Dividends and Cost of Capital - An Empirical Study on REITs

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Abstract

Given a firm's investment policy, its dividend policy is irrelevant (Miller and Modigliani (1961)). REITs, by law, pay at least 90 percent of their corporate income into dividends so their dividend policy is given. This is flipping of the dividend irrelevance theorem. Such a high dividend payment also means lower retained earnings so little free cash flow. Jensen (1986) argues lower free cash flow results in mitigated agency problems. In this paper, I ask 2 questions - first, how an average REIT, given its dividend policy, responds to its investment opportunities and second, if an average REIT (with mitigated agency problems) faces lower financing constraints. For the 1st question, I find that an average REITs investment responsiveness is higher than other firms. For the 2nd question, I find that an average REIT faces, in fact, higher financing constraints than other firms.

1 Introduction

In 1960, Congress created Real Estate Investment Trusts (REITs) in the US. A year later, Miller and Modigliani (1961) rigorously proves dividend irrelevance theorem which says given a firm's investment policy, its dividend policy is irrelevant. REITs are stipulated by law to remit at least 90 percent of their corporate income into dividends so their dividend policy is given. This flips the dividend irrelevance theorem. The first question, I ask how an average REIT, given its dividend policy, responds to its investment opportunities. Such a high dividend payment also means lower retained earnings so little free cash flow. Jensen (1986) argues lower free cash flow mitigates agency problems. My second question is if an average REIT (with mitigated agency problems) faces lower financing constraints. For the 1st question, I find that an average REIT's investment responsiveness is higher than other firms. For the 2nd question, I find that an average REIT faces, in fact, higher financing constraints than other firms.

The basic argument of Jensen (1986) is that a higher free cash flow leads to (over) investment on inefficient projects but the point I emphasize, in this paper, is that free cash flow can also act as a symptom (not signal) of potential agency costs for outside investors. The intuition is that observing the level of free cash flow a firm has, outside investors can rationally conjecture to what extent that firm can waste its resources. Rational managers having free cash flow must expect that existence of free cash flow will be treated as an indicator of their wasteful spending leading to a higher frictional premium in capital markets.

A real estate investment trust, or REIT, is a company that owns, and in most cases, operates income-producing real estate. In 1960, Congress created REITs in the U.S. as a means to facilitate an easy access for small investors to invest in large-scale, income-producing real estate. Prior to REITs, access to the investment returns of commercial real estate equity as a core asset was more or less confined only to institutions and wealthy individuals. In order for a company to qualify as a REIT in the US, it must comply with certain ground rules specified in the Internal Revenue Code including an investment of at least 75 percent of total assets in real estate, deriving at least 75 percent of gross income as rents from real property or interest from mortgages on real property and distributing annually at least 90 percent of taxable income to shareholders in the form of dividends. A company that qualifies as a REIT is permitted to deduct dividends paid to its shareholders from its corporate taxable income.

Higher dividend payouts can make it much harder for management to

squander the funds on wasteful projects. Jensen (1986) argues the optimal mechanism to achieve the goal is to increase the leverage since it is more difficult for management to renege on a debt than on dividends. However, for REITs, at least 90 percent of the corporate income has to be paid in dividends to retain the status so a renege on dividends payment is out of question. Free cash flow is also viewed as a channel where wealth is transferred to debtholders from shareholders. Just as shareholders want to increase dividends to the maximum extent to discipline managers, debtholders may want to limit dividends to avoid the problems of debt overhang (Myers (1977)) and risk shifting (Jensen and Meckling (1976)). Since for REITs dividend policy is already put in place before any debt is issued, debtholders, aware of the fact that the most of the earnings would be transferred to shareholders, can design the terms of contract accordingly.

If one of the objectives back in 1960 when the US Congress enacted REITs law was to increase investment in real estate, it seems it has served some of its purpose over time. According to NAREIT, listed U.S. REITs in 2010, constitute a more than 300 billion USD equity market with an average daily trading volume of about 4 billion USD. Unlisted REITs in the U.S. now manage assets of more than 70 billion USD and are adding another 7 billion USD annually. Figure 1 plots investment in REITs against investment of firms in other industries for 1985 to 2010. Year is on horizontal axis while investment is on vertical axis. Investment is measured as capital expenditures scaled by the beginning-of-period net fixed capital. I sum the capital expenditure and fixed capital across the firms in two groups (REITs and all other firms) on yearly basis. Then, I take the ratio of capital expenditure and capital stock. The dashed line is for REITs investment whereas the solid line is for non-REITs investment. We can see while REITs investment shows somewhat a cyclical pattern, investment in other firms is almost flat over time. One feature that clearly stands out is that investment in REITs has been very dramatic during 2005-2010. A sharp hike is followed by a sharp drop accounting for, most probably, the real estate boom and bust in the crisis of 2008. On an average, REITs investment seems to stand up pretty well and in line with investment for other firms.

It is an important policy implication how government can influence investment in an industry by altering its dividend policy. REITs seem to be a success story but the question is if the results can be replicated in other lackluster and lagging industries due to lack of investment.

2 Literature Review

There are mainly two lines of thoughts serving as foundational grounds for majority of studies in dividend literature - Lintner (1956) and Miller and Modigliani (1961). On the basis of results from a survey with corporate professionals Lintner (1956) documents that managers decide dividends policy first and other policies are adjusted taking dividend policy as given. Almost after 50 years since Lintner (1956) study, Brav, Graham, Harvey and Michaely (2004) documents that firms still determine their dividend and investment policy together. On the other hand, Miller and Modigliani (1961) rigorously shows that, given a firm's investment policy in a perfect and complete capital markets, dividends have no relevance on its value.

Obviously, Miller and Modigliani (1961) is based on very simplistic assumptions, a number of studies followed afterwards with interesting implications by relaxing those assumptions. Most notably of them are signaling or asymmetric information based studies such as Bhattacharya (1979), John and Williams (1985) and Miller and Rock (1985). In our setting, signaling explanations have only limited relevance because of two reasons. First, dividend policy is already regulated so dividends cease to be a discretionary variable in the hands of management. Second, there is no taxation on dividends for REITs and tax is the cost of signal (for it to be credible) in most studies.

Grullon, Michaely, and Swaminathan (2002) proposes an explanation that develops the relation between dividend changes and risk changes also known as "maturity hypothesis". It says a firm pays dividends when it becomes mature in its life cycle resulting in one with a shrunk investment opportunity and concomitant a decline in risk. For REITs, it may not hold since they are required to pay a high rate of dividends right from their inception. Another study by Baker and Wurgler (2004) or catering theory of dividends is based on argument that managers pay dividends to satisfy investors' changing preferences for dividends. For REITs, dividends have to be paid each period regardless of investors' preferences so this study has limited explanation for the present context.

Explaining dividends as a means to restrict agency problems comes long way. Easterbrook (1984) notes 3 sources of agency concerns. One source of agency concern is between management and shareholders as advocated by Jensen and Meckling (1976) and Jensen (1986) where managers maximize their gains at firm's cost. Second source of agency costs originates between debtholders and the management acting in interests of shareholders. While Myers (1977) shows how debt overhang may preclude management to take

positive NPV projects, Jensen and Meckling (1976) documents how risk shifting behavior may induce managers to undertake riskier projects at the cost of debtholders. The third source of agency costs is risk aversion on the part of managers as documented by Marcus (1982). The intuition is that managers have substantial part of their personal wealth tied to their firms. If firms perform poorly or go bankrupt, managers will lose their jobs and, even worse, it may be harder for them to find similar opportunities somewhere else. Thus, managers' personal risk aversion can make them choose projects that are safer than necessary. Agency based explanations for dividend payouts are more suitable to our context even though dividend payment for REITs is a regulatory restriction.

Literature on financing constraints or better known as investment cash flow sensitivity is enormous. Hubbard (1998) and Schiantarelli (1996) document excellent reviews. The equation estimating financing constraints used by several studies including Fazzari, Hubbard, and Petersen (1988, 2000) is of the following form:

$$Investment_{it} = \alpha_i + \beta q_{it} + \gamma Cashflow_{it} + \text{ Year Dummies } + u_{it}$$

The interpretation for this equation is that in a frictionless world, with a measure of marginal q, investment's response to its opportunities should be one to one. Therefore, the coefficient on q should be unity and coefficient on cash flow (which is used as a measure of firm's net worth) should be zero. However, in the presence of frictions and with a less than perfect estimate of average q, the coefficient on q could be less than unity and the coefficient on cash flow is positive. Higher the magnitude of the coefficient on cash flow, the higher the degree of financing constraints a firm faces.

q is essentially a marginal concept in the sense that it establishes the connection between investment and increase in firm value via incremental capital stock but marginal q remains unobserved. Hayashi (1982) lays out the conditions for equality of marginal and average q. It says that for a price taker firm if both of its production function and cost of adjustment function are linearly homogenous of same degree, average and marginal q are equal. If these conditions are not met, average q turns out to be a potentially poor proxy for marginal q. Other potentially serious issues with the usage of average q include endogeniety (Poterba (1988)) and measurement error (Erickson and Whited (2000)).

To capture the cross sectional differences in cash flow (or net worth) among firms, several studies have employed various a priori variables to classify firms on varying degree of financing constraints. For instance, Fazzari,

Hubbard, and Petersen (1988) uses dividend payouts and Whited (1992) uses leverage ratios as a priori variable to classify firms. Firms that make higher dividend payouts are likely to be less financing constrained than firms that make lower payouts. Similarly, firms with lower leverage are expected to be less financing constrained than firms with higher leverage. Next step is to estimate the above equation for different groups to compare their investment cash flow sensitivities. Interestingly, as we will see later, for REITs both - dividend payouts and leverage ratios - are high.

Kaplan and Zingales (1997, 2000) raise doubts on the validity of cash flow sensitivity to investment. One potential issue with a priori classification of firms by some variable that is expected to be correlated with investment cash flow sensitivity is that the variable might be a poor or sensitive proxy. As a result, the cross sectional analysis may become sensitive to the choice of such a priori variable. Moreover, single variable might not reveal any non linearity of sensitivity of investment cash flow sensitivity if it exists among different firms. Studies such as Hu and Schiantarelli (1998) and Hovakimian (2009) attempt to circumvent the issue of a priori classification adopting alternative approaches. Hu and Schiantarelli (1998) adopts an endogenous regime switching regression model to classify firms into different states but the problem is only partly resolved with this technique since the number of regimes may be limited. Hovakimian (2009) uses the error term from the estimation of above equation to classify firms into different investment cash flow sensitivity groups. The idea is the average of the error term should not be very significantly different between high and low cash flow states for an unconstrained firm. The potential limitation with this approach is that it rules out the possibility for a firm to have both unconstrained and constrained periods of financing constraints. In this paper, I do not use any a priori variable to classify firms.

Lamont (1997) and Blanchard, Lopez-de-Silanes, and Shleifer (1994) analyze the sensitivity of investment to cash flow shock for smaller and focused samples. Lamont (1997) analyzes the role of internal capital markets for a small sample of firms in oil industry with nonoil subsidiaries. He documents how a shock in cash flow for oil business in those companies affects the investment in nonoil business with no change in investment opportunities. Blanchard, Lopez-de-Silanes, and Shleifer (1994) asks how managers disburse windfall funds with no change in investment opportunities. They find that managers do not return the funds to the stakeholders of the firm. Their results emphasize the role of agency issues.

3 Hypotheses Development

The intuition can be imparted parsimoniously with figure 2. The capital stock is on the horizontal axis whereas risk-adjusted cost of capital is on the vertical axis. D is downward sloping curve for a firm's demand for capital. In a perfect world of Modigliani and Miller (1958) with no frictions, the supply schedule is rr'. Internal funds and external funds are perfect substitutes for each other. In figure 2, rc is the amount of internal funds and cr' is the amount of external funds. The equilibrium is achieved at point a with the capital stock, F and risk adjusted cost, r.

However, the world is far from being so perfect and there do exist frictions such as asymmetric information and agency problems. In the presence of frictions, internal and external funds cease to be perfect substitutes for each other. Therefore, the supply curve becomes $rcS0$. The slope of the curve is determined by the degree of frictions the firm faces. The segment, rc, still represents firm's internal funds at its disposal. The risk adjusted cost of internal funds is r which is also the risk-adjusted firm's cost of capital. $OW0$ may be considered as firm's net worth. For external funds, firm pays a higher price than its shadow cost of internal funds, r. The premium is due to frictions. The equilibrium is attained where demand schedule D and supply curve, $rcS0$, intersect each other. Now, the equilibrium price is b which is higher than the firm's cost of capital, r and new quantity of capital is K which is lower than that of the first best, F.

Let's consider an impact of lower internal funds on the equilibrium holding else constant. At net worth, $OW1$, the internal funds are shrunk to re from rc. Since it is assumed, nothing else changes so the demand curve and the slope of $eS1$ portion of supply curve remains unchanged. With this new supply curve, there is a new equilibrium. The price is d which is even higher than b and new quantity is L which is even lower than K. With lower internal funds, firm pays even higher price to get ab lower amount of external funds in presence of frictions. This result is in the spirit of Myers and Majluf (1984) where in presence of asymmetric information between firm and outside investors, internal funds are preferred.

Figure 2 is the same figure as appeared in Hubbard (1998). The frictional premium could be due to asymmetric information quite as much as due to agency problems. In Blanchard, Lopez-de-Silanes, and Shleifer (1994), agency effect of an increase in cash flow is nothing but the effect of free cash flow for a given set of investment opportunities. Figure 2 and the equation given in the previous section can not simply distinguish between cash flow and free cash flow nor it can distinguish between good and bad

investment. As Fazzari, Hubbard, and Petersen (1988) acknowledges it is an asymmetric information setting. Free cash flow hypothesis implies that firm with a free cash flow spends it on wasteful projects but it is not an unconditional hypothesis. It may be implicitly assumed that the firm with a free cash flow does not need to access the capital markets at the same time. It may not be so. Firms could hold free cash flow and access the capital markets at the same time. If so, outside investors will add the layers of frictional premium in tandem with level of free cash flow a firm has. Yet, it is not an asymmetric information since free cash flow can be observed by managers as much as outside investors. Therefore, higher the free cash flow a firm has, larger the frictional premium it pays.

Next we consider the impact of lower free cash flow in figure 2. Let us assume that the firm has not only lower net worth, re in figure 2, but also lower free cash flow. Jensen (1986) argues that lower free cash flow lowers agency costs. Consequently, the slope of the supply curve for external funds becomes less steep and shifts inwards to $reS2$ from $reS1$. With this new supply curve we have a new equilibrium at f where the firm now pays a lower price f than d and gets even higher amount of capital, M than L. So with the same amount of internal funds, a firm with a lower free cash flow is likely to be less financing constrained than the similar firm with higher free cash flow. In our context, REIT's supply schedule should be $reS2$ resulting in lower financing constraints. Based on the discussion, two hypotheses are formed:

Hypothesis 1: Given its dividend policy, how does an average REIT respond to its investment opportunities?

Hypothesis 2: Ceteris paribus, whether an average REIT with lower free cash flow (implying mitigated agency costs) faces lower financing constraints for its investment needs when it accesses capital markets to obtain external funds.

This is not the only study that examines the financing constraints for REITs. Gentry and Mayer (2005) has already examined the investment responsiveness of REITs employing an alternative measure of q based on net asset value (NAV). They find that using an NAV based q instead of traditional measure of q results in higher even responsiveness of investment. The focus of this study differs from that of Gentry and Mayer (2005). This study compares the investment responsiveness of REITs with that of firms in other industries instead of examining firms within REITs industry.

4 Empirical Results

4.1 Data and Summary Statistics

I obtain the data from COMPUSTAT for firm specific accounting information, I/B/E/S for analysts' coverage, and CRSP for firms' beta from 1985 to 2010. The sample starts from 1985 because this is the year when COMPUSTAT started reporting Standard and Poor's credit ratings. Only non-financial and non-utility firms are included.

I divide the sample into 3 categories - REITs, other real estate firms excluding REITs and all other (non real estate) firms. The identification strategy is as follows. I classify firms with SIC code 6798 as REITs since this code is exclusively allotted to REITs. Firms with SIC codes, 6500 (real estate), 6510 (real estate operators and lessors), 6512 (operators of non-residential buildings), 6513 (operators of apartment buildings), 6519 (lessors of real property), 6531 (real estate agents and managers), 6532 (real estate dealers) and 6552 (land sub-dividers and developers), form my group for other real estate firms without REITs. All other firms (non-financial and non-utility) forms the third sub-group for other firms.

The variables are defined as follows. Firm investment is measured as capital expenditures (item128) scaled by the beginning-of-period net fixed capital (item8). Cashflow is measured as the sum of the income before extraordinary items (item18) and depreciation and amortization (item14) scaled by the beginning-of-period net fixed capital (item8). Tobin's q (average) is calculated as market value of equity (item 24 multiplied by item 25) plus book value of assets minus book value of equity minus deferred taxes (item 6 - item 60 - item 74), scaled by total assets (item6). Unlike Gentry and Mayer (2005), I do not use NAV based q to keep my variables comparable with other firms. Free cash flow is calculated as net income (item172) plus depreciation and amortization (item14) minus capital expenditure (item128) minus preferred dividends ((item19) plus change in debt (item111 - item114) plus change in preferred stock scaled by assets (item6). Free cash flow variable is created as suggested by Damodaran (2002). Firm size is measured as natural logarithm of book assets (item6). Leverage is measured as long-term debt (item9) plus short-term debt (item34) divided by assets (item6). Cash is defined as cash holding (item1) scaled by total assets (item6). Credit rating (item280) is a dummy variable taking value 1 when the firm has access to debt market else not. Number of analysts is the headcount of analysts following a firm in a given year. The value of tangible assets is estimated by dividing the book value of a firm's net fixed capital

(item8) by total assets (item6). Firms' betas are obtained from CRSP files. It is calculated on year-basis using daily returns from the market model.

Table 1 summarizes the key variables in the sample. The first 3 columns belong to REITs, the next 3 columns belong to other real estate firms excluding REITs, and following next 3 columns belong to other firms excluding real estate firms. The last column is the median test for Kruskal-Wallis statistic. The table I reports means, standard deviations and medians of some key variables for every group. It can be seen that the median Tobin's average q is the highest for non real estate firms at 1.41 followed by REITs at 1.22 and then other real estate firms at 1.10. A q greater than 1 calls for investment. Interestingly, the standard deviation of q seems to be lower and tighter than the other 2 groups implying that most REITs firms have similar level of investment opportunities with a lower volatility than other groups. Matching the pattern of q, median investment is also the highest for non real estate firms at 0.23 followed by REITs at 0.18 and then other real estate firms with 0.15. One observation that clearly stands out is the leverage ratios of REITs compared to other groups. The median leverage ratio for REITs is 0.59 followed by other real estate firms at 0.46 and lastly other firms at 0.23. This statistic implies that REITs have greater share of external funds in their capital structure which certainly fosters our intuition. As can be expected, median cash or internal liquidity is the lowest in case of REITs only at 0.03. On the hand, median cash for non-real estate firms is at 0.17 which more than twice than that of REITs statistic. REITs have far higher level of median total assets at USD 1121.6 million compared to non real estate firms at USD 253 million or other real estate firms at USD 211 million. Median net income is the highest for non real estate firms at 0.03 compared to 0.02 for real estate firms. The statistics for 3 groups are different to each other as p values for KW statistics are very low. I also checked for pairwise comparisons and found that the KW statistics remained largely unchanged for most variables.

4.2 Main results

This section reports results from multivariate analysis. The regression equation is:

$$\begin{aligned} Investment_{it} &= \alpha + \beta_1 q_{it} + \beta_2 Cashflow_{it} + \beta_3 FreeCashflow_{it} + \gamma_1 Size \\ &\quad + \gamma_2 Cash + \gamma_3 Leverage + \gamma_4 Rating + \gamma_5 AnalystCoverage \\ &\quad + \gamma_6 TangibleAssets + \text{ Year Dummies } + u_{it} \end{aligned}$$

This equation is an extended version of the equation that appeared in Fazzari, Hubbard and Petersen (1988) with additional controls. Investment deflated by capital stock is the dependent variable, Tobin'q and cash flow are the measures of investment opportunities and net worth respectively. I add free cash flow to the equation to measure the impact of free cash flow or agency issues on investment. Others controls include: size, cash, leverage, debt rating, analyst coverage and collateral.

The main equation in Fazzari, Hubbard and Petersen (1988) does not have these additional control variables. However, over time, previous literature on investment cash flow sensitivity has established the association of these additional controls on investment.

We saw in the univariate statistics (table 1) that median REIT seems to be of larger size than that of non-REIT firm. Firms with smaller size may attract less analyst coverage and, therefore, are subject to higher likelihood of adverse selection problems affecting their investment given cash flow and investment opportunities. As documented by Huberman (1984), many investment opportunities are of 'now or never' nature and if not undertaken at the right time, they may vanish away. In such cases, cash holding as precautionary motive serves as a vital source of liquidity for funding. There are two additional benefits from holding cash. First, firms do not have to incur transaction costs to frequently raise funds. In a structural approach, Gamba and Triantis (2008) documents the importance of cash holding for financial flexibility by incorporating the costs of debt issuance. Second, information asymmetry between managers and capital market participants makes liquidity valuable as shown by Myers and Majluf (1984). Cash could also serve a general purpose buffer against future cash shortfalls. Lins, Servaes, and Tufano (2009) terms cash as unconditional liquidity, funds at firm's disposal. Acharya, Almeida, and Campello (2006) develops a model which presents cash as a hedging tool. Debt is issued to hoard cash so that a constrained firm can channel it across various states especially low cash flow states. Another study by Almeida, Campello, and Weisbach (2004) develops a model that documents the cash flow sensitivity of cash which essentially seems to be affecting the investment. Due to all such reasons, cash holding is included as a control variable in the equation. Table 1 reports that a median REIT seems to have a higher leverage than a non-REIT firm. A firm with higher leverage may be facing a higher probability of debt overhang issues (Myers (1977)). Alternatively, risk shifting argument, where firm's management in the interests of shareholders, takes up only risky projects at the expense of debt holders is equally valid (Jensen and Meckling (1976)). These issues clearly affect investment. Whited (1992) uses bond rating to filter firms

ex-ante to conjecture the degree of financing constraints since it assesses a firm's ability to obtain debt financing. I use a dummy variable for bond rating, which takes the value one if the firm's debt is rated by Standard and Poor's. More analysts coverage for a firm implies more information production for that firm resulting in less information asymmetry. This variable may be useful to assess the degree of asymmetric information especially for those firms that do not have debt rating. In Myers and Majluf (1984), it is the asymmetric information regarding the assets in place (and not growth projects) that results, in an extreme scenario, in non-financing at all or market for lemons (Akerlof (1976)). Figure 2 implicitly assumes that the loans are uncollateralized which may not be a very plausible assumption for many firms. Value of assets in place can be viewed as a measure of collateral. Firms with lower collateral are more likely to have difficulties borrowing. As a measure, I use the value of tangible assets to control for collateral issues.

I estimate the above mentioned equation using firm fixed effects model. For time effects, I use year dummies. To control for industry effect, I demean all my variables using the industry mean at SIC four digit level. To overcome a potential outliers issue, I winsorize all my variables at 99 percent level. As suggested by Petersen (2009), I cluster the error in the model by firm in constructing efficient standard errors. Table 2 reports the estimation results from equation 2. The first 3 columns report results for REITs, the following 3 columns report results for non-REITs in real estate and the last 3 columns report results for other firms.

I find first that investment responsiveness to investment opportunities is the highest for REITs. The coefficient on q is the largest for REITs at 0.14. The coefficient on q for other two groups is at 0.03 which is substantially lower than that of REITs. These coefficients are statistically significant at all conventional levels. This answers our first question of how an average REIT responds to its investment opportunities. The coefficient on cash flow is not different from zero in a statistically significant way for REITs implying that if cash flow is a measure of net worth then an average REIT's investment does not show any sensitivity to cash flow. This is not the case for other two groups. The coefficient on cash flow for non-REITs real estate firms is 0.02 which is twice than that of other firms at 0.01. It is interesting to note that the coefficient on free cash flow is negative and statistically significant for all groups implying higher free cash flow leads to lower investment[1]. This

[1]We can see that cash flow and free cash flow are not the same thing. The coefficients take opposite signs. Moreover, the magnitude of coefficient on free cash flow is higher than

coefficient (absolute value) is the highest for REITs at 0.34 followed by non-REITs at 0.29 and finally for non real estate firms at 0.20. Coefficient on cash is positive and statistically significant for all groups suggesting liquidity helps investment. However, the coefficient is higher for real estate firms, 0.14 for REITs and 0.11 for non-REITs, than non-real estate firms at 0.10 suggesting real estate firms seem to be tapping liquidity better than non real estate firms. However, the coefficient on cash is not significant for REITs. As expected, coefficient on size is positive implying higher size may mitigate asymmetric information and adverse selection problems. Again, the coefficient on size is not statistically significant for REITs. The coefficient on size for non REITs at 0.02 is twice than 0.01 for non real estate firms. Coefficient on leverage is negative for all groups. Debt overhang issues do seem to cloud the corporate investment. The coefficient on leverage for REITs is not different from zero in a statistically significant way, though. The coefficients on leverage for non-REITs at -0.17 and -0.16 for other firms are statistically significant. The coefficient on analyst coverage is not different from zero in a statistically significant manner for any group. The coefficient on tangible assets or our measure of collateral is negative which is counter intuitive. However, it is not different from zero in a statistically significant manner for real estate firms. The adjusted R-squared is highest for REITs at 0.54, non-REITs at 0.20, and other firms at 0.11. Apparently, there is still a lot of heterogeneity that remains unexplained for non real estate firms.

So far, from the analysis above, two main results emerge. First, an average REIT's responsiveness to its investment opportunities is higher than both - non-REITs and non real estate firms. Second, an average REIT does not face financing constraints.

Real estate is traditionally known to be a hedge against other financial assets due to its low correlation with them. Several studies document that the risk characteristics of real estate as an asset class falls between bonds and stocks (Geltner, Miller, Clayton and Eichholtz, (2007)). It is a possibility that our current specification might not be capturing the risk-related differences in the cost of funds for the different groups as pointed by Hubbard (1998). Besides, given high level of leverage for REITs (table 1), one may argue that debt overhang issue could prevent some REITs to invest producing in a downward bias. No investment, no financing constraints.

that of cash flow for every group. I explore the possibility of high correlation between the two variables. The correlation coefficients between cashflow and free cash flow for REITs, other real estate firms without REITs, and non real estate firms are .16, .41, and .52, respectively. I estimated the equation for every subgroup without cash flow and found that the sign and magnitude on free cash flow remain unchanged.

Though the argument holds for new projects, high leverage itself reflects the riskiness of a firm. As a next exercise, I control for risk by including beta into the equation. Including a measure of firm's riskiness could help us make our specification tighter. Beta estimates are collected from CRSP. CRSP estimates betas using market model for daily returns on yearly basis. A richer model such as that of Fama and French (1993) could have been employed as well to compute beta estimates but having market to book ratio and size variables already in our specification might assuage the concerns. For comparing the different groups, I employ logistic regression model. The advantage of using logit model is that it allows us to compare the impact of different variables on different groups simultaneously. Following notation of Cameron and Trivedi (2005):

$$Pr[y_{it} = 1|x_{it}, \beta, \alpha_i] = \Lambda(\alpha_i + x'_{it}\beta)$$

where $\Lambda(\cdot)$ is the logistic cdf with $\Lambda(z) = e^z/(1+e^z)$. Assuming conditional independence, the joint density for the ith observation ($y_i = (y_{i1}, ..., y_{iT})$) is:

$$f(y_i|X_i, \alpha_i, \beta) = \frac{exp(\alpha_i \sum_t y_{it}) exp((\sum_t y_{it} x'_{it})\beta)}{\prod_t [1 + exp(\alpha_i + x'_{it}\beta)]}.$$

After eliminating individual effects, this equation can be estimated for the binary outcome variable ($y_{it} = 1/0$) where the base group is REITs ($y_{it} = 0$). Estimation results from the logit model specified above are reported in table 3 and 4.

Table 3 reports the estimation results of binary logit model for REITs (base group) and non real estate firms. If the model is correctly specified, the right hand side will estimate the correct likelihood of investment type by group on the left hand side. The reported coefficient estimates are average marginal effects.

For Tobin's q, a statistically significant marginal effect is -0.59 which implies that the likelihood of REIT investment (vs. non real estate firm investment) goes up for an increment in Tobin's q. This confirms our previous result from table 2 that REIT's responsiveness of investment to investment opportunities is higher relative to other groups. Surprisingly, the results for cash flow sensitivity are completely turned upside down in table 3. Now, we note that the coefficient is negative and statistically significant suggesting that REIT's investment is more sensitive to cash flow changes. Thus, REITs are more financing constrained than non real estate firms. Let us also look at beta. Its coefficient, as may be expected, is positive and statistically significant implying that REIT investments are less risky. Hence,

the two groups do seem to have different characteristics that our specification in table 2 was not able to capture fully. For free cash flow, we have the expected result that a low level of free cash flow is associated with the likelihood of REIT's investment. For cash, we can see that the likelihood of REITs investment goes up to an increment in cash holding. Precautionary motive of cash seems to be higher for REITs. Or, REITs may be performing a better job in liquidity management given the limited amount of internal funds. A larger size seems to be more advantageous for REITs. For leverage, we can see that the coefficient is negative and statistically significant suggesting that the debt overhang issues may be more constraining for non real estate investment. For tangible assets, the coefficient is negative and also significant implying that collateral is more important for REITs which is not surprising given their higher leverage. Coefficient on analyst coverage is positive and significant suggesting that the asymmetric information frictions are more pronounced for non real estate firms. Table 4 reports the estimation results of binary logit model for REITs (base group) and other real estate firms excluding REITs. The results are alomost similar to table 3 so to conserve space and avoid repetition, we skip the interpretation.

On the basis of above discussion, we conclude that despite REITs' higher responsiveness to investment opportunities they remain more financing constrained than firms in other industries.

5 Concluding remarks

An important question why some firms face more financing constraints than others keeps haunting the finance literature on a regular basis. Most studies compare varying degree of financing constraints for a set of firms within a group of supposedly similar industries (manufacturing firms). This paper evaluates the impact of a single friction on financing constraints on three groups of industries with different characteristics. It finds that agency problems can substantially escalate the financing frictions resulting in higher financing constraints.

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Table 1: Summary Statistics - 1985-2010

Variables	Mean	SD	Med	Mean	SD	Med	Mean	SD	Med	KW Test
	Non- RE			REITS			RE - Other than REITs			
Assets	2645.51	13660.17	252.97	2522.39	4065.03	1121.16	1389.09	4758.23	211.06	0.0001
Investment	0.32	2.20	0.23	5.02	37.59	0.18	0.23	0.43	0.15	0.0001
Net Income	-0.01	0.34	0.03	0.01	0.07	0.02	0.01	0.18	0.02	0.0001
Tang Assets	0.35	0.25	0.29	0.48	0.38	0.55	0.52	0.32	0.58	0.0001
Leverage	0.28	0.29	0.23	0.59	0.28	0.59	0.47	0.28	0.46	0.0001
Tobin's *q*	1.92	2.53	1.41	1.26	0.32	1.22	1.38	0.96	1.10	0.0001
Cash	0.14	0.18	0.07	0.06	0.09	0.03	0.09	0.13	0.04	0.0001

Table 2 - Multiple regression results for Investment - Cashflow senstivity

Dependent variable - Investment									
	Real Estate Firms						Non-Real Estate Firms		
	REITs			Non REITs			Other Firms		
	Coefficient	Robust SE	p' value	Coefficient	Robust SE	p' value	Coefficient	Robust SE	p' value
Cashflow	0.01	0.01	0.30	0.02	0.00	0.00	0.01	0.00	0.00
Tobin's 'q'	0.14	0.04	0.00	0.03	0.01	0.00	0.03	0.00	0.00
FCF	-0.34	0.07	0.00	-0.29	0.03	0.00	-0.20	0.00	0.00
Size	0.02	0.02	0.30	0.02	0.01	0.04	0.01	0.00	0.00
Cash	0.14	0.20	0.50	0.11	0.06	0.05	0.10	0.01	0.00
Leverage	-0.08	0.15	0.60	-0.17	0.04	0.00	-0.16	0.01	0.00
Number of Analysts	0.00	0.00	0.20	0.00	0.00	0.17	0.00	0.00	0.22
Tangible Assets	-0.24	0.23	0.31	-0.05	0.04	0.19	-0.14	0.01	0.00
Constant	0.10	0.11	0.35	0.00	0.03	0.88	0.06	0.00	0.00
S&P Rating		Yes			Yes			Yes	
Year Dummies		Yes			Yes			Yes	
R-squared	0.54	**n**	254	0.20	n	1195	0.11	**n**	119411

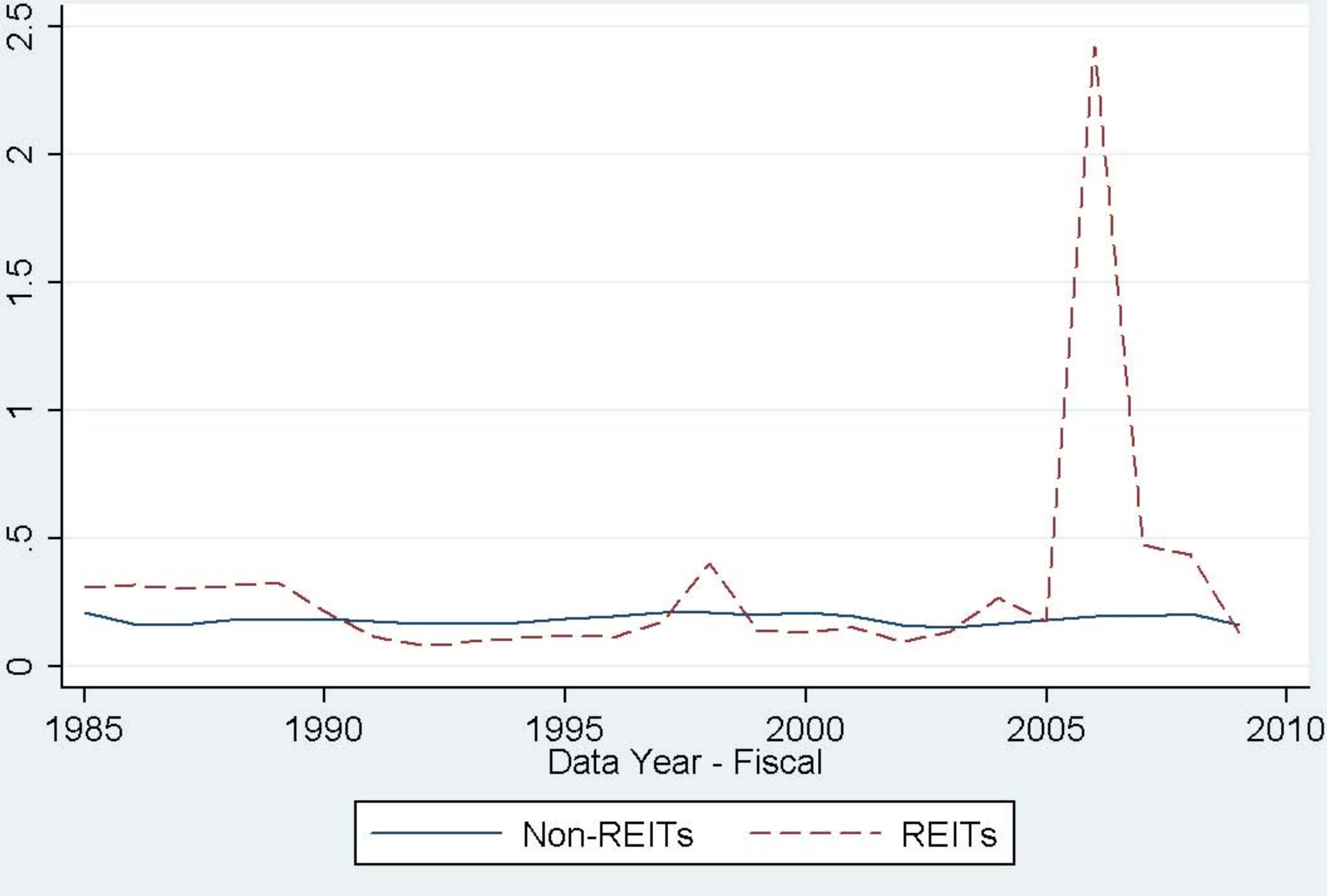
Table 3: Marginal Effects for Logit Regression Results
Base = REITs = 0; Other (non real estate) Firms = 1

Variable	dy/dx	Robust SE	p' value
Cashflow	-0.12	0.04	0.00
Tobin's 'q'	-0.59	0.09	0.00
FCF	2.47	0.42	0.00
Cash	-4.43	0.60	0.00
Size	-0.49	0.05	0.00
Leverage	-3.91	0.48	0.00
S&P Rating Dummy	-0.69	0.14	0.00
Tangible Assets	-2.11	0.33	0.00
Number of Analysts	0.09	0.02	0.00
Beta	0.39	0.10	0.00
Constant	7.73	0.73	0.00
Year Dummies		Yes	
Number of observations		113821	

Table 4: Marginal Effects for Logit Regression Results
Base = REITs = 0; Other RE Firms = 1

Variable	dy/dx	Robust SE	p' value
Cashflow	-0.17	0.05	0.00
Tobin's 'q'	-0.37	0.14	0.01
FCF	2.50	0.53	0.00
Cash	-5.84	0.87	0.00
Size	-0.22	0.07	0.00
Leverage	-3.61	0.56	0.00
S&P Rating Dummy	-0.80	0.18	0.00
Tangible Assets	-0.60	0.35	0.09
Number of Analysts	0.03	0.02	0.11
Beta	-0.50	0.15	0.00
Constant	3.94	0.80	0.00
Year Dummies		Yes	
Number of observations		1305	

Investment:REITs VS Non-REITS -1985-2010



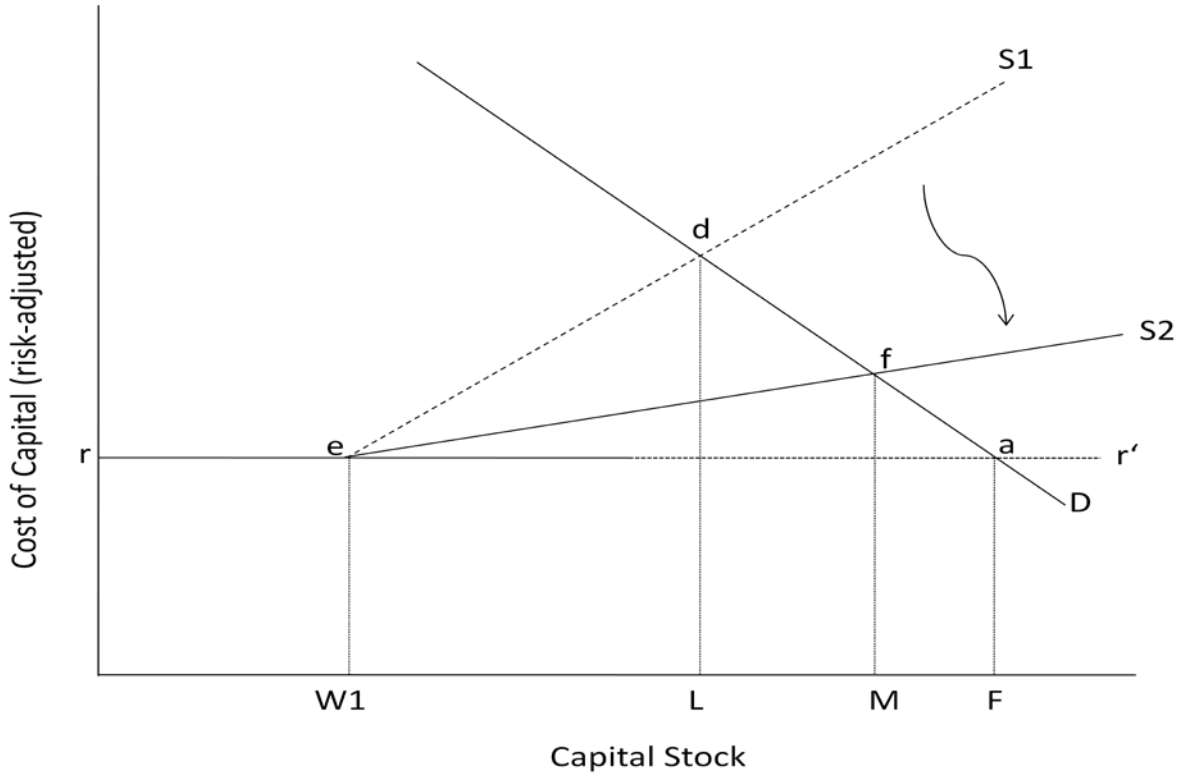


Figure 2

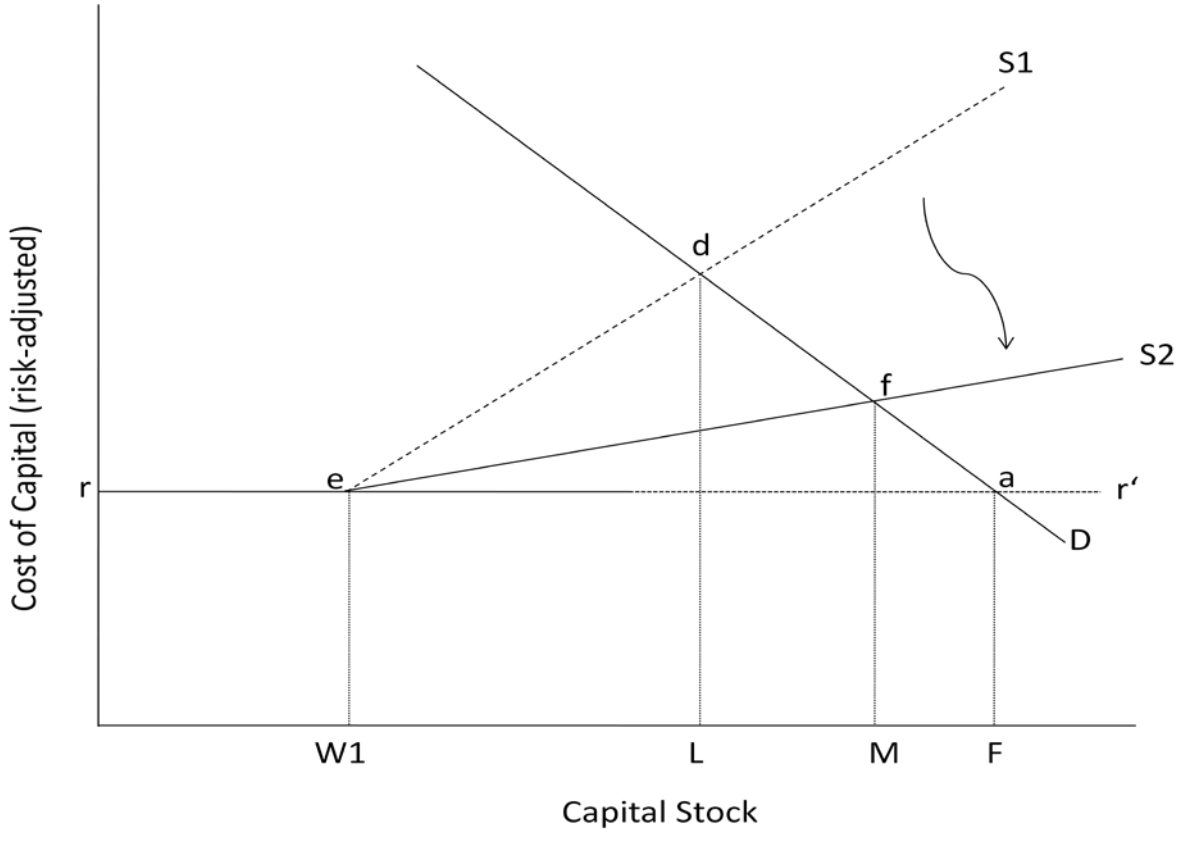


Figure 3