness only on operating cash flows asymmetry. The t-statistics reported in parentheses are calculated using standard errors corrected for the effects of two-way clustering by firm and year. Panel A of Table 10 regresses from *CASH_DSALE* (cash margin equals cash inflows from sales minus cash outflows from suppliers and employees) on negative stock returns, factor of cost stickiness and the dummy variable *DMIN* to observe the difference between mining and non-mining firms. Results indicate that the cost stickiness in Column (1) (c_4 = 0.160, P-value < 0.01) affects cash margin significantly, and in Column (2) mining firms show a lesser degree of cost stickiness (the coefficient d_7 = -0.128, P-value < 0.01) to affect cash margin. Therefore, when Model (4), regressing from cash margin on annual stock return, is applied to measure the effect of product pricing on operating cash flows asymmetric timeliness, it not only captures the effect of product pricing, but also the effect of cost stickiness on operating cash flows asymmetry since they interrelate.

In order to test the mutual effects of product pricing and cost stickiness on operating cash flows asymmetric timeliness directly and to avoid the interrelations between these two factors, Panel B of Table 10 uses *PP1*, which has already been discussed in Panel B of Table 7, as the factor of product pricing. Panel B regresses from *CFO* on stock returns, the factor of product pricing and cost stickiness, and the dummy variable *DMIN* observing the

difference between mining and non-mining firms to examine *CFO* asymmetry. Column (1), the coefficient c_3 on *PP1*RET*DRET* (c_3 = -0.197, P-value < 0.01), and d4 on *DSALES*SALES_CHG* (d_4 = 0.142, P-value < 0.01) documents that product pricing and cost stickiness are likely to cause greater operating cash flows asymmetric timeliness in response to bad economic news than good news.

Column (2), the coefficient e_3 on *DMIN*RET*DRET* (e_3 = -0.143, P-value < 0.01) shows that mining firms still present less operating cash flows asymmetric timeliness than non-mining firms while controlling for product pricing and cost stickiness. The coefficient e_7 on *DMIN*PP1*RET*DRET* (e_7 = 0.000, P-value > 0.1) indicates that the effect of product pricing on operating cash flows asymmetric timeliness show no differences between mining and non-mining firms. The coefficient e_{11} on *DMIN*DSALES*SALES_CHG* (e_{11} = -0.100, P-value < 0.01) still documents that the effect of cost stickiness on operating cash flows asymmetric timeliness are greater for non-mining firms than for mining firms, which is consistent with the results shown on Panel A of Table 10.

The results of Panel B therefore show that both product pricing and cost stickiness are the explanations affecting operating cash flows asymmetric timeliness. However, while testing the difference between mining and non-mining firms by eliminating the interrelated effect between cost stickiness and product pricing, a significant difference for the effect of cost stickiness is demonstrated but insignificant difference for the effect of product pricing on operating cash flows asymmetric timeline between mining and non-mining firms.

Table 10 Test Mutual Effects of Product Pricing and Cost Stickiness on Asymmetry

Panel A. Using Cash Margin as Dependent Variable to Measure Product Pricing Effects together with Cost Stickiness

VARIABLES	(1) CASH_DSALE	(2) CASH_DSALE
Constant (a_0)	0.027***	0.046***
	(2.60)	(3.40)
DRET (a_1)	-0.034***	-0.034**
	(-3.16)	(-2.17)
RET (b_0)	-0.026***	-0.018
	(-3.22)	(-1.41)
DRET*RET (b_1)	0.124***	0.172***
	(5.07)	(5.22)
SALES (c_1)	0.056***	0.049***
	(13.57)	(12.64)
DSALES (c_2)	0.011	0.018
	(0.81)	(0.94)
SALES_CHG (c_3)	-0.002***	-0.004***
	(-5.41)	(-5.03)
DSALES*SALES_CHG (c_4)	0.160***	0.239***
	(7.06)	(6.46)
DMIN (d_0)		-0.079***
		(-3.81)
DMIN*DRET (d_1)		0.010
		(0.59)
DMIN*RET (d_2)		-0.014
		(-1.01)
DMIN*RET*DRET (d_3)		-0.123***
		(-3.47)
DMIN*SALES (d_4)		0.084***
		(3.86)
DMIN*DSALES (d_5)		0.008
		(0.37)
DMIN*SALES_CHG (d_6)		0.003***
		(3.91)
DMIN*DSALES*SALES_CHG (d_7)		-0.128***
		(-4.11)
Obs.	17,565	17,565
Adj. R^2	0.149	0.168

This panel presents result for whether positive or negative stock returns, and changes in sales cause sticky cost to affect cash margin.

$CASH\_DSALE_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + c_1 SALES_t + c_2 DSALES_t + c_3 SALES\_CHG_t + c_4 DSALES_t * SALES\_CHG_t + e$

This regression model combines Banker et al.'s (2013) testing on the effects of cost stickiness and Steele's (2011) on product pricing to examine the mutual effects of cost stickiness and product

pricing on operating cash flows asymmetric timeliness, where SALES, SALES_CHG, DSALES are total sales deflated by lagged market value of equity, change in sales and the dummy sales of sales increase or decrease to measure the cost stickiness. Sales decrease with DSALES = 1, otherwise DSALES = 0. The dependent variable CASH_DSALE is the cash margin measuring the operating cash flows asymmetric timeliness from product pricing. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Columns (4) – (6) are the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel B. Using the Change in Cash Sales to Total Sales Ratio as the Factor of Product Pricing Together with Cost Stickiness to Test Operating Cash Flows Asymmetric Timeliness

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.035***	0.035***
	(5.03)	(5.01)
DRET (a_1)	-0.155***	-0.141***
	(-4.68)	(-4.39)
RET (b_0)	-0.215***	-0.210***
	(-6.67)	(-5.81)
DRET*RET (b_1)	0.457***	0.520***
	(6.38)	(7.14)
PP1 (c_0)	0.000	0.000
	(0.99)	(1.64)
PP1*DRET (c_1)	0.064***	0.061***
	(3.64)	(3.56)
PP1*RET (c_2)	0.113***	0.112***
	(6.60)	(6.56)
PP1*RET*DRET (c_3)	-0.197***	-0.207***
	(-5.13)	(-5.41)
SALES (d_1)	0.026***	0.025***
	(14.29)	(14.19)
DSALES (d_2)	0.002	0.010
	(0.17)	(0.91)
SALES_CHG (d_3)	-0.001***	-0.003***
	(-3.06)	(-2.79)
DSALES*SALES_CHG (d_4)	0.142***	0.202***
	(7.17)	(7.51)
DMIN (e_0)		-0.008
		(-0.56)
DMIN*DRET (e_1)		-0.030**
		(-2.39)
DMIN*RET (e_2)		-0.009
		(-0.64)
DMIN*RET*DRET (e_3)		-0.143***
		(-5.45)
DMIN*PP1 (e_4)		0.002***
		(2.90)
DMIN*PP1*DRET (e_5)		-0.002***
		(-2.82)
DMIN*PP1*RET (e_6)		-0.001***
		(-4.89)
DMIN*PP1*RET*DRET (e_7)		0.000
		(0.67)
DMIN*SALES (e_8)		0.018*
		(1.69)
DMIN*DSALES (e_9)		-0.014

		(-1.21)
DMIN*SALES_CHG (e_{10})		0.002**
		(2.08)
DMIN*DSALES*SALES_CHG (e_{11})		-0.100***
		(-3.39)
Obs.	12,926	12,926
Adj. R^2	0.257	0.265

This panel presents results for whether product price and cost stickiness within positive or negative stock returns affect operating cash flows asymmetry.

$CFO_t/EARN_t/TACC_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_0PP1_t + c_1PP1_t*DRET_t + c_2PP1_t*RET_t + c_3PP1_t*RET_t*DRET_t + d_1SALES_t + d_2DSALES_t + d_3SALES\_CHG_t + d_4DSALES_t*SALES\_CHG_t + e$

This model regresses from CFO on stock returns, product pricing and cost stickiness to test whether product-pricing strategy in response to bad news would cause greater CFO asymmetric timeliness than for good news. CFO is operating cash flows deflated by lagged market value of equity. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. PP1 is the change in cash sales to total sales ratio from year t-1 to t to present the product pricing. SALES, SALES_CHG, DSALES are total sales deflated by lagged market value of equity, change in sales and the dummy sales of sales increase or decrease to measure the cost stickiness, respectively, to test cost stickiness, where sales decrease with DSALES = 1, otherwise DSALES = 0. Columns (4) – (6) are the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

5.7 Robustness Check

As discussed in Section 2.4 Chapter 2, Ball and Shivakumar (2005, 2006) uses change in operating cash flows as the proxy for economic news to test the accruals asymmetric timeliness. Table 11 reports regression analyses for all previous models but changes the proxy of economic news from stock returns to change in operating cash flows as the check of robustness. The t-statistics reported in parentheses are calculated using standard errors corrected for the effects of two-way clustering by firm and year.

Panel A regresses operating cash flows on change in operating cash flows and the dummy mining variable, and results are consistent with Table 6 that operating cash flows asymmetry exists (the coefficient b_1 = 0.627/0.780, P-value < 0.01). In addition, mining firms still show less operating cash flows asymmetric timeliness (the coefficient c_3 = -0.372, P-value < 0.01).

In testing product pricing, Panel B presents the consistent results of Panel A of Table 7. The coefficient b_1 in both Columns (1) and (2) are positive and significant (P-value < 0.01), indicating more cash margin falls in response to bad news than a rise in response to good news, which cause operating cash flows asymmetric timeliness. Furthermore, mining firms present less asymmetry on cash margin (the coefficient c_3 = -0.813, P-value < 0.01).

However, Panel C examines product pricing regressing from operating cash flows on change in cash sales to sales ratio from year t-1 to t and other variables provides different results. The coefficient c_3 in Column (1) (c_3 = 0.000, P > 0.1) indicates that *PP1* in response to bad economic news has no effects on operating cash flows asymmetric timeliness. The

coefficient c_3 in Column (2) (c_3 = 0.000, P-value > 0.1) and d_7 (d_7 = -0.000, P-value > 0.1) also shows that mining and non-mining firms have insignificant differences on the effect of PP1 on operating cash flows asymmetric timeliness.

Panel D illustrates the effect of cost stickiness on *CFO* asymmetric timeliness by using the change in operating cash flows as the proxy for economic news. Column (1), the positive c_4 (coefficient c_4 = 0.139, P-value < 0.01), documents the existence of cost stickiness and its effect on operating cash flows asymmetric timeliness, and is consistent with the results of Table 8 using the annual stock return as the proxy for economic news. However, in contrast to the results of Table 8, Column (2) the coefficient d_7 (d_7 = -0.028, P-value > 0.1) is insignificant, indicating that there is no difference in cost stickiness to affect operating cash flows asymmetric timeliness between mining and non-mining firms.

Panel E describes the effect of firm's life cycle on operating cash flows asymmetric timeliness. Results show that non-mining firms carry greater operating cash flows asymmetric timeliness in response to bad economic news, where the bad economic news is measured by negative changes in operating cash flows. Furthermore, while controlling the dummy variable for mining firms, the insignificant coefficient d_7 (d_7 = 0.039, P-value > 0.1) of Column (2) indicates that there is no difference for the effect of firm's life cycle between mining and non-mining firms on operating cash flows asymmetry. This is inconsistent with the results of Table 9 that there is a significant difference between mining and non-mining firms for firm's life cycle to affect operating cash flows asymmetry.

Panel F and G uses different regression models, as the same as Panel A and B of Table 10, to examine the product pricing effect on operating cash flows, as well as earnings

and total accruals asymmetric timeliness. Results of Panel F of Table 11 are consistent with the previous results of Table 10 that cash margin as part of operating cash flows asymmetry contains the effect of cost stickiness [Column (1) coefficient $c_4 = 0.135$, P-value < 0.01], and mining firms present less cost stickiness in affecting cash margin (coefficient $d_7 = -0.049$, P-value < 0.1).

Panel G provides significantly different results compared to that of Panel B of Table 10. Using *PP1* (the change of cash sales to total sales ratio from year t-1 to t) as the factor of product pricing, the coefficient c_3 ($c_3 = -0.000$, P-value > 0.1) reports the insignificant effect of product pricing on operating cash flows asymmetric timeliness. While testing the difference between mining and non-mining firms, neither of their effects of product pricing are significant on operating cash flows asymmetry. In addition, the effect of cost stickiness on operating cash flows asymmetry is significant (coefficient $d_4 = 0.152$, P-value < 0.01), but no significant differences exist between mining and non-mining firms (coefficient $e_{11} = -0.127$, P-value > 0.1).

While using the change of operating cash flows as the proxy for economic news, some results are inconsistent with the regression results using annual stock return indicating economic news. The possible reason is that the variables *PP1* (the change of cash sales to total sales ratio from year t-1 to t), *SALES_CHG* (the change of total sales from year t-1 to t) and *D1CFO* (the change of operating cash flows from year t-1 to t) are likely to be interrelated since they all use total sales or cash flows changes ratio from year t-1 to t as part of their measurements, which might be the explanation for this inconsistency.

Table 11 Robustness Check Using Change in Operating Cash Flows as Proxy for Economic News

Panel A: Evidence of Operating Cash Flows Asymmetric Timeliness

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.063***	0.106***
	(6.98)	(12.15)
DD1CFO (a_1)	-0.080***	-0.078***
	(-14.04)	(-13.56)
D1CFO (b_1)	-0.001	-0.002**
	(-1.29)	(-2.32)
DD1CFO*D1CFO (b_1)	0.627***	0.780***
	(20.12)	(19.22)
DMIN (c_0)		-0.117***
		(-8.28)
DMIN*DD1CFO (c_1)		0.025***
		(3.31)
DMIN*D1CFO (c_2)		0.079***
		(2.59)
DMIN*D1CFO*DD1CFO (c_3)		-0.372***
		(-7.22)
Obs.	19,658	19,658
Adj. R^2	0.162	0.196

This panel displays results from regressing operating cash flows on change in operating cash flows and other variables.

$$CFO_t = a_0 + a_1 DD1CFO_t + b_0 D1CFO_t + b_1 D1CFO_t * DD1CFO_t + e$$

This regression model is modified from Basu (1997) where the variable of change in operating cash replaces stock return as the proxy for good or bad economic news. CFO is operating cash flows deflated by lagged market value of equity, D1CFO is change in operating cash flows and DD1CFO is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. Column (2) is the similar regression but adding another variable DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel B: Effects of Product Pricing on Operating Cash Flows Asymmetric Timeliness Using Cash Margin as the Dependent Variable

VARIABLES	(1) CASH_DSALE	(2) CASH_DSALE
Constant (a_0)	0.096***	0.155***
	(7.05)	(11.97)
DD1CFO (a_1)	-0.083***	-0.080***
	(-10.69)	(-8.70)
D1CFO (b_0)	0.045	-0.006
	(1.02)	(-0.92)
DD1CFO*D1CFO (b_1)	0.599***	0.919***
	(10.13)	(15.68)
DMIN (c_0)		-0.175***
		(-8.11)
DMIN*DD1CFO (c_1)		0.047***
		(3.45)
DMIN*D1CFO (c_2)		0.303***
		(3.41)
DMIN*D1CFO*DD1CFO (c_3)		-0.813***
		(-6.78)
Obs.	19,737	19,737
Adj. R^2	0.084	0.122

This panel presents results for whether positive or negative change in operating cash flows from t-1 to t affect cash margin.

$$CASH\_DSALE = a_0 + a_1 DD1CFO + b_0 D1CFO + b_1 D1CFO*DD1CFO + e$$

This regression model is modified from Steele (2011) where CASH_DSALE is cash margin (cash inflows from sales – cash outflows from suppliers and employees) deflated by lagged market value of equity, D1CFO is change in operating cash flows and DD1CFO is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel C: Effects of Product Pricing on Operating Cash Flows Asymmetric Timeliness Using Change in Cash Sales to Total Sales Ratio as the Factor of Product Pricing

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.080***	0.112***
	(11.28)	(13.21)
DD1CFO (a_1)	-0.081***	-0.077***
	(-18.56)	(-13.01)
D1CFO (b_0)	0.002	-0.006*
	(0.46)	(-1.79)
DD1CFO*D1CFO (b_1)	0.647***	0.816***
	(19.03)	(20.74)
PP1 (c_0)	-0.001**	-0.001***
	(-2.37)	(-4.55)
PP1*DD1CFO (c_1)	0.001**	0.001***
	(2.41)	(4.82)
PP1*D1CFO (c_2)	0.000	-0.000
	(0.72)	(-1.28)
PP1*D1CFO*DD1CFO (c_3)	-0.000	0.000
	(-0.22)	(0.77)
DMIN (d_0)		-0.109***
		(-8.56)
DMIN*DD1CFO (d_1)		0.023**
		(2.38)
DMIN*D1CFO (d_2)		0.171***
		(4.62)
DMIN*D1CFO*DD1CFO (d_3)		-0.523***
		(-8.68)
DMIN*PP1 (d_4)		0.001***
		(3.09)
DMIN*PP1*DD1CFO (d_5)		-0.001***
		(-3.26)
DMIN*PP1*D1CFO (d_6)		-0.000
		(-0.97)
DMIN*PP1*D1CFO*DD1CFO (d_7)		-0.000
		(-0.23)
Obs.	17,354	17,354
Adj. R^2	0.157	0.183

This panel presents results for whether product price within positive or negative change in operating cash flows affect operating cash flows.

$$CFO_t = a_0 + a_1 DD1CFO_t + b_0 D1CFO_t + b_1 D1CFO_t * DD1CFO_t + c_0 PP1_t + c_1 PP1 * DD1CFO_t + c_2 PP1 * D1CFO_t + c_3 PP1_t * D1CFO * DD1CFO_t + e$$

This model regresses from CFO on change in operating cash and PP1 as the proxy for product-pricing strategy to test whether product-pricing strategy in response to bad news would cause greater CFO asymmetric timeliness than for good news. CFO is operating cash flows deflated by lagged market value of equity respectively. The variable of change in operating cash replaces stock

return as the proxy for good or bad economic news from the Basu model. D1CFO is change in operating cash flows and DD1CFO is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. PP1 is the change in cash sales to total sales ratio from year t-1 to t to present the product pricing. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel D: Cost Stickiness to Affect Operating Cash Flows Asymmetric Timeliness

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.044***	0.059***
	(6.42)	(7.84)
DD1CFO (a_1)	-0.071***	-0.074***
	(-14.97)	(-14.92)
D1CFO (b_0)	0.001	0.000
	(0.96)	(0.71)
DD1CFO*D1CFO (b_1)	0.553***	0.673***
	(17.06)	(16.21)
SALES (c_1)	0.031***	0.028***
	(16.21)	(16.27)
DSALES (c_2)	0.017**	0.013
	(2.29)	(1.35)
SALES_CHG (c_3)	-0.001***	-0.002***
	(-6.33)	(-2.82)
DSALES*SALES_CHG (c_4)	0.139***	0.161***
	(10.19)	(8.02)
DMIN (d_0)		-0.061***
		(-4.96)
DMIN*DD1CFO (d_1)		0.027***
		(2.84)
DMIN*D1CFO (d_2)		0.093***
		(3.22)
DMIN*D1CFO*DD1CFO (d_3)		-0.331***
		(-5.97)
DMIN*SALES (d_4)		0.030***
		(2.71)
DMIN*DSALES (d_5)		0.023*
		(1.94)
DMIN*SALES_CHG (d_6)		0.001
		(0.72)
DMIN*DSALES*SALES_CHG (d_7)		-0.028
		(-1.27)
Obs.	17,654	17,654
Adj. R^2	0.281	0.292

This panel presents result for whether positive or negative change in operating cash flows from t-1 to t, and changes in sales cause sticky cost to affect operating cash flows differently.

$$CFO_t = a_0 + a_1 DD1CFO + b_0 D1CFO + b_1 D1CFO*DD1CFO + c_1 SALES_t + c_2 DSALES_t + c_3 SALES\_CHG_t + c_4 DSALES_t*SALES\_CHG_t + e$$

This regression model is modified from Banker et al. (2013) where CFO_t is operating cash flows deflated by lagged market value of equity, D1CFO is change in operating cash flows and DD1CFO is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. SALES, SALES_CHG and DSALES are total sales deflated by lagged market value of equity, change in sales from t-1 to t, and the dummy sales of sales increase or decrease

respectively, where sales decrease with DSALE = 1, otherwise DSALE = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel E: Firm's Life Cycle to Affect Operating Cash Flows Asymmetric Timeliness

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.054***	0.077***
	(7.21)	(6.63)
DD1CFO (a_1)	-0.067***	-0.074***
	(-10.95)	(-8.47)
D1CFO (b_0)	0.070***	0.046*
	(3.11)	(1.78)
DD1CFO*D1CFO (b_1)	0.529***	0.661***
	(11.66)	(11.60)
Z_LIFE_CYCLE (c_1)	-0.031***	-0.030***
	(-12.15)	(-6.67)
Z_LIFE_CYCLE*DD1CFO (c_2)	0.003	-0.002
	(1.31)	(-0.43)
Z_LIFE_CYCLE*D1CFO (c_3)	-0.004	-0.035
	(-0.46)	(-1.25)
Z_LIFE_CYCLE*D1CFO*DD1CFO (c_4)	-0.057***	-0.052*
	(-4.38)	(-1.92)
DMIN (d_0)		-0.071***
		(-4.65)
DMIN*DD1CFO (d_1)		0.026**
		(2.22)
DMIN*D1CFO (d_2)		0.087
		(1.59)
DMIN*D1CFO*DD1CFO (d_3)		-0.347***
		(-4.28)
DMIN*Z_LIFE_CYCLE (d_4)		0.009
		(1.59)
DMIN*Z_LIFE_CYCLE*DD1CFO (d_5)		0.007
		(1.41)
DMIN*Z_LIFE_CYCLE*D1CFO (d_6)		0.045
		(1.07)
DMIN*Z_LIFE_CYCLE*D1CFO*DD1CFO (d_7)		0.039
		(0.90)
Obs.	16,003	16,003
Adj. R^2	0.201	0.217

This panel indicates results for whether positive or negative change in operating cash flows from t-1 to t, and different firm's life cycle affect operating cash flows.

$$CFO_t = a_0 + a_1 DD1CFO_t + b_0 D1CFO_t + b_1 D1CFO_t * DD1CFO_t + c_1 Z\_LIFE\_CYCLE_t + c_2 Z\_LIFE\_CYCLE_t * DRET_t + c_3 Z\_LIFE\_CYCLE_t RET_t + c_4 Z\_LIFE\_CYCLE_t * RET_t * DRET_t + e$$

This regression model is modified based on Collins et al. (2014) according to the Basu model but controlling firm's life cycle to test whether firms in different life cycles would have different asymmetric timeliness incurred in response to bad economic news, where CFO_t is operating cash flows deflated by lagged market value of equity. $D1CFO_t$ is change in operating cash flows and $DD1CFO_t$ is the dummy variable for negative change in operating cash flows from t-1 to t as a

proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. $Z\_LIFE\_CYCLE_t$ is the combined z-score of four firm's characteristic (firm age, size, capital expenditure and sales growth rate), and the details of the measurement can be found in Table 1. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel F: Effect of Product Pricing and Cost Stickiness Together on Cash Margin

VARIABLES	(1) CASH_DSALE	(2) CASH_DSALE
Constant (a_0)	0.042***	0.064***
	(4.20)	(5.14)
DD1CFO (a_1)	-0.071***	-0.076***
	(-11.85)	(-9.41)
D1CFO (b_0)	0.015	0.009
	(1.16)	(0.98)
DD1CFO*D1CFO (b_1)	0.576***	0.788***
	(12.80)	(13.07)
SALES (c_1)	0.057***	0.050***
	(12.54)	(11.94)
DSALES (c_2)	0.024**	0.021
	(2.14)	(1.34)
SALES_CHG (c_3)	-0.001***	-0.002***
	(-5.62)	(-3.93)
DSALES*SALES_CHG (c_4)	0.135***	0.164***
	(7.66)	(5.05)
DMIN (d_0)		-0.088***
		(-5.15)
DMIN*DD1CFO (d_1)		0.036***
		(2.81)
DMIN*D1CFO (d_2)		0.064
		(1.64)
DMIN*D1CFO*DD1CFO (d_3)		-0.466***
		(-5.14)
DMIN*SALES (d_4)		0.076***
		(3.62)
DMIN*DSALES (d_5)		0.024
		(1.31)
DMIN*SALES_CHG (d_6)		0.001**
		(2.13)
DMIN*DSALES*SALES_CHG (d_7)		-0.049*
		(-1.65)
Obs.	17,802	17,802
Adj. R^2	0.223	0.245

This panel presents results for whether positive or negative change in operating cash flows, changes in sales cause sticky cost to affect cash margins.

$CASH\_DSALE_t = a_0 + a_1 DD1CFO_t + b_0 D1CFO_t + b_1 D1CFO_t * DD1CFO_t + c_1 SALES_t + c_2 DSALES_t + c_3 SALES\_CHG_t + c_4 DSALES_t * SALES\_CHG_t + e$

This regression model is modified according to Steele (2011) and Banker et al. (2013) where CASH_DSALE is the cash margin (cash inflows from sales – cash outflows from suppliers and employees) deflated by lagged market value of equity to test the product pricing. SALES, SALES_CHG and DSALES are total sales deflated by lagged market value of equity, change in sales from t-1 to t, and the dummy sales of sales increase or decrease respectively to identify the cost stickiness, where sales decrease with DSALES = 1, otherwise DSALES = 0. $D1CFO_t$ is change

in operating cash flows and $DD1CFO_t$ is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative changes in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel G: Effect of Product Pricing and Cost Stickiness Together on Operating Cash Flows Asymmetric Timeliness

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.045***	0.059***
	(6.92)	(8.03)
DD1CFO (a_1)	-0.072***	-0.073***
	(-17.11)	(-14.26)
D1CFO (b_0)	0.006	0.003
	(1.27)	(0.78)
DD1CFO*D1CFO (b_1)	0.566***	0.696***
	(18.19)	(17.07)
PP1 (c_0)	-0.000	-0.000*
	(-0.74)	(-1.83)
PP1*DD1CFO (c_1)	0.000	0.001**
	(0.97)	(2.45)
PP1*D1CFO (c_2)	0.000	0.000
	(1.13)	(0.76)
PP1*D1CFO*DD1CFO (c_3)	-0.000	0.000
	(-0.14)	(1.00)
SALES (d_1)	0.031***	0.028***
	(16.14)	(16.27)
DSALES (d_2)	0.020***	0.015*
	(2.89)	(1.65)
SALES_CHG (d_3)	-0.001***	-0.002***
	(-6.34)	(-2.81)
DSALES*SALES_CHG (d_4)	0.152***	0.172***
	(11.77)	(8.65)
DMIN (e_0)		-0.064***
		(-5.42)
DMIN*DD1CFO (e_1)		0.025**
		(2.53)
DMIN*D1CFO (e_2)		0.132***
		(4.17)
DMIN*D1CFO*DD1CFO (e_3)		-0.395***
		(-6.50)
DMIN*PP1 (e_4)		0.001***
		(2.99)
DMIN*PP1*DD1CFO (e_5)		-0.001***
		(-3.32)
DMIN*PP1*D1CFO (e_6)		-0.001***
		(-2.80)
DMIN*PP1*D1CFO*DD1CFO (e_7)		-0.001
		(-0.41)
DMIN*SALES (e_8)		0.030***
		(2.68)
DMIN*DSALES (e_9)		0.026**
		(2.11)

DMIN*SALES_CHG (e_{10})		0.000
		(0.66)
DMIN*DSALES*SALES_CHG (e_{11})		-0.027
		(-1.09)
Obs.	17,040	17,040
Adj. R^2	0.276	0.288

This panel presents results for whether product price and cost stickiness within positive or negative change in operating cash flows affect operating cash flows asymmetry.

$$CFO_t = a_0 + a_1 DD1CFO_t + b_0 D1CFO_t + b_1 D1CFO_t * DD1CFO_t + c_0 PP1_t + c_1 PP1_t * DD1CFO_t + c_2 PP1_t * D1CFO_t + c_3 PP1_t * D1CFO_t * DD1CFO_t + d_1 SALES_t + d_2 DSALES_t + d_3 SALES\_CHG_t + d_4 DSALES_t * SALES\_CHG_t + e$$

This model regresses from CFO on change in operating cash flows, product pricing and cost stickiness to test whether product-pricing strategy in response to bad news would cause greater CFO asymmetric timeliness than for good news. CFO is operating cash flows deflated by lagged market value of equity. $D1CFO_t$ is change in operating cash flows and $DD1CFO_t$ is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. PP1 is the change in cash sales to total sales ratio from year t-1 to t to present the product pricing. SALES, SALES_CHG, DSALES are total sales deflated by lagged market value of equity, change in sales and the dummy sales of sales increase or decrease to measure the cost stickiness respectively to test cost stickiness, where sales decrease with DSALES = 1, otherwise DSALES = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms show significant differences compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

5.8 Conclusion

In this chapter, the empirical results document the existence of operating cash flows asymmetric timeliness, together with earnings and total accruals asymmetric timeliness by using 23,203 firm-year observations. Evidence presents that product pricing and cost stickiness are likely to be the factors resulting in more operating cash flows fall in response to bad economic news than operating cash flows rise in response to good news. However, firm's life cycle presents unexpected results that are inconsistent with US evidence found in Collin et al.'s (2014) work indicating that firms in an earlier stage are not likely to have greater asymmetric timeliness than do mature firms.

Moreover, mining firms capture less operating cash flows asymmetric timeliness than non-mining firms by using the dummy variable that tests mining firms separately. In addition, results show that product pricing and cost stickiness are mutually influenced in that they both generate greater operating cash flows decrease in response to bad economic news than increasing in response to good economic news.

The robustness check uses change in operating cash flows from t-1 to t to replace stock return as the proxy for economic news. Most of the results are consistent by using either stock return or change in operating cash flows, except (1) models using the measurement of PP1 to test product pricing, and (2) the effect of cost stickiness on operating cash flows presenting no significant differences between mining and non-mining firms.

CHAPTER 6 CONCLUSION

6.1 Summary of Findings

This thesis examines the operating cash flows asymmetric timeliness, together with earnings and accruals asymmetry. Empirical results support the existence of operating cash flows asymmetric timeliness, which is found to be greater in firms facing bad economic news compared to those receiving good economic news. Although mining firms also show this asymmetry on operating cash flows, earnings and accruals, the degree of this asymmetry is much less than that in non-mining firms. Evidence is also found that product pricing and cost stickiness are likely to affect this asymmetry. Product pricing and cost stickiness are examined not only independently but also mutually to evaluate their effects on operating cash flows asymmetric timeliness. Results show that both of these items are the causes of operating cash flows asymmetric timeliness.

The explanation of firm's life cycle presents its insignificant effect on operating cash flows asymmetric timeliness, which is not to the extent found in US firms in that firms in the earlier stages would have greater operating cash flows asymmetric timeliness. Results show that firms in moderate stages have the greatest operating cash flows asymmetric timeliness in response to bad economic news compared to good news. Firms in both earlier and later stages present less asymmetry inversely. It is likely that the differences in sample size and industry settings between Australia and US lead to this inconsistent result of the effect of firm's life cycle on operating cash flows asymmetric timeliness.

6.2 Contribution and Implications

This thesis makes several important contributions and implications, theoretically, empirically and practically.

First, this is the first Australia-based study to investigate why operating cash flows would have asymmetric timeliness in response to bad and good economic news. Previous Australian studies emphasising earnings asymmetric timeliness (Balkrishna et al., 2007; Lai and Stephen, 2008; and Lai et al., 2013) either omit the operating cash flows asymmetric timeliness or capture the existence of this asymmetry without explanations.

Second, the explanations of product pricing and cost stickiness on operating cash flows asymmetric timeliness are examined separately and mutually, in order to reduce their interrelationship and provide more accurate evaluation.

Third, since the Australian Accounting Standard Board (AASB) 1026 "Statement of Cash Flows" applies to financial years ending on or after 30 June 1992, Australian firms use the direct method of statement of cash flows. This provides pure measures of operating cash flows asymmetric timeliness, since operating cash flows from the indirect method might involve some accruals effects (Collins et al., 2014).

Fourth, through examining mining firms separately, evidence shows that mining firms have significantly lower levels of operating cash flows asymmetric timeliness than firms in other industries. In addition, the effects of product pricing and cost stickiness on operating cash flows asymmetric timeliness are both weaker in mining compared to non-mining firms.

Fifth, the effect of firm's life cycle on operating cash flows is contrary to expectations, and significantly different to that found in the US market, indicating US results are not generalisable to other countries. The US market is significantly bigger than Australia's and the characteristic of firm's life cycle is more prominent in the US than in Australia according to the firm size, market value and market capitalisation.

Furthermore, understanding operating cash flows is important to outsiders of firms, such as investors and analysts, to enable better predictions and forecasts on future firm value. Operating cash flows are usually considered as having a less subjective distortion, and not easily adjusted as accruals and earnings. Awareness of this asymmetry of operating cash flows would be useful for these investors and analysts to identify adjustments and improve the predictive ability of operating cash flows.

6.3 Limitations and Future Research

Although the effects of product pricing, cost stickiness and firm's life cycle are tested on operating cash flows asymmetric timeliness, some other explanations such as cost intervention and option-based compensation have not been explicitly tested in this study partly due to the availability of data. For example, the cost intervention explanation cannot be examined as accounting data of Australian listed firms from the Aspect Huntley Financial Database do not include detailed information for cost items such as cost of goods sold and selling, general and administrative expenses. Therefore, there are research opportunities to test these explanations using the data from other countries to understand their effects on operating cash flows asymmetry for further research.

In addition, Watts (2003a, 2003b) identifies contracting, litigation, regulation and taxation as the four explanations based on the demand for conservatism from outsiders, and examine whether and how the degree of accounting conservatism changes over time. However, Watts (2003a, 2003b) and the follow-up studies (e.g. Guay and Verrecchia, 2006; and Ball et al., 2008) emphasise primarily on asymmetric timeliness of accounting accruals rather than cash flows asymmetry. Future research may investigate whether these explanations based on the demand for conservatism would induce asymmetric behavior in business operations as reflected in operating cash flows asymmetric timeliness

Furthermore, Collins et al. (2014) suggest that data used from the statement of cash flows based on the indirect method is likely to capture some accruals effects. Since there is an advantage for Australian firms to report the statement of cash flows in the direct method, future studies could compare the differences between the statement of cash flows items using the direct and indirect methods to examine operating cash flows asymmetric timeliness. Recently, Australian firms have been allowed to choose between the direct method and indirect method in the preparation of the statement of cash flows. While there have been very limited firms adopting the indirect method, future research may use this unique setting to directly examine the differential attributes of the statement of cash flows items when more data are available in Australia.

Finally, this thesis tests the effect of firm's life cycle on operating cash flows in Australia, and reports the results differently from those reported for US firms. This study then suggests that the difference in results may be due to the fact that the Australian market, compared to US's, is relatively smaller according to firm's size, market value and market capitalisation. Additionally, a large portion of Australian firms (more than 40 per cent of all

Australian listed firms) being from mining industry with low sales in their early stage of life may also result in this difference between the Australian and the US's market. However, there may be other explanations and the validity of the life cycle explanation may be tested using data from other countries in future research.

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APPENDICES

Appendix 1 Mean value of Main Variables Ranked by Life Cycle Quartiles

Z_LIFE_CYCLE_ QUARTILES	SIZETA	AGE	CAPEX	SG	CFO	EARN	TACC
(Most Mature) 0	19.918	5.544	0.046	0.424	0.103	0.028	-0.081
1	17.693	4.989	0.050	0.901	0.041	-0.062	-0.112
2	16.599	4.546	0.065	1.750	-0.030	-0.149	-0.120
(Youngest Firms) 3	16.055	4.239	0.191	19.028	-0.085	-0.235	-0.156
Total	17.566	4.830	0.088	5.526	0.007	-0.104	-0.117

This table shows the descriptive statistics for these main variables ranked by firm's life cycle quartiles.

Appendix 2 Operating Cash Flows Asymmetric Timeliness by Quartiles of Life Cycle and the Individual Firm Characteristics

Panel A: By Firm's Life Cycle Quartiles

	Most Mature			Earlier Stage
LIFE CYCLE QUARTILES	0	1	2	3
VARIABLES	CFO	CFO	CFO	CFO
Constant (a_0)	0.116***	0.085***	0.027**	-0.073***
	(16.18)	(7.87)	(2.39)	(-5.13)
RET (a_1)	0.034**	-0.003	-0.028**	0.001
	(2.15)	(-0.25)	(-2.08)	(0.08)
DRET (b_0)	-0.011	-0.025**	-0.042***	-0.001
	(-1.53)	(-2.25)	(-3.04)	(-0.08)
DRET*RET (b_1)	0.107***	0.186***	0.148***	0.045*
	(3.52)	(6.26)	(6.80)	(1.81)
Obs.	4,013	3,979	3,948	3,874
Adj. R^2	0.039	0.037	0.024	0.002

This panel presents results from regressing stock return on operating cash flows but quartering samples into different quartiles of firm's life cycle

$$CFO_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e$$

This regression model is as the same as Table 6 but ranked by quartiles of life cycle, where CFO is operating cash flows deflated by lagged market value of equity respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Life cycle quartiles are ranked by the z-score of life cycle, where firms in higher quartiles are considered as firms in earlier stages and firm with lower quartiles indicate their more matureness. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel B: By Firm Size Quartiles

	Smaller			Larger
SIZETA QUARTILES	0	1	2	3
VARIABLES	CFO	CFO	CFO	CFO
Constant (a_0)	-0.158***	-0.033**	0.086***	0.122***
	(-9.26)	(-2.47)	(7.60)	(13.71)
RET (a_1)	-0.019***	-0.032***	-0.003	0.031***
	(-2.95)	(-3.76)	(-0.15)	(3.31)
DRET (b_0)	-0.008	-0.028**	-0.021*	-0.006
	(-0.79)	(-2.19)	(-1.81)	(-0.98)
DRET*RET (b_1)	0.011	0.087***	0.164***	0.100***
	(0.50)	(3.10)	(6.06)	(4.64)
Obs.	4,406	4,659	4,878	5,197
Adj. R^2	0.002	0.009	0.031	0.039

This panel displays results from regressing operating cash flows on positive or negative stock returns but quartering samples into different quartiles of firm size

$$CFO_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e$$

This regression model is from Basu (1997) where CFO_t is the operating cash flows deflated by lagged market value of equity, RET_t is annual stock return and $DRET_t$ is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Samples are quartered into four quartiles by firm size, where low quartile indicates smaller firms and higher quartile is for larger firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel C: By Firm Age Quartiles

	Younger			Older
AGE QUARTILES	0	1	2	3
VARIABLES	CFO	CFO	CFO	CFO
Constant (a_0)	-0.039**	0.036***	0.048***	0.078***
	(-2.10)	(3.28)	(5.36)	(7.54)
RET (a_1)	-0.025***	-0.032***	-0.030**	-0.027***
	(-2.64)	(-4.36)	(-2.37)	(-2.79)
DRET (b_0)	-0.021	-0.042***	-0.025***	-0.032***
	(-1.60)	(-4.87)	(-2.86)	(-3.17)
DRET*RET (b_1)	0.132***	0.151***	0.179***	0.200***
	(4.47)	(6.84)	(7.15)	(7.66)
Obs.	3,683	5,175	5,223	5,275
Adj. R^2	0.014	0.027	0.026	0.042

This panel displays results from regressing operating cash flows on positive or negative stock returns but quartering samples into different quartiles of firm age

$$CFO_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e$$

This regression model is from Basu (1997) where CFO_t is the operating cash flows deflated by lagged market value of equity, RET_t is annual stock return and $DRET_t$ is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Samples are quartered into four quartiles by firm age, where low quartile indicates younger firms and higher quartile is for older firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel D: By Firm's Capital Expenditures Quartiles

	Lower CAPEX			Higher CAPEX
CAPEX QUARTILES	0	1	2	3
VARIABLES	CFO	CFO	CFO	CFO
Constant (a_0)	-0.054***	0.073***	0.097***	0.032***
	(-4.49)	(8.10)	(11.22)	(2.87)
RET (a_1)	-0.046***	-0.020	-0.032**	-0.019**
	(-5.29)	(-1.33)	(-2.43)	(-2.29)
DRET (b_0)	-0.020	-0.039***	-0.036***	-0.022*
	(-1.55)	(-3.05)	(-4.14)	(-1.96)
DRET*RET (b_1)	0.153***	0.196***	0.230***	0.138***
	(5.58)	(7.27)	(10.24)	(7.70)
Obs.	4,572	4,877	4,882	4,795
Adj. R^2	0.014	0.042	0.056	0.027

This panel shows results from regressing operating cash flows on positive or negative stock returns but quartering samples into different quartiles of firm's capital expenditures

$$CFO_t = a_0 + a_1 DRET_t + b_0 RET_t + b_1 RET_t * DRET_t + e$$

This regression model is from Basu (1997) where CFO_t is the operating cash flows deflated by lagged market value of equity, RET_t is annual stock return and $DRET_t$ is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Samples are quartered into four quartiles by firm's capital expenditure, where low quartile indicates firms have lower capital expenditure and higher quartile is for firms having higher capital expenditure. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel E: By Firm's Sales Growth Rate Quartiles

	Lower Sales Growth			Higher Sales Growth
SG QUARTILES	0	1	2	3
VARIABLES	CFO	CFO	CFO	CFO
Constant (a_0)	-0.083***	0.130***	0.102***	-0.001
	(-9.36)	(14.68)	(13.67)	(-0.09)
RET (a_1)	-0.027***	-0.000	0.039***	-0.011
	(-3.79)	(-0.02)	(2.80)	(-0.98)
DRET (b_0)	-0.011	-0.041***	-0.004	-0.010
	(-1.07)	(-4.35)	(-0.34)	(-1.11)
DRET*RET (b_1)	0.056***	0.151***	0.181***	0.131***
	(2.97)	(5.03)	(6.06)	(4.84)
Obs.	4,032	4,102	4,085	3,981
Adj. R^2	0.004	0.041	0.072	0.014

This panel presents results from regressing operating cash flows on positive or negative stock returns but quartering samples into different quartiles of firm's two-year sales growth rate

$CFO_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + e$

This regression model is from Basu (1997) where CFO_t is the operating cash flows deflated by lagged market value of equity, RET_t is annual stock return and $DRET_t$ is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. Samples are quartered into four quartiles by firm's sales growth rate, where low quartile indicates firms having lower growth rate and higher quartile is for firms with higher rate. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Appendix 3 Use the Lower Indicator of Change in Cash Sales to Cash Payment Ratio as an Alternative Proxy for Product Pricing

Panel A. Product-Pricing Effects on CFO, EARN and TACC

VARIABLES	(7) CFO	(8) EARN	(9) TACC	(10) CFO	(11) EARN	(12) TACC
Constant (a_0)	0.055***	-0.037***	-0.099***	0.102***	0.011	-0.098***
	(6.19)	(-4.17)	(-13.88)	(17.39)	(1.28)	(-13.16)
DRET (a_1)	-0.032***	-0.034***	0.000	-0.014	-0.010	0.006
	(-4.16)	(-2.71)	(0.01)	(-1.23)	(-0.75)	(0.57)
RET (b_0)	-0.029***	-0.047***	-0.018***	0.009	-0.008	-0.025**
	(-4.03)	(-3.83)	(-2.68)	(0.80)	(-0.79)	(-2.47)
DRET*RET (b_1)	0.197***	0.342***	0.135***	0.234***	0.443***	0.208***
	(10.68)	(11.57)	(5.57)	(7.77)	(15.34)	(9.35)
PP2 (c_0)	-0.053***	0.017	0.071***	-0.106***	-0.010	0.098***
	(-4.60)	(1.26)	(5.27)	(-10.49)	(-0.95)	(6.32)
PP2*DRET (c_1)	0.001	-0.010	-0.014	-0.014	-0.022	-0.019
	(0.08)	(-0.47)	(-0.80)	(-0.80)	(-1.05)	(-0.88)
PP2*RET (c_2)	-0.025***	-0.032**	-0.004	-0.064***	-0.054***	0.002
	(-2.63)	(-2.00)	(-0.28)	(-4.12)	(-2.78)	(0.07)
PP2*RET*DRET (c_3)	-0.035*	0.063*	0.095***	-0.044	0.021	0.066
	(-1.66)	(1.90)	(2.72)	(-1.19)	(0.42)	(1.07)
DMIN (d_0)				-0.150***	-0.153***	0.001
				(-8.82)	(-9.32)	(0.10)
DMIN*DRET (d_1)				-0.008	-0.014	-0.011
				(-0.47)	(-0.86)	(-0.99)
DMIN*RET (d_2)				-0.032**	-0.031*	0.010
				(-2.43)	(-1.92)	(0.79)
DMIN*RET*DRET (d_3)				-0.170***	-0.282***	-0.125***
				(-5.15)	(-7.80)	(-3.75)
DMIN*PP2 (d_4)				0.166***	0.082***	-0.083***
				(8.65)	(4.18)	(-4.08)
DMIN*PP2*DRET (d_5)				-0.000	-0.013	0.010
				(-0.01)	(-0.38)	(0.31)
DMIN*PP2*RET (d_6)				0.031	0.012	0.006
				(1.45)	(0.37)	(0.22)
DMIN*PP2*RET*DRET (d_7)				0.105**	0.078	-0.024
				(2.09)	(0.89)	(-0.23)
Obs.	19,385	19,412	19,433	19,385	19,412	19,433
Adj. R^2	0.041	0.048	0.014	0.097	0.075	0.018

This panel presents result that whether product price within positive or negative stock returns affect operating cash flows, earnings and total accruals differently

$$CFO_t/EARN_t/TACC_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_0PP2_t + c_1PP2*DRET_t + c_2PP2*RET_t + c_3PP2_t*RET*DRET_t + e$$

This model regresses from CFO, EARN and TACC on stock returns and PP2 as the alternative proxy for product-pricing strategy to test whether product-pricing strategy in response to bad news would cause greater CFO, EARN and TACC asymmetric timeliness than in good news. CFO,

EARN and TACC are operating cash flows, earnings and total accruals deflated by lagged market value of equity respectively. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. PP2 is dummy variable where the lowest quartile of change in cash margin from year t-1 to t with PP2 = 1, otherwise PP2 = 0. Columns (4) – (6) are the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms showing significant difference compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel B: Mutual Effects of Product Pricing and Cost Stickiness on Operating Cash Flows Asymmetric Timeliness

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.038***	0.059***
	(6.23)	(10.26)
DRET (a_1)	-0.025***	-0.013
	(-3.24)	(-1.36)
RET (b_0)	-0.014**	0.012
	(-2.18)	(1.42)
DRET*RET (b_1)	0.126***	0.167***
	(6.40)	(5.93)
PP2 (c_0)	-0.055***	-0.087***
	(-5.95)	(-9.68)
PP2*DRET (c_1)	-0.003	-0.008
	(-0.18)	(-0.58)
PP2*RET (c_2)	-0.029***	-0.064***
	(-3.07)	(-4.36)
PP2*RET*DRET (c_3)	-0.022	-0.019
	(-0.86)	(-0.50)
SALES (d_1)	0.031***	0.026***
	(15.77)	(14.41)
DSALES (d_2)	0.011	0.014
	(1.25)	(1.36)
SALES_CHG (d_3)	-0.002***	-0.003***
	(-6.37)	(-4.33)
DSALES*SALES_CHG (d_4)	0.161***	0.200***
	(9.88)	(9.30)
DMIN (e_0)		-0.077***
		(-6.12)
DMIN*DRET (e_1)		-0.011
		(-0.88)
DMIN*RET (e_2)		-0.036***
		(-3.58)
DMIN*RET*DRET (e_3)		-0.123***
		(-3.84)
DMIN*SALES (e_4)		0.037***
		(3.24)
DMIN*DSALES (e_5)		0.001
		(0.11)
DMIN*SALES_CHG (e_6)		0.002**
		(2.41)
DMIN*DSALES*SALES_CHG (e_7)		-0.070***
		(-3.21)
DMIN*PP2 (e_8)		0.109***
		(5.69)
DMIN*PP2*DRET (e_9)		-0.007
		(-0.27)
DMIN*PP2*RET (e_{10})		0.041**

		(2.28)
DMIN*PP2*RET*DRET (e_{11})		0.039
		(0.72)
Obs.	17,406	17,406
Adj. R^2	0.189	0.210

This panel presents results that whether product price and cost stickiness within positive or negative stock returns affect operating cash flows asymmetry

$$CFO_t/EARN_t/TACC_t = a_0 + a_1DRET_t + b_0RET_t + b_1RET_t*DRET_t + c_0PP2_t + c_1PP2*DRET_t + c_2PP2*RET_t + c_3PP2_t*RET*DRET_t + d_1SALES_t + d_2DSALES_t + d_3SALES\_CHG_t + d_4DSALES_t*SALES\_CHG_t + e$$

This model regresses from CFO on stock returns, product pricing and cost stickiness to test whether product-pricing strategy in response to bad news would cause greater CFO asymmetric timeliness than in good news. CFO is operating cash flows deflated by lagged market value of equity. RET is the stock return and DRET is the dummy variable for negative stock return as a proxy for bad economic news, where negative stock return with DRET = 1, otherwise DRET = 0. PP2 is dummy variable as the proxy of product pricing, where the lowest quartile of change in cash margin from year t-1 to t with PP2 = 1, otherwise PP2 = 0. SALES, SALES_CHG, DSALES are total sales deflated by lagged market value of equity, change in sales and the dummy sales of sales increase or decrease to measure the cost stickiness respectively to test cost stickiness, where sales decrease with DSALES = 1, otherwise DSALES = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms showing significant difference compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel C: Effects of Product Pricing on CFO using Change in Operating Cash Flows as Proxy for Economic News

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.064***	0.113***
	(7.35)	(13.78)
DD1CFO (a_1)	-0.099***	-0.086***
	(-17.32)	(-16.25)
D1CFO (b_0)	0.027	-0.005
	(1.63)	(-0.27)
DD1CFO*D1CFO (b_1)	0.628***	0.828***
	(15.38)	(11.66)
PP2 (c_0)	-0.048***	-0.097***
	(-4.80)	(-5.66)
PP2*DD1CFO (c_1)	0.102***	0.096***
	(8.91)	(5.67)
PP2*D1CFO (c_2)	-0.028*	0.004
	(-1.73)	(0.19)
PP2*D1CFO*DD1CFO (c_3)	0.008	-0.083
	(0.16)	(-1.03)
DMIN (d_0)		-0.129***
		(-8.55)
DMIN*DD1CFO (d_1)		0.010
		(1.01)
DMIN*D1CFO (d_2)		0.098***
		(2.85)
DMIN*D1CFO*DD1CFO (d_3)		-0.407***
		(-5.56)
DMIN*PP2 (d_4)		0.142***
		(7.72)
DMIN*PP2*DD1CFO (d_5)		-0.039**
		(-2.00)
DMIN*PP2*D1CFO (d_6)		-0.208***
		(-3.04)
DMIN*PP2*D1CFO*DD1CFO (d_7)		0.237*
		(1.82)
Obs.	19,658	19,658
Adj. R^2	0.170	0.209

This panel presents result that whether product price within positive or negative change in operating cash flows affect operating cash flows

$$CFO_t = a_0 + a_1 DD1CFO_t + b_0 D1CFO_t + b_1 D1CFO_t * DD1CFO_t + c_0 PP2_t + c_1 PP2 * DD1CFO_t + c_2 PP2 * D1CFO_t + c_3 PP2_t * D1CFO * DD1CFO_t + e$$

This model regresses from CFO on change in operating cash and PP2 as the proxy for product-pricing strategy to test whether product-pricing strategy in response to bad news would cause greater CFO asymmetric timeliness than in good news. CFO is operating cash flows deflated by lagged market value of equity respectively. The variable of change in operating cash replaces stock

return as the proxy for good or bad economic news from the Basu model. D1CFO is change in operating cash flows and DD1CFO is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. PP2 is dummy variable as the proxy of product pricing, where the lowest quartile of change in cash margin from year t-1 to t with PP2 = 1, otherwise PP2 = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms showing significant difference compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.

Panel D Mutual Effects of Product Pricing and Cost Stickiness on CFO Asymmetric Timeliness Using Change in Operating Cash Flows as proxy for Economic News

VARIABLES	(1) CFO	(2) CFO
Constant (a_0)	0.039***	0.059***
	(6.15)	(8.62)
DD1CFO (a_1)	-0.079***	-0.078***
	(-14.75)	(-15.74)
D1CFO (b_0)	0.049***	0.024
	(2.64)	(1.36)
DD1CFO*D1CFO (b_1)	0.502***	0.653***
	(12.35)	(9.70)
PP2 (c_0)	-0.007	-0.033**
	(-0.79)	(-2.33)
PP2*DD1CFO (c_1)	0.044***	0.045***
	(4.17)	(2.87)
PP2*D1CFO (c_2)	-0.049***	-0.024
	(-2.65)	(-1.35)
PP2*D1CFO*DD1CFO (c_3)	0.096*	0.034
	(1.79)	(0.41)
SALES (d_1)	0.031***	0.028***
	(16.18)	(15.94)
DSALES (d_2)	0.015**	0.012
	(2.00)	(1.28)
SALES_CHG (d_3)	-0.001***	-0.002***
	(-6.47)	(-3.02)
DSALES*SALES_CHG (d_4)	0.135***	0.158***
	(9.95)	(8.26)
DMIN (e_0)		-0.064***
		(-5.16)
DMIN*DD1CFO (e_1)		0.015
		(1.42)
DMIN*D1CFO (e_2)		0.090***
		(2.64)
DMIN*D1CFO*DD1CFO (e_3)		-0.308***
		(-4.15)
DMIN*PP2 (e_4)		0.076***
		(5.03)
DMIN*PP2*DD1CFO (e_5)		-0.021
		(-1.04)
DMIN*PP2*D1CFO (e_6)		-0.158**
		(-2.30)
DMIN*PP2*D1CFO*DD1CFO (e_7)		0.134
		(1.00)
DMIN*SALES (e_8)		0.027***
		(2.58)
DMIN*DSALES (e_9)		0.012
		(1.01)
DMIN*SALES_CHG (e_{10})		0.001

		(1.03)
DMIN*DSALES*SALES_CHG (e_{11})		-0.041*
		(-1.93)
Obs.	17,654	17,654
Adj. R^2	0.285	0.297

This panel presents results that whether product price and cost stickiness within positive or negative change in operating cash flows affect operating cash flows asymmetry

$$CFO_t = a_0 + a_1DD1CFO_t + b_0D1CFO_t + b_1D1CFO_t*DD1CFO_t + c_0PP2_t + c_1PP2_t*DD1CFO_t + c_2PP2_t*D1CFO_t + c_3PP2_t*D1CFO_t*DD1CFO_t + d_1SALES_t + d_2DSALES_t + d_3SALES\_CHG_t + d_4DSALES_t*SALES\_CHG_t + e$$

This model regresses from CFO on change in operating cash flows, product pricing and cost stickiness to test whether product-pricing strategy in response to bad news would cause greater CFO asymmetric timeliness than in good news. CFO is operating cash flows deflated by lagged market value of equity. $D1CFO_t$ is change in operating cash flows and $DD1CFO_t$ is the dummy variable for negative change in operating cash flows from t-1 to t as a proxy for bad economic news, where negative change in operating cash flows with DD1CFO = 1, otherwise DD1CFO = 0. PP2 is dummy variable as the proxy of product pricing, where the lowest quartile of change in cash margin from year t-1 to t with PP2 = 1, otherwise PP2 = 0. SALES, SALES_CHG, DSALES are total sales deflated by lagged market value of equity, change in sales and the dummy sales of sales increase or decrease to measure the cost stickiness respectively to test cost stickiness, where sales decrease with DSALES = 1, otherwise DSALES = 0. Column (2) is the similar regression but adding the DMIN (dummy variable for mining firms) to test whether mining firms showing significant difference compared to non-mining firms. Figures in parentheses are t-statistics, and all t-statistics in this table are calculated using standard errors corrected for two-way clustering by firm and year. *** (**, *) indicates significant at 1% (5%, 10%) level for two-tailed test.