

# **An investigation of the usefulness of accounting data in extractive industry operations**

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*Research funding from the UWA Business School is  
gratefully acknowledged*



# Introduction

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- Aim: to investigate of the usefulness of extractive industry companies' accounting data for market participants
- Accounting data is produced in response to requirements of law and accounting standards
- It should be useful for capital providers when evaluating company performance, prospects and risks



# Background

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- Research indicates that accounting data is useful for explaining market value of listed companies
  - There is an association between earnings, net assets and share prices (Frances & Schipper, 1999; Barth, Beaver & Landsman, 1998)
  - In the extractive industry, other information is relevant for analysts and investors (PWC, 2003)

# Accounting standards for extractive industry companies

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- Existing accounting practices are incomplete, inconsistent and old (Luther, 1996)
- The IASB issued IFRS 6 as an interim standard
  - A current project is developing a revised standard
  - AASB leads the project team

# IASB (2007) user survey

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- the financial statements and note disclosures
  - some information useful for investment decision (cash flow and current period expenditures)
  - not sufficient to meet the needs of analysts; much information is sourced elsewhere
- very limited interest in
  - valuation of reserves and resources (at current value or fair value) on the balance sheet
  - disclosing a valuation of reserves and resources (at current value or fair value)

# IASB (2007) user survey (cont.)

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- reserve and resource assets
  - balance sheet historical cost measurement (e.g. successful efforts, full cost, area of interest) does not generate much useful information
  - analysts generally prefer more, and/or improved, disclosure of key valuation inputs
    - incorporate into their own valuation models
  - directors sign off was preferred assurance



# Motivation and contribution

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- To examine the value relevance of extractive industry accounting numbers
  - Tangible, intangible, capitalised pre-production expenditure, disclosed amounts
- To provide information useful to standard setters re an extractive industry standard and disclosures

# Prior studies

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- Relevance of asset measurement Barth & Clinch (1998)
  - PPE, investments, intangible assets
  - 350 Aus firms 1991-1995
  - For the mining companies: value relevant
    - PPE and investments at historical cost
    - Goodwill (not other intangibles)
    - Revalued PPE, revalued investments
    - Disclosed asset values

# Prior studies

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- Capitalised research and development expenditure  
Ahmed & Falk (2006)
  - 377 Aus companies, 1992-1999 (28% EI firm)
  - 75% of companies capitalise some 'R&D' expenditure
  - Capitalised amounts are associated with share price
- Bryant (2003) US oil and gas firms
  - 'Full cost' more relevant than 'successful efforts'
  - Allowed companies to present 'smooth' earnings

# Hypotheses

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- H1: Tangible assets related to extractive industry operations are value relevant;
- H2: Intangible assets related to extractive industry assets are value relevant;
- H3: Assets representing capitalised pre-production expenditure are value relevant; and
- H4: Disclosed (not recognised) measures of capital commitments are value relevant.

# Empirical models

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- Eq (1) Ohlson (1995)

$$P_{it} = \alpha_0 + \alpha_1 NI_{it} + \alpha_2 BVE_{it} + \varepsilon_{it}$$

- Eq (2) Barth & Clinch (1998)

$$BVE1 = [BVE - (CAPEED + EILAND + EIPLANT + EIOTHER + INTANG)]$$

# Empirical models

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- Eq (3) Share price is a function of income, net assets and specific EI assets

$$P_{it} = \alpha_0 + \alpha_1 NPAT_{it} + \alpha_2 BVE1_{it} + \alpha_3 CAPEED_{it} + \alpha_4 EILAND_{it} \\ + \alpha_5 EIPLANT_{it} + \alpha_6 EIOTHER_{it} + \alpha_7 INTANG_{it} + \alpha_8 CAPCOM_{it} + \varepsilon_{it}$$

# Data

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- Aus companies 1998-2003
  - 294 firm-years
  - Mining = 234, oil and gas = 60
  - 2003: 47 companies of which 44 in sample all years
  - 2003: 321 ASX listed mining companies, 35 (11%) in this sample

DESC.							
STAT		MKTVALUE	NPAT	BVE1	CAPEED		
	N	A\$'000					
1998-2003	294	mean	1,600,742	77,981	892,957	49,188	
Mining	234	median	57,875	122	53,057	6,934	
Oil&Gas	60	minimum	1,160	-2,424,400	-1,261,700	0	
		maximum	39,567,940	2,969,147	22,750,416	730,512	
		std dev	5,167,902	429,040	2,816,501	122,892	
		N	242	242	242	182	
			EILAND	EIPLANT	EIOTHER	INTASS	CAPCOM
		mean	33,692	36,390	559,167	176,369	83,264
		median	0	0	0	14,311	200
		minimum	0	0	0	0	0
		maximum	1,297,126	3,749,269	10,124,738	3,029,013	2,872,860
		std dev	165,544	316,809	1,639,522	401,064	364,110
		N	178	180	182	242	236

DESC.											
STAT		MKTVALUE	NPAT	BVE1	CAPEED	EILAND	EIPLANTEI	IO	OTHER	INTASS	CAPCOM
N		A\$'000									
1998-2003	294	mean	1,600,742	77,981	892,957	49,188	33,692	36,390	559,167	176,369	83,264
Mining	234	median	57,875	122	53,057	6,934	0	0	0	14,311	200
Oil&Gas	60	minimum	1,160	-2,424,400	-1,261,700	0	0	0	0	0	0
		maximum	39,567,940	2,969,147	22,750,416	730,512	1,297,126	3,749,269	10,124,738	3,029,013	2,872,860
		std dev	5,167,902	429,040	2,816,501	122,892	165,544	316,809	1,639,522	401,064	364,110
		N	242	242	242	182	178	180	182	242	236
1998	46	mean	861,837	36,365	632,457	50,942	17,179	47,763	474,387	108,710	30,345
Mining	34	median	41,850	-39	38,628	7,495	0	5,939	56,632	10,492	0
Oil&Gas	12	minimum	620	-151,897	450	0	0	0	0	0	0
		maximum	13,286,230	1,035,000	10,940,000	560,850	70,000	280,284	3,563,000	656,167	328,500
		std dev	2,295,450	164,847	1,783,703	106,455	27,392	88,979	930,624	190,037	74,996
		N	46	45	46	32	9	10	19	46	44
1999	49	mean	1,506,753	11,296	806,920	49,759	9,628	4,949	444,799	133,800	29,893
Mining	37	median	67,940	638	46,733	7,574	0	0	2,947	13,880	500
Oil&Gas	12	minimum	2,100	-2,309,000	-11,016	0	0	0	0	0	0
		maximum	29,301,500	1,700,000	10,750,000	486,000	174,724	113,983	4,639,000	1,193,728	453,000
		std dev	4,699,101	421,180	2,060,934	107,479	35,022	20,740	1,096,266	254,489	93,803
		N	49	49	49	37	31	32	34	49	45
2000	50	mean	1,696,122	120,404	854,286	51,364	13,081	4,418	513,111	158,386	88,201
Mining	37	median	55,890	2,111	51,352	6,501	0	0	0	15,806	91
Oil&Gas	12	minimum	1,180	-188,607	-16,096	0	0	0	0	0	0
		maximum	34,125,280	2,249,000	13,219,000	685,549	357,840	117,687	5,360,000	2,104,000	2,403,000
		std dev	5,478,977	409,370	2,413,220	130,894	60,304	19,948	1,325,791	369,306	367,315

	N	50	50	50	38	37	37	38	50	49
2001 51	mean	1,689,332	39,997	852,682	53,758	45,772	4,547	558,732	185,808	84,600
Mining 38	median	52,600	-244	56,305	7,035	0	0	0	14,573	337
Oil&Gas 13	minimum	1,160	-2,424,400	-856,600	0	0	0	0	0	0
	maximum	31,762,370	1,607,000	14,029,000	730,512	1,297,126	118,684	6,033,000	2,106,000	2,221,000
	std dev	5,394,665	485,442	2,551,166	139,328	218,131	20,244	1,472,858	397,460	347,409
	N	51	51	51	37	36	37	37	51	50
2002 51	mean	1,516,693	42,353	985,652	53,123	38,817	100,536	640,409	211,037	81,201
Mining 38	median	56,230	-2,349	46,690	7,804	0	0	0	14,049	150
Oil&Gas 13	minimum	1,980	-919,699	-1,261,700	0	0	0	0	0	0
	maximum	33,612,850	2,810,125	22,750,416	606,867	1,069,566	3,749,269	9,704,551	3,029,013	2,872,860
	std dev	5,207,656	428,131	3,648,059	136,003	177,124	599,975	2,022,494	522,702	408,920
	N	51	51	51	39	39	39	39	51	51
2003 47	mean	2,013,980	122,906	1,038,509	44,270	54,028	56,353	687,970	187,548	129,054
Mining 35	median	71,980	1,443	48,395	5,137	0	0	6,355	13,325	0
Oil&Gas 12	minimum	2,180	-812,584	-80,647	0	0	0	0	0	0
	maximum	39,567,940	2,969,147	18,468,960	619,246	1,086,020	2,018,527	10,124,738	1,796,852	2,386,398
	std dev	6,366,637	508,133	3,276,089	115,252	218,915	327,388	2,108,341	410,508	465,326
	N	47	47	47	37	38	38	38	47	47

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**Table 2 Pearson correlation matrix 2003**

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	MKT VALUE	NPAT	BVE1	CAPEED	EILAND	EIPLANT	EIOTHER	INTANG
NPAT	0.947225							
BVE1	0.960175	0.949484						
CAPEED	0.836331	0.795725	0.765787					
EILAND	0.107842	0.030459	0.017634	0.083266				
EIPLANT	0.189594	0.101766	0.049584	0.208822	0.590961			
EIOTHER	0.946918	0.944968	0.996417	0.754855	-0.02585	0.004842		
INTANG	0.84509	0.845093	0.91523	0.777737	-0.04243	-0.00063	0.908546	
CAPCOM	0.879522	0.811442	0.778371	0.788651	0.339169	0.614488	0.754208	0.667161

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# Results

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- Model 1 1998-2003
- Market value is associated with
  - Earnings, net assets
  - EI assets (support for H1)
  - Intangible assets and capitalised pre-production expenditure are not significant (H2 and H3 not supported)
  - Capital expenditure commitment significant (H4 supported)

Table 3

Regression Analysis		98-03 Model 1		
	Coefficient	t-Statistic	Prob.	
Constant	1.1029	3.2936	<b>0.0013</b>	
NPAT	0.8134	2.7219	<b>0.0074</b>	
BVE1	0.9136	2.7514	<b>0.0068</b>	
CAPEED	-0.0547	-0.0432	0.9656	
EILAND	1.7212	5.2722	<b>0.0000</b>	
EIPLANT	0.7678	1.9932	<b>0.0484</b>	
EIOTHER	1.2697	7.4306	<b>0.0000</b>	
INTANG	0.3692	1.3972	0.1648	
CAPEX	0.5478	3.2956	<b>0.0013</b>	
N	175			
Adjusted R-squared	0.97			
F-statistic	134.41			

# Results

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- Models 2, 3 and 4 (1998 and 1999, 2000 and 2001, and 2002 and 2003)
  - EILAND significant three times, EIOTHER significant two times, EIPLANT significant once
  - CAPEED significant in Model 2 and 3
  - INTANG and CAPEX significant in Model 4

Table 3

Regression Analysis	1998-99 Model 2	2000-01 Model 3	2002-3 Model 4						
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
Constant	0.2473	0.6007	0.5539	0.2043	0.6394	0.5250	0.3426	1.7558	0.0838
NPAT	2.6791	1.7495	0.0935	0.5182	0.4882	0.6272	0.1003	0.2531	0.8010
BVE1	0.8700	2.7696	<b>0.0109</b>	1.9997	5.6464	<b>0.0000</b>	1.5033	5.7136	<b>0.0000</b>
CAPEED	5.3643	2.3642	<b>0.0269</b>	8.8749	5.3221	<b>0.0000</b>	1.1521	1.0640	0.2913
EILAND	3.5258	4.0895	<b>0.0005</b>	3.0641	8.0986	<b>0.0000</b>	2.2668	14.4342	<b>0.0000</b>
EIPLANT	-2.2836	-0.7004	0.4907	1.4533	1.8963	0.0627	2.1785	6.8133	<b>0.0000</b>
EIOTHER	0.6181	1.1291	0.2705	0.5757	2.0778	<b>0.0420</b>	0.7130	4.2596	<b>0.0001</b>
INTANG	0.0135	0.0235	0.9815	0.2091	0.5215	0.6039	1.3016	3.7135	<b>0.0004</b>
CAPEX	0.7796	0.3846	0.7041	0.3205	1.2801	0.2054	3.1621	6.0951	<b>0.0000</b>
N	32			69			74		
Adjusted R-squared	0.89			0.93			0.96		
F-statistic	33.54			122.57			212.29		
Prob(F-statistic)	0.00			0.00			0.00		



# Conclusion

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- We find some support for the relevance of extractive industry company accounting information
- Contrary to survey evidence, the share market appears to price specific extractive industry assets, including tangible and intangible assets



# Limitations and future work

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- Small sample, limited number of years and only Australian data
- Future work
  - Expand sample, multiple countries, extend time period
  - Compare to other industries eg high tangible and high intangible
  - Consider value relevance of other disclosures eg reserves disclosure