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Return Enhancing, Cash-rich or simply Empire-Building? An Empirical Investigation of Corporate Real Estate Holdings

Julan Du

Department of Economics, Chinese University of Hong Kong, Shatin, Hong Kong. Phone: (852) 2609 8008; Fax: (852) 2603 5805; Email: julandu@cuhk.edu.hk.

Charles Ka Yui Leung*

Department of Economics and Finance, City University of Hong Kong, Kowloon Tong, Hong Kong. Phone: (852) 2788 9604; Fax: (852) 2788 8806; Email: kycleung@cityu.edu.hk.

Derek Chu

Department of Economics, Chinese University of Hong Kong, Shatin, Hong Kong. Phone: (852) 2609 8008; Fax: (852) 2603 5805.

No, we find no evidence for a return-enhancing role for corporate real estate holdings, which is consistent with the previous literature. Instead, our study based on a sample of U.S. listed corporations suggests that corporate real estate holdings are a form of managerial “empire building”. Corporations with weaker corporate governance and a lower degree of financial constraint tend to have higher real estate holdings, whereas higher real estate holdings are associated with lower returns to shareholders. The impact of corporate governance on corporate real estate holdings seems to be stronger in manufacturing-related industries. Implications and future research directions are discussed.

Keywords

Corporate Real Estate; Empire-building; Corporate Governance; Financial Constraint

* Corresponding author

...But over time distributable income earnings that have been withheld by managers should earn their keep. If earnings have been unwisely retained, it is likely that managers, too, have been unwisely retained.

Warren Buffett, The Essays of Warren Buffett.

1. Introduction

It is not uncommon for corporate real estate decisions to appear as headline news. For instance, on June 20th, 2007, the headline news of the Wall Street Journal reported that over the years, Toyota U.S. has been expanding its building of factories in the U.S. as a way to increase the employment of U.S. workers so as to win goodwill in the face of public rancor over the role of foreign automakers in the decline of the American auto industry.¹ The building of new factories has increased corporate real estate holdings, installed more factory management teams, and enhanced management visibility and status. In short, corporate real estate decisions could be directly linked to the over-expansion symptoms of corporate management, a typical issue in corporate governance.² This paper attempts to take this view seriously and systematically examine the relationship between corporate real estate holdings and corporate governance

In this paper, corporate real estate (CRE) refers to the land and buildings owned by companies that are not primarily engaged in the real estate business. Many companies choose to commit their scarce capital to owning real estate rather than redeploying such capital to their core business. In the United States, it is estimated that corporate users own over \$1 trillion worth of various property types, amounting to at least five times the value held by publicly traded real estate companies (Kim, 2004). By using U.S. data, Tuzel (2005) finds that on average, property makes up 30% of a firm's physical capital. In the United Kingdom, many of the largest non-real estate companies control property portfolios that are comparable in value terms with those owned by mainstream property companies (Liow, 1995).

Why do non-real estate firms prefer to buy CRE, which will clearly decrease the "liquidity" of the firms, rather than rent them?³ One possible and important reason is that there is a tax advantage. More generally, this class of explanation will predict that, other things being equal, higher CRE holdings are associated with higher stock returns.

¹ According to the article, the Toyota U.S. management has ignored idle production capacity in existing factories, but built more factories around the U.S. as a form of "political insurance". Later, in view of the rising labor costs, idle production capacity, and unprofitable expansion of factory building, Toyota headquarters decided to stop new factory building in the United States.

² Although the scale of business is often intuitively related to the scale of real estate investment in the media so that Toyota's move was interpreted as slowing down its investment expansion in the U.S., this is not necessarily the case. In fact, there are economic arguments which suggest that firms with strong growth potential should rent rather than purchase real estate in order to preserve liquidity.

³ See Wheaton (2005) for a discussion of the traditional views on why corporations may want to own rather than lease real estate.

Another view is that for some industries, such as manufacturing, real estate ownership is necessary, otherwise they cannot find optimal industrial real estate in the market which is compatible with the special design of assembly lines that they need. In other words, the demand for real estate holdings is driven by the production mode. Firms which do not own their real property may simply be constrained to do so. On the other hand, other sectors such as legal or accounting services do not hold real property because their production mode does not require specially designed real estate. Thus, the *cross-firm variation* in real estate holdings is driven by the difference in the nature and necessity of corporate demand for real estate. The exact composition of assets could vary from firm to firm. Furthermore, since the composition of assets is optimally determined for each firm, the *cross-firm variation* in real estate holdings should not bear any relationship with the cross-firm variation in equity returns or firm performance in general.

Contrary to these two views, most empirical work show that real estate holdings do *not* improve and often worsen the stock market performance of ‘property-intensive’ non-real estate firms ⁴ (see Appendix 1a for a summary). This leaves the CRE holdings as a commonly observed yet puzzling phenomenon.⁵

We attempt to address this issue from a corporate finance perspective. According to Jensen (1986), if firms are left with free cash flow, management has incentive to use the free cash in inefficient ways, i.e., investing in projects with negative net present value but high private benefits rather than repayment to investors as dividends. In countries with extremely weak legal institutions and corporate governance, managers could easily expropriate corporate earnings for their own private benefit. Under some extreme circumstances, managers can divert corporate resources simply through outright theft.⁶

However, in countries with fairly strong legal institutions and corporate governance systems, managers need to adopt a *more circuitous and hidden approach* to expropriating corporate earnings. Clearly, overinvestment in real estate could be one avenue for managerial expropriation. Managers can gain tremendous on-the-job consumption benefits from literally “empire-building” in the sense of over-purchasing, over-building and over-holding a large number of plush office buildings and luxurious company apartments, and they can keep the profits of investors under their own discretion and potentially gain various monetary and non-pecuniary benefits from possible real estate price appreciation in the future. Interestingly, these investments in real estate

⁴ For instance, see Deng and Gyourko (1999), Seiler, Chatrath and Webb (2001), and Brounen and Eichholtz (2005).

⁵ Another popular explanation is the holdup problem for firm-specific corporate real estate. We will get back to this point later.

⁶ Among others, see La Porta et al. (1998, 1999, 2002), and Johnson et al. (2000) for related discussions.

holdings are often made in the name of improving corporate image and the working (and even living) conditions of all staff members, and corporate long-term expansion. In summary, real estate investment could be an excellent way for managers to extract corporate earnings for their own private benefit.

In this paper, we first revisit the relationship between CRE holdings and corporate stock returns. Consistent with earlier studies, we detect a strong negative relationship between real estate holdings and firm returns for our sample of U.S. companies.⁷ After establishing the adverse impact of CRE holdings on corporate valuation, we move on to examine the empirical determinants of real estate holdings for our sample of U.S. firms. In particular, we study the relationship between property holdings and various corporate governance measures, controlling for other factors (including financial constraint measures, growth potential, etc.). The U.S. is selected for this research because it is widely agreed to have one of the most adequate legal institutions and corporate governance systems in practice. Thus, it provides us with a good setting to investigate whether CRE holdings have been used as a circuitous way for management to pursue private benefits. We measure corporate governance strength mainly from the corporate ownership structure and management compensation scheme. Our findings confirm our hypothesis: other things being equal, both a higher extent of financial constraint and weaker corporate governance are associated with higher real estate holdings. More concretely, CEO ownership, management compensation structure and outsider ownership play important roles in determining real estate holdings in the U.S. corporations. First, an increase of ownership by the CEO or outside blockholders reduces the real estate holdings. Second, for management compensation, we find that higher proportions of stock options to total compensation mean lower real estate holdings. Third, we provide empirical evidence that the problem of duality, i.e., when the position of the chairman of the board (COB) of directors and that of the chief executive officer are held by the same person, this most probably increases real estate holdings. Finally, the results suggest that higher real estate holdings are associated with larger amounts of free cash flow, but lower growth opportunities. Our analysis helps to identify one channel of how corporate governance affects corporate valuation: weak corporate governance leads to excessive real estate holdings by non-real estate companies, which in turn brings down the firm value.

Clearly, this apparently unorthodox view may bother some readers. For instance, some may worry that larger and more capital intensive firms may need more real estate in their production process. Thus, our current regressions include “size” as one of the control variables. In addition, the industry dummy variables can potentially control for capital intensity variation across industries. The second concern is that the treatment of real

⁷ Recently, Dong et al. (2012) have studied corporate real estate holdings in China and examined whether CRE holdings are driven by some government policies among competing explanations.

estate depreciation may distort the measurement of real estate holding and therefore affect the accuracy of the results. While this point is well taken, we also want to mention a few points on why this concern may not be as serious as it may seem. First, our sampling period is relatively short and ends before the “mark-to-the-market” practice in accounting became popular. Second, we also had casual conversations with some accounting professionals and they tend to think that the differences in real estate depreciation treatment across firms are rather small, due to regulations and other considerations. Perhaps more importantly, we are more concerned on *how the differences in real estate holdings across firms* can be explained by the difference in corporate governance variables across firms. Thus, even if there are mismeasurements in the calculations of real estate holdings, as long as those mismeasurements are uncorrelated to the explanatory variables, it would not affect our qualitative results. The third concern points to the fact that the ownership of real estate can lead to “easier finance” through the collateral effect. Our current regression formulation has already included a “long term debt” variable which would capture that effect (from our conversations with market participants, the collateral position does not seem to matter as much for short term financing). The fact that corporate governance variables seem to matter most in manufacturing firms, which seems to be a kind of industry effect, also bothers some researchers. Some may argue that because manufacturing firms need specific investment in land and building for the production process, they would naturally have larger shares of real estate holdings in their assets. While this observation is true, the production-based argument may still need to explain why firms with “weaker corporate governance” *within the same industry* will hold even more properties than those that are “stronger” in corporate governance after controlling for a host of production-based and liquidity-based potential determinants of CRE holdings. We will elaborate more on these points in later sections.

Perhaps more fundamentally, one may wonder why CRE investment is highlighted as a case study to verify the free cash flow theory as well as the importance of corporate governance in shaping corporate investment policy. After all, these points have been extensively discussed in the literature. In our view, the studying of the relationship between CRE and corporate governance can substantially improve our understanding of the importance of corporate governance in determining corporate investment policy. First, CRE investment usually involves a very significant amount of liquidity, which would imply a sacrifice of other investment opportunities. Given the fact that there is a well-developed rental market for commercial real estate in the USA, it is not clear why some corporations will insist on purchasing CRE. Second, the negative correlation between CRE holdings and stock performance has been repeatedly documented and yet firms still invest in CRE. This is a puzzle that has not been solved. Third, recent research such as that by Jin et al. (2012) suggest that the fluctuations of CRE value can impact the “borrowing capacity” of firms and hence CRE can play a role in the propagation of shocks

over the business cycles. Perhaps more importantly, the relationship between corporate governance and CRE holdings seems to be underexplored.⁸ The closest is work by Coles, Daniel and Naveen (2006), who study the relationship between managerial incentive and investment in property, plant and equipment (PPE). They examine the effects of CEO pay-performance sensitivity and the sensitivity of CEO wealth to stock volatility on the investment strategy of firms. They find that higher CEO pay-performance sensitivity (change in the dollar value of the executive's wealth for a one percentage point change in stock price) provides strong incentive to CEOs to decrease risky investments (R&D expenditures in their framework) and increase less risky investments (PPE investment in their framework). They also find that a higher sensitivity of CEO wealth to stock volatility leads to riskier policy choices, including relatively more investment in R&D and less investment in PPE. This paper examines corporate PPE investment from a completely different angle. Coles, Daniel and Naveen (2006) treat PPE as less risky investment, but we regard PPE or CRE investment as a channel for corporate managers to overinvest for the purpose of empire building. In particular, we examine the impact of a host of corporate governance aspects rather than the CEO pay-performance sensitivity on PPE investment. Moreover, we also allow for other factors, such as diversification, financial constraint, etc., to be empirical determinants of PPE investment. In addition, we provide evidence that higher PPE investment is not associated with higher stock return. Thus, this paper should be considered as complementary to Coles, Daniel and Naveen (2006).

The remainder of the paper is organized in the following way. Section 2 summarizes some of the findings in the CRE management literature. Section 3 explains the dataset and lays out the corporate governance measures to be employed. Other determinants of real estate holdings are discussed in Section 4. Section 5 provides evidence that higher CRE holdings are associated with lower stock returns. Section 6 investigates the empirical determinants of CRE holdings. Section 7 looks at the role of corporate governance as well as other firm characteristics in determining the flow of real estate acquisitions or sales. Some further robustness tests are conducted in Section 8. Section 9 concludes the paper.

2. Mismanagement of Corporate Real Estate

Before conducting formal econometric tests, we would like to summarize a relatively overlooked literature on real estate management. Despite the great

⁸ After the circulation of the first draft, the authors became aware of Sing and Yin (2006). They study a similar problem in the context of firms listed on the Singapore Stock Exchange. However, they combine real estate, financial and other firms in their sample. All of their data are from the same year. In summary, they adopt a very different strategy from this paper.

value invested, CRE assets are found to be seriously undermanaged and even mismanaged.

The effective management of real estate, as in the case of other assets, requires the collection and maintenance of a database for sound decision making. However, according to a survey by Veale (1989), approximately 2/3 of the firms surveyed do not maintain a separate management information system for the ongoing management and control of real estate assets. Furthermore, when asked how the after-tax return on real estate (net income plus appreciation) was compared with the company's overall return, 60% of the firms reported that real estate returns are not calculated. Most significantly, only 29% of the respondents reported that they have analyzed and prepared information related to real estate management for top management to review on any scheduled basis (i.e., quarterly, semiannually, or annually). Approximately 47% prepared the information on an 'as necessary' basis only. Another 23% did not report at all. Gale and Case (1989) also find that less than half of the firms in their study (44%) have made any attempt to maintain current market value data on their real estate. Redman and Tanner (1991) find that many managers make their CRE purchasing decisions based on individual subjective measures rather than analytical methods. Apparently, surveys of corporate managers have revealed the curious ignorance of managers and lack of interest in relating their real property assets to overall business strategies (Veale, 1989).

On the other hand, the literature tends to support the view that leasing real estate is more favorable for the interest of the shareholders. Nourse (1994) finds that firms that lease tend to link their real estate strategy more closely to their overall corporate strategy. Veale (1989) finds that while only 1/3 of the firms surveyed maintain a separate management information system for the ongoing management and control of their real estate, roughly 2/3 maintain information on lease dates and commitments, identification of surplus properties, utilization and current capacity of existing properties as well as to track square-foot costs by facility, and evaluate the physical condition and performance of buildings. Allen, Rutherford and Springer (1993) find that there are positive abnormal returns after sales and leaseback announcements and suggest that real estate leasing decisions benefit corporate stockholders.⁹

In summary, the real estate management literature does not seem to support the value-enhancing role of CRE holdings. This leads us to naturally

⁹ One potential explanation that reconciles our argument with the findings of the better management of leased corporate real estate is that corporations that have better corporate governance tend to lease rather than purchase and hold real estate. The better corporate management teams in corporations with better governance typically keep good records of leased real estate.

conjecture an alternative hypothesis, namely, overinvestment in real estate is a subtle approach for management to expropriate corporate earnings.

3. Our Dataset and Conventional Determinants of Real Estate Holdings

Our initial sample is universal of all the firms for which complete data are simultaneously available on the following databases: Compustat Industrial Annual which provides accounting data for firms, Compustat Executive Compensation which provides CEO compensation structure related items, Blockholder dataset which provides information related to blockholders, and Compustat segment dataset which provides the reported number of business segments. To minimize the endogeneity problem in analyzing the impact of corporate governance and corporate liquidity on CRE holdings, we focus on the CRE holdings in the year 1998, and the corporate governance, liquidity and other characteristic variables over the period of 1995-97.

First, we follow common practices in the literature to exclude financial firms from the sample because they are subject to a different set of regulations, which may affect their corporate governance. We also exclude real estate development firms since our aim is to analyze the land and buildings owned by companies that are not primarily engaged in the real estate business. Firms with missing observations of any variable are also dropped. Consequently, we are left with 549 firms for our analysis. We name this sample as the 1998 sample because it is used for analyzing the CRE holdings in 1998. To establish the robustness of our results, we further trace those firms in the 1998 sample four years forward to build a new sample. With the same selection criteria, we find that 350 firms in the 1998 sample have explanatory variables available for the period of 1999-2001 and CRE holdings available for 2002. We label this new sample as the 2002 sample.

Now we turn to a description of the conventional factors which are important to CRE holdings, and how they are measured in the dataset that we employ. They include the growth opportunities, size, diversification of a firm's business segments, level of debt, industrial effect and the impact of an imperfect capital market. Appendix 1b provides a summary of the variables that we will employ.

3.1 Growth Opportunities

We hypothesize that firms with greater growth opportunities have more incentives to avoid cash shortage or financial distress. The demand for cash drives these firms to rent rather than own, which results in a smaller proportion of real estate in their total asset portfolio. In following the

literature, we employ the ratio of market to book value of equity (M/B) as a proxy for the growth opportunity of firms. A higher M/B ratio suggests that the market expects corporations to have better future earnings. This could be indicative of better growth opportunities.

We derive the market to book value by using fiscal year end stock price (data 199) multiplied by the total number of shares outstanding (data 25) over total shareholders' equity (data 216).

3.2 Size

Theories suggest that smaller firms have a greater propensity to lease than larger firms if there are significant non-convexities or indivisibilities associated with the use of certain fixed assets. For example, smaller firms may not need an entire unit of building. Also, smaller firms tend to be younger and may face greater uncertainty over their future needs in capital investment. Thus, leasing could avoid the incurring of transaction costs associated with resale. On the other hand, it is also suggested that owning is less costly than leasing for major companies due to the ability of large corporations to borrow at low rates (Whited, 1992; Fazzari and Petersen, 1993). However, there is presently no empirical agreement whether the size effect on the proportion of real estate to total assets is positive or negative.¹⁰ In our study, we employ the natural logarithm of sales (data 12) as the proxy for a firm's size.

3.3 Firm Focus

A popular explanation for corporations to hold real estate is its use in diversifying portfolios. Low correlation between real estate and other components in portfolios suggests that real estate can play a significant role in risk diversification in mixed-asset portfolios.¹¹ We expect that firms that focus on a small number of business lines may find holding real estate as a way to diversify their corporate risk. Thus, the number of business segments reported would be negatively related with the proportion of real estate in total assets. We use the number of reported business segments from the Compustat segment dataset as a measure of business focus.

¹⁰ For instance, Sharpe and Nguyen (1995) empirically find that the influence of firm size on owning is positive and significant. On the other hand, Redman and Tanner (1991) find that firms with assets valued less than \$50 million are more likely to own real estate than larger firms. With UK data, Liow (1995) suggests that over the sample period, it appeared that size would not affect the owning/leasing decision.

¹¹ The literature is too large to be reviewed here. Among others, see Quigley (2006) and the reference therein.

3.4 Level of Debt

It has been suggested since the 1980s that debt acts as a self-enforcing governance mechanism.¹² The idea is that debt can force managers to generate cash and/or reduce the cash flow available to them in order to meet obligations to repay interest and principal. Thus, this mitigates the potential agency costs of free cash flow. Hence, we expect to observe a negative correlation between CRE holdings and debt level. On the other hand, some scholars suggest that interest payments can be easily met, and hence doubt the usefulness of debt in mitigating the potential agency costs of free cash flow.¹³ In this view, no significant relationship is expected between CRE holdings and corporate leverage. In addition, since real estate can serve as collateral for borrowings, CRE holdings are expected to be positively associated with long term debt¹⁴. We employ the ratio of long term debt to total assets as a measure of the level of debt to control for the effect of corporate leverage on CRE holdings.

3.5 Industrial Effect

It is reasonable to conjecture that for different industries, the optimal proportion of property, plant and equipment (PPE) in asset portfolios should be different.¹⁵ For instance, power plants, bridges and railways constitute a high share of the total assets for utility and transportation firms. On the other hand, the demand of the service sector for real estate may be much smaller. Hence, it is important to control for industry differences in the study of CRE holdings. For our model, we will try to isolate the industrial effect by including industry dummies based on the one-digit Standard Industrial Classification (SIC) code.¹⁶

3.6 Imperfect Capital Market

It is well known that with a perfect capital market, there would be no association between internally generated cash flows and firm-level investment activities. In practice, capital markets are imperfect.¹⁷ Thus, firms that face high costs of external finance which arise from severe information asymmetry may find that leasing can economize on fixed capital costs. In the literature, it

¹² For instance, Jensen (1986, 1993) calls it the ‘control hypothesis’.

¹³ Empirically, the results seem to be mixed.

¹⁴ See Redman and Tanner (1991) and Liow (1995).

¹⁵ For instance, see Redman and Tanner (1991), Brounen and Eichholtz (2005).

¹⁶ According to the SIC code, firms can be generally classified into 7 categories. They are: 1. mining; 2. construction; 3. manufacturing; 4. services; 5. trade; 6. transportation, communication and utility; and 7. other.

¹⁷ For instance, see Fazzari, Hubbard and Petersen (1988), Myers (2003), Stein (2003) and the reference therein.

is generally agreed that firms that pay no cash dividends and generate low cash flow are likely to be among those that suffer most from information asymmetry.

3.6.1 Dividend Payout

Smith and Watts (1992) argue that dividends should be the lowest for firms with the greatest risk of facing the underinvestment problem. As a result, firms with low or no cash dividend payout may prefer to lease rather than own PPE in order to economize the cost of funding. Sharpe and Nguyen (1995) find that the total lease share of a firm that pays no cash dividends is about 25% higher than that of a dividend-paying firm. Hence, from the perspective of liquidity constraint, we expect that firms with no cash dividend payout will hold a smaller proportion of real estate to their total assets.

Alternatively, dividend policies very likely reflect corporate governance structure. According to La Porta et al. (2000), weak corporate governance leads to the reluctance of a firm to pay out cash dividends; the firm may well misuse the retained earnings to purchase rather than rent real estate. In this sense, we anticipate that firms with no cash dividend payout will keep a larger proportion of their assets in real estate.

To test the view that is more relevant, we include in our analysis, a dummy variable which is equal to one for non-dividend-paying firms and zero otherwise.

3.6.2 Cash Flow

Prior studies have repeatedly documented a positive relation between investment expenditure and cash flow. For instance, Sharpe and Nguyen (1995) find that the share of total annual fixed capital costs attributable to leases is substantially higher in cash-poor firms. Krishnan and Moyer (1994) find that firms with lower operating earnings are more likely to lease, thus suggesting the existence of financial constraint at the corporate level. Fazzari, Hubbard, and Petersen (1988) show that investment is constrained by current cash flow for U.S. manufacturing firms from the Value Line database. Myers and Majluf (1984) argue that if there is asymmetric information, firms would prefer internal funds (i.e., cash flow) to external finance that is information sensitive. Recent studies such as those by Brav et al. (2005) and Graham, Harvey and Rajgopal (2005) suggest that managers have strong incentive to maintain dividends at some “target ratio”. What would they do if they have some “windfall cash”? Investing in real estate could be one possibility. Riddick and Whited (2007) show that when a positive productivity shock causes both cash flow and the marginal product of capital to rise, firms will dissave and invest cash in capital goods including real estate assets that have become more productive, hence leading to a negative correlation between

savings and cash flow. Thus, we expect that firms with more cash flow will invest more in real estate.

On the other hand, cash flow can be “in excess”. Jensen (1986) suggests that if firms are left with too much cash flow, the management has incentive to use the cash flow in inefficient ways. Recently, researchers have found that firms with low growth opportunity and high cash flow tend to ‘waste’ cash flow in ways such as acquisitions (Lang, Stulz, and Walking, 1991; Hanson, 1992; Born and McWilliams, 1993; Doukas, 1995). Opler et al. (2001) find that companies with excess cash (measured by using balance sheet cash information) have higher capital expenditure and spend more on acquisitions, even when they appear to have poor investment opportunities (as measured by Tobin’s Q).

To empirically test these competing theories, we measure cash flow by operating income before depreciation (data13) minus interest expenses (data15), taxes (data16), preferred dividends (data19), and common dividends (data21). To eliminate any size effect, we normalize this measure by the book value of assets (data6)¹⁸.

4. Measuring Corporate Governance

Clearly, the literature on corporate governance is too large to be reviewed here. Due to the limitations in space, we will only provide a summary of some of the literature in Appendix 2. This section will thus briefly describe how different measures of corporate governance could be related to CRE holdings.

4.1 Effect of Corporate Governance Measures on Over-investment in PPE

Jensen and Meckling (1976) suggest that the separation of ownership and control gives managers the chance to waste corporate resources and cash flow on excess perquisites and negative net present value projects at the expense of shareholders. This view is largely verified by recent empirical studies such as those by La Porta et al. (1999, 2000, 2002) and Brav et al. (2005). Therefore, on top of the conventional determinants of CRE holdings, we would consider whether weaker corporate governance is associated with more CRE holdings. If such a relationship is established, our hypothesis that over-investment in real estate is an avenue for management to waste cash flow will have grounds. By following the corporate finance literature,¹⁹ we will consider several general categories of governance measures, including CEO ownership, outside blockholder ownership, CEO compensation sensitivity, board

¹⁸ We follow Lehn and Poulson (1989), Lang, Stulz, and Walking (1991) by doing so.

¹⁹ See surveys by Shleifer and Vishny (1997) and Gillan (2006).

composition and the problem of duality, all of which will be explained in more detail in the following.

4.2 Management Ownership

There is a large body of literature that supports the notion that managerial ownership of company stock shares can help to align the interests of managers with those of shareholders, that is, agency cost will be reduced.²⁰ Thus, with increased managerial ownership, managers are less likely to divert resources away from firm value maximization as they bear part of the costs of their actions. Therefore, one would expect a negative relationship between managerial ownership and real estate holdings. In our empirical test, we adopt CEO ownership as a proxy for management ownership. Data on CEO ownership are collected from the Compustat Industrial Annual and Compustat Executive Compensation datasets.

4.3 Outside Blockholder Ownership

Due to the well-known free rider problem, no shareholder who owns minority shares is willing to monitor managers. This is because shareholders bear all the costs of their monitoring activities while benefit from monitoring only in proportion to their shareholdings (Grossman and Hart, 1988). On the other hand, blockholders with claims to a large fraction of a firm's return, have a much stronger incentive to monitor managers. Consequently, managerial discretion is restricted to some extent and agency costs between managers and shareholders will be reduced (Shleifer and Vishny, 1986). In addition, an outside blockholder has arguably a different set of incentives than a shareholder who is the CEO of the firm. There are many studies that support the view that outsider ownership is positively related to corporate governance quality (Weisbach, 1988; Mehran, 1995; North, 2001). The Compustat Blockholder dataset provides information on the ownership of outside blockholders, which is the sum of the percentage of equity held by individual investors, institutional investors, and corporations who own at least 5% of the common stock of a company. We choose 5% (as many researchers do) because this ownership level triggers mandatory public filing under SEC regulations.

4.4 Executive Compensation Structure

The use of equity-based compensation in the form of stock and options has become increasingly popular in recent years (Murphy, 1999). The structure of executive compensation can be used to effectively align the interests of

²⁰ Among others, see McConnel and Servaes (1990), Mehran (1995), and Singh and Davidson (2003).

managers with those of shareholders. Previous research suggest that by tightly linking compensation to managers with firm performance motivates them to make more value-maximizing decisions (e.g. Holmstrom, 1979; Harris and Raviv, 1979; Grossman and Hart, 1983). For instance, Jensen and Murphy (1990a) suggest that equity-based rather than cash compensation gives managers the correct incentive to maximize firm value. Jensen and Murphy (1990b) also find a statistically significant relationship between level of pay (measured by changes in executive wealth) and performance (measured by changes in value). Mehran (1995) finds that firm performance is positively related to the percentage of executive compensation that is equity-based. Hall and Liebman (1998) suggest that a CEO's incentive to increase stock price is significantly generated from the movement of his/her option value instead of by flow compensation. Datta, Datta and Raman (2001), by studying executive compensation and corporate acquisition decisions, find that executive stock option grants provide effective and strong motivation for managers to make value-maximizing investment decisions. In this sense, we expect that more equity or option-based CEO compensation strengthens corporate governance and reduces CRE holdings.

On the other hand, some studies examine the CEO compensation structure from a different perspective. They suggest that the use of equity compensation will expose managers to more risk. This is because their level of remuneration is highly dependent on firm performance. As a result, risk-averse managers will choose to forgo some positive net present value projects if the projects are very risky. A study by Coles, Daniel and Naveen (2006) empirically suggests that higher CEO pay-performance sensitivity provides strong incentive to CEOs to reduce risky investments (R&D expenditures in their framework) and increase less risky investments (PPE investments in their framework). Thus, under this view, more equity or option-based CEO compensation increases CRE holdings.

We follow the previous practice²¹ in constructing a proxy for the proportion of equity-based compensation in the total compensation of CEOs.²² Specifically, we employ the ratio of total value of stock options granted (by using Black-Scholes) to total compensation which comprises the following items: salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (by using Black-Scholes), long-term incentive payouts, and all other total as a proxy of the total compensation of CEOs which is equity-based. These kinds of compensation-related information are from the Compustat Excomp dataset.

²¹ Mehran (1995), Datta, Datta and Raman (2001).

²² We choose only the total compensation of CEOs, but not other high ranking executives because of the limitations on data availability. Moreover, Core and Larcker (2002) suggest that non-CEO executives generally hold a substantially smaller amount of equity in their compensation than CEOs.

4.5 Board Composition

There is a growing body of evidence that outside directors (those who do not work for the company) are more independent of top management and thus better represent the interests of shareholders than inside directors. Jensen (1993) argues that outside directors have an incentive to act as effective monitors of management because they want to protect their reputation as independent and effective decision makers. There are many empirical studies on board composition and agency cost (Weisbach, 1988; Brickley, Coles and Terry, 1994; Rosenstein and Wyatt, 1997; Chen et al., 2006). Overall, empirical findings generally support the argument that outside directors are important and effective for monitoring management and thus reduce agency cost. In the current context, we will test whether the real estate holdings affected by the corporate board composition, which is measured by the ratio of the number of outsider directors (neither current nor past officers) relative to the total number of directors. Data on board composition are collected from proxy statements and/or annual reports of companies.

4.6 Duality

Jensen (1993) argues that CEOs should not have dual positions as also the COB because they may not be able to separate personal from shareholder interests. The issue of CEO duality has aroused considerable attention because the practice is frequently observed in many large firms and seems to exert a negative effect on firm performance (Kesner, Victor, & Lamont, 1986; Baliga et al., 1996; Simpson and Gleason, 1999). In our study, we include a dummy variable which takes a value of one if the CEO of a firm is also the COB and zero otherwise. We aim to examine whether the problem of duality will exacerbate the problem of overinvestment in CRE.

5. Revisiting Corporate Real Estate Holdings and Firm Returns

In this section, we will investigate the relationship between CRE and firm returns by following the methodologies in the existing literature, such as that from Deng and Gyourko (1999). This is a crucial step. As will be made clear, higher CRE holdings are not associated with higher returns to corporate shares. This naturally leads the analysis to other explanations of CRE holdings, which will be examined in the following sections. The analysis here mainly consists of two stages. The first stage follows the Fama-Macbeth approach to estimate Jensen's alpha. The regression model is specified as:

$$ERET_{it} = \alpha_i + \beta_i EMKT_t + \varepsilon_{it}$$

where the dependent variable, $ERET_{it}$, is the weekly excess return on the stock of firm i in period t . It is calculated as the difference between the company's weekly holding period return and the weekly T-bill return. The latter is derived from the 30-day T-bill return. $EMKT_t$ is the weekly excess return on the market portfolio which is measured as the difference between the weekly return on the Center for Research in Security Prices (CRSP) value-weighted market portfolio and the weekly T-bill return. Slope coefficient β_i measures the sensitivity of firm return to systematic risk. Constant term α_i is the idiosyncratic component of the monthly excess return. Error term ε_{it} follows the standard normal distribution. From this regression model, we can obtain the fitted values of α_i and β_i . In the statistical analysis, for the sake of checking robustness, we estimate this model for several different periods: we use weekly stock return data to estimate this model for the periods of 1995-1998, 1998-2002, and 1995-2002 respectively. Accordingly, we obtain fitted values of α_i based on these three different periods of time.

In the second stage, we examine the relationship between CRE holdings and the non-systematic or idiosyncratic component of firm returns α_i . Table 1 displays the various regression specifications. The dependent variable is Jensen's alpha for each firm. The central independent variable is the ratio of PPE to total assets. We control for industry dummies, firm size (the logarithm of sales), and β estimates. The regression results are quite strong and consistent: companies with *higher CRE* holdings tend to have *lower excess stock returns*.

To check the robustness, we vary the measure of the CRE holdings. We generate a dummy variable that takes a value of one if the firm's PPE/total asset ratio is above the sample median. This variable indicates a high concentration of real estate holdings. It also exhibits consistently negative and significant impacts on firm returns in various regressions. We also construct a dummy variable that takes a value of one if the firm's beta is below 0.9 which is roughly the average beta for commercial real estate companies in the U.S. (Deng and Gyourko, 1999). The principal result remains unchanged.

This exercise helps us to verify an intriguing phenomenon in corporate America: the concentration of CRE holdings is associated with lower returns to shareholders; real estate holdings cast negative effects on corporate value. It is then natural to ask *why* there exists such a negative relationship between the two, and *why* the shareholders would allow the managers to "over-accumulate" CRE in the first place. In the following, we attempt to shed light on this question from the perspective of corporate governance.

Table 1 Cross Sectional Data Regression of Alpha vs. PPE(net)/TA-Full Sample

	Alpha98	Alpha02	Alpha full	Alpha98	Alpha02	Alpha full
PPE/Total Assets	-0.0014 ^b (0.00070)	-0.0013 ^a (0.00048)	-0.00092 ^b (0.00037)	-0.0014 ^b (0.00070)	-0.0013 ^a (0.00048)	-0.00094 ^b (0.00037)
Log of Sales	0.000073 (0.000098)	-0.000053 (0.000063)	-0.000022 (0.000052)	0.000069 (0.000098)	-0.000063 (0.000064)	-0.000032 (0.000052)
Beta				0.00029 (0.00029)	0.0012 ^b (0.00049)	-0.00076 ^a (0.00016)
# of obs.	549	549	549	549	549	549
Adjusted R ²	0.0078	0.073	0.071	0.0080	0.059	0.047

Note: Industry specific fixed effects are estimated for all models, but they are not reported. Superscripts a, b, c, and d indicate statistical significance at the 1%, 5%, 10%, and 15% levels respectively.

(Continued...)

(Table 1 Continued)

	Alpha98	Alpha02	Alpha full	Alpha98	Alpha02	Alpha full
PPE/Total Assets	-0.0014 ^b (0.00070)	-0.0013 ^a (0.00048)	-0.00094 ^b (0.00037)			
PPE/Total Assets>50%				-0.00059 ^b (0.00027)	-0.00049 ^a (0.00018)	-0.00033 ^b (0.00015)
Log of Sales	0.000069 (0.000098)	-0.000063 (0.000064)	-0.000032 (0.000052)	0.000081 (0.000097)	-0.000053 (0.000064)	-0.000025 (0.000052)
Beta<0.9	0.00029 (0.00029)	-0.0011 ^a (0.00022)	-0.00076 ^a (0.00016)	0.00028 (0.00029)	-0.0010 ^a (0.00022)	-0.00077 ^a (0.00017)
# of obs.	549	549	549	549	549	549
Adjusted R ²	0.0080	0.059	0.047	0.0082	0.056	0.045

Note: PPE/Total Assets>50% is a dummy variable that takes value of one if the ratio PPE/total assets for a company is above sample median and zero otherwise. Beta<0.9 is a dummy variable that takes a value of one if the beta of a company is below 0.9, which is roughly the average level of beta in the commercial real estate industry, and takes a value of zero otherwise. Industry specific fixed effects are estimated for all models, but they are not reported. Superscripts a, b, c, and d indicate statistical significance at the 1%, 5%, 10%, and 15% levels respectively.

6. Empirical Analysis of Relationship between Corporate Governance and Real Estate Holdings

The previous section suggested that CRE holdings may not be good news for shareholders. It begs the question of why CRE is purchased in the first place. There are many possibilities and this section attempts to shed light on this issue. Specifically, we estimate a cross-sectional econometric model by using the three-year average value of each of the firm characteristics (except corporate governance related variables).²³ For the 1998 sample, we measure real estate holdings (the dependent variable) in 1998 and the explanatory variables over the “previous period”, 1995-1997. The use of past values also reduces the probability of reverse causality, i.e., the observed relations reflect the effects of real estate holdings on firm-specific factors.²⁴ Corporate governance variables (such as CEO ownership, CEO compensation structure, outside blockholder ownership and characteristics of board structure of firms) are also measured in the year prior to 1998, i.e., they take the value of the year 1995. Empirical studies suggest that corporate governance-related variables are rather stable over a certain period of time (Shleifer and Vishny, 1986; Barclay and Holderness, 1989; Denis and Sarin, 1999). We repeat the same analysis in the 1998 sample for the 2002 sample by employing the same econometric structure (please refer to Table 2 for comparison purposes).

Table 2 Comparison of 1998 and 2002 Samples

	1998 sample	2002 sample
Dependent variable	1998	2002
Financing variables	Average of 1995-1997	Average of 1999 to 2001
Corporate governance variables	1995	1999

6.1 Summary Statistics

The summary statistics in Table 3 present an overview of the sample characteristics of real estate holdings and corporate governance variables. The mean PPE ratio of the 1998 sample is 0.38 and the median is 0.32. The figures decrease to 0.34 and 0.28 in the 2002 sample respectively. The average CEO ownership for the 1998 sample is 2.2% and the median is 0.26%. For the 2002 sample, the corresponding figures are 2% and 0.27%. In the 1998 sample, there are 71.7% of firms with CEO ownership less than 1%; 88.9% of firms have CEO ownership less than 5%. In the 2002 sample, the corresponding figures are 72.9% and 90.3% respectively. Moreover, there are 69% and 80% of firms in the 1998 and 2002 samples respectively that contain outside blockholders. The median value of the ownership of the outside blockholders

²³ In following Ozkan and Ozkan (2004), we do this to mitigate problems that might arise due to short-term fluctuations or extreme values in any particular year.

²⁴ See Rajan and Zingales (1995), and Ozkan and Ozkan (2004), for similar methodologies.

is 18.9% for the 1998 sample while the figure increases to 19.9% in the 2002 sample. The median is 17.26% for the 1998 sample and 18.3% for the 2002 sample.

In terms of CEO compensation structure, the mean and median of the ratio of the stock option value to total compensation are 25.9% and 20.4% respectively for the 1998 sample. The corresponding figures for the 2002 sample are 37.5% and 37.6%. Our figures are very close to those found by Core, Guay, and Verrecchia (2003), who report an average ratio of 30.3% during the period of 1993-98. On average, boards of firms comprise 10.4 directors in the 1998 sample and 10.2 directors in the 2002 sample, while the median is 10 directors in both the 1998 and the 2002 samples. The average proportion of outsiders on the board is 0.73 while the median is 0.75 in the 1998 sample. In the 2002 sample, the average slightly increases to 0.77, while the median also increases to 0.8. That is, for an average firm in the 1998 sample, the number of directors who are current or past executive officers is 2.8, whereas the number of directors who are not current or past executive officers is 7.6. The corresponding figures for the 2002 sample are 2.5 and 7.7 respectively. For the problem of duality, 26.4% and 25.6% of the firms in the 1998 and 2002 samples respectively have the positions of CEO and COB held by different people.

6.2 Regression Results

In Table 4, we report the regression results for the model that includes the conventional and corporate governance determinants of CRE holdings. The conventional determinants include cash flow, firm size, market-to-book ratio, number of business segments, no dividend dummy, and long-term debt. The corporate governance variables include CEO ownership, CEO compensation sensitivity, ownership by outside blockholders and two variables related to board characteristics, namely (OUTSIDER/DIR) which gives the fraction of executive directors on the board of directors, and a dummy variable (CEO_COB) that takes a value of one if the firm's CEO and COB are the same individual.

In general, the estimated coefficients deliver the predicted signs. The results are consistent with the theory that under imperfect capital markets, firms that face high costs of external finance find that leasing can economize on fixed capital costs. Two proxy variables for external financing costs display expected results. Cash flow exerts a significantly positive impact on CRE holdings.²⁵ The estimated coefficients are significant at the 1% level in both the 1998 and the 2002 samples. In addition, the coefficients for the 'no dividend' dummy are negative and significant at the 1% level in both periods. The result supports that firms with no dividend payout (which may be more cash-constrained) hold less property in their asset portfolios.

²⁵ For instance, Redman and Tanner (1991) find that 62.8% of the correspondents of their survey employ cash flow from operations as the method of real estate financing.

Table 3 Summary Statistics-Full Sample

Summary statistics for variables explaining 1998PPE/TA

Remarks: Number in () is the summary statistics for variables that explain 2002 PPE/TA

	Mean	S.D.	Max	Min	25 th percentile	50 th percentile	75 th percentile
PPE/TA	0.375 (0.337)	0.222 (0.220)	0.933 (0.946)	0.011 (0.007)	0.197 (0.166)	0.324 (0.283)	0.548 (0.485)
Free cash flow	0.093 (0.086)	0.054 (0.053)	0.287 (0.288)	-0.323 (-0.160)	0.058 (0.054)	0.090 (0.083)	0.124 (0.113)
M/B	3.339 (4.100)	3.210 (5.981)	35.214 (69.681)	0.371 (0.164)	1.767 (1.469)	2.512 (2.327)	3.757 (4.229)
Business segments	2.02 (3.31)	1.40 (1.94)	10 (10)	1 (1)	1 (1)	1 (3)	3 (4)
Sales (\$MM)	4776 (5802)	9434 (11045)	105481 (121275)	6.727 (101.9)	714 (867)	1626 (2035)	4658 (5797)
Ln Sales	7.549 (7.761)	1.329 (1.303)	11.57 (11.71)	1.906 (4.624)	6.571 (6.765)	7.394 (7.618)	8.446 (8.665)
LT DEBT	0.195 (0.221)	0.124 (0.139)	0.630 (0.664)	0 (0)	0.097 (0.126)	0.192 (0.228)	0.284 (0.311)
CEO OWN (%)	2.19 (1.98)	5.62 (5.23)	53.6 (39.6)	0 (0)	0.080 (0.084)	0.258 (0.266)	1.216 (1.002)

(Continued...)

(Table 3 Continued)

	Mean	S.D.	Max	Min	25 th percentile	50 th percentile	75 th percentile
CEO	0.259	0.251	0.964	0	0	0.204	0.419
COMP	(0.375)	(0.281)	(0.999)	(0)	(0.129)	(0.376)	(0.578)
OUTBLK	18.9	11.5	65.4	5	10.4	17.26	25.2
OWN (%)	(19.9)	(12.2)	(79.5)	(5)	(10.6)	(18.3)	(26.5)
Board composition	0.727	0.159	1	0	0.667	0.75	0.833
	(0.771)	(0.117)	(1)	(0)	(0.714)	(0.8)	(0.846)

Note: PPE/TA is the ratio of PPE to total asset, both in net book value. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. LT DEBT is long term debt scaled by total assets. No dividend dummy equal to 1 if the firm paid no dividend in year 1997(2001) and is 0 otherwise. CEO OWN is the percentage of shares owned by chief executive officer. CEO COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

Table 4 Cross Sectional Data Regression of PPE(net)/TA-Full Sample

	Expected sign		
Year of PPE(net)/TA	1998	2002	
Year of independent variables	Average of 95-97*	Average of 99-01*	
Year of corp gov variables	1995	1999	
Sample size	549	350	
M/B	-0.011 <i>a</i> (0.003)	-0.004 <i>a</i> (0.001)	-
Size	-0.009 (0.007)	-0.003 (0.007)	?
Business segments	-0.009 <i>c</i> (0.005)	-0.014 <i>a</i> (0.005)	-
LT DEBT	0.525 <i>a</i> (0.074)	0.390 <i>a</i> (0.071)	?
Cash flow	1.045 <i>a</i> (0.211)	0.769 <i>a</i> (0.166)	+
No dividend	-0.089 <i>a</i> (0.018)	-0.067 <i>a</i> (0.021)	-
CEO OWN	-0.002 (0.001)	-0.003 <i>c</i> (0.002)	-
OUTBLK OWN	-0.002 <i>a</i> (0.001)	-0.001 <i>d</i> (0.001)	-

(Continued...)

(Table 4 Continued)

	Expected sign		
CEO COMP	-0.018 (0.033)	-0.029 (0.034)	-
Board composition	0.028 (0.051)	0.001 (0.086)	-
CEO_CHR	0.024 <i>d</i> (0.017)	0.008 (0.020)	+
R-sq.	0.461	0.489	

Note: The dependent variable is the ratio of PPE to total asset, both in net book value. Dependent variables are cash flow, size, M/B, business segments, LT DEBT, no dividend, CEO OWN, CEO COMP, OUTBLK OWN, board composition and CEO_CHR. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. LT DEBT is long term debt scaled by total assets. No dividend dummy equal to 1 if the firm paid no dividend in year 1997(2001) and 0 otherwise. CEO OWN is the percentage of shares owned by chief executive officer. CEO COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

Similarly, consistent with the theoretical prediction, firms with better growth opportunities (measured by a higher market-to-book value ratio) invest a relatively smaller amount on real estate. In both the 1998 and the 2002 samples, the relationship between growth opportunities and real estate holdings is negative and significant at the 1% level. In addition, the estimated coefficients of the number of segments are negative in sign and significant at the 10% level in the 1998 sample and the 1% level in the 2002 sample. This lends support to the argument that the advantage of corporate asset diversification by holding real estate is relatively minor for well-diversified firms that run many lines of businesses. On the other hand, we fail to find any evidence to support the view that larger firms have a higher propensity to own properties. The estimated coefficients for Size are *insignificant* in both periods. The coefficient of leverage (long term debt/total assets) is positive and significant in both samples. This may be because firms that hold excessive real estate come with a large amount of mortgage loans (Redman and Tanner, 1991; Liow, 1995). Our findings on the relationship between long-term debt and CRE are consistent with those of previous empirical work.

Next, we turn to perhaps a more important issue, i.e., how corporate governance affects CRE holdings in U.S. corporations. We detect evidence that show that corporate governance strength is negatively related to CRE holdings. The coefficient of CEO ownership is negative and significant at the 10% level in the 2002 sample and negative but insignificant for the 1998 sample. This suggests that the level of CEO ownership may exert an influence on CRE holding decisions of U.S. firms. This is consistent with the view that a better alignment of the interests of CEOs and shareholders can mitigate the problem of over-investment in real estate.

The coefficients of ownership by outside blockholders are negative and significant at the 1% and 15% levels in the 1998 and 2002 samples respectively. The result corroborates the view that outside block shareholders contribute to monitoring corporate management. Since outside blockholders are not involved in the daily operations of the firm, they can rarely generate private benefits from a firm's decision, and thus will not support inefficient investment. This finding confirms that governance structure affects the decisions of firms on CRE holdings.

We cannot find any significant relation between board composition and CRE holdings in both the 1998 and 2002 samples. This may arise from the fact that the variation in the proportion of outsiders on the board in our sample is too small. In our sample, only around 5% of the firms have board of directors in which current and past executive officers account for more than half of the board members. In more than 75% of our sample firms, outsiders compose of more than 2/3 of their board.²⁶

²⁶ Another possibility is that some of the "outside directors" are not "outside enough". We, however, do not have a better measure to determine this possibility.

The dummy variable for duality, i.e., the same individual holds the position of chief executive officer and the COB, is significant at the 15% level with a positive sign in the 1998 sample. A positive sign is exhibited in the 2002 sample, but the estimated coefficient is not statistically significant. The results can be interpreted as follows: when a corporation concentrates management power and board power in an individual, this would probably lower the effectiveness of corporate governance mechanisms. Thus, it is easier for management under such 'loose' control mechanisms to waste cash flow by over-investing in negative net present value projects, such as purchasing real estate properties. The coefficients of CEO compensation incentive are negative, but insignificant in both samples.

Overall, we find that some of the corporate governance indicators widely used in the literature display statistically significant and negative impacts on CRE holdings, thus suggesting that a higher level of CRE investment and holdings is likely to be a consequence of weaker corporate governance.

7. Corporate Governance Changes and Increment in Real Estate Holdings

So far, our study has focused on a cross-sectional analysis for the stock of real estate holdings in the years 1998 and 2002 separately. A natural question to ask is whether real estate holdings will change significantly once corporate governance and other firm characteristics have changed. To put it differently, what determines the flow of real estate acquisition or sales? We conjecture that the changes in corporate governance structure, liquidity constraint and other firm characteristics may induce companies to purchase or sell a substantial amount of properties. As the changes in real estate holdings may well be caused by some natural variation in real estate stock value such as depreciation, we pay particular attention to how the changes in firm characteristics affect the likelihood of incurring substantial changes in real estate holdings. The rationale for this analysis lies in that a large degree of changes in real estate holdings is more likely to be caused by significant changes in corporate policies on real estate investments rather than by natural adjustment of real estate holdings.

To verify this conjecture, we first match the companies in the 1998 sample with those in the 2002 sample, and obtain 322 firms that are covered in both samples with complete data. We then calculate the *change* in real estate holdings, i.e., the difference in the ratio of the PPE/total assets, over the four years. The majority of the sample companies (around 63%) experience a decline in real estate holdings in the period of 1998-2002. About 20% of the sample companies witness an increase of more than 4.6% in the ratio of PPE/total assets, and about 10% of the sample firms register an increment of over 5.1% in this real estate holding ratio. Based on the distribution

characteristics of the increment in real estate holdings for our sample firms, we define a dummy variable for large increment in real estate holdings based on three alternative criteria: positive change (>0), more than 4.6% positive change, and more than 5.1% positive change. The dummy variable takes a value of one if the four-year growth in real estate holdings is larger than 0, 4.6%, and 5.1% respectively. To look at how the changes in firm characteristics affect those in CRE holdings, we generate explanatory variables that reflect the changes in cash flow, company size, market-to-book ratio, number of business segments, corporate leverage (long-term debt), CEO ownership, CEO compensation structure, outside blockholder ownership, board composition and duality of the positions of CEO and COB.²⁷

Table 5 presents the logistic regressions where the dependent variable (dummy variable that corresponds to a large increment in CRE holdings) is regressed on a host of explanatory variables. We see that an increase in cash flow leads to a lower level of real estate holdings in some of the regressions. Other things being equal, an *increase in firm size* actually causes the ratio of CRE holdings to *decline*. Perhaps as the firm size increases, firms tend to have more than one establishment, but may not commit to purchasing all of the operation sites. Hence, the ratio of renting would actually increase. The changes in the market-to-book ratio, long-term debt and the number of business segments produce no significant impact on the increment in real estate holdings.

In terms of corporate governance measures, an increase in the CEO ownership share *reduces* the probability of incurring a large increment in CRE holdings, and the effect is statistically significant when the dependent variable is a positive change in real estate holdings. Similarly, a change from the CEO-COB duality to no duality, a signal of improvement in corporate governance, *decreases* the likelihood of firms in experiencing a large increment in corporate property. These results are consistent with our claim that better corporate governance leads to lower chances of increasing CRE holdings. Other corporate governance indicators are mostly insignificant. Change in board composition (i.e., increases in the proportion of outside directors on the board) even shows positive and significant effects in one regression.

One may object that the use of differences in the dependent and independent variables to measure changes may suffer some bias due to the existence of scale effects. To correct this potential issue, we use a four-year growth rate in the dependent and independent variables to measure increment. For instance, the growth rate of CRE holdings for firm i is calculated as $(\text{PPE}/\text{total assets for year 2002} - \text{PPE}/\text{total assets for year 1998})/(\text{PPE}/\text{total assets for year 1998})$. In corresponding to the above-mentioned case of using difference in

²⁷ We also examine the effects of changes in dividend issuance status on the changes in real estate holdings. However, dividend issuance status does not have enough time-series and cross-section variation so that it is often dropped from regressions.

the variables, about 63% of the sample companies have a decrease in real estate holdings in the period of 1998-2002. Around 20% of the sample companies register a growth rate of more than 10% in property holdings; and about 10% of the sample firms record a growth rate of over 20% in real estate holdings. Therefore, we define a dummy variable for a large growth in real estate holdings based on three alternative criteria: positive change (>0), more than 10% positive growth, and more than 20% positive growth. The dummy variable takes a value of one if the four-year growth in real estate holdings is larger than 0, 10%, and 20% respectively.

Table 6 presents the logistic regressions based on the growth rates in property holdings, corporate governance, financial constraint and other control variables.²⁸ As these variables have some observations in taking a value of zero, the calculation of four-year growth rates leads to a smaller sample size of 161 firms. The results in Table 6 are consistent with those in Table 5. An increase in cash flow leads to a higher level of real estate holdings in some of the regressions. An increase in firm size actually causes the real estate holdings to *decline*. The growth rates in the market-to-book ratio and the number of business segments produce no significant impact on the increment in real estate holdings.

The corporate governance measures produce some significant results. An increase in CEO ownership share *reduces* the probability of incurring a large increment in CRE holdings. Its estimated coefficient is statistically significant when the dependent variable is more than 10% and 20% growth in real estate holdings. Similarly, an increase of the equity-based option value in CEO compensation *reduces* the likelihood of having a large increment in CRE holdings. Its estimated coefficients are significant when the dependent variable is positive or there are more than 10% positive changes in real estate holdings. There is also some evidence that a change from CEO-COB duality to no duality *reduces* the likelihood of having more than 20% growth in real estate holdings. These results are consistent with our claim that better corporate governance lead to lower chances of increasing CRE holdings. Other corporate governance measures are mostly insignificant. Change in board composition even shows positive and significant effects in one regression.

In summary, our analysis in this section provides some further evidence on how improved corporate governance depresses CRE holdings.²⁹

²⁸ The dummy variables of changes in duality are constructed as before.

²⁹ Taking into consideration the possibility that corporate governance variables might show relatively small variations over a short period of time, we also tried to conduct regressions with variant specifications. For instance, the explanatory variables include the changes in the accounting variables and the levels of the corporate governance variables by taking the value of the initial year (1998). The results are reported in Appendix 3. The corporate governance variables produce much less statistically significant estimated coefficients.

Table 5 Logistic Model Regressions of the Change in PPE(net)/TA on the Changes in Liquidity and Corporate Governance Variables - Full Sample

Years of PPE(net)/TA change	1998-2002	1998-2002	1998-2002
Dependent variable	Dummy =1 if change>0	Dummy =1 if change > 4.6% (about 20% of firms)	Dummy=1 if change > 5.1% (about 10% of firms)
Sample size	322	322	322
Change in M/B	0.00634 (0.0317)	0.0483 (0.0342)	0.0158 (0.0382)
Change in size	-0.557 ^d (0.375)	-0.157 (0.407)	-0.977 ^c (0.548)
Change in business segments	-0.0753 (0.0872)	0.151 (0.113)	-0.121 (0.134)
Change in LT DEBT	-0.104 (1.339)	0.320 (1.457)	0.598 (2.181)
Change in cash flow	-1.0634 (2.908)	-5.730 ^c (3.183)	0.679 (3.887)
Change in CEO OWN	-0.0805 ^c (0.0437)	-0.0385 (0.0344)	-0.0560 (0.0402)
Change in OUTBLK OWN	0.0141 (0.00986)	0.00096 (0.011)	0.00020 (0.0134)
Change in CEO COMP	0.219 (0.443)	0.520 (0.541)	0.135 (0.717)

(Continued...)

(Table 5 Continued)

Years of PPE(net)/TA change	1998-2002	1998-2002	1998-2002
Change in board Composition	1.468 ^c (0.782)	0.763 (0.855)	-0.992 (0.953)
Change in duality (from no to yes)	-0.483 (0.361)	-0.151 (0.403)	-0.624 (0.583)
Change in duality (from yes to no)	-0.607 ^d (0.391)	-0.852 ^c (0.501)	-0.903 ^d (0.593)
Log pseudo likelihood	-201.863	-155.94	-113.744
Pseudo R-sq.	0.0434	0.0372	0.0431

Note: The dependent variable is dummy variable that indicates changes in corporate real estate holdings which meet certain criteria, that is, changes in the ratio of PPE to total asset, both in net book value, are larger than 0, 4.6% and 5.1% respectively. Independent variables are four-year differences in cash flow, size, M/B, business segments, long-term debt, CEO ownership, equity-based CEO compensation, outside blockholder ownership, board composition and CEO_COB duality. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. Long-term debt is long term debt scaled by total assets. CEO OWN is the percentage of shares owned by chief executive officer. CEO COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

Table 6 Logistic Model Regressions of the Growth Rate in PPE(net)/TA on the Growth Rates in Liquidity and Corporate Governance Variables --- Full Sample

Years of PPE(net)/TA change	1998-2002	1998-2002	1998-2002
Dependent variable	Dummy =1 if growth rate>0	Dummy =1 if growth rate > 10%	Dummy=1 if growth rate > 20%
Sample size	161	161	161
Growth in M/B	-0.308 (0.425)	-0.0547 (0.203)	-0.535 (0.515)
Growth in size	-3.892 (2.965)	-9.468 ^b (4.323)	-15.571 ^a (5.141)
Growth in business segments	0.0573 (0.137)	-0.0173 (0.0631)	0.0132 (0.265)
Growth in LT DEBT	0.0196 (0.0367)	0.0172 (0.0631)	0.0809 ^b (0.0327)
Growth in cash flow	0.189 (0.221)	0.0739 ^a (0.0265)	-0.0100 (0.0234)
Growth in CEO OWN	-0.00202 (0.0291)	-0.431 ^a (0.157)	-0.476 ^c (0.268)
Growth in OUTBLK OWN	0.174 (0.120)	0.0911 (0.155)	0.174 (0.197)
Growth in CEO COMP	-0.186 ^c (0.107)	-0.310 ^b (0.149)	-0.265 ^d (0.183)

(Continued...)

(Table 6 Continued)

Years of PPE(net)/TA change	1998-2002	1998-2002	1998-2002
Change in board composition	0.00309 (0.167)	0.647 ^b (0.277)	-0.0189 (0.125)
Change in duality (from no to yes)	-0.552 (0.487)	-0.701 (0.774)	-1.749 (1.393)
Change in duality (from yes to no)	-0.145 (0.538)	-0.268 (0.757)	-2.317 ^d (1.463)
Log pseudo likelihood	-102.038	-71.565	-40.593
Pseudo R-sq.	0.0531	0.151	0.221

Note: The dependent variable is dummy variable that indicates growth rates in corporate real estate holdings which meet the stated criteria, that is, growth rates in the ratio of PPE to total asset, both in net book value, are larger than 0, 10% and 20% respectively. Independent variables are four-year growth rates in cash flow, size, M/B, business segments, long-term debt, CEO ownership, equity-based CEO compensation, outside blockholder ownership, board composition and CEO_COB duality. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. Long-term debt is long term debt scaled by total assets. CEO_OWN is the percentage of shares owned by chief executive officer. CEO_COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK_OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

8. Robustness Check

8.1 Full Sample Splitting

As we mentioned in the previous section, the ‘optimal’ level of CRE holdings across industries should be different based on the specific needs of their industries. Researchers suggest that the CRE ratio exhibits very large variations across industries (Redman and Tanner, 1991; Nourse and Roulac, 1993; Brounen and Eichholtz, 2005). Our main objective in this section is to check whether the factors that are shown to be significant in determining CRE in the full sample behave the same way for industries of a different nature. We will split the full sample into two sub-samples based on the nature of different industries. One sub-sample includes the mineral, construction and manufacturing (MCM) sectors. The other sub-sample includes the trade, services and other (TSO) sectors.³⁰ Clearly, the production process of the MCM sectors often requires specific physical assets, e.g. factory and production lines. On the other hand, there is less need for specific physical assets for firms engaged in the TSO sectors. Tables 7 and 8 provide a description of the summary statistics.

8.2 Regression Results

In Table 9, we report the regression results for the MCM and TSO sub-samples³¹. Firms with low cash flow, no dividend payout and good growth opportunities tend to hold a small amount of CRE in their asset portfolio regardless whether they are in the MCM or TSO sectors. Moreover, regardless whether it is the MCM or TSO sectors, the CRE holdings appear to be associated with long-term debt ratio. In addition, firms in the TSO sectors hold a smaller amount of CRE if their business is well-diversified by operating in several business lines. On the other hand, this sort of pattern cannot be observed in the MCM sectors.

For corporate governance measures, CEO ownership tends to play a more important role in mitigating the problem of over-investment in CRE in the MCM sectors. Such a role is performed by outside blockholders in the TSO sectors. For the MCM sectors, we can also observe a significantly negative impact of CEO compensation incentive and outsider blockholder ownership on real estate holdings in the 2002 and the 1998 samples, respectively. In addition, a significantly positive coefficient for the duality dummy (CEO=chairman) can be observed in the 1998 sample in the MCM sectors.

³⁰ The reason for excluding the transportation, communication and utility sectors will be explained in the appendix.

³¹ We included the mineral and construction sector dummies in MCM, and trade and other sector dummies in TSO.

Table 7 Summary statistics- Mineral, Construction and Manufacturing

Summary statistics for variables that explain 1998PPE/TA

Remarks: Number in () is the summary statistics for variables that explain 2002 PPE/TA

	Mean	S.D.	Max	Min	25 th percentile	50 th percentile	75 th percentile
PPE/TA	0.338 (0.301)	0.186 (0.189)	0.933 (0.946)	0.011 (0.007)	0.196 (0.164)	0.305 (0.267)	0.427 (0.366)
LT DEBT	0.72 (0.210)	0.114 (0.131)	0.630 (0.634)	0 (0)	0.085 (0.110)	0.161 (0.208)	0.253 (0.301)
Free cash flow	0.101 (0.090)	0.055 (0.051)	0.287 (0.282)	-0.323 (-0.159)	0.070 (0.064)	0.098 (0.088)	0.128 (0.115)
M/B	3.676 (4.267)	3.658 (5.374)	35.214 (40.559)	0.371 (0.164)	2.036 (1.588)	2.722 (2.485)	4.105 (4.350)
Business segments	2.06 (3.42)	1.36 (1.77)	8 (10)	1 (1)	1 (2)	2 (3)	3 (4)
Sales (\$MM)	4323 (5036)	7432 (7849)	64765 (55743)	6.7 (102)	700 (842)	1603 (1820)	4171 (5410)
Ln Sales	7.486 (7.672)	1.333 (1.298)	11.08 (10.93)	1.906 (4.624)	6.551 (6.735)	7.380 (7.506)	8.336 (8.596)
CEO OWN (%)	2.227 (1.823)	5.677 (4.777)	53.6 (37.1)	0 (0)	0.101 (0.084)	0.291 (0.259)	1.360 (0.939)

(Continued...)

(Table 7 Continued)

	Mean	S.D.	Max	Min	25 th percentile	50 th percentile	75 th percentile
CEO COMP	0.272 (0.400)	0.242 (0.269)	0.964 (0.985)	0 (0)	0.047 (0.206)	0.227 (0.394)	0.442 (0.591)
OUTBLK OWN (%)	20.1 (19.4)	11.5 (12.6)	64.2 (79.5)	5 (5)	11.3 (10)	17. (16.83)	27.0 (25.8)
Board composi- tion	0.723 (0.766)	0.166 (0.120)	1 (1)	0 (0)	0.667 (0.714)	0.75 (0.8)	0.833 (0.833)

Note: PPE/TA is the ratio of PPE to total asset, both in net book value. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. LT DEBT is long term debt scaled by total assets. No dividend dummy equal to 1 if the firm paid no dividend in year 1997(2001) and 0 otherwise. CEO OWN is the percentage of shares owned by chief executive officer. CEO COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

Table 8 Summary statistics-Trade, Services and Other

Summary statistics for variables that explain 1998 PPE/TA

Remarks: Number in () is the summary statistics for variables that explain 2002 PPE/TA

	Mean	S.D.	Max	Min	25 th percentile	50 th percentile	75 th percentile
PPE/TA	0.318 (0.317)	0.243 (0.248)	0.917 (0.932)	0.017 (0.022)	0.127 (0.111)	0.239 (0.263)	0.469 (0.463)
LT DEBT	0.195 (0.218)	0.136 (0.163)	0.529 (0.664)	0 (0)	0.073 (0.080)	0.192 (0.211)	0.270 (0.314)
Free cash flow	0.089 (0.090)	0.052 (0.060)	0.258 (0.288)	-0.020 (-0.069)	0.052 (0.050)	0.084 (0.082)	0.115 (0.118)
M/B	3.250 (4.702)	2.395 (8.264)	13.174 (69.681)	0.488 (0.223)	1.923 (1.408)	2.531 (2.377)	3.774 (5.420)
Business segments	1.680 (2.759)	1.350 (2.139)	10 (10)	1 (1)	1 (1)	1 (2)	2 (4)
Sales (\$MM)	6345 (8948)	14183 (18030)	105481 (121275)	207 (320)	711 (1198)	1799 (2503)	6346 (8630)
Ln Sales	7.717 (8.099)	1.358 (1.347)	11.57 (11.71)	5.333 (5.767)	6.567 (7.088)	7.495 (7.825)	8.755 (9.062)
CEO OWN (%)	2.963 (3.058)	6.348 (6.981)	43.872 (39.604)	0 (0.002)	0.124 (0.120)	0.459 (0.456)	2.014 (1.363)

(Continued...)

(Table 8 Continued)

	Mean	S.D.	Max	Min	25 th percentile	50 th percentile	75 th percentile
CEO COMP	0.286 (0.347)	0.284 (0.323)	0.948 (0.999)	0 (0)	0 (0)	0.218 (0.323)	0.464 (0.598)
OUTBLK	18.3 (21.1)	11.6 (11.3)	65.4 (59.6)	5 (5.1)	10.5 (13.1)	16.8 (19.8)	22.6 (26.6)
Board composition	0.695 (0.761)	0.149 (0.122)	0.929 (0.952)	0.1 (0.375)	0.615 (0.696)	0.714 (0.778)	0.786 (0.866)

Note: PPE/TA is the ratio of PPE to total asset, both in net book value. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. LT DEBT is long term debt scaled by total assets. No dividend dummy equal to 1 if the firm paid no dividend in year 1997(2001) and 0 otherwise. CEO OWN is the percentage of shares owned by chief executive officer. CEO COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

Table 9 Regression of PPE(net)/TA-Split into MCM and TSO

	Mineral- construction- manufacturing		Trade- services, other	
	98	02	98	02
Year of PPE(net)/TA Year of independent variables	Average of 95-97*	Average of 99-01*	Average of 95-97*	Average of 99-01*
Year of corp gov variables	1995	1999	1995	1999
Sample size	351	230	122	83
M/B	-0.007 a (0.002)	-0.003 b (0.001)	-0.036 a (0.014)	-0.011 a (0.002)
Size	-0.008 (0.008)	-0.003 (0.008)	0.000 (0.016)	-0.008 (0.014)
Business segments	-0.000 (0.007)	0.004 (0.006)	-0.040 a (0.012)	-0.060 a (0.010)
LT DEBT	0.413 a (0.080)	0.355 a (0.078)	0.689 a (0.148)	0.662 a (0.134)
Cash flow	0.831 a (0.222)	0.498 a (0.172)	2.213 a (0.571)	2.086 a (0.411)
No dividend	-0.087 a (0.021)	-0.062 a (0.023)	-0.077 b (0.038)	-0.062 (0.047)
CEO OWN	-0.002 c (0.001)	-0.004 c (0.002)	0.000 (0.003)	-0.003 (0.003)

(Continued...)

(Table 9 Continued)

	Mineral- construction- manufacturing		Trade- services, other	
OUTBLK OWN	-0.001 b (0.001)	-0.001 (0.001)	-0.004 b (0.002)	-0.007 a (0.002)
CEO COMP	-0.016 (0.038)	-0.068 c (0.040)	-0.037 (0.067)	0.018 (0.060)
Board composition	0.003 (0.061)	-0.119 (0.086)	0.026 (0.119)	0.344 (0.177)
CEO_CHR	0.037 b (0.019)	0.003 (0.022)	0.014 (0.037)	0.017 (0.050)
R-sq.	0.336	0.478	0.420	0.566

Note: The dependent variable is the ratio of PPE to total asset, both in net book value. Dependent variables are cash flow, size, M/B, business segments, LT DEBT, no dividend, CEO OWN, CEO COMP, OUTBLK OWN, Board Composition and CEO_CHR. Cash flow is operating income before depreciation minus the sum of interest expenses, taxes, preferred dividends and common dividend scaled by total assets. Size is natural log of sales. M/B is market value to book value. Business segments are the number of segments reported by Compustat segment dataset. LT DEBT is long term debt scaled by total assets. No dividend dummy equals 1 if the firm paid no dividend in year 1997(2001) and 0 otherwise. CEO OWN is the percentage of shares owned by chief executive officer. CEO COMP is the proportion of compensation that is equity based (please refer to variables description for details of construction). OUTBLK OWN is the percentage of shares owned by outside blockholder. Board composition is the proportion of outsiders on the board of directors. CEO_CHR is a dummy variable which is equal to 1 if the CEO of the firm is also the COB, 0 otherwise. Number in () is robust standard error. ‘*’ represents the figure on number of segments and no dividend from year 1997(2001) for 1998(2002) year of PPE(net)/TA. ‘a’, ‘b’, ‘c’ and ‘d’ indicate statistical significance at the 1%, 5%, 10% and 15% levels, respectively.

In summary, we find that a negative relationship between corporate governance strength and CRE holdings is much stronger in the MCM sectors. Why is this the case? A popular explanation is the “holdup” problem for firm-specific real estate. In principle, real estate firms could build and own firm-specific real estate and then rent them to the production firms. However, this would lead to a “holdup” problem in *ex post* terms. After the real estate is built, since it is firm-specific, it can only be rented out to other firms with a significant discount. The “inside value” is now higher than the “outside value”. In that case, the production firm can threaten to terminate the rental contract unless the real estate firm lowers the rent. The real estate firm can anticipate this *ex post* holdup problem and hence will be unwilling to build firm-specific real estate. Therefore, at equilibrium, firm-specific real estate would be built and sold to production firms.³² The corporate governance perspective, however, further elaborates the issue. Since it is much more justifiable for firms in the MCM sector to purchase rather than rent real estate, and those properties tend to be firm-specific, the management has even more excuses to over-invest. The asset-specificity makes it harder for the shareholders to judge whether the investment is well grounded. There may not be enough “outside references” for the sake of comparison. In that situation, the corporate governance schemes in monitoring management become more critical, which explains why we obtain the result that other things being equal, the corporate governance variables are shown to be more important determinants of CRE holdings in the MCM as opposed to the TSO sectors.

9. Concluding Remarks

It has long been advised that management needs to be monitored, or their investment decisions may not maximize the interests of the shareholders. The previous literature tends to focus on investment projects which are directly related to production, such as the amount of physical capital investments. This paper suggests that the same kind of intuition also applies to CRE holdings, which are a kind of capital investment less directly related to the production process. Our results confirm previous studies in that asset return in the stock market is negatively associated with real estate holdings, which are in turn, influenced by financial constraint variables (such as whether firms distribute dividends) and growth variables. On top of that, we find that corporate governance variables are also important, especially in industries where plants and property are “necessary”. In particular, the devices which discipline the management for other kinds of “excessive spending”, such as increasing the CEO ownership, increasing the percentage of stock option in total managerial compensation, etc., also contribute to reducing the CRE holdings. Our results derived from sample splitting and logit regression further support the view that firms with good corporate governance tend to rent real estate, and have

³² For a more formal discussion on optimal contracts under a potential hold-up problem, see Hart (1995), among others.

better performance in the stock market, and that over-investment in CRE could be an avenue for management to expropriate firm resources.

Future research should therefore address the following questions. First, if “weak corporate governance” is associated with more CRE holdings, how would those holdings interact with executive compensation? Second, is there any self-selection about which kind of corporate governance mechanism to adopt? Third, how would the dynamics of the market structure be affected if more corporations choose to rent rather than own real estate? Fourth, would globalization in production and consumption promote or discourage CRE holdings? Some ongoing projects are now being pursued along these directions.

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Appendix 1a

Previous literature on the relationship between real estate concentration ratio with raw Return, risk, systematic risk and abnormal return

	Deng and Gyourko (1999)	Seiler, Chatrath and Webb (2001)	Liow (2004)	Brounen and Eichholtz (2005)
Sample period	1984-93	1985-1994	1997-2001	1992-2000
Raw return	N/A	N/A	positive : 46.7% negative : 53.3%	Negative (exception: electronics industry)
Risk (standard deviation of return)	N/A	N/A	Positive	N/A
Systematic risk (Beta)	N/A	Insignificant	Positive and significant	Insignificant (only significant in high yielding industries like communications and business services)
Abnormal return (Jensen's index)	Negative (Only for firms with high real estate concentration and high beta risk)	2 out of 9 sub samples: Positive 7 out of 9 sub samples: Negative Overall: insignificant	Negative	N/A

Appendix 1b Variables Description

Variable name	Variable definition	Data code in Compustat	Year
Dependent variable			
PPE/TA	PPE(net)/TA	Data8/ Data 6	1998 (2002)
Firm Characteristics:			
LT DEBT	Long term debt/Total asset	Data 9/Data 6	Average of 1995-1997 (1999-2001)
Cash Flow	Operating income before depreciation minus interest expense, taxes, preferred dividends and common dividends divided by book value of Total assets	(Data 13-Data 15-Data 16-Data 19- Data 21) / Data 6	Average of 1995-1997 (1999-2001)
No Dividend	Dummy variable equal to 1 if the firm paid no dividend in year 1997(2001), and 0 otherwise.	N/A	1997 (2001)
M/B	Market to book value	(Data 199 * Data 25)/ Data 216	Average of 1995-1997 (1999-2001)
Ln Sales(\$MM)	Ln Sales(\$MM)	Ln Data 12	Average of 1995-1997 (1999-2001)
Business Segments	Number of reported business segments	N/A	1997 (2001)

(Continued...)

(Appendix 1b Continued)

Variable name	Variable definition	Data code in Compustat	Year
Corporate governance variables :			
CEO OWN (%)	Shares owned by chief executive officer	N/A	1995 (1999)
OUTBLK OWN (%)	Shares owned by outside blockholder	N/A	1995 (1999)
Board Composition	Number of outsiders on board of directors (neither current nor past officers) divided by total number of directors on board	N/A	1995 (1999)
CEO COMP	Total value of stock options granted (by using Black-Scholes) divided by total compensation which comprises salary, bonus, other annual, total value of restricted stock granted, total value of stock options granted (by using Black-Scholes), long-term incentive payouts, and all other total	N/A	1995 (1999)
CEO_CHR	Dummy variable which equal to 1 if the CEO of the firm is also the COB, 0 otherwise.	N/A	1995 (1999)

Appendix 2

A Selective Summary of Corporate Governance

Quality of Corporate Governance Measures of Management Ownership

	Sample period	Sample size	Relationship between variable and corporate governance quality	Significance	Origin	Remarks
Morch, Shleifer and Vishny (1988)	1980	371	(+) 0% to 5% (-) 5% to 25% (+) > 25%	Yes	U.S.	
Short and Keasey (1999)	1988-1992	225	<12% (+) >12% and <42% (-) >42% (+)	Yes	U.K.	Firms quoted on the official list of the London Stock Exchange
Mehran (1995)	1979-1980	153	(+)	Yes	U.S.	Manufacturing firms
Hermalin and Weisbech (1991)	1971, 1974, 1977, 1980, 1983	142	Tobin's Q (+) 0-1%, (-) 1-5% (+) 5-20%, (-) >20%	0-1%: Yes 1-5%: Yes 5-20%: Yes >20%: Yes	U.S.	NYSE firms
Singh and Davidson (2003)	1992 and 1994	1528	Proxies by (1) Asset turnover: (+) (2) SG&A expensive: (-)	Asset turnover: Yes SG&A expensive: No	U.S.	NYSE, AMEX and NASDAQ listed large U.S. corporations that have sales revenue of \$100 M or more

(Continued...)

(Appendix 2 Continued)

	Sample period	Sample size	Relationship between variable and corporate governance quality	Significance	Origin	Remarks
McConnel and Servaes (1990)	1976 and 1986	1173 (yr1976) 1093 (yr1986)	(+) until 40-50% (-) afterward	Yes	U.S.	
Holderness, Kroszner and Sheehan (1999)	1935 and 1995	651 (yr1935) 1464 (yr1995)	1995 data 0-5%: (+) >5% and <25%: (+) >25% (+)	0-5%: No >5% and <25%: No >25%: Yes	U.S.	
Ozkan and Ozkan (2004)	1984-1999	839	(+) < 20% (-) >24% and <64% (+) >64%	Yes	U.K.	Used cash holding as proxy of corporate governance measure (cash holding inversely related to agency cost)

Structure of Executive Compensation

	Sample period	Sample size	Relationship between variable and corporate governance quality	Significant	Origin	Remarks
Mehran (1995)	1979-1980	153	(+)	Yes	U.S.	Manufacturing firms
Datta, Datta and Raman (2001)	1993-1998	1719	(+)	Yes	U.S.	Analysis on the cumulative abnormal returns to acquiring shareholders

Duality

	Sample period	Sample size	Relationship between variable and corporate governance quality	Significant	Origin	Remarks
Simpson and Gleason (1999)	1993	287	(-)	yes	U.S.	Banking firms
Baliga et al. (1996)	1986 to 1991	181	(-)	yes	U.S.	

Outside Blockholder

	Sample period	Sample size	Relationship between variable and corporate governance quality	Significant	Origin	Remarks
Mehran (1995)	1979-1980	153	(+)	No	U.S.	Manufacturing firms
Holderness and Sheeham (1988)		114	(+)	Yes	U.S.	Analysis on stock performance after block share purchase
Barclay and Holderness (1989)	1978-1982	63	(+)	Yes	U.S.	Analysis on stock performance after block share purchase
Singh and Davidson (2003)	1992 and 1994	1528	Asset turnover: (+) SG&A expense: (+)	Asset turnover: No SG&A expense: No	U.S.	NYSE, AMEX and NASDAQ listed large U.S. corporations that have sales revenue of \$100 M or more
McConnel and Servaes (1990)	1976 and 1986	1173 (yr1976) 1093 (yr1986)	(+)	No	U.S.	

Board Composition-Fraction of Outside Directors

	Sample period	Sample size	Relationship between variable and corporate governance quality	Significant	Origin	Remarks
Weisbach (1988)	1977-1980	495	(+)	yes	U.S	Used earnings as performance measure
Rosenstein and Wyatt (1990)	1981-1985	1251	(+)	Yes	U.S	
Mehran (1995)	1979-1980	153	(+)	No	U.S.	Manufacturing firms
North (2001)	1990-1997	342	(+)	Yes	U.S	Analysis on corporate acquisitions (not restricted to hostile)
Singh and Davidson (2003)	1992 and 1994	1528	Proxies by (1)Asset turnover: (+) (2)SG&A expensive: (-)	Asset turnover: No SG&A expense: No	U.S	NYSE, AMEX and NASDAQ listed large U.S. corporations that have sales revenue of \$100 M or more
Ozkan and Ozkan (2004)	1984-1999	839	(+)	No	U.K.	Used cash holding as proxy of corporate governance measure

