

The Effectiveness of Ownership Concentration, Debt and Firm Value as Governance Mechanisms

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The aim of this study is to investigate whether ownership concentration, debt and firm value should be utilised as a group in order to ensure their effectiveness as governance mechanisms. Also, it entails to answer the question of whether these mechanisms are substitute for or complementary with each other. These mechanisms are selected because they are hypothesised to have dual effects on each other. Using the largest 100 Australian firms in years 1997–2008, we employ GMM estimation. The study fails to find evidence that ownership concentration, debt and firm value should be employed as a group in order to be effective governance mechanisms. It also finds no evidence to support the existence of an interaction effect among these mechanisms, and thus fails to find the substitutability or complementarity among them. However, it is found that the ownership concentration of the largest five shareholders uses debt as a substitute monitoring mechanism when it functions as a stand-alone mechanism.

Field of Research: Finance

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1. Introduction

Extensive literature has noted the significance of corporate governance mechanisms in solving or at least mitigating agency problems in corporations. Agrawal and Knoeber (1996) concluded that the evidence from studies that use governance mechanisms individually can be misleading. More recently, it has been suggested that these mechanisms function best as a group rather than as a stand-alone mechanism (Ward, Brown & Rodriguez, 2009). The researcher should be able to identify whether these mechanisms as a group are substitute for or complementary with each other (Ward, Brown & Rodriguez, 2009, Brown, Beekes & Verhoeven, 2011) by investigating the interaction effects among them. Separate work by Mulherin (2005), Bhagat, Bolton and Romano (2010), and Kim and Lu (2011) suggests that the investigation of a particular corporate governance mechanism should also control the interactions with other governance mechanisms. However, most previous studies have made conclusions regarding the interaction effects based on the relationship between the explanatory and dependent variables shown in the models regardless of the types of estimations used (see for instance: Dang, 2011, Setia-Atmaja, 2009, Setia-Atmaja, Tanewski & Skully, 2009). As Bhagat, Bolton and Romano (2010, p.104) note, 'Researchers have

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undertaken little modelling of corporate governance and no satisfactory theory exists of when or whether different aspects of good governance should be understood to be substitutes or complements'. Further, there are no studies in the literature investigating the link among them. The present study therefore seeks to contribute to the literature by including the interaction variables between ownership concentration and firm value, ownership concentration and debt, and debt and firm value in order to discover whether they function best as a group, as well as to identify their interaction effects in order to determine the substitutability or complementarity of them.

This study aims at answering a research question as to whether ownership concentration, debt and firm value should be utilised as a group in order to ensure their effectiveness as governance mechanisms. This entails the following questions: (1) Are there any interaction effects between ownership concentration and debt, ownership concentration and firm value, and debt and firm value towards firm value, debt, and ownership concentration respectively? (2) If interaction effects do exist, do they substitute or complement each other? This study applies the generalised method of moments (GMM) estimation method in order to correct the dynamic endogeneity issue.

The study fails to find evidence that ownership concentration, debt and firm value should be employed as a group in order to be effective governance mechanisms. This study finds no evidence to support the existence of interaction effects between these mechanisms, and thus fails to find the substitutability or complementarity of them. As such, the findings in the present study are not consistent with some of the findings previously found that other governance mechanisms are substitute or compliment each other.

The remainder of this paper proceeds as follows. Section 2 reviews on previous studies. Section 3 describes on methodology employed. Findings are presented in Section 4 and Section 5 ends this paper with conclusion.

2. Literature Review

A large body of literature has emphasised the significance of corporate governance mechanisms in solving or at least mitigating the agency problems in corporations. Nevertheless, those findings have failed to agree on whether these mechanisms function best as a substitute or complement each other (Pindado and de la Torre, 2006). In their conceptual paper, Ward, Brown and Rodriguez (2009) proposed that in addressing agency problems between shareholders and managers in the Anglo-Saxon system of corporate governance, monitoring and incentive alignment should be utilised as a governance bundle instead of in isolation. In addition, as a governance bundle, these corporate governance mechanisms are functions of firm performance, and firm performance is the key determinant of whether these mechanisms act as substitutes or complements within the bundle. This study modifies Ward's, Brown's and Rodriguez's (2009) concept by exploring ownership concentration and debt as the corporate governance mechanisms that are investigated as a bundle in mitigating agency problems between large and minority shareholders. Further, firm value is also treated as one of the governance mechanisms in the governance bundle that might have the potential to overcome the agency problems when it is combined with ownership concentration and debt.

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Miguel, Pindado and De La Torre (2005) found that a complementary effect of insider ownership, debt and dividends was used to control agency problems in Spanish firms. However, this complementary effect did not exist when the controlling owners, who were the significant shareholders through their concentrated ownership, expropriated firm minority shareholders, and the managerial ownership of firm managers resulted in managerial entrenchment.

Using the same dataset and within the same period of study in Miguel, Pindado and De La Torre (2005), Pindado and de la Torre (2006) found that ownership concentration and insider ownership were complementary mechanisms and that agency problems between large and minority shareholders, and between shareholders and firm managers, in Spanish firms could not be resolved by using only one of the mechanisms. They also found that the monitoring role of large shareholders substituted the disciplinary function of debt.

Setia-Atmaja, Tanewski & Skully (2009) investigated whether debt, dividends and board structure served as corporate governance mechanisms that alleviated agency problems between controlling and minority shareholders or aggravated them in family controlled firms. They found that family firms used debt as well as dividends to substitute for independent directors in controlling agency problems. Also, they found that family firms moderated the effectiveness of these mechanisms in controlling agency problems as the effects of debt, dividend and board size on firm performance were stronger in family firms than in non-family firms; thus suggesting that investors perceived that the agency problems between controlling and minority shareholders in family firms were more rigorously controlled than the agency problems between shareholders and managers in non-family firms. More recently, Lv and Li (2013) also found that dividend was used as a substitution for the ownership concentration in mitigating agency conflicts in Malaysian listed companies.

It is widely suggested in the literature that good corporate governance practices carried out by corporate governance mechanisms have a positive association with firm value (see, for instance, La Porta et al., 2002). However, many previous empirical studies (among others Cho, 1998; Miguel, Pindado and De La Torre, 2004; Wintoki, Linck & Netter, 2007) have provided evidence that corporate governance is endogenous and that how a firm is valued by the market is also related to firm corporate governance mechanisms. This study views firm value as one of the important governance mechanisms because it has a hidden ability to overcome corporate issues, and hence it might be among the good corporate governance practices. In addition, there are no empirical evidence in previous studies that have investigated the interaction effects and the link among these governance mechanisms which are ownership concentration, debt and firm value.

Empirical evidence from previous studies are also limited by concluding the interaction effects of the selected mechanisms based on the relationship between the explanatory and dependent variables shown in the models, without in actuality including the interaction effects variables of those mechanisms in the models. It is also important to simultaneously test the interaction effects of these governance mechanisms due to the endogeneity issue.

3. The Methodology

3.1 Sample

We use data that consist of the largest 100 Australian firms by year-end market capitalisation for the period of 1997-2008. In accordance with the usual practice, firms in the financial sector are excluded from the study, as well as non-Australian firms that may have different ownership structures (see Mulherin, 2005). On average, for the 12-year period of this study, the largest Australian firms represented approximately 51% of the Australian total market value. The variables of interest are ownership concentration, debt and firm value. The descriptions of all the variables used are shown in Table 1.

Table 1: List of variables

Variable	Description
Ownership concentration of the largest shareholders (OC1)	The percentage of ordinary shares owned by a firm's largest shareholders
Ownership concentration of the largest five shareholders (OC5)	The percentage of ordinary shares owned by a firm's largest five shareholders
Debt (D)	Book value total debt scaled by book value total assets
Firm value (Q)	The sum of year-end market capitalization and book value of total debt and book value of preferred shares scaled by book value total assets
Investment (INV)	Capital expenditure scaled by book value total assets
Firm size (SI)	The natural logarithm of book value total assets
Firm age (AGE)	The natural logarithm of the number of years since the firm's incorporation
Change in assets turnover (AT)	Sales scaled by assets change; where it is defined as current value of sales/book value total assets - lagged value of sales/book value total assets
Profitability (ROA)	Earnings before interest and tax scaled by book value total assets
Lagged (Profitability) (ROA(-1))	Previous year's profitability

3.2 Model Development and Methodology

In order to investigate the interaction effects between ownership concentration and debt, ownership concentration and firm value, and debt and firm value towards firm value, debt and ownership concentration respectively, the following models are proposed:

$$Q_{it} = \lambda_0 + \lambda_1 OC_{it} + \lambda_2 (OC_{it})D_{it} + \lambda_3 D_{it} + \lambda_4 INV_{it} + \lambda_5 SI_{it} + \lambda_6 AGE_{it}$$

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$$+ \lambda_7 AT_{it} + \lambda_8 ROA_{it} + X_{it} \quad (1)$$

$$D_{it} = \lambda_0 + \lambda_1 OC_{it} + \lambda_2 (OC_{it}) Q_{it} + \lambda_3 Q_{it} + \lambda_4 INV_{it} + \lambda_5 SI_{it} + \lambda_6 AT_{it} + \lambda_7 ROA(-1)_{it} + Y_{it} \quad (2)$$

$$OC_{it} = \lambda_0 + \lambda_1 D_{it} + \lambda_2 (D_{it}) Q_{it} + \lambda_3 Q_{it} + \lambda_4 INV_{it} + \lambda_5 SI_{it} + \lambda_6 AGE_{it} + \lambda_7 AT_{it} + Z_{it} \quad (3)$$

where i and t denote firm and year respectively. Q , D and OC are Tobin's Q , debt ratio and ownership concentration respectively. These are the variables of interest in this test. INV , SI , AGE , AT , ROA and $ROA(-1)$ are investment, firm size, firm age, change in assets turnover, profitability and lagged profitability respectively. These are the control variables. X_{it} , Y_{it} and Z_{it} are the error terms. Firm-specific effects η_i are used to control the unobservable heterogeneity. Time-specific effects ω_t control for the effect of unobservable time-specific shocks that affect all firms in a particular year, such as macroeconomics changes. Hence, the error terms X_{it} , Y_{it} and Z_{it} are transformed into $\eta_i + \omega_t + \varepsilon_{it}$, where ε_{it} is the random disturbance. Thus, in contrast to previous studies which do not employ the proxies of the governance mechanisms namely ownership concentration, debt and firm value, this study also includes the interaction terms of these mechanisms at a period of time. In addition, this study also makes an improvement in this model by testing the variables simultaneously.

Model 1 is the regression for firm value. Ownership concentration might have dual effects on firm value, either serving as an effective monitoring mechanism on managers (Shleifer & Vishny, 1986; Jensen & Meckling, 1976), or tending to expropriate on minority shareholders (Shleifer & Vishny, 1997). The former will result in a positive relationship with firm value, while the latter will have a negative relationship. Debt might have a positive relationship with firm value if it serves as a disciplinary device in mitigating ownership concentration's perquisite of free cash flow. As such, debt can also play a role as an effective monitoring mechanism (Jensen, 1986). On the other hand, if debt is seen to increase the agency cost, it will result in a negative association with firm value (Jensen & Meckling, 1976). The interaction variable of ownership concentration and debt is included to investigate its effect toward firm value.

The control variables included in model 1 are investment, size, age, change in assets turnover, and profitability. Investment could also represent the production capability of a firm. Hence, investors might anticipate good future prospects for the firm, thus enhancing firm value (Hu & Izumida, 2008). Size might be negatively related to firm value as, if size is too large, there is a possibility that the firm has a high agency cost and difficulties in monitoring, which would reduce firm value. This hypothesis follows Himmelberg, Hubbard and Palia (1999). Age is expected to have a negative association with firm value, as young firms are seen to have better growth prospects (Ritter, 1991). Firm value can be positively related by change in assets turnover as a high turnover of assets indicates that the firm is efficient in generating income (Thomsen, Pedersen & Kvist, 2006). Similarly, profitability is also expected to have a positive relationship with firm value.

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The determinants of debt are identified in Model 2. A negative (positive) association between ownership concentration and debt is expected if ownership concentration plays its role as an effective monitoring mechanism, thus using debt as its substitute (complement) in order to control agency costs. These hypotheses follow Friend and Lang (1988), Miguel, Pindado and De La Torre (2005) and Hu & Izumida (2008). On the other hand, if ownership concentration expropriates the minority shareholders, it will result in a negative relationship with debt due to the intention to use free cash flow for its perquisite, as the disciplinary effect of debt becomes weaker (Jensen, 1986). In addition, a positive relationship with debt can be a signal that ownership concentration tends to expropriate the minority shareholders in order to maintain the large shareholders' percentage of ownership in the firm or it can be a defensive tactic against a takeover attempt. Also, it might be a fake signalling message to external investors either to show that they do not mind being bonded with fixed obligations carried by debt (Du & Dai, 2005), or that their intention is to mitigate the possibility of agency costs (Hu & Izumida, 2008). Firm value can also be a sign of corporate growth opportunity. Hence, firm value and debt could be negatively related as growing firms might avoid high debt level due to the higher probability of financial distress risk that might also put their growth opportunities at risk. In addition, the negative association between firm value and debt might be due to the agency cost of debt and the firm wanting to mitigate the underinvestment problem (Myers, 1977). On the other hand, firm value can be positively related to debt as high valued firms can easily obtain debt financing from creditors (Rajan & Zingales, 1995). The interaction variable of ownership concentration and firm value is included in order to examine its effect toward debt.

The control variables for model 2 are investment, size, change in assets turnover, and lagged profitability. Investment can have dual effects on debt through its impact on firm value (Hu & Izumida, 2008), where if the firm has an internal excess of funds, debt will be negatively related to investment. On the other hand, if the firm faces a shortage of internal funds, investments will be positively associated with debt. Firm size and debt are expected to be positively related as a larger firm has a lower probability of financial distress due to the tendency to be more diversified (Setia-Atmaja, Tanewski & Skully, 2009). Change in assets turnover can be positively associated with debt due to the effectiveness of a firm's assets in generating income that could influence the need for external finance (Thomsen, Pedersen & Kvist, 2006). This model includes the lagged profitability (and not the current year's profitability), as the need to use debt/external financing depends on the accumulation of retained earnings which are brought forward from the past profitability of the firm (Du & Dai, 2005, p.64). A firm that has made a good profit in the previous year might easily get access to the capital market; thus debt should be positively related to the previous year's profitability. However, taking into account the pecking-order theory (Myers & Majluf, 1984; Myers, 1984), the previous year's profitability and debt should be negatively related as the higher the previous year's profitability, the more retained earnings the firm will have and thus the less it will rely on debt.

Model 3 incorporates ownership concentration as the dependent variable. On the one hand, if large shareholders are monitoring managers effectively, debt should be negatively associated with ownership concentration due to the possibility that debt can be the alternative to large shareholders in monitoring managers (Hu & Izumida, 2008). In addition, in this context, debt might positively relate to ownership concentration as

these two variables are complementary to each other. On the other hand, if large shareholders are expropriating firm minority shareholders, a negative association between debt and ownership concentration might be exhibited, as large shareholders want to limit their risk of holding a large fraction of shares due to the high level of debt. This hypothesis follows the risk-based argument in Demsetz and Lehn (1985). Further, debt might positively relate to ownership concentration when large shareholders, who tend to expropriate, increase their holding positions if the firm increases its debt level as a signal that the firm is doing well (Leland & Pyle, 1977). Firm value and ownership concentration are expected to be positively related if large shareholders retain their majority shares by issuing fewer shares to external investors when the firm is valued relatively high by the market (La Porta et al., 2000). Contrarily, a negative association is expected if large shareholders intend to sell a fraction of their shares when the firm value is high (Thomsen, Pedersen & Kvist, 2006). The interaction variable of debt and firm value is included in order to investigate its effect toward ownership concentration.

In model 3, investment, size, age and change in assets turnover are included as control variables. Investment is expected to have dual effects on ownership concentration. On the one hand, a positive relationship may be exhibited as large shareholders increase their holding positions as the investment level increases in order to increase their levels of monitoring on managers, as higher investment leads to higher opportunities for managerial discretion (Pindado & de la Torre, 2006). On the other hand, a negative relationship may result as large shareholders tend to diversify their portfolios, as higher investment leads to higher risk as well (Hu & Izumida, 2008). The firm size is expected to be negatively related to ownership concentration, as wealth distribution among shareholders will be smaller as the firm becomes larger (Demsetz & Lehn, 1985). Older firms might be more complicated and difficult to manage (Hermalin & Weisbach, 1998). Based on this hypothesis, firm age and ownership concentration are expected to be positively related. Change in assets turnover, used to measure the changes in capital intensity, can have a positive association with ownership concentration. This is because, in order to overcome high monitoring costs as a result of the high changes in capital intensity, ownership concentration is needed (Thomsen, Pedersen & Kvist, 2006).

This study applies short and wide panel data (small T and large N). All models involved in the estimation capture firm-specific effects that do not vary from year to year. Since firms are heterogeneous, there is a possibility of not being able to obtain or measure some variables that also affect firms. Hence, it is important in such panel data to eliminate unobserved heterogeneity as it will lead to biased results. Other main assumptions developed in this study are that although the inclusion of the dependent variable on the right-hand side of the regression yields it to be endogeneous, all explanatory variables in all models are not strictly exogenous and they are simultaneously determined. Even though simultaneous-equations estimators are more efficient than GMM, they are not consistent as they do not control unobserved heterogeneity. This necessitates employing a consistent estimation that is able to control unobserved heterogeneity, dynamic endogeneity and simultaneity (Miguel, Pindado & De La Torre, 2005, Wintoki, Linck & Netter, 2007). Thus, the method used in this study is justified, that is, the system generalised method of moment (GMM) estimator with first differences developed by Arellano and Bover (1995) and Blundell and Bond (1998).

This instrument set is tested for validity by conducting an analysis based on the Hansen test (Hansen, 1982) of the full instrument set and the Difference-in-Hansen test of a subset of instruments for over-identifying restrictions ($H_0 = \text{Valid instruments}$). As such, both tests require the failure to reject the null hypothesis.

As the estimator assumes that there is no serial correlation in the error term, ε_{it} , tests for serial correlation are conducted where the residuals in the first differences (AR1) should be correlated, but in the second differences (AR2) there should be no serial correlation (Arellano & Bond, 1991). This study uses the Windmeijer (2005) correction of robust standard errors to account for the panel-specific autocorrelation and heteroskedasticity.

4. The Findings

Table 2 presents the descriptive statistics. The mean and median values of ownership by the largest shareholder are 23.11 per cent and 17.53 per cent respectively. This suggests that the largest shareholders in the largest Australian firms have a fairly concentrated ownership. Setia-Atmaja (2009) defines ownership concentration by categorising the sample firms as closely-held or widely-held firms. Firms are categorised as closely-held if a firm has at least one shareholder who controls at least 20 per cent of the firm's equity.

With regard to the ownership concentration of the largest five shareholders, the mean and median are 50.48 per cent and 49.69 per cent respectively. This verifies that half of the total percentage of shares is already in the largest five shareholders' hands. It also suggests that the largest five shareholders have a fairly concentrated structure of ownership. This was also indicated in Setia-Atmaja, Tanewski and Skully (2009), where the mean of the Australian firms' substantial shareholdings, which they defined as shareholders with at least 5 per cent equity stake, was 44.6 per cent.

The mean and median values of debt ratio are 0.26. This is virtually the same as found in other studies which used Australian firms as a sample such as Setia-Atmaja (2009) and Setia-Atmaja, Tanewski and Skully (2009), where the mean of debt ratio was 0.22 and 0.227 respectively. However, the debt ratio is relatively low compared to other countries, for instance, Japan, where the mean debt ratio of Japanese firms is 0.5646 (Hu & Izumida, 2008). This might be due to the dividend imputation taxation system that was introduced in Australia in 1987. One of the significant impacts of this system was that corporate debts were issued at a relatively low level (Davis, 2011, Henry, 2010).

As for Tobin's Q, the mean and median of this variable are 2.40 and 1.32 respectively. Applying the essential interpretation, the mean of Tobin's Q found in this study indicates that, on average, the market value of the largest Australian firms is 2.4 greater than the value of the firms' total assets. With a slightly different estimation conducted on 434 listed Australian firms in 2000, Davidson, Goodwin-Stewart and Kent (2005) found that the mean and median of the firms' market to book ratio was 3.820 and 1.485 respectively.

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The mean (median) for the other control variables used in this study are: investment 0.07 (0.05), firm size 13.94 (13.98), firm actual age 40.20 (28.00), change in assets turnover 0.97 (0.70) and ROA 0.10 (0.09).

Table 2: Descriptive statistics

	Mean	Median	Min.	Max.	SD
Largest shareholder (%)	23.11	17.53	1.66	96.82	16.06
Largest 5 shareholders (%)	50.48	49.69	3.82	99.71	18.84
Debt ratio	0.26	0.26	0.00	2.20	0.20
Tobin's Q	2.40	1.32	0.26	59.63	4.13
Investment	0.07	0.05	0.00	0.59	0.08
Firm size	13.94	13.98	8.34	18.67	1.61
Firm actual age	40.20	28.00	0.00	171.00	34.99
Change in assets turnover	0.97	0.70	-0.002	9.39	1.03
ROA	0.10	0.09	-1.29	1.02	0.14

The regressions results are shown in Table 3. In this section, the GMM estimation is employed to find the results of the interaction tests where ownership concentration, debt and firm value are tested as a group. Their effects as stand-alone mechanisms are also tested. This estimation is important as it meets one of the main aims of this study, that is, to take account of the dynamic endogeneity issue.

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Table 3 Interaction test: GMM estimation

Model Variable	Panel A			Panel B		
	1 Q	2 D	3 OC1	1 Q	2 D	3 OC5
Q		-0.010 [-0.62]	0.000 [0.14]		-0.008 [-0.92]	0.000 [0.21]
D	-2.58 [-1.20]		-0.028 [-0.55]	-1.26 [-0.18]		0.024 [0.37]
OC1	-5.04 [-1.50]	-0.29 [-1.63]				
OC5				0.029 [0.0062]	-0.25* [-1.91]	
Q*D			0.002 [0.56]			-0.003 [-0.47]
Q*OC1		0.037 [0.70]				
D*OC1	10.7 [1.43]					
Q*OC5					0.013 [1.25]	
D*OC5				5.66 [0.54]		
INV	4.47 [0.76]	0.48* [1.66]	0.047 [0.53]	6.70 [1.04]	0.44 [1.32]	0.059 [0.48]
SI	-1.32 [-1.34]	0.004 [0.13]	-0.002 [-0.21]	-1.15 [-1.65]	0.017 [1.09]	0.006 [0.57]
AGE	0.022 [0.098]		-0.002 [-0.34]	0.059 [0.16]		-0.003 [-0.54]
AT	-0.28 [-0.61]	-0.01 [-0.34]	0.002 [0.15]	-0.33 [-0.42]	-0.007 [-0.53]	0.004 [0.32]
ROA	7.57 [0.77]			8.12 [1.01]		
ROA(-1)		0.024 [0.45]			0.032 [0.62]	
Observations	940	940	940	940	940	940
Number of instruments	110	89	99	110	89	99
Number of groups	165	165	165	165	165	165
AR(1)	-1.67	-3.71	-3.47	-1.80	-3.72	-5.01
[P-value]	[0.09]	[0.00]	[0.00]	[0.07]	[0.00]	[0.00]
AR(2)	-0.82	0.93	-0.71	-0.73	0.71	0.29
[P-value]	[0.41]	[0.35]	[0.48]	[0.46]	[0.48]	[0.77]

Table 3 Interaction test: GMM estimation (Continued)

Model Variable	Panel A			Panel B		
	1 Q	2 D	3 OC1	1 Q	2 D	3 OC5
Hansen test	97.13	68.64	85.97	92.46	60.30	80.13
[P-value]	[0.28]	[0.52]	[0.30]	[0.41]	[0.79]	[0.48]
Difference-in-Hansen test	84.75	58.95	71.86	86.51	52.16	75.47
[P-value]	[0.36]	[0.62]	[0.48]	[0.32]	[0.83]	[0.37]
F statistics	16.95	218.06	433.96	21.87	196.23	1880.58
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Time effects	Included	Included	Included	Included	Included	Included
Firm effects	Included	Included	Included	Included	Included	Included

Table 3 presents the findings of the test using GMM estimation. Panel A encloses the regression estimates obtained by using OC1 as the measure of ownership concentration, and Panel B states the estimates using OC5 as the measure of ownership concentration.

In model 1 of both panels, the insignificance of ownership concentration and debt ratio coefficients suggest that, as stand-alone mechanisms, they are not significantly associated with firm value. Also, when they are tested as a group, the study fails to find evidence that they function best as a group and thus fails to identify whether they are substitutes or complements each other. Also, all the control variables coefficients are not significant, thus suggesting that they are not the determinants of firm value.

In model 2, it is found that the coefficients of OC1 and Tobin's Q are not significant, which suggests that, as stand-alone mechanisms, they do not significantly relate to debt. However, the significance of OC5 coefficient at the 10% level indicates that it is significantly negatively associated to debt. It suggests that, as a stand-alone mechanism, the largest five shareholders and debt are substitutes in monitoring firm managers in order to control agency costs. This suggestion is made based on the positive effects of OC5 on the firm's value in model 2, although there is no evidence of a significance relationship between them. Nevertheless, there is also no evidence that the largest shareholder and debt, as well as the largest five shareholders and debt, function effectively as a group. Therefore, their substitutability or complementarity is not identified.

As for the other control variables in model 2, again, the coefficients are all insignificant, suggesting that they are not determinants of debt. The exception is investment. The significance of the coefficient of investment at the 10% level in the equation in Panel A indicates that it is significantly positively associated to debt. This suggests that the largest Australian firms use more debts as investment increases in order to cover for the shortage of internal funds. This might be related to models 1 and 2 where the coefficient signs show that there is a possibility that the largest shareholder expropriates minority shareholders ($\lambda_1 = -5.04$) and tends to exploit debt in the expropriation act ($\lambda_1 = -0.29$). However, due to the insignificance of the coefficients, there is insufficient evidence to suggest that this is the case.

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In model 3 of both panels, the insignificance of the coefficient of the interaction variable between these two suggests that they do not function effectively as a group. As such, this study fails to find whether they are substitutes or complements. All the other control variable coefficients in this model are not significant, thus suggesting that they are not the determinants of ownership concentration.

In conclusion, the findings suggest that, as a stand-alone mechanism, only the largest five shareholders and debt are negatively associated. Again, the findings fail to find evidence that the three governance mechanisms function best as a group and therefore fail to find the substitutability or complementarity of these mechanisms. As such, the findings in the present study are not consistent with some of the findings previously found in which other governance mechanisms substitute or compliment each other.

The robustness test is conducted to examine whether there is a variation if all control variables are considered as exogenous in the GMM estimation. Thus, models 1, 2 and 3 are re-estimated. Little variation is found when the stand-alone variable of interest and the interaction between the variables are treated as endogenous while all other control variables are treated as exogenous. Therefore, it can be suggested that the findings in the main test are robust, as the results are not sensitive to whether control variables are considered endogenous or exogenous.

5. Conclusion

This study investigated the interaction between ownership concentration and firm value, ownership concentration and debt, and debt and firm value, as well as their effects on debt, firm value and ownership concentration respectively. In addition, the stand-alone effect of each variable was also tested. This filled a gap in the literature by constructing the interaction variable in the models investigated. Therefore, the study was able to answer the question as to whether these governance mechanisms should be utilised as a group to ensure their effectiveness, thus identifying their substitutability or complementarity.

The results showed that ownership concentration, debt and firm value were not significant regardless of whether they were utilised as stand-alone mechanisms or as a group. An exception was the stand-alone effect of the ownership concentration of the largest five shareholders, which was found to substitute for debt. Thus, this study failed to find evidence of substitutability or complementarity among these variables, therefore failing to support the argument that these mechanisms should be employed as a group in order to achieve mutual effectiveness. Finally, in the robustness test, these findings were largely supported regardless of whether the control variables were treated as endogenous or exogenous. To conduct further tests of the interaction hypothesis, future studies can employ other corporate governance mechanisms as proxies.

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