BOARD CHARACTERISTICS, OWNERSHIP STRUCTURE AND FIRM PERFORMANCE: EVIDENCE FROM TAIWAN

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ABSTRACT

This study examines the impact of corporate governance, in particular the board characteristics and ownership structure, on firm performance. Using a dataset of Taiwanese listed companies from 1997 to 2008, we find that the higher the proportion of independent directors and the smaller the board size, the higher the firm performance. As regards ownership structure, institutional ownership, foreign ownership and family ownership are positively related to firm value. In contrast, block-holders' ownership is negatively associated with firm performance.

Keywords: corporate governance, board characteristics, ownership structure, firm performance

1. INTRODUCTION

Poor corporate governance has been cited as one of the major reasons that led to the Asian financial crisis of 1997. In addition, prior to a number of infamous corporate scandals such as Enron and WorldCom in the US and Parmalat in Europe, corporate governance was not considered as an important issue in many jurisdictions outside the US and Europe. In Taiwan, corporate governance became a major and heated issue only at the beginning of the 21st Century when the Taiwanese authorities started to introduce and implement a series of corporate governance reforms. These reforms are aimed at strengthening Taiwan's corporate governance, and amongst others include the amendment of the Company Act, the Securities and Exchange Act and other related regulations, the introduction of an independent director system and audit committee, and the promotion of shareholders' rights.

The relationship between corporate governance and firm performance is important in formulating efficient corporate management and public regulatory policies. However, prior literature mainly focuses on the corporate governance practices in the UK, US and other western developed countries (e.g., Yermack, 1996; Dahya and McConnell, 2007; Wintoki, Linck and Netter, 2012). Due to some institutional factors of newly-industrialised countries being considerably different compared with those of US/UK, we shift our study to a new setting, namely Taiwan, and examine the impact of corporate governance, in particular the board characteristics and ownership structure, on firm performance. In addition, it has now been several years since the corporate governance reforms were introduced in Taiwan in early 2002. Accordingly, since these reforms which require public companies to improve their corporate governance have now been enforced for a period of time, it is a valuable research agenda to investigate whether the new policies are making Taiwanese public companies perform better.

First, as an internal governance mechanism, the board of directors plays an important role in monitoring the management and reducing the agency problem between managers and shareholders (Drakos and Bekiris, 2010), and hence may improve firm performance (Weir, Laing and McKnight, 2002; Kiel and Nicholson, 2003; Cho and Kim, 2007; Setia-Atmaja, Tanewski and Skully, 2009). In particular, we assess the impact of board characteristics (i.e., the proportion of independent directors and independent supervisors, board size, and role duality) on firm performance. Second, we focus on the external governance mechanism of ownership structure (i.e., block-holders' ownership, institutional ownership, foreign ownership and family ownership), which might be another determinant of firm performance (Agrawal and Knoeber, 1996; Demsetz and Villalonga, 2001; Dwivedi and Jain, 2005; Piesse, Filatotchev and Lien, 2007). In addition, the ownership structure may also display considerable change after the corporate governance reform. Therefore, the second objective is to analyse the impact of the ownership structure on firm performance.

The results regarding board characteristics show that the higher the proportion of independent directors and the smaller the board size, the stronger the firm's performance. These results are consistent with Mak and Kusnadi (2005), Cho and Kim (2007) and Guest (2009). However, we observe that the separation between positions of chairman and CEO, and the proportion of independent supervisors, are not associated with firm performance, which partly contradicts the finding of Young, Tsai and Hsieh (2008). As regards ownership structure, in line with Filatotchev, Lien and Piesse (2005), Maury (2006), and Andres (2008), institutional ownership, foreign ownership and family ownership, are positively related to firm value. In contrast, block-holders' ownership is negatively associated with firm performance, which is consistent with the study of Lefort and Urzúa (2008).

This study contributes to the corporate governance literature in several ways. First, unlike much of the previous literature on western developed countries (e.g., Bhagat and Black, 2001; De Andres, Azofra and Lopez, 2005; Andres, 2008), this study examines the impact of corporate governance on firm performance in a newly-industrialised country, Taiwan. Second, while a number of studies use a single indicator of firm performance (e.g., Yermack, 1996; Dahya and McConnell, 2007; Wintoki, Linck and Netter, 2012), this study examines both accounting-based and market-based firm performance. Third, this study addresses the endogeneity issue between ownership concentration and firm performance by using two stage least squares (2SLS) estimation and details the econometric tests for justifying the appropriateness of using 2SLS estimation.

The remainder of this paper is structured as follows. Section 2 provides a discussion of corporate governance in Taiwan. Section 3 presents, in addition to the hypothesis development, the literature as to whether board characteristics and ownership structure have an impact on firm performance. Section 4 explains the methodological aspects being used in the current study as well as discussing the variables used in developing the hypotheses. Section 5 reports our main findings, analyses of the statistical methods applied to the sample data, and the results of a variety of robustness tests. Finally, section 6 concludes the paper.

2. CORPORATE GOVERNANCE IN TAIWAN

Corporate governance became a major and heated issue in Taiwan only at the beginning of the 21st century when the Taiwanese authorities, having learnt the lessons from the Asian financial crisis of 1997 as well as many corporate scandals around the world, started to introduce and implement a series of corporate governance reforms. Due to the considerable attention on public companies, the reform laid emphasis on the improvement of the monitoring function that prevents self-dealing and deceptive misconduct by boards of directors and management (Lin, 2009). These reforms, aimed at strengthening Taiwan's corporate governance, and including amongst others the amendment of the Company Act, Securities and Exchange Act and other related regulations, the introduction of an independent director system and an audit committee, and the promotion of shareholders' rights, were initiated in early 2002 by the Securities and Futures Commission (SFC), the predecessor of the Financial Supervisory Commission (FSC), and were co-sponsored by other official institutions.

The most significant change is perhaps the introduction of the independent director system for listed companies. In particular, effective from February 2002, companies that apply for initial public offerings on the Taiwan Stock Exchange (TWSE) are required for the first time to appoint at least two independent directors. However, this regulation is not applied to existing listed companies, i.e. it is not mandatory for them to choose to appoint independent directors.

In Taiwan, the majority of firms are in the form of small and medium-sized enterprises (SMEs). The board of directors in SMEs tends to be family dominated, implying that companies in Taiwan have few outside directors who are not members of the family or business associates. As for listed companies, family control is still a dominant characteristic, and Yeh, Lee and Woidtke (2001) report that 51.4% of Taiwanese listed companies are family controlled. Faccio, Lang and Young (2001) find that families with control/voting greater than their cash flow rights tend to expropriate wealth in East Asia. Similarly, in

Taiwan, Yeh and Woidtke (2005) report that the average control rights of the largest shareholders are 30.33%, whereas the average cash flow rights are only 21.68%. Thus this discrepancy (an excess control of 8.66%) provides an incentive for controlling shareholders to expropriate wealth by seeking private interests at the expense of minority investors (Shleifer and Vishny, 1997). In recent years, due to the guidance of the government policy and related regulations, and the considerable transformation of industry structure from labour-intensive to high-tech, there has been a trend towards separation of ownership and control although the discrepancy still exists.

According to the report of Investors Structure in terms of Trading Value on TWSE Market prepared by the Securities and Futures Bureau of the FSC, institutional investors constituted 34.8% of the total trading value in December 2011, whilst individual investors constituted the major portion of 65.2%, implying that individual investors are the main participants in the Taiwan stock market. Due to their extremely small shareholdings, individual investors often renounce their voice in company operations, which leads to neglect in enhancing corporate governance by the listed companies. Coffee (1991) argues that institutional investors are more active and have greater needs for better corporate governance. However, in Taiwan, due to restrictions in the shareholding limit and holding period, the institutional shareholders play a more passive role in corporate governance than those in the developed countries where the institutional investors actively promote the importance of corporate governance (Admati, Pfleiderer and Zechner, 1994; Bathala and Rao, 1995).

Taiwan opened its securities market for foreign investment in three stages. In 1982 foreign investment in the securities market was allowed indirectly through investment funds only. In 1990 foreign institutional investors were allowed to invest directly in the securities market. Finally, in 1996 the Taiwan securities market was opened for all foreign institutional and individual investors. In the Taiwan market, foreign investors' ownership is lower than that of domestic investors, but their trading actions dramatically affect the investment decisions of domestic investors through their ability to monitor corporate strategy, capital usage and personnel (Chen, Chiou, Chou and Syue, 2009). In addition, the media regularly report that the stock price performance is positively correlated with the level of foreign ownership. Consequently, due to their great influence on Taiwan's capital markets, foreign investors play a critical role in improving Taiwanese firms' corporate governance.

3. LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES

(i) Board Characteristics and Firm Performance

With regard to board independence, Agency theory conjectures that outside directors will carry out their tasks to monitor top management because they have incentives to develop reputations in decision control (Fama and Jensen, 1983), and therefore the probability of collusion and expropriation of shareholder wealth by top management might be lowered with a greater proportion of outside directors on the board, which will then minimise the agency costs (Fama, 1980). In addition, prior studies document that independent directors improve the quality of financial statements (Beasley, 1996; Peasnell, Pope and Young, 2005; Chen, Elder and Hsieh, 2007; Cornett, Marcus and Tehranian, 2008). Moreover, previous literature points out that outside-dominated boards are more likely than inside-dominated boards to

make better decisions in a variety of contexts, such as replacing CEOs in response to poor performance (Weisbach, 1988), resisting demands for greenmail payments (Kosnik, 1987), and making better acquisition deals (Byrd and Hickman, 1992; McDonald, Westphal and Graebner, 2008). However, findings to date on the relationship between board independence and firm performance or value in developed markets (e.g., US and UK) are still mixed.

As regards the positive effect of board independence on firm performance or value, Baysinger and Butler (1985) indicate that firms with a higher proportion of independent directors have a superior accounting performance record, by using a sample of 266 major US business corporations over the period 1970–1980. Rosenstein and Wyatt (1990) examine the effect of the appointment of outside directors on shareholder wealth by using a sample of 1,251 announcements from the Wall Street Journal and CRSP over the 1981–1985 period, and find that the addition of an outsider director increases firm value. Similarly, Dahta and McConnell (2005) also find that appointing outside directors is directly related to stock price reactions in the UK. In addition, Chung, Wright and Kedia (2003) argue that outside directors affect firm performance positively through their ability to provide effective monitoring activities. Dahya and McConnell (2007) examine the association between changes in board composition and firm performance in the UK from 1989 to 1996. Their results reveal that firms which conform to the Cadbury Report recommendation to have at least three outside directors show an improvement in operating performance. In contrast, however, some studies find no significant explanatory power of board independence on firm performance (Fosberg, 1989; Hermalin and Weisbach, 1991; Mehran, 1995; Klein, 1998; Prevost, Rao and Hossain, 2002; Lefort and Urzúa, 2008; Ramdani and van Witteloostuijn, 2010), and yet others even report a negative relationship between board independence and firm performance (Agrawal and Knoeber, 1996; Yermack, 1996; Bhagat and Black, 1998; Bhagat and Black, 2001; Kiel and Nicholson, 2003; Mangena, Tauringana and Chamisa, 2012).

Unlike the inconclusive empirical results in the developed markets, evidence in newly-developed markets and developing markets is more consistent. For example, using a sample of 1,834 observations over the period 1999–2002, Choi, Park and Yoo (2007) investigate the valuation impacts of independent directors in Korea in the aftermath of the Asian financial crisis, and indicate that the effect of independent directors on firm performance is significantly positive. In addition, using a sample of 347 firms in 1999, Cho and Kim (2007) analyse the linkage between outside directors and firm performance during the governance reform movement undertaken in Korea. The results show that outside directors have a significantly direct impact on firm performance. In their analysis of 799 firms with a dominant shareholder across 22 countries in 2002, Dahya, Dimitrov and McConnell (2008) conclude that the association between corporate value and the percentage of independent directors is positively significant, especially in countries with weaker governance. Recently, using a sample of 157 non-financial Indian companies for the year 2008, Kumar and Singh (2012) report that the proportion of independent directors has a positive but statistically weak effect on firm value.

Based on the results and arguments demonstrated in the prior studies discussed above, agency theorists underline the positive effect of a higher proportion of outside directors on firm performance. Therefore, in accordance with Agency theory and the argument that independent directors bring about a more powerful board in developing markets, we expect that the potential costs of increasing the number of independent directors on the board are less than the potential benefits for the Taiwanese market. That is to say, there is a positive firm performance effect related to the appointment of independent directors for Taiwanese firms, which suggests the following hypothesis:

H1: Board independence is positively correlated with firm performance.

In addition to the board of directors, firms in Taiwan also have a board of supervisors, functioning in a capacity equivalent to an audit committee as required in other jurisdictions. The primary responsibilities and powers of these supervisors are to investigate and oversee directors' behaviour, audit firms' financial reports, and scrutinize firms' operations at any time. The relationship between the independent supervisors and firm performance for Taiwan-listed firms has not been widely investigated. However, similar to independent directors, independent supervisors are also important monitors of the firm; hence we expect to find that firm performance improves with an increasing proportion of independent supervisors. Consistent with this argument, Young, Tsai and Hsieh (2008) find that the more the independent supervisors on the board, the higher the firm performance, by using a sample of 943 firms listed on the Taiwan Stock Exchange for the years 2001 and 2002. Thus, the following hypothesis is proposed:

H2: The proportion of independent supervisors is positively correlated with firm performance.

The board of directors is considered as an institution to mitigate the effect of agency problems between the owners and managers (Drakos and Bekiris, 2010). As boards are supposed to be large decision-making groups, size may affect the decision-making process and effectiveness of the board (Dwivedi and Jain, 2005). Lipton and Lorsch (1992) suggest that an ideal board size should be around eight or nine directors, whilst Jensen (1993) indicates that a board size of seven or eight is optimal. The optimal size of the board and its effect on firm performance have been issues of frequent debate over the years, but the literature shows mixed empirical results.

On the one hand, proponents of small boards argue that smaller boards are more cohesive and effective in decision making (Jensen, 1993), impartial in evaluations of managerial performance (Lipton and Lorsch, 1992), and easier to coordinate but difficult for the CEO to control (Jensen, 1993; Haniffa and Hudaib, 2006). This argument is supported by several empirical studies. For example, Yermack (1996) finds a negative relationship between board size and firm value (as measured by Tobin's Q) in a sample of 452 large US industrial companies over the period 1984–1991. Also, in their study of 460 firms in Singapore and Malaysia for the years 1999 and 2000, Mak and Kusnadi (2005) report an inverse association between board size and firm value.

In addition, De Andres, Azofra and Lopez (2005) report a negative relationship between firm value and the size of board of directors in a sample of 450 non-financial firms from ten countries in Western Europe and North America for the year 1996. In an analysis of 347 companies listed on the Kuala Lumpur Stock Exchange from 1996 to 2000, Haniffa and Hudaib (2006) find board size to be negatively associated with market performance measures based on Tobin's Q. Similarly, Cheng (2008) uses a sample of 1,252 US firms over the period 1996–2004 to investigate the relationship between board size and the variability of firm performance, and concludes that firm performance is negatively related to board size. Dahya, Dimitrov, and McConnell (2008) also find a negative correlation of Tobin's Q with board size in a sample of 799 firms from 22 countries in 2002.

Moreover, using a sample of 492 firms listed on the Taiwan Stock Exchange for the years 2001 and 2002, Young, Tsai and Hsieh (2008) reveal that firm performance is inversely associated with board size. In his study of a large sample of 2,746 firms in the UK between 1981 and 2002, Guest (2009) shows that the linkage between board size and firm performance is significantly negative. More recently, Drakos and Bekiris (2010), using a sample of 1,409 firm-year observations for the years 2000 to 2006, document that the relationship between board size and firm performance is inversely significant in Greece. Analysing a sample of 23 Tunisian listed firms over the period 1998–2009, Turki and Sedrine (2012) also find that board size has a significantly inverse impact on firm performance.

On the other hand, proponents of large boards argue that they may be valuable to some companies as they provide more monitoring resources (Ramdani and van Witteloostuijn, 2010), bring more experience and knowledge (Adams and Ferreira, 2007; Mangena, Tauringana and Chamisa, 2012), and support diversity that helps companies to reduce environmental uncertainties and obtain key resources (Pearce and Zahra, 1992; Goodstein, Gautam and Boeker, 1994), all of which may enhance firm performance (Kiel and Nicholson, 2003; Choi, Park and Yoo, 2007; Lefort and Urzúa, 2008; Ramdani and van Witteloostuijn, 2010). However, Dahya and McConnell (2007), and Wintoki, Linck and Netter (2012), find no association between board size and firm performance.

Although the empirical evidence on the relationship between board size and firm performance is still inconclusive, Agency theory argues that larger board size increases agency cost and monitors the firm improperly. In addition, Lipton and Lorsch (1992), and Jensen (1993), also suggest that as board size increases beyond a certain point, it affects firm performance in an inverse direction, and leads to a free rider problem among the many board directors. Taken together, the following hypothesis is then proposed:

H3: Board size is negatively correlated with firm performance.

A further board structure control mechanism relates to board leadership or role duality, which exists when a chief executive officer (CEO) also serves as the chairman of the board (COB). Jensen (1993) indicates that when someone holds these two top important positions simultaneously, internal control mechanisms fail, i.e. the function of the board as a monitor of the CEO is weaker. Similarly, Fama and Jensen (1983) argue that combining the decision management and decision control power lowers a board's effectiveness in monitoring the CEO, which might lead to worse firm performance.

Empirical evidence of the effect of CEO duality on firm performance has yielded conflicting results. Rhoades, Rechner and Sundaramurthy (2001) find that firms with a separation of CEO and COB consistently have higher performance than those that have the two roles combined. Similarly, analysing a sample of 412 Hong Kong listed firms from 1995 to 1998, Chen, Cheung, Stouraitis and Wong (2005) find a negative association between CEO duality and firm performance. In addition, Haniffa and Hudaib (2006) indicate that board leadership is negatively and significantly associated with accounting performance, using a sample of 347 Malaysian listed companies between 1996 and 2000. Likewise, using a sample of US firms included in the S&P 100 Index over the period 1994–2003, Cornett, Marcus and Tehranian (2008) detect an inverse impact of role duality on firm performance.

In contrast to the studies supporting a negative correlation between CEO duality and firm performance, some empirical studies find no relationship between the dual role of a

leadership structure and firm performance (Weir, Laing and McKnight, 2002; Kiel and Nicholson, 2003; Dahya and McConnell, 2007; Young, Tsai and Hsieh, 2008; Belkhir, 2009; Drakos and Bekiris, 2010; Wintoki, Linck and Netter, 2012), while others support the notion that firms which combine the roles of CEO and the chairman of the board outperform those with separated roles (Tian and Lau, 2001; Al Farooque, van Zijl, Dunstan and Karim, 2007; Ramdani and van Witteloostuijn, 2010).

Although empirical studies on the role-duality and firm-performance relationship have documented mixed findings, Agency theory argues that a separation of the CEO and COB is important to develop effective monitoring by the board, which may impact positively on firm performance (Dayton, 1984; Ramdani and van Witteloostuijn, 2010). Therefore, it is proposed that the combination of CEO and board chairman positions would lead to a detriment of firm performance, which suggests the following hypothesis:

H4: Board leadership is negatively correlated with firm performance.

(ii) Ownership Structure and Firm Performance

Ownership concentration (in the form of block-holders' ownership) is one of the key determinants of corporate governance. The literature documents that the impact of ownership concentration on firm performance ranges from positive to negative. On the one hand, since block-holders can receive a large proportion of firm profits, they have extremely strong incentives to monitor insiders in order to alleviate agency problems (Demsetz and Lehn, 1985; Shleifer and Vishny, 1986). In addition, Jensen and Meckling (1976) suggest that the value of the firm increases with ownership concentration as long as the change in ownership aligns the interests of management and shareholders. Consistent with this view, Claessens and Djankov (1999), using a sample of 706 Czech firms from 1992 to 1997, find that the more concentrated the ownership, the higher the firm profitability.

Moreover, Mak and Kusnadi (2005) indicate that there is a positive relationship between block-holders' ownership and firm performance in Malaysia and Singapore. Similarly, using a sample of 347 Malaysian listed companies between 1996 and 2000, Haniffa and Hudaib (2006) suggest that the impact of block-holders' ownership on accounting performance is significantly positive. Cho and Kim (2007) also find a positive relationship between block-holders' ownership and firm performance in Korea. Furthermore, in Taiwan, Young, Tsai and Hsieh (2008) report that firm performance is positively related to block-holders' ownership. Omran, Bolbol and Fatheldin (2008) point out that the relationship between ownership concentration and firm performance is significantly positive.

On the other hand, Fama and Jensen (1983) argue that if the ownership concentration increases to such a level that it entrenches the management and prevents takeovers, then firm performance falls. In addition, large shareholders who are forced into voting with management and find it beneficial to collaborate with management might cause poor firm performance due to less effective monitoring and high risk exposure (Brickley, Lease and Smith Jr, 1988; Pound, 1988). Supporting evidence provided by Demsetz and Villalonga (2001) indicates that the higher the ownership concentration, the lower the firm performance in the US.

Similarly, Villalonga and Amit (2006) point out that block-holders' ownership is negatively associated with firm performance, in a sample of 508 firms listed on the Fortune 500 over the period 1994–2000. Moreover, using a panel data of 160 Chilean companies from 2000 to 2003, Lefort and Urzúa (2008) show that firm performance is negatively related to ownership concentration. Belkhir (2009) also reports an inverse impact of block-holders' ownership on firm performance. Therefore, due to mixed results on the relationship between block-holders' ownership and firm performance, the following hypothesis is proposed:

H5: Block-holders' ownership is correlated with firm performance.

Admati, Pfleiderer and Zechner (1994) and Shleifer and Vishny (1997) argue that institutional investors have strong incentives to mitigate managerial opportunism and control managers' exploitation of investors. In addition, Coffee (1991) and Choi, Park and Yoo (2007) suggest that institutional investors may assist independent directors in their monitoring and thereby contribute to firm performance. Consistent with these arguments, McConnell and Servaes (1990) find a direct linkage between institutional ownership and firm performance for US firms. Moreover, Filatotchev, Lien and Piesse (2005) show that the relationship between institutional ownership and firm performance is significantly positive, using a dataset of 228 firms listed on the Taiwan Stock Exchange in 1999.

Piesse, Filatotchev and Lien (2007) also use a Taiwanese dataset and find that the higher the institutional ownership, the higher the firm's performance. Similarly, using a sample of 943 firm-year observations for the years 2001 and 2002, Young, Tsai and Hsieh (2008) report that firm performance improves with institutional ownership in Taiwan. Furthermore, analysing a sample of 1,834 Korean firm-year observations from 1999 to 2002, Choi, Park and Yoo (2007) indicate that institutional ownership has a positive impact on firm performance. Omran, Bolbol and Fatheldin (2008) suggest that firm performance is positively related to institutional ownership, with a sample of 304 firms from four Arab countries over the 2000–2002 period. Based on the above arguments, we then propose the following hypothesis:

H6: Institutional ownership is positively correlated with firm performance.

Dahlquist and Robertsson (2001) argue that the role of foreign investors is similar to that of institutional investors. In addition, foreign investors usually have less connection with insiders than domestic investors, and hence they may monitor insiders more effectively (Chen, Chiou, Chou and Syue, 2009). Therefore, it is expected that foreign ownership also has a positive impact on firm performance. Supporting evidence is provided by several studies. For example, using a sample of 340 large listed Indian firms over the period 1997–2001, Dwivedi and Jain (2005) find that foreign shareholding is positively associated with firm performance. Moreover, Cho and Kim (2007) indicate that firm performance is directly related to foreign investor ownership, with a sample of 347 firms listed on the Korea Stock Exchange in 1999.

Similarly, Choi, Park and Yoo (2007) document that foreigners have a positive impact on firm performance in Korea, using a sample of 1,834 firm-year observations from 1999 to 2002. Furthermore, Omran, Bolbol and Fatheldin (2008) work with a sample of 304 firms from four Arab countries for the period 2000–2002, and report that there is a positive relationship between foreign ownership and firm performance. Recently, analysing a sample of Taiwanese firms conducting seasoned equity offerings over the 1991–2002 period, Chen,

Chiou, Chou and Syue (2009) point out that the impact of foreign ownership on post-issue operating performance is significantly positive. The above arguments and empirical findings lead us to the following hypothesis:

H7: Foreign ownership is positively correlated with firm performance.

The expected relationship between a family-controlled firm and performance is unclear. On the one hand, families have a powerful incentive to expropriate wealth by seeking private interests at the expense of minority investors (Shleifer and Vishny, 1997; La Porta, Lopez-de-Silanes and Shleifer, 1999). Hence, unlike the traditional agency problem between managers and shareholders, the agency conflict between controlling shareholders and minority shareholders might be more prevalent in family-controlled firms (Setia-Atmaja, Tanewski and Skully, 2009). For example, using a sample of 5,897 financial and non-financial corporations in East Asia and Western Europe, Faccio, Lang and Young (2001) find that families with control greater than their cash flow rights tend to expropriate wealth. Therefore, family ownership might affect firm performance negatively (Choi, Park and Yoo, 2007; Setia-Atmaja, Tanewski and Skully, 2009).

On the other hand, families also have strong incentives to monitor managers and decrease agency costs since families have usually invested most of their private wealth in the company (Demsetz and Lehn, 1985). In addition, if monitoring activities need knowledge and information about the firm's technology, families might also have an advantage due to their close and lengthy involvement with the firm (Filatotchev, Lien and Piesse, 2005; Piesse, Filatotchev and Lien, 2007; Andres, 2008). As a result, a family-controlled firm may provide a competitive advantage and improve firm performance (Anderson and Reeb, 2003). A number of other empirical studies also show that family ownership is correlated with better performance (Carney and Gedajlovic, 2002; Joh, 2003; Maury, 2006; Villalonga and Amit, 2006; Bonilla, Sepulveda and Carvajal, 2010). When all the evidence is taken together, since the impact of family ownership on firm performance is an empirical issue, the following hypothesis is then proposed:

H8: Family ownership is correlated with firm performance.

4. RESEARCH METHOD

(i) Ordinary Least Squares (OLS) Regression Model

OLS estimation is used to test our hypothesis. While some of the variables are subject to outlier concerns (e.g., dividend payout ratio), this study uses robust standard errors for testing statistical significance in order to reduce the impact of outliers on regression estimates. In addition, the large sample size employed in this study also mitigates these outlier problems (Linck, Netter and Yang, 2008). The equation (1) specified below is established to test the hypothesis for the relationship between board characteristics, ownership structure and firm performance.

$$\begin{aligned}\mathrm{PERF_{it}} = {} & \alpha_0 + \alpha_1 \mathrm{INDBOD\_R}_{it} + \alpha_2 \mathrm{INDSUP}_{it} + \alpha_3 \mathrm{BODSIZE}_{it} + \alpha_4 \mathrm{DUALITY}_{it} \\ & + \alpha_5 \mathrm{BLOCKOWN}_{it} + \alpha_6 \mathrm{INSTOWN}_{it} + \alpha_7 \mathrm{FOROWN}_{it} \\ & + \alpha_8 \mathrm{FAMOWN}_{it} + \sum \alpha \mathrm{CONTROLS}_{it} + \varepsilon_{it}\end{aligned} \quad (1)$$

$i = 1, \dots, N;\ t = 1, \dots, T$

We provide below details of the measurement of the research variables in the equation (1).

(a) Dependent Variables

$\mathrm{PERF_{it}}$ is the firm performance, which is measured using both accounting-based measures (i.e., return on assets and return on equity), backward and inward indicators that represent the past results, and market-based measures (Tobin's Q and market-to-book value of equity), forward-looking indicators that reflect the expected future earnings by the market. Return on assets (ROA) is the ratio of earnings before interest and taxes divided by the book value of average total assets. Return on equity (ROE) is measured as the ratio of net income divided by the book value of average total equity. Tobin's Q (Q) is calculated as the sum of the market value of common shares and the book value of total debt divided by the book value of total assets, which is consistent with prior studies (Choi, Park and Yoo, 2007; Andres, 2008; Dahya, Dimitrov and McConnell, 2008; Young, Tsai and Hsieh, 2008; Bozec, Dia and Bozec, 2010). Market-to-book value of equity (MBVE) is measured as the market value of equity divided by the book value of equity.

(b) Independent Variables: Board Characteristics

The proportion of independent directors (INDBOD_R) is calculated as the ratio of the number of independent directors divided by the total number of directors on the board. The proportion of independent supervisors (INDSUP) is calculated as the ratio of the number of independent supervisors divided by the total number of supervisors. An independent director or supervisor should meet all of the board independence criteria for being independent as stated in Articles 2 and 3 of the Regulations Governing Appointment of Independent Directors and Compliance Matters for Public Companies. Board size (BODSIZE) is measured as the total number of directors on the board. Board leadership (DUALITY) is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise.

(c) Independent Variables: Ownership Structure

Block-holders' ownership (BLOCKOWN) is measured as the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding. Institutional ownership (INSTOWN) is measured as the proportion of shares owned by institutional shareholders. Institutional shareholders include both foreign and domestic financial institutions (e.g., investment trust funds, securities dealers). Foreign ownership (FOROWN) is measured as the proportion of shares owned by foreign shareholders. Foreign ownership includes shareholdings owned by foreign individuals and institutions such as asset management firms. Family ownership (FAMOWN) is measured as the proportion of shares owned by family members and other legal entities that are controlled by family members.

(d) Control Variables

The reason for inclusion of the control variables ($\mathrm{CONTROLS}_{it}$) in the regression models is that it can isolate the impact of other factors affecting firm performance and will highlight the relationship between board characteristics and ownership structure, and firm performance. Firm size (FIRMSIZE) is measured as the natural logarithm of the book value of total assets. Larger firms find it easier to generate funds internally and to gain access to funds from external sources, which can have valuable effects on firm performance (Ng, 2005). However, larger companies are likely to be more diversified, and thus might be subjected to higher agency and bureaucratic costs (Fama and French, 1992; Choi, Park and Yoo, 2007). Therefore, we do not predict a sign for this variable.

Growth opportunity (GROWTH) is measured as the ratio of current year sales minus prior year sales divided by prior year sales. Sales growth generally enhances the capacity utilisation rate, which spreads fixed costs over more revenue resulting in higher profitability (Brush, Bromiley and Hendrickx, 2000; Amidu, 2007). Accordingly, GROWTH is predicted to be positively correlated with firm performance. Leverage (LEV) is measured as the ratio of total debt divided by the book value of total assets. LEV is used to gauge the firm's ability to cope with business downturns. A firm with a high LEV ratio is more easily exposed to the danger of business shocks since it has less ability to repay debt. LEV could be harmful to the firm value because of the accompanying bankruptcy costs and the deterioration of underinvestment issues (Myers, 1977; McConnell and Servaes, 1995). Similarly, according to the pecking order theory, debt is inversely associated with the profitability of the firm (Myers, 1984; Ng, 2005). Therefore, this study expects LEV to be negatively correlated with firm performance.

Dividend payout ratio (DIVIDEND) is calculated by dividing cash dividend per share by earnings per share. Dividend is important to shareholders and prospective investors in showing the profits that a company is making. Arnott and Asness (2003) and Zhou and Ruland (2006) report that high-dividend-payout companies tend to experience strong future earnings growth. In contrast, Amidu (2007) finds a negative association between dividend payout ratio and firm performance (proxied by return on assets). Therefore, no sign is predicted for this variable. Firm age (FIRMAGE) is measured as the number of years that a firm has operated. FIRMAGE is included as a control variable because it is plausible that as the firm matures, it may become more complex, creating more agency problems (Denis and Sarin, 1999; Choi, Park and Yoo, 2007). Therefore, we employ FIRMAGE to control for the maturation effect on firm performance, and expect that firm performance is negatively related to firm age.

Product market competition is measured by the Herfindahl-Hirschman Index (HHI) and is calculated as the sum of squares of the market share for each firm in the industry in each year. The lower the HHI, the lower is the industry concentration, and hence the higher is the industry competition. Previous research indicates that high product market competition may ensure that management does not shirk its responsibilities (Machlup, 1967; Pant and Pattanayak, 2010). Pant and Pattanayak (2010) also argue that higher product market competition forces the managers/insiders to focus on high performance. Big-4 audit firm (BIG4) is a dummy variable, which equals 1 if the firm is audited by a Big-4 audit company, and 0 otherwise. Fan and Wong (2005) report that firm value measured by the market-to-book value ratio is positively correlated with the Big 5 auditor, suggesting a Big 5 premium. Therefore, a dummy variable, BIG4, is expected to be positively associated with firm performance.

R&D ratio (RD) is calculated by dividing the ratio of R&D expenditure by total sales. Chung, Wright and Kedia (2003) and Sher and Yang (2005) find that firms with higher R&D expenditures perform better than those with lower R&D expenditures. However, there is also evidence of a negative relationship between investments in R&D and firm performance (Pearl, 2001). Accordingly, we employ RD as a control variable but do not predict the direction of the linkage between RD and firm performance. Electronics industry (ELECTRONIC) is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. Because firms in the electronics industry constitute nearly 41% of the full sample size, we use ELECTRONIC as a control variable to control for the potential effect of the electronics industry on firm performance.

Table 1 below provides the definition of the research variables employed in the model.

[insert Table 1 here]

(ii) Two Stage Least Squares (2SLS) Regression Model

Prior literature on the relationship between ownership structure and firm performance reports an issue of endogeneity (Cho, 1998; Demsetz and Villalonga, 2001; Chang, 2003; Maury, 2006; Villalonga and Amit, 2006; Al Farooque, van Zijl, Dunstan and Karim, 2007; Andres, 2008; Omran, Bolbol and Fatheldin, 2008; Turki and Sedrine, 2012). In this study, the endogeneity problem at issue is that the direction of causality between ownership concentration (proxied by block-holders' ownership, BLOCKOWN) and firm performance is unclear. That is to say, ownership concentration may affect firm performance and/or vice versa. In their review article, Roberts and Whited (forthcoming) state that "endogeneity leads to biased and inconsistent parameter estimates that make reliable inference virtually impossible." A large number of empirical studies conclude that certain ownership structures cause better performance, but these studies might be contaminated with endogeneity issues.

To solve the endogeneity problem, the instrumental variable (IV) method is widely used with 2SLS estimation in accounting research to estimate the coefficients in the regression model (Larcker and Rusticus, 2010). Therefore, to mitigate the biases caused by the issue of endogeneity, we employ exogenous instruments (instrumental variables) for the endogenous variable, BLOCKOWN, in a single-equation 2SLS model which is the same as equation (1). As the term suggests, 2SLS can theoretically be divided into two steps: (1) estimate the predicted values, $\widehat{X}_k$ by regressing the endogenous variable X_k on all of the exogenous variables: explanators or controls ($X_1, \dots, X_{k-1}$) and instruments ($Z_1, \dots, Z_m$), and (2) replace the endogenous variable X_k with its predicted values $\widehat{X}_k$ from the first stage, and regress the outcome variable of interest Y on all of the explanatory or control variables and $\widehat{X}_k$ (Roberts and Whited, forthcoming).

However, finding instrumental variables is not an easy task, since they should be correlated with the endogenous regressor but uncorrelated with the error term in the structural equation (Ramdani and van Witteloostuijn, 2010). In other words, an appropriate instrument, Z, is a variable that satisfies two conditions: relevance and exclusion (Roberts and Whited, forthcoming). The relevance condition requires that after netting out the effects of all other

exogenous variables, the correlation between the instrument and the endogenous regressor, $\mathcal{X}_k$, should not equal zero, while the exclusion condition requires that the correlation between the instrument and the error term, $\mathcal{U}$, should equal 0 ($cov(\mathcal{Z}, \mathcal{U}) = 0$).

It is suggested by Larcker and Rusticus (2010) that when addressing the endogeneity issue by using the IV method with a single-equation 2SLS estimation, a number of diagnostic tests should be reported, including tests for the weak instruments (relevance condition), over-identifying restrictions (exclusion condition: exogeneity and excludability), and differences between the OLS and 2SLS estimates (endogeneity problem), which will be detailed below.

(a) Test for the Strength of Instruments

In a standard IV approach, the instrumental variable should be relevant, which suggests that the instrumental variable, $\mathcal{Z}$, needs to be correlated with the endogenous variable $\mathcal{X}_k$. In their survey on weak instruments, Stock, Wright and Yogo (2002) indicate that when the instrumental variable is only weakly correlated with the endogenous regressor, the IV method can produce highly biased estimates. If that is the case, it is probable that IV estimates are more biased and more likely to support the wrong statistical inference than simple OLS estimates that make no adjustment for endogeneity. Therefore, this study conducts a diagnostic test to identify any weak instrument issues, and to ensure that the relevance condition is satisfied.

A number of diagnostics have been established in order to detect the weak instruments problem. The most widely-used approach in the literature is developed by Stock and Yogo (2005), based on the Cragg-Donald statistic.[2] When there is only one endogenous regressor, this statistic is simply the first-stage *F*-statistic in which the instruments are jointly zero (or partial *F*-statistic if there are other control variables). If the *F*-statistic is low, this implies that the selected instrumental variables are only weakly correlated with the endogenous regressor.

They then develop critical values for the necessary size of the *F*-statistic. For example, when the number of instrumental variables is 2, 4, 5, 6, and 10, the suggested critical *F*-values are 11.59, 13.96, 15.09, 16.23, and 20.88, respectively. If the first-stage (partial) *F*-statistic falls below these critical values, the instrumental variables are assumed to be weak and hence the IV estimates may not be consistent and are biased in the same direction as OLS. The fact that the critical values increase with the number of instrumental variables obviously implies that adding low quality instrumental variables is not the solution to a weak-instrument problem (Larcker and Rusticus, 2010).

(b) Test for Over-Identifying Restrictions

As mentioned above, in an IV technique with 2SLS estimation, an appropriate instrument must also satisfy the exclusion condition, suggesting that instrumental variables are exogenous with respect to the error term ($cov(\mathcal{Z}, \mathcal{U}) = 0$) and are excludable from the main equation. However, the exclusion condition cannot be tested directly because the error term, $\mathcal{U}$, is unobservable. Therefore, an alternative way has to be found to test this assumption.

A number of statistical specification tests have been developed. The one most commonly used is a test of over-identifying restrictions, where the number of instrumental variables excluded from the equation exceeds the number of potentially endogenous regressors

[2] See Cragg and Donald (1993) for details.

(Murray, 2006). This test can be used to measure the validity of all other instruments (i.e., whether the instruments are uncorrelated with the estimated error term in the second stage of 2SLS) under the assumption that at least one instrument is valid.

The over-identifying restrictions may be tested via the commonly employed *J*-statistic of Hansen (1982). Under the null hypothesis that all instrumental variables are uncorrelated with the error term, the *J*-statistic is distributed as $\mathcal{X}^2(r)$ where r is the degree of freedom equal to the number of over-identifying restrictions (i.e., the number of instrumental variables minus the number of endogenous variables). A high value of the test statistic tends to reject the null hypothesis, indicating that the instruments are not satisfying the exclusion condition required for their employment. This may be either because they are not actually exogenous, or because they are non-excludable from the regression.

(c) Endogeneity Test

In the presence of endogeneity, OLS estimation would produce biased and inconsistent parameter estimates, and therefore hypothesis tests can be severely misleading. However, the standard IV approach assumes that the explanatory regressor is endogenous, but if it is in fact exogenous, then OLS estimation would be more efficient. As Wooldridge (2009, p.511) states "[This] highlights an important cost of performing IV estimation when *x* and *u* are uncorrelated: the asymptotic variance of the IV estimator is always larger, and sometimes much larger, than the asymptotic variance of the OLS estimator."

Accordingly, the current study employs the Hausman (1978) test, which provids a formal test on whether the IV estimates are significantly different from the OLS estimates, to check if the OLS estimates are consistent. Under the null hypothesis that the specified endogenous variables can indeed be treated as exogenous (i.e., OLS is an appropriate estimation technique), the test statistic is an *F* test for IV versus OLS, with numerator degrees of freedom equal to the number of included endogenous variables. A high value of the test statistic tends to reject the null hypothesis, which indicates the existence of an endogeneity problem, and thus reveals the need for and the appropriateness of using IV estimation.

(iii) Sample Selection and Data Source

In order to investigate the hypotheses developed in the previous section, this study uses a dataset of firms listed on the Taiwan Stock Exchange (TWSE) with fiscal year ending on 31st December for the years 1997–2008 as the preliminary sample. As regards the data sources, all the data regarding financial statements, stock prices, board characteristics, and ownership structure, are drawn from the Taiwan Economic Journal (TEJ) database.

Table 2 provides details about the sample selection process. The preliminary sample size for firms listed on the TWSE from 1997 to 2008 is 8,542. We then exclude 362 observations for firms in the financial, securities and insurance industries, and 39 observations for foreign firms issuing depository receipts in Taiwan, because their regulatory and reporting regimes are considerably different from firms in other industries. We further exclude 413 observations for firms listed less than one year, and 1,591 observations for firms with incomplete financial, stock price and corporate governance data. The full sample size after this selection process

thus consists of 6,137 firm-year observations, an unbalanced panel data of different numbers of firms from 1997 to 2008.

[insert Table 2 here]

5. RESULTS

(i) Descriptive Statistics

Table 3 below reports the descriptive statistics of the research variables used in this study for the full sample from 1997 to 2008. In addition, we present the yearly mean values of the research variables in Table 4 below. With respect to firm performance variables, the results show that the average ROA is 5.11%, the average ROE is 5.70%, the average Tobin's Q is 1.34, and the average market-to-book value ratio (MBVE) is 1.53. Additionally, the mean values of these performance variables show a downward trend from 1997 to 2000 due to the Asian financial crisis and the dot-com bubble, and then an upward trend until the financial "tsunami" in 2008. Given that Taiwan is an export-oriented country, it is plausible that the profitability of most Taiwanese firms is deeply affected by the global economic conditions.

With respect to board characteristics variables, the proportion of independent directors (INDBOD_R) has an average of only 4.52% and a median of 0, indicating that there are still many Taiwanese companies which do not appoint independent directors, consistent with a recent study using Taiwanese firms by Young, Tsai and Hsieh (2008). As shown in Table 4, the average proportion of independent directors in Taiwan increases over the period, although it is markedly lower than that in other countries; for example, the percentages are 56%, 41%, 46%, 57% for the US (Boone, Field, Karpoff and Raheja, 2007), UK (Guest, 2008), Australia (Arthur, 2001) and Singapore (Mak and Li, 2001), respectively.

As to the other board characteristics variables, the average number of directors on the board (BODSIZE) is 9.77 (with a minimum of 1 and a maximum of 32), which is smaller than the mean numbers of 11.88 and 12.03 for listed firms in the US reported by Fitch and Shivdasani (2006) and in the UK reported by Andres, Azofra and Lopez (2005), respectively. The mean number of board size declines from 10.56 in 1997 to 9.65 in 2001, and then remains relatively stable from 2001 onwards. In addition, the proportion of independent supervisors (INDSUP) is on average 7.34% with a median of 0, implying that most supervisors in the sample companies are not independent. As regards the trend, the average proportion of independent supervisors increases from 5.62% in 2002 to 15.03% in 2005, and then declines dramatically to 5.09% in 2008. Last but not least, approximately 27.9% of the sample firms' CEOs are also the chairmen of the board of directors (DUALITY). The mean value increases from 20% in 1997 to 28.3% in 2008.

In terms of ownership structure variables, the average block-holders' ownership (BLOCKOWN) is 15.90%, with a maximum of 74.20%. The mean value increases from 9.72% in 1997 to 19.11% in 2008. In addition, the average (median) institutional ownership (INSTOWN) is 1.85% (0.21%), which is considerably lower than the mean of 34.16% in the

US (Linck, Netter and Yang, 2008). As regards the trend, the mean institutional ownership increases steadily from 1.66% to 2.17% over the period under study. Moreover, the average foreign ownership (FOROWN) is 7.76%, indicating that foreigners constitute only a small proportion of firm ownership for the sample companies. The mean value trend of foreign ownership shows a downward pattern from 1997 to 2001, and then begins an upward pattern from 2001 onwards. Lastly, based on the definition of this study, the average family ownership (FAMOWN) is 28.12%, with a maximum of 95.45%. The mean value of family ownership remains relatively stable between 26% and 30% over the period.

With respect to control variables, the average firm size (FIRMSIZE, natural logarithm of the book value of total assets) is 15.69 billion NTD (New Taiwan Dollars), the average growth opportunity (GROWTH) is 12.92%, the average debt ratio (LEV) is 39.16%, and the average dividend payout ratio is 37.02%. In addition, the average product market competition (HHI, the sum of squares of the market share for each firm in the industry) is 0.154 (with a minimum of 0.047 and a maximum of 0.931).

[insert Table 3 here]

[insert Table 4 here]

(ii) Correlation Analyses

Table 5 reports the results of the Pearson correlation matrix amongst the independent variables used in the regressions for the full sample over the period 1997–2008. The correlation coefficients between all independent variables are small (with a maximum of 0.682), suggesting no multicollinearity problem.[3] The current study also uses the Variance Inflation Factor (VIF) to double-check for any multicollinearity issue. The largest VIF is for the proportion of independent directors (INDBOD_R) (2.05), whereas the lowest VIF is for the growth opportunity (GROWTH) and dividend payout ratio (DIVIDEND) (1.01). As a result, the VIFs vary from 1.01 to 2.05 (with a mean of 1.34, not reported in the table), which are all lower than the critical value of 10. Therefore, the regression models used to test the hypotheses are relatively free from multicollinearity problems.

The highest correlation coefficient is the correlation between the proportion of independent directors (INDBOD_R) and the proportion of independent supervisors (INDSUP) ($r = 0.682$, $p < 0.01$), indicating that firms with a higher percentage of independent directors are more likely to have a higher percentage of independent supervisors. In addition, block-holders' ownership (BLOCKOWN) is negatively related to firm age (FIRMAGE) ($r = –0.247$, $p < 0.01$), implying that firms with larger block-holders' ownership are younger in age. Moreover, the larger the firm size (FIRMSIZE), the larger the institutional ownership (INSTOWN) ($r = 0.222$, $p < 0.01$) and foreign ownership (FOROWN) ($r = 0.405$, $p < 0.01$), showing that large firms are more attractive to institutional and foreign investors.

[3] Multicollinearity may be a problem when the correlation coefficient exceeds 0.80 (Gujarati, 1995)

[insert Table 5 here]

(iii) OLS Regression Results

Table 6 below provides the standard OLS regression results of firm performance on board characteristics, ownership structure and control variables.

(a) Accounting-Based Measures

The regression results in columns 1 and 2 are based on accounting measures for ROA and ROE, respectively. In terms of board characteristics variables, the coefficient of INDBOD_R is positive for both ROA and ROE, but only statistically significant at the 1% level for ROA. The results support Hypothesis 1 and are in line with Cho and Kim (2007). Hypothesis 2 is also accepted as the coefficient of INDSUP is positively and significantly associated with ROA and ROE at the 1% and 10% level, respectively. In addition, the coefficient of BODSIZE is not significant. Therefore, Hypothesis 3 is not supported, suggesting that board size has no impact on firm performance, which is consistent with Mangena, Tauringana and Chamisa (2012). Moreover, the coefficient of DUALITY is negative and significant at the 1% and 5% level for ROA and ROE, respectively, thus supporting Hypothesis 4. These results are consistent with Haniffa and Hudaib (2006).

With respect to ownership structure, the coefficient of BLOCKOWN is negative but statistically insignificant for both ROA and ROE models. Thus Hypothesis 5 is rejected, indicating that there is no relationship between block-holders' ownership and firm performance, consistent with Omran, Bolbol and Fatheldin (2008). In addition, similar to the research of Filatotchev, Lien and Piesse (2005), the coefficient of INSTOWN is positive and significant at the 1% and 5% level for ROA and ROE, respectively. These results support Hypothesis 6. Moreover, the coefficient of FOROWN is positive for both ROA and ROE, but only significant at the 1% level for ROA, thus supporting Hypothesis 7. The results are similar to those of Chen, Chiou, Chou and Syue (2009). As to family ownership, the coefficient of FAMOWN is positive and significant for ROA and ROE at the 1% level. Therefore, Hypothesis 8 is supported. Finally, as regards the control variables, we observe that DIVIDEND and ELECTRONIC are not significantly related to either ROA or ROE. In addition, FIRMSIZE, GROWTH, and BIG4 are positively correlated with both ROA and ROE, whereas LEV, HHI FIRMAGE and RD are negatively associated with both ROA and ROE.

(b) Market-Based Measures

The regression results based on market measures (i.e. Q and MBVE) are shown in columns 3 and 4. With regard to board characteristics, the coefficient of INDBOD_R is negative and significant at the 1% level for both Q and MBVE. These results lead us to reject Hypothesis 1, showing that the more the independent directors on the board, the lower the firm performance, which is consistent with the studies of Agrawal and Knoeber (1996), Yermack (1996), Bhagat and Black (1998; 2001), Kiel and Nicholson (2003), and Mangena, Tauringana and

Chamisa (2012), but which contradicts other studies (Weir, Laing and McKnight, 2002; Choi, Park and Yoo, 2007). In addition, consistent with Young, Tsai and Hsieh (2008), the coefficient of INDSUP is positive and significant at the 5% level for Q and MBVE. Therefore, Hypothesis 2 is supported. Moreover, we find that Hypotheses 3 and 4 are not supported since both BODSIZE and DUALITY are not significantly associated with either Q or MBVE, suggesting that firm performance is not affected by board size or CEO duality. These results are in line with Belkhir (2009).

In terms of ownership structure, the coefficient of BLOCKOWN is negative and significant at the 5 % significance level for Q and MBVE. The results support Hypothesis 5, suggesting that firm performance is inversely related to block-holders' ownership, which is similar to the studies of Demsetz and Villalonga (2001) and Villalonga and Amit (2006). Besides, we observe that Hypotheses 6, 7 and 8 are also supported as each of the coefficients of INSTOWN, FOROWN and FAMOWN is positive and significant at the 1% level for Q and MBVE. These results are in line with those of Filatotchev, Lien and Piesse (2005), Choi, Park and Yoo (2007) and Andres (2008). Lastly, when we look at the control variables, we find that Q and MBVE are not significantly related to FIRMSIZE or BIG4. In addition, GROWTH, RD, and ELECTRONIC are positively correlated with Q and MBVE, whereas LEV, HHI, DIVIDEND and FIRMAGE are negatively correlated with both Q and MBVE.

[insert Table 6 here]

(iv) 2SLS Regression Results

Table 7 below provides the 2SLS regression results of BLOCKOWN and firm performance for the full sample by using the standard instrumental variable (IV) method where BLOCKOWN and firm performance are treated as endogenous.

As discussed in the previous section, the standard OLS regression results may suffer from the endogeneity problem. In this study, endogeneity of ownership concentration (proxied by the block-holders' ownership, BLOCKOWN) through firm performance would imply that the OLS estimates are biased and inconsistent, and therefore cannot be used to make inferences about the causality of the relationship. Accordingly, we use the IV method with a single-equation 2SLS estimation to address the endogeneity issue. The equation being employed to conduct the IV method is the same as equation (1). However, 2SLS estimation may not bring better estimates than OLS estimation since it is difficult to find theoretically and empirically appropriate instruments.

Based on the data we have, we identify two potential instrumental variables: leverage (LEV) and dividend payout ratio (DIVIDEND), which might be correlated with the endogenous regressor (i.e. BLOCKOWN), but not with the error terms. First, external debt may be correlated with ownership concentration because of the possibility that creditors can act as external monitors to minimize managerial agency costs, which might affect the ownership concentration in that process (Lins, 2003; Omran, Bolbol and Fatheldin, 2008). Second, in the presence of information asymmetry between managers and external shareholders, dividend payout policy can reduce the costs of agency conflicts by limiting resources available for use

at the discretion of managers (Jensen, 1986; Short, Zhang and Keasey, 2002; Mancinelli and Ozkan, 2006). In addition, larger dividend payments might also be attractive to block-holders.

The appropriateness of the chosen instrumental variables is then examined by the two specification tests: the test of weak instruments (i.e., relevance condition: the instrumental variables should be correlated with the endogenous regressor) and over-indentifying restrictions (i.e., exclusion condition: the instrumental variables should be uncorrelated with the error term). The results of these tests are presented in the lower part of Table 7. First, the relevance condition is checked by the results from the first-stage linear regression of 2SLS estimation with the value for the *F*-statistic on the excluded instruments. The lower part of Table 7 shows that the partial *F*-statistic in which the instruments are jointly zero is 15.459 (significant at the 1% level), which is in excess of the critical value of 11.59 as suggested by Stock and Yogo (2005), indicating that the chosen instrumental variables, LEV and DIVIDEND, are relevant and therefore there is no weak instruments problem.

Second, the Hansen (1982) test for over-identifying restrictions is used to check whether the instrumental variables satisfy the exclusion condition. The test results in the lower part of Table 7 reveal that the Hansen *J*-statistic, $\mathcal{X}^2(1)$, is 0.000 (p = 0.989), 0.000 (p = 0.991), 1.270 (p = 0.260), and 2.297 (p = 0.130) for ROA, ROE, Q and MBVE models, respectively. These results fail to disprove the null hypothesis that all instrumental variables are uncorrelated with the error term, which suggests that the selected instrumental variables are exogenous and valid. In addition, we also conduct the standard Hausman (1978) test to justify the employment of 2SLS estimation rather than OLS estimation. The results of the Hausman *F*-statistic (F = 536.191, 82.366, 156.204 and 10.575 for ROA, ROE, Q and MBVE models, respectively, $p < 0.01$) strongly contradict the null hypothesis that BLOCKOWN is exogenous, which implies that the OLS estimates are biased and inconsistent, and thus indicates the need for, and the appropriateness of using , 2SLS estimation.

With regard to the results of 2SLS estimates, the second-stage firm performance equations are shown in columns 2–5 of Table 7. The signs of the coefficients on the independent and control variables in each equation are generally as predicted. In general, the 2SLS estimates are larger than those of OLS estimation in Table 6.

(a) Accounting-Based Measures

Columns 2 and 3 of Table 7 provide the regression results based on accounting-based measures for ROA and ROE, respectively. The coefficient of the endogenous regressor, BLOCKOWN, is negative and statistically significant at the 1% level for ROA and ROE models, thus supporting Hypothesis 5. The results, unlike those in the OLS estimation, suggest that block-holders' ownership has a negative impact on firm performance, similar to the findings of Lefort and Urzúa (2008). As far as corporate characteristics variables are concerned, we find, consistent with Cho and Kim (2007), that the coefficient of INDBOD_R is positively correlated with ROA and ROE at the 1% significance level. Therefore, Hypothesis 1 is supported, suggesting that firm performance increases significantly after an increase in the proportion of independent directors, similar to the results of OLS estimation.

In addition, unlike the results of OLS estimation, the coefficient of BODSIZE is negative and significant at the 1% level for both ROA and ROE. The results support Hypothesis 3, indicating that board size is inversely associated with firm performance, which is in line with the studies of Mak and Kusnadi (2005) and Guest (2009). Moreover, in contrast to the results of OLS estimation, we observe that both of the coefficients of INDSUP and DUALITY are

not significantly related to either ROA or ROE, thus rejecting Hypotheses 2 and 4. These results show that neither the proportion of independent supervisors nor CEO duality has an effect on firm performance, similar to the study of Dahya and McConnell (2007).

In terms of other ownership structure variables, consistent with previous OLS estimation results, each of the coefficients of INSTOWN, FOROWN, and FAMOWN is positive and significant at the 1% level for both ROA and ROE. These results support Hypotheses 6–8, suggesting that all institutional, foreign and family ownership has a direct impact on firm performance, consistent with Filatotchev, Lien and Piesse (2005), Cho and Kim (2007), and Andres (2008). Finally, with respect to control variables, we find that GROWTH is not significantly correlated with ROA and ROE. In addition, ROA and ROE are positively related to FIRMAGE and BIG4, but negatively to FIRMSIZE, HHI, RD and ELECTRONIC.

(b) Market-Based Measures

The regression results based on market measures for Q and MBVE are shown in columns 2 and 3, respectively. Consistent with Demsetz and Villalonga (2001), the coefficient of the endogenous BLOCKOWN variable is negatively associated with Q and MBVE and statistically significant at the 1% level. Thus Hypothesis 5 is supported, indicating firm performance decreases with a high block-holders' ownership, similar to the OLS estimation results. With regard to board characteristics, similar to the results of OLS estimation, we find that the coefficient of INDBOD_R is positive for both Q and MBVE but only statistically significant at the 1% level for Q. The results partly support Hypothesis 1, suggesting that firm performance improves significantly with a higher proportion of independent directors, in line with those of Weir, Laing and McKnight (2002).

Additionally, in contrast to that of OLS estimation, the coefficient of BODSIZE is negative and significant at the 1% and 10% level for Q and MBVE, respectively. Hypothesis 3 is supported, showing that the bigger the board size, the lower the firm performance. This negative coefficient supports the evidence provided by Haniffa and Hudaib (2006) and Dahya, Dimitrov and McConnell (2008). Moreover, we find, unlike the OLS estimation results but similar to those of accounting measures, that both of the coefficients of INDSUP and DUALITY are insignificant, suggesting that both the proportion of independent supervisors and CEO duality are irrelevant to the determinants of firm performance. Therefore, Hypotheses 2 and 4 are not supported. These results are similar to those of Drakos and Bekiris (2010), but partly contradict the findings of Young, Tsai and Hsieh (2008).

With regard to other ownership structure variables, consistent with the results of accounting measures and those of OLS estimation, each of the coefficients of INSTOWN, FOROWN, and FAMOWN is positive and significant at the 1% level for Q and MBVE. Thus all Hypotheses 6–8 are supported again, implying that firm performance is positively affected by institutional, foreign and family ownership, consistent with Maury (2006) and Omran, Bolbol and Fatheldin (2008). Finally, as regards control variables, the present study observes that GROWTH, BIG4, RD and ELECTRONIC are positively associated with both Q and MBVE, whereas FIRMSIZE, HHI, FIRMAGE are negatively related to Q and MBVE models.

[insert Table 7 here]

(v) Robustness Checks

In this section, we perform additional tests to confirm the robustness of the results of our primary analysis of the relationship between board characteristics, ownership structure and firm performance. We repeat our 2SLS regression models by increasing the number of instrumental variables. Table 8 below provides the 2SLS regression results of BLOCKWON and firm performance based on Tobin's Q with different instrumental variables. In columns 2–4, we employ 4, 5 and 6 instrumental variables, respectively, in the equation models. With regard to the results of 2SLS estimates, regardless of how many instruments we use, our findings are consistent with one another and remain the same as those in the primary analysis.

With regard to the test of weak instruments, the partial *F*-statistics are 27.056, 21.832, and 20.032 (all significant at the 1% level) for Q with 4, 5 and 6 instruments, respectively. These partial *F*-statistics exceed, respectively, the critical values of 13.96, 15.09 and 16.23 noted by Stock and Yogo (2005), suggesting that the chosen instrumental variables are relevant and therefore there is no weak instruments problem. In addition, the chosen instrumental variables are also valid, as the results of the Hansen *J*-statistic ($\mathcal{X}^2(3) = 1.581$, $p = 0.664$; $\mathcal{X}^2(4) = 4.639$, $p = 0.326$; $\mathcal{X}^2(5) = 7.848$, $p = 0.165$) do not reject the null hypothesis that all instrumental variables are uncorrelated with the error term.

[insert Table 8 here]

6. CONCLUDING REMARKS

This paper investigates the relationship between corporate governance and firm performance using a dataset of Taiwanese non-financial listed firms. In particular, we assess the impact of board characteristics, the internal corporate governance mechanism, and ownership structure, the external corporate governance mechanism, on firm performance. In contrast with prior evidence on western developed countries that show no linkage between independent directors and firm performance, our findings indicate that for both accounting-based measures and market-based measures, board independence has a significant and positive effect on firm performance in our study on Taiwanese firms. We also find that firm performance is positively related to institutional ownership, foreign ownership and family ownership. In contrast, our evidence points out that board size and block-holders' ownership are negatively associated with firm performance. However, we observe that the separation between chairman and CEO, and the proportion of independent supervisors, are not associated with firm performance.

Our findings have the following main implication. In contrast to the inconclusive empirical results on the impact of independent boards on firm performance in developed markets such as the UK, the findings of the current study, which show a significantly positive association between appointment of independent directors and firm performance, imply that the monitoring value of independent directors tends to be more significant in markets with weaker corporate governance mechanisms.

REFERENCES

Adams, R. B. and Ferreira, D. (2007). A Theory of Friendly Boards. *The Journal of Finance, 62*(1), 217-250.

Admati, A. R., Pfleiderer, P. and Zechner, J. (1994). Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium. *Journal of Political Economy, 102*(6), 1097-1130.

Agrawal, A. and Knoeber, C. R. (1996). Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders. *The Journal of Financial and Quantitative Analysis, 31*(3), 377-397.

Al Farooque, O., van Zijl, T., Dunstan, K. and Karim, A. W. (2007). Corporate Governance in Bangladesh: Link between Ownership and Financial Performance. *Corporate Governance: An International Review, 15*(6), 1453-1468.

Amidu, M. (2007). How does Dividend Policy Affect Performance of the Firm on Ghana Tock Exchange? *Investment Management and Financial Innovations, 4*(2), 103-112.

Anderson, R. C. and Reeb, D. M. (2003). Founding-Family Ownership and Firm Performance: Evidence from the S&P 500. *The Journal of Finance, 58*(3), 1301-1327.

Andres, C. (2008). Large Shareholders and Firm performance—An Empirical Examination of Founding-Family Ownership. *Journal of Corporate Finance, 14*(4), 431-445.

Arnott, R. D. and Asness, C. S. (2003). Surprise! Higher Dividends = Higher Earnings Growth. *Financial Analysts Journal, 59*(1), 70-87.

Arthur, N. (2001). Board Composition as the Outcome of an Internal Bargaining Process: Empirical Evidence. *Journal of Corporate Finance, 7*(3), 307-340.

Bathala, C. T. and Rao, R. P. (1995). The Determinants of Board Composition: An Agency Theory Perspective. *Managerial and Decision Economics, 16*(1), 59-69.

Baysinger, B. D. and Butler, H. N. (1985). Corporate Governance and the Board of Directors: Performance Effects of Changes in Board Composition. *Journal of Law, Economics, and Organization, 1*(1), 101-124.

Beasley, M. S. (1996). An Empirical Analysis of the Relation between the Board of Director Composition and Financial Statement Fraud. *The Accounting Review, 71*(4), 443-465.

Belkhir, M. (2009). Board Structure, Ownership Structure and Firm Performance: Evidence from Banking. *Applied Financial Economics, 19*(19), 1581-1593.

Bhagat, S. and Black, B. (1998). The Uncertain Relationship between Board Composition and Firm Performance. *Business Lawyer, 54*, 921-963.

Bhagat, S. and Black, B. (2001). The Non-Correlation between Board Independence and Long-Term Firm Performance. *Journal of Corporate Law, 27*(2), 231-273.

Bonilla, C. A., Sepulveda, J. and Carvajal, M. (2010). Family Ownership and Firm Performance in Chile: A Note on Martinez Et Al.'s Evidence. *Family Business Review, 23*(2), 148-154.

Boone, A. L., Field, L. C., Karpoff, J. M. and Raheja, C. G. (2007). The Determinants of Corporate Board Size and Composition: An Empirical Analysis. *Journal of Financial Economics, 85*(1), 66-101.

Bozec, R., Dia, M. and Bozec, Y. (2010). Governance-Performance Relationship: A Re-Examination using Technical Efficiency Measures. *British Journal of Management, 21*(3), 684-700.

Brickley, J. A., Lease, R. C. and Smith Jr, C. W. (1988). Ownership Structure and Voting on Antitakeover Amendments. *Journal of Financial Economics, 20*(0), 267-291.

Brush, T. H., Bromiley, P. and Hendrickx, M. (2000). The Free Cash Flow Hypothesis for Sales Growth and Firm Performance. *Strategic Management Journal, 21*(4), 455-472.

Byrd, J. W. and Hickman, K. A. (1992). Do Outside Directors Monitor Managers? : Evidence from Tender Offer Bids. *Journal of Financial Economics, 32*(2), 195-221.

Carney, M. and Gedajlovic, E. (2002). The Coupling of Ownership and Control and the Allocation of Financial Resources: Evidence from Hong Kong. *Journal of Management Studies, 39*(1), 123-146.

Chang, S. J. (2003). Ownership Structure, Expropriation, and Performance of Group-Affiliated Companies in Korea. *The Academy of Management Journal, 46*(2), 238-253.

Chen, K. Y., Elder, R. J. and Hsieh, Y. (2007). Corporate Governance and Earnings Management: The Implications of Corporate Governance Best-Practice Principles for Taiwanese Listed Companies. *Journal of Contemporary Accounting & Economics, 3*(2), 73-105.

Chen, Y., Chiou, J., Chou, T. and Syue, M. (2009). Corporate Governance and Long-Run Performance of Equity Issues: The Role of Foreign Ownership in Taiwan. *Asia Pacific Management Review, 14*(1), 27-46.

Chen, Z., Cheung, Y., Stouraitis, A. and Wong, A. W. S. (2005). Ownership Concentration, Firm Performance, and Dividend Policy in Hong Kong. *Pacific-Basin Finance Journal, 13*(4), 431-449.

Cheng, S. (2008). Board Size and the Variability of Corporate Performance. *Journal of Financial Economics, 87*(1), 157-176.

Cho, D. and Kim, J. (2007). Outside Directors, Ownership Structure and Firm Profitability in Korea. *Corporate Governance: An International Review, 15*(2), 239-250.

Cho, M. (1998). Ownership Structure, Investment, and the Corporate Value: An Empirical Analysis. *Journal of Financial Economics, 47*(1), 103-121.
Choi, J. J., Park, S. W. and Yoo, S. S. (2007). The Value of Outside Directors: Evidence from Corporate Governance Reform in Korea. *Journal of Financial and Quantitative Analysis, 42*(4), 941-962.
Chung, K. H., Wright, P. and Kedia, B. (2003). Corporate Governance and Market Valuation of Capital and R&D Investments. *Review of Financial Economics, 12*(2), 161-172.
Claessens, S. and Djankov, S. (1999). Ownership Concentration and Corporate Performance in the Czech Republic. *Journal of Comparative Economics, 27*(3), 498-513.
Coffee, J. C.,Jr. (1991). Liquidity Versus Control: The Institutional Investor as Corporate Monitor. *Columbia Law Review, 91*(6), 1277-1368.
Cornett, M. M., Marcus, A. J. and Tehranian, H. (2008). Corporate Governance and Pay-for-Performance: The Impact of Earnings Management. *Journal of Financial Economics, 87*(2), 357-373.
Cragg, J. G. and Donald, S. G. (1993). Testing Identifiability and Specification in Instrumental Variable Models. *Econometric Theory, 9*(2), 222-240.
Dahlquist, M. and Robertsson, G. (2001). Direct Foreign Ownership, Institutional Investors, and Firm Characteristics. *Journal of Financial Economics, 59*(3), 413-440.
Dahya, J., Dimitrov, O. and McConnell, J. J. (2008). Dominant Shareholders, Corporate Boards, and Corporate Value: A Cross-Country Analysis. *Journal of Financial Economics, 87*(1), 73-100.
Dahya, J. and McConnell, J. J. (2005). Outside Directors and Corporate Board Decisions. *Journal of Corporate Finance, 11*(1-2), 37-60.
Dahya, J. and McConnell, J. J. (2007). Board Composition, Corporate Performance, and the Cadbury Committee Recommendation. *Journal of Financial and Quantitative Analysis, 42*(3), 535-564.
Dayton, K. N. (1984). Corporate Governance - the Other Side of the Coin. *Harvard Business Review, 62*(1), 34-37.
De Andres, P., Azofra, V. and Lopez, F. (2005). Corporate Boards in OECD Countries: Size, Composition, Functioning and Effectiveness. *Corporate Governance: An International Review, 13*(2), 197-210.
Demsetz, H. and Lehn, K. (1985). The Structure of Corporate Ownership: Causes and Consequences. *Journal of Political Economy, 93*(6), 1155-1177.
Demsetz, H. and Villalonga, B. (2001). Ownership Structure and Corporate Performance. *Journal of Corporate Finance, 7*(3), 209-233.
Denis, D. J. and Sarin, A. (1999). Ownership and Board Structures in Publicly Traded Corporations. *Journal of Financial Economics, 52*(2), 187-223.
Drakos, A. A. and Bekiris, F. V. (2010). Endogeneity and the Relationship between Board Structure and Firm Performance: A Simultaneous Equation Analysis for the Athens Stock Exchange. *Managerial and Decision Economics, 31*(6), 387-401.
Dwivedi, N. and Jain, A. (2005). Corporate Governance and Performance of Indian Firms: The Effect of Board Size and Ownership. *Employee Responsibilities & Rights Journal, 17*(3), 161-172.
Faccio, M., Lang, L. H. P. and Young, L. (2001). Dividends and Expropriation. *The American Economic Review, 91*(1), 54-78.
Fama, E. F. (1980). Agency Problems and the Theory of the Firm. *Journal of Political Economy, 88*(2), 288-307.
Fama, E. F. and Jensen, M. C. (1983). Separation of Ownership and Control. *Journal of Law & Economics, 26*(2), 301-325.
Fama, E. F. and French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance, 47*(2), 427-465.
Fan, J. P. H. and Wong, T. J. (2005). Do External Auditors Perform a Corporate Governance Role in Emerging Markets? Evidence from East Asia. *Journal of Accounting Research, 43*(1), 35-72.
FICH, E. M. and SHIVDASANI, A. (2006). Are Busy Boards Effective Monitors? *The Journal of Finance, 61*(2), 689-724.
Filatotchev, I., Lien, Y. and Piesse, J. (2005). Corporate Governance and Performance in Publicly Listed, Family-Controlled Firms: Evidence from Taiwan. *Asia Pacific Journal of Management, 22*(3), 257-283.
Fosberg, R. H. (1989). Outside Directors and Managerial Monitoring. *Akron Business and Economic Review, 20*(2), 24-32.
Goodstein, J., Gautam, K. and Boeker, W. (1994). The Effects of Board Size and Diversity on Strategic Change. *Strategic Management Journal, 15*(3), 241-250.
Guest, P. M. (2008). The Determinants of Board Size and Composition: Evidence from the UK. *Journal of Corporate Finance, 14*(1), 51-72.
Guest, P. M. (2009). The Impact of Board Size on Firm Performance: Evidence from the UK. *The European Journal of Finance, 15*(4), 385-404.
Gujarati, D. N. (1995). Basic Econometrics (3rd ed.). *New York: McGraw-Hill.*

Haniffa, R. and Hudaib, M. (2006). Corporate Governance Structure and Performance of Malaysian Listed Companies. *Journal of Business Finance & Accounting, 33*(7), 1034-1062.
Hansen, L. P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica, 50*(4), 1029-1054.
Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica, 46*(6), 1251-1271.
Hermalin, B. E. and Weisbach, M. S. (1991). The Effects of Board Composition and Direct Incentives on Firm Performance. *Financial Management, 20*(4), 101-112.
Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review, 76*(2), 323-329.
Jensen, M. C. (1993). The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. *The Journal of Finance, 48*(3), 831-880.
Jensen, M. C. and Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics, 3*(4), 305-360.
Joh, S. W. (2003). Corporate Governance and Firm Profitability: Evidence from Korea before the Economic Crisis. *Journal of Financial Economics, 68*(2), 287-322.
Kiel, G. C. and Nicholson, G. J. (2003). Board Composition and Corporate Performance: How the Australian Experience Informs Contrasting Theories of Corporate Governance. *Corporate Governance: An International Review, 11*(3), 189-205.
Klein, A. (1998). Firm Performance and Board Committee Structure. *Journal of Law and Economics, 41*(1), 275-304.
Kosnik, R. D. (1987). Greenmail: A Study of Board Performance in Corporate Governance. *Administrative Science Quarterly, 32*(2), 163-185.
Kumar, N. and Singh, J. P. (2012). Outside Directors, Corporate Governance and Firm Performance: Empirical Evidence from India. *Asian Journal of Finance & Accounting, 4*(2), 39-55.
La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (1999). Corporate Ownership Around the World. *The Journal of Finance, 54*(2), 471-517.
Larcker, D. F. and Rusticus, T. O. (2010). On the use of Instrumental Variables in Accounting Research. *Journal of Accounting and Economics, 49*(3), 186-205.
Lefort, F. and Urzúa, F. (2008). Board Independence, Firm Performance and Ownership Concentration: Evidence from Chile. *Journal of Business Research, 61*(6), 615-622.
Lin, A. J. G. (2009). Common Law Influences in Private Law: Taiwan's Experiences Related to Corporate Law. *National Taiwan University Law Review, 4*(2), 107-138.
Linck, J. S., Netter, J. M. and Yang, T. (2008). The Determinants of Board Structure. *Journal of Financial Economics, 87*(2), 308-328.
Lins, K. V. (2003). Equity Ownership and Firm Value in Emerging Markets. *The Journal of Financial and Quantitative Analysis, 38*(1), 159-184.
Lipton, M. and Lorsch, J. W. (1992). A Modest Proposal for Improved Corporate Governance. *Business Lawyer, 48*(1), 59-77.
Machlup, F. (1967). Theories of the Firm: Marginalist, Behavioral, Managerial. *The American Economic Review, 57*(1), 1-33.
Mak, Y. T. and Kusnadi, Y. (2005). Size really Matters: Further Evidence on the Negative Relationship between Board Size and Firm Value. *Pacific-Basin Finance Journal, 13*(3), 301-318.
Mak, Y. T. and Li, Y. (2001). Determinants of Corporate Ownership and Board Structure: Evidence from Singapore. *Journal of Corporate Finance, 7*(3), 235-256.
Mancinelli, L. and Ozkan, A. (2006). Ownership Structure and Dividend Policy: Evidence from Italian Firms. *The European Journal of Finance, 12*(3), 265-282.
Mangena, M., Tauringana, V. and Chamisa, E. (2012). Corporate Boards, Ownership Structure and Firm Performance in an Environment of Severe Political and Economic Crisis. *British Journal of Management, 23*, S23-S41.
Maury, B. (2006). Family Ownership and Firm Performance: Empirical Evidence from Western European Corporations. *Journal of Corporate Finance, 12*(2), 321-341.
McConnell, J. J. and Servaes, H. (1990). Additional Evidence on Equity Ownership and Corporate Value. *Journal of Financial Economics, 27*(2), 595-612.
McConnell, J. J. and Servaes, H. (1995). Equity Ownership and the Two Faces of Debt. *Journal of Financial Economics, 39*(1), 131-157.
McDonald, M. L., Westphal, J. D. and Graebner, M. E. (2008). What do they Know? the Effects of Outside Director Acquisition Experience on Firm Acquisition Performance. *Strategic Management Journal, 29*(11), 1155-1177.
Mehran, H. (1995). Executive Compensation Structure, Ownership, and Firm Performance. *Journal of Financial Economics, 38*(2), 163-184.

Murray, M. P. (2006). Avoiding Invalid Instruments and Coping with Weak Instruments. *The Journal of Economic Perspectives, 20*(4), 111-132.
Myers, S. C. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics, 5*(2), 147-175.
Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance, 39*(3), 575-592.
Ng, C. Y. M. (2005). An Empirical Study on the Relationship between Ownership and Performance in a Family-Based Corporate Environment. *Journal of Accounting, Auditing & Finance, 20*(2), 121-146.
Omran, M. M., Bolbol, A. and Fatheldin, A. (2008). Corporate Governance and Firm Performance in Arab Equity Markets: Does Ownership Concentration Matter? *International Review of Law & Economics, 28*(1), 32-45.
Pant, M. and Pattanayak, M. (2010). Corporate Governance, Competition and Firm Performance: Evidence from India. *Journal of Emerging Market Finance, 9*(3), 347-381.
Pearce, J. A. and Zahra, S. A. (1992). Board Composition from A Strategic Contingency Perspective. *Journal of Management Studies, 29*(4), 411-438.
Pearl, J. (2001). Intangible Investments, Tangible Results. *MIT Sloan Management Review, 43*(1), 13-14.
Peasnell, K. V., Pope, P. F. and Young, S. (2005). Board Monitoring and Earnings Management: Do Outside Directors Influence Abnormal Accruals? *Journal of Business Finance & Accounting, 32*(7-8), 1311-1346.
Piesse, J., Filatotchev, I. and Lien, Y. (2007). Corporate Governance in Family-Controlled Firms in Taiwan. *International Review of Economics, 54*(1), 176-193.
Pound, J. (1988). Proxy Contests and the Efficiency of Shareholder Oversight. *Journal of Financial Economics, 20*(0), 237-265.
Prevost, A. K., Rao, R. P. and Hossain, M. (2002). Board Composition in New Zealand: An Agency Perspective. *Journal of Business Finance & Accounting, 29*(5-6), 731-760.
Ramdani, D. and van Witteloostuijn, A. (2010). The Impact of Board Independence and CEO Duality on Firm Performance: A Quantile Regression Analysis for Indonesia, Malaysia, South Korea and Thailand. *British Journal of Management, 21*(3), 607-627.
Rhoades, D. L., Rechner, P. L. and Sundaramurthy, C. (2001). A Meta-Analysis of Board Leadership Structure and Financial Performance: Are "Two Heads Better than One"? *Corporate Governance: An International Review, 9*(4), 311-319.
Roberts, M. R. and Whited, T. M. (forthcoming). Endogenetiy in Empirical Corporate Finance. In: G. M. Constantinides, M. Harris and R. M. Stulz (Eds.), *Handbook of the Economics of Finance, Volume 2*. Elsevier
Rosenstein, S. and Wyatt, J. G. (1990). Outside Directors, Board Independence, and Shareholder Wealth. *Journal of Financial Economics, 26*(2), 175-191.
Setia-Atmaja, L., Tanewski, G. A. and Skully, M. (2009). The Role of Dividends, Debt and Board Structure in the Governance of Family Controlled Firms. *Journal of Business Finance & Accounting, 36*(7-8), 863-898.
Sher, P. J. and Yang, P. Y. (2005). The Effects of Innovative Capabilities and R&D Clustering on Firm Performance: The Evidence of Taiwan's Semiconductor Industry. *Technovation, 25*(1), 33-43.
Shleifer, A. and Vishny, R. W. (1986). Large Shareholders and Corporate Control. *Journal of Political Economy, 94*(3), 461-488.
Shleifer, A. and Vishny, R. W. (1997). A Survey of Corporate Governance. *The Journal of Finance, 52*(2), 737-783.
Short, H., Zhang, H. and Keasey, K. (2002). The Link between Dividend Policy and Institutional Ownership. *Journal of Corporate Finance, 8*(2), 105-122.
Stock, J. H. and Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regression. In: D. W. K. Andrews and J. H. Stock (Eds.), *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*. Cambridge: Cambridge University Press, 80-108.
Stock, J. H., Wright, J. H. and Yogo, M. (2002). A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments. *Journal of Business & Economic Statistics, 20*(4), 518-529.
Tian, J. J. and Lau, C. (2001). Board Composition, Leadership Structure and Performance in Chinese Shareholding Companies. *Asia Pacific Journal of Management, 18*(2), 245-263.
Turki, A. and Sedrine, N. B. (2012). Ownership Structure, Board Characteristics and Corporate Performance in Tunisia. *International Journal of Business and Management, 7*(4), 121-132.
Villalonga, B. and Amit, R. (2006). How do Family Ownership, Control and Management Affect Firm Value? *Journal of Financial Economics, 80*(2), 385-417.
Weir, C., Laing, D. and McKnight, P. J. (2002). Internal and External Governance Mechanisms: Their Impact on the Performance of Large UK Public Companies. *Journal of Business Finance & Accounting, 29*(5-6), 579-611.
Weisbach, M. S. (1988). Outside Directors and CEO Turnover. *Journal of Financial Economics, 20*, 431-460.
Wintoki, M. B., Linck, J. S. and Netter, J. M. (2012). Endogeneity and the Dynamics of Internal Corporate Governance. *Journal of Financial Economics, 105*(3), 581-606.

Wooldridge, J. M. (2009). Introductory Econometrics: A Modern Approach (4th ed.). *New York: South-Western Cengage Learning*.
Yeh, Y., Lee, T. and Woidtke, T. (2001). Family Control and Corporate Governance: Evidence from Taiwan. *International Review of Finance, 2*(1-2), 21-48.
Yeh, Y. and Woidtke, T. (2005). Commitment Or Entrenchment?: Controlling Shareholders and Board Composition. *Journal of Banking & Finance, 29*(7), 1857-1885.
Yermack, D. (1996). Higher Market Valuation of Companies with a Small Board of Directors. *Journal of Financial Economics, 40*(2), 185-211.
Young, C., Tsai, L. and Hsieh, P. (2008). Voluntary Appointment of Independent Directors in Taiwan: Motives and Consequences. *Journal of Business Finance & Accounting, 35*(9-10), 1103-1137.
Zhou, P. and Ruland, W. (2006). Dividend Payout and Future Earnings Growth. *Financial Analysts Journal, 62*(3), 58-69.

Table 1 Definition of the Research Variables for Performance Equation Models

Variables	Acronym	Definition	Expected sign
Dependent variables			
Return on assets	ROA	The ratio of earnings before interest and taxes over the book value of average total assets.	
Return on equity	ROE	The ratio of net income over the book value of average total equity.	
Tobin's Q	Q	The ratio of the sum of the market value of common shares and the book value of total debt over the book value of total assets.	
Market-to-book value of equity	MBVE	The market value of equity over the book value of equity.	
Board characteristics variables			
The proportion of independent directors	INDBOD_R	The proportion of independent directors over the total number of directors on the board.	+
The proportion of independent supervisors	INDSUP	The proportion of independent supervisors over the total number of supervisors.	+
Board size	BODSIZE	The total number of directors on the board.	−
Board leadership	DUALITY	A dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise.	−
Ownership structure variables			
Block-holders' ownership	BLOCKOWN	The proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding.	+/−
Institutional ownership	INSTOWN	The proportion of shares owned by institutional shareholders.	+
Foreign ownership	FOROWN	The proportion of shares owned by foreign shareholders.	+
Family ownership	FAMOWN	The proportion of shares owned by family members and other legal entities that are controlled by family members.	+/−
Control variables			
Firm size	FIRMSIZE	The natural logarithm of the book value of total assets.	?
Growth opportunity	GROWTH	The ratio of current year sales minus prior year sales over prior year sales.	+
Leverage	LEV	The ratio of total debt to total assets.	−
Dividend payout ratio	DIVIDEND	The ratio of cash dividend per share to earnings per share.	?
Product market competition	HHI	The sum of the squares of the market share for each firm in the industry in each year.	?
Firm age	FIRMAGE	The number of years that a firm has operated.	−
Big-4 audit firm	BIG4	A dummy variable, which equals 1 if the firm's auditor is a Big-4 audit firm and 0 otherwise.	+
R&D ratio	RD	The ratio of R&D expenditure to total sales.	?
Electronics industry	ELECTRONIC	A dummy variable, which equals 1 if the firm is in the electronics industry and 0 otherwise.	?

Table 2 Sample Selection Process

	Firm-year observations
Preliminary sample size (1997–2008)	8,542
Less:	
Firms in the financial sector	-362
Firms in depository receipts sector	-39
Firms listed less than one year	-413
Firms with incomplete data regarding financial statements, stock price, and corporate governance information	-1,591
Full sample size	6,137

Table 3 Descriptive Statistics

Variables	Min.	25%	Mean	Median	75%	Max.	SD
Dependent variables							
ROA	-105.770	1.310	5.105	4.970	9.390	50.640	9.038
ROE	-939.560	0.950	5.696	7.170	14.670	77.810	22.575
Q	0.279	0.873	1.341	1.105	1.524	9.513	0.802
MBVE	0.040	0.764	1.526	1.193	1.879	10.957	1.198
Board characteristics variables							
INDBOD_R	0.000	0.000	4.521	0.000	0.000	50.000	8.804
INDSUP	0.000	0.000	7.343	0.000	0.000	100.000	16.638
BODSIZE	1.000	8.000	9.767	9.000	11.000	32.000	3.444
DUALITY	0.000	0.000	0.279	0.000	1.000	1.000	0.449
Ownership structure variables							
BLOCKOWN	0.000	8.040	15.895	14.250	21.970	74.200	11.374
INSTOWN	0.000	0.000	1.850	0.210	2.260	62.260	3.717
FOROWN	0.000	0.230	7.756	2.560	9.510	92.850	11.832
FAMOWN	0.000	14.650	28.123	26.220	39.320	95.450	16.990
Control variables							
FIRMSIZE	12.585	14.860	15.691	15.531	16.281	20.290	1.205
GROWTH	-134.400	-6.140	12.915	5.670	20.170	5081.780	90.226
LEV	1.460	27.070	39.162	38.750	49.550	98.720	16.546
DIVIDEND	-750.000	0.000	37.022	24.138	58.824	11000.000	164.266
HHI	0.047	0.060	0.154	0.085	0.217	0.931	0.143
FIRMAGE	1.137	17.721	27.055	26.436	35.263	62.712	11.867
BIG4	0.000	1.000	0.830	1.000	1.000	1.000	0.375
RD	0.000	0.000	2.293	0.710	2.600	547.740	10.817
ELECTRONIC	0.000	0.000	0.407	0.000	1.000	1.000	0.491

Notes: N = 6,137. The definitions of the research variables are as follows. ROA is the ratio of earnings before interest and taxes over the book value of average total assets; ROE is the ratio of net income over the book value of average total equity; Q is the ratio of the sum of the market value of common shares and the book value of total debt over the book value of total assets; MBVE is the market value of equity over the book value of equity; INDBOD_R is the proportion of independent directors over the total number of directors on the board; INDSUP is the proportion of independent supervisors over the total number of supervisors; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FOROWN is the proportion of shares owned by foreign shareholders; FAMOWN is the proportion of shares owned by family members and other legal entities that are controlled by family members; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; DIVIDEND is the ratio of cash dividend per share to earnings per share; HHI is the sum of the squares of the market share for each firm in the industry in each year (Herfindahl-Hirschman Index); FIRMAGE is the number of years that the firm has operated; BIG4 is a dummy variable, which equals 1 if the firm is audited by Big-4 accounting firms, and 0 otherwise; RD is the ratio of R&D expenditure to total sales; ELECTRONIC is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. For the dummy (binary) variables, the mean indicates the proportion of sample firms with value equal to 1 for the variable.

Table 4 Yearly Mean Values of The Research Variables

Variables	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Dependent variables												
ROA	6.991	4.103	4.115	4.632	3.170	4.245	5.581	5.877	5.165	6.487	7.346	2.958
ROE	9.361	3.819	3.830	4.360	2.026	3.702	6.891	7.568	6.421	7.942	8.584	2.618
Q	1.974	1.617	1.577	1.068	1.269	1.179	1.354	1.251	1.308	1.509	1.484	0.966
MBVE	2.531	1.968	1.919	1.059	1.379	1.263	1.564	1.410	1.472	1.824	1.729	0.929
Board characteristics variables												
INDBOD_R	0.000	0.000	0.000	0.000	0.000	2.132	4.780	6.753	7.627	7.697	7.557	7.658
INDSUP	0.000	0.000	0.000	0.000	0.000	5.625	9.515	13.024	15.034	14.335	10.273	5.085
BODSIZE	10.564	10.196	9.958	9.701	9.651	9.677	9.692	9.715	9.658	9.717	9.680	9.673
DUALITY	0.200	0.235	0.232	0.285	0.284	0.282	0.298	0.298	0.294	0.294	0.280	0.283
Ownership structure variables												
BLOCKOWN	9.718	10.651	11.623	13.088	13.321	14.539	17.681	16.837	17.506	17.970	18.805	19.106
INSTOWN	1.658	1.697	1.838	1.618	1.631	1.802	1.628	1.696	1.904	1.957	2.207	2.174
FOROWN	8.616	6.368	5.444	5.301	4.864	5.368	5.522	8.085	8.516	9.848	10.809	10.661
FAMOWN	25.925	26.457	27.143	29.244	28.812	28.907	29.381	28.156	27.733	27.803	27.894	28.317
Control variables												
FIRMSIZE	15.799	15.811	15.755	15.694	15.636	15.626	15.599	15.626	15.652	15.701	15.771	15.733
GROWTH	18.309	9.317	8.887	18.093	-3.779	16.506	15.555	24.867	11.988	18.359	11.446	4.171
LEV	37.197	37.662	39.412	40.530	40.508	41.047	41.369	41.544	39.858	37.993	36.395	36.357
DIVIDEND	8.315	18.620	18.753	23.138	33.605	32.889	33.922	34.878	49.641	44.576	44.369	60.167
HHI	0.156	0.161	0.214	0.214	0.173	0.135	0.131	0.140	0.143	0.138	0.142	0.149
FIRMAGE	26.441	26.699	26.743	26.543	26.193	26.330	26.051	26.328	26.879	27.621	28.372	29.013
BIG4	0.793	0.801	0.801	0.810	0.819	0.822	0.830	0.839	0.840	0.844	0.847	0.856
RD	1.157	1.323	1.321	1.496	1.989	1.968	2.358	2.126	2.737	2.679	2.763	3.563
ELECTRONIC	0.211	0.235	0.272	0.306	0.360	0.389	0.438	0.457	0.465	0.474	0.481	0.492
N	280	311	357	421	475	517	578	610	626	642	653	667

Notes: The definitions of the research variables are as follows. ROA is the ratio of earnings before interest and taxes over the book value of average total assets; ROE is the ratio of net income over the book value of average total equity; Q is the ratio of the sum of the market value of common shares and the book value of total debt over the book value of total assets; MBVE is the market value of equity over the book value of equity; INDBOD_R is the proportion of independent directors over the total number of directors on the board; INDSUP is the proportion of independent supervisors over the total number of supervisors; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FOROWN is the proportion of shares owned by foreign shareholders; FAMOWN is the proportion of shares owned by family members and other legal entities that are controlled by family members; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; DIVIDEND is the ratio of cash dividend per share to earnings per share; HHI is the sum of the squares of the market share for each firm in the industry in each year (Herfindahl-Hirschman Index); FIRMAGE is the number of years that the firm has operated; BIG4 is a dummy variable, which equals 1 if the firm is audited by Big-4 accounting firms, and 0 otherwise; RD is the ratio of R&D expenditure to total sales; ELECTRONIC is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. For the dummy (binary) variables, the mean indicates the proportion of sample firms with value equal to 1 for the variable.

Table 5 Variance Inflation Factor and Pearson Correlation Matrix

	Variables	VIFs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	INDBOD_R	2.05	1															
2	BODSIZE	1.19	-0.009	1														
3	DUALITY	1.06	0.021[c]	-0.175[a]	1													
4	INDSUP	1.89	0.682[a]	-0.014	0.039[a]	1												
5	BLOCKOWN	1.27	0.078[a]	-0.117[a]	0.019	0.044[a]	1											
6	INSTOWN	1.07	0.043[a]	0.123[a]	-0.042[a]	0.023[c]	0.009	1										
7	FOROWN	1.32	0.100[a]	0.096[a]	-0.050[a]	0.073[a]	0.072[a]	0.137[a]	1									
8	FAMOWN	1.30	-0.026[b]	-0.067[a]	-0.057[a]	-0.021	0.399[a]	-0.042[a]	-0.091[a]	1								
9	FIRMSIZE	1.51	-0.078[a]	0.305[a]	-0.141[a]	-0.085[a]	-0.088[a]	0.222[a]	0.405[a]	-0.051[a]	1							
10	GROWTH	1.01	0.000	-0.027[b]	0.009	0.008	0.007	-0.004	-0.008	0.029[b]	0.002	1						
11	LEV	1.12	-0.066[a]	-0.026[b]	0.002	-0.054[a]	0.045[a]	0.009	-0.129[a]	0.020	0.127[a]	0.067[a]	1					
12	DIVIDEND	1.01	0.066[a]	0.022[c]	-0.024[c]	0.051[a]	0.004	0.020	0.034[a]	-0.010	0.020	-0.014	-0.053[a]	1				
13	HHI	1.42	-0.270[a]	0.106[a]	-0.087[a]	-0.194[a]	0.034[a]	-0.033[a]	-0.064[a]	0.150[a]	0.059[a]	-0.021	0.045[a]	-0.001	1			
14	FIRMAGE	1.49	-0.292[a]	0.176[a]	-0.072[a]	-0.247[a]	0.090[a]	-0.015	0.013	0.118[a]	0.145[a]	-0.048[a]	0.029[b]	0.001	0.328[a]	1		
15	BIG4	1.10	0.115[a]	0.066[a]	-0.030[b]	0.079[a]	0.016	0.094[a]	0.153[a]	0.019	0.131[a]	-0.005	-0.116[a]	0.036[a]	-0.119[a]	-0.134[a]	1	
16	RD	1.05	0.101[a]	0.003	0.007	0.073[a]	-0.041[a]	-0.005	0.019	-0.078[a]	-0.063[a]	-0.017	-0.130[a]	-0.003	-0.100[a]	-0.141[a]	-0.024[c]	1
17	ELECTRONIC	1.97	0.368[a]	-0.105[a]	0.115[a]	0.295[a]	-0.125[a]	0.076[a]	0.102[a]	-0.266[a]	0.007	0.013	-0.121[a]	0.005	-0.527[a]	-0.518[a]	0.190[a]	0.116[a]

Notes: N = 6,137. The definitions of the research variables are as follows. INDBOD_R is the proportion of independent directors over the total number of directors on the board; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; INDSUP is the proportion of independent supervisors over the total number of supervisors; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FOROWN is the proportion of shares owned by foreign shareholders; FAMOWN is the proportion of shares owned by family members and other legal entities that are controlled by family members; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; DIVIDEND is the ratio of cash dividend per share to earnings per share; HHI is the sum of the squares of the market share for each firm in the industry in each year (Herfindahl-Hirschman Index); FIRMAGE is the number of years that the firm has operated; BIG4 is a dummy variable, which equals 1 if the firm is audited by Big-4 accounting firms, and 0 otherwise; RD is the ratio of R&D expenditure to total sales; ELECTRONIC is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. [a] Significant at the 0.01 level. [b] Significant at the 0.05 level. [c] Significant at the 0.10 level.

Table 6 OLS Regression Results of Firm Performance on Board Characteristics, Ownership Structure and Control Variables

Independent Variables	Expected Sign	Accounting-based Performance		Market-based Performance	
		ROA	ROE	Q	MBVE
Constant	?	-1.252	-26.780***	1.789***	1.996***
		(1.997)	(8.496)	(0.148)	(0.222)
INDBOD_R	+	0.098***	0.110	-0.004***	-0.007***
		(0.021)	(0.143)	(0.002)	(0.003)
INDSUP	+	0.028***	0.103*	0.002**	0.003**
		(0.010)	(0.061)	(0.001)	(0.001)
BODSIZE	−	-0.007	0.006	0.001	0.004
		(0.026)	(0.057)	(0.002)	(0.004)
DUALITY	−	-0.785***	-1.376**	-0.032	-0.046
		(0.238)	(0.640)	(0.021)	(0.032)
BLOCKOWN	+/−	-0.010	-0.047	-0.002**	-0.003**
		(0.010)	(0.034)	(0.001)	(0.001)
INSTOWN	+	0.192***	0.235**	0.011***	0.016***
		(0.023)	(0.107)	(0.002)	(0.004)
FOROWN	+	0.074***	0.009	0.014***	0.023***
		(0.015)	(0.065)	(0.001)	(0.002)
FAMOWN	+/−	0.036***	0.107***	0.003***	0.005***
		(0.007)	(0.025)	(0.001)	(0.001)
FIRMSIZE	?	0.900***	3.150***	0.002	-0.012
		(0.149)	(0.718)	(0.010)	(0.016)
GROWTH	+	0.010**	0.020*	0.001**	0.001**
		(0.005)	(0.010)	(0.000)	(0.001)
LEV	−	-0.190***	-0.456***	-0.008***	-0.003***
		(0.008)	(0.050)	(0.001)	(0.001)
DIVIDEND	?	0.001	0.003	-0.000***	-0.000***
		(0.001)	(0.003)	(0.000)	(0.000)
HHI	?	-2.319***	-4.026*	-0.318***	-0.496***
		(0.719)	(2.114)	(0.046)	(0.077)
FIRMAGE	−	-0.104***	-0.148***	-0.015***	-0.022***
		(0.011)	(0.024)	(0.001)	(0.001)
BIG4	+	0.952***	2.331***	0.014	0.044
		(0.293)	(0.730)	(0.021)	(0.034)
RD	?	-0.078***	-0.137***	0.006***	0.007***
		(0.016)	(0.041)	(0.001)	(0.001)
ELECTRONIC	?	-0.157	-0.369	0.174***	0.321***
		(0.303)	(0.725)	(0.024)	(0.038)
Adjusted R^2		0.238	0.168	0.209	0.189
Model *F*		82.542***	45.142***	60.645***	65.150***

*Notes: N = 6,137. The definitions of the research variables are as follows. ROA is the ratio of earnings before interest and taxes over the book value of average total assets; ROE is the ratio of net income over the book value of average total equity; Q is the ratio of the sum of the market value of common shares and the book value of total debt over the book value of total assets; MBVE is the market value of equity over the book value of equity; INDBOD_R is the proportion of independent directors over the total number of directors on the board; INDSUP is the proportion of independent supervisors over the total number of supervisors; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FOROWN is the proportion of shares owned by foreign shareholders; FAMOWN is the proportion of shares owned by family members and other legal entities that are controlled by family members; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; DIVIDEND is the ratio of cash dividend per share to earnings per share; HHI is the sum of the squares of the market share for each firm in the industry in each year (Herfindahl-Hirschman Index); FIRMAGE is the number of years that the firm has operated; BIG4 is a dummy variable, which equals 1 if the firm is audited by Big-4 accounting firms, and 0 otherwise; RD is the ratio of R&D expenditure to total sales; ELECTRONIC is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. The values in parentheses are robust standard errors. * Significant at the 0.01 level. ** Significant at the 0.05 level. *** Significant at the 0.10 level.*

Table 7 2SLS Regression Results of BLOCKOWN and Firm Performance

	First Stage	*Second Stage*				
Independent		Accounting-based performance		Market-based performance		Expected
Variables	BLOCKOWN	ROA	ROE	Q	MBVE	Sign
Constant	24.469***	91.946***	196.235***	5.395***	3.564***	?
	(2.137)	(19.085)	(47.866)	(0.790)	(0.597)	
BLOCKOWN		-3.819***	-9.162***	-0.149***	-0.067***	+/−
		(0.710)	(1.890)	(0.029)	(0.023)	
INDBOD_R	0.141***	0.634***	1.393***	0.016***	0.002	+
	(0.021)	(0.129)	(0.315)	(0.005)	(0.004)	
INDSUP	-0.009	-0.006	0.022	0.000	0.002	+
	(0.011)	(0.041)	(0.106)	(0.002)	(0.001)	
BODSIZE	-0.280***	-1.073***	-2.544***	-0.041***	-0.014*	−
	(0.036)	(0.248)	(0.635)	(0.010)	(0.008)	
DUALITY	0.653**	1.701	4.574	0.065	-0.003	−
	(0.296)	(1.254)	(3.106)	(0.053)	(0.041)	
INSTOWN	0.125***	0.668***	1.376***	0.030***	0.024***	+
	(0.047)	(0.197)	(0.503)	(0.008)	(0.006)	
FOROWN	0.156***	0.668***	1.430***	0.037***	0.033***	+
	(0.016)	(0.119)	(0.298)	(0.005)	(0.004)	
FAMOWN	0.258***	1.017***	2.455***	0.041***	0.022***	+/−
	(0.010)	(0.183)	(0.491)	(0.008)	(0.006)	
FIRMSIZE	-1.227***	-3.772***	-8.029***	-0.180***	-0.091***	?
	(0.147)	(0.919)	(2.261)	(0.038)	(0.029)	
GROWTH	-0.001	0.008	0.014	0.001*	0.001**	+
	(0.001)	(0.006)	(0.013)	(0.000)	(0.001)	
LEV	0.050***					
	(0.009)					
DIVIDEND	-0.000					
	(0.001)					
HHI	-1.786	-9.122*	-20.307*	-0.582***	-0.611***	?
	(1.176)	(4.871)	(11.901)	(0.196)	(0.122)	
FIRMAGE	0.085***	0.220***	0.626***	-0.002	-0.016***	−
	(0.013)	(0.075)	(0.190)	(0.003)	(0.002)	
BIG4	0.577	3.149**	7.589**	0.098*	0.079*	+
	(0.356)	(1.395)	(3.346)	(0.056)	(0.042)	
RD	-0.006	-0.102***	-0.195***	0.005***	0.006***	?
	(0.006)	(0.031)	(0.072)	(0.002)	(0.002)	
ELECTRONIC	-1.131***	-4.465**	-10.677**	0.009	0.250***	?
	(0.367)	(1.749)	(4.331)	(0.071)	(0.054)	
Adjusted R^2	0.210					
Model *F*	67.137***	4.828***	3.417***	17.543***	54.872***	
Partial *F*-statistic	15.459***					
Hansen *J*-statistic		$\chi^2(1)$=0.000	$\chi^2(1)$=0.000	$\chi^2(1)$=1.270	$\chi^2(1)$=2.297	
		(*p*=0.989)	(*p*=0.991)	(*p*=0.260)	(*p*=0.130)	
Hausman *F*-statistic		536.191***	82.366***	156.204***	10.575***	

*Notes: N = 6,137. The definitions of the research variables are as follows. ROA is the ratio of earnings before interest and taxes over the book value of average total assets; ROE is the ratio of net income over the book value of average total equity; Q is the ratio of the sum of the market value of common shares and the book value of total debt over the book value of total assets; MBVE is the market value of equity over the book value of equity; INDBOD_R is the proportion of independent directors over the total number of directors on the board; INDSUP is the proportion of independent supervisors over the total number of supervisors; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FOROWN is the proportion of shares owned by foreign shareholders; FAMOWN is the proportion of shares owned by family members and other legal entities that are controlled by family members; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; DIVIDEND is the ratio of cash dividend per share to earnings per share; HHI is the sum of the squares of the market share for each firm in the industry in each year (Herfindahl-Hirschman Index); FIRMAGE is the number of years that the firm has operated; BIG4 is a dummy variable, which equals 1 if the firm is audited by Big-4 accounting firms, and 0 otherwise; RD is the ratio of R&D expenditure to total sales; ELECTRONIC is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. The values in parentheses are robust standard errors. * Significant at the 0.01 level. ** Significant at the 0.05 level. *** Significant at the 0.10 level.*

Table 8 2SLS Regression Results of BLOCKOWN and Tobin's Q with Different Instrumental Variables

	Fist Stage	*Second Stage*			
Independent Variables	BLOCKOWN	Q (4 instruments)	Q (5 instruments)	Q (6 instruments)	Expected Sign
Constant	24.469***	5.725***	5.790***	6.043***	?
	(2.137)	(0.551)	(0.553)	(0.563)	
BLOCKOWN		-0.163***	-0.164***	-0.172***	+/−
		(0.018)	(0.018)	(0.018)	
INDBOD_R	0.141***	0.018***	0.019***	0.020***	+
	(0.021)	(0.004)	(0.004)	(0.004)	
INDSUP	-0.009	0.000	0.000	0.000	+
	(0.011)	(0.002)	(0.002)	(0.002)	
BODSIZE	-0.280***	-0.045***	-0.045***	-0.046***	−
	(0.036)	(0.007)	(0.007)	(0.008)	
DUALITY	0.653**	0.074	0.074	0.077	−
	(0.296)	(0.053)	(0.054)	(0.056)	
INSTOWN	0.125***	0.031***	0.032***	0.033***	+
	(0.047)	(0.008)	(0.008)	(0.008)	
FOROWN	0.156***	0.039***	0.040***	0.041***	+
	(0.016)	(0.004)	(0.004)	(0.004)	
FAMOWN	0.258***	0.044***	0.045***	0.047***	+/−
	(0.010)	(0.005)	(0.005)	(0.005)	
FIRMSIZE	-1.227***	-0.196***	-0.194***	-0.206***	?
	(0.147)	(0.030)	(0.030)	(0.031)	
GROWTH	-0.001	0.001*	0.001*	0.001*	+
	(0.001)	(0.000)	(0.000)	(0.000)	
LEV	0.050***				
	(0.009)				
DIVIDEND	-0.000				
	(0.001)				
HHI	-1.786	-0.616***	-0.644***	-0.660***	?
	(1.176)	(0.179)	(0.180)	(0.187)	
FIRMAGE	0.085***				
	(0.013)				
BIG4	0.577	0.105*			+
	(0.356)	(0.059)			
RD	-0.006	0.005***	0.005***		?
	(0.006)	(0.002)	(0.002)		
ELECTRONIC	-1.131***				
	(0.367)				
Adjusted R^2	0.210				
Model *F*	67.137***	17.426***	18.332***	17.872***	
Partial *F*-statistic		27.056***	21.832***	20.032***	
Hansen *J*-statistic		$\chi^2(3)=1.581$	$\chi^2(4)=4.639$	$\chi^2(5)=7.848$	
		(*p*=0.664)	(*p*=0.326)	(*p*=0.165)	
Hausman *F*-statistic		389.716***	390.266***	420.838***	

*Notes: N = 6,137. The definitions of the research variables are as follows. Q is the ratio of the sum of the market value of common shares and the book value of total debt over the book value of total assets; INDBOD_R is the proportion of independent directors over the total number of directors on the board; INDSUP is the proportion of independent supervisors over the total number of supervisors; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FOROWN is the proportion of shares owned by foreign shareholders; FAMOWN is the proportion of shares owned by family members and other legal entities that are controlled by family members; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; DIVIDEND is the ratio of cash dividend per share to earnings per share; HHI is the sum of the squares of the market share for each firm in the industry in each year (Herfindahl-Hirschman Index); FIRMAGE is the number of years that the firm has operated; BIG4 is a dummy variable, which equals 1 if the firm is audited by Big-4 accounting firms, and 0 otherwise; RD is the ratio of R&D expenditure to total sales; ELECTRONIC is a dummy variable, which equals 1 if the firm is in the electronics industry, and 0 otherwise. The values in parentheses are robust standard errors. * Significant at the 0.01 level. ** Significant at the 0.05 level. *** Significant at the 0.10 level.*