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CEO's managerial power, board committee memberships and idiosyncratic volatility

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ABSTRACT

Based on Upper Echelons Theory and Agency Theory, we explore the effect of CEOs' power through their tenure, board committee membership and other corporate governance factors on idiosyncratic volatility. Our study addresses the gap in the literature to find the direct link between the source of corporate governance practices and idiosyncratic volatility in stock price. We use a generalised method of moments in a panel analysis of Australian firms for 2004–2013 and a robust model that controls for firm size, firm age, trading volume, market-to-book ratio, dividend payout, the global financial crisis, product market competition and financial intermediaries. We find that CEOs who have stronger managerial power are associated with lower idiosyncratic volatility. This determining factor remains significant with the inclusion of widely-researched firm characteristics and external factors on idiosyncratic volatility in our robust analysis.

1. Introduction

This paper examines how a chief executive officer's (CEO) managerial influence on board decisions (Pathan, 2009) affect idiosyncratic volatility. Idiosyncratic volatility, by definition, is the risk that is not correlated with systematic price movements in the market. Although prominent asset pricing studies[1] such as (Merton, 1987) suggests that investors demand higher returns for holding high idiosyncratic volatility stocks, we are only beginning to understand this behaviour through the observation that idiosyncratic volatility may arise due to information extraction by investors (Ferreira & Laux, 2007). Little is known about the relation between CEO's characteristics and firm-specific information that affects unsystematic price movements in the market. Stock price directly relate to shareholder (investor) satisfaction which in turn could influence investor trading behaviour and resultant idiosyncratic volatility. This interesting question, such as to the causes of idiosyncratic volatility from corporate governance perspective, has been rarely investigated in the literature. Therefore, we combine Upper Echelon Theory with Agency Theory to explore these research questions.

Corporate governance in terms of anti-takeover provisions, as measured by the Gompers index, has been investigated as a determinant of idiosyncratic volatility (Ferreira & Laux, 2007). However, as Gompers, Ishii, and Metrick (2003) note, this index that measures a wide range of governance performance may reflect the practices in a firm but not their causes. Following this, Ferreira and Laux (2007) investigate how investor behaviour in the market causes volatility by focusing on a subset of Gompers et al.'s (2003) corporate governance index – the anti-takeover provisions in firms. They trace idiosyncratic volatility through the information flow hypothesis and argue that institutional investors' interest in collecting private information, measured by arbitrage trading volume, leads to idiosyncratic volatility. The authors find that firms that are vulnerable to corporate takeover have higher idiosyncratic volatility than firms with stronger anti-takeover provisions. They therefore postulate that insiders (i.e. controlling shareholders and managers) are less likely to expropriate outside investors in more open (democratic) firms. Hence, more noise trading is triggered by outside investors who are interested and willing to extract private information through higher trading volumes. Ferreira and Laux (2007) have therefore highlighted that corporate culture and conducts have great influence on how investors in the market behave and the resultant stock price movements of firms. The source of the corporate culture and conducts is the decision-making of top management team. This is linked to Chok and Sun (2007)'s study that examines a cross-sectional relation between managerial characteristics and idiosyncratic volatility for Biotech IPO firms. According to them, CEOs' risk taking behaviour is aligned with

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[1] Recent empirical studies provide strong evidence that idiosyncratic volatility is priced internationally. For example, idiosyncratic volatility is priced in US stock returns Peterson & Smedema, 2011. The return impact of realized and expected idiosyncratic volatility. *Journal of Banking & Finance*, 35, 2547–2558. and other stock markets, including both developed and emerging markets Ang et al., 2009. High idiosyncratic volatility and low returns: international and further US evidence. *Journal of Financial Economics*, 91, 1–23, Angelidis, 2010. Idiosyncratic Risk in Emerging Markets. *The Financial Review*, 45, 1053–1078, Liu & Di Iorio, 2016. The pricing of idiosyncratic volatility: An Australian study. *Australian Journal of Management*, 41, 2016, 353–375. These papers provide strong evidence to support that idiosyncratic volatility determines expected returns, hence influences stock prices.

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shareholders' interests via CEO stock options, which increases with idiosyncratic volatility. In addition, older boards are found to be more experienced with initiating strategic changes which are linked to higher idiosyncratic volatility. However, through CEO stock options it is still unable to explain how CEOs directly influence corporate strategies and risks.

Hence, we address the outstanding question following the studies above to explore the means through which CEO can assert influence on corporate strategies and risks by examining their representation on board committees. Based on Upper Echelon Theory and Agency Theory, we examine CEOs managerial power via their board committee membership as the channel through which they can influence key strategic decisions and risks such as resource allocation in key projects, nomination, appointment/dismissal and compensation of directors and monitoring effectiveness and efficiency by the audit committee. The board of directors plays a key role in setting strategic directions, assess critical risks and monitor performance of the top management team in firms. Hence, by examining the board committee membership of CEOs, we can directly examine their influence on the board. We contribute to the literature in the following ways. First, besides investigating CEOs' board committee memberships, we also investigate their length of tenure, the ratio of executive directors and independent directors as factors that enable an environment which enhances CEO's influence. Second, we conduct a panel data analysis given that long-term idiosyncratic volatility arises due to deviation from long-term equilibrium asset pricing model as the examination of changes in corporate strategies and risks should be undertaken from a long-term perspective. Third, we control a broad set of firm-specific characteristics and external factors that have been empirically proven to affect idiosyncratic volatility in order to isolate the true effect of CEOs' managerial influence on the board. Through the investigation of the powerfulness of CEOs via their board committee membership, we are also able to examine the monitoring efficiency of board of directors. Therefore, we directly link the structure and tenure of a company's board of directors to idiosyncratic volatility.

To test our hypothesis, we measure CEO tenure by the number of years s/he has been appointed to the role in a firm. We then construct what we call a CEO power index using a combination of CEO board committee membership and the ratios of executive directors and independent directors. The power index measures a CEO's extent of control and the environment that enable this control. We use a system of generalised method of moments (GMM) in dynamic panel data estimation to control for endogeneity and address autocorrelation. In doing so, we find that CEO tenure has no effect on idiosyncratic volatility. On the other hand, we find that the power index has a significant and negative effect on idiosyncratic volatility. Our results suggest that greater managerial power is associated with lower idiosyncratic volatility. More influential CEOs are linked to lower volatility. This implies that board monitoring is less effective when CEOs have greater managerial influence through board committee membership. CEOs are able to adjust corporate strategies and risks when they have the opportunity to influence board decisions (Pathan, 2009).

We control for external governance factors on idiosyncratic volatility when examining the effect of internal governance structure. For example, following Gaspar and Massa (2006), we control for market competition by using the Herfindahl–Hirschman Index to measure inter-industry market power and excess price cost margins (EPCMs) to measure intra-industry market power. We also control for financial intermediaries, which may mitigate information asymmetry. We find no results to indicate that these factors affect idiosyncratic volatility in the presence of the power index. We also control for the global financial crisis (GFC) effect and find that the GFC period is associated with higher volatility. In terms of firm size, we find that firms with the largest 10% market capitalisation among Australian listed firms have lower idiosyncratic volatility compared to smaller firms. Other variables, such as the book to market, trading volume turnover, firm age, and dividend dummy, yield insignificant results, suggesting that firm-specific characteristics and external factors do not explain long-term idiosyncratic volatility in the presence of internal governance structure.

We organise our paper in the following way. Section 2 discusses the managerial power hypothesis. Section 3 discusses our methodology and summary statistics. Section 4 presents our empirical results. Section 5 presents our conclusions and discusses important implications.

2. Hypothesis development

Agency conflict is an important field of study in corporate governance. The agency problem not only diminishes shareholder wealth (Jensen & Meckling, 1976, Bhagat & Bolton, 2008) but also affects market operations and resource allocation efficiency (Claessens, 2006). Extensive theoretical and empirical research has investigated the causes of agency conflict (see for example Agrawal & Knoeber, 1996; Bebchuk & Fried, 2003) and its effect on various corporate performance indicators. On the other hand, Upper Echelons Theory argues that managers' strategic decision-making and performance are a reflection of his/her various characteristics, including formal qualifications, experience, socioeconomic background, etc. (Hambrick & Mason, 1984). Hence, Upper Echelon Theory complements agency costs, such as bonding and monitoring costs, arguments by casting personal human characteristics on explaining managerial self-interest maximisation behaviour which may diminish shareholder interests. Dissatisfied shareholders will choose not to hold stocks in firms where top managerial behaviour diminishes their welfare and therefore stock price movement is affected. Hence, we focus on a stream of studies that investigate the effect of managerial power of CEOs on idiosyncratic volatility by their tenure and influence on the power structure of the board directors and senior managers. In addition, we investigate how managerial power affects the uncertainty environment of a firm and suppresses the role of board of directors. Both theories support that the performance in firms are a result of a combination of factors of the top managers and the strategic decisions they make under the incentives are driven by these factors. We discuss these hypotheses in the following.

2.1. Managerial power

An important role of top managers and directors is their ability to manage uncertainty and derive coping strategies in their firms (Daily & Johnson, 1997). Chok and Sun (2007) link managers' and board of directors' ages to strategic change which affects idiosyncratic volatility. They posit that younger managers and directors tend to undertake higher levels of risk in corporate strategy, hence increasing a firm's idiosyncratic volatility. We investigate the influence of top executives on corporate strategies which affect idiosyncratic volatility through managers' and directors' tenure instead of their age. From the Agency Costs perspective, longer tenure may reflect the presence of entrenched managers who may have a higher likelihood to maximise self-interests (Berger, Ofek, & Yermack, 1997; Schulze, Lubatkin, Dino, & Buchholtz, 2001). According to Upper Echelons Theory, a manager's experience within a firm when measured by their length of tenure, can affect his/her strategic decision making. Executives who are entrenched in a firm tend to initiate less innovation and unrelated diversification strategy compared to new executives (Hambrick & Mason, 1984). Longer-tenured CEOs are associated with less strategic breadth and lower degree of innovative and marketing differentiation (Miller, 1991). In addition, entrenched CEOs tend to have poorer alignment of corporate strategy with their operating environment due to their ability to resist external pressures for changes by homogenising the team of senior executives and directors around them (Miller, 1991). This is further supported by Wiersema and Bantel (1992) who find that longer management team tenure is associated with less change in corporate strategy. The longer the tenure of a CEO, the greater control s/he could gain via ownership and/or board chairmanship (Xie, 2014).

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Based on the above, we argue that the longer a CEO's tenure is, the less risk s/he is likely to undertake via corporate strategic change, and that idiosyncratic volatility will be reduced.

H1. *CEO tenure is negatively related to idiosyncratic volatility.*

According to the literature already published, we investigate CEOs' power in relation to idiosyncratic volatility in the light that CEOs are able to influence the nomination, appointment/dismissal, remuneration of directors and the board's audit agenda. In turn, CEOs are able to influence the board's strategic decision making and monitoring efficacy. Daily and Johnson (1997) suggest that a potential source of power is structural. Structural power for CEOs can be obtained through a number of channels (Daily & Johnson, 1997). The first is the official appointment of CEOs to their executive position. This serves as a formal recognition of the person's qualifications, experience and expertise. Second is through the role of a CEO on the firm's board of directors. An enhancement of managerial power is often gained by a CEO who is also the Chairman of the board (Chen, Ezzamel, & Cai, 2011). Another way to ascertain whether CEOs are powerful is by examining the board composition in firms. CEOs can control corporate strategies and directions by exerting their influence over board matters including the hire/dismissal of directors, reward and compensation and board meeting agendas. Since our dataset shows a very low incidence of CEO-Chairman duality, we examine CEOs' structural power in terms of their board committee membership on audit committee, remuneration committee and nomination committee.

Strategic decision making is affected by the 'cohort' of managers that are in place in a firm (Hambrick & Mason, 1984). 'Cohort' is defined by the extent of commonality that a group of managers share, such as the year of entering a job market, the year of birth and career pathway. The more diverse a cohort is, the greater the chance is for conflict to arise among firm managers. Agency Theory posits that the role of Board of Directors is to monitor and ensure proper alignment of interests between managers and shareholders and the former's action would result in the maximisation of the latter's welfare (Jensen & Meckling, 1976). However, managers and insider-directors (i.e. executive directors) tend to reduce the levels of diversification in their firms in order to maximise their strategic control in reducing the risk of employment termination (Baysinger & Hoskisson, 1990). Emphasis on appointing a diversified board of directors is increasing over time. Under such pressure, CEOs are found to appoint directors that share similarity in their profile as other CEOs that are demographically similar to the appointing CEOs (Zhu & Westphal, 2014). In addition, CEOs who departs from their executive role but remain as the Chairperson of the Board of Directors in a firm reduce the influence of newly appointed CEOs and their ability to introduce changes in their firms' corporate strategy (Quigley & Hambrick, 2012). Top management teams are biased by their individual cognitive framework and the context in which they operate when choosing which strategic issues to prioritise and how they will interpret the issues (Thomas & Mcdaniel, 1990). Hence, CEOs who have higher representation on board committees will be able to influence the cognitive bias of committee members and create a CEO-friendly agenda of issues that set the context of board discussion. Furthermore, when the ratio of executive directors is high and/or the ratio of independent directors is low, CEOs may receive more 'management voice' during board discussion. Based on this, we postulate that stronger CEOs' board committee membership, higher ratio of executive directors and lower ratio of independent directors help to install a homogenous cohort in relation to CEOs; hence, less conflict arises in the strategic decision making process by CEOs and the board of directors. This will align the interests of the board of directors with that of the CEOs which focus on less undertaking of changes in corporate strategies and the inherent risks.

H2. *Greater managerial power is associated with lower idiosyncratic volatility.*

3. Methodology and summary statistics

For this study, we chose Australian firms listed on the Australian Stock Exchange due to the accounting and disclosure standards and practices in place and the stability of the legal environment for investor protection based on a common law system (Tian & Twitte, 2011). Furthermore, to-date the issues of corporate governance and asset pricing have not been examined outside of the US market, and because Australia has a distinctively different equity market structure from that of the US, we believe this makes for a valuable study. As it is, the US market consists of a large number of small stocks, but approximately 75% of market capitalisation is associated with the largest 200 companies. Hence, this affects the explanatory power of firm-specific characteristics and external factors such as firm size, trading volume, market power and analyst coverage on idiosyncratic volatility in Australia. In addition, majority of Australian firms are run by professional managers and have dispersed ownership structure, which is different from major East Asian markets that are dominated by large family ownership. Undertaking asset pricing and corporate governance studies in Australia therefore will contribute to the literature on how well currently used asset pricing models and corporate governance literature apply to markets outside of the US. In this paper, we construct a panel dataset by collecting CEO and the data on board of directors from Sirca, corporate financial data from DatAnalysis (Morningstar), and financial intermediary information from the Bloomberg Professional Service. The period for our data is from 2004 to 2013. Our sample consists of both listed and delisted firms and hence we have no concerns about survival bias.

3.1. Managerial power

We develop our measure of managerial power following Agency Theory and Upper Echelon Theory (Hambrick & Mason, 1984; Jensen & Meckling, 1976). In our dataset, the incident of CEO–chair duality proved to be trivial. We thus measured CEO tenure and develop a new index to measure the extent of managerial influence on the board of decision making, by combining a number of the following board of director variables.

We postulate that if a CEO is also the chief financial officer (CFO) and sits on the audit, remuneration or nomination committee will concentrate power in the hands of the CEO. In addition, we add the enabling context for CEO influence by including the executive director ratio per board and the independent director ratio per board to the index. We argue that a higher (lower) executive (independent) director ratio will enhance the CEO's power. Our index thus measures the environment and opportunity that CEOs have to influence board decisions and corporate risks. To ensure consistency in terms of measurement with other financial variables measured in terms of ratios, for each firm we first constructed dummy variables that take the value of one if the CEO is the CFO and the CEO sits on the audit, remuneration, or nomination committee; and zero if otherwise. We then divide the total value of these four dummies by four to obtain a ratio. We then add this ratio to the ratio of executive directors per board and subtract the ratio of independent directors per board to obtain what we call the power index:

$$\text{Dummy variable (CFO)} = 1 \text{ if CEO} = \text{CFO; otherwise } 0$$

$$\text{Dummy variable (Audit)} = 1 \text{ if CEO is a member of audit committee; otherwise } 0$$

$$\text{Dummy variable (Remuneration)} = 1 \text{ if CEO is a member of remuneration committee; otherwise } 0$$

$$\text{Dummy variable (Nomination)} = 1 \text{ if CEO is a member of nomination committee; otherwise } 0$$

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Dummy variables ratio
= (CFO + Audit + Remuneration + Nomination)/4

Power index = dummy variables ratio
+ executive director per board ratio
−independent director per board ratio

We use an equally-weighted index because it is intuitively simple to interpret. Our objective is to investigate the presence of CEOs on board committees and its effect on idiosyncratic volatility. The level of influence can be reflected in the summation of the dummy variables. On the other hand, a value-weighted power index will require an in-depth examination of the psychological and social aspects of how CEOs and directors conduct decision making both at the individual and group level settings. The latter is not the intention of this paper.

Along with the power index, we investigate the effect of CEO tenure. This is because a CEO needs time to become familiar with a firm's operational infrastructure and to form a strategic view to manage the business into the future. Time is also essential for a CEO to accumulate and manipulate information within a firm to make decisions, including lobbying information holders to provide it or use it as the CEO intends.

Ownership data in Australian companies is opaque and dominated by nominee ownership, therefore we do not include this data in our examination (Hu & Tan, 2012). Nominee ownership information is inappropriate for determining the dispersion of ownership and any shareholder monitoring effect because the true effect of control cannot be established.

The Appendix A provides a full description of our key variables.

3.2. Idiosyncratic volatility

Following Ang, Hodrick, Xing, and Zhang (2009), we define idiosyncratic volatility as the standard deviation of the regression residuals of the Fama–French three-factor model. The following is the equation for the three-factor model:

$$r_t - r_{ft} = a + \beta(r_{mt} - r_{ft}) + sSMB_t + hHML_t + \varepsilon_t$$

where the dependent variable is the daily excess return of stock i, r_{mt} is the daily return of the S&P/ASX All Ordinaries Index, and SMB_t and HML_t are the daily returns of risk factor-mimicking portfolios for size and BE/ME, respectively. The idiosyncratic volatility of stock i is estimated as the standard deviation of the regression residual ε_t.

3.3. Other factors that affect idiosyncratic volatility

Our managerial power hypothesis establishes that a firm has lower idiosyncratic volatility if its CEO has more dictating power. However, this hypothesised negative relation between idiosyncratic volatility and managerial power could result from other factors to do with governance. Moreover, previous studies have investigated possible drivers of idiosyncratic volatility that derive from a firm's external governance environment. Hence, we include a set of control variables in our regressions to test the robustness of the relation between managerial power and idiosyncratic volatility.

3.3.1. Size and the book-to-market equity ratio

Risk is closely related to a firm's size and book-to-market equity ratio. For example, Fama and French (1993) find a firm's size and book-to-market equity ratio explain the returns of US stocks and proxy for risks in different dimensions. More specifically, the correlations between these two risk proxies and idiosyncratic volatility have also been reported. For example, Bali, Cakici, Yan, and Zhang (2005) report a negative relationship between idiosyncratic volatility and firm size in the United States; Chang and Dong (2006) show that firm size explains idiosyncratic volatility in Japan; Ferreira and Laux (2007) find that the market-to-book equity ratio is negatively related to idiosyncratic volatility in the United States; and Liu and Di Iorio (2016) use Australian data to show a negative relationship between idiosyncratic volatility and firm size. Since firm size and the market-to-book equity ratio proxy for different risks and are correlated to idiosyncratic volatility, we use these two non-governance variables as control variables in the regressions.

We create a firm size dummy variable that has a value of one for the top 10% largest firms in terms of market capitalisation; and zero if otherwise. We do so because our firm size measures in terms of total assets and market capitalisation do not assume a normal distribution in our samples with a large number of small firms. We also do so to mimic the ASX200 index to control for a firm size effect on information transparency and financial analyst following.

3.3.2. Trading volume

Stock liquidity, as indicated for example by trading volume, has also been shown to positively correlate with idiosyncratic volatility by studies conducted by Lo and Wang (2000) and Chang and Dong (2006).

3.3.3. Firm age

Firm age is closely related to the amount of firm-specific information available in the market (Barry and Brown, 1985). According to our managerial power hypothesis, implication of Barry and Brown (1985) is that older firms tend to reveal more information to the market, resulting in lower idiosyncratic volatility. Results of Zhang (2006) results support this implication. Ferreira and Laux (2007) finds a positive relationship between firm age and idiosyncratic volatility. This may be due to older firms being more complex and therefore the level and quality of information that investors need for evaluation are higher; or because being more complex offers more room for managerial shirking. We use firm age as a proxy to control for information complexity and firm efficiency.

3.3.4. Dividend payout

CEO power can influence dividend payout. La Porta, Lopez-De-Silanes, Shleifer, and Vishny (2000) argue that dividend payout and corporate governance quality are positively related, since better corporate governance provides greater shareholder protection. In return, with greater protection, shareholders can influence firm dividend payouts (Jiraporn & Ning, 2006; Mitton, 2004). As a result, a CEO's autonomy could be reduced in a better-governed firm, resulting in a more open firm with higher idiosyncratic volatility.

3.3.5. Analyst coverage

Lang, Lins, and Miller (2004) find that analysts are less likely to follow badly governed firms whose management has incentives to

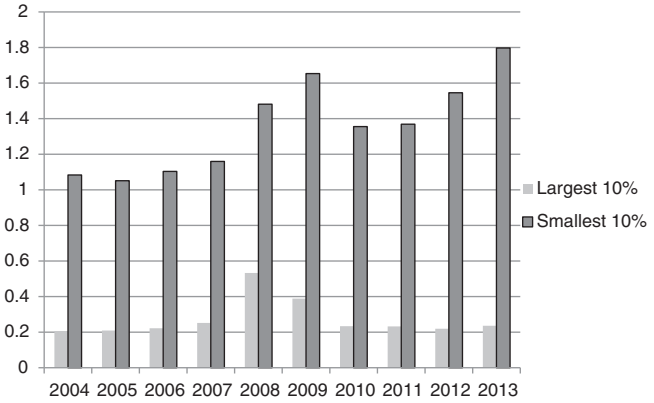

Fig. 1. Mean value of idiosyncratic volatility for the largest and smallest firms.

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Table 1
The number of CEOs who are also the CFO (value = 1) and member of the audit, remuneration and nomination committees (value = 1).

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
CEO-CFO											
0	960	986	999	1000	963	928	909	861	802	575	9083
1	3	5	11	8	2	7	6	8	9	7	66
CEO-audit											
0	938	965	987	973	915	906	896	856	819	640	8895
1	127	128	116	121	136	112	90	80	70	42	1022
CEO-remuneration											
0	910	947	937	943	897	883	868	856	824	648	8713
1	155	146	166	151	154	135	118	80	65	34	1204
CEO-nomination											
0	962	1093	977	985	935	915	894	860	822	646	9089
1	103	113	126	109	116	103	92	76	67	36	828

withhold information. Therefore, analyst following could impact idiosyncratic volatility.

3.3.6. GFC

We also control for volatility during the GFC with a dummy variable *GFC*, which takes the value of one for the years 2008 and 2009; and zero if otherwise. The selection of the years 2008 and 2009 is supported by a higher level of idiosyncratic volatility in these years (see Fig. 1).

We also investigate the effect of announcement, pending and completed corporate takeover events on idiosyncratic volatility. However the number of incidents is low and therefore excluded from our study.

3.4. Summary statistics and correlation test

Table 1 shows the distribution of CEOs who are also the CFO and member of the audit, remuneration and nomination committees in our sample firms. If a CEO is also the CFO, a value of one is assigned to the dummy variable; otherwise they are assigned a zero. If a CEO is a member of the audit, remuneration and nomination committees, a value of one is assigned to the respective dummy variable; otherwise they are assigned a zero. As shown in the table, the incidence of CEO-CFO duality is low while a CEO's board committee membership is not uncommon.

Table 2 shows our summary statistics, presented in three groups: the overall sample, the group where Mcap = largest 10% of firms, and that where Mcap = smallest 10% of firms. The average CEO has served 2.23 years in a firm, whereas the average is close to three in the largest firms and 2.62 years in the smallest. The longest-serving CEO's tenure is 24.85 years. On average, a director's tenure is 3.62 years and a chairperson's tenure is 7.54 years. Board tenure, on average, is similar between the largest and smallest firms; however, the chairperson's tenure is much higher, at 9.71 years in the largest firms compared to 6.63 years in the smallest. The minimum power index value is zero, indicating a strongly independent board and no CEO presence in board committees, while the opposite case is associated with a maximum power index value of 1.6. While the index is similar between the largest and smallest firms, the largest firms show slightly greater power control by the CEO. The average number of analysts following a firm is 2.47, with a maximum of 17.51. The largest firms have a significantly higher number of analysts following (9.23) than the smallest firms (0.21). The largest firms are also significantly more monopolistic than the smallest firms, as measured by the Herfindahl–Hirschman Index (or HHIndex, inter-industry competition) and the ECPM (intra-industry competition). Overall, investors are willing to price firms above their fundamental value, with the market-to-book ratio being higher in the largest firms than in the smallest firms. The largest firms are also more likely to issue dividends than smaller firms. The average value of idiosyncratic volatility is 0.66, with a standard deviation of 0.50.

Fig. 1 shows the mean value of idiosyncratic volatility for the largest 10% and smallest 10% of firms, ranked by market capitalization over

Table 2
Summary statistics. In this table, Power = Power index; Ctenure = CEO tenure; Btenure = board tenure on average; CHtenure = chairperson tenure; Turnover = trading volume divided by outstanding capital issued; Analyst = number of analysts following a firm; ECPM = excess price cost margin; the intra-industry market power measure HHindex = Herfindahl–Hirschman Index; the inter-industry market power measure Mcap = market capitalisation; Dividend = a dividend dummy that equals one if the firm issues dividends and zero if otherwise; Idiovol = idiosyncratic volatility; NPM = net price margin; and Price change = change in share prices at year-end.

	Overall model					Mcap = largest 10%					Mcap = smallest 10%				
Variable	No.	Mean	S.d.	Min	Max	No.	Mean	S.d.	Min	Max	No.	Mean	S.d.	Min	Max
Entrenchment															
Power	9149	0.26	0.18	0.00	1.60	812	0.27	0.17	0.00	1.40	812	0.26	0.18	0.00	1.20
Ctenure	9149	2.23	4.42	0.00	24.85	854	2.95	4.85	0.00	24.85	771	2.62	5.09	0.00	24.85
Btenure	10,139	3.62	3.55	0.00	26.85	905	3.76	3.01	0.00	26.85	989	3.73	3.83	0.00	26.85
CHtenure	9730	7.54	7.22	0.00	39.06	874	9.71	7.45	0.00	39.06	904	6.63	7.27	0.00	39.06
External governance															
Turnover	9714	0.24	0.84	0000.00	8.46	961	0.25	1.01	0.00	8.46	943	0.22	0.84	0.00	8.46
Analyst	11,391	2.47	4.11	0.00	17.51	1002	9.23	5.33	0.00	17.51	1002	0.21	1.58	0.00	17.51
ECPM	6204	8.93	73.23	−329.77	465.58	745	14.55	65.79	−148.80	465.58	483	−0.63	78.33	−329.77	465.49
HHIndex	6163	14.6	137.9	0.0	1684.2	723	68.2	310.7	0.0	1684.2	485	0.2	1.5	0.0	24.5
Firm characteristics															
Mcap[a]	9977	1180	4960	1350	51,600	1002	9750	12,700	1350	51,600	1002	3.32	1.99	0.65	10.80
Debt-assets	9054	18.7	120.0	0.0	1397.2	886	119.7	300.2	0.0	1397.2	898	0.4	11.1	0.0	332.3
Log firm age	10,350	2.10	0.42	0.48	2.87	933	2.08	0.43	0.48	2.87	957	2.11	0.42	0.48	2.87
Market/BOOK	10,078	2.65	4.99	−17.22	43.45	886	3.01	5.54	−17.22	43.45	900	2.62	5.07	−17.22	43.45
Dividend	10,736	0.47	0.50	0.00	1.00	1002	0.92	0.27	0.00	1.00	1002	0.05	0.22	0.00	1.00
Dependent variable															
Idiovol	9578	0.66	0.50	0.05	3.61	847	0.62	0.48	0.05	3.61	880	0.75	0.59	0.05	3.61
Control variables															
GFC	11,391	0.20	0.40	0.00	1.00	1002	0.21	0.41	0.00	1.00	1002	0.21	0.41	0.00	1.00
Instruments															
NPM	7611	−41.0	451.1	−4854.5	1839.8	699	−52.2	461.6	−4854.5	1839.8	655	−66.00	606.2	−4854.5	1839.8
Price change	9119	1.51	5.63	−1.00	43.35	808	1.10	4.39	−1.00	43.35	802	1.47	5.50	−1.00	43.35

[a] Market capitalisation in millions of Australian dollars.

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2004–2013. It is obvious that large firms exhibit lower idiosyncratic volatility than small firms over the sample period. This difference in idiosyncratic volatilities between large and small firms is supported by the literature (Liu & Di Iorio, 2016). More interestingly, the idiosyncratic volatility of small firms did not fall to pre-GFC levels; instead it increased gradually to its highest level in 2013. The idiosyncratic volatility of the large firms though, decreased to pre-GFC levels after 2009. Ooi, Wang, and Webb (2009) find that idiosyncratic volatility tends to increase significantly during periods of crisis, and decrease during non-crisis periods; similarly, Liu and Di Iorio (2016) confirm similar behaviour for idiosyncratic volatility in the Australian stock market. Our results thus complement these previous studies.

This asymmetrical behaviour of idiosyncratic volatility between large and small stocks could reflect unsettled investor confidence due to heightened uncertainties that persist in the post-GFC period. Since small firms are inherently riskier, investors may be reshuffling their portfolios by loading up with large stocks as a motion for risk-aversion. The causes of such asymmetrical behaviour require further exploration.

Table 3 shows only the correlation coefficients that are significant at the 5% and 1% confidence levels; we omit other, insignificant results. We see that idiosyncratic volatility has a positive but weak correlation with CEO tenure and firm age, yet a strong and positive correlation with the GFC dummy variable. We can postulate that investors trade more actively to discover new private information when a firm has a longer-serving CEO, during crisis periods, and when the firm is older and therefore more complex in terms of business and information. On the other hand, idiosyncratic volatility has a negative but weak correlation with the debt-to-assets ratio, dividend payout, and the market-to-book ratio. The power index has a positive but weak correlation with the number of analysts following a firm. The index also has similar relation with the GFC dummy variable, the market-to-book ratio, the net profit margin, and year-end stock price changes. This result suggests that the higher power index that is a proxy of greater information asymmetry, and could be associated with higher numbers of analysts following a firm to extract private information.

The number of analysts following a firm has a strong and positive correlation with the debt-to-assets ratio, since firms with more debt are more closely monitored by creditors; dividend payments; and large firms, since these are generally more transparent. Board, chairperson, and CEO tenure have strong and positive correlations between them; hence, we avoid including all three variables in the same econometric model. Interestingly, CEO tenure has a moderate and positive correlation with the inter-industry market power measure. This is an indication that monopolistic firms could provide an environment that shields CEOs from constant monitoring and disciplinary actions; hence CEOs may be more likely to be entrenched in these firms. The inter-industry market power measure has a similar relation with the number of analysts following a firm and the intra-industry market power measure. The other correlation coefficients are lower than 0.12 and are therefore not discussed in detail here.

4. Empirical results

We use a panel dataset to investigate the effect of CEO power on idiosyncratic volatility from both time series and cross-sectional perspectives. As discussed by de Andres and Vallelado (2008), panel data analysis allows us to consider the unobserved and constant heterogeneity arising from firm-specific features. In our case, it is important to make allowances for how investors and financial intermediaries, business strategies, managerial know-how, and skills change under different business conditions over time that could affect our explanatory and dependent variables. Pooled ordinary least squares (OLS) estimations will not be able to overcome the simultaneity, serial correlations, and endogeneity issues that are involved with the panel data structure. We perform a Durbin–Wu–Hausman test to determine endogeneity

Table 3
Pearson correlations for key variables. Only correlation coefficients that are significant at the 1% and 5% levels are shown. The superscripts * indicates significance at the 1% level.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Analyst	1																
2. Board tenure	–	1															
3. Chairperson tenure	0.0789*	0.5757*	1														
4. CEO tenure	0.0675*	0.4776*	0.1038*	1													
5. Debt-Assets	0.2341*	–	–	0.0476*	1												
6. Dividend	0.3603*	0.1080*	0.2418*	0.0304*	0.1509*	1											
7. ECPM	0.1100*	0.1051*	–	0.0681*	–	–	1										
8. GFC	–	−0.0684*	–	–	0.0254	–	−0.0518*	1									
9. HHIndex	0.2108*	0.1293*	0.0353*	0.1267*	–	0.0704*	0.1462*	−0.0518*	1								
10. Idiovol	–	–	−0.024	0.0321*	−0.0375*	−0.0880*	–	0.2041*	–	1							
11. Firm age	–	0.0495*	0.0286*	–	0.0265	–	0.0382*	–	0.0397*	0.0216	1						
12. Market/book	–	–	–	–	0.0269	–	−0.0279	−0.0299*	–	–	−0.0756*	1					
13. Market capitalisation	0.3992*	–	0.0492*	0.0676*	0.3007*	0.2295*	0.0328	–	0.1513*	−0.0565*	–	–	1				
14. Net profit margin	–	–	–	–	−0.0577*	–	0.0694*	–	–	–	0.0239	−0.0692*	–	1			
15. Price change	−0.0267	–	–	–	−0.0598*	–	–	−0.0293*	−0.0285	–	0.1246*	0.0685*	–	0.0495*	1		
16. Turnover	0.0514*	–	−0.0273*	–	−0.0348*	−0.0657*	0.1007*	−0.022	0.1775*	–	–	–	–	–	–	1	
17. Power	0.0955*	–	–	–	–	–	−0.0410*	0.0511*	–	–	−0.022	0.027	–	0.0273	0.0245	–	1

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between our dependent variable and the key explanatory variable (power index) and find that OLS is not consistent [$F(1, 5227) = 56.94$, $p < 0.0000$]. We address this issue by using dynamic panel data estimation through system of GMM. A system panel estimator combines both levels of panel data and difference panel data, where the first differenced variables are instruments for the levels of estimation to improve consistency and efficiency and produce heteroskedasticity-consistent standard errors (Arrellano & Bond, 1991, Roodman, 2006).

We first identify our equation model on levels to investigate the effect of the internal and external governance models on idiosyncratic volatility:

$$Idiovol_{it} = \alpha_{it} + \beta_1 Idiovol_{i,t-1} + \beta_2 Power_{it} + \beta_3 Control_{it} + \mu_{it} \quad (1)$$

where

$Idiovol_{it}$ idiosyncratic volatility for a given firm i at time t (years)
$Idiovol_{i,t-1}$ lagged value of idiosyncratic volatility
$Power_{it}$ power index
$Control_{it}$ control variables for a given firm i at time t (years), measured in terms of CEO tenure, a firm size dummy, log firm age, the market-to-book ratio, a dividends paid dummy, the debt-to-total assets ratio, a GFC dummy, the Herfindahl–Hirschman Index of market competition, the EPCM, and the number of analyst following

Following Mileva (2007), a system GMM method is selected for the following reasons. First, the Durbin–Wu–Hausman result shows that $Power_{it}$ regressors are endogenous. We cannot be sure that causality does not run both ways in Eq. (1). Idiosyncratic volatility, by definition, is the risk that is not correlated with systematic movements in the market. Hence, part of idiosyncratic volatility can arise from firm-specific characteristics, including management structure and managerial decision making. We therefore cannot ascertain that management characteristics and influence are not already captured in idiosyncratic volatility and cause changes to it instead of vice versa. For example, increasing idiosyncratic volatility is related to decreasing managerial investment, especially if the executives hold stocks of the firms (Panousi & Papanikolaou, 2012). Second, since our dataset is a panel of firms over 10 years there is a risk that time-variant firm characteristics are correlated with our $Power_{it}$ and $Control_{it}$variables. Third, our panel data consists of 10 years of the time dimension ($T = 10$) but the number of firms dimension (N) is greater than T.

We use a number of instrumental variables to remove endogeneity from our explanatory variables, particularly the $Power_{it}$ variables. The variables we use include the net profit margin and change in stock prices. These variables are used in the review of managerial performance and could influence CEOs' negotiations about their future contracts. This approach will pre-determine the endogenous variables and remove the correlation between them with the error term in Eq. (1):

$$\mu_{it} = \nu_{it} + \varepsilon_{it} \quad (2)$$

where

ν_{it} unobserved firm-specific effects
ε_{it} observation-specific errors

We transform Eq. (1) into

$$\Delta Idiovol_{it} = \alpha_{it} + \beta_1 \Delta Idiovol_{i,t-1} + \beta_2 \Delta Power_{it} + \beta_3 \Delta Control_{it} + \Delta\mu_{it} \quad (3)$$

Hence, from Eq. (2), we obtain

$$\Delta\mu_{it} = \Delta\nu_{it} + \Delta\varepsilon_{it}$$

The system GMM then combines the first difference model with one in levels to estimate Eq. (1). Since our panel data sample contains a large number of firms, a system GMM estimator is an efficient and appropriate way to address issues of autocorrelation and heteroscedasticity within firms and the endogeneity issue in governance variables, since managerial and board data do not change regularly over time (Roodman, 2006).

Table 4 shows our regression results. We have a sample dataset of 2664 observations and 935 groups for this estimation model. First, we test whether our GMM estimator is consistent through the validity of our instruments. The results of a Sargan test suggest we should not reject the over identifying restrictions, and that the instruments are not correlated with the error terms from the regression in levels. Then we test if the error term exhibits second-order serial correlation. This prediction is rejected by an AR(2) test, where the p-value is 0.979. The first-order error term is, by nature, serially correlated; even though AR(1) is significant in rejecting the null, it does not invalidate our results.

H1 is rejected as our result shows that CEO tenure has insignificant effect on idiosyncratic volatility. On the other hand, the power index has a negative coefficient value of −0.3324 that is significant at the 1% level. This result supports H2, that more powerful CEOs are more capable of reducing volatility. They undertake lower number of changes in corporate strategy and risks, which could result in less volatile stock prices. The GFC dummy is significant at the 1% level and a positive result indicates that volatility is higher during a crisis period. Our large firm size dummy has a negative and significant coefficient for idiosyncratic volatility. This indicates that the top 10% largest firms have lower levels of volatility. Other control variables are found to have no significant effect on idiosyncratic volatility. The internal governance environment has a stronger effect in explaining idiosyncratic volatility than firm-specific characteristics and external factors. Our results strongly support the managerial power hypothesis, even in the presence of a large number of control variables that are deemed to have a significant effect on idiosyncratic volatility.

Table 4
Results for a system GMM estimator. The dependent variable is idiosyncratic volatility (on an annual basis). The explanatory variables are shown in the left-hand column. Firm size is measured by the dummy variable Mcap-Top, which takes a value of one if the firm has market capitalisation in the top 10% of all firms in the sample, and zero if otherwise. Turnover is the annual trading volume divided by outstanding share capital of a firm; Market/book is the price-to-book ratio; Dividend is a dummy variable that takes the value of one if a firm issues dividends in a given year, and zero if otherwise; and GFC is a dummy variable that takes the value of one for the years 2008 and 2009 and zero otherwise. The superscripts *, **, and *** denote 10%, 5%, and 1% confidence levels, respectively.

Explanatory variables	Coefficient	Std. errors
Constant	0.9470*	0.5685
Idiosyncratic volatility (lag)	−0.0301	0.1740
Power	−0.3324**	0.1646
CEO tenure	−0.0058	0.0169
Mcap-top	−1.0984**	0.5222
Log firm age	−0.0584	0.2460
Turnover	−0.0483	0.1555
Market/book	−0.0254	0.0166
Dividend	0.1623	0.2363
GFC	0.2591***	0.0854
	$F(9, 2654) = 2.45$	$p = 0.009$
	$AR(1) = -3.54$	$p = 0.000$
	$AR(2) = -0.03$	$p = 0.979$
	Sargan: $chi^2(25) = 29.71$	$p = 0.235$
	No. of instruments = 35	
	No. of observations = 2664	
	No. of groups = 935	

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4.1. Product market competition constraints

We further conduct robustness checks on our primary estimator by investigating factors that could influence information asymmetry between firms and outsiders. First, we investigate product market competition constraints on CEO behaviours and idiosyncratic volatility at both inter- and intra-industry levels. Although our results show a significant negative effect of managerial power on idiosyncratic volatility, we do not control for sector variances in our model. Industry factors such as product market competition could affect managerial actions. Scharfstein (1988) postulates that, in a strongly competitive market, entrepreneurial managers can outperform other managers given their better efficiency and ability to absorb price shocks. Gaspar and Massa (2006) examine the determinants of idiosyncratic volatility from the perspective of product market competition. They argue that monopolistic firms (with high market power) have the upper hand in smoothing out idiosyncratic volatility by minimising volatility in their cost functions and manipulating pricing to maintain a constant profit stream observable by outsiders. An alternative view is that monopolistic firms are more capable of managing uncertainties due to market competition and more able to reduce volatility in their earnings.

Both arguments relate to how market (outside investors) perceive and analyse corporate information that drives their trading interests. Gaspar and Massa (2006) find evidence for both hypotheses, and conclude that competition is a source of idiosyncratic volatility in which higher competition (lower monopolistic power) is linked to higher volatility. This result is echoed in Irvine and Pontiff's (2009) time series study in the US and cross-country examination of market competition and idiosyncratic volatility. They find that the levels of market competition and fundamental cash flow increased with time alongside an increase in idiosyncratic volatility. Further support for these studies can be found in the work of Datta, Iskandar-Datta, and Singh (2013) for the US market. We use three different measures of market power but, instead of idiosyncratic volatility, they focus on the extent of earnings manipulation that affects investors' valuation of firms and stock prices. We include market competition measures in our model to control for the constraints and influences faced by managers in different market structures.

Table 5 shows the results for inter-industry market power measured by the Herfindahl–Hirschman Index (HHIndex) in Panel A and the intra-industry market power measured by the ECPM in Panel B. Neither the Sargan nor the AR(2) test rejects the null. Due to limited data availability for computing market power measures, the numbers of observations decrease to 1720 and 1730 for each model, respectively. The results are similar to those of our primary model. The power index has significant explanatory power for idiosyncratic volatility. The coefficients are −0.3840 and −0.3347 in Panels A and B, respectively, both significant at the 5% level. The large firm size dummy has a significant (10% confidence level) and negative effect on idiosyncratic volatility, but only in Panel B. This result is similar to the previous result that finds idiosyncratic volatility is highest in small firms. The GFC dummy retains its explanatory power in this estimation. The HHIndex has an insignificant and trivial effect (coefficient = −0.0005), while the ECPM has a similar but positive relation (coefficient = 0.0012) with idiosyncratic volatility. Our findings are inconsistent with those of Gaspar & Massa (2006).

After controlling the effect of market competition to account for industry factors, we can still maintain our hypothesis that CEOs with greater control are able to influence idiosyncratic volatility. Although our results do not show that the level of product market competition constrains managerial behaviour, we cannot reject the possibility that powerful managers may manipulate board decision making and corporate strategies and risks. We also show that conventional factors, such as trading volume, analyst following, firm size, and market-to-book ratio, lack the power to explain long-term idiosyncratic volatility in light of managerial power. One explanation for this could be that accounting information can be manipulated by managers to generate signals to their advantage.

4.2. Financial intermediaries

Tables 4 and 5 indicate that larger firms, by market capitalization, are more open and have lower idiosyncratic volatility (Bali et al., 2005; Chang & Dong, 2006). Bushman, Piotroski, and Smith (2004) find that firm size has a positive effect on financial disclosure. This may suggest that large firms have better disclosure systems and are required to adhere to more stringent disclosure standards and expectations.

Table 5
Results for the system GMM estimator. The dependent variable is idiosyncratic volatility (on an annual basis). The explanatory variables are shown in the left-hand column. Firm size is measured by the dummy variable Mcap-Top, which takes a value of one if the firm has a market capitalisation in the top 10% of all firms in the sample and zero otherwise; Turnover is the annual trading volume divided by the outstanding share capital in a firm; Market/book is the price-to-book ratio; Dividend is a dummy variable that takes the value of one if a firm issues dividends in a given year and zero otherwise; GFC is a dummy variable that takes the value of one for the years 2008 and 2009 and zero otherwise; HHIndex is the Herfindahl–Hirschman Index, which measures inter-industry market power; ECPM is the ECPM, which measures intra-industry market power; and Analyst is a dummy variable that takes the value of one if the firm is in the top 10% of all firms in the sample in terms of number of analysts following it and zero otherwise. The superscripts *, **, and *** denote the 10%, 5%, and 1% confidence levels, respectively.

Explanatory variables	Panel A		Panel B		Panel C	
	Coefficient	Std. errors	Coefficient	Std. errors	Coefficient	Std. errors
Constant	0.9007	0.6786	1.2850*	0.7359	1.2119**	0.5814
Idiosyncratic volatility (lag)	−0.2714	0.2327	−0.2466	0.2553	−0.3164	0.2406
Power	−0.3840**	0.1591	−0.3347**	0.1664	−0.3060**	0.1557
CEO tenure	0.0167	0.0219	0.0006	0.0183	0.0029	0.0204
Mcap-top	−0.7051	0.4368	−0.8024*	0.4657	–	–
Log firm age	−0.0072	0.3089	−0.1613	0.3444	−0.1817	0.2552
Turnover	−0.0948	0.1250	−0.1001	0.1317	0.0173	0.1545
Market/book	−0.0273	0.0214	−0.0306	0.0216	0.0035	0.0167
Dividend	0.2111	0.1993	0.1540	0.2007	0.0147	0.2436
GFC	0.3227***	0.1152	0.3195***	0.1167	0.2927***	0.1038
HHIndex	−0.0005	0.0008	–	–	–	–
ECPM	–	–	0.0012	0.0033	–	–
Analyst	–	–	–	–	0.1543	0.5666
	F(10, 1709) = 1.95	$p = 0.035$	F(10, 1719) = 1.84	$p = 0.050$	F(9,2663) = 1.83	$p = 0.058$
	AR(1) = −1.97	$p = 0.049$	AR(1) = −1.69	$p = 0.092$	AR(1) = −1.79	$p = 0.073$
	AR(2) = −0.65	$p = 0.519$	AR(2) = −0.23	$p = 0.815$	AR(2) = −1.59	$p = 0.112$
	Sargan: chi^2 (24) = 19.10	$p = 0.747$	Sargan: chi^2 (24) = 18.89	$p = 0.758$	Sargan: chi^2 (9) = 14.37	$p = 0.110$
	No. of instruments = 35		No. of instruments = 35		No. of instruments = 19	
	No. of observations = 1720		No. of observations = 1730		No. of observations = 2673	
	No. of groups = 798		No. of groups = 802		No. of groups = 935	

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Furthermore, the disclosure costs in larger firms are lower compared to those of smaller firms (Verrecchia, 1983); larger firms are found to have higher levels of disclosure. In addition, financial intermediaries increase firm disclosure and transparency by providing analyst reports and making recommendations for investors (Healy & Palepu, 2001). Often, their choice of firms depends on the level of information they can obtain, such that larger firms receive higher levels of exposure through financial intermediaries. This phenomenon is evident from the strong correlation between market capitalisation and the number of analysts following a firm in Table 3. We construct a dummy variable named *Analyst* as an alternative proxy of firm size, since this variable does not assume a normal distribution. Many small firms do not have analysts following them or have a very low number or nil. The variable takes a value of one if a firm is in the top 10% in terms of analysts following for a given year, and zero if otherwise. This measure controls for the effect of the degree of disclosure and transparency a firm has in the market on idiosyncratic volatility. We also follow Datta et al. (2013) to construct the Analyst variable as Log(1 + number of analysts following) / 100. The results are qualitatively similar to those for our measure.

Panel C of Table 5 shows results similar to those in the previous tables. The power index has a similar magnitude and sign as in the previous results, significant at the 5% level. We omit the firm size variable from our model, since it is strongly correlated with our analyst following variable. The GFC dummy has the same explanatory power. The variable Analyst as a proxy of firm size and information transparency has a positive but insignificant effect on idiosyncratic volatility. This result is not in line with that of Datta et al. (2013), who find that analyst coverage reduces information asymmetry between firms and external investors. Furthermore, the Analyst variable has the opposite sign compared to the firm size variable, where the former has a positive effect and the latter has a negative effect. This suggests that the Analyst variable does not embody the same information as measured by firm size, but it possibly reflects the trading interests and activities of investors in the market.

We postulate that the number of analysts following a firm is an imperfect substitute of information arbitrage trading by investors. When investors attempt to extract private information from firms, they engage in trading that induces higher idiosyncratic volatility (Ferreira & Laux, 2007). This said, analysts are able to assist in extracting private information on behalf of investors by engaging directly with firm managers. Financial analysts though, are intermediaries between firms and investors, and information pass-through to investors is imperfect, since analysts can retain part of the information they gather to extract further private benefits for themselves later. This agency problem may be known by investors who cannot observe its extent. Hence, investors are still required to extract additional private information to confirm and compare the information they receive from analysts. Therefore, more analysts following a firm indirectly relates to higher levels of idiosyncratic volatility. Overall, our managerial hypothesis holds after several robustness checks. In addition, we also show that the internal governance structure has a stronger explanatory power for idiosyncratic volatility than external environmental factors.

5. Conclusions

Idiosyncratic volatility has gained wide attention as an important risk factor in asset pricing. The challenge remains in explaining what determines idiosyncratic volatility. We postulate that high managerial (CEO) power is associated with low idiosyncratic volatility due to management's ability to manipulate board decision making and corporate strategies and risks via their board committee membership and an enabling context with high 'management voice' during board discussion. Based on Upper Echelon Theory and Agency Theory, we argue that powerful managers, under market structure constraints, are able to pursue self-interests at the costs of shareholders' welfare. This is possible because managerial effort cannot be fully observed by shareholders and outsiders.

Our sample consists of Australian listed and delisted firms between 2004 and 2013. We use system GMM to address several shortfalls in OLS regression modelling, including autocorrelation in time variance firm characteristics and endogeneity between management variables and idiosyncratic volatility. We measure CEO tenure and construct a power index to measure the level of managerial power of the CEO. We control for the effect of other factors that affect idiosyncratic volatility, including trading turnover, the book-to- market ratio, analyst coverage, firm size, firm age, dividends, the GFC, takeover events, and market competition. We hypothesise that powerful managers (high power index) are associated with low idiosyncratic volatility and that the internal governance structure is superior in its influence on idiosyncratic volatility than firm-specific characteristics and external factors.

After controlling for the important factors mentioned above, we find that the power index has a significant and negative effect on idiosyncratic volatility and its effect is robust to the presence of various control variables and other checks while CEO tenure has no significant effect. Our results support our hypothesis that higher managerial power leads to lower idiosyncratic volatility. We test our managerial power hypothesis through an investigation of a firm's governance structure that enables CEOs to accumulate control through their long tenure. Although we take a step closer to addressing the postulation of Gompers et al. (2003), that the governance structure is a symptom and not a cause of corporate strategies and culture, by examining the leadership structure that instils corporate strategies and culture, we stop short of examining how this structure results in various degrees of information asymmetry and in what form, as well as their effect on idiosyncratic volatility. This will be the next question in our quest to determine the causes of long-term idiosyncratic volatility.

The GFC effect is profound and our dummy variable is both reliable in terms of prediction power and consistent in terms of the direction of the effect. During the GFC period, idiosyncratic volatility was higher than in the non-GFC period, as would be expected. However, we do not find market power, both inter-industry and intra-industry measures, to have any influence on idiosyncratic volatility. We also find the effect of financial intermediaries, in terms of the number of analysts following a firm, on idiosyncratic volatility is insignificant. In addition, there is little evidence of any significant effect of the other factors including trading volume, price/book ratio and dividend payout. Therefore, the power of governance structure variables in determining long-term idiosyncratic volatility is superior to that of other factors that may be appropriate in explaining short-term or shorter-term effects.

Appendix A

Table A.1
Variable descriptions.

Variable	Description
CEO tenure	Tenure of CEO, in years. If there is more than one CEO, we take the average value. An alternative measure is to take the sum of all the CEO tenure durations.
Power	This is an index that indicates the centralisation of power by the CEO: Dummy variable (CFO) = 1 if CEO = CFO; otherwise 0 Dummy variable (Audit) = 1 if CEO is a member of audit committee; otherwise 0 Dummy variable (Remuneration) = 1 if CEO is a member of remuneration committee; otherwise 0 Dummy variable (Nomination) = 1 if CEO is a member of nomination committee; otherwise 0 Dummy variables ratio = (CFO + Audit + Remuneration + Nomination) / 4 ***Power index*** = dummy variables ratio + executive director per board ratio − independent director per board ratio
MCAPTOP	This variable takes the value of one if a firm in a given year has a market capitalisation value in the top 10% of all listed firms; zero

(continued on next page)

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Table A.1 (*continued*)

Variable	Description
	otherwise.
Log firm age	Log of Firm Age, measured in terms of the difference between a firm's financial balance date and its listing date.
Turnover	Trading volume divided by outstanding capital issued.
Analyst	Dummy variable: Takes the value of one if the total number of analyst forecast recommendations made for a given firm in a given year is in the top 10% of the sample firms; otherwise zero.
Market/book	The equity market price divided by the value of total assets.
Dividend	This variable takes the value of one if a firm paid dividends in a given year; zero otherwise.
HHIndex	The Herfindahl–Hirschman Index of market power concentration. This is an inter-industry market power measure. It is the sum of the squared market shares (sales over total industry sales) of firms in the industry (Gaspar & Massa, 2006).
ECPM	Excess price cost margin. This is an intra-industry market power measure. It is the difference between a firm's operating profit margin and the average operating profit margin of its industry (Gaspar & Massa, 2006).
GFC	This variable takes the value of one for all observations in the years 2008 and 2009 to denote the GFC effect; zero otherwise.
Idiovol	Idiosyncratic volatility.

References

Agrawal, A., & Knoeber, C. R. (1996). Firm performance and mechanisms to control agency problems between managers and shareholders. *The Journal of Financial and Quantitative Analysis*, *31*, 377–397.

Ang, A., Hodrick, R., Xing, Y., & Zhang, X. (2009). High idiosyncratic volatility and low returns: International and further US evidence. *Journal of Financial Economics*, *91*, 1–23.

Angelidis, T. (2010). Idiosyncratic risk in emerging markets. *The Financial Review*, *45*, 1053–1078.

Arrellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*, 277–297.

Bali, T. G., Cakici, N., Yan, X. S., & Zhang, Z. (2005). Does idiosyncratic risk really matter? *The Journal of Finance*, *60*, 905–929.

Barry, C. B., & Brown, S. J. (1985). Differential information and security market equilibrium. *Journal of Financial and Quantitative Analysis*, *20*, 407–422.

Baysinger, B., & Hoskisson, R. E. (1990). The composition of boards of directors and strategic control: Effects on corporate strategy. *The Academy of Management Review*, *15*, 72–87.

Bebchuk, L. A., & Fried, J. M. (2003). Executive compensation as an agency problem. *The Journal of Economic Perspectives*, *17*, 71–92.

Berger, P. G., Ofek, E. L. I., & Yermack, D. L. (1997). Managerial entrenchment and capital structure decisions. *The Journal of Finance*, *52*, 1411–1438.

Bhagat, S., & Bolton, B. (2008). Corporate governance and firm performance. *Journal of Corporate Finance*, *14*, 257–273.

Bushman, R. M., Piotroski, J. D., & Smith, A. J. (2004). What determines corporate transparency? *Journal of Accounting Research*, *42*, 207–252.

Chang, E. C., & Dong, S. (2006). Idiosyncratic volatility, fundamentals, and institutional herding: Evidence from the Japanese stock market. *Pacific-Basin Finance Journal*, *14*, 135–154.

Chen, J., Ezzamel, M., & Cai, Z. (2011). Managerial power theory, tournament theory, and executive pay in China. *Journal of Corporate Finance*, *17*, 1176–1199.

Chok, J. I., & Sun, Q. (2007). Determinants of idiosyncratic volatility for biotech IPO firms. *Financial Management*, *36*, 107–122.

Claessens, S. (2006). Corporate governance and development. *World Bank Research Observer*, *21*, 91–122.

Daily, C. M., & Johnson, J. L. (1997). Sources of CEO power and firm financial performance: A longitudinal assessment. *Journal of Management*, *23*, 97–117.

Datta, S., Iskandar-Datta, M., & Singh, V. (2013). Product market power, industry structure, and corporate earnings management. *Journal of Banking & Finance*, *37*, 3273–3285.

De Andres, P., & Vallelado, E. (2008). Corporate governance in banking: The role of the board of directors. *Journal of Banking & Finance*, *32*, 2570–2580.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*.

Ferreira, M. A., & Laux, P. A. (2007). Corporate governance, idiosyncratic risk, and information flow. *The Journal of Finance*, *62*, 951–989.

Gaspar, J. -M., & Massa, M. (2006). Idiosyncratic volatility and product market competition. *Journal of Business*, *79*, 3125–3152.

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate governance and equity prices. *Quarterly Journal of Economics*, *118*, 107–155.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *The Academy of Management Review*, *9*, 193–206.

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, *31*, 405–440.

Hu, H. W., & Tan, M. (2012). Corporate governance and initial public offerings in Australia. In A. Zattoni, & W. Judge (Eds.), *Corporate Governance and Initial Public Offerings*. New York: Cambridge University Press.

Irvine, P., & Pontiff, J. (2009). Idiosyncratic return volatility, cash flows, and product market competition. *Review of Financial Studies*, *22*, 1149–1177.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*, 305–360.

Jiraporn, P., & Ning, Y. (2006). Dividend policy, shareholder rights, and corporate governance. *Journal of Applied Finance*, *16*, 24.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., & Vishny, R. W. (2000). Agency problems and dividend policies around the world. *The Journal of Finance*, *55*, 1–33.

Lang, M. H., Lins, K. V., & Miller, D. P. (2004). Concentrated control, analyst following, and valuation: Do analysts matter most when investors are protected least? *Journal of Accounting Research*, *42*, 589–623.

Lo, A. W., & Wang, J. (2000). Trading volume: definitions, data analysis, and implications of portfolio theory. *Review of Financial Studies*, *13*, 257–300.

Liu, B., & Di Iorio, A. (2016). The pricing of idiosyncratic volatility: An Australian study. *Australian Journal of Management*, *41*, 353–375.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *The Journal of Finance*, *42*, 483–510.

Mileva, E. (2007). *Using Arellano-bond dynamic panel GMM estimators in Stata*. New York: Economics Department, Fordham University.

Miller, D. (1991). Stale in the saddle: CEO tenure and the match between organization and environment. *Management Science*, *37*, 34–52.

Mitton, T. (2004). Corporate governance and dividend policy in emerging markets. *Emerging Markets Review*, *5*, 409–426.

Ooi, J. T. L., Wang, J., & Webb, J. R. (2009). Idiosyncratic risk and REIT returns. *Journal of Real Estate Finance and Economics*, *38*, 420–442.

Panousi, V., & Papanikolaou, D. (2012). Investment, idiosyncratic risk, and ownership. *The Journal of Finance*, *67*, 1113–1148.

Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. *Journal of Banking & Finance*, *33*, 1340–1350.

Peterson, D. R., & Smedema, A. R. (2011). The return impact of realized and expected idiosyncratic volatility. *Journal of Banking & Finance*, *35*, 2547–2558.

Quigley, T. J., & Hambrick, D. C. (2012). When the former ceo stays on as board chair: Effects on successor discretion, strategic change, and performance. *Strategic Management Journal*, *7*, 834–859.

Roodman, D. (2006). *How to do xtabond2: An introduction to "difference" and "system" GMM in Stata*. Cambridge, Massachusetts: The Center for Global Development.

Scharfstein, D. (1988). Product-market competition and managerial slack. *RAND Journal of Economics*, *19*, 147–155.

Schulze, W. S., Lubatkin, M. H., Dino, R. N., & Buchholtz, A. K. (2001). Agency relationships in family firms: Theory and evidence. *Organization Science*, *12*, 99–116.

Thomas, J. B., & Mcdaniel, R. R. J. (1990). Interpreting strategic issues - effects of strategy and the information-processings structure of top management teams. *The Academy of Management Journal*, *33*, 286–306.

Tian, G. Y., & Twitte, G. (2011). Corporate governance, external market discipline and firm productivity. *Journal of Corporate Finance*, *17*, 403–417.

Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, *5*, 179–194.

Wiersema, M. F., & Bantel, K. A. (1992). Top management team demography and corporate strategic change. *The Academy of Management Journal*, *35*, 91–121.

Xie, Q. (2014). CEO tenure and ownership mode choice of Chinese firms: The moderating roles of managerial discretion. *International Business Review*. http://dx.doi.org/10.1016/j.ibusrev.2014.02.003.

Zhang, X. (2006). Information uncertainty and stock returns. *The Journal of Finance*, *61*, 105–137.

Zhu, D. H., & Westphal, J. D. (2014). How directors' prior experience with other demographically similar CEOs affects their appointments onto corporate boards and the consequences for CEO compensation. *The Academy of Management Journal*, *57*, 791–813.

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