Patterns of disclosure and volatility effects in speculative industries: the case of small and mid-cap Metals & Mining entities on the Australian Securities Exchange

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Abstract

Purpose – There is conjecture that small and mid-cap companies in highly speculative industries use frequent and repetitive disclosure to promote price volatility and heighten market interest. Excessive disclosure could indicate instances of self-promotion or poor disclosure practices, and these habits could mislead investors. This paper quantitatively investigates the impact of firm disclosure on price volatility in the Australian stock market.

Design/methodology/approach – This paper considers the effect of information disclosure on the daily stock price volatility of 340 Metals & Mining industry entities listed on the Australian Securities Exchange over the period 2005-07 using regression analysis.

Findings – The results indicate the number of disclosures, the number of price and non-price sensitive disclosures and the number of disclosures by category has a significant influence on daily price volatility. Moreover, the volatility impact of disclosure is greater for small and mid-sized firms than large firms.

Research limitations – Price volatility is calculated using daily data; intra-day stock prices could provide measures that are more accurate. There is also no attempt to allow for asymmetry in disclosure; categorizing news as 'good' or 'bad' would allow better insights.

Practical implications – There is support for the conjecture that disclosure could serve as a self-promotion tool through fabricated and repetitive announcements. Inadvertent poor disclosure practice could also result in excessive price volatility. Disclosure practice requires ongoing consideration by regulatory bodies.

Originality/value – This analysis complements basic work by the Australian regulator to establish a quantitative link between disclosure practice and price volatility.

Keywords Disclosure policy, information effects, price volatility

Paper type Research paper

1. Introduction

In Australia and elsewhere, government and industry regulators – like the Australian Securities and Investment Commission¹ (ASIC) (2008) and the Australian Securities Exchange Limited² (ASX) (2008), respectively – aim to attain market integrity. This is usually through market integrity regulation, referring to the legislative and self-regulatory measures used to ensure that markets are efficient, orderly and fair for all types of investors. The regulators aim to ensure that investors have timely and accurate information and intervene when they find the market has not been properly informed. The provision of this

information, known as disclosure, is the publication of corporate information that may influence the price and other movements of the market and the decisions of individual investors. Regulatory practices in Australia (and elsewhere) invariably make it compulsory for public companies to disclose on a regular basis.

As a rule, "...once an entity is or becomes aware of any information concerning it that a reasonable person would expect to have a material effect on the price or value of the entity's securities, the entity must immediately tell ASX that information" (ASX, 2008). While this rule excludes some types of information, including trade secrets and confidential material (any information that is confidential and has not ceased to be confidential), several specific types of disclosure – including modification of capital, changes in directors and their interests, changes in company details, documents sent to current shareholders and take-over bids – must take place. The Company Announcements Office of the ASX processes and releases all information provided and operates from 8.30 am to 8.30 pm on trading days (actual trading is from 10:00 am to 4:00 pm).

However, there is some conjecture in the Australian equity market that companies may use disclosure as a self-promotion tool whereby they manipulate the market via fabricated and repetitive announcements. These concerns have generally arisen with entities operating in speculative industries, like mining exploration (particularly uranium), biotechnology, and renewable and alternative energies. In these sectors, it is argued that the issue of timely and accurate disclosure is particularly relevant, as uncertainties are prevalent, and references to technical information or the use of industry jargon is common. Moreover, the suggestion is that these practices are especially prevalent in small and medium-sized firms (generally, the earlier stages of the firm lifecycle) as these companies generally attract less attention by analysts and are highly reliant on new discoveries and technologies to promote themselves.

In response, ASIC (2006) recently undertook an analysis of the accuracy—entities should disclose information that is factually correct, easily understandable, gives due prominence to both positive and negative information, and avoids unnecessary repetition of previously disclosed information—and timeliness—entities should disclose information immediately when it becomes necessary to do so under the Corporations Act and the relevant market rules—of disclosure patterns for small and mid-sized mining firms. The objective was to detect entities that demonstrated a pattern of extremely frequent disclosure which could indicate instances of self-promotion or poor disclosure practices, and that such habits could potentially result in investors being misled.

Unfortunately, ASIC (2006) chose to rely on simple standardised announcement scores to merely identify outlier entities that had disclosed excessively and thereby merited closer qualitative attention. The results indicated that about 4% (16 of 419) small and mid-cap miners fell into this category with relative disclosure scores of 71 (in the range 1–100) or above. However, when recognising the limitations of the analysis, ASIC (2006) pointed out that fruitful avenues of research included the examination of alternative indicators, such as price volatility, and to consider the different types of announcements, comprising both price and non-price sensitive information and their components.

Accordingly, the main purpose of this paper is to assess the volatility impact of the number of company announcements by firms included in the Metals & Mining industry listed on the Australian Securities Exchange. A second purpose is to consider whether the volatility impacts of announcements for small and mid-cap companies is such that a pattern of excessive and repetitive disclosure would promote price movements that would indicate self-promotion or poor disclosure practices, and that such practices could potentially result in investors being misled. The paper is divided into four main sections. Section 2 surveys the literature on disclosure. Section 3 deals with the specification of inputs and outputs. Section 4 presents the results. The paper ends with some concluding remarks in Section 5.

2. Literature review

Two broad categories of rules help attain market integrity: (i) conduct rules and (ii) disclosure rules. In brief, conduct rules promote methodical and efficient price discovery, trading and settlement practice. These include rules that apply to the endorsement and supervision of exchanges and their members, and legal bans on unwarranted trading and market manipulation. Disclosure rules, however, deal with information gaps in the market so that investors can make informed decisions founded on quality information. The introduction of corporate disclosure regulation aims to ensure that market participants are able to access up-to-date information regarding current or potential investments. If the market lacks disclosure regulation owing to market failure, privileged investors who have information advantages are able to trade on that information at the expense of the uninformed. However, regulation also inflicts costs and restrictions on market participants. As a result, there is a need to balance market integrity and activity restrictions that may impede the competitiveness of the market.

Theoretically, disclosure regulation improves the efficiency of the market (Healy and Palepu, 2001). Empirically, Admati and Pfleiderer (2000) concluded that strict disclosure requirements lead to liquid and efficient markets, hence the requirement for information regulation. However, others have found that while regulation is efficient in increasing the level of disclosure, there is no impact on the quality of information. Heflin, *et al* (2001) concluded that since the introduction of regulation there was lower return volatility, some improvement in the speed with which pre-announcement earnings price converged to the post-announcement level, an increase in the quantity of the firms' voluntary forward looking disclosures, but no reliable evidence of change in various aspects of analysts forecast bias, accuracy, and dispersion. Overall, Heflin *et al* (2001) found no evidence to support the notion that the quality of public disclosure had deteriorated following the introduction of regulation.

Disclosure, of course, has profound effects at the firm level. Prior studies have indicated many beneficial capital market effects associated with firms improving their disclosure policies, including lower equity and debt costs, narrower bid-ask spreads, and improved stock price responsiveness to earnings. Other potential benefits of disclosure include improved analyst followings and increased institutional investor ownership, thereby contributing to price stability, though some work has suggested that increased disclosure levels might also attract institutional investors who trade aggressively, bringing volatile reactions to company announcements. Empirical studies concerning the benefits for the firm of more accurate and increased levels of disclosure include Diamond (1985), Ho and Michaely (1988), Fishman and Hagerty (1989), Brookfield and Morris (1992), Welker (1995), Lang and Lundholm (1996), Fox (1997), Serwer (1997), Botosan (1997), Sengupta (1998), El-Gazzar (1998), Price (1998), Holland (1998), Lundholm and Myers (2001), Dutta and Trueman (2002), Gelb and Zarowin (2002) and Bailey *et al.* (2005).

The most commonly cited benefit of high disclosure is a reduction in information asymmetry, as it reduces the magnitude of unforeseen activities and makes a firm's stock less volatile (Lang and Lundholm, 1993; Chiyachantana *et al.*, 2004)). Diamond and Verrecchia (1991) suggested that public information used to reduce information asymmetry also reduces a firm's cost of capital by attracting increased demand from large investors due to increased liquidity (Kim and Verrecchia, 1991; Potter, 1992). They considered that an increase in liquidity assists current stock prices and that the reduction in information asymmetry increases competition among market makers, thereby lowering future volatility. Likewise, McNichols and Trueman (1994) found that an increase in the precision of public disclosure increases the expected trading profits of the informed trader, while Lang and Lundholm (1996) found that "...firms with more forthcoming disclosure practices have a larger analyst following", finding that these practices have positive effects on forecasts in terms of accuracy, dispersion and volatility.

Disclosure also allows firms to better align their goals with investors. According to Anand (1991), Elgin (1992) and Bryne (1999), investor relation consultants encourage targeting institutional investors with long investment horizons – with the exception of traders who buy and sell frequently – attempting to achieve a stable ownership structure to support a stable stock price history and their short-term developments. In order to appeal to these investors more forthcoming disclosure practices are often required. To maintain a close relationship with investors, firms attempt to disclose in a timely manner to prevent private information influencing stock prices before their investor base can react.

As a result, Ross (1979), Grossman (1981), Milgrom (1981), Verrecchia (1983), Milgrom and Roberts (1986) and Okuno-Fujiwara *et al* (1990) argue that when the firm is more informed than the market, and there are no costs of verification and disclosure, then the firm cannot do anything but disclose. The threat of liability for failure to disclose can also encourage a firm to comply [see, for example, Skinner (1994)], but may not enforce complete disclosure. In deciding whether to disclose, firms balance the risk of liability against the costs of publicising bad news. The expectation adjustment hypothesis puts forward that managers disclose to align investors' goals with their own (Ajinkya and Gift, 1984). Ajinka and Gift (1984) provided evidence that investors react positively (negatively) to management disclosure with good (bad) news. As a result, regulation is unwarranted, as more often than not the lack of disclosure is badly interpreted. According to Admati and Pfleiderer (2000), firms rarely voluntarily fully disclose, only fulfilling minimum regulation requirements, as it is otherwise costly to the company.

Non-regulatory costs also help justify non-disclosure. First, there is a direct cost in producing and distributing information and secondly, it alters a firm's competitive advantage and bargaining power. For example, disclosures by one firm influence investors' beliefs about the profitability of other organisations in the same industry, thereby altering their market values (Foster, 1981). Similarly, Jansen (2005) concluded that firms which voluntarily disclose face a trade-off. On the one hand, the firm creates a 'strategic advantage' by revealing its efficiency and market leader status; on the other, it disadvantages itself as innovative ideas spill over to the competitor. While the strategic effect provides an incentive to disclose, the expropriation effect promotes the concealment of information by firms. The firm also incurs legal and other costs for publicising documentation, and intermediaries must exhaust resources – both time and money – to analyse the data. While the firm's expenditure is implicitly paid for by its shareholders, the majority of the cost to market participants falls upon intermediaries, who later resell their analysis to potential investors. Indirect costs from changing voluntary disclosure can be attributed to the increased attraction from a short-term investor base imposing an increase in share price volatility.

In sum, the general view is that disclosure has an important effect on investors and the market itself. Regulation helps improve market efficiency and enforces the free flow of information to the marketplace. Strict disclosure requirements lead to liquid and efficient markets, potentially reducing the cost of capital for organisations. Disclosure also arouses the interest of analysts and institutional investors, but there may be important differences between the quantity and quality of the information disclosed.

3. Empirical methodology

The purpose of this analysis is to determine whether there is a relationship between the number of disclosure announcements Metals & Mining firms release and the volatility of stock prices. This is a similar objective to work undertaken in ASIC's (2006) *Small and Mid-Cap Miners Study*. In that report, ASIC examined the disclosure habits of small and mid-cap mining stocks on the ASX to determine if they were potentially using the announcement

system for self-promotion. While it found some companies were disclosing relatively excessively, the effects of the practice on price behaviour were not considered.

The first hypothesis is that the quantity of corporate disclosure has a positive influence on stock price volatility. The second hypothesis is that the volatility of large capitalisation firms is influenced less by firm-specific information than small or mid-cap firms. A regression-based approach is used to regress individual firm's price volatility against various categories of disclosure frequency using a common effects model. Three measures of disclosure are specified. The first is a measure of total disclosure. The second is total disclosure divided into non-price sensitive and price sensitive disclosure. The final measure categorises disclosure into eighteen sub-categories. The dependent variable in all three regressions is the change in the daily standard deviation as a measure of stock price volatility. The respective regression equations are:

$$\sigma_{it} - \sigma_{it-1} = \beta_0 + \beta_1 \text{Total disclosure}_{it} + \varepsilon_{it} \quad (1)$$

$$\sigma_{it} - \sigma_{it-1} = \beta_0 + \beta_1 \text{Non-price sensitive disclosure} + \beta_2 \text{Price sensitive disclosure} + \varepsilon_{it} \quad (2)$$

$$\sigma_{it} - \sigma_{it-1} = \beta_0 + \sum_{i=1}^{18} \beta_i \text{Category of disclosure}_i + \varepsilon_{it} \quad (3)$$

where the response variable σ is the daily standard deviation of the i th stock at time t and $t-1$, β are coefficients to be estimated, and ε_{it} is the random error.

Disclosure and market data covering the period from May 1 2005 to April 31 2007 are collected. Table I represents the GICS breakdown by sector for the 1,865 companies trading on the ASX as of August 1, 2007. Materials (including the Metals & Mining industry) account for nearly 32% of all traded companies on the ASX by number, and over 23% of the total capitalisation (second to Financials). Metals & Mining firms themselves account for 550 of the 593 Materials stocks (93%), thereby comprising 29% of all ASX companies and over 20% of total market capitalisation.

<TABLE I ABOUT HERE>

Table II provides the breakdown by sector of ASX corporate announcements for the three calendar years to August 1, 2007 for the total number of announcements and the number of price sensitive announcements. Information is deemed by the ASX (2008) to be price sensitive when a "...reasonable person would expect it to have a material effect on price or value of the entity's securities". On average, each Materials firm makes 100 non-price sensitive announcements and 35 price sensitive announcements each year. By announcements per firm per year, this gives the Materials sector the fifth highest rate of non-price sensitive information and the third highest rate of price-sensitive information among the ten sectors.

<TABLE II ABOUT HERE>

The data used for the analysis are from three sources. First, daily end-of-day prices are from the Securities Industry Research Centre of Asia-Pacific (SIRCA). These prices are adjusted for stock splits and stock consolidations (reverse stock splits), so that unrealistic price jumps are removed. These prices are used to calculate the daily price volatility. Market capitalisations from the Aspect Huntley database measure the economic size of each firm. This information to categorise each firms as (i) large (greater than \$500 million), (ii) mid (\$50 million to \$500 million), (iii) and small (less than \$50 million). Finally, disclosure information (including the number of announcements and the type of announcement) are from the ASX. These comprise more than 40,000 individual announcements. Data from all three sources is gathered for the 314 Metals & Mining stocks actively traded over the sample period.

4. Empirical results

Table III provides daily returns, standard deviations and disclosures for each of the three capitalisation categories (small, mid and large). As shown, the daily returns for large firms are higher, though the volatilities (standard deviations) for small firms are greater than mid-sized firms, which are greater than large-sized firms are. A positive relationship between firm size and the number of disclosures is also evident in Table III. That is, larger firms disclose more frequently than small and mid size firms. However, the statistics presented are for broad categories of firm sizes and may not fully reflect the disclosure practices of firms within each category nor fully account for the sizeable variance in returns, volatility or disclosure possible with stochastic modelling.

<TABLE III ABOUT HERE>

Table IV presents the estimated coefficients and levels of significance of the volatility models in Equations (1) and (2). The upper portion of the table above shows the influence of overall disclosures on stock price volatility. To start with, each of the intercept estimates are significant and negative, suggesting that volatility decreases in the absence of disclosure. The disclosure coefficient for large cap stocks is 0.300, compared with 0.642 for mid caps and 1.000 for small caps, all of which are significant. This indicates that volatility increases with the amount of disclosure and that the impact of disclosure on small caps is three times greater than that for large caps. This counters earlier evidence by Diamond and Verrecchia (1991) which associated high levels of disclosure with lower levels of stock return volatility.

The lower portion of the table divides the number of announcements into non-price sensitive and price sensitive disclosures. This is to identify what type of disclosure has the greater effect on volatility. As shown, the non-price sensitive disclosure coefficients are positive for all three categories of size, with the magnitude of the coefficient being largest for small caps and smallest for large caps. All other things equal, disclosures by a small-sized firm will bring about a 2.85 times greater increase in its price volatility compared to a large sized firm making a comparable number of disclosures. The findings for price sensitive disclosure are comparables, though the volatility impact of small compared to large firms is slightly less at 2.68 times.

<TABLE IV ABOUT HERE>

Table V divides the daily disclosures of the firms into a number of categories and estimates the price volatility model using Equation 3. The signs and significance of the intercept coefficients again indicate that small cap firms are more price volatile than either mid or large cap firms are. Putting this aside, for most categories of disclosure the volatility response of small cap firms is greater in magnitude than large or mid caps making a comparable number of disclosures. This includes ASX queries, commitments tests, issued capital, notice of meeting, other notices, periodic reports, quarterly activities reports, and stock exchange announcements. The exceptions are announcements placing the company into administration, dividend announcements and letters to shareholders, progress reports, and details of security holders.

<TABLE V ABOUT HERE>

Interestingly, categorising disclosures in this manner shows that the change in volatility, either positive (an increase) or negative (a decrease), varies by the type of disclosure. For instance, ASX queries and stock exchange announcements increase volatility for all sizes of firms, while cash flow and periodic reports decrease volatility. This is a clear indication that provision of information may serve to reduce price volatility. However, while letters to

shareholders and progress reports reduce volatility for mid and large size firms, they increase volatility for small size firms.

5. Concluding remarks

This paper investigates the effect of firm specific disclosures on stock price volatility for Australian Metals & Mining firms. Changes in volatility are explained using three measures: (i) the total number of disclosures, (ii) the numbers of price sensitive and non-price sensitive disclosure, and (iii) the number of disclosures by category. The results indicate that the amount of disclosure has positive volatility effects and that these are relatively greater for small and mid-sized firms than large firms. This provides some support for the conjecture that disclosure could potentially serve as a self-promotion tool whereby the market is manipulated via fabricated and repetitive announcements. However, even if the intent is not to deceive market players, poor disclosure practice by firms, particularly small and mid-sized firms in speculative industries, may still result in excessively volatile stock prices. Accordingly, the requirements and enforcement of disclosure practice requires ongoing consideration by regulatory bodies.

Of course, this analysis does suffer from a number of limitations, all of which provide suggestions for future research. One limitation is that the firm's price volatility is calculated using daily data. While differencing the daily volatility series enabled a reduction in statistical dependence (read autocorrelation), intra-day stock prices could provide more accurate volatility measures. This would also allow the direct pairing of volatility changes with the timestamps of the announcements, resulting in a better basis for comparison. A second limitation is that has been no attempt to allow for asymmetry in the types of disclosure. Some announcements, for example, could conceivably have a greater positive effect on volatility than others could and this may be related to whether the item represents 'good' or 'bad' news. Accordingly, one possible extension of this research would be to categorise the various announcements into positive and negative signals, though this would necessarily be a major task given the sheer volume of announcements made over time.

Notes

1. ASIC is an independent government body that administers and enforces Australian corporations' and consumer protection law. It regulates companies, financial markets, financial services organisations and professionals who deal and advise in investments, superannuation, insurance, deposit taking and credit.
2. The ASX—Australia's national market for listed equity and exchange-traded derivatives—resulted from the merger of the Australian Stock Exchange and the Sydney Futures Exchange. Its listing rules apply to all companies listed on the ASX (including the ASX), and are contractually binding and enforceable under corporations' law.

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Table I. Breakdown of ASX listed firms by GICS

GICS	Number	Capitalisation (millions)
Consumer Discretionary	164	\$130,035
Consumer Staples	56	\$100,438
Energy	201	\$108,588
Financials	316	\$597,589
Health Care	163	\$50,127
Industrials	192	\$158,350
Information Technology	118	\$16,356
Materials	593	\$380,583
Telecommunication Services	36	\$59,368
Utilities	27	\$33,115
Total	1,865	\$1,634,550

Table II. Announcement breakdown by GICS and calendar year

GICS	2005		2006		2007		Mean 2005-2007	
	All	Price sensitive	All	Price sensitive	All	Price sensitive	Non-price sensitive	Price sensitive
Consumer Discretionary	4,888	1,305	7,849	1,826	6,969	1,413	92 (10)	28 (9)
Consumer Staples	1,731	430	2,660	601	2,672	568	98 (6)	29 (7)
Energy	7,826	2,831	12,296	3,518	11,210	2,644	111 (3)	45 (1)
Financials	11,161	2,348	17,265	3,094	16,427	2,428	117 (1)	25 (10)
Health Care	5,084	1,524	8,065	2,008	7,265	1,580	94 (9)	31 (4)
Industrials	5,598	1,548	9,473	2,136	8,954	1,790	97 (7)	29 (8)
Information Technology	4,360	1,075	5,289	1,307	5,061	1,144	95 (8)	30 (5)
Materials	20,435	6,305	30,449	7,907	28,946	6,492	100 (5)	35 (3)
Telecommunication Services	1,241	337	2,276	540	1,897	425	114 (2)	36 (2)
Utilities	1,113	332	1,433	322	1,103	149	105 (4)	30 (6)
Total	63,437	18,035	97,055	23,259	90,504	18,633	102 (–)	32 (–)

Notes: 2007 data to 1 August. Mean non-price and price sensitive announcements are per entity, ranking by GICS in brackets.

Table III. Statistics on daily categorical returns, standard deviations and disclosures by firm size

		Small	Mid	Large
Returns	Observations	76,650	62,342	21,462
	Mean	0.001	0.002	0.003
	Median	0.002	0.003	0.004
	Standard Deviation	0.054	0.045	0.031
	Minimum	-1.159	-0.445	-0.192
	Maximum	0.969	1.063	0.137
Std. deviations	Mean	0.045	0.039	0.027
	Median	0.045	0.039	0.026
	Standard Deviation	0.031	0.022	0.015
	Minimum	0.000	0.000	0.000
	Maximum	0.404	0.538	0.137
Disclosures	Mean	0.174	0.231	0.325
	Median	0.147	0.213	0.310
	Standard Deviation	0.511	0.577	0.731
	Minimum	0	0	0
	Maximum	9	10	10

Table IV. Estimated coefficients for disclosure and non-price sensitive and price sensitive models by firm size

	Small	Mid	Large
Intercept	-1.631***	-1.657***	-0.887***
Disclosure	1.000***	0.642***	0.300***
Intercept	-1.785***	-1.789***	-9.492***
Non-price sensitive	3.265***	1.714***	1.144**
Price sensitive	2.290***	1.750***	0.854***

Notes: Asterisks indicate significance at the *** –.01, ** –.05 and * –.10 level.

Table V. Estimated coefficients for categorised disclosures by firm size

Category	Small	Mid	Large
Intercept	1.830***	0.855**	1.392***
Asset acquisition/disposal	—	—	—
ASX query	9.694***	6.149***	2.928***
Company administration	-1.220**	-0.424**	-1.876***
Cash flow report	-1.073**	-0.364**	-0.841**
Commitments test entity quarterly reports	-1.087**	0.372**	—
Dividend announcement	—	—	-1.392**
Issued capital	-1.422**	-0.722**	-1.240***
Letters to shareholders	0.904**	-5.431***	-2.891**
Notice of call	—	—	—
Notice of meeting	-1.148**	-0.232**	-0.991**
Other	-1.994**	1.730**	-1.493**
Periodic reports	-2.397***	-0.570**	-0.869¥
Progress report	0.830**	-0.821**	-2.015**
Quarterly activities report	-1.231**	-0.501**	-0.614**
Stock exchange announcement	1.604**	1.041**	0.745**
Security holder details	—	-0.440**	-0.958**
Takeover announcement	—	—	—
Warrants	—	—	—

Notes: Asterisks indicate significance at the *** –.01, ** –.05 and * –.10 level.