公司治理與超額現金持有之償付決策關係

Corporate Governance and the Payment Decisions of Excess Cash Holdings

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摘要

　　本研究旨在探討台灣上市櫃企業公司治理與現金部位之關係，並進而分析公司超額現金的償付決策以及對公司績效的影響。首先，實證結果發現，股權結構與公司現金之持有呈非線性的關係，採用 piecewise 非線性模型時，發現隨著董監事股權的增加，公司的現金持有會先減少再增加，在股權持有 10% 下會出現反轉。此外，當公司有股權質押時，會持有較多的現金；當公司有獨立董事時，公司會持有較少的現金，此表示當公司治理越差時，公司會持有較高的現金。其次，發現當公司持有多餘現金，會考慮優先償還公司債，並不會用在資本支出、研發費用及股利支付。最後，當公司超額現金的變動愈大時，會削弱公司未來的成長潛力。

關鍵詞：現金持有、公司治理、董事會股權、超額現金、償付決策

Abstract

　　We set out in this study to examine the relationships between corporate governance, cash holding policies, payment decisions of excess cash holdings and the overall effects of excess cash holdings on the future value of publicly-listed firms in Taiwan. We find that the relationship between ownership and cash holdings is non-linear. The piecewise linear specifications reveal a fall and subsequent rise in cash holdings with an increase in board ownership; our findings suggest that the turning point for this effect is at the 10 per cent board ownership level. We also find that a higher collateralized ratio will have larger firm's cash holdings, whereas firms with an independent board tend to have smaller cash reserves, thereby indicating firms with weaker corporate governance structures are likely to have greater cash reserves. Further, our results demonstrate that firms with greater cash holdings may consider returning their bond debt. The capital expenditure, R&D expenditure and dividends are generally unrelated to a firm's cash position. Finally, we find that firms with greater change in cash reserves will decline their growth prospects.

Keywords: Cash holdings, Corporate governance, Board ownership, Excess cash, Payment Decisions

1. INTRODUCTION

Why do some firms have high cash holdings whilst others have low holdings? Clearly, the cash-holding policy of a firm is one of the most important corporate financial decisions that a manager has to make; when there is an inflow of cash, the manager must decide whether to disburse the cash to shareholders as dividends, use it for external investment opportunities, spend it internally, or hoard it for the future needs of the firm. Although it is argued that in an imperfect capital market, the major benefit of holding cash is an increase in the ability of the firm to avoid the excessive costs of external financing, it is also recognized that there are costs associated with holding excessive cash if it is put to inefficient use.

The extant literature suggests that agency problems are an important factor affecting the propensity to store cash. For example, Jensen (1986) argues that agency conflicts which exist between shareholders and managers can be at their most severe, and can also create excessive agency costs, when firms have substantial free cash flows. Managers may have incentives to hold onto large reserves of cash, since this would enable them to pursue their own private interests at the expense of shareholders. Dittmar & Mahrt-Smith (2007) also indicate that cash reserves are easily accessible by management, with little scrutiny, and with much of their use being discretionary. Indeed, left to their own devices, managers will tend to waste corporate resources. Thus, under an agency theory framework, firms with severe agency conflicts are expected to exhibit the highest cash holdings.

Although the impact on corporate cash holdings arising from both agency conflicts and governance quality has recently gained considerable attention within the empirical finance literature,[1] the evidence on the relationship between agency problems, corporate governance and cash holdings remains inconclusive. Several studies find a negative relationship between the quality of corporate governance and cash holdings, with some providing strong support for an inverse relationship between the effectiveness of corporate governance mechanisms and cash holdings.[2]

For example, Dittmar et al. (2003) provide strong support for the importance

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[1] See for example, Kim et al. (1998), Opler et al. (1999), Pinkowitz & Williamson (2001), Bruinshoofd & Kool (2002), Dittmar et al. (2003), Ozkan & Ozkan (2004), Kalcheva & Lins (2007), Harford et al. (2008).

[2] Examples include Pinkowitz et al. (2003), Kusnadi (2006) and Guney et al. (2007).

of corporate governance structures in terms of the effect on corporate cash levels, indicating that agency problems are an essential determinant of corporate cash holdings; using data on more than 11,000 firms from 45 countries, they note that firms in countries with poor shareholder protection (poor corporate governance practices) tend to hold more cash than firms in countries with good shareholder protection. Conversely, Opler et al. (1999) and Mikkelson & Partch (2003) could find no evidence of agency cost proxies having any important impact on cash holdings, whilst Harford et al. (2008) find that firms with weaker corporate governance structures actually have smaller cash reserves.

Chen et al. (2007) note that a good corporate governance structure should induce the board and management to pursue the interests of both the firm and its shareholders, whilst also facilitating effective monitoring, since good corporate governance practices are the shareholders' major defense against the inefficient use of corporate assets by managers. The ownership structure and composition of the board are viewed as the key components of corporate governance, which can also affect a firm's choice of cash holdings; however, Ozkan & Ozkan (2004) note that the relationship between ownership and cash holdings may be non-linear. Greater ownership amongst board shareholders can lead to the alignment of the interests of managers and shareholders (i.e., the 'incentive alignment effect'); thus, we would expect to find a negative relationship between board ownership and cash holdings. When board ownership levels are greater, board shareholders will tend to become entrenched (i.e. the 'entrenchment effect'), and since they are provided with opportunities to indulge in non-value-maximizing activities, with no disciplinary control by other shareholders, they will tend to have higher cash holdings.

On the other hand, a firm's board of directors is responsible for monitoring and evaluating managers, and a generally accepted view within the extant literature is that there will be variations in the degree of alignment between the interests of managers and shareholders based upon board composition. The market reacts more positively to the decisions of outsider-dominated firms than those of insider-dominated firms (Borokhovich et al., 1996). Thus, firms with externally-dominated boards are likely to see a reduction in the agency costs arising from external financing; hence, we would expect to see these firms holding lower amounts of cash reserves.

The cash level of a firm is related to its future investment and payout decisions. Harford et al. (2008) note that among firms with high levels of cash holdings, those

with weaker governance practices will tend to spend such cash more rapidly than those with stronger governance practices on going largely into acquisitions; however, when firms experience significant changes in their excess cash levels as a result of operating losses, their excess cash holdings have a significant short-run impact on capital expenditure as a whole, but particularly on spending on acquisitions and payouts to shareholders (Opler et al., 1999).

The difference between overall cash value and cash holding levels is also related to the future value of a firm. Focusing on the overall value of cash holdings, as opposed to the level of cash holdings, Dittmar & Mahrt-Smith (2007) examine the ways in which corporate governance has an impact on both firm value and the use of cash holdings; they find that corporate governance practices increase firm value by improving the use of cash holdings, demonstrating that governance practices have greater impacts on the use, rather than the accumulation, of cash holdings. Harford et al. (2008) find that firms with excess cash holdings and lower shareholder rights also tend to have lower profitability and valuations.

Although the extant literature provides ample evidence on the relationship between corporate governance and cash holdings, this is mainly for US or cross-country samples, which are generally characterized by heterogeneous legal environments and varying degrees of capital market development; and indeed, the within-country tests of the agency theory predictions for cash holdings have also tended to focus largely on the US. There is, however, very little evidence on this relationship in Taiwan, and since Taiwanese listed firms are characterized by the presence of concentrated ownership, low institutional ownership and collateralized shares of the board of directors, relative to US firms (Yeh et al., 2003; Kao et al., 2004), this would seem to indicate a critical gap in the literature.

The primary aim of the present study is therefore to addresses this gap in the literature by extending the prior country studies to include a sample of Taiwanese firms (where the governance characteristics of firms differ markedly from those of the US) in order to determine the effects of agency conflicts and governance quality on cash holdings. We provide a comprehensive examination of the relationship between corporate governance and cash holding policies, excess cash payment decisions and the effects of excess cash holdings on the future value of the firm based upon a sample of 8,342 firm-year observations obtained on a total of 1,248 listed firms in Taiwan covering the period from 1996 to 2007.

We begin by investigating the effects of corporate governance practices on cash holdings using a number of governance variables to measure the extent of the agency problems. These measures include board ownership, stock collateral ratio, board structure and deviation between control rights and cash flow rights. We adopt the piecewise linear regressions proposed by Morck et al. (1988), whilst allowing for changes in the slope coefficient on board ownership to capture the non-linear relationship. We then go on to examine how the governance variables and excess cash holdings affect the use of the cash. Finally, we assess the effects of governance structure and excess cash holdings on the future value of the firm.

Our cross-sectional examination shows that, over time, firms with greater board ownership will tend to have higher cash holdings, whilst the piecewise linear specifications reveal a fall and subsequent rise in cash holdings with an increase in board ownership; our findings suggest that the turning point for this effect is the 10 per cent board ownership level. We also find that a higher collateralized ratio will have larger firm's cash holdings.

As regards the relationship between board structure and cash holdings, we find that a larger board with weaker corporate governance practices can tend to lead to larger cash reserves, whereas firms with an independent board tend to have smaller cash reserves. Furthermore, if the CEO and the top manager are one and the same person, then there will be a stronger tendency for investment decisions to be taken, thereby leaving the firm with smaller cash reserves.

We go on to examine the ways in which governance practices affect the way that firms manage their cash flow, first of all studying the bond debt return behavior of our sample firms in order to explain the differences in cash holdings. The significantly positive sign on the change in excess cash indicates that an increase in cash over the previous period will ultimately lead to a rise in the ability, and the likelihood, of the firm returning its bond debt. On the other hand, we find that capital expenditure, R&D expenditure and dividends are generally unrelated to the firm's cash position.

When examining whether these differences are reflected in the future profitability and value of a firm, we find that a change in excess cash has a negative correlation with both profitability and firm value, which may indicate that when a firm with large cash reserves increases its cash flow, it will tend to see a decline in its growth prospects. Firms with high excess cash and poor governance

structures subsequently experience particularly low operating performance.

The remainder of this paper is organized as follows. A review and discussion of the prior literature is provided in Section 2, followed in Section 3 by a discussion of the data, variable construction and methodology adopted for this study. Section 4 presents the details of the descriptive statistics for the study sample and the data sources, with Section 5 subsequently presenting the multivariate results of our empirical tests and also providing other alternative specifications. Finally, the conclusions drawn from this study are provided in Section 6, along with a discussion of the implications.

2. LITERATURE REVIEW

Various explanations are proposed within the prior literature for the determinants of corporate cash holdings, including the 'trade-off', 'financial hierarchy' and 'agency cost' theories (Wynn, 2008). The trade-off theory suggests that firms will engage in a trade-off of the costs and benefits of holding cash when determining their optimal cash levels (Opler et al., 1999; Dittmar et al., 2003). On the other hand, according to both the financial hierarchy and agency cost theories, a firm's cash balance is merely the outcome of its investment and financing decisions (Dittmar & Mahrt-Smith, 2007). Within the financial hierarchy theory, based on arguments similar to the 'pecking order' theory of capital structure, it is suggested that there is no optimal amount of cash (Myers & Majluf, 1984), whereas the agency cost theory suggests that managers with excess cash flows will accumulate cash in order to pursue their own objectives, as opposed to maximizing shareholder wealth.

On the whole, the extant literature provides support for both the trade-off and agency cost theories (Wynn, 2008); for example, Kim et al. (1998) provide support for the trade-off theory through their empirical evidence which shows that the optimal level of liquid assets is determined by the trade-off between the costs of investing in such liquid assets and the benefit of minimizing the need for costly external financing. More recent research has, nevertheless, tended to focus on the agency cost theory. For example, Opler et al. (1999) and Mikkelson & Partch

(2003) investigate the association between corporate governance and cash holdings. Based upon a comparison of the value and use of cash holdings in poorly-governed and well-governed firms, the investigation by Dittmar & Mahrt-Smith (2007) into the impact that corporate governance practices can have on firm value concludes that the value of a cash dollar is substantially less if the firm pursues poor corporate governance practices. They further show that the cash holdings of those firms with poor corporate governance practices tend to dissipate quickly, and in ways that can significantly reduce their overall operating performance; however, they also note that this negative impact of large cash holdings on future operating performance is cancelled out if the firm is well governed.

In an earlier study by Dittmar et al. (2003), only weak evidence of agency costs and cash holdings is noted; indeed, they find a significantly negative association between corporate governance and cash holdings, which is essentially attributed to the fact that the US markets provide strong shareholder protection. However, a more recent study by Harford et al. (2008) reports that firms with weaker corporate governance structures actually have smaller cash reserves, with a positive relationship being discernible between corporate governance and cash holdings; firms with stronger governance structures may opt for the choice of increasing dividends, thereby committing themselves to higher payouts in the long term.

In the present study, we encompass both ownership structure and board characteristics as proxies for governance mechanisms in an attempt to gain a better understanding of the role of boards. In the following sub-section, we focus on studies examining the effects between specific variables, such as the effects between ownership structure and cash holdings, those between board characteristics and cash holdings, and those between the cash levels of a firm and their future investment and payout decisions.

2.1 Ownership Structure and Cash Holdings

Managers have incentives to increase the amount of funds under their control, essentially because this enables them to spend as they see fit; however, shareholders may well prefer to see such free cash flows being returned to them. The overall performance of a firm is likely to improve with increased managerial ownership,

since managers are less likely to divert resources away from firm value maximization. However, at certain levels of managerial ownership, with the greater entrenchment of managers, other shareholders find it difficult to monitor their actions. Consequently, such managers may have a greater propensity for shirking, with their consumption of prerequisites potentially outweighing the losses they suffer from any reduction in the value of the firm (Morck et al., 1988; McConnell & Servaes, 1990).

A non-linear relationship is found to exist between managerial ownership and the alignment of shareholder and managerial interests; indeed, Ozkan & Ozkan (2004) present evidence to show that the relationship between managerial ownership and cash holdings is both non-linear and significant. In Taiwan, shareholders are able to collateralize their shares in order to obtain loans from financial institutions; under such circumstances, a controlling shareholder may use such collateral shares to obtain additional shares to enhance their control rights. However, when there is a fall in the share price, the financial institutions will ask the borrowers to pay back the loans or to put up more shares as collateral. If the shareholders are unable to meet this requirement, then their collateral shares will be sold at a loss.[3] Thus, in order to avoid such personal loss, a controlling shareholder may misuse the firm's resources to sustain the stock price. All of these actions will clearly lead to overall deterioration in the agency problem whilst further reducing the value of the firm.

Unlike the agency problem referred to above, an alternative approach is to examine the deviation between control rights and cash flow rights within a firm. The lower the cash flow rights, the less responsibility the controller will have with regard to any changes in firm value, which thereby induces a lower positive incentive effect; thus, a larger deviation between control rights and cash flow rights will enhance the negative entrenchment effect (Claessens et al., 2002; Lemmon & Lins, 2003).

In a situation where lower cash flow rights are accompanied by a greater deviation between control rights and cash flow rights, controlling shareholders may choose to increase their personal benefits as opposed to increasing the value of the firm. As a result, high-risk R&D investment projects may well be ignored even if

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[3] Kao et al. (2004) reveal a significantly negative correlation between collateralized shares and accounting performance.

they are likely to generate future cash inflows for the firm. Ozkan & Ozkan (2004) find that the wedge between the control of the largest shareholder and the cash flow rights in a firm has a negative impact on cash holdings.

2.2 Board Characteristics and Cash Holdings

The effectiveness of the board of directors as a monitoring mechanism has been widely studied (John & Senbet, 1998; Hermalin & Weisbach, 2003), with a large board having been generally found to be less effective, since decision-making becomes much slower due to the involvement of more people. Both Yermack (1996) and Eisenberg et al. (1998) find an inverse relationship between Tobin's Q and board size, thereby providing support for the notion that a small board improves firm value; a smaller board may be less encumbered with bureaucratic problems and may, therefore, be more functional. Thus, a larger board with weaker corporate governance may tend to hold larger cash reserves.

Several studies have documented that independent outside directors can act as effective monitors, since the inclusion of external directors on the board can result in an increase in shareholder wealth through a positive stock price reaction to the announcement of such appointments (Weisbach, 1988). Furthermore, when a positive relationship exists between an independent board and firm value, firms with stronger corporate governance structures may tend to hold smaller cash reserves.

However, it is also argued in other studies that external directors do not contribute towards improved firm performance; for example, from their examination of the relationship between board independence and firm performance on a large sample of publicly-listed firms in the US, Bhagat & Black (2002) find that those firms with more independent boards actually performed worse than all of the other firms examined. Thus, it is obvious that the literature on the role of outside directors has consistently yielded inconclusive results.

The debate continues as to whether the Chairman and CEO positions within a firm should be separated. Whilst Tsui et al. (2001) suggest that the dual leadership structure (when the Chairman and CEO are two different people) is a more effective control mechanism; others such as Brickley et al. (1997) do not support

such a view, arguing that the separation of roles and titles will only be of any use if the combined agency costs, information costs, costs of changing the succession process, and other costs, are lower than the benefits obtained. Since firms with a CEO duality structure (headed by a Chairman who also holds the CEO position) are generally found to be less efficient, it is expected that such firms would tend to suffer more from severe agency problems and have less effective corporate governance, which may also mean that they would tend to have larger cash reserves.

2.3 The Effects of Corporate Governance and Cash Holdings on Firm Value and Payment Decisions

Although numerous studies have been undertaken comparing governance with performance, little is known about the relationship between corporate governance and cash holdings and the subsequent effect on firm value. Excess cash can affect the value of the firm through reduced profitability, either in the following year, or over much longer horizons, and although low insider ownership is negatively related to firm value, the presence of excess cash holdings may well enhance the relationship. Harford et al. (2008) find that firms with low shareholder rights and excess cash have lower profitability and valuations. As opposed to any ongoing reduction in operating performance, the reduction in value caused by the interaction between cash reserves and poor governance practices comes from dissipative activities, such as paying an excessive amount for an acquisition target.

Evidence has been provided in a number of empirical studies on other important determinants of corporate cash holdings; for example, Jensen (1986) argues that, if left to their own devices, entrenched managers may tend to waste free cash flows. Kalcheva & Lins (2007) also suggest that firms associated with poor governance practices and large cash holdings have a lower value, whilst from their use of excess stock returns as a proxy for firm value, Faulkender & Wang (2006) find a negative relationship between cash holdings and the marginal value of cash.

Dittmar & Mahrt-Smith (2007) demonstrate that firms with poor corporate governance practices tend to dissipate cash far more quickly, and in ways that will significantly reduce their operating performance; however, this negative impact of

large cash holdings on future operating performance is cancelled out if the firm is well governed. An increase in free cash flow is associated with an increase in agency conflicts between management and shareholders; in particular, managers are more likely to engage in overinvestment, consumption of private benefits, or simply, the retention of cash. The studies of Lang et al. (1991), Blanchard et al. (1994) and Harford (1999) provide further evidence to show that cash-rich firms often engage in value-destroying activities, such as overpaying for acquisitions and not returning excess cash to their shareholders, which seems to suggest that managers have a tendency to use excess cash to bolster their long-term survival.

3. VARIABLE CONSTRUCTION

3.1 Cash Holdings

Cash is viewed in the present study as the liquid investment which is necessary to support the working capital needs of a firm, with the primary ratio under examination here being the industry-adjusted ratio of cash to assets. We begin by computing cash holdings using the ratio of cash to total assets, and then, given that the industry classification is a significant factor in the determination of cash holdings, we compute the mean levels of the ratio of cash to assets according to the two-digit SIC classification rule of the Taiwan Economic Journal (TEJ), ruling out all categories which do not refer to the manufacturing industries.

The industry-adjusted cash holdings measure is then calculated as the firm's cash holdings minus the mean industry level, as follows:

$$Industry\text{-}adjusted\ Cash\ Holdings_{i,t} = \frac{Cash_{i,t}}{Total\ Assets_{i,t}} - Mean\ Industry\ Level \tag{1}$$

3.2 Measuring Corporate Governance

We use a number of corporate governance variables in the present study to measure the severity of the firm's agency problems; these include: ownership structure (boards and directors, institutional), stock collateral ratio, deviation

between control rights and cash flow rights, board structure (size, board independence and CEO duality) and all of which are described in greater detail below.

3.2.1 Ownership structure

Dittmar et al. (2003) and Kalcheva & Lins (2007) find that greater shareholder rights are associated with lower cash holdings; thus, we begin with an examination of the relationship between cash holdings and ownership structure (including board ownership and shares owned by institutional investors). Following Harford et al. (2008), we provide a control for potential endogeneity, whilst our regression models include the lagged cash holdings of the firm, board ownership and institutional ownership.

A totally unambiguous prediction of the relationships that may exist between ownership and the market value of a firm cannot be provided by theoretical arguments alone; and indeed, whilst the 'convergence-of-interest' hypothesis suggests a uniformly positive relationship, the 'entrenchment hypothesis' suggests that the market valuation can be adversely affected for certain ranges of high ownership stakes. We nevertheless argue that firms with stronger corporate governance structures will tend to have lower cash reserves.

Board shareholders tend to be entrenched in cases where board ownership levels are greater, and as such, they may tend to indulge in non-value-maximizing activities with no concerns over discipline by their shareholders, so they could elect to hold higher cash reserves over which they will have total control. We adapt the piecewise linear regressions of Morck et al. (1988) to capture the non-linear relationship, whilst allowing for changes in the slope coefficient on cash holdings.

We construct three variables M_1, M_2 and M_3, as follows:[4]

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4 By using different switch points, we find that the 10 per cent and 25 per cent board ownership levels provided the best goodness of fit; this differs somewhat from the findings of Morck et al. (1988), essentially because the mean board ownership in our sample is 25.1 per cent, whereas the mean board ownership in Morck et al. (1988) was only 10.6 per cent.

Industry-adjusted Cash Holding$_{i,t}$=

$\alpha_1+\alpha_2M_1+\alpha_3M_2+\alpha_4M_3+\alpha_5Ins_{t-1}+Control\ Variables+\varepsilon_{i,t}$

where M_1 = board ownership level if board ownership level is <0.1,

= 0.1 if board ownership is ≥0.1;

M_2 = 0 if board ownership level is <0.1,

= board ownership level minus 0.1 if 0.1 ≤ board ownership level <0.25

= 0.15 if board ownership is ≥0.25;

M_3 = 0 if the board ownership level is <0.25,

= board ownership level minus 0.25 if board ownership is ≥0.25.

3.2.2 Stock collateral ratio and deviation between control and cash flow rights

The collateralized stock ratio of controlling shareholders represents a measure of the expropriation of small shareholders. Investors in Taiwan can take their shares to the financial institutions as collateral in order to raise capital; however, whilst minority shareholders may collateralize their shares to increase the leverage on their stock investment, directors can use the funds raised from such share collateralization to buy more shares of the firm in order to gain greater control over it.

Thus, the stock collateral ratio is likely to have a positive effect on cash holdings; and indeed, Kao et al. (2004) demonstrate that collateralized shares have a significantly negative correlation with accounting performance. This variable is calculated in the present study as the ratio of collateralized shares to the total number of shares owned by the board of directors.

A number of prior studies have found that, under the concept of ultimate control, most firms throughout the world are dominated by large stockholders.[5] A greater deviation between control rights and cash flow rights will enhance the negative entrenchment effect (Claessens et al., 2000; Lemmon & Lins, 2003), and in such a situation, the controlling shareholders may elect to increase their personal benefits, as opposed to increasing firm

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[5] Examples include: La Porta et al. (1999), Claessens et al. (2000) and Yeh et al. (2003).

value. As a result, high-risk R&D investment projects may well be ignored, even if they are likely to generate cash inflows for the firm. The firm will, in turn, have a weaker corporate governance structure, and it may therefore tend to have higher cash reserves.

According to La Porta et al. (1999), control rights comprise of a combination of a shareholder's direct and indirect voting rights in the firm. Such direct control comes through shares registered under a shareholder, whilst indirect control is the final proportion held in the control chain. The deviation between control rights and cash flow rights is defined as the latter divided by the former, with a greater deviation between control rights and cash flow rights indicating a smaller value, which could have negative effects on cash holdings.

3.2.3 Board structure

The board of directors of a firm is responsible for monitoring and evaluating managers. In this study, we include three board structure variables within the regression equations to measure cash holdings; these include the size of the board, the independence of the board and CEO duality.

As regards the first variable, board size, the members of the board include the board chairman, auxiliary board chairman, managing director, directors and independent directors. We use this variable to determine whether a larger board is associated with weaker firm performance, and whether the firm may have higher cash reserves. As a result of the high correlation between board size and firm size, we divide this variable by the log of total assets.

The second variable, the independence of the board members, includes both independent directors and supervisors,[6] with board independence being measured as the ratio of independent directors and supervisors to board size. The third variable is CEO duality, which takes a value of 1 if the board

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[6] The corporate law in Taiwan, which had previously placed restrictions on directors and supervisors being shareholders in a firm, was relaxed at the end of 2001; however, from January 2002 onwards, the TSE required that two independent directors and one independent supervisor must be included on the board of all IPO-listing firms.

chairman and the top manager are one and the same person; otherwise 0. If we can confirm that the CEO and senior manager are the same person, then this may indicate that the firm has higher cash reserves, which will reduce the market value of the firm.

3.3 Control Variables

From the results of their empirical investigation into the determinants of corporate cash holdings, Ozkan & Ozkan (2004) suggest that the ownership structure of a firm plays an important role in determining its cash holdings. The cash flows, growth opportunities, liquid assets, leverage and bank debts of a firm are all important factors in determining cash holdings.

The control variables in this study include firm size (*Size*), leverage (*Leverage*), the ratio of the market-to-book value of the firm's assets (*Market-to-Book*), net working capital to total assets (*Working Capital/Assets*), the ratio of research and development to sales (*R&D*), the ratio of capital expenditure to assets (*CapEx/Assets*), the standard deviation in cash flow over the previous five-year period (*CF_Volatility*), a dividend dummy variable (*Dividend*) which takes the value of 1 if a firm pays a dividend, and otherwise zero, and a bond dummy (*Bond*) which takes the value of 1 if a firm issues bonds, and otherwise zero. A value of 1 is given to firms belonging to the electrical industry (*Elec*), otherwise zero.

Size is measured as the natural log of total assets and *Leverage* is measured as the ratio of total debt (both short- and long-term debt) to assets; the debt ratio not only reflects the efficiency of financial leverage, but also the liquidity of the firm and its debt-paying ability. Those firms with no remaining debt capacity are likely to have greater cash holdings since their only alternative would be to raise capital through information-sensitive securities, such as equity. Thus, we would expect firms with a low debt ratio to hold more cash reserves.

Market-to-Book is a proxy for growth opportunities which is measured as the book value of assets minus the book value of equity, plus the market value of equity divided by the book value of assets. A number of prior studies have found that the market-to-book ratio is an important determinant of corporate financing

choices which are dependent on a firm's portfolio of growth options.[7] In this study we measure the likelihood of a firm having positive NPV projects in the future by using the ratio of the market value of a firm's assets to the book value of its assets. We would expect to find that firms with a higher market-to-book ratio would tend to have greater cash holdings.

Working Capital/Assets is a proxy for liquidity comprising of the ratio of current net cash assets minus current liabilities, divided by total assets. *R&D*, the ratio of R&D to sales, is used as a proxy for financial distress costs; Opler & Titman (1994) provide evidence to show that firms with a high R&D/sales ratio are more vulnerable to financial distress, arguing that R&D expenditure is correlated with bankruptcy and distress costs. Our results indicate that firms with high R&D expenditure have greater cash holdings.

CapEx/Assets indicates whether managers attempt to give the impression of increasing the size of their firms. *CF_Volatility*, a proxy for business risk, is computed using the standard deviation of the firm's cash flow ratio over the previous five-year period. The level of risk for cash flows has a positive effect on cash holdings when it is proxied by the industry standard deviation of cash flow to assets.

4. DATA

All of the sample firms in this study were listed on the Taiwan Stock Exchange (TSE) between 1991 and 2007. The ownership structure and board structure of the firms are collected from the Taiwan Economic Journal (TEJ), along with the firm-specific financial information. The data excludes those firms which were not listed prior to 1991, as well as those firms in the financial sector due to their unique operational and financial characteristics.

Given the small number of extreme observations, in order to ensure that the results are not driven by outliers, we follow Harford et al. (2008) and delete the cash to sales variables at the 0.5 per cent level on each tail. Furthermore, since we need cash holding data for the previous five-year period in order to compute the

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[7] See for example, Barclay & Smith (1995) and Jung et al. (1996).

standard deviation of the firm's cash flows (as a proxy for business risk), we discard the first five years of the cash holding history of all stocks; thus, our final sample covers the period from 1996 to 2007. We ultimately obtain a dataset of 8,342 firm-year observations on a total of 1,248 firms. Table 1 provides the sample statistics, which include the mean, median, standard deviation, minimum and maximum.

Table 1 Descriptive statistics

This table provides summary statistics for the sample. The data set comprises 8,342 firm-year observations from 1,248 firms covering the period from 1996 to 2007. The descriptive statistics include: ratio of cash to asset (Cash Holdings), equity ownership of the board (Board Ownership), institutional ownership, ratio of collateral shares to total shares (Collateral), the cash flow rights divided to control rights (Deviation), the number of board (Board Size), ratio of independent directors and supervisors on the board to board size (Board Independence), if the chairperson of the board and the top manager are the same people, the value is 1, and 0 otherwise (CEO duality), firm size (Size), firm leverage (Leverage), ratio of the market value to book value of assets (Market-to-Book), ratio of net working capital to net assets (Working Capital/Assets), ratio of research and development to sales (R&D/Sales), ratio of capital expenditures to net assets (CapEx/Assets), standard deviation of cash flows for the past five years (CF Volatility), one if a company pays a dividend and zero otherwise (Dividend), a bond dummy that takes a value of one if a company issues bond and zero otherwise (Bond), companies belonging to the electric industry will be set as one, otherwise set as zero (Elec).

	Mean	Median	Standard Deviation	Min	Max
Cash Holdings	0.08	0.05	0.09	0.005	0.69
A. Ownership structure					
Board Ownership	0.25	0.22	0.14	0.01	0.98
Institutional ownership	0.35	0.32	0.22	0	1
Collateral	0.12	0.00	0.21	0.00	1
Deviation	0.81	0.94	0.25	0.17	1
B. Board structure					
Board Size	9.62	9.00	3.19	8.00	32
Board Independence	0.10	0.00	15.22	0	0.75
CEO duality	0.30	0.00	0.46	0	1
C. Control variables					
Asset ($MM)	1194	348	36789	104	620,941
Leverage	0.40	0.40	0.17	0.02	2.16

Market-to-Book	1.41	1.17	0.87	0.03	11.95
Working Capital/Assets	0.19	0.18	0.20	0.06	0.87
R&D/Sales	0.05	0.01	1.65	0.00	149.2
CapEx/Assets	0.06	0.04	0.10	0.01	0.74
CF Volatility	0.10	0.07	0.24	0.003	20.04
Dividend	0.55	1	0.50	0	1
Bond	0.14	0.00	0.34	0	1
Elec	0.17	0.00	0.39	0	1

The main variable in our analysis, cash holdings, has a mean of 8 per cent and a median of 5 per cent, with a standard deviation of 9 per cent. On average, board ownership accounts for approximately 25 per cent of all outstanding shares, with institutions holding about 35 per cent of the outstanding shares. In comparison, in the Harford et al. (2008) sample the level of board ownership was about 4 per cent and institutional holdings were about 60 per cent; thus, board ownership (institutional ownership) is greater (smaller) in our sample than the Harford et al. (2008) sample. The differences may arise from the fact that family-controlled firms have been the dominant structural form in Taiwan for many years, with most firms also being dominated by large stockholders.

When examining the stock collateral ratio and the deviation between control rights and cash flow rights, we find that the mean collateral ratio is about 12 per cent and the mean deviation is about 81 per cent. In a situation where there is a greater deviation between control rights and cash flow rights, the controlling shareholder may elect to increase his personal benefits as opposed to increasing firm value.

On the other hand, when examining board characteristics, the mean board size is found to be 9.62 whilst the independence of the board is about 10 per cent. The value of board independence in the present study is much smaller than that reported in Harford et al. (2008); this is essentially because the requirement by the TSE, that IPO listing firms must include two independent directors and one independent supervisor on the board, took effect only in January 2002.

As regards the control variables, the average firm had assets of about NT$1.2 billion, a leverage ratio of 40 per cent, and a market to book value of about 1.41. In comparison, in the Harford et al. (2008) sample, the leverage ratio value was about 21 per cent; thus, our leverage ratio is much larger than theirs. This may be because

raising funds through debt in Taiwan provides tax shields; therefore, firms in Taiwan may, to some extent, prefer to obtain finance through debt. Our market-to-book value is smaller than in the Harford et al. (2008) sample. Additionally, the value of the standard deviation for cash flow over the past five years (*CF_Volatility*) is 10 per cent, which is larger than the 4 per cent in Harford et al. (2008). The greater cash flow risk is likely to have a positive effect on cash holdings.

5. EMPIRICAL RESUTLS

First, we investigate the effects of corporate governance on corporate cash holdings using a number of governance variables to measure agency problems. These measures include: board ownership, stock collateral ratio, deviation of control from cash flow rights, and board structure. Next, we examine how governance variables and excess cash affect the use of cash. Finally, we assess the effect of governance characteristics and excess cash holdings on future firm value.

5.1 Firm Cash Holdings and Corporate Governance

5.1.1 Firm cash holdings and ownership structure

We first examine the relationships between shareholder rights, cash holdings and various controls for firm-specific variables in a multivariate setting using cross-sectional time-series models. The dependent variable of the industry-adjusted measure is calculated as the firm's cash holdings minus the mean industry level. The independent variables are the ownership structure variables and the firm-specific factors affecting cash holdings.

Under the various estimation methods, the residuals may be correlated across firms or across time, and the OLS standard errors may be biased; we therefore follow Petersen (2009) to report the t-statistics for the pooled results using standard errors corrected for clustering at firm level. The standard errors with firm clustering are unbiased and produce correctly sized confidence intervals, regardless of whether there is a permanent or temporary firm effect.

We also follow the corporate governance literature, albeit using an alternative approach, adding the lagged cash holdings of the firm into our regression models. This provides evidence of the ability of a firm's governance variables to predict its future cash holdings by controlling for the lagged value of the firm's cash holdings. The governance variables are also lagged to represent the historical value, whilst controlling for any potential endogeneity. Models 1-3 in Table 2 provide an analysis of the relationship between shareholder rights and cash holdings.

Table 2 The relation between ownership structure and cash holdings

This table examines the relation of ownership structure and cash holdings. The data set comprises 8,342 firm-year observations from 1,248 firms covering the period from 1996 to 2007. The model 1 and model 3 are the linear OLS. The model 2 is the piecewise linear specification of Morck et al. (1988). If M is the 1-year lagged percentage of board ownership, the piecewise linear specification is specified as follows: $M_1=M$ if M <10%, or $M_1=10\%$ if M ≥10%; $M_2=0$ if M <10%, or $M_2=M$ minus10% if 10%≤M <25%; or $M_2=15\%$ if M ≥25%; $M_3=0$ if M <25%, or $M_3=M$ minus25% if M ≥25%. The dependent variable is the industry-adjusted cash holdings. The independent variables includes: lagged industry-adjusted cash holdings, equity ownership of the board (Board Ownership), institutional ownership (Institutional Ownership), ratio of collateral shares to total shares (Collateral), the cash flow rights divided to control rights (Deviation), firm size (Size), firm leverage (Leverage), ratio of the market value to book value of assets (Market-to-Book), ratio of net working capital to net assets (Working Capital/Assets), ratio of research and development to sales (R&D/Sales), ratio of capital expenditures to net assets (CapEx/Assets), standard deviation of cash flows for the past five years (CF Volatility), one if a company pays a dividend and zero otherwise (Dividend), a bond dummy that takes a value of one if a company issues bond and zero otherwise (Bond), companies belonging to the electric industry will be set as one, otherwise set as zero (Elec). Standard errors are estimated with clustered errors at the firm level. T-Statistics are reported in parentheses below the coefficient. Level of significance: 1%***; 5%**; 10%*

Dependent variable: cash holdings	Model 1	Model 2	Model 3
Intercept	-0.056***	-0.029**	-0.053***

	(-5.09)	(-2.12)	(-4.58)
Ownership structure			
Cash holdings$_{(t-1)}$	0.656***	0.655***	0.656***
	(40.53)	(40.39)	(40.61)
Board Ownership$_{(t-1)}$	0.0002***		0.0002***
	(4.06)		(4.22)
$M_{1(t-1)}$		-0.002**	
		(-2.55)	
$M_{2(t-1)}$		0.0003***	
		(2.6)	
$M_{3(t-1)}$		0.0001	
		(1.06)	
Institutional Ownership$_{(t-1)}$	-0.0001	0.000	-0.000
	(-0.43)	(0.27)	(-0.44)
Collateral$_{(t-1)}$			0.0001***
			(2.80)
Deviation$_{(t-1)}$			-0.00001
			(-0.07)
Control variables			
Size	0.003***	0.003***	0.003***
	(4.45)	(3.82)	(3.99)
Leverage	-0.024***	-0.024***	-0.024***
	(-4.98)	(-4.97)	(-5.01)
Market-to-Book	0.007***	0.007***	0.007***
	(5.38)	(5.46)	(5.43)
Working Capital/Assets	0.079***	0.080***	0.081***
	(13.24)	(13.34)	(13.37)
R&D/Sales	-0.001***	-0.001***	-0.001***
	(-6.77)	(-7.06)	(-6.67)

Table 2 (continued)

	Model 1	Model 2	Model 3
CapEx/Assets	-0.167***	-0.165***	-0.166***
	(-14.58)	(-14.42)	(-14.49)
CF Volatility	0.015	0.011	0.014
	(1.53)	(1.25)	(1.55)
Dividend	-0.009***	-0.009***	-0.009***
	(-6.56)	(-6.40)	(-6.28)
Bond	0.020***	0.020***	0.02***
	(8.91)	(9.00)	(8.91)
Elec	-0.004**	-0.004**	-0.005**
	(-2.10)	(-2.22)	(-1.99)
Observation	7754	7754	7753
Adj R^2	0.5712	0.5709	0.5714

In Model 1, we find that board ownership is positively related to cash holdings. This may be because equity holders with strong rights allow their managers to hold substantial cash reserves as they are confident in their ability to control the way in which such cash will be used. In this model, we assume a linear relationship between cash holdings and board ownership.

In Model 2, we examine whether the relationship is non-linear; in order to do this, we use the piecewise linear specification of Morck et al. (1988), and find that with an increase in board ownership, there is a corresponding reduction in cash holdings followed by a subsequent increase; we suggest that the cash holdings of a firm are adversely affected at the 10 per cent board ownership level. When board ownership levels are greater than 10 per cent, board shareholders tend to become entrenched and can indulge in non-value-maximizing activities without being disciplined by their shareholders; thus, they will tend to hold higher cash reserves.

Only at board ownership levels smaller than 10 per cent will the relationship between board ownership and cash holdings be negative; this is consistent with the prior evidence showing that greater shareholder rights are associated with lower cash holdings (Dittmar et al., 2003; Kalcheva & Lins, 2007). The results for institutional ownership and cash holdings are insignificant, which may be attributable to the fact that the value of our institutional ownership, at 34.91 per cent, is relatively smaller than the 60 per cent value reported in Harford et al. (2008).

We add two variables, *Collateral* and *Deviation*, into Model 3 of Table 2. The stock collateralized ratio of controlling shareholders is a measure of expropriation of small shareholders; firms with a higher collateralized ratio are likely to have higher cash reserves. The positive and significant sign of *Collateral* found in this study (Model 3) indicates that the higher collateralized ratio will tend to increase the firm's cash holdings. When there is a greater deviation between control rights and cash flow rights (when the value is smaller), controlling shareholders may elect to increase their personal benefits as opposed to increasing firm value, and as such, they will tend to have greater cash holdings. However, we find that *Deviation* has an insignificant effect on cash holdings. This may be because the extent of the deviation is more serious in family-controlled firms in Taiwan.

5.1.2 Board structure effects

Model 1 of Table 3 provides the results of the analysis of the relationship between board structure and cash holdings, from which we can see that board size is positive and significantly related to cash holdings; however, board independence and CEO duality are both found to have significantly negative relationships with cash holdings. Yermack (1996) and Eisenberg et al. (1998) demonstrate that smaller boards are associated with better firm performance, possibly because a smaller board may be less encumbered with bureaucratic problems and may, therefore, be more functional; thus, a larger board with weaker corporate governance mechanisms may tend to hold larger cash reserves.

Table 3 The relation between board structure and cash holdings

This table examines the relation of ownership structure and cash holdings. The data set comprises 8,342 firm-year observations from 1,248 firms covering the period from 1996 to 2007. The model 1 is the relation between board structure and cash holdings. We use model 2 to test the relation between board structure, piecewise linear specification and cash holdings. The model 3 is the relation between ownership structure, board structure and cash holdings. The dependent variable is the industry-adjusted cash holdings. The independent variables includes: lagged industry-adjusted cash holdings, equity ownership of the board (Board Ownership), institutional ownership (Institutional Ownership), ratio of collateral shares to total shares (Collateral), the cash flow rights divided to control rights (Deviation), ratio of the number of board to the log of total assets (Board Size), ratio of independent directors and supervisors on the board to board size (Board Independence), if the chairperson of the board and the top manager are the same people, the value is 1, and 0 otherwise (CEO duality), firm size (Size), firm leverage (Leverage), ratio of the market value to book value of assets (Market-to-Book), ratio of net working capital to net assets (Working Capital/Assets), ratio of research and development to sales (R&D/Sales), ratio of capital expenditures to net assets (CapEx /Assets), standard deviation of cash flows for the past five years (CF Volatility), one if a company pays a dividend and zero otherwise (Dividend), a bond dummy that takes a value of one if a company issues bond and zero otherwise (Bond), companies belonging to the electric industry will be set as one, otherwise set as zero (Elec). Standard errors are estimated with clustered errors at the firm level. T-Statistics are reported in parentheses below the coefficient. Level of significance: 1%***; 5%**; 10%*

Dependent variable: cash holdings	Model 1	Model 2	Model 3
Intercept	-0.034***	-0.016*	-0.051***
	(-3.39)	(-1.2)	(-4.31)
Ownership structure			
Cash holdings$_{(t-1)}$	0.654***	0.653***	0.655***
	(41.78)	(42.10)	(40.90)
Board Ownership$_{(t-1)}$			0.0002***
			(3.92)
$M_{1(t-1)}$		-0.002***	
		(-2.86)	
$M_{2(t-1)}$		0.0003**	
		(2.19)	
$M_{3(t-1)}$		0.0001	
		(0.69)	
Institutional Ownership$_{(t-1)}$			-0.000
			(-0.39)
Collateral$_{(t-1)}$			0.0001***
			(2.63)
Deviation$_{(t-1)}$			0.000
			(0.31)
Board structure			
Board Size$_{(t-1)}$	0.008***	0.007***	0.009***
	(2.63)	(2.56)	(2.79)
Board Independence$_{(t-1)}$	-0.014***	-0.014***	-0.013**
	(-2.8)	(-2.77)	(-2.42)
CEO duality$_{(t-1)}$	-0.003*	-0.002*	-0.003*
	(-1.9)	(-1.74)	(-1.69)
Size	0.002***	0.002**	0.002***
	(2.56)	(2.53)	(3.09)

Table 3 (continued)

	Model 1	Model 2	Model 3
Control variables			
Leverage	-0.018***	-0.019***	-0.020***
	(-4.06)	(-4.18)	(-4.51)
Market-to-Book	0.007***	0.007***	0.007***
	(5.99)	(5.92)	(5.61)
Working Capital/Assets	0.081***	0.081***	0.083***
	(13.89)	(13.95)	(13.74)
R&D/Sales	-0.001***	-0.001***	-0.001***
	(-6.24)	(-6.29)	(-6.41)
CapEx/Assets	-0.161***	-0.162***	-0.166***
	(-15.00)	(-14.93)	(-14.50)
CF Volatility	0.002	0.003	0.016*
	(1.04)	(1.04)	(1.72)
Dividend	-0.008***	-0.008***	-0.008***

	(-5.94)	(-6.02)	(-5.63)
Bond	0.019***	0.020***	0.020***
	(8.99)	(9.10)	(8.95)
Elec	-0.004**	-0.004**	-0.003*
	(-2.35)	(-2.44)	(-1.70)
Observation	8443	7754	7752
Adj R^2	0.567	0.5673	0.5717

From their examination of the wealth effects surrounding outside director appointments, Rosenstein & Wyatt (1990) find a significantly positive share-price reaction, a result which is consistent with the hypothesis that the selection of outside directors does ensure that the interests of shareholders are taken into account. Thus, an independent board is positively related to firm value for firms with stronger corporate governance structures, who may also have smaller cash holdings.

If the CEO and top manager are the same person, then this will undoubtedly result in the concentration of management decision making, which will in turn lead to a reduction in the market value of the firm; where such firms are found to have weaker corporate governance structures, they may also have larger cash holdings. This result is inconsistent with our hypothesis, although this may be because when the CEO and the top manager are the same person, then there will be a stronger incentive for this person to make investment decisions, which results in the firm holding smaller cash reserves.

We test the relationship between board structure and cash holdings in Model 2 of Table 3 using piecewise linear specifications, and find that with an increase in board ownership, there is a corresponding reduction in cash holdings followed by an increase. The relationship between ownership structure, board structure and cash holdings is tested in Model 3, with all of the variables being included in the analysis. The results obtained are the same as those reported above, with the control variables having the expected signs across all of the different models.

Firms with high cash holdings are characterized as larger firms, with higher growth options (*Market-to-Book*) and net working capital; we also find

that if the firm issues bonds, it may also hold higher cash reserves. On the other hand, firms with low cash holdings tend to have higher leverage, capital expenditure and R&D expenditure, and if the firm pays dividends, it may also have lower cash reserves.

We also find that the high-tech firms in Taiwan hold smaller cash reserves, which may be attributable to the fact that these firms have significantly larger cash expenditure on both R&D and investment. The greater cash flow risk should have a positive effect on cash holdings, although the value found in this study is insignificant.

5.2 Payment Decisions effects

In this sub-section, we focus on the ways in which the excess cash and governance variables are related to future payment decisions. In the next set of tests, we examine how the excess cash and firm governance characteristics, as well as the interactions between these variables, are related to a firm's investment and payment decisions, and to the likelihood of the firm returning its bond debt. Firstly, we focus on decisions on the return of bond debt, essentially because when firms have large cash holdings, they may consider returning such debt to reduce their costs of capital. Secondly when firms have excess cash, they will also have certain investment decisions to make, which include decisions on both capital expenditure and R&D expenditure. Thirdly, firms with an increase in cash holdings are more likely to increase their dividends; we investigate the ways in which the governance metrics are related to a firm's payout policy, specifically for the case of firms issuing dividends.

To take into account industry-specific factors which may drive investment decisions, we calculate the annual mean investment, payout and bond debt return variables of the firm relative to the annual mean values for the industry. We also follow Harford et al. (2008) to define a firm's cash position as the excess proportion of cash holdings, as well as the change in the unexplained proportion. Specifically, we define excess cash in this study as the residual from a regression of cash holdings on firm size, leverage, growth options, working capital to assets, R&D to sales, capital expenditure to assets and cash flow volatility, as well as

dividend, bond and industry indicator variables. Since we are interested in the ways in which the excess cash and governance variables are related to future business decisions, these variables are entered as their lagged values.

In order to examine the ways in which governance and cash holdings are jointly related to firm decisions, we create a set of interaction variables which includes the way in which board ownership interacts with excess cash. The additional control variables include working capital, leverage, market to book ratio and lagged firm size. We also follow Petersen (2009), using their method to estimate the models with clustered standard errors with the year effect captured in the annual industry adjustment. The results of our analysis are presented in Table 4.

Table 4 Cash holding, corporate governance and return debt, investment, payout decisions

This table examines the relation between return debt, investment and payout decisions and governance metrics. For return bond debt decisions, the dependent variables are the change in industry-adjusted return bond debt. For investment decisions, the dependent variables are the change in industry-adjusted capital expenditures, R&D expenditures (for firms with available R&D expenditures). For payout decisions, the dependent variables are the change in industry-adjusted dividends. All the dependent variables are industry-adjusted on a yearly basis according to the classification rule of TEJ (two-digit SIC classification). The firm's cash position as the excess portion of cash holdings as well as the change in the excess portion. We define excess cash as the residual from a regression of cash holdings on firm size, leverage, growth options, working capital to assets, R&D to sales, Capital expenditures to assets, cash flow volatility, as well as dividend, bond and industry indicator variables. The governance variables include board ownership. The board ownership is interacted with the cash residuals. Additional control variables include: working capital (ratio of net working capital to net assets), leverage, market to book ratio (ratio of the market value to book value of assets), and lagged firm size. Standard errors are estimated with clustered errors at the firm level. T-Statistics are reported in parentheses below the coefficient. Level of significance: 1%***; 5%**; 10%*

	Return debt decision	Investment Decisions		Payout Decisions
	ΔInd. Adjusted Return Bond debt(Model 1)	ΔInd. Adjusted Capital Exp (Model 2)	ΔInd. Adjusted R&D Exp (Model 3)	ΔInd. Adjusted Dividends (Model 4)
Intercept	0.070	-0.260	0.381	19.98

	(0.48)	(-0.04)	(0.32)	(0.43)
Excess Cash$_{(t-1)}$	0.468	6.678	4.320	515.08
	(1.33)	(0.86)	(1.03)	(0.96)
Change in Excess	0.723***	-6.449	-0.426	82.07
Cash$_{(t-1)}$	(2.59)	(-0.89)	(-0.64)	(1.10)
Ownership Variables				
Board ownership$_{(t-1)}$	-0.002**	0.025	-0.008	0.587
	(-2.38)	(1.17)	(-1.29)	(0.99)
Board ownership$_{(t-1)*}$	0.006	-0.450*	0.019	11.757
Cash residual$_{(t-1)}$	(-0.73)	(-1.75)	(-0.16)	(-0.98)
Control Variables				
Working capital	0.279***	-0.511	-0.843	-12.915
	(4.74)	(-0.23)	(-1.04)	(-1.09)
Leverage	-0.377***	4.02	0.901	25.35
	(-6.24)	(1.41)	(1.38)	(1.17)
Market-to-Book	0.063***	-0.251	0.229	-17.88
	(6.29)	(-1.46)	(1.18)	(-0.80)
Size$_{(t-1)}$	-0.031***	-0.020	-0.044	-1.280
	(-3.67)	(-0.05)	(-0.53)	(-0.41)
Observation	7959	7916	7629	7888
Adj R^2	0.02	0.0002	0.0005	0.002

We find a low R^2 across all of the models, which is consistent with the findings of Harford et al. (2008) who explain that the focus on changes over time in a firm's industry-adjusted position is likely to involve a large idiosyncratic component. Model 1 of Table 4 reflects the results for the change in industry-adjusted bond debt return, from which we can see that firms with higher levels of excess cash, and greater changes in excess cash, are more likely to return their bond debt. The positive and significant signs of the change in excess cash indicate that an increase in cash over the previous period will have some influence on firms with regard to the likelihood of them returning their bond debt.

As regards the governance variables, we find that the probability of bond debt being returned is reduced for firms with higher board ownership. Furthermore, we can find no evidence of any interaction between board ownership and a change in the likelihood of a firm returning its bond debt. As for the control variables, firms with higher working capital and market-to-book values are more likely to return their bond debt; however, those firms with higher leverage are less likely to return their bond debt, as are larger firms.

The relationships between the excess cash holdings, governance metrics and

investment decisions examined in this study are shown in Models 2 and 3 of Table 4, with Model 2 presenting the results for the change in industry-adjusted capital expenditure, and Model 3 presenting those for the analysis of the change in industry-adjusted R&D. The level of excess cash as well as the change in excess cash is found to be unrelated to the changes in capital and R&D expenditure.

We also find no evidence of any relationship between board ownership and changes in capital and R&D expenditure; however, from the interaction between board ownership and excess cash in Model 2, we do find that with an increase in their cash position, firms have a propensity for reduced capital expenditure relative to their industry peers. Nevertheless, it is only in Model 2 that we find any evidence of governance practices affecting the allocation of excess cash.

We now go on to investigate the ways in which excess cash holdings and the governance metrics affect the payout decisions of a firm, focusing specifically on dividends. Changes in payout ratios (dividends or repurchases) can capture any slow changes in the level of dividend payments brought about by a conservative dividend policy (Brav et al., 2005; Harford et al., 2008). When examining the changes in dividends in Model 4, we also find that the level of excess cash and the change in excess cash are unrelated to changes in dividends.

In order to explain the differences in cash holdings, we examine the ways in which governance practices affect the ways that firms manage their cash flows. The results show that when firms have large cash holdings, they may consider returning their bond debt; however, we find that capital expenditure, R&D expenditure and dividends are generally unrelated to the firm's cash position. Nevertheless, there may be a reduction in the probability of bond debt being returned for firms with higher board ownership. We find that governance practices affect the allocation of excess cash only with regard to capital expenditure decisions.

5.3 Firm Profitability and Value Effects

We now go on to assess the effects of ownership structure and excess cash holdings on the future value of the firm, examining whether excess cash and pre-determined governance characteristics are related to future profitability. We use ROE as the measure for calculating the dependent variable, *Profitability*. In order to take into account industry-specific factors, we calculate the ROE relative to the annual industry mean value, whilst also including lagged industry-adjusted profitability in our regression models in order to take into account firm-level characteristics, which may be jointly determined.

We include the same governance, excess cash and interaction variables from the allocation analysis in the previous sub-section, as well as the same control variables; the results of our examination of how a firm's governance characteristics are related to its future profitability are presented in Model 1 of Table 5, from which we can see that lagged industry-adjusted profitability accounts for a significant proportion of the firm's current profitability.

Table 5 Cash holding, ownership structure as they relate to firm's profitability and value

This table examines the relation between excess cash, ownership structure and firm's profitability and value relative to industry peers. Due to endogeneity concerns, we include firm's lagged profitability or value in the models, and lag all the governance metrics. The dependent variable in models 1 and 2 are industry-adjusted profitability, using ROE to measure it, and industry-adjusted value, using market-to-book to measure it. To control for a selection bias, industry means are calculated on a yearly basis using the classification rule of TEJ (two-digit SIC classification). The firm's cash position as the excess portion of cash holdings as well as the change in the excess portion. We define excess cash as the residual from a regression of cash holdings on firm size, leverage, growth options, working capital to assets, R&D to sales, Capital expenditures to assets, cash flow volatility, as well as dividend, bond and industry indicator variables. The governance variables include board ownership. The board ownership is interacted with the cash residuals. Additional control variables include: working capital (ratio of net working capital to net assets), leverage, and lagged firm size. Standard errors are estimated with clustered errors at the firm level. T-Statistics are reported in parentheses below the coefficient. Level of significance: 1%***; 5%**; 10%*

Corporate Governance and the Payment Decisions of Excess Cash Holdings

	Model 1	Model 2
	Industry-adjusted profitability	industry-adjusted value
Intercept	-0.264***	-0.149
	(-5.986)	(-1.51)
Industry-adjusted profitability or market-to-book$_{(t-1)}$	0.523***	0.617***
	(9.5)	(27.13)
Excess Cash$_{(t-1)}$	-0.119	0.371
	(-0.88)	(1.39)
Change in Excess Cash$_{(t-1)}$	-0.204***	-1.034***
	(-3.8)	(-4.35)
Ownership Variables		
Board ownership$_{(t-1)}$	0.001***	0.0003
	(4.37)	(0.65)
Board ownership$_{(t-1)*}$ Cash residual$_{(t-1)}$	0.001	0.002
	(0.39)	(0.25)
Control Variables		
Working capital	0.177***	0.197***
	(5.46)	(4.20)
Leverage	-0.002***	-0.139***
	(-7.81)	(-3.46)
Size$_{(t-1)}$	0.019***	0.009
	(7.22)	(1.52)
Observation	7927	7927
Adj R^2	0.301	0.422

We also find that the levels of both excess cash and changes in excess cash are negative, as compared to the current profitability level. Firms with larger changes in excess cash are found to have significantly lower profitability and declining growth prospects, whilst firms with higher ownership levels have significantly higher profitability. All of the control variables have the expected signs, with high

profitability firms being characterized by large firms with higher working capital, but also lower leverage.

In Model 2 of Table 5, we examine whether excess cash and the governance metrics are related to firm value, using the market-to-book value as the measure; the models also include the firms' lagged industry-adjusted market-to-book value. Naturally, these lagged industry-adjusted market-to-book values represent a significant proportion of the firms' current market-to-book valuation. We find that the lagged change in excess cash has a significantly negative correlation with firm value, with the lagged change in excess cash affecting firm value through reduced profitability and market-to-book value, either in the following year or over much longer horizons. With regard to the governance variables, we find that the lagged ownership variables are unrelated to current firm value; firms with high ownership may have higher profitability, but this does not translate into an increase in the value of the firm. As for the control variables, we obtain the same results as those found in Model 1.

6. DISCUSSION AND CONCLUSIONS

This study provides a comprehensive analysis on the ways in which the governance practices of a firm can affect its use of cash. The sample provides 8,342 firm-year observations on a total 1,248 TSE-listed firms, covering the period from 1996 to 2007. We first of all determine whether Taiwanese firms with weaker governance structures tend to hold higher cash reserves by examining the relationship between shareholder rights, board structure and cash holdings, and find that the relationship between ownership and cash holdings is non-linear using the piecewise linear specifications of Morck et al. (1988), and find that with an increase in board ownership, there is a reduction in cash holdings followed by a rise; we suggest that the turning point is the 10 per cent board ownership level. The significantly positive sign of the Collateral variable indicates a rise in the firm's cash holdings with a higher collateralized ratio. As for the relationship between board structure and cash holdings, we find that board size has a significantly positive correlation with cash holdings. A larger board with weaker corporate governance structure may tend to have larger cash reserves; however, board independence and CEO duality both have a significantly negative correlation with

cash holdings.

An independent board is positively related to firm value in cases where firms with stronger corporate governance practices have smaller cash reserves. If the CEO and the top manager are the same person, then firms with weaker governance practices may tend to hold larger cash reserves. This result is inconsistent with our hypothesis, essentially because, when the CEO and the top manager are the same person, that person then has strong incentives to undertake the necessary investment decisions, thereby leaving the firm with smaller cash reserves.

We further examine the way in which excess cash, firm governance practices, and the interaction between these variables, are related to a firm's investment and payout decisions, as well as the likelihood of the firm returning its bond debt. The results show that firms with large cash reserves may consider returning their bond debt, but that when examining the effect of governance characteristics and excess cash holdings on future firm value, both capital/R&D expenditure and dividends are largely unrelated to the firm's cash position. We find that lagged excess cash has a negative correlation with current profitability and market-to-book value, but that excess cash can affect the value of the firm through reduced profitability and market-to-book value, either in the following year or over much longer horizons.

Conflicting results are provided within the prior literature on the relationship between corporate governance and cash holdings. The results of the present study can help to provide a better understanding of the ways in which shareholder rights and board structure interact with firm-level agency problems and the cash decisions of firms in Taiwan. Our results are consistent with the findings of Dittmar et al. (2003), who also find that firms with poor shareholder protections (poor corporate governance practices) tend to hold more cash than those with better shareholder protections.

These findings provide several possible extensions for future research. Firstly, when investigating the factors driving some firms, but not others, to choose cash payment mechanisms, we should look not only at the return of bond debt by firms, but also at their investment or acquisitions decisions. Another extension would be to investigate whether certain groups of firms organized as conglomerates or family-owned firms tend to have greater cash holdings as compared to those of non-conglomerate and non-family-owned firms, and the differences that ultimately determine the level of corporate cash holdings.

Reference

Barclay, M. J. and Smith, C. W. Jr., 1995, "The Maturity Structure of Corporate Debt," **Journal of Finance**, Vol. 50, No. 2, 609-631.

Bhagat, S. and Black, B., 2002, "The non-correlation between board independence and long term firm performance," **Journal of Corporation Law**, Vol. 27, No. 2, 231-274.

Blanchard, O. J., Lopez-de-Silanes, F., and Shleifer, A., 1994, "What do firms do with cash windfalls ?" **Journal of Financial Economics**, Vol. 36, No. 3, 337-360.

Borokhovich, K. A., Parrino, R., and Trapani, T., 1996, "Outside directors and CEO selection," **Journal of Financial and Quantitative Analysis**, Vol. 31, No. 3, 337-355.

Brav, A., Graham, J., Harvey, C., and Michaely, R., 2005, "Payout Policy in the 21st Century," **Journal of Financial Economics**, Vol. 77, No. 3, 483-527.

Brickley, J. A., Coles, J. L., and Jarrell, G., 1997, "Leadership structure: Separating the CEO and chairman of the board," **Journal of Corporate Finance**, Vol. 3, No. 3, 189-220.

Bruinshoofd, A. and Kool, C., 2002, "The Determinants of Corporate Liquidity in the Netherlands." Working paper, Maastricht University.

Chen, A., Kao, L., Tsao, M., and Wu, C., 2007, "Building a Corporate Governance Index from the Perspectives of Ownership and Leadership for Firms in Taiwan," **Corporate Governance: an International Review**, Vol. 15, No. 2, 251-261.

Claessens, S., Djankov, S., and Lang, L. H. P., 2000, "The Separation of Ownership and Control in East Asian Corporations," **Journal of Financial Economics**, Vol. 58, No. 1, 81-112.

Claessens, S., Djankov, S., Fan, J. P. H., and Lang, L. H. P., 2002, "Disentangling the incentive and entrenchment effects of large shareholdings," **Journal of Finance**, Vol. 57, No. 6, 2741-2771.

Dittmar, A. and Mahrt-Smith, J., 2007, "Corporate Governance and the Value of Cash Holdings," **Journal of Financial Economics**, Vol. 83, No. 3, 599-634.

Dittmar, A., Mahrt-Smith, J., and Servaes, H., 2003, "International Corporate Governance and Corporate Cash Holdings," **Journal of Financial and Quantitative Analysis**, Vol. 38, No. 1, 111-133.

Eisenberg, T. S., Sundgren, S., and Wells, M., 1998, "Larger Board Size and Decreasing Firm Value in Small Firms," **Journal of Financial Economics**, Vol. 48, No. 1, 35-54.

Faulkender, M. and Wang, R., 2006, "Corporate financial policy and the value of cash," **Journal of Finance**, Vol. 61, No. 4, 1957-1990.

Guney, Y., Ozkan, N., and Ozkan, A., 2007, "International evidence on the non-linear impact of leverage on corporate cash holdings," **Journal of Multinational Financial Management**, Vol. 17, No. 1, 45-60.

Harford, J., 1999, "Corporate cash reserves and acquisitions," **Journal of Finance**, Vol. 54, No. 6, 1969-1997.

Harford, J., Mansi, S. A., and Maxwell, W. F., 2008, "Corporate Governance and Firm Cash Holdings in the US," **Journal of Financial Economics**, Vol. 87, No. 3, 535-555.

Hermalin, B. E. and Weisbach, M. S., 2003, "Boards of directors as an endogenously determined institution: A survey of the economic literature," **FRBNY Economic Policy Review**, Vol. 9, No. 1, 7-26.

Jensen, M. and Meckling, W., 1976, "Theory of the firm: managerial behavior, agency costs and ownership structure," **Journal of Financial Economics**, Vol. 3, No. 4, 305-360.

Jensen, M. C., 1986, "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers," **American Economic Review**, Vol. 76, No. 3, 323-339.

John, K. and Senbet, L. W., 1998, "Corporate governance and board effectiveness," **Journal of Banking and Finance**, Vol. 22, No. 4, 371-403.

Jung, K., Kim, Y. C., and Stulz, R., 1996, "Timing, Investment Opportunities, Managerial Discretion, and the Security Issue Decision," **Journal of Financial Economics**, Vol. 42, No. 2, 159-185.

Kalcheva, I. and Lins, K., 2007, "International Evidence on Cash Holdings and Expected Managerial Agency Problems," **The Review of Financial Studies**, Vol. 20, No. 4, 1087-1112.

Kao, L., Chiou, J., and Chen, A., 2004, "The Agency Problems, Firm Performance and Monitoring Mechanisms: the Evidence from Collateralized Shares in Taiwan," **Corporate Governance: An International Review**, Vol. 12, No. 3, 389-402.

Kim, C. S., Mauer, D. C., and Sherman, A. E., 1998, "The Determinants of Corporate Liquidity: Theory and Evidence," **Journal of Financial and Quantitative Analysis**, Vol. 33, No. 3, 335-359.

Kusnadi, Y., 2006, "Corporate Governance Mechanisms and Corporate Cash Holdings?" Working paper, Hong Kong University of Science and Technology.

La Porta, R., Lopez-de-Silianes, F., and Shleifer, A., 1999, "Corporate Ownership around the World," **Journal of Finance**, Vol. 54, No. 2, 471-517.

Lang, L. H. P., Stulz, R. M., and Walkling, R. A., 1991, "A test of the free cash flow hypothesis: The case of bidder returns," **Journal of Financial Economics**, Vol. 29, No. 2, 315-335.

Lemmon, M. L. and Lins, K. V., 2003, "Ownership Structure, Corporate Governance, and Firm Value: Evidence from East Asian Financial Crisis," **Journal of Finance**, Vol. 58, No. 4, 1445-1468.

McConnell, J. J. and Servaes, H., 1990, "Additional evidence on equity ownership and corporate value," **Journal of Financial Economics**, Vol. 27, No. 2, 595-612.

Mikkelson, W. H. and Partch, M. M., 2003, "Do Persistent Large Cash Reserves Hinder Performance?" **Journal of Financial and Quantitative Analysis**, Vol. 38, No. 2, 275-294.

Morck, R., Shleifer, A., and Vishny, R., 1988, "Management Ownership and Market Valuation: An Empirical Analysis," **Journal of Financial Economics**, Vol. 20, No. 1, 293-315.

Myers, S. and Majluf, N., 1984, "Corporate Financing Decisions When Firms Have Investment Information that Investors Do Not," **Journal of Financial Economics**, Vol. 13, No. 2, 187-221.

Opler, C. T. and Titman, S., 1994, "Financial distress and corporate performance," **Journal of Finance**, Vol. 49, No. 3, 1015-1040.

Opler, T., Pinkowitz, L., Stulz, R., and Williamson, R., 1999, "The Determinants and Implications of Corporate Cash Holdings," **Journal of Financial Economics**, Vol. 52, No. 1, 3-46.

Ozkan, A. and Ozkan, N., 2004, "Corporate Cash Holdings: An Empirical Investigation of UK Companies," **Journal of Banking and Finance**, Vol. 28, No. 9, 2103-2134.

Petersen, M., 2009, "Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches," **The Review of Financial Studies**, Vol. 22, No. 1, 435-480.

Pinkowitz, L. and Williamson, R., 2001, "Bank Power and Cash Holdings: Evidence from Japan," **The Review of Financial Studies**, Vol. 14, No. 4, 1059-1082.

Pinkowitz, L., Stulz, R., and Williamson, R., 2003, "Do firms in countries with poor protection of investor rights hold more cash?" Working paper, Georgetown University.

Pinkowitz, L., Stulz, R., and Williamson, R., 2006, "Does the Contribution of Corporate Cash Holdings and Dividends to Firm Value Depend on Governance? A Cross-country Analysis," **Journal of Finance**, Vol. 61, No. 6, 2725-2751.

Rosenstein, S. and Wyatt, J. G., 1990, "Outside Directors, Board Independence and Shareholder Wealth," **Journal of Financial Economics**, Vol. 26, No. 2, 175-191.

Tsui, J. S. L., Jaggi, B., and Gul, F. A., 2001, "CEO domination, growth opportunities, and their impact on audit fees," **Journal of Accounting, Auditing and Finance**, Vol. 16, No. 3, 189-208.

Weisbach, M., 1988, "Outside directors and CEO turnover," **Journal of Financial Economics**, Vol. 20, No. 1, 431-460.

Wynn, J. P., 2008, "Legal Liability Coverage and Voluntary Disclosure," **The Accounting Review**, Vol. 83, No. 6, 1639-1669.

Yeh, Y. H., Ko, C., and Su, Y. H., 2003, "Ultimate Control and Expropriation of Minority Shareholders: New evidence from Taiwan," **Academia Economic Papers**, Vol. 31, No. 3, 263-299.

Yermack, D., 1996, "Higher Market Valuation of Companies with a Small Board of Directors," **Journal of Financial Economics**, Vol. 40, No. 2, 185-211.

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