



Underpricing and voluntary disclosure: The case of mining IPOs in Australia

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ABSTRACT

We study the extent to which voluntary disclosure of information in IPO prospectuses of mining companies is associated with lower IPO underpricing. We study the disclosure of information at IPO, looking at the IPO prospectus which is the fundamental document providing investors with information about the company. While its format and main contents are largely fixed by law, there is considerable scope for voluntary disclosure. Mining is a highly capital intensive endeavor and access to equity capital is a key requirement for the development of a mine. We find that the quality of information disclosure, as well as the characteristics of the mining companies, indeed affects underpricing.

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1.0 Introduction

Asymmetric information is considered one the main reason for the underpricing of shares sold in an Initial Public Offering (IPO)¹. Asymmetric information about the true value of issued shares may exist between the three main parties to the IPO: the issuing firm, the underwriter, and the investors and such phenomenon is known as underpricing anomaly (Booth, 2014).

First, the IPO firm's founders may know more about the firm than prospective investors. In this case investor's faces a 'lemons problem,' since only firms with lower than average value are willing to issue shares at the average price. Underpricing can then be used as a costly, and therefore credible, signal of quality: better-than-average firms choose to 'leave money on the table' to convince investors of its quality. This leads to a separating equilibrium where lower quality firms -which expect lower profits -refrain from underpricing, provided its cost is large enough. Better-than-average firms can later offset the cost of underpricing by enjoying stock price better reactions to future dividend announcements (Allen and Faulhaber, 1989), by obtaining better analyst coverage (Chemmanur, 1993), or by receiving high valuation from investors when later issuing more shares in a Seasoned Equity Offering (Welch, 1989).

At the other extreme, it can also the case that some investors are more informed than others. Being more informed, they will bid only for shares of higher-value firms, deserting issues of less promising firms. In this case issuers need to underprice to avoid a winner's curse (Rock, 1986): uninformed investors only receive their full allocation

¹ See Ljungqvist (2007) and Ritter and Welch (2002) for comprehensive surveys of IPO underpricing

of (overpriced) shares when informed investors do not bid. In issues where informed investors also bid, all investors receive only a fraction of their requested allocation of (now underpriced) shares. On average, therefore, uninformed investors would make a loss, and underpricing is required to make them break even.

Asymmetric information among investors may also result in an informational cascade (Welch, 1992). If investors make their decisions sequentially and update their expectations based on previous investors' decisions, it becomes crucial for issuers to convince early investors to bid.

Informed investors are often identified with institutional investors, which form a rather homogeneous group repeatedly interacting with underwriters. If institutional investors have superior information about the demand for the issuer's shares, a different rationale for underpricing exists. The underwriting bank may elicit information through the book building process, in which it obtains from investors confidential information on their bids. In order to reveal information, rather than profiting from it directly, investors must receive some compensation in the form of underpricing. Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990) model this situation, showing that the repeated nature of the interaction allows underwriters to reward, through underpricing, institutional investors who correctly reveal information. In this setting underpricing compensates informed investors for revealing information to the underwriter, and therefore to the issuing firm. While it represents a cost to issuers, they still benefit from the revelation of information, which may lead to a revision of the issue price. Finally, it is also possible that the underwriting bank has a better idea of how the market is going to value the firm, due to its familiarity with market participants on both sides. Since the bank's marketing effort is unobservable to the issuer, underpricing provides a second-best solution, as modeled by Baron (1982). In all these situations, a reduction in asymmetric information reduces the amount of required underpricing.

This motivates our paper. A large body of empirical literature has been developed which tests theories of underpricing. All studies face the same difficulty: finding reliable measures of asymmetric information and in particular finding measures of voluntary disclosure of information. Since the seminal contribution of Diamond and Verrecchia (1991), several studies investigated the economics of voluntary disclosure of information and mainly on its effects on the cost of capital: see Baiman and Verrecchia (1996), Leuz and Verrecchia (2000) and Verrecchia (2001) for accounting information and Abody and Lev (2000) for strategic information. The main insight of these articles, which look at disclosure through annual reports or earnings announcements, is that increased disclosure reduces uncertainty, and so stock price volatility. A substantial body of empirical research has looked at how firms' cost of capital is affected by voluntary disclosure (see the surveys by Core (2001) and by Healey and Palepu, 2003). Typically they rely on indirect, sometime coarse, proxies based on company characteristics, issue characteristics and aftermarket characteristics.

We follow the literature looking at the short run underpricing of IPO on the Australian Stock Market (ASX) and in particular on the IPO of mining firms. Mining is a highly capital intensive endeavor and access to equity capital is a key requirement for the development of a mine. However since mining issues have often no history on which to base predictions of future earnings it is very difficult to predict their profits and the information contained in the issuing prospectus might contribute to reduce underpricing. For these reasons authorities have placed a lot of emphasis on the disclosure of information at IPO for the mining industry.

We have focused on the mining companies IPOs on the Australian Stock Market since a large proportion of ASX listed companies have historically been junior miners – 64% of all ASX listed companies have market capitalization of less than USD 50m. Average mining market capitalization is, however, higher than other markets like Toronto: Resource companies make up nearly half of all ASX listed companies and account for a third of ASX market capitalization. ASX is also the most diversified listing venue with a balanced mix across all commodities, the most prominent being iron ore and coal. ASX is the preferred destinations for smaller companies and the attention of the authorities for the disclosure of information at the IPO has been crucial to attract investors. And in fact in 2012 ASX has released new rules for reserves and resources reporting which has become effective at the end of 2013. The rules affect companies engaged in mining that will be required to report under a revised Joint Ore Reserves Committee (JORC) Code².

Of course this is not the first study of underpricing of the Australian mining stocks. How (2000), using a sample of 130 mining IPO between 1979 and 1990, finds a remarkable 63.6% underpricing and finds that mining stocks are more underpriced than other stocks, and market sentiment dependent. Suchard and Woo (2003) find contrasting results as in their study resource based IPOs are on average less underpriced than industrial IPOs in “cold” markets while they experience higher level of underpricing in “hot” markets. In contrast, they do not find any statistical significant correlation between the nature of the firm's activity, whether explorer or producer, as well as of the

² The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (‘the JORC Code’) is a professional code of practice that sets minimum standards for Public Reporting of minerals Exploration Results, Mineral Resources and Ore Reserves

level of commodity diversification and underpricing. Dimovski and Brooks (2008) examine a sample of 114 gold mining IPOs from 1994 to 2004 and find a significantly lower 13.3% underpricing return. Nguyen, Dimovski and Brooks (2010) investigate 260 resources IPOs in Australia between 1994 and 2004 providing evidence of 16.13% first day return. The focus of their study is on the role of risk management in alleviating the degree of uncertainty surrounding the issue but they fail to document such relationship. Instead, they provide strong evidence of the hot issue effect by testing the correlation between initial return and two proxies of hot issue market: market return and initial return of previous IPO.

In this work our attention is on the disclosure of information at IPO evaluating the content of the IPO prospectus. The prospectus is the fundamental document providing investors with information about the company. While its format and main contents are largely fixed by law, there is considerable scope for voluntary disclosure (Hail and Leuz, 2003). Whereas the effects of disclosure on underpricing has been analyzed before the issuance of the prospectus (Schrand and Verrecchia, 2005), the prospectus content itself has been studied only recently. A recent set of articles has made a significant advance in this respect by using automated textual analysis to measure the information content of the IPO prospectus (Hanley and Hoberg 2010, Loughran and McDonald, 2013). Hanley and Hoberg (2010) argue that issuing firms face a trade-off between higher underpricing and higher information disclosure costs. Issuers can expect lower underpricing if they spend more managerial time and effort and more money to compensate underwriter, legal counsel, and auditor for the due diligence necessary for writing the prospectus. Loughran and McDonald (2013) provide a direct proxy for ex ante uncertainty about an IPO's valuation, by creating a six sentiment word lists (uncertain, weak modal, negative, positive, legal, and strong modal). Bottazzi and Da Rin (2014) build on these two papers and develop a direct measure of voluntary information disclosure in the IPO prospectus. They construct an index which summarizes the presence of specific information items in the IPO prospectus. Summarizing information disclosure through an index is an approach which has already been used in several studies³ but they validated their work using text search methods.

The main finding of these studies is that the information contained in the issuing prospectus does contribute to reduce underpricing. This is an important result, as it shows that listing companies might use voluntary disclosure to reduce underpricing.

We build on these recent results and we take a deeper look at how information disclosure affects underpricing. We proxy uncertainty by performing a textual analyses on the mining report, which is a compulsory section of the IPO prospectus, and by looking at the "independent geologist report" and at the "solicitor report on tenements" and measuring the technical characteristics of the mining process. We find that information disclosure matters. In particular, companies whose independent geologist report has a more uncertain tone experience a higher first day return. This effect is mitigated when mining companies have a geologist on their board, who probably play the role of certification of their activity, or in the case in which they are in the production phase.

The rest of the paper is organized as follows. Section 2 presents the data. Section 3 discusses the choice of the independent variables and their use in the extant literature. Section 4 highlights our research hypothesis and reports our main results. Section 5 concludes.

2.0 The variables

The main source of data is the issuing prospectuses of the Mining companies⁴ which listed on the Australian Stock exchange between 2003 and 2012. We downloaded the prospectuses from stock exchange or company websites.

From the issuing prospectuses we obtain several types of data. First, we obtain the issue price of each stock. Second, each company's ownership structure before and after the IPO. Third, we obtain the pricing mechanism used and the number of shares sold to the market, which we use to compute the IPO size. Finally, we obtain the description of the mining activities. From DataStream we obtain stock prices. From the stock exchange we get information about the date of each listing.

2.01 Dependent variable

Our dependent variable is UNDERPRICING. Underpricing is defined as the percent change of the company's stock

³ For example, the disclosure index developed by CIFAR (Center for International Financial Analysis and Research) has been used by Pope (2003) to document a positive relationship between disclosure and analysts' earnings forecasts, by Laporta et al. (1998) to codify the quality of national accounting systems, and by Rajan and Zingales (1998) to study the effects of financial development on economic growth; Babhra and Pettway (2003) build an index of IPO prospectus and find that it predicts future firm success (or failure); Botosan (2000) develops an index of information disclosure in annual reports, and find it significantly related to US firms' cost of capital.

⁴ We have been able to gather almost 90% of the prospectuses of the mining companies listed in the period.

first closing price from its offer price:

$$R_c = (P_{c1} - P_{c0}) / P_{c0}$$

Where P_0 and P_1 are the offer price and the first closing price.

In the research we use two additional underpricing measures as robustness check.

The second measure of underpricing is obtained by subtracting to R_c the return of the ASX Metals & Mining 300 market index. This measure is usually referred to as the initial abnormal market adjusted first day return (IR_c).

$$IR_c = R_c - R_m$$

We follow [Habib and Ljungqvist \(1998\)](#) who argues that entrepreneurs care about underpricing only to the extent that it affects their net wealth. Hence they provide a different measure of underpricing that measures the actual loss to the issuers per issued share.

$$UI_c = \frac{(1 - RO) \times (P_1 - P_0)}{P_{c0}}$$

Where RO_c is the ownership portion of the firm retained.

2.02 Independent variables

The independent variables which we believe affect underpricing are usually divided into four broad categories: factors related to the issuing firm, factors related to the offer, market-related factors and factors related to the Mining industry.

2.2.1 Firm specific factors

We build our independent variables based on the existing literatures on disclosure and underpricing that we discussed above. Our first set of independent variables includes variables at the level of the IPO issue that are likely to affect underpricing. We consider the following variables:

AGE (Age): It is the company's age at the date of the IPO, measured in days. We obtain information on the founding date of the company from the issuing prospectus. We made a particular effort to cross-check other sources in order to identify the effective foundation date, since some prospectuses report the company's incorporation date which may occur just a few months before the IPO. There is evidence of a negative correlation between firm's age and underpricing ([Reside et al., 1994](#)) as a higher age is a proxy for better information. [Shelly and Singh \(2008\)](#) found, instead, that an increase in firm age is positively correlated to oversubscriptions resulting in higher underpricing.

COMPANY SIZE (Asset): It is the logarithm of the company's total assets measured in dollars. Empirical support for a negative relationship between underpricing and size can be found in [Chalk and Perry \(1986\)](#) and [Wolfe and Cooperman \(1990\)](#).

UNCERTAINTY (Uncertainty): We follow [Loughran and McDonald \(2013\)](#) and do a very simple textual analyses counting for the number of uncertain words contained in the section "Exploration Potential" of the independent geologist report. We then use a dummy equal to one if the percentage of uncertain words is above the median. We expect that the effect of uncertainty on underpricing is positive.

2.2.2 Issue specific factors

Our second set of independent variables includes variables at the level of the IPO issue that are likely to affect disclosure and underpricing.

IPO SIZE (Size): It is measured as the logarithm of the product between price and number of shares offered in the IPO ([Ibbotson, Sindelar, and Ritter, 1988](#); [Tinic, 1988](#); [Schultz, 1993](#)).

RETAINED OWNERHIP (Δ Own): is the percentage sale of equity by company's insiders. These include founders (both direct holdings and those through investment vehicles), their 'family and friends,' and managers. We obtain this information from the issuing prospectus, and identify founders' holdings also when they occur through investment vehicles for tax purposes (see [Ang and Baru, 2003](#)). A larger ownership share sold by company insiders

may provide a negative signal about their firm's prospects, as argued by [Jensen and Meckling \(1976\)](#), and should therefore result in higher underpricing (as found by [Ljungqvist and Wilhelm, 2003](#)). Moreover, after the company has gone public, the incentives of insiders are better aligned with those of investors when insiders have larger equity holdings. Both effects should generate a positive relationship between underpricing and insiders' sales. Following the logic of [Habib and Ljungqvist' \(2001\)](#) model of insider wealth maximization, we also submit that higher insiders' sales should increase disclosure; this is because insiders anticipate their sales to lead to higher underpricing and may counter this by reducing the asymmetric disadvantage of investors. Higher pre-IPO insider ownership impose a higher cost to insiders in the case the IPO is underpriced. We follow [Jensen and Meckling \(1976\)](#), who believe that entrepreneurs with a higher stake being more confident about the future of the business, signal the "high value" of the issue to investors and experience a lower underprice ([Jensen and Meckling, 1976](#)).

COST OF THE OFFER (Cost): It includes the underwriter fee, the independent advisors fee, marketing costs, ASX fee which we use as proxy of the costs incurred in the promotion of the IPO. Historically there has been a notable amount of research focussing on the trade-off between promotion / certification of the issue and underpricing. [Booth and Smith \(1986\)](#) discussed the trade-off between the certification costs and underpricing, and finally [Habib and Ljungqvist \(2001\)](#) assess a direct relationship between promotion costs and underpricing. We expect an inverse relationship between the cost of the issue (Cost of the issue/Proceeds) and first day returns ([Habib and Ljungqvist \(2001\)](#)).

UNDERWRITER (UW): We control for the use of an underwriter assisting the issue. [Dimovski and Brooks \(2004\)](#) find that the presence of an underwriter may allow for more severe underpricing, as the risk of loss of reputation is very high in the case in which the underpricing return made by subscribers is too high⁵.

LISTING DELAY (Delay): It is the logarithm of the number of calendar days between the date the prospectus is registered and the date of listing. This variable should prove [Rock's \(1986\)](#) argument: issues that are filled more quickly are expected to have a high level of informed demand and therefore are expected to be more underpriced. On the other hand, issues that are sold less quickly are likely to be less underpriced due to a lack of interest from informed investors. The period of subscription, due to the peculiarity of the Australian IPO procedures, is widely used as a risk proxy in Australian underpricing studies. This variable has been used in many Australian studies, including: [Finn and Hingham \(1988\)](#), [How, Izan, and Monroe \(1995\)](#), [Lee, Taylor, and Walter \(1996\)](#) and [How \(2000\)](#). [Finn and Hingham \(1998\)](#) measure the period of subscription as the time lapse between the date the subscription opens and the date of listing, and found a weak negative relationship between subscription period and underpricing

OPTIONS (Option_s Option_{uw}): We use two dummy variables. One indicating if options are offered to the underwriter and the second indicating if options are offered to subscribers. [Dimovski and Brooks \(2004\)](#) and [Dunbar \(1995\)](#) if the underwriters are willing to accept options to buy more shares they have a more correct idea on the true value of the firm therefore and a lower underpricing is expected. Offering options to subscribers, instead, might mitigate agency costs: if the firm's forecast does not match expectations, the issuing firm won't be able to rely on the cash inflow generated from those options. ([Dunbar, 1995; Dimovski and Brooks, 2004](#)).

2.2.3 Market-specific factors

Since [Ritter's \(1984\)](#) research on "Hot issue" markets, market sentiment has proven to be an established explanatory variable for underpricing. The existence of this influence of "hot" markets on first day return indicates that price adjusts not only to private information but also to public information.

HOT (hot): A hot IPO market is defined as one which is characterized by high IPO volumes and high level of first day return. The relationship between hot markets and huge amount of money "left on the table" by issuers has been proved in many studies including [Ritter \(1984\)](#), [How \(2000\)](#), and [Derrien \(2005\)](#), while for Australian evidence see [Brailsford, Heaney, and Shi \(2001\)](#). Given the great intrinsic uncertainty of the mining issues, those issues are likely to be more susceptible to hot issues. We consider the years 2006 and 2007 as a hot issue period.

MARKET SENTIMENT (M.Sentiment): It is a variable which measures the amount of capital raised in IPOs in the last 90 days before the issue (in thousands of euros), following [Ellul and Pagano \(2006\)](#). We obtain this information by identifying all IPOs which had occurred within a 90 days span in the market where the company lists. [Benveniste et al. \(2002\)](#) provide a model of information spillovers in which previous IPOs provide information on the current demand for new issues, and so should reduce underpricing. On the other hand, [Derrien \(2005\)](#) derives an opposite prediction in a model of IPO underpricing in optimistic markets that aims to explain the influence of market conditions on IPO pricing during the 'dot.com' bubble, In his model, a high number of IPOs

⁵ [Carter and Manaster \(1990\)](#), [Micheally and Shaw \(1995\)](#), [Dimovski and Brooks, 2004](#)

increased demand for new securities, and through this also underpricing. The effect of market sentiment on disclosure is expected to have the same sign as its effect on underpricing. The market sentiment regarding the whole market tests the hypothesis that a more positive mood of the stock market generally should be associated with higher first day return. This is proxied using a variable that measures the percentage change in the ASX All Resources Index (Dimovski and Brooks, 2004).

2.2.4 Industry factors

We look at some interesting information which is disclosed in the “independent geologist report” which is a compulsory section of the IPO prospectus for the mining companies and in the “solicitor report on tenements”.

LICENCE (Licence): It is computed by dividing the hectares of tenements with underlying granted exploration license over the total hectares of mining tenements claimed by the Exploration permits (usually lasting five years) allow the holder to act in order to determine the existence of commercially exploitable mineral resources. The grant of refusal of tenements is subject to ministerial discretion and there is no certainty that the tenements applied will be granted. Firms with a higher percentage of granted tenements have a lower risk component and should be less underpriced.

EXPIRING LICENCE (ExpLic): The renewal of licenses is an onerous and risky process. Exploration licenses are usually granted for five years. The closer is the licence to its expiration date, the riskier is perceived the mining company and we expect that it will experience higher underpricing than companies with “younger” licenses.

GEOLOGIST FEE (Geo Fee): As the information contained in the prospectus is expected to provide investors with credible basis to carry out their own evaluation, the credibility of the information depends on the credibility of the person who certifies this information. We are here interested in the mining-related technical information and we use the geologists' fee as a proxy for the geologist reputation. As in How (2000) we expect that IPO associated with high reputation geologist are less underpriced.

GEOLOGIST IN THE BOARD (Geo Board): Certo, Daily and, Dalton (2001) certified the relationship between Board structure and underpricing. The presence of a geologist in the Board of Directors of a company should signal a higher value of the firm to the investors.

NATIVE TITLE (Native): The Native Title Act recognises and protects the rights and interest in Australia of Aboriginal and Torres Strait Islander people in land and waters, according to their traditional laws and customs. Tenement applications are subject to additional processes and requirements under the Native Title Act. The right to negotiate process under Native Title matters can result in significant delays to the implementation of any project or stall it. Negotiated Native Title agreements may adversely impact on the economics of projects depending on the nature of any commercial terms agreed. We can therefore suppose that a higher percentage of tenements subject to Native Title claims over the total of tenements should increase underpricing.

EXTENSION OF EXPLORATION TENEMENTS (ExtExp): The extension of exploration tenements granted should be related to the size of the mining company. Therefore, as stated above, larger companies should be less risky, reducing underpricing.

EXTENSION OF MINING TENEMENTS (ExtProd): The extension of mining (productive) tenements granted should be related with the size of the mining company. Therefore, as stated above, larger companies should be less risky, reducing underpricing.

PRODUCTIVE STATUS (Prod): Many mining companies are pure exploration players and are considered to be higher risk investments than those mining companies with an existing mine asset. In order to distinguish companies which are already in their production phase we introduce a dummy that is equal to 1 in the case of production.

3.0 Data and summary statistics

Summary statistics for the IPO sample are reported in Table 1. Consistent with the extant literature on IPOs we find that mining companies have experienced, in the period we consider, an underpricing of 15,25% which is not far from the 16,13% recorded by Hoa, Nguyen and Brooks (2010) and from the 13,3% reported by Dimovski and Brooks (2008). However it is consistently lower than the 107.8% reported by How (2000) and the 46,5% documented by Brailsford et al. (2001), a difference that can be attributed to the diverse time period considered in their paper :1979-1990 for How (2000) and 1976-1997 for Brailsford et al. (2001).

Another particular feature of mining company is the very low age of firms going public: on average 2-years old but with a high variance. The smallest company has just slightly more than a month of life. This is consistent with the common practice of junior mining firms of going public only few months after incorporation as these firms are seeking, through IPO, the funds needed to carry out exploration expenses. Interestingly, less than 40% of the sample is taken public by a top-tier underwriter while there is a large variation in the number of days between the date at which the prospectus is registered and the date of listing.

Table 1 also reports the percentage of firms for which the percentage of uncertainty words is higher than the median: 41% on average. The standard deviation of this share is also high and that tells us how heterogeneous the value of information captured by our variable.

Table 01: Descriptive statistics

Variable	Mean	Median	S.Dev.	Min	Max
R _c	.152	0.075	0.400	-0.600	2.460
IR	.113	0.050	0.309	-0.616	2.018
UI	.143	0.058	0.397	-0.569	2.430
Age (in days)	756.696	365	1079.477	46	8732
Asset	10.551	.455	131.234	0.001	2775.178
Cost (in% offer price)	.102	.095	.0607	.025	1.135
ΔOwn	132.860	0	2879.842	-0.499	62500
Delay	59.598	50	43.491	10	413
Uncertainty	.414		0.493	0	1
UW	0.142		0.345	0	1
Options	.709		0.454	0	1
Options _{uw}	0.104		0.306	0	1
Hot	0.367		0.482	0	1
Licence	0.659		0.318	0	1
ExpLic.	0.424		0.377	0	1
Geo Fee	30424.23	20000	31200.461	3000	249084
Geo Board	0.728		0.445	0	1
Prod	0.991		0.091	0	1
Native	0.524		0.416	0	1
M.sentiment	0.020	0.019	0.099	-0.449	0.664
ExtExp (in ha)	183567.3	53628	482899.5	0	7450000
ExtProd (in ha)	3076.174	0	26144.08	0	489700

This table provides descriptive statistics for all our variables. For dummy variables the MEAN column reports the frequency of observations. Variables are defined in Section 2.

The correlations between key variables are reported in Table 2. The percentage of uncertainty words is negatively correlated with initial returns. The expiration of mining licensing within two years is also positively correlated with underpricing while having a geologist on the company board has a negatively affect first day return correlation, as we expected.

4.0 Results & discussion

Summary statistics for the IPO sample are reported in Table 1. Consistent with the extant literature on IPOs we find that mining companies have experienced, in the period we consider, an underpricing of 15,25% which is not far from the 16,13% recorded by Hoa, Nguyen and Brooks (2010) and from the 13,3% reported by Dimovski and Brooks (2008). However it is consistently lower than the 107,8% reported by How (2000) and the 46,5% documented by Brailsford et al. (2001), a difference that can be attributed to the diverse time period considered in their paper :1979-1990 for How (2000) and 1976-1997 for Brailsford et al. (2001).

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Table 2: Correlation matrix for the sample 2002-2013

Variable	Rc	Age	Asset	Cost	ΔOwn	Delay	Uncert.	UW	Option	Opt.uw	Hot	Licence	ELic	GFee	GBoard	Prod	Native	M.Sen.	ExtExp	ExtProd	
Rc	1																				
Age	-0.096	1																			
Asset	-0.045	0.193	1																		
Cost	-0.07	-0.008	-0.042	1																	
ΔOwn	0.012	-0.016	-0.003	-0.044	1																
Delay	-0.132	0.154	-0.054	0.127	-0.015	1															
Uncertainty	-0.038	0.110	0.037	0.017	-0.038	-0.007	1														
UW	-0.027	0.125	0.140	-0.037	-0.018	0.005	0.032	1													
Options	-0.033	-0.045	-0.045	0.017	-0.002	0.080	0.242	0.140	1												
Options _{uw}	-0.081	-0.048	-0.048	0.027	-0.089	-0.050	-0.027	-0.068	0.126	1											
Hot	0.161	0.006	-0.018	-0.067	0.060	-0.159	0.092	-0.020	0.000	-0.074	1										
Licence	-0.101	0.046	0.023	0.252	0.049	0.047	0.011	0.064	0.068	-0.047	0.013	1									
ExpLic.	0.042	0.005	-0.005	-0.041	0.070	0.000	-0.042	0.084	-0.001	0.039	-0.001	0.046	1								
Geo Fee	-0.105	0.087	0.317	-0.130	-0.015	-0.055	-0.071	0.078	0.006	-0.050	-0.060	0.110	-0.029	1							
Geo Board	-0.053	0.012	0.012	0.048	0.028	-0.060	0.019	0.057	0.005	0.081	0.070	0.005	0.049	0.010	1						
Prod	-0.002	0.022	0.006	0.014	0.004	0.019	-0.063	-0.028	-0.044	-0.059	-0.025	0.015	0.026	-0.013	-0.004	1					
Native	0.092	-0.021	0.012	-0.059	-0.058	-0.058	0.055	-0.041	-0.066	-0.021	0.040	-0.219	0.025	-0.187	0.006	-0.048	1				
M.sentiment	0.146	0.120	0.011	0.035	-0.030	0.146	0.081	0.031	-0.042	-0.049	0.173	-0.055	0.062	-0.074	-0.067	0.023	0.065	1			
ExtExp	0.016	0.027	0.152	-0.048	0.031	-0.039	0.090	0.019	-0.045	-0.025	-0.036	0.073	0.037	0.133	-0.008	0.017	-0.056	0.052	1		
ExtProd	-0.050	0.031	0.104	0.030	0.005	-0.042	-0.034	0.036	-0.29	0.033	-0.066	-0.000	0.062	0.138	0.062	0.138	0.010	0.016	-0.012	1	

The correlations between key variables are reported in Table 2. The percentage of uncertainty words is negatively correlated with initial returns. The expiration of mining licensing within two years is also positively correlated with underpricing while having a geologist on the company board has a negatively affect fist day return correlation, as we expected.

We now turn to the test of our hypothesis, that uncertainty affects underpricing.

We employ a model that explains underpricing with company, issue characteristics, and set of fixed effects. Our model is described in equation (1).

$$\text{UNDERPRICING}_c = \alpha + \gamma_c X_c + \alpha_t + \gamma_m X_m + \gamma_i X_i + \gamma_j X_j + \varepsilon_c \quad (1)$$

We index company's controls with c, issues (IPOs) controls with i, industry characteristics with j and market characteristics with m. The dependent variable is UNDERPRICING, which varies at company level.

The intercept term is denoted by α , and IPO year fixed effects account for the cyclicity of the IPO market α_t (year), which was relevant in the period under consideration. The vector X_i represents variables that measure issue characteristics, the vector X_c represents variables that measure company characteristics and X_j and X_m the industry mining and the market characteristics respectively. These are the same described in section 3.

Our coefficients of interests are γ_c , and in particular the coefficient on our measure of uncertainty, and γ_j , as we are interested in the way mining firm's heterogeneity affect first day return.

Table 03: Underpricing in mining industry 2002-2013				
	R _c	R _c	IR	UI
	(1)	(2)	(3)	(4)
Age	-0.0376 (0.0394)	-0.0254 (0.0394)	-0.0249 (0.0395)	-0.0261 (0.0306)
Asset	-0.0120 (0.0266)	-0.00450 (0.0264)	-0.00789 (0.0261)	0.000497 (0.0205)
Cost	-0.373 (0.274)	-0.379 (0.268)	-0.401 (0.275)	-0.377 (0.250)
Size	-0.0924* (0.0490)	-0.0796* (0.0465)	-0.0726 (0.0453)	-0.0569 (0.0372)
Δ Own	0.136 (0.153)	0.154 (0.152)	0.138 (0.152)	0.0791 (0.122)
Delay	-0.421*** (0.114)	-0.420*** (0.115)	-0.437*** (0.111)	-0.334*** (0.0814)
Uncertainty	0.0338*** (0.00924)	0.0338*** (0.00916)	0.0353*** (0.00900)	0.0232*** (0.00714)
UW	-0.00382 (0.0535)	0.00510 (0.0536)	0.000101 (0.0534)	0.00226 (0.0418)
Options	0.0526 (0.0600)	0.0485 (0.0591)	0.0480 (0.0588)	0.0539 (0.0487)
Options _{UW}	0.00361 (0.0483)	0.000370 (0.0480)	0.0110 (0.0474)	-0.00659 (0.0380)
Hot	0.0355 (0.0603)	0.0316 (0.0602)	0.0433 (0.0596)	0.0147 (0.0484)
Licence	-0.0873 (0.0595)	-0.0722 (0.0595)	-0.0719 (0.0595)	-0.0353 (0.0449)
ExpLic.	0.0334 (0.0505)	0.0336 (0.0501)	0.0352 (0.0501)	0.0289 (0.0393)
Geo Fee	-0.0566 (0.0627)	-0.0277 (0.0633)	-0.0404 (0.0628)	-0.0288 (0.0493)
Geo Board	-0.0820* (0.0485)	-0.0801* (0.0481)	-0.0794* (0.0477)	-0.0488 (0.0353)
Prod	-0.0903* (0.0484)			
Native	0.0134 (0.0528)	0.0226 (0.0524)	0.0224 (0.0523)	0.0144 (0.0401)
M.sentiment	0.589** (0.233)	0.598** (0.235)	0.156 (0.231)	0.453** (0.177)
ExtExp	0.0207 (0.0240)	0.00436 (0.0244)	0.00735 (0.0243)	0.00580 (0.0193)
ExtProd		-0.0139*** (0.00485)	-0.0138*** (0.00481)	-0.0100*** (0.00385)
Constant	1.457*** (0.346)	1.292*** (0.329)	1.347*** (0.328)	1.038*** (0.263)
Year fixed effect	Yes	Yes	Yes	Yes
Observations	465	465	465	465
R-squared	0.146	0.157	0.155	0.153

Table 3 reports the results. Columns 1 to 2 report the model which looks at the effect of uncertainty and the mining characteristics on underpricing, measured with R_c. The last two columns use IR and UI as an alternative measure of underpricing.

The only difference between the regressions in columns 1 and 2 is that the variable *Prod* is not in the second column as it is substituted by the extension of mining productive tenements granted. This variable is related to the size of the mining company and, as expected, shows that larger companies are less risky.

The key result shown in table 3 is that uncertainty has a statistically strong effect on underpricing. *Uncertain* has a positive coefficient (*t*-statistic of 3.75): the IPOs whose percentage of uncertainty words (*uncertain*, *may*, *approximate*, and *pending*, among others) is above the median, *experience* higher first-day returns. The effect is also economically meaningful: if the percentage of uncertainty words is above the median underpricing increases

by 3%. This result provides evidence that the quality of information disclosure has a causal effect on underpricing that is economically appreciable.

The effect is quite stable across specifications as it is evident by looking at column 3 and 4 where we use the other two alternative measures of underpricing. Our finding of a relation between uncertainty word frequencies and first-day returns is similar to the evidence in Loughran and McDonald (2013).

The other main explanatory factors which are statistically significant in all the regressions are market sentiment (proxied using the Metal & Mining 300 Index), and the listing delay, a result already found by Lee, Taylor and Walter (1990) and How (2000). We can interpret the result as the latter authors do: issues that are 'filled' more quickly are expected to be more underpriced due to the positive sentiment surrounding the issue. The size of the issue is statistically significant and negatively related to underpricing as also proved by Beatty and Ritter (1986).

As regards the mining-related variables, which measure the uncertainty of the mining activity, we find that the dummy variable indicating if a mining company is in the exploration or production phase, and the size of mining extraction tenements are negatively related to underpricing. This means that mining companies with more hectares of granted mining extraction tenements that are in the productive phase are less underpriced. However the effects of these variables are not statistically significant.

The variable that measures the expiration of the exploration licenses in the following two years are, instead, not statistically significant. The cost of the offer is not statistically significant although with the right sign, indicating that more "expensive" issues are less underpriced. Unlikely the previous studies, options, both offered to the underwriter and to the subscribers, are not found to have a statistically significant impact on underpricing. The difference between pre and post-IPO insider's ownership is not statistically significant either.

Finally having a geologist on board decreases underpricing as he probably plays the role of certification of the quality of the company and of the reliability of the information disclosed at the IPO.

5.0 Conclusions

In this paper we study the short run underpricing of IPO on the Australian Stock Market (ASX) and in particular on the IPO of Mining firms. Resource companies make up nearly half of all ASX listed companies and account for a third of ASX market capitalization. Mining is a highly capital intensive endeavor and access to equity capital is a key requirement for the development of a mine. Since mining issues have often no history on which to base predictions of future earnings it is very difficult to predict their profits. For these reasons authorities have placed a lot of emphasis on the disclosure of information at IPO for the mining industry.

We provide some novel contribution to the literature on underpricing. We build on the seminal contribution of Loughran and McDonald (2013) that provide a textual analysis of IPO prospectuses to measure voluntary disclosure of information. We find that the quality of information disclosure as well as the characteristics of the Mining companies indeed affects underpricing.

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