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Project	Extractive Activities		
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CONTACT(S)	Ana Simpson	asimpson@ifrs.org	+44 (0) 20 7246 6920
	Tim Craig	tcraig@ifrs.org	+44 (0) 20 7246 6921

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Summary of the academic literature review

1. This paper summarises the academic evidence on extractive activities obtained after a comprehensive search for papers on topics relevant to IFRS 6 *Exploration for and Evaluation of Mineral Resources*. The literature search focused on academic papers published around or after the publication of the 2010 Discussion Paper *Extractive Activities*. This search was not confined to papers addressing specific questions or topics. The literature review is based mainly on evidence from IFRS jurisdictions but includes US-based evidence when such evidence was considered useful to the project and when comparative IFRS evidence was absent.
2. Fifteen published and three working papers relevant to extractive activities were identified using Google Scholar, the Social Science Research Network and other databases of academic papers. Although the results reported in working papers may change before their publication, these papers were included in this review because they may be relevant to the project on extractive activities.

Overview

3. The paper is structured as follows:
 - (a) Key takeaways (paragraphs 4–9);

- (b) Diversity of accounting policies for exploration and evaluation expenditures (paragraph 10);
- (c) Value relevance of exploration and evaluation expenditures (paragraph 11);
- (d) Reserve and resource disclosures (paragraph 12);
- (e) Information asymmetry between extractive companies and investors (paragraphs 13–16); and
- (f) Lobbying behaviour and the standard-setting process (paragraph 17).

Key takeaways

4. The number of international comparative studies on extractive companies' accounting practices is very limited.¹ The narrow scope of the academic evidence is possibly due to the diversity of extractive companies' accounting both within and between countries which makes comparisons difficult.
5. Extractive companies that reported using IFRS Standards applied a wide range of accounting policies for exploration and evaluation expenditures. Accounting policies varied by country, by sub-industry sector (oil and gas, and mining) and by company size.
6. Capitalised exploration and evaluation expenditures of oil and gas companies were positively associated with stock prices—value relevant. The evidence on the value relevance of mining companies' capitalised exploration and evaluation expenditures was mixed. One academic study showed that immediately expensed exploration and evaluation expenditures of mining companies were value relevant and that their value relevance increased after implementing IFRS 6.
7. The disclosure of information about reserves and resources² varied among companies. Many companies disclosed information required by their local jurisdiction or local

¹ Gray, Hellman, and Ivanova (2019).

² **Reserves** generally refer to the quantity of minerals or oil and gas that is estimated to be economically recoverable. **Resources** generally refer to the quantity of minerals or oil and gas that has been discovered but is not yet capable of being classified as a reserve.

stock exchange and a few companies disclosed additional information. Technical information about mineral exploration, development and production activities of mining companies was considered useful by analysts and investors. Improving disclosure requirements was associated with a stronger market reaction to exploration, reserve and resource announcements but also with increased information asymmetry between companies and investors.

8. Analysts developed more private information and produced more accurate forecasts for extractive companies with a higher amount of exploration and evaluation expenditures.
9. In some researchers' view, the extractives industry influenced the IFRS 6 standard-setting process and contributed to codifying existing unregulated industry practice.

Diversity of accounting policies for exploration and evaluation expenditures

10. Evidence on the diversity of accounting policies for exploration and evaluation expenditures is based on two published academic papers and two working papers. The findings are:
 - (a) based on a sample of 163 mining and 146 oil and gas companies from ten countries which reported using IFRS Standards in 2017/2018, that:³
 - i) companies used nine different accounting policies for exploration and evaluation expenditures. There was variation in accounting policies, based on the scope of capitalised expenditures and on the unit of account for impairment testing.
 - ii) accounting policies for exploration and evaluation expenditures varied by country, between oil and gas companies and mining companies and by company size. For example, larger companies chose more conservative

³ Stadler and Nobes (2020a). The countries included in their sample are Australia, Brazil, Canada, China, France, United Kingdom, Hong Kong, Italy, Russia and South Africa.

- accounting policies for exploration and evaluation (ie more expensing of exploration and evaluation expenditure).
- iii) some companies disclosed policies that did not correspond to the methods in the authoritative literature—for example, most companies that reported the use of the successful efforts method did not comply with the method as defined in US GAAP. The authors also found examples of confusing accounting policy notes. In the authors' view, such inconsistent disclosures were related to the lack of definitions and guidance in IFRS 6.
- (b) based on a sample of 118 oil and gas companies from six major stock exchanges in the period 2006–2014, that:⁴
- i) many companies used the successful efforts method⁵, many used the full cost method⁶, a few used the area of interest method⁷ and some did not disclose the method they used.⁸
 - ii) a few companies changed their accounting policies following adoption of IFRS 6, for example from full cost to successful efforts.

⁴ Abdo (2016). 110 out of 118 companies in the sample were listed on the London stock exchange (15 FTSE 350 companies and 95 listed on the Alternative Investment Market). The rest of the sample included companies listed on the Hang Seng stock exchange, the Toronto stock exchange, the Irish stock exchange and Fortune.

⁵ Applying the **successful efforts method** only exploration and evaluation expenditure associated with successfully locating new minerals or oil and gas reserves are capitalised.

⁶ Applying the **full cost method** all exploration and evaluation expenditure incurred is capitalised, regardless of whether new minerals or oil and gas reserves are located.

⁷ Applying the **area of interest method** exploration and evaluation expenditure is accounted for by area of interest (ie by geological area, geographical area, well, field, etc). For example, an entity defines its area of interest and then determines the types of exploration and evaluation expenditure it will capitalise based on that area of interest.

⁸ This agenda paper uses the following terms to describe subsets of sample companies: most – a large majority; many – a small majority or large minority; some – a small minority, but more than a few; and a few – a very small minority.

- (c) based on a sample of 84 oil and gas and 112 mining companies listed on the London Stock Exchange in the period 2006–2012, that:⁹
 - i) most oil and gas companies used the successful efforts method and some used the full cost method.
 - ii) most mining companies used the successful efforts method, some expensed all expenditures related to their exploration and evaluation activities and a few used the full cost method.
- (d) that the wide diversity of accounting policies for exploration and evaluation expenditures applied by IFRS reporting companies:¹⁰
 - i) complied with IFRS Standards except for the rarely used full cost method as defined in US GAAP.
 - ii) in the authors' view, would be reduced and greater comparability would be achieved by including extractive expenditures within the scope of a revised IAS 38 *Intangible Assets*.

Value relevance of exploration and evaluation expenditures

11. The academic literature that examines the value relevance of companies' expenditures related to exploration and evaluation activities, measured as the association of these expenditures with stock prices and returns, is based on two published academic papers. The findings are that:

- (a) for oil and gas companies:¹¹
 - i) capitalised exploration and evaluation expenditures were, on average, value relevant.
 - ii) capitalised exploration and evaluation expenditures were value relevant for larger companies that used the successful efforts method and for smaller companies that used the full cost method.

⁹ Power, Cleary, and Donnelly (2017).

¹⁰ Stadler and Nobes (2020b).

¹¹ Power et al (2017).

- (b) for mining companies:¹²
 - i) capitalised exploration and evaluation expenditures were, on average, not value relevant.
 - ii) capitalised exploration and evaluation expenditures were value relevant only for smaller companies that expensed all their exploration and evaluation expenditure (until it was determined to be associated with future economic benefits).

- (c) exploration and evaluation expenditures were not value relevant when companies chose methods that deviated from the commonly used methods by companies of the same size and same industry (for example when larger oil and gas companies did not use the successful efforts method). In the authors' view, the flexibility to choose the most appropriate accounting policy for exploration and evaluation expenditure allowed companies to provide useful information to investors.

- (d) based on sample of 84 Australian listed mining companies in the period 2003–2009:¹³
 - i) immediately expensed and capitalised exploration and evaluation expenditures were both value relevant, suggesting that it did not matter to investors whether the expenditures were expensed or capitalised.
 - ii) the relevance of immediately expensed exploration and evaluation expenditure improved in the period 2006–2009 after the implementation of AASB 6 *Exploration for and Evaluation of Mineral Resources* (developed from IFRS 6) relative to the period 2003–2004 before the implementation of AASB 6 (AASB 6 replaced AASB 1022 *Accounting in the Extractive Industry*). In the authors' view, the implementation of AASB 6 led to an improvement in the disclosure of exploration and evaluation expenditures, leading to increased value relevance.

¹² Power et al., (2017) *ibid*.

¹³ Zhou, Birt, and Rankin (2015).

- iii) the number of mining projects for each company provided relevant information to investors.

Reserve and resource disclosures

12. Evidence on the usefulness of reserve and resource disclosures is based on seven published academic papers and one working paper. The findings are:
- (a) based on a sample of 113 publicly listed Australian companies that reported in 2007,¹⁴ that:
 - i) most companies provided disclosures required by the local stock exchange.^{15,16}
 - ii) many companies disclosed information about reserve quantities, reserve recognition, historical performance and accounting information related to reserves (for example impairment, depreciation and provision for restoration).
 - iii) a few companies disclosed information about reserve related projections, such as production schedules and growth of reserves; reserve related risks, such as sensitivity of estimates and independent valuations; and governance issues, such as reserve committees, policies and procedures for reserve estimation.
 - iv) companies with stronger corporate governance, foreign listing, reserves in foreign jurisdictions, companies that pledged reserves in debt covenants, had higher leverage and were audited by Big Four accounting firms provided more disclosures related to reserves.

¹⁴ Taylor, Richardson, Tower, and Hancock (2012).

¹⁵ The Australian Stock Exchange (ASX) requires firms to disclose information by reserve category, details of a competent person who calculated the reserves and a statement of compliance with *The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC code)*. The JORC code sets-out the minimum standards, recommendations and guidelines for the public reporting of exploration results, mineral resources and ore reserves.

¹⁶ The disclosures examined in this paper are provided in the annual report although companies can also disclose this information in ASX announcements, interim reports, quarterly reports, media releases, announcements over the internet and analyst briefings.

- (b) based on a sample of 1,260 exploration, 624 resource and 84 reserve announcements by Australian mining companies in the period 2004–2008,¹⁷ that:
- i) companies that released exploration or resource announcements earned positive abnormal stock returns of 2% to 3% in the period starting 10 trading days before the announcement and ending 20 trading days after the announcement.
 - ii) companies earned significant stock returns in the three days preceding the announcements. In the authors’ view, investors anticipated exploration and resource announcements.
 - iii) companies that released reserve announcements earned insignificant abnormal returns which, in the authors’ view, might indicate little new information was provided by reserve announcements.
- (c) based on an Australian mining company sample of 36,081 exploration, resource and reserve announcements and on a sub-sample of 100 announcements evaluated by geologists for disclosure compliance and disclosure quality in the period 2003–2014,¹⁸ that:
- i) announcements were associated with a significant market reaction.
 - ii) after the local stock exchange revised the disclosure requirements:¹⁹
 - 1. companies’ compliance with the disclosure requirements and the quality of companies’ disclosures increased although geologists disagreed on the extent of the improvements.

¹⁷ Bird, Grosse, and Yeung (2013). Exploration, resource and reserve announcements are defined by the Joint Ore Reserve Committee (JORC) and contain information about the companies’ future geological asset bases.

¹⁸ Katselas, Sidhu, Smith, and Yu (2019).

¹⁹ The JORC code was revised in 2012 and the revisions increased the reporting requirements with regard to several disclosure items.

2. the market reaction to companies' announcements became stronger.
 3. there continued to be information leakage before the announcement date.
 4. information asymmetry, measured by bid-ask spreads, increased, which, in the authors' view, was due to delays in disclosure as a result of the increased disclosure requirements.
- (d) based on weak evidence from a sample of 1,467 reserve and resource announcements by 404 Australian mining companies in the period 1996–2012, that disclosures assured by specialist mining consultants were associated with stronger market reaction.²⁰
- (e) based on a sample of 362 Canadian and 117 US oil and gas companies that reported in the period 2002–2011, that increasing the specificity of oil and gas reserve quantity disclosures increased their positive association with stock prices and their negative association with bid-ask spreads, which the authors interpreted as an increase in the informativeness of these disclosures.²¹
- (f) based on a sample of 258 Canadian oil and gas companies that reported in the period 2004–2011, that disclosures of (i) proven reserves and (ii) proven and probable reserves revealed information relevant for assessing company risk.²²
- (g) based on a sample of 85 Australian gold feasibility studies in the period 1990–2007, that companies' disclosures of technical information increased

²⁰ Ferguson and Püdrich (2014).

²¹ Badia, Duro, Jorgensen, Ormazabal, and Christensen (2020). The paper examined the introduction of the National Instrument 51-101 “Standards for Oil and Gas Activities” (NI 51-101) by the Alberta Securities Commission (ASC) in 2003 and the introduction of the “Modernization of Oil and Gas Reporting” (MOGR) by the US Securities and Exchange Commission (SEC) in 2009. An important feature of both regulations was the introduction of bright-line probability thresholds to the mandated estimation of reserves.

²² Badia, Barth, Duro, and Ormazabal (2020).

with external party involvement and were positively associated with debt financing availability and project success.²³

- (h) based on interviews with nine mining and mineral sector analysts using Canadian listed companies' technical reports providing summaries of the companies' mineral exploration, development and production activities that:²⁴
 - i) the reserve and resource information in the technical reports was an important input in analyst valuation models.
 - ii) analysts' perceptions of the usefulness of the technical report information varied with the expertise and independence of the qualified person preparing or supervising the report.
 - iii) the information in the technical reports was not timely. In the author's view, there was a need to improve the definition of the material changes that triggered technical reporting.

Information asymmetry between extractive companies and investors

13. Evidence on the information asymmetry between extractive companies and investors is based on three published academic papers.
14. In a review paper, Gray et al., (2019) noted that the high uncertainty related to extractive companies' activities contributed to high information asymmetry between these companies and investors.
15. One academic paper focused on analysts' role in resolving the information asymmetry between extractive companies and investors. Based on a sample of 131 Australian

²³ Ferguson, Feigin, and Kean (2013).

²⁴ Fox (2017). The National Instrument 43-101 Standards of Disclosure for Mineral Projects, issued by Canadian Securities Administrators, is a codified set of rules and guidelines for reporting and displaying information related to mineral properties owned by, or explored by, companies which report these results on stock exchanges within Canada.

companies reporting exploration and evaluation expenditures in the period 1993–2013, the researchers found that,²⁵

- (a) analysts developed more private information for extractive companies with higher amounts of exploration and evaluation activities. In the authors' view, analysts contributed to reducing the information asymmetry between extractive companies and investors.
 - (b) analysts produced more accurate forecasts for extractive companies with higher amounts of exploration and evaluation activities due to private information development.
 - (c) analysts developed more private information and produced more accurate forecasts for companies that capitalized their exploration and evaluation expenditures. In the authors' view, capitalization of exploration and evaluation expenditures enabled managers to better communicate information about the probable future benefits of exploration projects.
16. Based on the evidence discussed in paragraphs 14–15, Gray et al., (2019) concluded that there was an urgent need for the development of a comprehensive IFRS Standard on extractive activities. Based on the evidence discussed in paragraph 12(c)(ii)(4), however, Katselas et al., (2019) cautioned against unintended consequences of strengthening disclosure requirements for extractive companies.

Lobbying behaviour and the standard-setting process

17. Three published papers examined the influence of the extractive industry on the IFRS 6 standard-setting process. The findings from these papers are:
- (a) that because the choice of accounting policy for exploration and evaluation expenditures had significant economic consequences, in the authors' view, extractive companies favoured flexible reporting practices in order to be able to present their activities most favourably. In the authors' view, the

²⁵ Chen, Wright, and Wu (2018).

accounting policy flexibility existed because the extractive industry influenced the standard-setting process to this effect.²⁶

- (b) based on analysis of comment letters submitted to the International Accounting Standards Committee on its 2000 Issues Paper *Extractive Industries* (Issues Paper) by an international accounting firm, a global petroleum and petrochemical corporation, and an industry lobby group, that, in the authors' view, the extractive industry influenced the standard-setting process and contributed to codifying the existing extractive industry practice.²⁷
- (c) based on the percentage of comment letters received on the Issues Paper from extractive companies, and the direct or indirect representation of extractive companies on the steering committee on extractive industries, that, in the authors' view, the standard-setting process was influenced by dominant economic actors, such as extractive companies or accounting firms employed by extractive companies, and experts, such as financial professionals representing extractive companies.²⁸

²⁶ Cortese, Irvine, and Kaidonis (2009).

²⁷ Cortese, Irvine, and Kaidonis (2010).

²⁸ Noël, Ayayi, and Blum (2010).

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