

The Interplay between International Financial Reporting and Local Disclosure Rules: Evidence from the Oil and Gas Industry *

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Abstract:

We examine the informational consequences of loosening the connection between financial statements and non-financial disclosures. We focus on the setting of Canadian oil and gas (O&G) firms, where IFRS adoption weakens the connection between financial reporting and the jurisdiction- and industry-specific O&G reserve disclosure. We find that while the O&G reserve estimates are not directly exposed to IFRS, the attenuated connection to financial statements affects the informativeness of these estimates. We propose that this connection influences the informativeness of reserve estimates through two channels: processing costs and perceived reliability. The processing cost view suggests that a clear linkage with financial statements reduces costs associated with awareness, acquisition, and integration of non-financial information. Consistently, we find decreased clarity in how reserves are mapped into financial statements and a diminished focus on reserve estimates during earnings conference calls. Regarding the reliability channel, we posit and find that the weakened connection impairs the credibility of non-financial information. Collectively, our results indicate that connection with financial statements affects the incorporation of non-financial information into users' screening and monitoring.

Keywords: financial statements and non-financial disclosure; IFRS; oil and gas reserve disclosure

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“The readers will benefit from – and expect to see – a consistent and coherent narrative, from the front of the annual report through to the financial statements at the back... Standard setters are alert to these changing expectations, so we can expect to see more developments to enhance connectivity across the annual report.”

- Reinhard Dotzlaw, Global IFRS leader and partner at KPMG, 2023

1 Introduction

Financial reporting and disclosure regulations play an essential role in well-functioning capital markets. In businesses exposed to high complexity and uncertainty, firms are often subject to industry- or jurisdiction-specific non-financial disclosure requirements designed and mandated by different regulators alongside the applicable accounting standards.¹ Although these standards and regulations collectively shape the information presented to investors (FASB, 2018; IASB, 2018), there is relatively limited empirical evidence on the information effects of such interplay, especially in non-financial industries.² In this paper, we explore the unintended consequences of changing accounting standards on the informativeness of other non-financial disclosures due to weakening the connection between the two. We address this question in the context of mandatory IFRS adoption by Canadian oil and gas (O&G) firms.

We propose two non-mutually exclusive explanations for why the connection to financial statements might influence the informativeness of non-financial information. First, since financial statements undergo more scrutiny by management and external auditors, they are perceived to contain fewer measurement errors (Bratten, Choudhary and Schipper, 2013). Audited financial statements provide "confirmation" of other disclosures (Gigler and Hemmer,

¹ Cross this study, we define non-financial information as information that is not purely monetary in nature and does not directly relate to the financial performance or financial position of a firm, such as disclosures on patents, sustainability performance, and, in our case, petroleum reserve estimates. These disclosures nevertheless provide insights into a company's operations, strategies, values, and other aspects.

² A growing number of studies have started paying attention to such interplay in financial industries, where accounting standards overlap with banking regulations (e.g., Costello, Granja and Weber, 2019; Bischof, Daske, Elfers and Hail, 2022) or accounting numbers are used as inputs for prudential regulations (e.g., Bertomeu, Mahieux and Sapra, 2023)

1998; Lundholm, 2003; Ball, Jayaraman and Shivakumar, 2012).³ The connection between financial statements and non-financial information may facilitate checking information consistency across different sources, which enhances investors' confidence in incorporating such information in their decision-making. Indeed, survey evidence indicates that perceived reliability influences analysts' use of mineral reserve estimates. Analysts often compare this information with financial reports to increase their confidence in the figures (Fox, 2017).

Second, even if the connection with financial statements might not directly impact the reliability of non-financial information, it can influence the ease with which users process non-financial information (Blankespoor, deHaan, and Marinovic, 2020).⁴ Since financial statements are one of the primary information sources for users, a clear link with financial statements may streamline the process of acquiring non-financial information. Even for sophisticated users with relatively low awareness and acquisition processing costs, the connection may still affect integration costs. A diminished connection could increase the effort required to assimilate the earnings implications of non-financial information, potentially outweighing its benefits. Extant research supports this notion by showing that supplementary disclosures are more value-relevant if they assist interpretations of financial statement information (e.g., Sarath and Natarajan, 1996; Guay, Samuels and Taylor, 2016).

Conversely, it is also possible that altering the connection between financial statements and non-financial information at the regulation level has a limited impact. First, non-financial disclosures, such as reserve estimates for O&G firms, may contain crucial insights into firms' operational performance, independent of their link to financial statements. Second, changes in

³ NI 51-101 requires an external evaluator to monitor the quality of O&G reserves. The existence of such industry specialists might reduce the confirmation role of audited financial statements. However, prior studies question such specialists' monitoring role given low litigation risk (e.g., Ferguson and Pündrich, 2015).

⁴ Following Blankespoor et al. (2020), we consider processing costs that may arise due to awareness costs, acquisition costs, or integration costs. Awareness costs are those necessary to learn about the existence of a disclosure. Acquisition costs are to obtain and extract disclosures for a particular use. Integration costs are those necessary to combine and refine acquired disclosures to understand their implications for firm value.

accounting regulations could improve the overall information environment. For instance, studies demonstrate a host of capital market benefits associated with IFRS adoption (e.g., Barth, Landsman and Lang, 2008; Yip and Young, 2012). A more transparent reporting environment may facilitate users' ability to evaluate firms' performance using multiple information sources, including non-financial disclosures. Last, accounting standards, especially the principle-based IFRSs, typically grant firms substantial discretion (e.g., Hail, Leuz and Wysocki, 2010; Leuz and Wysocki, 2016). Firms, therefore, have the flexibility to make judgment calls to either maintain or change the connection (e.g., Christensen and Nikolaev, 2013).

We examine this question with a sample of Canadian O&G firms around the adoption of IFRS. Mandatory IFRS adoption in the Canadian O&G industry replaced industry-specific local GAAP, yet preserved pivotal non-financial disclosures, such as O&G reserve estimates, under local regulations. This provides a suitable setting for three reasons. First, along with financial reporting standards, listed Canadian O&G firms have long been subject to national regulation, National Instrument (NI) 51-101 (*Standards for Oil and Gas Activities*), which requires firms to provide information on O&G reserve amount estimates. Such estimates constitute a main asset of firms in this economically important industry and could potentially inform investors about potential future cash flows (e.g., Badia, Duro, Jørgensen, Ormazabal and Christensen, 2020). Second, under Canadian GAAP, these O&G reserve estimates were explicitly connected to financial statements. That is, Canadian GAAP specifies how firms should use reserve estimates for financial statement preparation.⁵ With IFRS, this explicit link is weakened due to the removal of industry-specific guidelines in favor of broader IFRS standards. Consequently, “most stakeholders were concerned about the lack of clarity about

⁵ For example, Canadian GAAP requires firms to use conservative estimates, “proved” reserves, at varying levels (e.g., well, project, property, and country) as the base value for depreciation and impairment tests of their on-balance extractive assets. It also specifies production-of-use as the depreciation method. “Proved” reserves are defined by NI 51-101 in Canada and MOGR “*Modernization of Oil and Gas Reporting*” in the US as those with at least a 90 percent probability of being actually recovered.

R[eserves]&R[esources] information used in financial statements” (IASB Investor Survey, 2021, p. 8). Finally, IFRS adoption did not alter the amount of information presented in O&G disclosures (IASB, 2021), enabling us to focus our analyses on assessing whether this modified linkage with financial statements influences the informativeness of reserve disclosures.

Canada maintains a high level of enforcement and integration of securities regulation and financial reporting incentives (e.g., Mittoo, 1992; La Porta, Lopez de Silanes and Shleifer, 2006), which controls for variations in institutional factors that may confound the effects of reporting regulation mandates (e.g., Isidro, Nanda and Wysocki, 2020). To address potential industry-level confounding events, we adopt a difference-in-differences (DiD) design where we examine the value relevance of reserve disclosures in the pre- and post-IFRS periods for a sample of Canadian O&G firms relative to a matched control sample of US peers. US O&G firms share many similarities with their Canadian counterparts in terms of reporting environment and enforcement mechanisms, facilitating comparisons (e.g., Burnett, Gordon, Jørgensen and Linthicum, 2015; Anantharaman and Chuk, 2018; Krishnan and Zhang, 2019).⁶ More importantly, Canadian and US O&G firms were subject to similar reserve disclosure requirements and applied similar accounting standards before Canada adopted IFRS in 2011 (e.g., Badia et al., 2020). Our main analysis is based on an entropy-balanced sample comprised of 119 Canadian and 95 US O&G firms, covering the period from 2009 (i.e., two years before IFRS adoption) to 2013, at which point IFRS had been in place for at least two years.⁷

In line with prior studies (e.g., Badia et al., 2020), we document that reserve estimates are value-relevant prior to IFRS adoption. However, we find that the value relevance of O&G

⁶ For example, since 1993, Canada has been the only country whose local GAAP is accepted by the US Securities and Exchange Commission (SEC) for firms cross-listed in the US. Canada is also the largest trading partner of the US, and the two countries are tied economically, politically, culturally, and geographically. The information environment in Canada is close to that of the US. Finally, the litigation risk in both countries is relatively high - Canada ranks second only to the US in terms of legal liability costs as a percentage of GDP (US Chamber Institute for Legal Reform, 2013).

⁷ Our sample starts from 2009 since it is the first year the US adopted a reserve disclosure rule similar to Canada.

reserves decreases in the post-IFRS period. The decrease in value relevance is more significant for O&G reserve components that are more forward-looking and less predictable (e.g., reserve discoveries). Further, share price becomes more sensitive to reserve estimate revisions, suggesting that investors become more concerned about the quality of O&G reserve disclosure (Badia et al., 2020). Consistently, we find weakened associations between changes in reserve level and stock return and liquidity after IFRS adoption.

We next examine whether the decline in value relevance reflects increases in processing costs. In particular, we focus on changes in firms' disclosure of their accounting practices related to O&G reserve estimates in the annual report notes on the transition to IFRS. As managers have the opportunity to maintain or provide disclosures within the notes, the overall information environment might not have changed significantly despite the weakened connection between financial reporting and reserve disclosure regulation. Notably, and in line with investors' concerns reported in the 2021 IASB survey mentioned above, we find that accounting policy *specificity* and *consistency* (e.g., which and how reserve estimates are used as inputs to financial statements) significantly decrease after IFRS adoption. These findings are consistent with the conjecture of increased processing costs for users to interpret and infer the financial statement implication of reserve estimates. Consistently, we find that the decreases in value relevance are mostly present for firms reducing accounting practice specificity and consistency after IFRS adoption.

We then explore the content of the questions-and-answers (Q&A) section of conference calls. Since in general, investors and analysts can only ask a limited number of questions in a conference call, we expect them to ask questions on important inputs to their forecasts (e.g., Barron, Byard and Yu, 2017). If O&G reserve estimates are associated with higher integration costs and lower earnings implications after IFRS adoption, we expect fewer related discussions in conference call Q&A sections. Accordingly, we find that discussions related to O&G reserve

estimates in conference call Q&A decline following IFRS adoption. Such declines are significant compared to US peers and more present in the fourth quarter when the financial statements and the reserve estimates are disclosed together.

Lastly, we explore whether decreased informativeness could also be explained by decreased reliability. Finding convincing proxies for perceived reliability is challenging; we use two industry-specific proxies for disclosure quality, frequency of revisions, and estimate dispersion (Badia et al., 2020). We find that both the frequency of revision and estimate dispersion increase. These findings are consistent with the weakened monitoring role of audited financial statements on other disclosures. Subsample tests reveal that disclosure quality decreases more for firms changing accounting policies, supporting the conjecture of interaction between reserve reporting and financial reporting. Collectively, our findings suggest that IFRS adoption impacts the informativeness of reserve estimates by changing firms' disclosing practices and users' processing costs of reserve estimates.

Our study contributes to the literature in three ways. First, we contribute to the literature exploring the relationship between financial statements and non-financial disclosures. While a growing number of studies focus on the impact of changes in financial statement regulations on firms' voluntary disclosure practices (e.g., Einhorn, 2005; Guay et al., 2016; Noh, So and Weber, 2019; Hribar, Mergenthaler, Roeschley, Young and Zhao, 2022), our research demonstrates that these impacts can extend to other mandatory disclosures. In particular, our study suggests that reporting regulations initiated and developed by different groups can have unintended consequences. Our findings may provide standard setters and regulators with insights for designing disclosure rules in light of the overall impact on the totality of information.

Second, we respond to the call by Leuz and Wysocki (2016) encouraging accounting regulation studies to focus more on specific properties of the regulation, such as the amount of

detail and guidance, to understand better the potential mechanisms through which change in accounting regulation generates impacts. Our study presents a case where disclosures regarding core assets are jurisdictionally designed, mandated, and unaffected by accounting regulation. Our results indicate that while not directly regulating or intentionally changing the information content of such disclosures, change in accounting regulation generates externalities by weakening the connection between financial reporting and other disclosure regulations.

Third, we add to the literature on accounting in the extractive industries. While O&G reserves present an important resource for firms operating in this industry, prior studies find conflicting results on the relevance of O&G reserve disclosures (*See* Gray, Hellman and Ivanova, 2019 for a review). Badia et al. (2020) document that the adoption of NI 51-101 in Canada in 2003 effectively improved O&G reserve value-relevance while explicitly cautioning whether this result holds under Canada's current financial reporting regime of IFRS (p. 1745). Our results provide direct evidence in this regard, shedding light for standard setters on the advantages of collaborating with global and sector-specific groups in designing industry-specific accounting and disclosure regulations.⁸

2 Institutional Setting

Accounting for extractive activities and IFRS

Prior to 2011, under Canadian GAAP, O&G firms recorded petroleum exploration and production activities at historical cost, applying either the successful efforts (SE) method or the

⁸ The proposal of coordination has been brought up by both regulators and industry practitioners. For example, in the US, Mary Jo White, Chair of the SEC, suggested that "The Commission adopted rules to update the disclosure guidance regarding oil and gas in 2008, but other guides may also need updating ... [T]he international mining community actually has developed comprehensive standards for reporting resources and reserves. Several foreign jurisdictions use these standards in their securities laws. Should our disclosure guidance here be modelled on the international standards?" *Source:* <https://www.sec.gov/news/speech/spch101513mjw>. Similarly, in their comment letter to the IASB Discussion paper (2010), Deloitte suggests that "we strongly recommend that the IASB work with both the Financial Accounting Standards Board (FASB) and the International Organization of Securities Commissions (IOSCO) on this project to ensure that the reserve and resource definitions, accounting methodologies and disclosures are converged between IFRSs and US GAAP[...]" (p. 4) *Source:* <https://www.iasplus.com/en/publications/global/commentletters/2010/pub3167>.

full cost (FC) method. Canada adopted IFRS as its dominant accounting standard in 2011. IFRS 6 pertains to accounting for exploration and evaluation activities in extractive industries but offers significant flexibility and effectively allows almost all pre-IFRS practices to continue (Gray et al., 2019; Nobes and Stadler, 2021). Firms are required to apply general IFRSs, such as IAS 16 (*Property, Plant, and Equipment*) and IAS 36 (*Impairment*), for activities in extractive phases other than exploration and evaluation.

Appendix B summarizes and compares accounting requirements under Canadian GAAP and IFRS.⁹ One notable difference is that while the Canadian GAAP provides detailed guidance on how reserve estimates are used as inputs to financial statement preparation, neither IFRS 6 nor general IFRSs specify any disclosure or use of reserve estimates. For example, under both SE and FC methods, depreciation, depletion and amortization (DDA) expense is calculated by dividing the net capitalized costs by the total proved reserves, and then multiplying the result by the volume of reserves produced during the reporting period. Moreover, Canadian GAAP explicitly requires companies to assess their extractive assets for impairment based on the value of proved reserves.

Moreover, IFRS Standards are less tailored and specific regarding extractive activities. For example, the impairment test units were specified as “country” or “property-to-property” basis under Canadian GAAP while they are referred to as “cash-generating units” under IFRS. In connection with the decision to switch from Canadian GAAP to IFRS, the Canadian Accounting Standards Board (AcSB) staff prepared a high-level comparison between Canadian GAAP and IFRS (AcSB 2008), where they explicitly state that “[...] some portions of Section 3061 and all of AcG-16 and EIC-126 are more comprehensive than IAS 16 with respect to

⁹ Under the full cost method, all costs associated with exploration are capitalized for the appropriate geographic cost center (generally a country). Under the successful effort method, costs of drilling exploratory and exploratory-type geographic tests are capitalized, pending proved reserves. If no reserves are found, these costs are expensed (KPMG 2017, 406).

mineral resources. Section 3061 does not contain an exemption from applying the GAAP hierarchy to develop accounting policies for exploration and evaluation activities” and “some portions of Section 3061 and all of AcG-16 and EIC-126 are more comprehensive than IFRS 6, as [...] as IFRS 6 only provides guidance during the exploration and the evaluation of mineral resources up to the point that technical feasibility and commercial viability of extracting is demonstrated.” (AcSB 2008, 12-13). Therefore, a critical implication of IFRS adoption is the removal of industry-specific guidance for development and production activities and a weakened link between financial statements and reserve disclosures for O&G firms.

The diminished linkage between financial statements and reserve estimates has elicited concerns among various market stakeholders. Auditors, for instance, have highlighted growing ambiguities regarding the categorization of reserves associated with extractive assets. They have recommended that standard setters collaborate more closely with industry specialists to broaden the existing IFRS framework. Surveys further indicate that post-IFRS adoption, investors encounter challenges in integrating reserve estimates with financial statements (IASB 2021). A detailed account of these concerns can be found in Appendix C.

Non-financial disclosures – the reporting of O&G reserve estimates

O&G reserves, broadly defined as resources economically viable to extract, are essential for O&G businesses because they directly indicate potential future economic inflows. Due to the high level of uncertainty and subjectivity in estimates, reserves generally do not meet the recognition criteria of assets; instead, non-financial reserve information is provided outside the scope of financial statements. Regulation on O&G reserve disclosures is developed within different jurisdictions and relies on the industry expertise of geologists, metallurgists, and engineers. In Canada, the disclosure regulation is developed with heavy reference to the Canadian Oil and Gas Evaluation Handbook (COGE), prepared jointly by The Society of Petroleum Evaluation Engineers and the Canadian Institute of Mining, Metallurgy & Petroleum.

In Canada and the US, O&G firms are traditionally required to disclose a conservative O&G reserve estimate – the “proved” reserves.

NI 51-101 was issued in 2003 in Canada to strengthen the faithful representation of reserve estimates. A similar disclosure regulation, “Modernization of Oil and Gas Reporting” (MOGR), was introduced in the US in 2009. Both NI 51-101 and MOGR introduce bright-line probability thresholds to the mandated estimation of reserves by defining proved reserves as “those reserves that have a probability of being produced of at least 90 percent.” Moreover, NI 51-101 and MOGR also redefined additional point estimates based on the probability distribution of reserves. In this study, we only focus on proved reserves since they are the only estimates of reserves available for all firms in our treatment and control groups.¹⁰

3 Related studies and hypothesis development

Reporting regulation has economic consequences for firms and information users. The literature recognizes that managers take a holistic view in adjusting reporting strategies to reach a new equilibrium when exposed to changes in disclosure regulations (e.g., Ball, Kothari and Robin, 2000; Leuz, Nanda and Wysocki, 2003; Burgstahler, Hail and Leuz, 2006). A growing number of studies in the banking industry show that changes in mandatory disclosures can have an impact on other existing information channels, highlighting the importance of considering the effects of different regulations on the totality of information (e.g., Costello et al., 2019;

¹⁰ Consistent with the notion that these two regulations share important commonalities, Canadian reserve disclosures are permitted in the US instead of MOGR. Moreover, rule-making in the US explicitly mentions their adoption of COGE’s definition of reserves and convergence with Canada (see MOGR Final Rule, p. 45). Despite the similarity in the reserve disclosure rules across the US and Canada, NI 51-101 and MOGR differ in several ways. First, NI 51-101 also mandates the disclosure of “proved and probable reserves,” whereas this disclosure is voluntary in the US. Second, NI 51-101 encourages the establishment of reserve committees and mandates external evaluators to audit reserve disclosures, whereas MOGR only requires disclosing the person in charge of auditing reserve amounts and procedures involved. Finally, while NI 51-101 requires a specific declaration of endorsement of the reserve disclosures made by managers and directors, MOGR accepts a generic declaration regarding financial information in the 10-K. Even though there are certain differences between the reserve disclosure regulation in Canada and the US, the parallel trends analysis presented in Figure 1 does not indicate any significant differences pre-IFRS.

Bischof et al., 2022). In the extractive sectors, prior studies report that economic incentives significantly influence firms' accounting choices (Lilien, Mellman and Pastena, 1988; Chen and Lee, 1995) and the early attempts to decrease managerial discretion in the US triggered adverse effects in that management of affected companies altered their reporting or operating plans to reduce the impact of the mandatory accounting changes (e.g., Collins and Dent, 1979; Collins et al., 1981).

As discussed in Section 2, one significant implication of Canadian O&G firms adopting IFRS is the replacement of industry-specific guidance with general IFRSs and the associated removal of guidance on mapping reserve disclosures to financial statements (e.g., through depreciation, impairment, and provisions). On the one hand, losing the connection with financial statements could adversely affect reserve informativeness in that users may face higher processing costs to extract and interpret reserve disclosures and infer their financial impact. Consistently, prior studies show that supplementary disclosures are more value-relevant if they assist interpretations of the financial statement information (e.g., Sarath and Natarajan, 1996; Guay et al., 2016). In addition, audited financial statements provide "confirmation" of other disclosures (Gigler and Hemmer, 1998; Ball et al., 2012). The weakened connections between financial statements and reserve information may hinder users' ability to cross-check information consistency through different sources and reduce their confidence in incorporating reserve information in their decision-making process.

On the other hand, there might not be a change in reserve relevance around IFRS adoption. First, prior studies demonstrate considerable capital market benefits associated with IFRS adoption (e.g., Barth et al., 2008; Yip and Young, 2012). If IFRS contributes to a better information environment, it may sharpen users' ability to evaluate a firm's performance with multiple information sources, including reserve disclosures. Second, reserve disclosures contain important information pertaining to firms' future cash flows, suggesting that reserves

could be directly used and evaluated by investors, independent of their connection with financial statements (e.g., Patatoukas, Sloan and Zha, 2015; Badia et al., 2020). Lastly, firms have substantial reporting discretion under the principle-based IFRS, including referring to local GAAP when making judgment calls (e.g., Christensen and Nikolaev, 2013; Hail et al., 2010), highlighting the role of reporting incentives in driving disclosure behaviors on IFRS transition. Therefore, it is not ex-ante clear whether the relevance of reserve estimates would be significantly affected by the change in accounting regulations. This leads to the following hypothesis, expressed in an alternate form:

Hypothesis: IFRS adoption has no effect on the value-relevance of reserve estimates.

4 Research design and sample selection

Model specification

To test the hypothesis, we follow prior studies (e.g., Patatoukas et al., 2015; Badia et al., 2020) to test the association between reserve levels and stock prices with the adapted Ohlson model. Two considerations motivate using this specification as our main test. First, level specifications are common in the literature examining the informational effects of disclosures (e.g., Barth, Beaver and Landsman, 2001) and facilitate comparisons with prior literature in O&G disclosure. Second, the design mitigates the concern that the market might require time to incorporate disclosures into prices, especially when the disclosure quality is low and there is a change in accounting standards (e.g., Callen, Khan and Lu, 2013). The model is as follows:

$$P_{i,t} = \alpha + \beta_1 RSV_{i,t} + \beta_2 Post_{i,t} + \beta_3 RSV_{i,t} \times Post_{i,t} + \beta_4 BVE_{i,t} + \beta_5 EPS_{i,t} + \varepsilon \quad (1)$$

where $P_{i,t}$ is the stock price three months after fiscal year-end, $RSV_{i,t}$ is the O&G “proved” reserves estimate in the physical unit, barrels of oil equivalent (BOE), from that fiscal year, scaled by the number of shares outstanding at fiscal year-end. $Post_{i,t}$ is 1 in the post-IFRS period. $BVE_{i,t}$ is the book value of equity at fiscal year-end, scaled by the number of shares outstanding

at fiscal year-end, and $EPS_{i,t}$ is the signed earnings per share. The variable of interest is the interaction term between RSV and $Post$. If IFRS adoption decreases reserve value relevance, the coefficient β_3 should be negative. For a DiD specification that compares pre- and post-IFRS shifts in value relevance of O&G reserve estimates of Canadian firms relative to the US control sample, we introduce an indicator variable, CA , identifying Canadian firms, to the interaction item:

$$\begin{aligned}
P_{i,t} = & \alpha + \beta_1 RSV_{i,t} + \beta_2 RSV_{i,t} \times Post_{i,t} + \beta_3 RSV_{i,t} \times CA_t + \beta_4 Post_{i,t} \times CA_t \\
& + \beta_5 RSV_{i,t} \times Post_{i,t} \times CA_t + \beta_6 BVE_{i,t} + \beta_7 EPS_{i,t} + \varepsilon
\end{aligned} \tag{2}$$

Our main coefficient of interest in specification (2) is the slope coefficient β_5 , which measures the differential effect of O&G reserve level on firm value for Canadian firms as a result of IFRS adoption. We include firm- and year-fixed effects and cluster the standard errors by firm.

Control sample

A credible estimation of the IFRS effects requires counterfactual benchmark groups that are usually difficult to find (Leuz and Wysocki, 2016). In this paper, we use US O&G firms as a control group. As discussed in Section 2, US O&G firms have been reporting their reserve estimates under similar rules since 2009, and the US and Canada shared similar accounting guidance prior to IFRS adoption in Canada.

In addition, several features of the two countries facilitate the comparison and generalizability of our study. First, the US is by far Canada's largest trading partner. Thus, many general economic shocks should affect both countries similarly. Second, both countries' energy markets are highly integrated through an extensive O&G pipeline network. Shocks to fossil fuel demand and supply are, therefore, likely to affect both countries. Finally, the

countries are institutionally similar, and both maintained a relatively high level of enforcement during our sample period (e.g., Burnett et al., 2015; Anantharaman and Chuk, 2018).

Data and descriptive statistics

We obtain a sample of publicly traded O&G firms in Canada and the US covering the sample period (2009–2013) from Compustat. We start from 2009, as it is the year when the US adopted reserve disclosure regulation similar to NI 51-101. We drop observations with missing stock prices, net income, or book value of equity information. We exclude integrated oil companies, funds, holdings, exploration service companies, and consultancies as they have less exposure to the financial statement and disclosure mandates. We require a balanced sample and exclude firms reporting all zero sales and depreciation in our sample period, since based on accounting standard practices under both Canadian GAAP and IFRS, zero sales and depreciation indicate that the firm probably has not developed any O&G reserves yet.

For Canadian O&G firms, we obtain O&G reserves-related data from the CanOils Database Ltd.¹¹ We merge the CanOil data with Compustat for the stock market and fundamental data required to construct the variables used in the analyses. For observations with missing data, we hand-collect data from the Annual Information Forms, Annual Reports, and Forms 51-101 (Statement of Reserves Data and Other Information), F2 (Report of Independent Qualified Reserves Evaluator or Auditor), and F3 (Report of Management and Directors) on the System for Electronic Document Analysis and Retrieval (SEDAR) website. We obtain reserves-related and fundamental data of US O&G firms from Compustat, Capital IQ, and firms' annual reports.

¹¹ CanOils is a commercial database that gathers financial information from annual financial statements and yearly O&G reserves disclosures from the annual filings required by the securities regulatory authorities for O&G companies listed on the TSX and TSX-V. This database is used by prior studies on Canadian O&G disclosures (Badia et al., 2020, 2021).

We use fiscal years rather than calendar years to measure firm-level variables to ensure that the post-IFRS adoption period is correctly captured at the firm level. Moreover, to avoid self-selection bias, we only include O&G firms subject to mandatory IFRS adoption in 2011. That is, we exclude IFRS adopters who are cross-listed in the U.S identified by Worldscope.¹² We obtain analyst-related data from IBES and conference call data from Refinitiv.

The resulting sample comprises 119 Canadian O&G firms with 595 firm-year observations around IFRS adoption. Our control sample comprises 95 US O&G firms (475 firm-year observations) around IFRS adoption. Table 1 presents the data selection process.

[Please insert Table 1 here]

Table 2 provides descriptive statistics of the main characteristics of Canadian and US firms in our sample, respectively. *RSV* is the reserve amount classified as “proved” in regulatory filings and measured in millions of *BOE* per share. As reserve estimates in dollars are subject to several assumptions, such as future oil prices, future extraction costs, production schedules, and discount rates, we use physical reserve amounts scaled by the number of shares in our main test to better capture the market reaction to the most fundamental and less subjective estimates of O&G reserves (Badia et al., 2020; Ferguson, Kean and Pündrich, 2020). The O&G producers in Canada are relatively smaller, less profitable, and more likely to have a Big 4 auditor than their US counterparts. Compared to Canadian O&G firms, US O&G firms have higher valuations and are more closely held. To create a more comparable sample, we perform entropy balancing based on the *RSV*, *BV*, and *EPS* used in the analysis.

[Please insert Table 2 here]

¹² Canadian companies cross-listed in the US are given the discretion to apply US GAAP. However, in our sample, all cross-listed Canadian O&G firms switched to IFRS in 2011 or the following years. We consider them as “voluntary” adopters and include them in sensitivity tests, which does not alter our inferences.

5 Main results

Value relevance of reserve estimates around IFRS adoption

In this section, we examine whether adopting IFRS results in weaker disclosure relevance by analyzing the empirical association between O&G reserve levels and stock prices around IFRS adoption. The Ohlson (1995) model captures value relevance reflected by the association between O&G reserve levels and stock prices.

Table 3, Columns (1) to (4), reports the results of the analyses focusing on the Canadian firms only. Specifically, Column (1) reports a significant and positive association between share prices and reserve levels before IFRS adoption, consistent with the findings of Badia et al. (2020) in the overlapping sample period.¹³ Earnings (*EPS*) and book value of equity (*BV*) are also significantly associated with share prices in the expected direction. However, as Column (2) indicates, the coefficient of reserve level *RSV* loses significance in the post-IFRS period. Column (3) presents the results for the pooled observations from both periods to test the statistical significance of the differences in the coefficients of *RSV*. The significant and negative coefficients of the interaction item, $Post \times RSV$, suggest that the decrease in reserves value relevance is significant after IFRS adoption. In Column (4), we further present the results from a fully interactive model. This model includes interactions between the *Post* indicator and both *EPS* and *BVE*, allowing the coefficients of these controls to vary between the pre- and post-IFRS periods. As IFRS adoption is likely to affect the accounting numbers, the relative importance of the other drivers could shift the results, motivating a fully interactive model. The results remain consistent in Column (4), where full interaction is included.

While the consistent results across Columns (1) to (4) indicate a decrease in reserve relevance after IFRS adoption, it could be driven by a time trend that is irrelevant to IFRS. To

¹³ Badia et al. (2020)'s sample period is from 2002 to 2011, the year when IFRS was adopted.

mitigate such concerns, we further include interactions between the existing variables with CA , an indicator that equals 1 for Canadian O&G firms and 0 for the US O&G firms. Considering the geographical closeness and similarity in reporting environment and enforcement mechanisms between Canada and the US, plus the limited differentiation in O&G products, we propose that US O&G firms serve as a suitable control sample. Furthermore, to reduce the DiD estimator's sensitivity to the functional form assumption of the OLS regression, we perform entropy balancing based on the main independent variables used in the analysis.

Table 3, Column (5) presents the result from this DiD specification. The negative and significant coefficient of the interaction items, $Post \times CA \times RSV$, illustrates that Canadian O&G firms, on average, experience a decrease in reserve relevance compared to US peers unaffected by IFRS adoption. The insignificant coefficients of $CA \times RSV$ illustrate that there was no significant difference between Canadian and US O&G firms' reserve relevance prior to IFRS adoption. Again, we report the consistent result from a full interaction model, as presented in Column (6).

[Please insert Table 3 here]

The validity of the DiD estimation relies on the assumption that the value relevance of US and Canadian O&G firms' O&G reserve estimates would have changed similarly in the absence of IFRS adoption (the parallel trends assumption). In support of this assumption, we show similar pre-treatment trends. Specifically, we modify Equation (2) by replacing the main interaction with interactions between the country indicator, reserve level, and individual year indicators. Figure 1 shows the coefficient estimates and confidence intervals for each sample year. The results reveal that the parallel trend assumption has not been violated.

[Please insert Figure 1 here]

The analyses above indicate that the informativeness of the aggregate disclosure of reserve levels decreases after IFRS adoption. However, prior studies indicate that the different reserve components might provide differential information compared to aggregate disclosure (e.g., Spear, 1994, 1996). Accordingly, to examine whether the results are driven by a particular reserve component, we decompose *RSV* into its components: *discoveries*, *acquisitions*, *dispositions*, *productions*, *recoveries*, and *revisions*. Table 4 presents the results for the periods pre- and post-IFRS. Compared to the results in Column (1), most coefficients lose significance after IFRS adoption in Column (2), consistent with the decrease in informativeness of reserves information. Specifically, IFRS adoption appears to have more impact on the components of reserves that are more forward-looking and subjective. This is consistent with the notion that weakening the connection between financial and non-financial disclosure limits users' ability to cross-check the reported information and reduces their confidence in incorporating it into their decision-making. Moreover, the association between revisions and share price is only significant in the post-IFRS period, suggesting that investors become more sensitive to reserve disclosure quality.

[Please insert Table 4 here]

Stock price reaction to reserve information around IFRS adoption

To corroborate the inferences from the value-relevance tests, we next analyze the stock price reaction to the release of reserves information. If the change in link to financial statements leads to less informative reserve estimates, we expect stock prices to be less sensitive to the disclosed amounts of proved reserves after IFRS adoption. To test this, we estimate the following model in the periods before and after IFRS adoption:

$$\begin{aligned}
 Abn_Ret_{i,t} = & \alpha + \beta_1 \Delta RSV_{i,t} + \beta_2 \Delta RSV_{i,t} \times Post_{i,t} + \beta_3 \Delta RSV_{i,t} \times CA_t + \beta_4 Post_{i,t} \times CA_t \\
 & + \beta_5 \Delta RSV_{i,t} \times Post_{i,t} \times CA_t + \beta_6 Control_{i,t} + \varepsilon
 \end{aligned}
 \tag{3}$$

where $Abn_Ret_{i,t}$ is the market-adjusted return of firm i over the $(-5, +5)$ -day window around the annual O&G reserve announcement date t ;¹⁴ $\Delta RSV_{i,t}$ is the percentage change in proved reserves fractionally ranked by year, as a proxy for reserve news; $Control_{i,t}$ is a vector of control variables following prior literature (e.g., Badia et al., 2020). One drawback of this stock reaction approach for our sample is that it only gives us one year of observations prior to IFRS adoption in order to have a clean control group (since the US adopted MOGR in 2009).

Table 5, Columns (1) and (2) present the results of estimating equation (3) within Canada and by period. The coefficients on ΔRSV are positive and significant in both the periods before and after the IFRS adoption, even though there seems to be a decrease in the magnitude. Specifically, β_1 equals 0.03 in the period before the introduction of IFRS, and 0.01 in the period after. Pooling observations from Canada in both periods, Columns (3) and (4) reveal that the pattern documented in Columns (1) and (2) is statistically significant, evident by the negative and significant interaction between ΔRSV and $Post$. Columns (5) and (6) further compare the changes with US industry peers and still find statistical significance of the differences in the coefficient on the interaction item $\Delta RSV \times Post \times CA$.

[Please insert Table 5 here]

Stock liquidity effect of reserve estimates around IFRS adoption

We next analyze the liquidity effect of reserve estimates. Liquidity has the advantage of having a clear theoretical link to disclosure quality, can be measured over shorter intervals, and is less anticipatory in nature (e.g., Glosten and Milgrom, 1985; Diamond and Verrecchia, 1991; Christensen, Hail and Leuz, 2013).

¹⁴ When O&G reserve announcement dates are missing, we use O&G reserves filing dates. In the United States, O&G reserves are reported in the annual report. In Canada, O&G reserves are reported in the Annual Information Form 51-101F1, which is often filed on the same day as the annual report. We collect such date for Canadian firms on SEDAR.

We follow prior literature and use four liquidity proxies. The first proxy is the bid-ask spread calculated as the average daily quoted percentage spread (closing bid-and-ask prices divided by the midpoint) over the quarter (Roll, 1984). The second proxy is price impact computed as the quarterly mean of Amihud (2002) illiquidity measure (daily absolute stock return divided by trading volume). The third proxy is zero returns, calculated as the proportion of trading days with zero daily stock return out of all potential trading days per quarter (Lesmond, Ogden and Trzcinka, 1999). The last proxy is total trading costs, estimated with a quarterly time-series regression of daily stock returns on the aggregate market returns (Lesmond et al., 1999). To mitigate measurement errors in the individual proxies, as well as differences in the relative quality of the proxies across countries, we follow prior studies (e.g., Daske, Hail, Leuz and Verdi, 2008; Lang, Lins and Maffett, 2012; Christensen, Hail and Leuz, 2016) and aggregate the four liquidity proxies into a single liquidity factor using factor analysis. We use the scores from the first (and only) factor with an Eigenvalue greater than 1 as the dependent variable.

Table 6 presents the results, where CA equals 1 for Canadian firms and 0 for US firms. Again, with a within-Canada sample, Columns (1) and (2) consistently reveal a positive coefficient on the interaction item, $Post \times \Delta RSV$, suggesting that news on proved reserves has a weaker association with the liquidity measure in the post-IFRS periods. Columns (3) and (4) report comparisons with US firms entropy-balanced on control variables. The significant and positive coefficients on the interaction item, $Post \times CA \times \Delta RSV$, suggest that compared to their US peers, Canadian O&G firms' reserve news is less informative after IFRS adoption. Nevertheless, due to the smaller sample with only one year prior to IFRS adoption in the DiD design, we cannot empirically test the parallel trends assumption. The insignificant coefficients on $CA \times \Delta RSV$ provide some comfort that there is no significant difference between the

liquidity effects of O&G reserve news of Canadian and US firms in the year before IFRS adoption.

[Please insert Table 6 here]

Reserve-related accounting practices

So far, our findings consistently suggest that the informativeness of O&G reserve estimates declines on IFRS transition for Canadian O&G firms. Our identification strategy hinges on the fact that reserve regulations were held consistent during the sample period while there was a change in the accounting regime. We acknowledge that the results could be confounded by other changes in the economy and business substance. Furthermore, our analyses rely on a “reduced form” to directly assess the economic consequences of a regulatory change, assuming changes in firms’ reporting practices triggered by the new regulation (Leuz and Wysocki, 2016). As managers have the opportunity to maintain or provide disclosures within the notes, the overall information environment might not have changed significantly despite the weakened connection between financial reporting and reserve disclosure regulation.

To mitigate these concerns, we explore the two potential channels by providing evidence of changes in firms’ reporting practices. In particular, we are interested in whether firms disclose how reserves are connected to financial statements, e.g., through being used as inputs for depreciation calculation and impairment tests, and whether there is a variation in such links around IFRS adoption. We first examine the annual reports of 20 randomly selected firms from our sample to immediately infer their reserve-related accounting practices during the IFRS transition. (See Appendix D for quotations from these firms’ financial statement notes).¹⁵ Almost all 20 firms’ annual report note disclosures regarding how depreciation and impairment costs are calculated became less specific under IFRS. Our intuition for disclosure

¹⁵ The accounting practices for extractive activities are usually reported explicitly under Canadian GAAP and reported under *PPE*, *Intangibles*, and *Impairments* under IFRS.

specificity is in line with prior textual analysis literature (e.g., Hope, Hu and Lu, 2016) and we gauge specificity in the sense that industry-specific words such as “proved reserve” or “oil well” contain more specific information than general words such as “economic benefits” or “cash-generating unit.” For example, “[t]he Company applies the *full cost* method of accounting for O&G assets, where they are depreciated using the *unit of production method* based on *proved reserves* using estimated future prices and costs” is more specific and easier to interpret than “[t]he recoverable amount of an asset or cash-generating unit estimated based on the value a potential purchaser would ascribe to it.”

Moreover, we find that, as prescribed by Canadian GAAP, most Canadian O&G firms use only “proved reserves” in preparing financial statements in the pre-IFRS period; however, diversity in the use of reserve estimates increases after IFRS adoption, with some firms switching to “proved and probable reserves,” rendering less consistent accounting practices across and within firms. This observation echoes investors’ concern that information used in the preparation of financial statements might be inconsistent since firms use different types of reserves under IFRS (IASB 2021, p. 8).¹⁶ We argue that low specificity and consistency are associated with higher processing costs (e.g., Blankespoor et al., 2020)

To provide more systematic evidence, we next conduct textual analyses on the full sample. We hand-collect note disclosures pertaining to the accounting for extractive activities from the annual reports of the full sample of Canadian firms in the pre-and post-IFRS adoption periods. Our first measure, *Specificity*, is based on the frequency of reserve-related words in the annual report note. We build the list of reserve-related words, including names of different reserve and resource types (proven, probable, possible); the terms of the accounting method used in prior GAAP (SE, FC, area of interest, and so on); the accounting unit of reserve

¹⁶ Although such concern was raised in the IASB investor survey (2021), based on the outreach and research performed to date, the IASB is seeking more evidence on the extent to which such diversity exists.

estimates (well, projects, property, country, and so on), and the reserve quantity in the unit (BOE, Bbf, Mcf, and so on) in each note and scale the count by the total number of words in the notes.¹⁷ The higher the value of *Specificity*, the more specific the reserve-related disclosures are.

Our second measure, *Consistency*, motivated by investors' concern about reserve input diversity in firms' financial statement preparation (IASB 2021), captures the frequency of different types of reserves (e.g., proved versus probable versus possible reserves) in firms' accounting policy disclosures. We calculate *Consistency* as the number of words related to probable and possible reserves, scaled by the total number of words in the notes and multiplied by minus one. The lower the value of *Consistency*, the more different types of reserve a firm uses in preparing financial statements. We control for potential determinants following prior literature on textual analysis of annual report specificity (Hope et al., 2016).

Table 7 reports findings from our textual analysis. Column (1) suggests that the level of specificity decreases significantly after IFRS adoption. At the same time, more firms choose to use “probable reserve and possible reserves” instead of “proved reserve” as financial statement inputs, as reported in Column (2). Columns (3) and (4) present the results of a logit model in predicting the change in *Specificity* and *Consistency* on IFRS transition. In general, the results are consistent with capital market incentives. For example, small, loss-making firms and firms with volatile stock returns are more likely to change disclosure practices on IFRS transition. Furthermore, firms with high leverage and big four auditors are less likely to reduce disclosure specificity and consistency on IFRS transition.

[Please insert Table 7 here]

Change in reserve-related questions in conference call Q&A

¹⁷ To extract O&G-related words, we construct the dictionary with reference to the words from the Canadian Oil and Gas Evaluation Handbook.

We next examine changes in the content of the questions-and-answers (Q&A) section of conference calls, which is a more responsive and interactive channel of disclosure and allows us to observe investors' and analysts' responses to the changes in accounting and disclosure practices (Bushee, Gow and Taylor, 2018). Appendix E provides examples of quotations from the Q&A sections indicating the relevance of reserve estimates and the interaction between reserve estimates and financial accounting numbers.

Survey evidence indicates that the perceived reliability of reserve estimates influences analysts' decisions to include, assume, and adjust such information in their analyses (Fox 2017). When reserve information is deemed less credible, analysts might assign it lesser importance and attention. Alternatively, if IFRS adoption weakens the tie between reserve estimates and financial statements, it could complicate the interpretation of earnings and valuations based on these estimates, potentially outweighing the benefits of it. Given that participants in conference calls can typically pose only a limited number of questions, analysts are likely to prioritize inquiries that are most pertinent to their valuation and earnings forecasts. Therefore, both the factors of perceived reliability and increased processing costs point towards a potential decrease in reserve-related discussions in the Q&A segments of conference calls following IFRS implementation.

Using conference call transcript data from Refinitiv, we develop a continuous measure, *CCQA_reserve*, based on the frequency of reserve-related words in the transcript of the Q&A section in the conference calls. We measure frequency by the number of reserve-related questions scaled by the total number of questions in a conference call. Here we limit reserve-related words to reserve and resource types and units only. In our sample, on average, 20% of questions in the Q&A section of earning conferences contain at least one reserve-related word. Following Loughran and McDonald (2011), we control for the length, tone, and uncertainty of the management presentation and reserve-related questions. Since discussion of reserves during

management presentations may trigger analysts' follow-up questions, we further control for the frequency of reserve-related words in management presentation sections. Last, we add quarterly firm characteristics and yearly reserve news.¹⁸

Table 8 presents the results of comparing reserve-related question frequency pre- and post-IFRS adoption. Columns (1) and (2) show that IFRS adoption is significantly associated with fewer discussions related to reserve estimates. Columns (3) – (5) reveal that such decreases are concentrated in the fourth quarter. Since reserve estimates are annually updated in the fourth quarter, the significant decrease in reserve discussions in fourth-quarter conference calls is consistent with the conjecture that users are less likely to connect reserves with the annual financial performance under IFRS. Column (6) adds US peers as the benchmark group, where we find consistent results that investors and analysts of Canadian firms are less likely to discuss reserve estimates under IFRS compared to their US peers. Figure 2 presents the parallel trend for this DiD test.

[Please insert Table 8 here]

[Please insert Figure 2 here]

These findings are suggestive of both the reliability and processing costs channels. Attempting to discern whether the diminished attention stems from processing costs or perceived reliability, we delve deeper into the impact of analysts' experience. Drawing from existing literature, we posit that less experienced analysts might grapple with higher processing costs (Blankespoor et al., 2020). Online Appendix A corroborates this notion, indicating a more pronounced decline in reserve-related questions from analysts with limited firm-specific

¹⁸ In Canada, the disclosure of conference call transcripts is not mandatory, so we are not able to collect the transcripts for all firms in our sample. This presents a potential selection bias in our regression estimates, contingent on the reasons behind the missing conference call transcripts.

experience. In line with this, we observe a rise in analyst forecast dispersion post-IFRS adoption, implying a potential decrease in analysts' reliance on their comment information set.

Reserve disclosure practices

Next, we explore the reliability channel by examining changes in disclosure quality of reserve estimates around IFRS adoption. We argue that the weakened connection between the financial statement information and the reserve information post-IFRS adoption, which limits users' ability to cross-check information consistency and monitor disclosing practices, may lead to opportunistic reserve disclosures after IFRS adoption.

We first investigate whether firms are more likely to negatively revise their reserve estimates after IFRS adoption. A negative revision could be triggered by previous upward estimation management and thus is typically interpreted as an indicator of low reserve disclosure quality (e.g., Badia et al., 2020). Table 9, Columns (1) - (3), reveals that the frequency of reserve estimate revisions increases in the post-IFRS adoption period, after controlling for other firm characteristics that might be associated with the likelihood of reserve manipulation and revision based on prior literature (e.g., Badia et al., 2020). Moreover, in line with the conjecture of the weakened confirmation role of financial statements triggering reserve disclosure manipulation, we find the revision is more significant for firms decreasing accounting policy specificity.

We use reserve estimate dispersion as our second measure of disclosure quality. Compared to proved reserves, probable reserves are less conservative and more subjective. Indeed, disclosure of probable reserves has been prohibited in the US over a long period of time due to concerns that it could be misleading (SEC 2008). Compared to proved reserve, it is relatively easier for firms to opportunistically inflate probable reserves to manage investors' expectations or circumvent contractual constraints. We expect the benefits of inflating probable reserves to increase after IFRS adoption since IFRS loosens the constraints of using probable

reserves as inputs in the financial statements. We capture the potential inflation of probable reserves by reserve dispersion, calculated as the difference between proved reserves and probable reserves, scaled by probable reserves.

Table 9, Column (4) – (6), reports the results comparing reserve dispersions before and after IFRS adoption. After controlling for other firm and reserve disclosure characteristics, we find that reserve dispersion significantly increases after IFRS adoption. To illustrate that the increased dispersion is associated with firms’ change in accounting practices rather than extractive activities, in Columns (5) and (6), we conduct cross-sectional analyses based on changes in firms’ extractive accounting policies. Column (6) reveals that firms changing their accounting practices to incorporate probable reserve estimates in their financial statement preparation are also more likely to inflate their probable reserves post-IFRS adoption. Combined, these analyses are consistent with the notion that there is a close connection between financial statements and off-balance reserve estimates, and firms exploit such a connection strategically when IFRS grants more flexibility.¹⁹

[Please insert Table 9 here]

Cross-sectional analyses

Our main identification strategy benefits from the fact that the US and Canadian O&G firms were subject to similar accounting rules and reserve disclosure regulations and that the reserve disclosure regulations were held constant during our sample period. This design helps to mitigate many omitted variable concerns, because in order for our DiD results to be explained by an omitted variable, that omitted variable would have to time-vary contemporaneously with

¹⁹ While these two measures capture potential disclosure manipulation, they may also simply reflect business risk or reserve estimation uncertainty. To mitigate this concern, we examine whether managers take a holistic view and use the connection between reserves and financial reporting opportunistically. Online appendix B reports suggestive evidence that reserve revision frequency is positively and significantly associated with financial accounting earning management indicators. This provides some support that our reserve disclosure measures reflect managerial opportunism, not only business risk and estimation uncertainty.

IFRS adoption and affect Canadian and US O&G firms differently. Another potential threat to this assumption is a potential spillover effect for firms operating in the same industry. For example, IFRS adoption may decrease comparability between Canadian and US O&G firms. Even though we do not expect that such an effect would directly impact the informativeness of US O&G firms' reserve estimates,²⁰ to further verify that the observed results are attributable to IFRS, we focus on within-country model specifications and explore the cross-sectional variation observed among Canadian O&G firms. Specifically, we reconcile and connect the observed information consequences (decrease in reserves' value relevance) with the observed disclosure consequences (change in accounting practices specificity, consistency, and disclosure quality). These tests further distinguish the effect of IFRS adoption from economy-wide contemporaneous shocks and provide additional insights into the proposed channels through which IFRS adoption generates informational consequences.

In particular, we partition our sample based on the median values of changes in *Specificity*, *Consistency*, and *Revision frequency* around IFRS adoption. These cross-sectional analyses rely on the assumption that the informational consequences of IFRS adoption are mostly concentrated on those firms with lower disclosure quality. Table 10 presents the results of re-estimating equation (1) for each of the two subsamples. For the group of firms with lower-quality disclosure practices, the results are consistent with our main tests. The coefficients on $Post \times RSV$ are significant for the subsample of firms decreasing accounting policy specificity and consistency and firms increasing reserve revision frequency. In contrast, for firms with below-median changes in disclosure practices, IFRS adoption does not seem to negatively affect reserve informativeness. These results are consistent with the connection between financial statements and reserve estimates affecting the usefulness of reserve disclosures.

²⁰ Moreover, if any decreases in cross-country comparability negatively affect the informativeness of US firms' O&G reserve estimates, it should bias against finding any results for the Canadian firms.

[Please insert Table 10 here]

6 Additional tests

Change in accounting quality and financial statement comparability

Our study investigates the changed connection between financial statements and non-financial disclosures in 2011 as part of the adoption of IFRS. This poses a potential identification challenge as the decrease in informativeness of reserve estimates post-IFRS adoption might be driven by other information effects correlated with IFRS adoption but unrelated to O&G reserves. For example, if IFRS significantly enhances financial reporting quality, users might put less weight on the reserve estimates (a substitution effect). Based on the pooled sample, prior studies report limited evidence on whether IFRS adoption increases accounting quality in Canada (e.g., Burnett et al., 2015). Nevertheless, to explore whether contemporaneous changes in financial statement quality confound our inferences, we estimate the change in accounting quality for the Canadian O&G industry. Consistent with prior studies, we find limited change in accounting quality indicators around IFRS adoption (see Online Appendix C).

However, in countries with high-quality accounting standards, one motivation to adopt IFRS might be to improve comparability (Hail et al., 2010). Our findings indicate decreased specificity and consistency of reserve-related accounting practices, suggesting that IFRS provides more principle-based accounting discretion regarding how firms map economic substance into accounting numbers, which potentially decreases comparability. We measure financial statement comparability following De Franco, Kothari, and Verdi (2011) and split the sample into low and high-comparability subsets based on the median value of change in comparability on IFRS transition. Online Appendix C results suggest that the decrease in reserve value relevance is more significant in the low-comparability group. This is consistent with the notion that the difficulty in mapping financial statement input to outcomes affects the relevance of information.

Within-country quarter analysis

Another potential limitation of our primary tests is the unobservability of market expectations regarding a firm's reserve levels. If market expectations deviate considerably from the reserve levels disclosed, our reserve measure could contain significant noises. To mitigate this concern, we follow Badia et al. (2020) and conduct another within-country analysis that does not rely on market's reserve expectations. Since reserve information is only disclosed yearly, we compare the liquidity effect between the quarter with reserve estimates disclosure and the rest of the quarters in the periods before and after IFRS adoption in Canada. Finding that the difference between quarters with reserve disclosure and other quarters changes after IFRS adoption could further indicate changes in informativeness of O&G reserves. Compared to other quarters, we find a higher liquidity impact in the fourth quarter that contains reserve information, supporting the notion that the fourth quarter's reporting is more informative. However, we document such difference decreases post-IFRS adoption, indicating that after IFRS adoption, there is a substantial change in the informativeness of the reserve quarter's reporting.²¹ Results are tabulated in Online Appendix D.

Additional controls and alternative reserve measure

Last, we test the robustness of the main results by using a different definition of reserves (based on monetary units instead of physical units) and controlling for other reserve disclosure

²¹ While these results are complementary to the year-level cross-country tests, again, this change could also be attributed to the change in financial reporting informativeness on IFRS transition and our tests are not able to isolate the results. Alternatively, we exploit that IFRS became effective depending on the firm's fiscal year end. Firms with December fiscal year-ends would be the treatment sample since these firms were the first to be subject to the new rules. We designate firms with other months as fiscal year-end as the control sample, as these firms adopted IFRS later. Thus, we can examine how investors responded to reserve news for treatment versus control firms from the year prior to December 2011 (when no firm was affected) to the subsequent year, when treated firms were affected but control firms were not (yet). Despite that the within-country estimation is data-demanding and eliminates a substantial amount of variation, we obtain weak yet consistent results from this specification.

information and extractive accounting methods. Online Appendix E provides supporting information showing that our results remain robust.²²

Falsification test

Last, to further sharpen identification, we follow Patatoukas et al. (2015) and repeat our main tests, restricting our sample to the subset of O&G royalty trusts, whose primary assets are proved O&G reserves. This analysis offers the advantage that proved reserve disclosures relate directly to changes in the value of the primary assets of these firms, so the connection between financial statements should not have a first-order effect. Consistently, we do not find any significant changes in reserve relevance around IFRS adoption for those companies.

7 Conclusion

In the past decades, considerable effort has been dedicated to achieving international convergence in accounting regulation. The IFRS adoption in many countries constitutes a major step forward to harmonized accounting practices; however, differences in other disclosure regulations across jurisdictions remain. Understanding the role of international accounting regulation for other local disclosure requirements is important as they interact to affect the totality of information provided to users. In this study, we examine whether IFRS adoption impacts parallel-existing disclosure regulation that is independent of IFRS. We exploit the dual disclosing system of Canadian O&G firms and find that IFRS adoption negatively affects the informativeness of reserve estimates. We provide supporting evidence

²² To further assess the sensitivity of our inferences to the possibility of correlated omitted variables, we also perform one additional analysis. Following Frank (2000), we estimate that, to invalidate our inferences, an omitted variable should have to be correlated positively at (at least) 27 percent with our dependent variable P and also correlated positively at (at least) 23 percent with our experimental variable. To determine the plausibility that a correlated omitted variable would affect our inferences, we use the two main control variables that exhibit the highest correlations with P and $RSV \times Post$. Untabulated statistics reveal that BKV has the largest correlation with P , at 16 percent. However, the correlation of BKV with $RSV \times Post$ is only 7 percent. Untabulated statistics reveal that EPS has a very high correlation with P , at 48 percent. However, the correlation of EPS with $RSV \times Post$ is only 3 percent. While it is still impossible to completely rule out confounding correlated omitted variables, this analysis sheds further confidence in our results.

that IFRS adoption leads to changes in firms' disclosure practices in that firms are less likely to provide precise and consistent accounting practices information regarding how reserves are used as inputs for financial statements. Such disclosure changes impair the earning implications of reserves; correspondingly, we document reduced analyst attention to reserves during the Q&A section of conference calls. Finally, we find suggestive evidence that IFRS adoption introduces reserve disclosure manipulation. Together, our findings provide insights into the information impact of decoupling non-financial disclosure from financial reporting.

Our findings are relevant to accounting standard setters and regulators. The IASB has been considering expanding the current scope of IFRS 6 and incorporating more guidance on reserve-related disclosures (IASB, 2021). Assessing the financial position and performance of extractive businesses in order to make economic decisions requires an understanding of the entity's minerals or O&G reserves and resources (IASB, 2010). However, except for the US, accounting and reserve disclosure requirements are developed by separate bodies in most IFRS countries. Our findings support investors' concerns expressed in IASB's investor survey (IASB, 2021, p. 8) that "they were concerned about the lack of clarity about R[eserves]&R[esources] information used in financial statements," motivating the IASB to consider potential coordination with industry professions, such as CRIRSCO and PRMS to develop accounting and disclosure requirements for reserve estimates.

More generally, we present new evidence on the costs associated with adopting more international and less jurisdiction-specific accounting standards. While the extant literature primarily focuses on the benefits associated with IFRS adoption, our findings suggest that the merits of IFRS adoption may depend on the presence of other disclosure regulations in a specific jurisdiction. By documenting that the informativeness of reserve disclosure decreases when Canadian firms move away from local GAAP to IFRS, our study sheds light on the costs

of loosening the link between accounting numbers and other forms of disclosure outside the scope of accounting standards.

Our study is subject to a number of limitations. First, despite the stable institutional environment and enforcement during the sample period, as our treatment event is concentrated in one year, we cannot completely rule out all concurrent events that might confound our results. Second, our study focuses on O&G reserves, one key resource in an economically important industry, and has implications for standard setters and regulators. Nonetheless, the prevailing mandatory non-financial disclosures may appear specific to the O&G industry, cautioning generalizing our findings to other types of nonfinancial disclosures in other industries.

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Appendix A: Variable definitions

<i>Accrual</i>	Earnings less cash flow from operations, scaled by end-of-year total assets; Compustat
<i>Acquisition</i>	Amount of acquired O&G reserves, measured as barrels of oil scaled by the number of shares; CanOil
<i>Analyst_acc</i>	Difference between the mean EPS forecast and the announced EPS, scaled by the stock price at the beginning of the fiscal year. Missing data is replaced by zero; IBES
<i>Analyst_missing</i>	Indicator set to 1 if <i>Analyst_acc</i> is missing and zero otherwise; IBES
<i>Big</i>	Indicator set to 1 if the firm's auditor is one of the big four audit firms, and 0 otherwise; Compustat
<i>BM</i>	Ratio of the book value of equity to the market value of equity; Compustat
<i>BVE</i>	Book value of equity at fiscal year-end scaled by the number of shares; Compustat
<i>CA</i>	Indicator that equals 1 for Canadian firms, and 0 for US firms; Compustat
<i>CCQA_reserve</i>	Number of questions containing reserve-related words, scaled by the total number of questions in the Q&A section in a conference call; Refinitiv
<i>Close</i>	Percentage of closely held shares of the firm; WorldScope.
<i>Consistency</i>	Number of times firms mention probable and possible reserves in the notes of accounting policy, scaled by the total number of reserves-related words; Annual report
<i>Discoveries</i>	Amount of exploration, discoveries, extensions, and improvements, measured as barrels of oil scaled by the number of shares; CanOil
<i>Dispositions</i>	Amount of O&G reserves disposed of during the year, measured as barrels of oil scaled by the number of shares; CanOil
<i>Dissue</i>	Percentage change in total liabilities; Compustat
<i>EPS</i>	Annual earnings before extraordinary items per share scaled by the number of shares outstanding at fiscal year-end; Compustat
<i>Gas_return</i>	Return on the HH Index compounded over the (-5, +5)-day window around the annual disclosure of O&G reserves (in percent)
<i>Growth</i>	Percentage change in sales; Compustat
<i>Illiquidity</i>	Proxy for illiquidity based on factor analysis on bid-and-ask spread, price impact, zero return days, and transaction costs; Compustat
<i>Lag_mv</i>	Stock price times the number of shares outstanding measured at the end of the last quarter; Compustat
<i>Lag_turnover</i>	Quarterly median of the daily turnover from last quarter (i.e., trading volume divided by the market value at the end of each trading day); Compustat
<i>Lag_ret_vol</i>	Standard deviation of daily stock returns in last quarter; Compustat
<i>Length</i>	Log of the number of all words in notes to financial statement; Compustat
<i>Lev</i>	Ratio of year-end total liability to book value of equity; Compustat
<i>Loss</i>	Indicator variable that equals one if net income is less than 0, and 0 otherwise; Compustat

Appendix A: Variable definitions (continued)

<i>Neg_CF</i>	Indicator variable that equals 1 for observations in which annual operating cash flow is less than 0, and zero otherwise; Compustat
<i>Oil_return</i>	Return on the WTI Index compounded over the (-5, +5)-day window around the annual disclosure of O&G reserves (in percent)
<i>P</i>	Stock price per share as of three months after fiscal year end; Compustat
<i>Percent_NatGas</i>	Proportion of proved reserves that are natural gas, in BOEs; CanOil
<i>Post</i>	Indicator that equals 1 for fiscal years after IFRS adoption (2011, 2012, 2013), 0 if it is 2009 or 2010; Compustat
<i>Pre_Length</i>	Logarithm of the number of words in a presentation section in a conference call; Refinitive
<i>Pre_reserve</i>	Number of reserve-related words, scaled by the total number of words in the presentation section of a conference call; Refinitive
<i>Pre_Tone</i>	Number of positive/negative-tone words according to Loughran and McDonald (2011), scaled by the total number of words in the presentation section of a conference call; Refinitive
<i>Pre_Uncertain</i>	Number of uncertainty words according to Loughran and McDonald (2011), scaled by the total number of words in the presentation section of a conference call; Refinitive
<i>Production</i>	Amount of O&G production, measured as barrels of oil scaled by the number of shares; CanOil
<i>Q_4</i>	Indicator variable that equals 1 if the earning conference call transcript is from the fourth quarter, and 0 otherwise; Refinitiv
<i>Q_Length</i>	Average of the logarithm of the number of words in reserve-related questions in a conference call; Refinitiv
<i>Q_Tone</i>	Average number of positive/negative-tone words according to Loughran and McDonald (2011), scaled by the total number of words in a reserve-related question in a conference call; Refinitiv
<i>Q_Uncertain</i>	The average number of uncertainty words according to Loughran and McDonald (2011), scaled by the total number of words in a reserve-related question in a conference call; Refinitiv
<i>QA_Length</i>	Logarithm of the number of words in the Q&A section of a conference call; Refinitiv
<i>Recoveries</i>	Amount of recovered reserves, measured as barrels of oil scaled by the number of shares; CanOil
<i>Revisions</i>	Amount of revisions of previously disclosed reserves, measured as barrels of oil scaled by the number of shares; CanOil
<i>RoA</i>	Ratio of net income to total assets at prior year's end; CanOil
<i>RSV</i>	"Proved" reserve estimates disclosed annually, measured as barrels of oil scaled by the number of shares; CanOil, Capital IQ, Compustat, and Annual report
<i>RSV-Dispersion</i>	Dispersion of the distribution of the quantity of the "proved" and "probable" O&G reserves, scaled by the quantity of the "probable" reserves; CanOil, Capital IQ, Compustat, and Annual report
<i>RSV-rank</i>	RSV decile-ranked by year; CanOil, Capital IQ, and Annual report
<i>SD_earn</i>	Standard deviation of quarterly earnings in the past 3 years; Compustat
<i>SD_return</i>	Standard deviation of monthly stock returns in year t-1; Compustat

Appendix A: Variable definitions (continued)

<i>Size</i>	Logarithm of market value of equity measured at the end of the fiscal year; Compustat
<i>Specificity</i>	Number of reserve and extractive activity-related specific words identified in firm accounting policies; Annual report

Appendix B: Main differences between Canadian GAAP and IFRS related to the use of reserves as inputs to the financial statements

	Canadian GAAP		IFRS
	(1)	(2)	(3)
Accounting standards	Accounting guideline AcG-16, Oil and Gas Accounting – Full Cost	FAS 19 – Financial Accounting and Reporting by Oil and Gas producing companies (Successful Efforts)	IFRS 6 for the expenditures incurred in exploration for and evaluation of mineral resources
Initial recognition criteria	All costs associated with property acquisition, exploration, and development activities should be capitalized at the country level	Acquisition costs should be capitalized when incurred. Exploration costs, other than exploration drilling costs, should be charged to expense when incurred. The costs of drilling exploratory wells should be capitalized, pending the determination of whether the well has found proved reserves . The capitalized costs of unsuccessful exploratory wells, net of any salvage value, should be charged to expense	The IASB Framework and other sections provide guidance for the development and production phases. The entity is to determine a policy specifying which expenditures are recognized as exploration and evaluation assets. IFRS 6 exempts an entity from applying paragraphs 11 and 12 of IAS 8 to exploration and evaluation assets, which effectively permits the previous practices to continue
Cap unit	Country or property	Property-by-property	Unspecified
Impairment	A ceiling test that the capitalized costs cannot exceed the present value (10 percent discount factor) of estimated proved reserves . Impairment is tested at the country level	The undiscounted net future cash flows are based on total proved and risk-adjusted probable and possible reserves . Future prices and costs should be in nominal dollars and must reflect management’s best estimates. The impairment should be on a field-by-field basis	IFRS 6 does not explicitly require impairment testing of E&E assets. Under IAS 36, impairment is recognized either on conversion to IFRS or subsequently if an asset or cash-generating unit’s carrying amount exceeds the higher of fair value less costs to sell or value-in-use.
DDA	Unit-of-production method using total proved reserves for that cost center	Unit-of-production method using total proved reserves	No DDA for E&E stage assets, no specified depreciation methods for development stage firms

Notes: This table compares the accounting standards under Canadian GAAP (1) and (2) and IFRS (3) on how reserve estimates should be used as inputs to the financial statements.

Appendix C. Market participants' reflection on the connection between reserve estimates and financial statements

One of the main premise of our study is that users are affected by the connection between financial statement and non-financial information, in our case, O&G reserve estimate disclosures. Even though we draw from the prior literature on the perceived reliability and processing costs (Bratten et al., 2013; Blankespoor et al., 2020), in this appendix, we provide additional suggestive evidence from IASB survey, auditors' comment letters, and key audit matters to reflect on this premise.

IASB Investor Survey (2021)

[29] Many stakeholders, in particular preparers and national standard-setters, said R(eserve)&R(esource) information can be used as inputs for financial statement items subject to significant judgements and assumptions. These stakeholders said diversity can arise because the information used in the preparation of financial statements might be inconsistent.

[30] Overall most stakeholders said they were concerned about the lack of clarity about R&R information used in financial statements. For example:

[...] whether the R&R information used was consistent with that reported outside financial statements (that is, a few stakeholders were uncertain how to reconcile R&R information disclosed and/or used in financial statements with that disclosed outside financial statements).

Deloitte Comment Letter to the IASB 2 Extractive Activities Discussion Paper (2010)

[...] There is diversity in how the depreciable amount is amortised. Some entities use a measure of reserves, others a measure of resources and others a mixture of both (e.g. reserves plus 'high-confidence' resources). In some cases, reserves are not proven at all, e.g. large scale coal operations, underground mines 'open at depth' (i.e. the resource extends significantly below the depth to which drilling and other exploratory activities have currently

been undertaken). As a result of these factors, the depreciation calculations for extractives projects can be complex.

[...] In practice, there is uncertainty as to whether only the cash flows from currently accessible reserves can be included in the calculation of value in use for extractive assets, potentially leading to an impairment loss, or whether future capital expenditure and cash flows from reserves accessible as a result of that expenditure can be included in the value in use calculation by reference to IAS 36.49.

[...] We strongly recommend that the IASB work with both the Financial Accounting Standards Board (FASB) and the International Organization of Securities Commissions (IOSCO) on this project to ensure that: the reserve and resource definitions, accounting methodologies and disclosures are converged between IFRSs and US GAAP.

Key audit matter for impairment of upstream oil and gas property, plant, and equipment assets – from BP’s Audited Annual Report (2021)

[...] We identified three key management estimates in management’s determination of the level of impairment test [...] Reserves and resources estimates - A key input to certain CGU impairment assessments is the oil and gas production forecast, which is based on underlying reserves estimates and field specific development assumptions. Certain CGU production forecasts include specific risk adjusted resource volumes, in addition to proven and/or probable reserves estimates, that are inherently less certain than reserves; and assumptions related to these volumes can be particularly judgemental. There is a risk that material misstatements could arise from unreasonable production forecasts for individually material CGUs and/or from the aggregation of systematic flaws in bp's reserves and resources estimation policies across the OP&O and G&LCE segments.

Appendix D: O&G accounting policy notes from annual reports

Firm	Annual report notes in 2009 / 2010	Annual report notes in 2011 / 2012	Comments
<i>Change in reserve-related accounting policy specificity</i>			
Paramount Resources	<p>Paramount follows the successful efforts method of accounting for its petroleum and natural gas operations. Under this method, all development costs, including property acquisitions and costs of drilling and equipping development wells are capitalized. Costs of drilling exploratory wells are initially capitalized, pending determination of proved reserves.</p> <p>Proved properties are reviewed for impairment annually, or as economic events dictate, on a field basis. An impairment provision is recorded when the carrying value of a field exceeds its estimated expected future cash flows from proved reserves</p>	<p>The recoverable amount of an asset or CGU is the greater of its fair value less costs to sell and its value in use. In assessing fair value less costs to sell, the Company estimates the value a potential purchaser would ascribe to an asset or CGU. For oil and gas properties, the fair value less costs to sell is generally estimated based on expected after-tax future net cash flows using forecast commodity prices and costs over the expected economic life of proved and probable reserves, discounted using market-based rates.</p>	<p><i>The firm changes the impairment unit and expands the base to include probable reserves. It also replaces the 10% fixed discount rate with a market-based rate.</i></p>
Fist Start Resources	<p>The Company utilizes the full cost method to account for its investment in oil and gas properties...The cost of the oil and gas properties with proved reserves will be depleted and charged to operations using the unit-of-production method based on the ratio of current production to estimated proved oil and gas reserves.</p> <p>In applying the full cost method, the Company performs an annual cost centre impairment (ceiling) test...The ceiling test is based on estimates of proved reserves, production rates, oil and gas prices, future costs and other relevant assumptions.</p>	<p>Capitalized costs of the exploration and evaluation asset are reclassified as mining assets and amortized using the unit of production method. When an exploration and evaluation asset is abandoned, all related costs are written off to operations.</p> <p>An impairment review is performed, either individually or at the cash-generating unit level, when there are indicators that the carrying amount of the asset may exceed its recoverable amount. To the extent that this occurs, the asset is written down to its estimated net realizable value.</p>	<p><i>The firm stops referring to proved reserves for amortization and impairment test.</i></p>

Tudor
Corporation

In applying the **full cost method**, the Company applies Canadian Institute of Chartered Accountants (“CICA”) Accounting Guideline 16 with respect to the calculation of the ceiling test. The carrying value of petroleum and natural gas properties and production equipment is compared annually to an estimate of **undiscounted future net cash flows from the production of proved reserves** and the carrying value for unproved properties, net of any impairments... Should this comparison indicate an excess carrying value, the magnitude of impairment is measured by comparing the carrying value of petroleum and natural gas properties and production equipment with the estimated discounted future cash flows from the Company’s **proved and probable reserves and the carrying value for unproved properties**, net of any impairments. **The discounted rate is a risk-free interest rate.** The **ceiling test** is calculated on a country by country basis.

Under previous GAAP, impairment is measured by comparing the carrying amount of property and equipment on a **country-by-country** basis (the ‘cost centre’) to an amount equal to the estimated net present value of future cash flows from proved plus probable reserves [...]. Under IFRS, the aggregate carrying value is compared against the expected **recoverable amount of each cash-generating unit (CGU)** [...]The CGU applied for impairment test purposes is **generally the field**, except that a number of field interests may be grouped as a single CGU where the cash flows of each field are interdependent.

After IFRS adoption, the firm no longer provides detailed information on the impairment unit and the use of proved reserves in their impairment test.

Ivanhoe
energy

The Company annually evaluates the carrying values of its oil and gas properties and development costs whenever events or conditions occur that indicate that the carrying values may not be recoverable from future cash flows. If the carrying values exceed the sum of **estimated undiscounted future cash flows expected from proved reserves**, the asset is impaired. **The cost of unproved properties is excluded** from the impairment test described above and subject to a separate impairment test

The Company periodically assesses tangible and intangible assets or groups of assets for impairment annually or earlier whenever events or changes in circumstances indicate the carrying value of an asset may not be recoverable. Individual assets are grouped into **cash generating units** for impairment purposes at the lowest level at which there are **identifiable cash inflows that are largely independent of the cash inflows of other groups of assets.**

The firm stops referring to proved reserves for amortization and impairment test.

Touchstone
Exploration

An impairment loss may be indicated when the carrying value of a cost centre exceeds the estimated undiscounted **future net cash flows associated with the cost centre's proved reserves ... Reserves are determined pursuant to National Instrument 51-101**, Standards of Disclosure for Oil and Gas Activities.

To test impairment, costs are allocated into cash generating units ("CGUs") based on their ability to generate largely independent cash inflows. The determination of CGUs is subject to judgment. The transfer of exploration assets to property, plant and equipment is based on **management's judgment of technical feasibility and commercial viability.**

After IFRS adoption, the firm stopped referring to NI 51-101 and related concepts.

Lightspeed
discoveries

The Company **follows the full cost method** of accounting for oil and gas operations whereby all costs of exploring for and developing oil and gas reserves are initially capitalized.

Costs capitalized, together with the costs of production equipment, are depleted and amortized on **the unit-of-production method based on the estimated gross proved reserves** as determined by independent petroleum engineers. **Petroleum products and reserves are converted to a common unit of measure, using 6 MCF of natural gas to one barrel of oil.**

The Company performs a **ceiling test** on properties which restricts the capitalized costs less accumulated depletion from exceeding an amount equal to the estimated undiscounted value of future net revenues from **proved oil and gas reserves**, as determined by independent engineers, based on sales prices achievable under existing contracts and posted, average reference prices in effect at the end of the year and current costs, and after deducting estimated future general and administrative expenses, production related expenses, financing costs, future site restoration costs and income taxes.

The Company **capitalizes** direct mineral property acquisition costs and those expenditures incurred following the determination that the property has economically recoverable reserves. These costs are **amortized over the estimated life of the property** following commencement of commercial production, or written off if the property is sold, allowed to lapse or abandoned, or when impairment in value has been determined to have occurred. A mineral property is reviewed for impairment whenever **events or changes in circumstances indicate that its carrying amount may not be recoverable.**

The firm stops referring to proved reserves for amortization and impairment test.

Change in reserve-related accounting policy consistency

Transglobe Energy	<p>Capitalized costs within each country are depleted and depreciated on the unit-of-production method based on the estimated gross proved reserves as determined by independent reserve evaluators. Gas reserves and production are converted into equivalent units using the energy equivalency conversion method of 6,000 cubic feet of natural gas to one barrel of oil.</p> <p>An impairment loss is recognized in net income if the carrying amount of a country (cost centre) is not recoverable and the carrying amount of the cost centre exceeds its fair value. The carrying value is assessed to be recoverable when the sum of the undiscounted cash flows expected from the production of proved reserves and the cost, less impairment, of unproved properties exceeds the carrying value.</p>	<p>Under Canadian GAAP – Development and production costs were included in the property and equipment balance and were depleted using a reserve base of Proved reserves. Under IFRS, the Company continues to capitalize development and production costs as property and equipment; however, these costs are depleted using a reserve base of Proved plus Probable reserves.</p> <p>The effect of transition to IFRS was the expensing of development and production costs over a larger reserve base and including future capital costs associated with the larger reserve base, resulting in a decrease to depletion and depreciation expense and a corresponding increase in retained earnings</p>	<p><i>The firm specifically state that they change depreciation basis after IFRS adoption with the earning implications; no justification is provided.</i></p>
Shamaran Petroleum Corp	<p>Capitalized costs of proved oil and gas properties are depleted using the unit of production method based on estimated gross proved reserves of petroleum and natural gas as determined by independent engineers. Successful exploratory wells and development costs and acquired resource properties are depleted over proved developed reserves. Acquisition costs of unproved reserves are not depleted or amortized while under active evaluation for commercial reserves.</p>	<p>The Company applies the full cost method of accounting for exploration and evaluation (“E&E”) costs in accordance with the requirements of IFRS 6 Exploration for and Evaluation of Mineral Resources [...] Oil and gas assets are depreciated using the unit of production method based on proved and probable reserves using estimated future prices and costs.</p>	<p><i>The firm still refers to pre-IFRS FC method as their accounting policy, even though it changes the depreciation base.</i></p>

Appendix E: Analysts' questions in earning calls regarding reserve estimates and its implications for earnings.

[Question] Yes. Okay, if I may, a question of detail. On DD&A, I note that the unit DD&A fell significantly from 1Q to 2Q and on a—in my mind, I was on a gross barrel basis from some \$22.50 to \$18.50 per barrel. Now, while the reserve base – and you talk about this in the press release, while the reserve base would be different for a year-on-year comparison, I would have thought that the first quarter-second quarter reserve base would have been identical.

David Dudleyke, *Stifel Nicolaus*

Q2 2010 GRAN TIERRA ENERGY Earnings Conference

[Question] Thanks. Last question for me is, the Marcellus, just talking about the reserves writedown here. Is that an indication of aggressive bookings previously? I'm assuming your long-term price has not changed substantially here. So I'm just wondering what exactly drove the writedown. Because you talk about capital expenditure, but certainly the timing of that expenditure can't be that significant.

George Toriola, *UBS*

Q1 2010 Hal Kvisle Talisman Energy Inc Earnings Conference

[Question] Good reserve metrics. Just to follow-up on the non-cash impairment charge, this is a non-cash charge. Was it not reflected in any reductions or negative revisions to your reserves, as well?

Jeremy Kaliel, *CIBC World Markets*

Q4 2013 Penn West Petroleum Ltd Earnings Conference Call

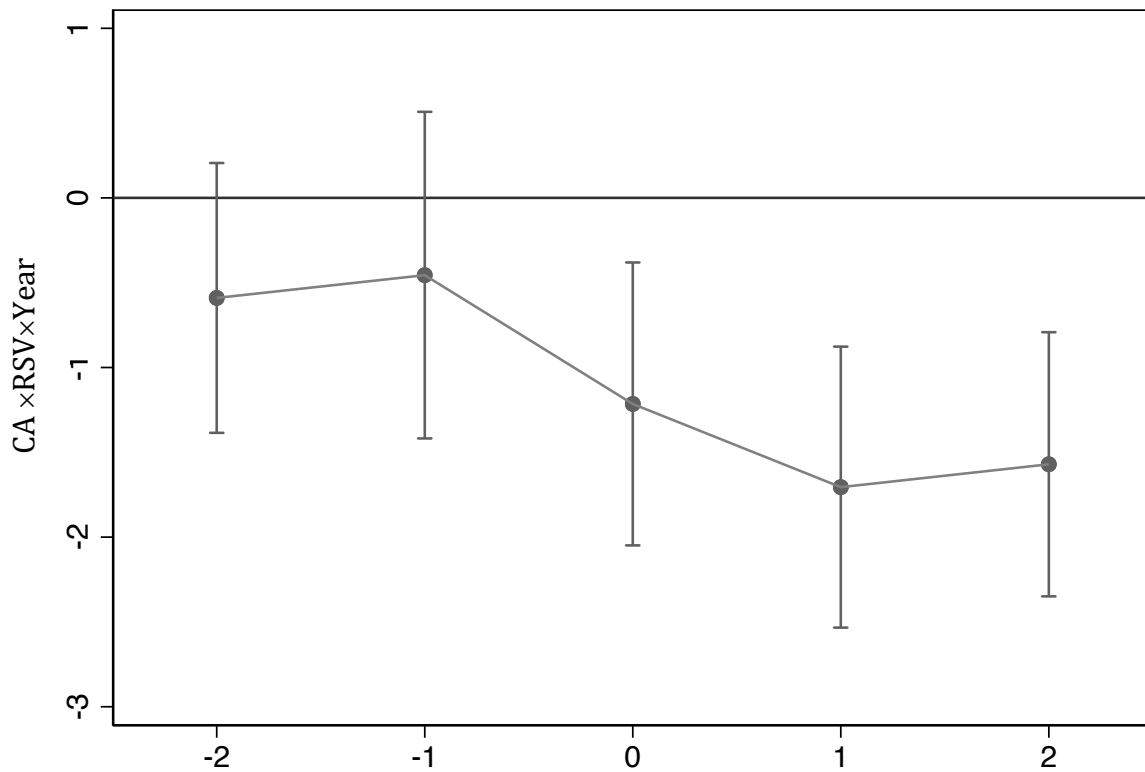


Fig. 1: The effects of IFRS adoption by Canadian firms on the value relevance of their reserves: parallel trend analysis

Notes: This figure plots the coefficients of a dynamic lead-lag difference-in-differences regression that estimates the effect of IFRS adoption by Canadian firms on the value relevance of the firm's disclosed level of reserves (RSV). In particular, share price is regressed on an indicator set to 1 for Canadian firms (CA) interacted with the firm's disclosed level of reserves (RSV) and with fiscal year indicators, controls, and firm fixed effects. The figure displays the slope coefficients and 90% confidence intervals for the interaction term. The sample period spans 2009–2013. Year 0 is the year of IFRS adoption. All variables are defined in Appendix A.

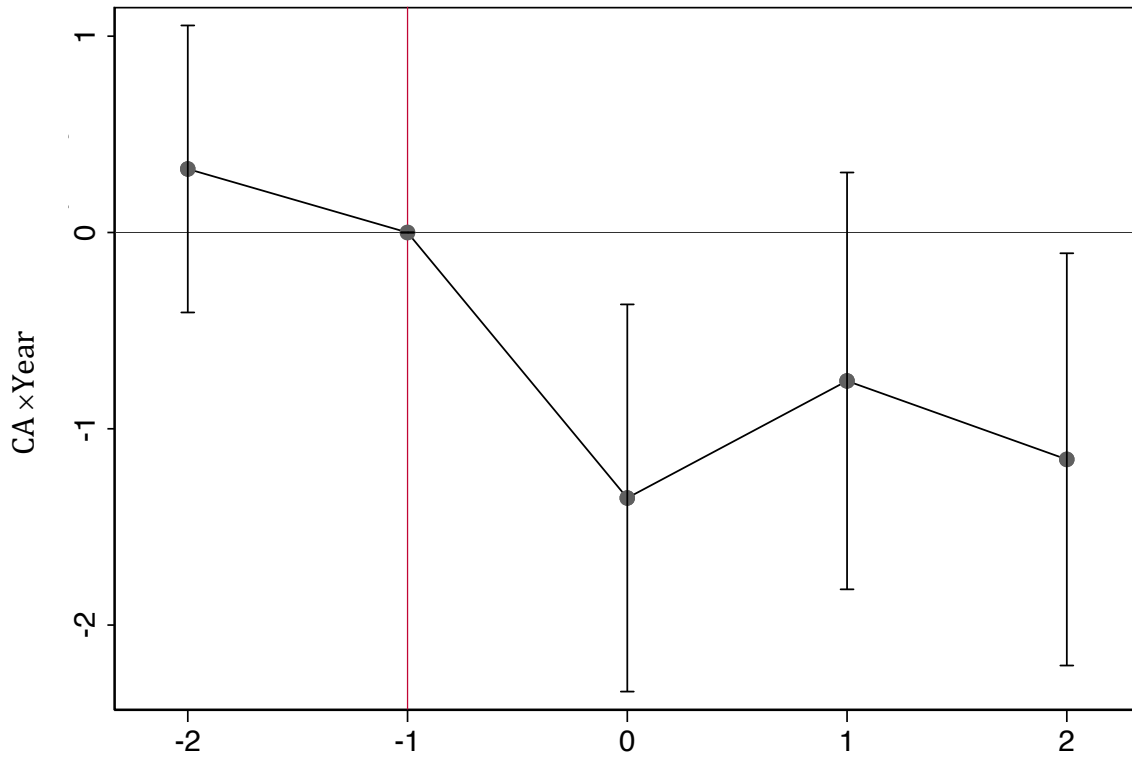


Fig. 2: The effects of IFRS adoption by Canadian firms on the frequency of reserve-related questions in conference calls Q&As: parallel trend analysis

Notes: This figure plots the coefficients of a dynamic lead-lag difference-in-differences regression that estimates the effect of IFRS adoption by Canadian firms on the frequency of reserve-related questions in conference call Q&A sessions (*CCQA_reserve*). In particular, *CCQA_reserve* is regressed on an indicator of Canadian firm (*CA*) interacted with fiscal year indicators, controls, and firm and quarter fixed effects. The base year is 2010 (one year before IFRS adoption). The dots represent the slope coefficients and the black vertical lines represent the 90% confidence intervals for the interaction term. The sample period spans 2009–2013. All variables are defined in Appendix A.

TABLE 1: Sample selection

	<i>Firm</i>	<i>Fiscal year</i>
<i>Number of companies in the sample</i>		
Compustat North America, Oil and Gas Sector, 2009 – 2013	1007	3778
- Less missing main variables (BE, EPS, and P)	-132	-661
- Less cross-listed firms identified by Worldscope	-61	-289
- Less holding, service, consulting, and integrated energies	-18	-61
- Less unbalance panel data	-457	-1072
- Less observations with zero sales and depreciation for all 5 years	-48	-240
- Less missing reserve data from CanOil, Capital IQ, Compustat or Annual reports	-77	-385
Final sample	214	1070
- Canadian O&G firms	119	595
- US O&G firms	95	475

Notes: This table provides sample selection process for the data used in the primary analysis. The sample spans 2009 to 2013, and US and Canadian O&G companies.

TABLE 2: Summary statistics

	Canada (595 Obs)		US (475 Obs)	
	Mean	SD	Mean	SD
Before entropy balancing				
<i>RSV</i>	0.66	2.59	1.81	5.50
<i>BVE</i>	3.75	4.89	14.68	14.76
<i>EPS</i>	0.07	0.73	0.40	2.88
<i>Lag_mv</i>	6.59	10.68	7.89	26.33
<i>Lag_ret_vol</i>	0.03	0.00	0.03	0.00
<i>Lag_turnover</i>	0.23	0.36	0.18	0.24
After entropy balancing				
<i>RSV</i>	0.66	2.46	0.66	2.59
<i>BVE</i>	3.75	5.70	3.75	4.89
<i>EPS</i>	0.06	1.61	0.07	0.73
<i>Lag_mv</i>	6.59	10.68	6.59	17.56
<i>Lag_ret_vol</i>	0.03	0.00	0.03	0.00
<i>Lag_turnover</i>	0.23	0.36	0.23	0.47
Other firm characteristics				
<i>Size</i>	5.14	2.29	5.05	2.13
<i>Growth</i>	0.66	1.97	0.40	1.70
<i>Lever</i>	0.73	1.30	1.06	2.02
<i>BM</i>	0.32	1.02	0.96	0.83
<i>Loss</i>	0.17	0.37	0.15	0.35
<i>Accrual</i>	-0.23	0.71	-0.19	0.77
<i>Dissue</i>	0.47	1.34	0.49	2.11
<i>Big</i>	0.48	0.50	0.86	0.35
<i>Close</i>	24.40	25.80	9.12	16.21

Notes: This table provides descriptive statistics of O&G firm characteristics around the IFRS adoption (2009-2013). See Appendix A for variable definitions. Figures in bold indicate that the difference of means between the Canadian and the US firms is significant at 5 percent levels or lower.

TABLE 3: Stock prices and proved reserves

Dep variable:	(1)	(2)	(3)	(4)	(5)	(6)
<i>Price</i>	<i>Pre</i>	<i>Post</i>	<i>Pooled</i>	<i>Pooled</i>	<i>Pooled</i>	<i>Pooled</i>
<i>RSV</i>	2.56***	-0.01	1.69***	1.13***	0.88***	0.84***
	(0.66)	(0.12)	(0.50)	(0.43)	(0.25)	(0.26)
<i>EPS</i>	3.15***	1.71***	0.93***	2.91***	0.56**	1.47***
	(0.62)	(0.48)	(0.36)	(0.59)	(0.25)	(0.42)
<i>BVE</i>	1.49***	1.70***	1.62***	1.99***	0.74***	0.88***
	(0.08)	(0.08)	(0.13)	(0.14)	(0.16)	(0.23)
<i>Post</i> × <i>RSV</i>			-1.71***	-1.40***	-1.06	-0.34
			(0.50)	(0.32)	(1.87)	(0.28)
<i>CA</i> × <i>RSV</i>					1.37	-0.91
					(1.61)	(1.70)
<i>Post</i> × <i>CA</i>					1.16	-0.83
					(1.77)	(2.17)
<i>Post</i> × <i>CA</i> × <i>RSV</i>					-1.56**	-1.83***
					(0.66)	(0.45)
<i>Post</i> × <i>Control</i>	No	No	No	Yes	No	Yes
Firm FE	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R2_Adj	0.86	0.64	0.90	0.91	0.89	0.90
Sample	CA	CA	CA	CA	CA&US	CA&US
N	238	357	595	595	1070	1070

Notes: This table reports the results of regressing stock price three months after the fiscal year-end on “proven” reserve estimates (*RSV*), earnings per share (*EPS*), and book value of equity (*BVE*). *Post* is an indicator that equals 1 for the post-IFRS period. *CA* is an indicator that equals 1 for Canadian O&G firms, and 0 for US O&G firms. *Post* × *Control* presents the interactions between the indicators and EPS and BV. Standard errors are reported under the coefficients and are calculated using robust standard errors clustered by firm. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE 4: Stock prices and decomposition of reserves

Dep variable:	(1)	(2)
<i>Price</i>	<i>Pre</i>	<i>Post</i>
<i>Discoveries</i>	1.24*** (0.22)	1.17 (1.56)
<i>Acquisitions</i>	0.92*** (0.19)	1.28 (4.64)
<i>Dispositions</i>	2.93*** (0.83)	9.45 (14.87)
<i>Production</i>	-1.05** (0.43)	-2.04** (0.86)
<i>Recoveries</i>	-1.03 (0.67)	0.69 (0.79)
<i>Revisions</i>	1.20 (0.78)	-3.46* (1.87)
<i>Percent_NatGas</i>	2.05** (0.93)	3.01*** (0.97)
<i>EPS</i>	0.56*** (0.17)	1.03*** (0.27)
<i>BVE</i>	1.59*** (0.03)	1.46*** (0.04)
Year FE	Yes	Yes
R2_Adj	0.79	0.68
N	238	357

Notes: This table reports the results of regressing stock price three months after the fiscal year-end on the decomposition of firms' O&G "proven" reserve estimate (RSV). See Appendix A for variable definitions. Standard errors are reported under the coefficients and are calculated using robust standard errors clustered by firm, correcting for heteroscedasticity. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE 5: Stock price reaction to reserve estimates news

Dep variable:	(1)	(2)	(3)	(4)	(5)	(6)
<i>Abn Ret</i>	<i>Pre</i>	<i>Post</i>	<i>Pooled</i>	<i>Pooled</i>	<i>Pooled</i>	<i>Pooled</i>
<i>ΔRSV</i>	0.03*** (0.00)	0.01*** (0.00)	0.02*** (0.00)	0.02*** (0.00)	0.02** (0.01)	0.01* (0.01)
<i>BM</i>	0.07** (0.03)	-0.06*** (0.01)	-0.04*** (0.01)	0.06** (0.03)	0.03*** (0.01)	0.03*** (0.01)
<i>Size</i>	-0.01 (0.03)	-0.07*** (0.02)	-0.07*** (0.02)	-0.04** (0.02)	-0.04*** (0.01)	-0.04** (0.02)
<i>Oil_return</i>	0.14*** (0.05)	0.03 (0.02)	0.04 (0.02)	0.01 (0.01)	-0.12 (0.15)	-0.04 (0.14)
<i>Gas_return</i>	-0.02 (0.03)	-0.03 (0.09)	-0.01 (0.01)	-0.08 (0.10)	-0.50 (0.74)	-0.24 (0.16)
<i>Post</i> × <i>ΔRSV</i>			-0.01** (0.00)	-0.01*** (0.00)	-0.01 (0.01)	-0.01 (0.01)
<i>CA</i> × <i>ΔRSV</i>					0.03*** (0.01)	0.02 (0.06)
<i>Post</i> × <i>CA</i>					-0.07*** (0.02)	-0.20** (0.08)
<i>Post</i> × <i>CA</i> × <i>ΔRSV</i>					-0.01*** (0.01)	-0.02** (0.01)
<i>Post</i> × <i>Control</i>	No	No	No	Yes	No	Yes
Firm FE	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R2_Adj	0.24	0.07	0.12	0.16	0.11	0.10
Sample	CA	CA	CA	CA	CA&US	CA&US
N	238	357	595	595	856	856

Notes: This table reports the results of regressing stock price reaction to the releases of O&G reserve news (*ΔRSV*). *Post* is an indicator that equals 1 for the post-IFRS period. *CA* is an indicator that equals 1 for Canadian O&G firms, and 0 for US O&G firms. Interaction × *Control* presents the interactions between the indicators and *BM*, *Size*, *Oil_return* and *Gas_return*. Standard errors are reported under the coefficients and are calculated using robust standard errors clustered by firm, correcting for heteroscedasticity. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE 6: Liquidity and change in proved reserves

Dep variable:	(1)	(2)	(3)	(4)
<i>Illiquidity</i>	<i>Pooled</i>	<i>Pooled</i>	<i>Pooled</i>	<i>Pooled</i>
ΔRSV	-0.11** (0.05)	-0.26*** (0.04)	-0.23*** (0.02)	-0.21*** (0.02)
<i>Lag_mv</i>	-0.01* (0.00)	-0.01** (0.00)	-0.01* (0.00)	-0.01* (0.00)
<i>Lag_ret vol</i>	1.03** (0.49)	1.14* (0.65)	2.73** (1.34)	1.03 (0.71)
<i>Lag_turnover</i>	-0.88** (0.43)	-0.74* (0.39)	-0.81** (0.40)	-0.92** (0.42)
<i>Post</i> $\times \Delta RSV$	0.10* (0.06)	0.09** (0.04)	-0.50*** (0.00)	-0.56** (0.27)
<i>Post</i> $\times CA$			1.11*** (0.00)	0.46 (0.33)
<i>CA</i> $\times \Delta RSV$			-0.09 (0.06)	-0.52 (0.47)
<i>Post</i> $\times CA$ $\times \Delta RSV$			0.47** (0.22)	1.70* (0.96)
<i>Post</i> $\times Control$	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
R2_Adj	0.11	0.12	0.12	0.15
Sample	CA	CA	CA&US	CA&US
N	595	595	856	856

Notes: This table represents the results of estimating stock liquidity around releases of annual information about O&G reserves. See Appendix A for variable definitions. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, and *** denote statistical significance at ten, five, and one percent (two-tailed) levels, respectively.

TABLE 7: Specificity and consistency of reserve-related accounting policy disclosure

<i>Dependent variables:</i>	(1) <i>Specificity</i>	(2) <i>Consistency</i>	(3) Δ <i>Specificity</i>	(4) Δ <i>Consistency</i>
<i>Post</i>	-2.00*** (0.37)	-0.18** (0.09)		
<i>Length</i>	-0.03*** (0.00)	-0.02*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
<i>RSV_rank</i>	-0.20 (0.29)	-0.02 (0.01)	-0.07 (0.18)	-0.48** (0.21)
<i>RSV</i>	0.67 (0.53)	0.01 (0.05)	0.83** (0.37)	-0.77 (0.55)
<i>Size</i>	0.42** (0.19)	0.03 (0.09)	-0.60** (0.28)	-0.50** (0.22)
<i>Growth</i>	0.40 (0.81)	-0.29 (0.34)	0.08 (0.79)	-1.28* (0.69)
<i>Lever</i>	-1.67 (5.49)	-0.98 (1.00)	-2.07** (0.96)	-1.94 (1.30)
<i>RoA</i>	0.79** (0.31)	-0.01 (0.02)	-0.06 (0.24)	0.02 (0.15)
<i>Accrual</i>	0.18** (0.08)	0.02 (0.01)	-0.08 (0.14)	0.07 (0.09)
<i>BM</i>	0.71* (0.39)	-0.01 (0.01)	-0.13 (0.15)	0.15* (0.08)
<i>Big</i>	0.18 (1.52)	0.15** (0.06)	0.47 (0.98)	-0.44*** (0.07)
<i>Close</i>	0.01 (0.03)	-0.00 (0.02)	0.16 (0.10)	-0.01 (0.04)
<i>Loss</i>	-1.67** (0.75)	-0.09** (0.03)	-0.04 (0.18)	0.30*** (0.09)
<i>SD_return</i>	-2.69** (1.05)	-0.18** (0.08)	1.36* (0.82)	0.52*** (0.19)
<i>SD_earn</i>	0.13 (0.10)	-0.06 (0.11)	-0.04 (0.16)	-0.03 (0.12)
<i>Analyst Acc</i>	-0.04 (0.07)	-0.01 (0.03)	-0.10 (0.15)	-0.02 (0.07)
<i>Analyst missing</i>	1.10 (0.98)	0.02 (0.42)	2.58 (1.72)	-1.87 (1.19)
Firm FE	Yes	Yes	No	No
R2_Adj (Pseudo R2)	0.58	0.49	0.45	0.28
N	595	595	238	238

Notes: The table reports the coefficient estimates from regressing Specificity and Consistency on determinants. All variables are defined in Appendix A. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE 8: Reserve-related questions in earnings conference calls

Dependent variable: <i>CCQA_reserve</i>	<i>Full sample</i>		<i>Quarter comparison</i>			<i>Country comparison</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Post</i>	-0.68*** (0.20)	-0.68*** (0.20)	-1.15*** (0.30)	-0.19 (0.21)		
<i>Post</i> × <i>Q4</i>					-1.57*** (0.39)	
<i>Post</i> × <i>CA</i>						-1.75*** (0.54)
<i>Q_Length</i>	-0.47*** (0.09)	-0.43*** (0.09)	-0.20 (0.13)	-0.46*** (0.11)	-0.38*** (0.09)	-0.61*** (0.10)
<i>Q_Tone</i>	-0.37 (0.61)	-0.16 (0.60)	0.19 (0.79)	-0.41 (0.68)	-0.38 (0.61)	-0.27 (0.58)
<i>Q_Uncertain</i>	-0.45 (0.57)	-0.17 (0.56)	0.38 (0.83)	-0.34 (0.59)	-0.41 (0.57)	-0.22 (0.53)
<i>QA_Length</i>	1.46*** (0.25)	1.47*** (0.24)	2.71*** (0.39)	0.65** (0.29)	1.23*** (0.29)	0.38 (0.33)
<i>Pre_Length</i>	0.59*** (0.04)	0.58*** (0.03)	0.87*** (0.05)	0.35*** (0.04)	0.59*** (0.04)	0.54*** (0.05)
<i>Pre_Tone</i>	0.8*** (0.29)	0.89*** (0.29)	1.04** (0.53)	1.49*** (0.33)	0.41 (0.34)	-5.51 (3.95)
<i>Pre_Uncertain</i>	1.49*** (0.31)	1.21*** (0.31)	3.16*** (0.59)	0.59* (0.32)	1.55*** (0.36)	-0.79** (0.37)
<i>Pre_reserve</i>	0.07* (0.03)	-0.01 (0.04)	0.12** (0.05)	0.08 (0.05)	-0.01 (0.04)	0.08** (0.04)
ΔRSV	0.11*** (0.01)	0.11*** (0.01)	-0.21*** (0.01)	-0.02** (0.01)	-0.12*** (0.01)	-0.05*** (0.01)
<i>Size</i>	-0.27** (0.13)	-0.22* (0.13)	-1.20*** (0.19)	0.21 (0.14)	5.96*** (1.83)	1.85 (1.22)
<i>Lever</i>	3.75** (1.65)	3.45** (1.62)	13.64*** (2.38)	-1.61 (1.94)	0.64** (0.26)	0.48 (0.35)

<i>RoA</i>	0.31 (0.28)	0.30 (0.27)	-2.09*** (0.65)	0.17 (0.24)	-0.38*** (0.09)	-0.61*** (0.10)
<i>BM</i>	0.14 (0.18)	0.11 (0.17)	0.24 (0.30)	0.10 (0.22)	0.39 (0.28)	-2.09 (2.54)
<i>Loss</i>	-1.26*** (0.36)	-1.69*** (0.36)	-4.42*** (0.70)	-0.10 (0.47)	-2.57*** (0.42)	-0.48 (0.34)
<i>Analyst Acc</i>	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	-0.01 (0.00)	0.01** (0.00)	0.01** (0.00)
Sample	CA	CA	CA-Q4	CA-Q1-3	CA	CA&US
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	Yes	Yes	Yes
Year FE	No	No	No	No	Yes	Yes
R2_Adj	0.14	0.17	0.18	0.17	0.15	0.17
N	866	866	341	525	866	2377

Notes: This table represents the results of testing the change in reserve-related questions in the conference call Q&A section. *CCQA_reserve* is the frequency of reserve-related questions in the conference call Q&A sessions scaled by the total number of questions. The control variables are variables related to the other characteristics of managers' presentations and Q&A in the conference call and firms' fundamentals, as defined in Appendix A. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE 9: Change in reserve dispersion pre-and post-IFRS

Dependent variable:	<i>RSV Revision t+1</i>			<i>RSV Dispersion</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Post</i> -	0.03*** (0.01)	0.02** (0.01)	0.07** (0.03)	0.06*** (0.02)	0.06** (0.03)	0.02*** (0.01)
<i>Post</i> × <i>Low Specificity</i>		0.08*** (0.03)			0.04 (0.05)	
<i>Post</i> × <i>Low Consistency</i>			-0.04 (0.03)			0.06* (0.03)
<i>Size</i>	0.02** (0.01)	0.01** (0.01)	0.02** (0.01)	-0.02* (0.01)	-0.01* (0.01)	-0.01 (0.00)
<i>Growth</i>	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
<i>Lever</i>	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
<i>RoA</i>	-0.03 (0.02)	-0.02 (0.02)	-0.03 (0.02)	0.03 (0.02)	0.02 (0.02)	0.02 (0.02)
<i>Accrual</i>	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.02 (0.02)	0.04* (0.02)	0.03* (0.02)
<i>BM</i>	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
<i>Big</i>	0.41*** (0.05)	0.39*** (0.05)	0.41*** (0.05)	0.17*** (0.06)	0.00 (0.03)	-0.01 (0.03)
<i>Close</i>	-0.01** (0.00)	-0.01** (0.00)	-0.01* (0.01)	-0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
<i>Loss</i>	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.05** (0.03)	0.08*** (0.03)	0.08*** (0.02)
<i>Dissue</i>	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)

<i>Neg_CF</i>	0.04* (0.02)	0.04** (0.02)	0.04** (0.02)	0.06* (0.03)	0.09*** (0.03)	0.08*** (0.03)
<i>Discoveries</i>	0.10*** (0.02)	0.11*** (0.02)	0.07*** (0.02)	0.00 (0.02)	-0.04 (0.02)	-0.00 (0.02)
<i>Acquisitions</i>	-0.17*** (0.03)	-0.17*** (0.03)	-0.21*** (0.04)	-0.06* (0.03)	-0.07* (0.03)	-0.06* (0.03)
<i>Dispositions</i>	0.02** (0.01)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.00)	0.05* (0.02)	-0.00 (0.01)
<i>Production</i>	-1.73*** (0.19)	-1.73*** (0.18)	-2.49*** (0.18)	-0.67* (0.37)	-0.72* (0.38)	-0.69* (0.37)
<i>Recoveries</i>	0.25 (0.20)	0.25 (0.20)	0.04 (0.21)	0.11 (0.15)	0.13 (0.48)	0.10 (0.08)
<i>Revisions</i>	0.04*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.00 (0.01)	0.04*** (0.01)	-0.02 (0.02)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
R2_Adj	0.95	0.95	0.95	0.35	0.34	0.35
N	595	595	595	595	595	595

Notes: This table represents the results of testing the change in reserve estimate revision and dispersion before and after IFRS adoption. Revision is an indicator variable that equals one if there is a negative revision in year $t + 1$. RSV Dispersion is the distribution of “proved” and “probable” O&G reserves, scaled by the “probable” reserves. All variables are defined in Appendix A. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE 10: Cross sectional tests based on changes in firms' disclosure practices and quality

Dep variable: <i>Price</i>	<i>Change in Specificity</i>		<i>Change in Consistency</i>		<i>Change in Revision Frequency</i>	
	Low (1)	High (2)	Low (3)	High (4)	Low (5)	High (6)
<i>RSV</i>	2.40** (1.08)	2.91** (1.26)	2.46*** (0.95)	3.10*** (0.71)	1.92** (0.93)	2.01*** (0.60)
<i>Post</i>	1.28 (1.84)	1.11 (2.40)	0.22 (0.23)	1.06* (0.63)	1.73 (2.07)	-0.11 (0.51)
<i>Post</i> × <i>RSV</i>	0.36 (1.76)	-2.91** (1.26)	-1.75 (2.19)	-3.12*** (0.72)	-1.31 (1.27)	-2.07*** (0.66)
<i>EPS</i>	0.79 (0.87)	1.30*** (0.40)	3.14*** (1.02)	2.40*** (0.43)	2.77*** (0.90)	2.93*** (0.41)
<i>BVE</i>	1.66*** (0.14)	1.29*** (0.15)	1.73*** (0.19)	1.55*** (0.07)	1.80*** (0.13)	1.39*** (0.07)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
R2_adj	0.90	0.91	0.92	0.91	0.88	0.90
N	295	300	295	300	295	300

Notes: This table reports the results of estimating the value relevance of O&G reserves in subsamples based on the change in disclosure practices. High (Low) refers to observations with above (below) median values of change in Specificity, Consistency, and Revision Frequency. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

Online Appendix:

**The Interplay between International Financial Reporting and Local
Disclosure Rules: Evidence from the Oil and Gas Industry**

Online Appendix A: Analyst experience and forecast dispersion

This study observes a decline in O&G reserve-related questions in conference calls post-IFRS adoption. To understand variations in this trend, we assess the role of analyst experience. Building on research suggesting experienced analysts face lower processing costs (Piotroski and Roulstone, 2004; Kanda, Madureira and Wang, 2012), we hypothesize that the decline in O&G reserve queries is more pronounced among less experienced analysts. We measure *General Experience* by the years an analyst is listed in IBES and *Firm Experience* by the years they have forecasted for a specific firm (Clement and Tse, 2005; De Franco and Zhou, 2009). Our question-level tests, similar to those in Table 8, introduce an *Inexp* indicator for analysts with experience below the median. The variable of interest is the interaction of *Inexp* and *Post*, with controls for question and firm attributes, including the total conference call questions (*Question_n*). The results are in Table A1.

Heterogeneous processing costs and reduced attention to reserve information imply variation in analysts' reliance on public information. We next test changes in analyst forecast dispersion pre- and post-IFRS adoption. We measure analyst forecast dispersion (*Dispersion*) as the sample variance of the individual forecasts around the mean forecast. Following prior literature (e.g., Lang and Lundholm 1996; Heflin, Subramanyam and Zhang 2003), we control for firm characteristics, including *Size*, *lever*, *BM*, *lag_turnover*, and *loss*. Additionally, we add unexpected earnings, SUE, a negative earning news indicator, *Neg UE*, for firm-years when earnings are below previous earnings, forecast horizon, *Fcs_days*, calculated as the logarithm of the number of days from the forecast date to the firm's earnings announcement date, and earning predictability, *predictability*, following Francis, LaFond, Olsson, and Schipper (2004). Table A2 reports the results.

TABLE A1: Analyst experience and O&G reserve-related questions

Dependent variable: <i>CCQA_reserve</i>	(1)	(2)
<i>Inexp</i>	-0.47*** (0.10)	0.11*** (0.02)
<i>Post × Inexp</i>	-0.30 (0.33)	-0.46*** (0.09)
<i>Question_n</i>	0.09*** (0.02)	0.08*** (0.01)
<i>Q_Length</i>	-0.96*** (0.09)	-0.95*** (0.09)
<i>Q_Tone</i>	0.29 (0.47)	0.39 (0.46)
<i>Q_Uncertain</i>	-1.57*** (0.43)	-1.54*** (0.43)
<i>QA_Length</i>	-1.52*** (0.25)	-1.54*** (0.24)
<i>Pre_Length</i>	0.30 (0.21)	0.42** (0.20)
<i>Pre_Tone</i>	2.50*** (0.28)	2.28*** (0.28)
<i>Pre_Uncertain</i>	1.14*** (0.27)	1.25*** (0.26)
<i>Pre_reserve</i>	0.90*** (0.03)	0.88*** (0.03)
<i>ΔRSV</i>	-0.97** (0.45)	-3.07*** (0.37)
<i>Size</i>	-5.22*** (1.23)	-3.44*** (0.85)
<i>Lever</i>	0.16 (0.19)	-0.10 (0.15)
<i>RoA</i>	-0.16 (1.65)	1.42 (1.44)
<i>BM</i>	-0.05 (0.06)	-0.04 (0.05)
<i>Loss</i>	0.03 (0.21)	0.03 (0.21)
<i>Analyst Acc</i>	0.02** (0.01)	0.01*** (0.00)
Firm & Quarter & Year FE	Yes	Yes
R2_adj	0.05	0.16
N	7714	7605

Notes: This table represents the results of testing the change in reserve-related questions in the conference call Q&A section. *CCQA_reserve* is the indicator for reserve-related questions in the conference call Q&A sessions. The *Inexp* in the first (second) column is a reserve measure of analyst (firm) general experience. The control variables are similar to those in Table 8. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

TABLE A2: Analyst forecast dispersion

<i>Dependent variable:</i>	(1)	(2)
<i>Forecast dispersion</i>		
<i>ΔRSV</i>	1.80**	1.48**
	(0.78)	(0.74)
<i>Post × ΔRSV</i>		0.60*
		(0.31)
<i>Size</i>	-0.23**	-0.16***
	(0.10)	(0.04)
<i>Lever</i>	3.39	3.77
	(4.54)	(4.59)
<i>BM</i>	0.51	0.55
	(0.53)	(0.52)
<i>Vol</i>	-0.74	-0.71
	(0.69)	(0.68)
<i>Issue</i>	-1.34	-1.37
	(0.95)	(0.96)
<i>Predicibility</i>	-4.95**	-4.89**
	(2.18)	(2.16)
<i>Lag_turnover</i>	13.65**	14.23**
	(5.86)	(5.80)
<i>Loss</i>	1.55	1.45
	(1.14)	(1.13)
<i>SUE</i>	0.17	0.15
	(0.23)	(0.23)
<i>Neg_UE</i>	0.16	0.12
	(0.70)	(0.70)
<i>Fcs_days</i>	2.04	1.77
	(2.58)	(2.58)
Firm FE	Yes	Yes
Year FE	Yes	Yes
R2_adj	0.47	0.54
N	576	576

Notes: This table represents the results of testing the change in analyst forecast dispersion around IFRS adoption. The definition of variables included is as discussed above. Standard errors clustered by firm are reported in parentheses under the coefficients. *, **, *** present significance at the ten, five, and one percent (two-tailed) levels, respectively.

Online Appendix B: Reserve estimates and earning management

Our main analyses use two measures, reserve estimate revision and dispersion, to capture potential disclosure manipulation. However, these two measures could also reflect business risk or reserve estimation uncertainty. To mitigate this concern, we examine whether managers take a holistic view and use the connection between reserves and financial reporting opportunistically. Reserve estimate being an input for depreciation and impairment tests indicates its earning implications. The content analyses suggest that firms are aware of these implications and may opportunistically select estimate reserves with higher value to reduce depreciation costs or avoid triggering impairment. This motivates us to look at indicators of whether reserve estimate is used as an earning management tool. In particular, we examine whether small earnings are associated with future negative reserve revisions.

Since reserves are used as inputs to several financial statement items, inflating reserves could be used as one tool to temporarily alter financial reporting results. For example, as illustrated in the accounting notes (Appendix D), an increase in reserves will effectively expand the depreciation base for O&G assets. Thus, we estimate the following equation:

$$Neg_Revision_{i,t+1} = \alpha + \beta_1 Spos_{i,t} + \beta_2 Controls_{i,t} + \varepsilon \quad [1]$$

where $Spos_{i,t}$ is an indicator variable that equals one for observations where net income scaled by total assets is between 0 and 0.01. $Neg_Revision_{i,t+1}$ is an indicator that equals one if the firm reports a negative proved reserve revision in year $t + 1$, and zero otherwise. A negative revision indicates that upward management is subsequently reversing. We control for other firm characteristics that might be associated with the possibility of reserve manipulation and revision, such as *size*, *growth*, *lever*, *BM*, *RoA*, *lag_turnover*, *close*, *Neg_CF*, and *Big*. Table A3 reveals that small positive earnings in the current year are significantly and positively associated with incidences of negative revisions in the following year.

TABLE A3: Small positive earnings and reserve revision

<i>Dependent variable:</i> <i>Revision in t+1</i>	(1)
<i>Spos</i>	0.34* (0.20)
<i>Size</i>	0.43*** (0.08)
<i>Growth</i>	-0.02** (0.01)
<i>Lev</i>	-0.01 (0.06)
<i>BM</i>	-0.00 (0.04)
<i>RoA</i>	-3.91*** (1.08)
<i>Dissue</i>	-0.05 (0.07)
<i>Neg_CF</i>	2.22* (1.21)
<i>Big</i>	0.09 (0.61)
<i>Close</i>	0.02 (0.01)
<i>Discoveries</i>	-0.01** (0.00)
<i>Acquisitions</i>	0.01 (0.47)
<i>Dispositions</i>	-2.98** (1.22)
<i>Production</i>	0.40 (3.31)
<i>Recoveries</i>	-4.00 (4.45)
<i>Revisions</i>	2.68 (3.26)
Firm FE	Yes
R2 Adj	0.84
N	595

Notes: This table represents the results of testing the association between current small positive earnings and the following years' negative reserve revision. Revision is an indicator variable that equals one if there is a negative revision at year t+1. The control variables are variables related to firms' fundamentals, as defined earlier. We cluster robust standard error at the firm level. *, **, *** present significance at the ten, five, and one percent level, respectively.

Online Appendix C: Accounting quality and financial statement comparability

Accounting quality:

We adopt three accounting quality constructs that are widely used in related studies (e.g., Barth et al., 2008; Christensen et al., 2015), namely, earning smoothing (the variability of changes in earnings, the variability of changes in earnings relative to the variability of changes in cash flows, and the negative correlation between accruals and cash flows.), the probability of managing towards small positive earnings, and timely loss recognition. We consider these constructs relevant to our research question as they can be affected by managerial discretion and are likely to be influenced by firms' reporting incentives (e.g., Christensen et al., 2015).

We closely follow Barth et al. (2008) to specify the equations as follows:

$$\Delta NI_{it} \text{ or } \Delta CF_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Growth_{it} + \beta_3 EISSUE_{it} + \beta_4 Lev_{it} + \beta_5 Dissue_{it} + \beta_5 Turn_{it} + \beta_6 CF_{it} + \beta_7 Aud_{it} + \beta_8 Numex_{it} + \beta_9 Close_{it} + \varepsilon \quad [1]$$

$$CF_{it} \text{ or } ACC_{it} = \alpha + \beta_1 Size_{it} + \beta_2 Growth_{it} + \beta_3 EISSUE_{it} + \beta_4 Lev_{it} + \beta_5 Dissue_{it} + \beta_5 Turn_{it} + \beta_6 Aud_{it} + \beta_7 Numex_{it} + \beta_8 Close_{it} + \varepsilon \quad [2]$$

where ΔNI is the change in net income, scaled by end-of-year total assets; ΔCF is the change in annual cash flow from operations, scaled by end-of-year total assets; ACC is the earnings less cash flow from operations, scaled by end-of-year total assets; CF is the annual net cash flow from operating activities, scaled by end-of-year total assets; $NUMEX$ is the number of exchanges on which a firm's stock is listed; $Close$ is the percentage of closely held shares. We estimate Equations (1) and (2) as pooled regressions, including all observations separately for Canadian O&G firms in the pre-regulation and post-IFRS period.

For measures of earnings management towards a target, we use the logistic regression as follows:

$$\begin{aligned}
Post(0,1)_{it} = & \alpha + \beta_1 Spos_{it} + \beta_2 Size_{it} + \beta_3 Growth_{it} + \beta_4 EISSUE_{it} + \beta_5 Lev_{it} \\
& + \beta_6 Dissue_{it} + \beta_7 Turn_{it} + \beta_8 CF_{it} + \beta_9 Aud_{it} + \beta_{10} Numex_{it} \\
& + \beta_{11} Close_{it} + \varepsilon
\end{aligned} \tag{3}$$

where $Post(0,1)$ is an indicator variable that equals one for observations in the post-adoption period and zero otherwise, and $Spos$ is an indicator variable that equals one for observations where net income scaled by total assets is between 0 and 0.01. A positive β_1 indicates that firms manage earnings more towards a small positive target in the post-regulation period.

For the timely loss recognition, we run the logistic regression as in Equation (4):

$$\begin{aligned}
Post(0,1)_{it} = & \alpha + \beta_1 Leng_{it} + \beta_2 Size_{it} + \beta_3 Growth_{it} + \beta_4 EISSUE_{it} + \beta_5 Lev_{it} \\
& + \beta_6 Dissue_{it} + \beta_7 Turn_{it} + \beta_8 CF_{it} + \beta_9 Aud_{it} + \beta_{10} Numex_{it} \\
& + \beta_{11} Close_{it} + \varepsilon
\end{aligned} \tag{4}$$

where $Leng$ is an indicator variable that equals one for observations in which annual net income scaled by total assets is less than -0.20 , and zero otherwise. A negative β_1 suggests that firms recognize large losses less frequently in the post-regulation period.

TABLE A4: Canadian O&G firms' accounting quality – pre and post IFRS

	Pre	Post	Expected sign	Level of significance
Variability of ΔNI^*	0.0018	0.0027	<i>N</i>	No
Variability of ΔCF^*	1.505	1.408	<i>N</i>	No
Correlation of ACC^* and CF^*	-0.256	-0.267	<i>N</i>	No
Small positive earnings $Spos$		-0.055	<i>N</i>	No
Large loss $Lneg$		0.081	<i>N</i>	*

Notes: This table presents the results of the changes in accounting quality metrics for Canadian O&G firms around IFRS adoption. ΔNI^* , ΔCF^* , CF^* , and ACC^* are the residuals from the regressions of ΔNI , ΔCF , CF , and ACC from Equation (1) and (2) in Appendix 1. Small positive earnings and large losses are the coefficients on $Spos$ and $Leng$ in logistic regressions based on Equations (3) and (4) in Appendix 1. For brevity concern, we follow Barth et al. (2008) and only present the coefficients on $Spos$ and $Lneg$ here. *, **, *** present significance at the ten, five, and one percent levels, respectively.

Financial Statement Comparability:

The paper finds decreased specificity and consistency of reserve-related accounting practices, suggesting that IFRS provides more principle-based accounting discretion regarding how firms map economic substance into accounting numbers, which potentially decreases comparability. Prior studies document financial statement comparability enhances information reliability and reduces processing costs (e.g., De Franco, Kothari and Verdi, 2011). Therefore, we expect the informativeness effect to be more significant for firms experiencing a relatively large decrease in comparability.

Our comparability measure follows De Franco et al. (2011), who propose to use stock return as a proxy for a company's economic outcome and earnings as the relevant accounting outcome. Barth, Landsman, Lang and Williams (2012) argue that stock returns capture stockholders' investment decisions. Similarly, earnings are a primary summary measure of accounting performance commonly used in accounting research.

We use the following steps to construct the comparability metrics based on time-series relations. First, we estimate the following equation separately for each firm in the O&G industries:

$$Earnings_{it} = a_i + b_i Return_{it} + \varepsilon_{it} \quad [1]$$

where $Earnings_{it}$ is net income before extraordinary items for firm i at time t , scaled by the market value of equity at the end of the prior fiscal year; $Return_{it}$ is the total investment return, including quarterly dividend per share; earnings and return are winsorized at the top and bottom 2 percent level to mitigate the influence of outliers. For each firm-year, we then estimate a_i and b_i using four consecutive years of data and winsorize each at the top and bottom 1 percent. The estimated coefficient vectors (\hat{a}_i, \hat{b}_i) and (\hat{a}_j, \hat{b}_j) capture how the accounting functions $f_i(\cdot)$

) and $f_j(\cdot)$ transfer the economic outcomes (return) into accounting amounts (earnings) for firms i and j .

Second, for each firm i , we use the estimated coefficient vector (a_i, b_i) to calculate the fitted value of earnings $\widehat{Earnings}_{iit}$.

$$\widehat{Earnings}_{iit} = \hat{a}_i + \hat{b}_i Return_{it} \quad [2]$$

Third, for each firm i , we predict its fitted value of earnings using i 's return and the estimated coefficients vector of firm j from the same country in the same period.

$$\widehat{Earnings}_{ijt} = \hat{a}_j + \hat{b}_j Return_{it} \quad [3]$$

Comparability lies in the similarity of accounting functions that produce similar accounting amounts for a specific economic outcome.

Fourth, we estimate comparability by calculating the negative value of the distance between the fitted value of earnings under different accounting functions.

$$Comp_{ijt} = -1/4 \times \sum_{t-3}^t |\widehat{Earnings}_{iit} - \widehat{Earnings}_{ijt}| \quad [4]$$

Greater (less negative) values for $Comp_{ijt}$ indicate a smaller difference between the fitted values of earnings, thus a higher $Comp$ level between firms i and j .

TABLE A5: Cross-sectional test based on change in financial statement comparability

<i>Dependent variable:</i>	(1)	(2)
<i>Price</i>	Low	High
<i>RSV</i>	1.10***	1.14***
	(0.26)	(0.42)
<i>Post</i>	-0.42	-1.21
	(0.71)	(0.85)
<i>Post</i> × <i>RSV</i>	-0.88***	-0.69
	(0.26)	(0.56)
<i>EPS</i>	1.04	2.93***
	(0.75)	(0.85)
<i>BVE</i>	1.69**	1.61**
	(0.80)	(0.72)
<i>Post</i> × <i>Control</i>	Yes	Yes
Firm FE	Yes	Yes
R2_Adj	0.80	0.85
N	295	300

Notes: This table reports the results of regressing stock price at the fiscal year end on the quantity of firms' O&G proved reserve estimate (*RSV*), earnings per share (*EPS*), and book value of equity (*BM*). *Post* is an indicator that equals one for the post-IFRS period. High (Low) refers to observations with above (below) median values of the change in the financial statement measure. We cluster robust standard error at the firm level. *, **, *** present significance at the ten, five, and one percent levels, respectively.

Online Appendix D: Quarterly analysis

TABLE A6: Quarterly announcements analysis

	(1)	(2)	(3)	(4)
	<i>Pre</i>	<i>Post</i>	<i>Pool</i>	<i>Pool</i>
<i>Rev_info</i>	-0.06**	-0.02*	-0.05*	-0.02
	(0.02)	(0.01)	(0.02)	(0.02)
<i>Post</i>			-0.04***	-0.04***
			(0.01)	(0.01)
<i>Rev_info</i> × <i>Post4</i>			0.04*	0.04*
			(0.02)	(0.02)
<i>Lag_mv</i>	-0.02**	-0.03**	-0.02***	-0.02***
	(0.01)	(0.02)	(0.01)	(0.01)
<i>Lag_ret vol</i>	0.51***	2.21***	1.09***	1.05***
	(0.07)	(0.27)	(0.24)	(0.27)
<i>Lag_turnover</i>	-0.44**	-0.73**	-0.51***	-0.51***
	(0.20)	(0.32)	(0.18)	(0.19)
<i>Post</i> × <i>Control</i>	No	No	No	Yes
Firm FE	Yes	Yes	Yes	Yes
R2_Adj	0.25	0.14	0.18	0.19
N	952	1428	2380	2380

Notes: This table reports the results of estimating changes in stock liquidity around releases of quarterly information in the presence or absence of O&G reserves. *RSV_info* is an indicator variable that equals one if the firm discloses O&G reserves information in a given quarter (the fourth quarter), and zero otherwise. Pre (Post) indicates the period prior to (post) IFRS adoption. See the Appendix for variable definitions. We cluster robust standard error at the firm level. *, **, *** present significance at the ten, five, and one percent levels, respectively.

Online Appendix E: Additional robustness tests

TABLE A7: O&G reserves measured in monetary unit

<i>Dep variable:</i>	(1)	(2)	(3)	(4)
<i>Price</i>	Pre	Post	Pooled	Pooled
<i>RSV</i>	1.02* (0.60)	0.13 (0.15)	1.64** (0.65)	1.61** (0.69)
<i>EPS</i>	2.25*** (0.44)	-0.13 (0.37)	2.53*** (0.41)	3.18*** (0.69)
<i>BVE</i>	1.12*** (0.26)	2.03*** (0.48)	1.99*** (0.47)	0.88 (0.69)
<i>Post</i>			-0.31 (0.63)	1.16 (0.98)
<i>Post × RSV</i>			-1.39** (0.65)	-1.31* (0.69)
<i>Post × Control</i>	No	No	No	Yes
<i>Firm FE</i>	Yes	Yes	Yes	Yes
<i>R2 Adj</i>	0.91	0.82	0.83	0.83
<i>Sample</i>	CA	CA	CA	CA
<i>N</i>	238	357	595	595

Notes: This table reports the results of using O&G reserves measured in dollars instead of BOEs for our main test in Table 3. The analysis is restricted to Canada due to some missing values in the US. We cluster robust standard error at the firm level. *, **, *** present significance at the ten, five, and one percent levels, respectively.

TABLE A8: Additional controls

<i>Dep variable:</i>	Probable reserve		Reserve dispersion		Accounting method	
<i>Price</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>RSV</i>	2.07*** (0.59)	1.01*** (0.34)	1.16*** (0.34)	1.40*** (0.49)	2.71*** (0.71)	1.23 (0.79)
<i>Post</i>	0.88* (0.50)	0.79* (0.49)	0.44*** (0.10)	1.32 (3.47)	0.44 (0.35)	0.33 (0.29)
<i>Post × RSV</i>	-2.75*** (0.74)	-1.14** (0.54)	-1.38*** (0.37)	-0.97* (0.54)	-1.33** (0.64)	-1.16* (0.65)
<i>EPS</i>	0.20 (0.95)	1.73 (1.78)	0.24 (0.95)	1.68 (1.77)	0.88* (0.50)	3.60*** (0.85)
<i>BVE</i>	1.75*** (0.36)	1.34*** (0.49)	1.76*** (0.36)	1.44*** (0.47)	1.52*** (0.16)	1.82*** (0.16)
<i>RSV_probable</i>	0.23 (0.95)	0.69 (1.49)				
<i>Dispersion</i>			-1.79 (5.67)	-0.87 (11.89)		
<i>EAM</i>					-11.69*** (2.89)	-8.99*** (2.76)
<i>Post × Control</i>	No	Yes	No	Yes	No	Yes
<i>Firm FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>R2 Adj</i>	0.93	0.93	0.93	0.93	0.91	0.92
N	595	595	595	595	595	595

Notes: This table reports the results of estimating the main tests in Table 3 with additional controls for other reserve disclosures, reserve dispersion, and accounting methods. *RSV_probable* is the disclosed reserve estimates for probable reserves, measured in millions of *BOE* per share. *EAM* is a firm's self-reported extractive accounting method. *EAM* equals one for the full cost method and zero for the successful effort method. We observe that even though neither of them is prescribed under IFRS, some firms keep referring to them while they have changed accounting practices. So the measure may be noisy after IFRS adoption. Controls include the control variables used in Table 3. We cluster robust standard error at the firm level. *, **, *** present significance at the ten, five, and one percent levels, respectively.

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