The current issue and full text archive of this journal is available at
www.emeraldinsight.com/1030-9616.htm

The reliability of mandatory cash expenditure forecasts provided by Australian mining exploration companies in quarterly cash flow reports

Gerry Gallery and Jodie Nelson
School of Accountancy, Queensland University of Technology, Brisbane, Australia

Abstract

Purpose – The purpose of this study is to examine the usefulness of pre-production cash expenditure forecasts issued by Australian mining explorers in their quarterly cash-flow reports.

Design/methodology/approach – Usefulness is determined by examining compliance and the reliability of forecasts (accuracy and bias) for a sample of 1,760 forecasts issued by 481 explorers in 2005/2006. The cross-sectional variation in reliability is examined using regression analysis.

Findings – The findings reveal a high level of compliance but significant inaccuracies (median forecast error of around 50 percent of actual expenditure for exploration and evaluation expenditure and 85 percent for development expenditure), and some evidence of forecast bias. Forecast inaccuracy is more prevalent in firms that have poorer performance, greater financial slack, greater cash-flow volatility, no financial leverage, and for firms that are smaller, in the pre-development stage, and in the mineral (non-oil and gas) sub-industry.

Research limitations/implications – The analysis of forecast usefulness is confined to compliance and reliability. Further research could consider the value-relevance and predictive ability of these forecasts.

Practical implications – The findings question the usefulness of mandatory forecasting by showing that the information role of forecasts in capital markets is impaired when firms have little discretion over the forecast decision, timing and specificity.

Originality/value – This is the first study to examine mandatory cash expenditure forecasts and makes a significant contribution to the small literature on mandatory financial forecasts.

Keywords Financial forecasting, Cash flow, Financial reporting, Australia, Mining industry

Paper type Research paper

1. Introduction

Our study examines the usefulness of forecasted pre-production costs in the quarterly cash flow reports of Australian mining exploration companies, and their relation to firm-specific characteristics. Three related issues motivate our study. First, numerous corporate scandals have focused regulators' attention around the world on

The authors thank Malik Mirza, Natalie Gallery, participants at the 2008 Pacific Basin Finance Economics Accounting Management Conference held at QUT, and an anonymous referee for their helpful comments and suggestions. The authors also thank Tahlee Fong for her expert research assistance.

Accounting Research Journal
Vol. 21 No. 3, 2008
pp. 263-287

1030-9616
DOI 10.1108/10309610810922503

strengthening corporate governance and disclosure regulations (Coglianese *et al.*, 2004). Sound financial disclosures mitigate agency problems by reducing information asymmetry between management and shareholders. However, where financial disclosures are poor, the opposite can occur; information asymmetry may increase, some market participants may be misled, and the firm's cost of equity and shareholder wealth may be adversely affected (Healy and Palepu, 2001). A higher probability of poorer quality disclosure is likely to be observed in situations where regulations prescribe the disclosure of forward-looking information by companies operating in uncertain environments.

Second, the mining industry plays a significant role in the Australian economy, representing approximately 20 percent of market capitalisation and about one third of all Australian Securities Exchange (ASX, 2008) listed companies. The mining industry is characterised by high-operating risk and information asymmetry, leading to high-price volatility. In this environment, public disclosure regarding outcomes from exploration and production activities can have a significant impact on stock prices. Since mid-2005, the Australian Securities and Investments Commission (ASIC, 2006) has increased its surveillance of small mining company disclosures. This increased surveillance followed concerns about inadequate disclosures in 2005 and 2006 and claims that surveillance efforts by the ASX were inadequate due to the lack of resources and expertise for monitoring mining company disclosures[1].

Third, the ASX requires listed mining exploration companies to issue quarterly cash flow reports in accordance with listing rule (LR) 5.3 and Appendix 5B. A unique additional disclosure in these reports is a requirement to forecast future cash outflows relating to pre-production expenditure. The release of forward-looking information has the potential to expand the information set available to investors and its disclosure may be viewed as one dimension of financial reporting quality since a financial report containing such information is more likely to be perceived as being of higher quality (Ajinkya *et al.*, 2005; Karamanou and Vafeas, 2005). However, the uncertain operating environment of mining exploration companies raises the issue of forecast reliability. Scott (2003) contends, that to highlight the uncertain nature and improve the reliability of forward-looking information, companies should only forecast for the period that such information can be reasonably estimated and in doing so, disclose underlying forecast assumptions[2]. However, despite this common view on when and how forecasts should be provided, the LR 5.3 does not permit any forecasting discretion and does not require disclosure of assumptions by mining explorers in their Appendix 5B cash flow reports[3].

Given the unusual nature of cash expenditure forecasts and the fact that they have been required for more than a decade, it could be expected that some research would have been conducted on the usefulness of such forecasts, however, we are unable to identify any prior research on this issue. The absence of research provides an opportunity to extend the disclosure literature to mandatory cash expenditure forecasts. Three research questions are considered:

RQ1. What is the nature of the Appendix 5B cash flow forecasts?

RQ2. How accurate are the forecasts, and are they biased?

RQ3. What firm-specific characteristics influence the accuracy and bias of the forecasts?

The characteristics examined include performance, financial slack, cash flow volatility, leverage, size (as measured by total assets), age and experience, and sub-industry (minerals versus and oil and gas).

Our findings show that most mining exploration entities comply with the requirement to disclose forecasts. Nearly, 90 percent of entities provide evaluation and exploration expenditure forecasts and nearly 20 percent of these same firms also provide development expenditure forecasts. However, despite the high level of compliance, our results reveal significant inaccuracies and some bias in the forecasts. On both a quarterly and pooled basis, the median forecast error is approximately 50 percent of the actual expenditure for exploration and evaluation (EE) expenditure, and approximately 85 percent of the actual expenditure for development expenditure. Our findings reveal that forecast inaccuracy is more prevalent in firms that have poorer performance, greater financial slack, greater cash-flow volatility, no financial leverage, and in firms that are smaller, in the pre-development stage, and in the mineral (non-oil and gas) sub-industry. We also find evidence that some of the same factors influence forecast bias. The significant inaccuracies and considerable variation across firms challenge the wisdom of mandating such forward-looking information for these type of entities.

The remainder of this paper is organised as follows. Section 2 provides an overview of the ASX LR as well as extant literature on financial forecasting by managers. Section 3 provides an overview of related research. Section 4 outlines the research questions and expectations. Section 5 presents the sample selection and research design. Section 6 presents the summary statistics and main results of the study. Section 7 summarises and discusses the implications of the study.

2. Institutional background and quarterly reporting requirements

Disclosures relating to exploration and development activities are governed by the Australasian Code for Reporting of Mineral Resources and Ore Reserves (JORC Code)[4]. This code was developed to ensure that mining and exploration companies report all information necessary for stakeholders to evaluate the activities of the company (ASX, 2008). The ASX requires listed mining exploration companies to issue quarterly activity and cash flow reports in accordance with ASX LR 5.3 and Appendix 5A and 5B (the JORC Code). With the exception of commitments test entities[5], mining exploration companies are the only companies in Australia required to provide quarterly reports in addition to their annual reporting requirements (Gallery *et al.*, 2004). In most jurisdictions outside North America, annual and semi-annual reports have been the traditional means for conveying detailed financial and non-financial information to stakeholders.

2.1 ASX listing rule 5.3

On July 1, 1996, the ASX amended LR 5.3 to require all listed mining exploration entities to issue quarterly cash flow reports, known as Appendix 5B reports. The purpose of this change was to inform the market on "how the entity's activities have been financed for the past quarter and the effect on its cash position" (Australian Stock Exchange – ASX, 2001). The cash flow report must be lodged as soon as the information is available or within one month after the end of each quarter of its financial year (ASX, 2001). A director or company secretary must complete a compliance statement attesting to

the fact that the information contained in the 5B report has been prepared under accounting policies that comply with accounting standards, as defined in the *Corporations Act 2001* or other standards acceptable to the ASX, and provides a true and fair view of the matters disclosed. However, unlike annual and semi-annual cash flow statements, there is no requirement for the 5B report to be audited or reviewed by an external auditor. The format of the cash flow report is specified in Appendix 5B, which contains a proforma cash flow statement, some additional financial information, and limited note disclosures. This format has been modelled on accounting standard *AASB 107 Cash Flow Statements*[6], which guides the presentation and preparation of annual cash flow statements by reporting entities in Australia. One stated benefit of a cash flow statement is to inform investors of the "amount, timing, and certainty of future cash flows" (AASB, 2007b, para. 5).

Although modelled on AASB 107, the prescribed content of Appendix 5B cash flow statements contain a number of notable variations from the AASB 107 version. First, while the Appendix 5B cash flow statement contains the general categories of cash flows (cash flows from operating, investing and financing), the line items within these categories are more detailed and suited to mining companies. For example, individual line item disclosures are required for cash outflows for EE, development, production, and administration activities. Second, other supplementary information that is not required under AASB 107 must be reported, including details of related party transactions, securities, and non-cash financing activities, and for the next quarter, the estimated cash outflows relating to EE activities (Item 4.1) and development activities (Item 4.2). Also, an entity wanting to disclose additional information is encouraged to do so, in a note or notes attached to the report (Appendix 5B, Note 1)[7].

Interestingly, cash expenditure forecasts are not required to be disclosed under Australia's GAAP or other corporate regulations. Although the ASX does not provide a rationale for their LR requirement, it is presumed that the speculative nature of the industry calls for greater disclosure in the form of financial forecasts to better inform investors of the amount, timing, and certainty of future cash flows.

2.2 Accounting for EE costs

In Australia, EE costs are accounted for in accordance with *AASB 6 Exploration for and Evaluation of Mineral Resources*[8]. Unsurprisingly, most mining exploration companies exercise their discretion permitted under this standard (AASB, 2007a, para. Aus 7.1) and capitalise rather than immediately expense EE costs. Hence, these costs are treated as assets in the balance sheet rather than expenses in the income statement, which is unlike other costs of a similar nature, such as research and development expenditure generated in the research phase[9].

The accounting treatment of pre-production costs may provide managers with incentives to focus their spending on exploration, evaluation and development costs, rather than other costs. Lilien and Pastena (1982) contend that firms that incur large amounts of pre-production costs have a greater incentive to capitalise these costs than expense them in order to avoid significant negative impacts on their income statement and balance sheet. Hence, from a financial statement perspective, when forecasting pre-production costs, managers have no strong incentive to understate their forecasts.

3. Related research

Prior research on financial forecasting by managers largely examines voluntary earnings forecast incentives (Healy and Palepu, 2001). Only a few studies have examined management cash forecasts. For example, Wasley and Wu (2006) investigate managers' incentives in the USA to provide voluntary cash flow forecasts. In a study of 2090 forecasts appearing in press releases from mid-1979 to October 2003, they report that management issue cash flow forecasts to signal good news in cash flows and thus, mitigate the negative impact of bad news in earnings, lend credibility to good news in earnings, and signal economic viability for young firms. They also find that cash flow forecasts are important in meeting investor demand for this type of information. Unlike prior studies on voluntary earnings forecasts, which reveal that managers tend to disclose bad news, especially when the risks of litigation are high (Skinner, 1994, 1997; Francis *et al.*, 1994) and job security is threatened (Brennan, 1999; Warner *et al.*, 1988; Weisbach, 1988), Wasley and Wu conclude that different incentives, other than litigation risk, drive the disclosure of different types of financial information, including cash flow information.

There is no known research on mandatory cash flow forecasts; however, there are some studies on mandatory sales and earnings forecasts. For example, Kato *et al.* (2006) investigate the accuracy of annual sales and earnings forecasts (as single-point estimates) issued under the Japanese Stock Exchange Timely Disclosure Rules (*Kessan-Tannsin*). In accordance with these rules (as prescribed in the Stock Exchange Act) listed entities must provide "significant"[10] forecast revisions at interim announcement dates. Based on a sample of 35,639 management forecasts issued from 1997 to 2006, their results reveal that managers initially set overly optimistic forecasts at the beginning of the year (especially for firms with poor profitability), and then issue downwards forecast revisions to meet realisations.

Kato *et al.*'s (2006) findings indicate that management forecasts are consistently biased from one year to the next, possibly because:

- managers are not exposed to the same high levels of litigation risk as managers in other countries, such as the USA; and
- reputation costs are not sufficient to penalise managerial opportunism in forecasting.

Kato *et al.* conclude that despite their consistent optimism, management forecasts in Japan affect stock prices (albeit these effects are smaller than those observed in the USA) and are informative about future earnings[11].

In addition to the institutional differences, the relevance of the prior forecast research to our study is limited by the reporting period (i.e. annual cash flows as opposed to quarterly cash flows), type of forecasts required (i.e. net cash flows versus cash outflows), and/or by the regulatory regime (i.e. voluntary versus mandatory forecasts). Nevertheless, the findings are important to this study because they show that, unlike prior earnings forecast findings, the disclosure of cash flow information is potentially motivated by different incentives.

4. Research questions and expectations

4.1 Compliance

Our first research question is: what is the nature of the Appendix 5B cash flow forecasts? Given that these forecasts are mandatory, we focus on the compliance issue in addressing this question. It is well accepted that routine compliance with disclosure

regulations requires implementation of effective enforcement mechanisms (La Porta *et al.*, 2006). The ASX has implemented a market surveillance unit that monitors company compliance with LRs and provides suspension and expulsion measures for non-compliance. Nevertheless, a comprehensive investigation of the ASX web site, company queries, and disciplinary activities from 2001 to 2006 found no evidence of ASX action with respect to incomplete or inaccurate information in 5B cash flow reports. This lack of enforcement suggests that the forecasting decision and the quality of forecasts ultimately depend upon managerial discretion[12]. Thus, we expect non-compliance is likely to be prevalent under these circumstances.

4.2 Forecasting accuracy and bias

Our second research question is: how accurate are the forecasts, and are they biased? In examining the factors associated with forecast accuracy, most prior studies associate the frequency and quality of earnings forecasts with attempts to minimise litigation costs. For example, Baginski *et al.* (2002) show that bad-news firms are more inclined to provide forecasts when the risks of litigation are relatively high. Bamber and Cheon (1998) find that managers are less inclined to issue specific earnings forecasts when exposure to legal liability and proprietary information costs are high. Similarly, Skinner (1994) documents that to minimise litigation costs, good earnings-related news tends to be disclosed as point or range estimates while bad news disclosures tend to be disclosed in qualitative statements and related to quarterly earnings announcements.

Reputation costs and credibility concerns are also important considerations in encouraging accuracy and deterring managers from issuing biased forecasts (Skinner, 1994; Hong *et al.*, 2000; Hong and Kubik, 2003; Rogers and Stocken, 2005). If managers obtain a reputation for unreliable forecasts, the credibility of their forecasts will decline, making it less likely that stock prices will respond positively to their forecasts and harder to convince investors of their managerial ability (Hutton and Stocken, 2007; Karamanou and Vafeas, 2005). Over 90 percent of US managers surveyed by Graham *et al.* (2005) agreed or strongly agreed that voluntarily disclosures promote a reputation for transparent reporting (La Porta *et al.*, 2006). The findings of Kato *et al.* (2006) with respect to mandatory management earnings forecasts in Japan, and Gallery *et al.* (2008) with respect to voluntary management earnings forecasts in Australian initial public offer prospectuses, provide some support for the influence of reputation in lower litigation environments. Both studies show that managers attempt to walk down prior earnings forecasts through forecast revisions prior to the earnings realisation dates.

In the case of mining exploration companies, cash expenditure forecasts in 5B reports are issued in point form. These specific forecasts encompass a narrower range of outcomes, which increases the likelihood of inaccuracy. The lack of enforcement and the associated low litigation risk reduces incentives for managers to devote resources to providing better quality forecasts. While forecasts are expected to be inaccurate, it is not clear what incentives managers have to bias their cash expenditure forecasts other than to meet budgeted expenditure outlays. Also, unlike the Japanese stock exchange and Australian IPO forecasts, the ASX does not require or explicitly encourage mining explorers to issue forecast revisions prior to reporting the actual realised outflows in the subsequent 5B report. Hence, managers have little opportunity to correct biases in cash

expenditure forecasts. Therefore, apart from a desire to meet targets or budgets, we do not expect exploration firms to exhibit optimistic biases in their expenditure forecasts.

4.3 Forecast accuracy and firm-characteristics

Our third research question is: what firm-specific characteristics influence the accuracy and bias of the forecasts? In examining this question we consider relevant factors from prior disclosure research, namely: performance, financial slack, financial leverage, cash flow volatility, firm age and experience, size, and sub-industry membership[13].

4.3.1 Performance. Disclosure research generally shows that better performing firms produce more frequent and better quality forecasts. Early US research reveals that management earnings forecasts tend to be more frequent when firm performance is high rather than low (Penman, 1980; Verrecchia, 1983; Lev and Penman, 1990, Lang and Lundholm, 1993). However, in more recent times, concerns about increased litigation risk in the US show that management forecasts have shifted from being more frequently associated with good performers (a "good news" firm bias) to more frequently associated with poorer performers (a "bad news" firm bias) (Skinner, 1994; Kasznik and Lev, 1995). Outside the USA where litigation risk is lower, the good news bias tends to persist (Baginski *et al.*, 2002), and there is some evidence that better performing firms tend to produce more accurate and less optimistically biased forecasts (Kato *et al.*, 2006). For similar reasons we expect that better performing mining explorers will produce cash expenditure forecasts with similar properties. Also, in the case of these firms, a high cash burn rate contributes to an ongoing need for future funding. The more a firm can generate cash from internal sources, the less uncertainty associated with future cash flows. Hence, we expect that better performing firms (as measured by cash performance) are more likely to have more accurate expenditure forecasts.

4.3.2 Financial slack. Sufficient cash holdings are necessary for firms to fund working capital requirements and investments in positive NPV projects. Observable differences in cash holdings across firms are a natural outcome of differences in the cost of external financing, capital constraints, and the level of financial distress (Myers, 1984; Myers and Majluf, 1984; Almeida *et al.*, 2004). However, high-cash balances can induce managers to overinvest in negative NPV projects, which benefit managers at the expense of shareholders (Easterbrook, 1984; Jensen, 1986). Furthermore, managers can more readily consume liquid assets for private gain than fixed assets (Myers and Rajan, 1998). This inefficiency in cash expenditure, or agency view, is generally consistent with the empirical evidence (Blanchard *et al.*, 1994; Harford, 1999; Opler *et al.*, 1999). However, the evidence is not conclusive on the optimal level of cash holdings or the impact of alternative governance characteristics and disclosure on the level of firms' cash holdings (Mikkelson and Partch, 2003; Kalcheva and Lins, 2007).

In addition to the agency concerns of excessive cash holdings, mining exploration companies face difficulty in quickly raising external funds due to their size and uncertain operating environments. Therefore, the failure to meet budgets and estimates may be related to a combination of agency and non-agency related factors such as poor planning and cost control. The agency and non-agency arguments both lead to similar predictions. Where cash holdings are large, managers are more likely to waste cash on less productive activities (i.e. non-exploration or development activities, such as administration and inefficient related-party transactions). In these circumstances, managers are likely to produce more inaccurate forecasts. In contrast, in companies with

low levels of cash holdings, managers are more likely to be focused on allocating cash to productive activities and conserving cash resources. Hence, it is expected that where financial slack is low, managers will issue more accurate expenditure forecasts.

4.3.3 Financial leverage. As leverage increases, lenders demand more information to ensure effective monitoring of the firm in order to assess the probability of a firm meeting its debt obligations (Jensen and Meckling, 1976). However, empirical studies present mixed findings with respect to the association between leverage variables and more frequent and better quality disclosure. Some researchers document a positive association between leverage and the voluntary disclosure of information (Ferguson *et al.*, 2002; Bradbury, 1992), while others fail to find any significant association (Malone *et al.*, 1993; Wallace *et al.*, 1994). Contrary to these studies, Meek *et al.* (1995) report a significant, negative relationship for US, UK, and continental European multinational corporations when disclosure is voluntary. A major assumption is that leverage variables (typically the debt-to-equity or debt-to-asset ratio) accurately proxy for the underlying financial risk across sample companies regardless of other cross-sectional differences such as firm size, asset structure, operating risk, and industry. In the case of mining exploration companies only a minority (approximately one third) have any form of debt in their capital structure. Explorers that have secured debt funding typically have a higher portion of assets in place, face lower uncertainty about their prospects, and have agreed to debtholder monitoring. Thus, firms with financial leverage are likely to produce more accurate cash expenditure forecasts than firms without financial leverage.

4.3.4 Cash flow volatility. Where investors demand information about cash flows, managers have incentives to issue cash flow forecasts (Wasley and Wu, 2006). However, where the firm's cash flows are more volatile, it can be more difficult for managers to make accurate forecasts (Wasley and Wu). Prior earnings forecast literature contends that when earnings are highly volatile, managers face a greater risk of making an inaccurate forecast (Baginski *et al.*, 2002; Kato *et al.*, 2006). In the case of cash flows, they can be more volatile than earnings because of the smoothing effect of accruals in earnings and because managers can engage in earnings management to reduce earnings volatility (Wasley and Wu). In the case of mining exploration companies, they operate in an uncertain environment that contributes to less predictable and more volatile cash flows than many other entities. It is therefore expected that as cash flow volatility increases, explorers produce less accurate cash expenditure forecasts.

4.3.5 Firm age and experience. Prior studies provide mixed results on the relationship between disclosure and firm age. Image and reputation are both important considerations for older, well-established companies, and accordingly, they have been found to disclose more information than younger companies (Owusu-Ansah, 1998). However, Chen *et al.* (2002) find a negative association between disclosure and firm age under a quarterly earnings announcement regime. They argue that investors demand more useful information from younger firms because their earnings and production activities are more uncertain. Consistent with this argument, Wasley and Wu (2006) reveal that younger firms issue cash flow information to signal economic viability and therefore assist with raising external capital. However, younger explorers in the Australian market may not be able to provide sufficiently accurate cash forecasts to credibly signal to potential fund providers. Also, age may not successfully capture an explorer's ability to predict future cash outlays if the firm has been unsuccessful in explorations activities over a number of years. A more relevant measure is likely to be a firm's stage of operation. If a firm has

progressed to the development stage it is more likely to be able to predict future cash EE expenditure than firms at the exploration stage. We therefore expect that both age and experience are likely to lead to more accurate forecasts.

4.3.6 Size. Firm size is likely to be closely related to age and experience and also capture other cross-sectional differences in firms. Prior research finds that larger firms are more likely to voluntarily disclose earnings forecasts compared to smaller firms (Cox, 1987; Choon *et al.*, 2000). In the IPO setting, firm size is also argued to have a negative relationship with forecast error as larger firms have a greater capacity to absorb the impact of unexpected events, more diverse operations, and more sophisticated forecasting techniques (Chapple *et al.*, 2005; Hartnett and Romcke, 2000). In terms of mandated information, empirical evidence suggests that larger companies disclose more adequate information, as opposed to smaller companies because their competitive advantage is less likely to be threatened (Owusu-Ansah, 1998)[14]. Therefore, it is expected that larger mining exploration firms are more likely to provide accurate forecasts than their smaller counterparts.

4.3.7 Sub-industry category. Several studies in the disclosure literature have indicated that industry membership can influence a firm's disclosure practices (Hope, 2003; Dye and Sridhar, 1995). For example, firms in high-risk industries may disclose more information in order to better distinguish themselves from competitors in the same industry. With regard to cash flow forecasts, the accuracy of the forecast is likely to differ across industries. In the Australian mining industry, there are two major sub-industries: minerals (materials) and oil and gas (energy). The mineral explorers typically face greater uncertainty in their exploration activities because of the more diverse nature of their operations. However, oil and gas firms face greater difficulty in estimating and extracting hydrocarbon reserves relative to resources measurement and extraction in the minerals industry (Sykes, 2001). In responding to the uncertainty facing oil and gas firms, the ASX imposes additional disclosure obligations on these firms[15]. Owing to these differences, it is expected that oil and gas explorers will provide less accurate cash expenditure forecasts relative to the mineral explorers.

5. Data and research design

5.1 Sample selection and data sources

The sample comprises all mining explorations companies listed on the ASX that lodged Appendix 5B reports between September 30, 2005 and July 31, 2006. For most companies, the study period spans four consecutive quarterly reporting periods, which varies depending on the company's respective balance date. A total of 481 companies are identified as representing the entire population of companies subject to Appendix 5B quarterly cash flow reporting by the ASX. Within this population of firms, 371 firms are in the GICS material (minerals) sector (GICS Codes 15101010-15105020) and 110 are in the energy sector (oil and gas) sector (GICS Codes 10101010-10102050). Where an entity is not listed or has not provided a forecast for a certain quarter, the quarterly observation is excluded from testing procedures, yielding a total of 1,760 cash flow reports (1,377 for the Materials and 383 for energy firms).

All quarterly cash flow information (including lodgement dates, listing/de-listing date) was hand-collected from announcements (including Appendix 5Bs reports) and other information obtained through the *Aspect Huntley DatAnalysis* database. Company financial data from the annual financial reports were hand-collected from a

combination of the *Connect 4 Annual Reports Collection* and *Aspect Huntley FinAnalysis* databases.

5.2 Research design

Our research design uses summary statistics to examine research question one (compliance) and research question two (accuracy and bias). Multivariate regression procedures are used to examine research question three (factors associated with accuracy and bias). The following sub-section explains the procedures used to measure the variables and test expected associations.

5.2.1 Measuring forecasting accuracy and bias. Following prior research, accuracy or forecast error (FERROR) is measured as the absolute value of the signed cash expenditure forecast error deflated by the actual (realised) cash expenditure[16]:

$$\frac{|\text{Forecasted cash expenditure} - \text{Actual cash expenditure}|}{\text{Actual cash expenditure}}$$

This measure captures the magnitude of the cash flow forecast error and is useful in measuring the percentage error. However, the measure does not capture the economic significance of the error. Following prior research (Kato *et al.*, 2006) we therefore use an alternative metric (using total assets as a deflator) in regression analysis to capture the economic significance of the error, calculated as follows:

$$\frac{|\text{Forecasted cash expenditure} - \text{Actual cash expenditure}|}{\text{Total assets}_{t-1}}$$

Forecast bias (FBIAS) is the relative (unsigned) directional forecast error. As cash expenditure is treated as an outflow (a negative value), a positive forecast error (i.e. the actual exceeds the forecast) indicates an underestimation or conservative forecast, and a negative forecast error (i.e. the forecast exceeds the actual) indicates an overestimation or optimistic forecast. If managers issue cash expenditure forecasts based on true expectations and these expectations are unbiased, it is expected that on average, forecast error will be statistically indistinguishable from zero.

5.2.2 Research model. Mining exploration companies are required to forecast cash outflows for EE costs, as well as development costs. Hence, the model below will be used to test research question three where the dependent variable is either forecast accuracy (equation (1)) or bias (equation (2)) for EE costs, or development costs, and the independent variables are the previously explained firm-specific factors that are expected to explain error and bias:

$$\begin{aligned}\text{FERROR}_{it} = {} & \alpha_1 + \alpha_2\text{PERFORM}_{it} + \alpha_3\text{FINSLACK}_{it} + \alpha_4\text{CFVOL}_{it} \\ & + \alpha_5\text{LEVDUM}_{it} + \alpha_6\text{AGE}_{it} + \alpha_7\text{AGEEXP}_{it} + \alpha_8\text{SIZE} \\ & + \alpha_9\text{INDDUM}_{it} + \varepsilon_{it}\end{aligned} \tag{1}$$

$$\begin{aligned}\text{FBIAS}_{it} = {} & \beta_1 + \beta_2\text{PERFORM}_{it} + \beta_3\text{FINSLACK}_{it} + \beta_4\text{CFVOL}_{it} \\ & + \beta_5\text{LEVDUM}_{it} + \beta_6\text{AGE}_{it} + \beta_7\text{SIZE}_{it} + \beta_8\text{INDDUM}_{it} + \varepsilon_{it}\end{aligned} \tag{2}$$

where dependent variables: FERROR, |forecasted cash expenditure-actual cash expenditure| deflated by lagged total assets; and FBIAS, forecasted cash expenditure-actual cash expenditure deflated by lagged total assets (signed values):

- Independent variables: PERFORM, net operating cash flows deflated by average total assets.
- FINSLACK, total cash at the end of the current quarter deflated by average total assets.
- CFVOL, standard deviation of net operating cash flows over four prior quarters deflated by lagged total assets.
- LEVDUM, one if the company has financial leverage (interest-bearing debt) and zero otherwise.
- AGE, number of years between the listing and the current quarterly reporting date.
- AGEEXP, one if the company has both actual exploration/evaluation and development expenditure in the same quarter, and zero otherwise; SIZE, natural logarithm of average total assets for the current fiscal year (t) and prior year ($t - 1$).
- INDDUM, one if the company is in the energy sector and zero if the company is in the materials sector.

6. Results

6.1 Descriptive statistics

Table I reports the number of cash expenditure reports and forecasts issued for EE costs (Panel A) and developments costs (Panel B) over each of the four quarters and an average for all quarters. Of the 481 firms in the sample (371 for materials and 110 for energy) an average of 440 reports (344 for materials and 96 for energy) were lodged with the ASX over the study period. Panel A and B further shows high compliance with the requirement to provide forecasts. For EE (development) forecasts, only 7.03 percent (6.21 percent) on average fail to provide a forecast when there is actual expenditure recorded in the subsequent quarter. Although most firms provide EE forecasts (93.81 percent for material firms and 91.06 percent for energy firms), only a minority have reached the development expenditure forecast stage (18.94 percent for material firms and 41.82 percent for energy firms). The difference between the two industries highlights the need to control for sub-industry type. Overall, these results show that contrary to our expectation for research question one, there is a strong culture of compliance with the ASX's Appendix 5B forecasting requirements.

Table II presents the descriptive statistics for forecasting accuracy (error and bias) for EE (Panel A) and development expenditure (Panel B). In both panels statistics for error and bias deflated by:

(1) actual cash outflows; and

(2) by lagged total assets are reported.

In Panel A, the mean (median) error for the pooled observations (ERROR Pooled) is 210.3 percent (46.8 percent), indicating that companies are issuing significantly inaccurate forecasts. More than half the sample issues forecasts with a median error of nearly 50 percent. Similar results are reported across each of the four quarters. In contrast, the median EE forecast bias is only − 2.9 percent, which indicates a small optimistic bias (i.e. forecast expenditure is greater than actual expenditure). The statistics for EE forecast

Table I.
Number of forecasts issued by quarter

Quarter	No. of cash flow reports lodged		No. of cash flow forecasts issued				No forecast but actual expenditure			
	Materials	Energy	Materials	Percent	Energy	Percent	Materials	Percent	Energy	Percent
Panel A: Exploration and evaluation										
1	328	85	304	92.68	76	89.41	25	7.62	6	7.06
2	342	92	322	94.15	84	91.30	26	7.60	6	6.52
3	349	99	330	94.56	91	91.92	18	5.16	7	7.07
4	358	107	336	93.85	98	91.59	20	5.59	8	7.48
Average	344	96	323	93.81	87	91.06	22	6.49	7	7.03
Total	1,377	383	1,292		349		89		27	
Panel B: Development										
1	328	85	57	17.38	38	44.71	19	5.79	5	5.88
2	342	92	64	18.71	43	46.74	15	4.39	5	5.43
3	349	99	69	19.83	39	39.39	13	3.74	6	6.06
4	358	107	71	19.83	39	36.45	10	2.79	8	7.48
Average	344	96	65	18.94	40	41.82	14	4.18	6	6.21
Total	1,377	383	261		159		57		24	

Notes: Forecasts are sourced from 1,760 quarterly cash flow reports issued by 481 firms during the 2005/2006 fiscal year. The percentage of cash flow forecasts issued for both materials and energy sub-industries are calculated as the number of cash flow forecasts issued, respectively, divided by the number of cash flow reports lodged for the particular quarter or average; no forecast refers to the number of companies which do not provide forecasted outflows but have actual outflows in the following quarter; the percentage of forecasts issued for no forecast is measured as the number of companies which provide no forecast divided by the number of cash flow reports lodged for the respective sub-industry

Variable	*N*	Mean	Median	SD	Variable	Mean	Median	SD
Panel A: Exploration and evaluation expenditure								
Forecast error deflated by actual expenditure					Forecast bias deflated by actual expenditure			
ERROR Q1	351	1.102	0.471	2.584	BIAS Q1	−0.652	0.032	2.733
ERROR Q2	378	3.769	0.411	46.862	BIAS Q2	−3.349	0.041	46.894
ERROR Q3	397	1.423	0.532	3.544	BIAS Q3	−1.024	−0.129	3.680
ERROR Q4	405	2.081	0.462	10.460	BIAS Q4	−1.708	−0.086	10.528
ERROR Pooled	1,531	2.103	0.468	23.997	BIAS Pooled	−1.694	−0.029	24.029
Forecast error deflated by lagged total assets					Forecast bias deflated by lagged total assets			
ERROR Q1	369	0.165	0.140	0.109	BIAS Q1	0.002	0.000	0.063
ERROR Q2	391	0.173	0.147	0.129	BIAS Q2	0.006	0.000	0.083
ERROR Q3	417	0.188	0.154	0.140	BIAS Q3	−0.009	−0.005	0.093
ERROR Q4	422	0.196	0.159	0.148	BIAS Q4	−0.005	−0.004	0.099
ERROR Pooled	1,599	0.181	0.150	0.133	BIAS Pooled	−0.002	−0.002	0.086
Panel B: Development expenditure								
Forecast error deflated by actual expenditure					Forecast bias deflated by actual expenditure			
ERROR Q1	79	13.587	0.873	105.954	BIAS Q1	−12.725	0.296	106.062
ERROR Q2	86	19.814	0.787	161.526	BIAS Q2	−19.009	0.257	161.624
ERROR Q3	90	2.284	0.858	6.485	BIAS Q3	−1.584	−0.021	6.693
ERROR Q4	87	2.818	0.864	8.861	BIAS Q4	−2.116	0.116	9.057
ERROR Pooled	342	9.439	0.856	95.697	BIAS Pooled	−8.674	0.173	95.770
Forecast error deflated by lagged total assets					Forecast bias deflated by lagged total assets			
ERROR Q1	109	0.188	0.152	0.174	*BIAS* Q1	−0.018	−0.002	0.110
ERROR Q2	110	0.217	0.172	0.180	*BIAS* Q2	−0.009	−0.002	0.137
ERROR Q3	124	0.240	0.181	0.204	*BIAS* Q3	−0.053	−0.008	0.157
ERROR Q4	121	0.269	0.209	0.208	*BIAS* Q4	−0.039	−0.008	0.173
ERROR Pooled	464	0.230	0.174	0.194	*BIAS* Pooled	−0.031	−0.005	0.148

Notes: Forecasts are sourced from 1,760 quarterly cash flow reports issued by 481 firms during the 2005/2006 fiscal year. ERROR is a measure of cash expenditure forecast accuracy and is measured as the absolute value of forecasted cash outflows less actual reported cash outflows for the respective quarter (Q1-4) deflated by the absolute value of the actual outflows in Panel A and deflated by lagged total assets in Panel B. BIAS is a measure of cash expenditure forecast bias and is measured as the signed ERROR or relative directional forecast error for the respective quarter, and is calculated as forecasted cash outflows less actual reported cash outflows, deflated by the value of the actual outflows for the respective quarter (Q1-4) in Panel A and deflated by lagged total assets in Panel B; ERROR Pooled includes all quarterly ERROR observations; BIAS Pooled includes all quarterly BIAS observations. The ERROR and BIAS measures shown in Panel B (i.e. using the lagged asset deflators) are used in regression analysis (the variable names are shown as FERROR and FBIAS in the regression models)

Table II.
Descriptive statistics – error and bias

error and bias calculated using the total asset deflator further show that the error is also economically significant. The mean (median) forecast error is 18.1 percent (15 percent) of total reported assets for the prior period. In contrast, the EE forecast bias is almost zero relative to total assets. Thus, these results show that in answer to research question two, EE expenditure forecasts are significantly inaccurate but not materially biased.

The Appendix provides an example of a typical sample company's quarterly expenditure forecasts extracted from Appendix 5B reports for the March 2006 quarter (the first period after listing) to the June 2008 quarter. The forecasts are compared with subsequent actual reported expenditure to estimate the forecast error. Over almost all quarters the errors are material (from 6.3 to 327.4 percent) and are optimistically biased.

An examination of notes provided in the covering letter attached to the Appendix 5Bs revealed that delays in obtaining exploration permits where frequently cited as reasons for the failure to commence exploration activities on a number of mining claims. However, forecasts were not explained or qualified and there was no indication provided as to why the forecasts were continually inaccurate and optimistically biased.

Table II Panel B shows development expenditure forecast error consistent with those reported for the EE forecast error. The median forecast error for the pooled observations is 85.6 percent. Contrary to the findings for the EE forecasts, a significant positive forecast bias is evident for most of the quarterly figures and the pooled observations (median error of 17.3 percent). This suggests that managers may be conservative in under-estimating their development expenditure relative to realised cash outflows. However, when the economic significance is considered (Panel B), the error for the pooled observations remains material with a mean (median) of 23 percent (17.39 percent), but not the bias.

Table III further explores error and bias by displaying the signed error over percentiles for the full sample and the industry sub-samples (material and energy). The statistics reveal that the negative EE forecast error and bias shown in Table II are evident in both sub-industries, but it is more pronounced in the energy sector. Approximately, 87 percent of firms in this sector have errors greater than positive or negative 50 percent and the negative errors dominate (58.4 percent are greater than -50 percent of realized cash flows). Thus, as expected, firms in the energy sector are more likely to produce inaccurate forecasts that overestimate their actual expenditure (negatively biased forecasts). In contrast, Panel B shows that similar biases are not evident for development expenditure forecasts.

Table IV provides the descriptive statistics for the independent variables entering in the regression model. The data were obtained from the most recent annual report prior to the release of each quarterly report. The sample size for most of the variables is less than the total 481 observations due to missing data for some of the variables. The statistics reveal that most firms are small (median total assets of $7.029 million), are performing poorly with negative net cash flow from operations, have relatively large amounts of their assets in the form of cash (median FINSLACK is 37.4 percent of total assets), have higher cash flow volatility, and are relatively young (median AGE is 4.74 years). Also, most firms have no debt (67.41 percent of the sample), are yet to reach the development expenditure stage (83.65 percent of the sample), and are in the material sub-industry (77.13 percent of the sample).

6.2 Multiple regression results

6.2.1 Exploration and evaluation forecast expenditure. Table V presents the results from estimating the model for EE forecasting error (Panel A) and bias (Panel B). Results are reported for each quarter and for the pooled observations[17]. Consistent with the findings of prior studies (Penman, 1980; Verrecchia, 1983; Lev and Penman, 1990), the Panel A pooled results show that the performance (PERFORM) coefficient is negative (-0.344) and significant ($p < 0.01$), indicating that better performing firms provide more accurate forecasts. The financial slack (FINSLACK) and cash flow volatility (CFVOL) coefficients are positive (0.041 and 0.020) and significant ($p < 0.01$); indicating that firms with greater cash holdings and greater cash flow volatility are more likely to exhibit greater EE forecasting errors. While the firm age (AGE) coefficient is not significant, the experience

	Signed error (percent)	All Firms No. of forecasts (percent)	Materials No. of forecasts (percent)	Energy No. of forecasts (percent)
Panel A: Exploration and evaluation expenditure				
Negative	< − 50.01	483 (31.55)	361 (29.64)	122 (58.37)
	− 40.01 to − 50	44 (2.87)	36 (2.95)	8 (3.83)
	− 30.01 to − 40	47 (3.07)	40 (3.28)	7 (3.35)
	− 20.01 to − 30	70 (4.57)	59 (4.84)	11 (5.26)
	− 10.01 to − 20	78 (5.09)	62 (5.09)	16 (7.65)
	− 0.01 to − 10	68 (4.44)	52 (4.27)	16 (7.65)
Positive	0 to 10	109 (7.12)	93 (7.63)	16 (7.65)
	10.01 to 20	95 (6.20)	76 (6.24)	19 (9.09)
	20.01 to 30	110 (7.18)	96 (7.88)	14 (6.70)
	30.01 to 40	93 (6.07)	83 (6.81)	10 (4.78)
	40.01 to 50	89 (5.81)	74 (6.07)	15 (7.18)
	> 50.01	245 (16.00)	186 (15.27)	59 (28.23)
Total		1,531	1,218	313
Panel B: Development expenditure				
Negative	< − 50.01	107 (31.29)	63 (30.14)	44 (33.08)
	− 40.01 to − 50	3 (0.88)	1 (0.48)	2 (1.50)
	− 30.01 to − 40	5 (1.46)	3 (1.44)	2 (1.50)
	− 20.01 to − 30	10 (2.92)	6 (2.87)	4 (3.01)
	− 10.01 to − 20	10 (2.92)	7 (3.35)	3 (2.26)
	− 0.01 to − 10	14 (4.09)	9 (4.31)	5 (3.76)
Positive	0 to 10	12 (3.51)	7 (3.35)	5 (3.76)
	10.01 to 20	13 (3.80)	6 (2.87)	7 (5.26)
	20.01 to 30	14 (4.09)	9 (4.31)	5 (3.76)
	30.01 to 40	11 (3.22)	4 (1.91)	7 (5.26)
	40.01 to 50	16 (4.68)	11 (5.26)	5 (3.76)
	> 50.01	126 (36.84)	82 (39.23)	44 (33.08)
Total		342	209	133

Notes: Forecasts are sourced from 1,760 quarterly cash flow reports issued by 481 firms during the 2005/2006 fiscal year. Signed error (or bias) is measured as the difference between forecasted cash outflows and the actual reported cash outflows, deflated by the value of the actual outflows

Table III.
Number of cash flow expenditure forecasts classified by percentage error (signed)

dummy coefficient (AGEEXP) is negative (− 0.039) and significant ($p < 0.01$) indicating that companies with more experience, that is, they have reached the development stage, are more likely to produce more accurate EE forecasts. Similarly the financial leverage (LEVDUM) coefficient is negative (− 0.016) and significant ($p < 0.05$), which suggests that the presence of debtholders may help to mitigate forecast inaccuracy. Also, consistent with prior research, larger firms are more likely to issue more accurate forecasts than smaller firms (the SIZE coefficient = − 0.012; $p < 0.05$). Finally, the negative and significant industry dummy (INDDUM) coefficient (0.035; $p < 0.01$) indicates that consistent with the results reported in Table III, firms in the materials sub-industry are more likely to provide more accurate EE forecasts than those in the energy sector.

Apart from company age, the findings for EE forecast accuracy provide strong support for the expected explanators of EE forecast error and in combination, the variables have significant explanatory power (adjusted $R^2 = 37.9$ percent). Similar results are evident in the quarterly models.

Panel A: Test variables – continuous						
	n	Mean	Median	SD	Minimum	Maximum
Total assets ($million)	479	14.503	7.029	28.087	0.18	326.12
Total assets (logged) SIZE)	479	8.902	8.858	1.101	5.18	12.70
Cash flow performance (PERFORM)	463	−0.116	−0.081	0.126	−0.50	0.13
Financial slack (FINSLACK)	463	0.526	0.374	0.507	−0.03	2.00
Cash flow volatility (CFVOL)	448	−3.118	−3.215	1.158	−6.73	5.073
Age in years (AGE)	481	8.590	4.740	9.069	0.000	38.05
				Frequencies		
		0			1	
		n	*Percent*		*n*	*Percent*
Panel B: Test variable – dichotomous						
Leverage dummy (*LEVDUM*)	448	302	67.41		146	32.59
Experience dummy (*AGEEXP*)	422	353	83.65		69	16.35
Panel C: Control variable – dichotomous						
Industry dummy (INDDUM)	481	371	77.13		110	22.87

Notes: Data are sourced from annual results for the population of 481 explorers for 2005/2006 fiscal year. In Panel A, SIZE is the natural logarithm of average total assets for the current fiscal year (t) and prior year ($t-1$); PERFORM is net operating cash flow deflated by average total assets for t and $t-1$; FINSLACK is total cash at end of quarter deflated by average total assets; CFVOL is the standard deviation of net operating cash flows over four prior quarters deflated by lagged total assets; and AGE is the number of years between listing and the current quarterly reporting date; deflated by lagged total assets. In Panel B, LEVDUM is equal to one if the company has financial leverage (interest-bearing debt) and zero otherwise; and AGEEXP is equal to one if the company has both actual exploration/evaluation and development expenditure in the same quarter, and zero otherwise. In Panel C; INDDUM is equal to one if the company is in the energy sector and zero if it is in the materials sector

Table IV.
Descriptive statistics – independent variables

The results in Table V, Panel B for EE forecast bias are modest in comparison with Panel A. Given the weak evidence of bias previously reported it is not surprising that the results for EE forecast bias reveal fewer significant coefficients and a lower model explanatory power (adjusted $R^2 = 8.30$ percent in the pooled model). Only the coefficients for firm performance (PERFORM), financial slack (FINSLACK), pre-production stage experience (AGEEXP) and size (SIZE) are significant. These results nevertheless reveal that better performance, greater financial slack, and pre-production stage experience induce an optimistic (overestimation) EE forecast bias, while larger size induces a conservative (underestimation) bias.

6.2.2 Development forecast expenditure. Table VI presents the results of estimating the model for development forecasting error (Panel A) and bias (Panel B). Consistent with the results reported for EE forecast error, Panel A shows in the pooled results that better performing firms (PERFORM), those with greater financial slack (FINSLACK), and greater cash flow volatility (CFVOL) are more likely to issue inaccurate forecasts. The size (SIZE), firm age (AGE), industry (IND) and leverage (LEV) coefficients have no significant influence on the Development forecast error.

Panel B shows that only the coefficients for performance (PERFORM) and financial slack (FINSLACK) are negative and significant. These results indicate that firms that are performing poorly and have lower cash holdings are more likely to overstate their development forecasts than firms that are performing well and have greater cash holdings. While these results are consistent with the results reported for EE forecast bias, none of the other variables display significant coefficients. The weaker results in

Table V. Cash flow forecast accuracy and bias - exploration and evaluation expenditure

Variables	Predicted sign	Quarter 1 Coeff.	Quarter 1 *t*-stat.	Quarter 2 Coeff.	Quarter 2 *t*-stat.	Quarter 3 Coeff.	Quarter 3 *t*-stat.	Quarter 4 Coeff.	Quarter 4 *t*-stat.	Pooled Coeff.	Pooled *z*-stat.
Panel A: Cash flow forecast error (Model 1)											
Intercept		0.084	1.587	0.239	4.148***	0.386	6.730***	0.309	5.284***	0.294	6.43***
PERFORM	−	−0.456	−7.913***	−0.340	−6.065***	−0.319	−5.995***	−0.377	−7.562***	−0.344	−7.86***
FINSLACK	+	0.032	2.425**	0.032	2.624***	0.034	2.658***	0.051	4.646***	0.041	4.55***
CFVOL	+	0.009	1.878**	0.023	3.884***	0.029	5.012***	0.019	3.053***	0.020	3.67***
LEVDUM	−	−0.022	−1.946*	−0.015	−1.243	−0.011	−0.880	−0.016	−1.247	−0.016	−1.99**
AGE	−	0.000	−0.295	0.000	−0.219	0.000	−0.661	0.000	−0.614	−0.000	−0.76
AGEEXP	−	−0.031	−2.039**	−0.065	−4.057***	−0.032	−2.016**	−0.062	−3.648***	−0.039	−3.91***
SIZE	−	0.007	1.234	−0.005	−0.794	−0.018	−2.944***	−0.014	−2.271**	−0.012	−2.42**
INDDUM	+	0.013	1.045	0.029	2.189**	0.052	3.803***	0.036	2.611***	0.035	3.16***
N		341		366		390		396		1,493	
Adjusted R^2/*F*-stat.		0.278	17.669***	0.359	26.606***	0.389	31.946***	0.424	37.593***	0.379	291.73***
Panel B: Cash flow forecast bias (Model 2)											
Intercept		−0.085	−2.473**	−0.108	−2.563**	−0.095	−2.020**	0.015	0.297	−0.098	−2.29**
PERFORM	?	−0.221	−5.903***	−0.350	−8.586***	−0.203	−4.655***	−0.071	−1.635	−0.227	−5.95***
FINSLACK	?	−0.010	−1.127	−0.038	−4.227***	−0.037	−3.550***	−0.028	−2.965***	−0.030	−3.94***
CFVOL	?	0.005	1.452	−0.009	−2.116**	0.004	0.790	0.012	2.279**	0.002	0.42
LEVDUM	?	−0.014	−1.835*	−0.013	−1.480	−0.002	−0.148	0.005	0.449	−0.005	−0.82
AGE	?	0.000	0.562	0.000	0.471	0.000	−0.155	0.000	0.473	0.000	0.25
AGEEXP	?	−0.011	−1.160	−0.017	−1.415	−0.026	−1.997**	−0.037	−2.525**	−0.024	−3.53***
SIZE	?	0.010	2.887***	0.008	1.782*	0.011	2.252**	0.003	0.627	0.011	2.42**
INDDUM	?	−0.019	−2.352**	−0.013	−1.302	−0.001	−0.074	−0.011	−0.929	−0.008	−0.90
n		341		366		390		396		1,493	
Adjusted R^2/*F*-stat.		0.122	7.007***	0.179	10.958***	0.064	4.350***	0.034	2.732***	0.083	63.55***

Notes: *, **, *** Significant at the 0.1, 0.05, and 0.01 levels (one-tailed test when coefficient sign is predicted, two-tailed when coefficient sign is not predicted), respectively. Model 1: $FERROR_{it} = \beta_1 + \beta_2 PERFORM_{it} + \beta_3 FINSLACK_{it} + \beta_4 CFVOL_{it} + \beta_5 LEVDUM_{it} + \beta_6 AGE_{it} + \beta_7 AGEEXP_{it} + \beta_8 SIZE_{it} + \beta_9 INDDUM_{it} + \varepsilon_{it}$; Model 2: $FBIAS_{it} = \beta_1 + \beta_2 PERFORM_{it} + \beta_3 FINSLACK_{it} + \beta_4 CFVOL_{it} + \beta_5 LEVDUM_{it} + \beta_6 AGE_{it} + \beta_7 AGEEXP_{it} + \beta_8 SIZE_{it} + \beta_9 INDDUM_{it} + \varepsilon_{it}$

Table VI.
Cash flow forecast accuracy and bias – development expenditure

Variables	Predicted sign	Quarter 1 Coeff.	Quarter 1 *t*-stat.	Quarter 2 Coeff.	Quarter 2 *t*-stat.	Quarter 3 Coeff.	Quarter 3 *t*-stat.	Quarter 4 Coeff.	Quarter 4 *t*-stat.	Pooled Coeff.	Pooled *z*-stat.
Panel A: Cash flow forecast error (Model 1)											
Intercept		0.006	0.039	−0.244	−1.557	0.017	0.101	−0.036	−0.214	0.149	1.54
PERFORM	−	−0.488	−3.049***	−0.851	−5.886***	−0.263	−1.609	−0.460	−3.053***	−0.451	−5.28***
FINSLACK	+	0.197	5.283***	0.015	0.459	0.094	2.407***	0.115	3.456***	0.101	4.58***
CFVOL	+	0.006	0.426	0.021	1.382*	0.043	2.480***	0.003	0.153	0.029	2.24**
LEVDUM	−	0.000	−0.013	−0.028	−0.875	−0.001	−0.029	0.011	0.281	0.013	0.60
AGE	−	−0.001	−0.417	−0.001	−0.653	0.000	0.198	0.000	0.110	−0.000	−0.12
SIZE	−	0.007	0.504	0.047	3.235***	0.030	1.719**	0.019	1.099	0.007	0.63
INDDUM	+	0.037	1.077	−0.032	−0.918	0.010	0.235	0.013	0.304	−0.009	−0.40
n		96		104		120		116		436	
Adjusted R^2/*F*-stat		0.363	9.135***	0.375	9.825***	0.169	4.459***	0.219	5.605***	0.168	5.235***
Panel B: Cash flow forecast bias (Model 2)											
Intercept		0.027	0.265	−0.069	−0.539	−0.018	−0.131	−0.025	−0.164	−0.139	−1.26
PERFORM	?	−0.256	−2.214**	−0.488	−3.781***	−0.189	−1.406	−0.310	−2.331**	−0.296	−3.20***
FINSLACK	?	−0.125	−4.640***	−0.078	−2.725***	−0.096	−2.999***	−0.101	−3.433***	−0.064	−3.30***
CFVOL	?	0.015	1.496	−0.005	−0.365	−0.023	−1.591	0.019	1.185	−0.011	−1.12
LEVDUM	?	−0.032	−1.389	0.012	0.408	0.010	−0.328	−0.036	−1.049	−0.005	−0.29
AGE	?	0.000	−0.063	0.001	0.553	−0.001	−0.486	0.001	0.382	0.000	0.48
SIZE	?	0.005	0.453	0.000	0.019	−0.007	−0.508	0.006	0.411	0.005	0.46
INDDUM	?	−0.006	−0.238	0.045	1.460	0.012	0.349	0.071	1.917*	0.033	1.66
N		96		104		120		116		436	
Adjusted R^2/*F*-stat		0.163	3.785***	0.143	3.457***	0.060	2.092**	0.123	3.302***	0.099	26.34***

Notes: *, **, ***Significant at the 0.1, 0.05, and 0.01 levels (one-tailed test when coefficient sign is predicted, two-tailed when coefficient sign is not predicted), respectively. Model 1: $FERROR_{it} = \beta_1 + \beta_2 PERFORM_{it} + \beta_3 FINSLACK_{it} + \beta_4 CFVOL_{it} + \beta_5 LEVDUM_{it} + \beta_6 AGE_{it} + \beta_7 SIZE_{it} + \beta_8 INDDUM_{it} + \varepsilon_{it}$; Model 2: $FBIAS_{it} = \beta_1 + \beta_2 PERFORM_{it} + \beta_3 FINSLACK_{it} + \beta_4 CFVOL_{it} + \beta_5 LEVDUM_{it} + \beta_6 AGE_{it} + \beta_7 SIZE_{it} + \beta_8 INDDUM_{it} + \varepsilon_{it}$

Table VI are possibly explained by the smaller sample of firms that have reached the development stage in the pre-production activities. Nevertheless, even with this smaller sample, the results show that forecast accuracy can be explained by well recognised firm specific differences.

7. Discussion and conclusion

This study investigates the reliability of cash expenditure forecasts issued mining exploration companies. Prior research has examined voluntary cash flow reporting by managers (Wasley and Wu, 2006), and voluntary (Skinner, 1994) and mandatory (Kato *et al.*, 2006) management earnings forecasts. However, as cash flow forecasts are not mandated in other jurisdictions, and as this issue has not been previously examined in Australia, this is the first known study to identify and examine such a mandatory setting. The context of the study is the ASX's (2001) Appendix 5B quarterly cash flow report regime. This setting is particularly interesting because the ASX's mandatory regime imposed on mining exploration companies only requires cash expenditure forecasts, not comprehensive cash flow (net cash flow) forecasts.

We investigate three research questions relating to the quality of these cash expenditure forecasts:

(1) What is the nature of the Appendix 5B cash flow forecasts?

(2) How accurate are the forecasts and are they biased?

(3) What firm-specific characteristics influence the accuracy and bias of the forecasts?

We examine these questions using the available Appendix 5B cash expenditure forecasts (1,760 cash expenditure observations) provided by the population of mining exploration entities listed on the ASX between September 30, 2005 and July 31, 2006.

Our findings show that most mining exploration entities comply with the requirement to disclose forecasts with more than 90 percent of entities providing evaluation and exploration expenditure forecasts, and nearly 20 percent of these same firms provide development expenditure forecasts. In contrast, similar findings are not observed for forecast accuracy and bias. On both a quarterly and pooled basis, the median forecast error is approximately 50 percent of the actual expenditure for EE expenditure, and approximately 85 percent of the actual expenditure for development expenditure. These findings indicate that firms have considerable difficulty in forecasting one-quarter-ahead pre-production expenditure. Our findings reveal that forecast inaccuracy is more prevalent in firms that have poorer performance, greater financial slack, greater cash-flow volatility, and no financial leverage. Also, forecasts are less accurate for firms that are smaller, in the pre-development stage, and in the mineral (non-oil and gas) sub-industry. We also find evidence that some of the same firm-specific factors influence forecast bias.

Overall, our results clearly show that, on average, the mandatory cash expenditure forecasts required by the ASX are unreliable and, contrary to the objectives of cash flow reports (AASB 107, para. 5), do not appear to provide information to better inform investors of the "amount, timing, and certainty" of future cash flows[18]. As a consequence, these forecasts may adversely affect the investment decisions of investors. The fact that many forecasts are significantly inaccurate, together with the considerable variation we observe across firms in the extractive industry, challenge the

wisdom of mandating such forward-looking information for firms in uncertain operating environments.

Given their potential to mislead, we suggest that cash expenditure forecasts should not remain mandatory. Regardless of whether they continue to be mandated or are made voluntary, we suggest that firms be required to disclose information about the underlying estimates and assumptions used in deriving the forecasts. Such additional disclosures would be consistent with best practice observed in other contexts, such as in initial public offer prospectus documents. Additionally, the ASX should require firms to provide explanations when forecasts vary materially from estimates. Finally, our study adds to the small body of literature that reveals the limitations of mandatory forecasting. As in other studies (Kato *et al.*, 2006) our findings show that the information role of forecasts in capital markets is impaired when firms have little discretion over the decision to forecast and the characteristics of the forecast.

Notes

1. For example, in 2006 CuDeco Ltd announced to the ASX a significant copper discovery, leading to its share price increasing from 29 cents to ten dollars in just eight weeks. Following an ASX investigation the discovery was subsequently shown to be overstated. The ASX was heavily criticised for its slow response (West and Andrusiak, 2006).
2. The ASIC adopts a similar "reasonable grounds" position with respect to forecasts in prospectuses (ASIC, 2002).
3. Additional disclosures can be provided in notes to the cash flow report.
4. The Code is issued by the Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia.
5. Commitments test entities are those companies that are allowed to list on the ASX without a 'binding contract', provided they make commitments to spend their cash in accordance with their business objectives (Gallery *et al.*, 2004).
6. AASB 107 is the equivalent of *IAS 7 Cash Flow Statements* issued by the International Accounting Standard Setting Board (IASB).
7. Although entities frequent provide additional information in coversheets and notes, a careful scrutiny of a large sample of 5B reports failed to find any evidence of attempts to justify forecasts or to explain forecast errors.
8. AASB 6 is the equivalent of IFRS 6 *Explorations and Evaluations of Mineral Resources* issued by the IASB.
9. Under AASB 138 *Intangible Assets* all research costs must be expensed (para. 54) because in the research phase, companies cannot demonstrate that an asset exists that will generate probable future income benefits (para. 55). Similarly with mining exploration and evaluation costs, there is on average, a low probability that these costs will result in a recoverable reserve from which the company will generate economic benefits, yet the company can initially capitalise these costs (development expenditure is generally recognised in accordance with AASB, 2007c).
10. 'Significant' revisions in management forecast estimates are defined as changes in estimated sales of 10 percent or more and/or changes in estimated earnings of 30 percent or more.
11. There is also evidence that mandatory and voluntary earnings forecasts in Australian IPO prospectuses are materially inaccurate, optimistically biased, and tend to be walked down prior to the earnings realisation date (Gallery *et al.*, 2008).

12. Arguably the absence of regulatory monitoring and sanctions for non-compliance is tantamount to having voluntary or no regulation at all (Fung *et al.*, 2004; Lopez-De-Silanes, 2003).
13. We also test these same factors in examining forecast bias but we make no directional predictions about their influence on bias.
14. Disclosure is considered "adequate" if it is relevant to the needs of users, capable of fulfilling those needs, and timely.
15. Oil and gas firms must provide a hydrocarbon report (inclusive of pre-hydrocarbon reserve stage details) as part of their quarterly Appendix 5B reports (ASX Listing Rule 5.9-5.17).
16. Actual rather than forecast cash expenditure is used as a deflator because a number of firms forecast zero cash expenditure. Appendix 5 provides an example of how this forecast error is calculated.
17. A panel data random effects regression procedure is used to estimate the pooled model. Robust standard errors are used in estimating the reported coefficients.
18. It is possible that the forecasts may be at least partially informative in some contexts. To more comprehensively assess the usefulness of the forecasts would require a comparative approach using alternative predictive models (e.g. historical versus forecast cash flows) and an assessment of the value-relevance of the forecasts to investors. We leave this relative value-relevance issue to further research.

References

AASB (2007a), *AASB 6: Exploration for and Evaluation of Mineral Resources*, Australian Accounting Standards Board, Melbourne.

AASB (2007b), *AASB 107: Cash Flow Statements*, Australian Accounting Standards Board, Melbourne.

AASB (2007c), *AASB 138: Intangible Assets*, Australian Accounting Standards Board, Melbourne.

Ajinkya, B., Bhojraj, S. and Sengupta, P. (2005), "The association between outside directors, institutional investors and the properties of management earnings forecasts", *Journal of Accounting Research*, Vol. 43 No. 3, pp. 343-76.

Almeida, H., Campello, M. and Weisbach, M. (2004), "The cash flow sensitivity of cash", *The Journal of Finance*, Vol. 59 No. 4, pp. 1777-804.

ASIC (2002), *PS 170, Prospective Financial Information*, Australian Securities and Investments Commission, Sydney.

ASIC (2006), *Small & Mid-cap Miners Study, ASIC Report*, Australian Securities and Investments Commission, Sydney.

ASX (2001), *Additional Reporting on Mining and Exploration Activities*, Australian Stock Exchange, Sydney.

ASX (2008), "ASX and Australian resources", Australian Securities Exchange, available at: http://asx.com.au (accessed 17 April).

Baginski, S.P., Hassell, J.M. and Kimbrough, M.D. (2002), "The effect of legal environment on voluntary disclosure: evidence from management earnings forecasts issued in US and Canadian markets", *Accounting Review*, Vol. 77 No. 1, pp. 25-50.

Bamber, L. and Cheon, Y. (1998), "Discretionary management earnings forecast disclosures: antecedents and outcomes associated with forecast venue and forecast specificity choices", *Journal of Accounting Research*, Vol. 36 No. 2, pp. 167-90.

Blanchard, O., Lopez-de-Silanes, F. and Shleifer, A. (1994), "What do firms do with cash windfalls?", *Journal of Financial Economics*, Vol. 36, pp. 337-60.

Bradbury, M.E. (1992), "Voluntary disclosure of financial segment data: New Zealand evidence", *Accounting and Finance*, Vol. 32 No. 1, pp. 15-32.

Brennan, N. (1999), "Voluntary disclosure of profit forecasts by target companies in takeover bids", *Journal of Business Finance & Accounting*, Vol. 26 Nos 7/8, pp. 883-917.

Chapple, L., Clarkson, P. and Peters, C. (2005), "Impact of Corporate Law Economic Reform Program Act 1999 on initial public offering prospectus earnings forecasts", *Accounting and Finance*, Vol. 45, pp. 67-94.

Chen, J.S., DeFond, M.L. and Park, C.W. (2002), "Voluntary disclosure of balance sheet information in quarterly earnings announcements", *Journal of Accounting and Economics*, Vol. 33 No. 2, pp. 229-51.

Choon, H., Smith, M. and Taylor, S. (2000), "What do Australian annual reports say about future earnings?", *Australian Accounting Review*, Vol. 10 No. 1, pp. 17-25.

Coglianese, C., Healey, T., Keating, E. and Michael, M. (2004), "The role of government in corporate governance", working paper, University of Pennsylvania and Harvard University, Philadelphia, PA and Cambridge, MA.

Cox, C.T. (1987), "Earnings variability, firm size, and the information content in management forecasts of annual earnings", *Journal of Accounting & Public Policy*, Vol. 6 No. 2, pp. 139-53.

Dye, R. and Sridhar, S. (1995), "Industry-wide disclosure dynamics", *Journal of Accounting Research*, Vol. 33, pp. 157-74.

Easterbrook, F. (1984), "Two agency-cost explanations of dividends", *The American Economic Review*, Vol. 74, pp. 650-9.

Ferguson, M.J., Lam, K.C. and Lee, G.M. (2002), "Voluntary disclosure by state-owned enterprises listed on the Stock Exchange of Hong Kong", *Journal of International Financial Management and Accounting*, Vol. 13 No. 2, p. 125.

Francis, J., Philbrick, D. and Schipper, K. (1994), "Shareholder litigation and corporate disclosures", *Journal of Accounting Research*, Vol. 32 No. 2, pp. 137-64.

Fung, A., Weil, D., Graham, M. and Fagotto, E. (2004), "The political economy of transparency: what makes disclosure policies effective?", working paper, Harvard University, Cambridge, MA.

Gallery, G., Gallery, N. and Linus, A. (2008), "The impact of recent regulatory changes on the earnings forecasting behaviour of Australian initial public offer firms", working paper, Queensland University of Technology and PricewaterhouseCoopers, Brisbane.

Gallery, G., Gallery, N. and Sidhu, B. (2004), "Quarterly cash flow reporting – is it useful?", *JASSA*, No. 3, Spring, pp. 14-18.

Graham, J.R., Harvey, C.R. and Rajgopal, S. (2005), "The economic implications of corporate financial reporting", *Journal of Accounting and Economics*, Vol. 40 Nos 1/3, pp. 3-73.

Harford, J. (1999), "Corporate cash reserves and acquisitions", *The Journal of Finance*, Vol. 54, pp. 1967-97.

Hartnett, N. and Romcke, J. (2000), "The predictability of management forecast error: a study of Australian IPO perspective", *Journal of Accounting, Auditing and Finance*, Vol. 16, pp. 401-29.

Healy, P.M. and Palepu, K.G. (2001), "Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature", *Journal of Accounting and Economics*, Vol. 31 Nos 1/3, pp. 405-40.

Hong, H. and Kubik, J.D. (2003), "Analyzing the analysts: career concerns and biased earnings forecasts", *The Journal of Finance*, Vol. 58 No. 1, pp. 313-51.

Hong, H., Kubik, J.D. and Solomon, A. (2000), "Security analysts' career concerns and herding of earnings forecasts", *The Rand Journal of Economics*, Vol. 31 No. 1, pp. 121-44.

Hope, O-K. (2003), "Firm-level disclosures and the relative roles of culture and legal origin", *Journal of International Financial Management and Accounting*, Vol. 14 No. 3, pp. 218-48.

Hutton, A. and Stocken, P. (2007), "Effect of reputation on the credibility of management forecasts", working paper, Boston College, Chestnut Hill, MA.

Jensen, M.C. (1986), "Agency cost of free cash flow, corporate finance and takeovers", *The American Economic Review*, Vol. 76, pp. 323-9.

Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behaviour, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-60.

Kalcheva, I. and Lins, K.V. (2007), "International evidence on cash holdings and expected managerial agency problems", *Review of Financial Studies*, Vol. 20, pp. 1087-112.

Karamanou, I. and Vafeas, N. (2005), "The association between corporate boards, audit committees, and management earnings forecasts: an empirical analysis", *Journal of Accounting Research*, Vol. 43 No. 3, pp. 453-86.

Kasznik, R. and Lev, B. (1995), "To warn or not to warn: management disclosures in the face of an earnings surprise", *The Accounting Review*, Vol. 70, pp. 113-34.

Kato, K., Skinner, D.J. and Kunimura, M. Sr (2006), "When voluntary disclosure isn't voluntary: management forecasts in Japan", working paper, University of Chicago and Osaka University of Economics, Chicago, IL and Osaka, 15 October.

La Porta, R., Lopez-De-Silanes, F. and Shleifer, A. (2006), "What works in securities laws?", *Journal of Finance*, Vol. 61 No. 1, pp. 1-32.

Lang, M.H. and Lundholm, R.J. (1993), "Cross-sectional determinants of analyst ratings of corporate disclosures", *Journal of Accounting Research*, Vol. 31 No. 2, pp. 246-71.

Lev, B. and Penman, S.H. (1990), "Voluntary forecast disclosure, nondisclosure, and stock prices", *Journal of Accounting Research*, Vol. 28 No. 1, pp. 49-76.

Lilien, S. and Pastena, V. (1982), "Determinants of intramethod choice in the oil and gas industry", *Journal of Accounting and Economics*, Vol. 4, pp. 145-70.

Lopez-De-Silanes, F. (2003), "A survey of securities laws and enforcement", Policy Research working paper series, The World Bank, Washington, DC.

Malone, D., Fries, C. and Jones, T. (1993), "An empirical investigation of the extent of corporate financial disclosure in the oil and gas industry", *Journal of Accounting, Auditing and Finance*, Vol. 8, pp. 249-75.

Meek, G.K., Roberts, C.B. and Gray, S.J. (1995), "Factors influencing voluntary annual report disclosures by US, UK and continental European multinational corporations", *Journal of International Business Studies*, Vol. 26 No. 3, pp. 555-72.

Mikkelson, W.H. and Partch, M.M. (2003), "Do persistent large cash reserves hinder performance?", *Journal of Financial and Quantitative Analysis*, Vol. 38 No. 2, pp. 275-94.

Myers, S.C. (1984), "The capital structure puzzle", *The Journal of Finance*, Vol. 56, pp. 575-92.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions when firms have information the investors do not have", *Journal of Financial Economics*, Vol. 13, pp. 187-221.

Myers, S.C. and Rajan, R.G. (1998), "The paradox of liquidity", *Quarterly Journal of Economics*, Vol. 108, pp. 733-71.

Opler, T., Pinkowitz, L., Stulz, R. and Williamson, R. (1999), "The determinants and implications of corporate cash holdings", *Journal of Financial Economics*, Vol. 52, pp. 3-46.

Owusu-Ansah, S. (1998), "The impact of corporate attributes on the extent of mandatory disclosure and reporting by listed companies in Zimbabwe", *The International Journal of Accounting*, Vol. 33 No. 5, p. 605.

Penman, S.H. (1980), "An empirical investigation of the voluntary disclosure of corporate earnings forecasts", *Journal of Accounting Research*, Vol. 18 No. 1, pp. 132-60.

Rogers, J.L. and Stocken, P.C. (2005), "Credibility of management forecasts", *The Accounting Review*, Vol. 80 No. 4, pp. 1233-60.

Scott, W.R. (2003), *Financial Accounting Theory*, 3rd ed., Prentice-Hall, Toronto.

Skinner, D.J. (1994), "Why firms voluntarily disclose bad news", *Journal of Accounting Research*, Vol. 32 No. 1, pp. 38-60.

Skinner, D.J. (1997), "Earnings disclosures and stockholder lawsuits", *Journal of Accounting and Economics*, Vol. 23 No. 3, pp. 249-82.

Sykes, T. (2001), *The Numbers Game*, Allen and Unwin, Sydney.

Verrecchia, R.E. (1983), "Discretionary disclosure", *Journal of Accounting and Economics*, Vol. 5 No. 3, pp. 179-94.

Wallace, R.S., Naser, K. and Mora, A. (1994), "The relationship between the comprehensiveness of corporate annual reports and firm characteristics in Spain", *Accounting & Business Research*, Vol. 25 No. 97, pp. 41-53.

Warner, J., Watts, R. and Wruck, K. (1988), "Stock prices and top management changes", *Journal of Financial Economics*, Vol. 20, pp. 461-93.

Wasley, C.E. and Wu, J.S. (2006), "Why do managers voluntarily issue cash flow forecasts?", *Journal of Accounting Research*, Vol. 44 No. 2, pp. 389-429.

Weisbach, M. (1988), "Outside directors and CEO turnover", *Journal of Financial Economics*, Vol. 20, pp. 431-61.

West, M. and Andrusiak, K. (2006), "The X-files: separating the gold dust form the bulldust", *The Australian*, 22-23 July, pp. 31-4.

(The Appendix Table is shown on the next page.)

Corresponding author
Gerry Gallery can be contacted at: g.gallery@qut.edu.au

Appendix. Central Petroleum Limited (CTP) forecast errors calculated from Appendix 5B estimated cash expenditure outflows: March 2006 to June 2008

App.5B Item	Quarter ending	March-2006	June-2006	September-2006	December-2006	March-2007	June-2007	September-2007	December-2007	March-2008	June-2008
	Estimated expenditure (next quarter) $A'000										
4.1	Exploration and evaluation	−500	−650	−2,000	−2,500	−2,000	−2,000	−1,000	−4,000	−7,000	−6,500
4.2	Development	0	0	0	0	0	0	0	0	0	0
	Total	−500	−650	−2,000	−2,500	−2,000	−2,000	−1,000	−4,000	−7,000	−6,500
	Actual expenditure (cash flows related to operating activities)										
1.2(a)	Exploration and evaluation		−117	−85	−287	−1,481	−597	−422	−712	−3,763	−2,335
1.2(b)	Development		0	0	0	0	0	0	0	0	0
1.2(c)	Production		0	0	0	0	0	0	0	0	0
1.2(d)	Administration		−509	−360	−344	−424	−458	−894	−549	−963	−892
			−626	−445	−631	−1,905	−1,055	−1,316	−1,261	−4,726	−3,227
	Net operating cash flows	−270	−541	−367	−467	−1,818	−885	−1,129	−1,023	−4,565	−3,007
	Cash at end of quarter	9,601	8,373	7,943	7,467	5,332	5,232	14,378	13,271	8,635	15,413
1.23	Aggregate amount of payments to related parties included in item 1.2		−54	−100	−188	−91	−141	−268	−187	−118	−118
	Calculated forecast error										
	Exploration and evaluation actual error		−383	−565	−1,713	−1,019	−1,403	−1,578	−288	−237	−4,665
	Error (per cent)		327.4	664.7	596.9	68.8	235.0	373.9	40.4	6.3	199.8

Note: ERROR is a measure of cash expenditure forecast accuracy and is measured as the absolute value of forecasted cash outflows less actual reported cash outflows for the respective quarter deflated by the absolute value of the actual outflows

Table AI.