Role of financial leverage in determining corporate investment in Pakistan

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Financial leverage, corporate investment, investment decision, Pakistan

Abstract
The present study is undertaken to analyze the impact of financial leverage on corporate investment by Pakistani firms. The sample consists of panel data of 400 non - financial firms listed on Karachi stock exchange belonging to different sectors. Period analyzed is fourteen years ranging from 1998 – 2011. Cash flow, firm size and Tobin's Q are included as control variables in the study. Fixed effect model has been applied for estimation purposes. The result concludes that leverage is significantly and negatively affecting corporate investment which reiterates that increased leverage provides a disciplining role for mangers and restricts them from overinvestment in context of Pakistani firms.

I. Introduction

A highly debatable topic in field of finance is the impact of leverage on investment decisions of firms. Modigliani and Miller (1958) in their irrelevance theory proposed that in a world of perfect capital markets, no transaction costs and no taxes, investment decision is irrelevant to the use of leverage. However, several researchers like Myers (1977), Jensen (1986), Stulz (1990) Lang *et al* (1996) challenged this proposition and argued that in imperfect market conditions and presence of asymmetric information, leverage could be related to investment decision. This relationship can be explained further by underinvestment and overinvestment theories. Proponents of underinvestment theory states that increase amount of debt in capital structure leads to underinvestment practices by managers. This is because larger portion of profits (accrued by investment) would have to be shared by debt holders. Therefore, the inclusion of high proportion of debt makes investment less attractive for shareholders, which compel managers to underinvest and ignore some valuable positive net present value (NPV) projects. Additionally, another point which bolster underinvestment hypothesis is the "debt overhang" problem, which explains that if firm is already debt saturated, creditors will be reluctant to finance the project because they would have certain reservations about the return of their payments. This ultimately leads to debt overhang problem (Myers 1977) which again coerces the manager to underinvest.

Other theory which caters the inclusion of debt is the overinvestment theory. It elucidates that, if managers have enormous cash flow at their disposal, they will be inclined to invest in poor projects with negative NPV. More investment in such projects would ultimately deteriorate the value of firm. However, the inclusion of more debt in this case will leave fewer amounts of funds for the managers, as larger chunk of the income have to be paid back in form of interest payments and principal amount. Therefore Jensen (1986), Stulz (1990) argued that inclusion of

high leverage in these firms will discipline and control the managers from investing in valueless projects as specific amount of cash flow will have to be set aside for debt commitments.

In following years numerous studies were perused to check the impact of leverage on investment like Lang *et al* (1996), Aivazian *et al* (2005), Rajakumar (2005), Ahn *et al* (2006), Firth *et al* (2008) *etc.* A significant and inverse relationship has been documented between debt and investment in most of the studies, which reinstate its importance in defining corporate investment. Riaz (2012) analyzed particularly textile sector data and documented a positive relationship between leverage and investment in Pakistan. Furthermore, most of the research on leverage and investment was performed in developed countries like US, UK, China, Japan, Canada and other European countries. As compared to underdeveloped states, these countries have more evolved structure and they operate in relatively stable economic environment, which makes it difficult to generalize on a country like Pakistan with somewhat unstable environment. While current study encompass all non – financial national firms listed on Karachi Stock Exchange, which gives a more comprehensive view of corporate investment scenario. To our knowledge, this is the first study reporting the impact of financial leverage on corporate investment analysis using largest time period i.e. 1998 – 2011. Therefore, our paper provides contribution in the existing literature of leverage and investment by presenting insight on an emerging economy like Pakistan.

The paper investigates the relationship between leverage and investment on all non – financial firms listed on Karachi Stock Exchange (KSE). Cash flow, firm size and Tobin's q are included in the study as control variables. Cash flow is an important variable in determining investment decision, because according to Pecking order theory internal sources are more preferred financing source than external sources as these are cheap and are readily available. The role of firm size in deriving corporate investment is also an important concern for the researchers. Since smaller firms have more information asymmetry and there are higher transaction costs for smaller firms which make external sources of finance expensive for them to access. In contrast, larger firms have more easy access to finance sources because of their stronger financial base and long term ties with creditors. Therefore, it is more plausible that larger firms will exhibit more investment. Tobin's Q is also included in the study as a control variable which measures the growth opportunities for the firm. If the growth opportunities exist for the firm, then its investment will be higher. The paper analyzes KSE data of 400 firms (after excluding firms that merged and have less than three years of observations) from 1998 – 2011 which belongs to different sectors such as textile, chemical, engineering, sugar, cement, paper and board, fuel and energy, transport and communication, vanaspati and allied, tobacco, jute and some other firms that were not categorized in specific sectors (miscellaneous sectors). The results are computed with *Stata* software by employing fixed effect model.

The results indicate the presence of inverse relationship between leverage and investment of Pakistani firms. The result though is inconsistent with Riaz (2012) but is in accordance with most of the previous researches and gives credence that more leverage in capital structure would curtail the investment made by the firms. Cash flow and firm size variables are also found to be positively related with corporate investment but Tobin's q is found to be insignificant in determining corporate investment in Pakistan.

The rest of the paper is organized as follows; Section II provides the review of previous studies. In section III, we present the data set and methodology of the study. Section IV discusses the empirical results of underlying variables. Section V consists of concluding remarks.

II. Literature Review

Modigliani and Miller (1958) proposed that in a world of perfect capital markets, symmetric information, no transaction costs and no taxes, investment decision is irrelevant to the use of leverage. However, several researchers (Myers (1977), Jensen (1986), Stulz (1990) Lang *et al* (1996)) challenged this proposition and argued that in the world of imperfect market conditions and presence of asymmetric information, leverage could be relevant to the investment decision. The argument of these researchers were based on presumption that due to asymmetric information, conflict of interest occurs between different stakeholders such as shareholders, managers and debt holders (which they termed as agency cost) which could give rise to underinvestment or overinvestment problems. Jensen (1986) addressed this agency problem and signifies the importance of relationship of leverage and investment. His conjectured was that if managers have ample free cash flow at their disposal then they would waste the resources by overinvesting in risky or negative NPV (Net present value) projects. The inclusion of debt in such firms would perform a disciplinary role that retracts managers from wasting cash flows by overinvesting.

Myers (1976) and Stulz (1990) also stressed that leverage could address the overinvestment and underinvestment problems. Myers (1976) proposed that if a high growth firm is already debt saturated than it would not undertake new NPV positive projects, as the profits from such projects would be shared with debt holders. He called this situation a debt overhang effect, and stressed that this could lead to underinvestment problem which in turn could affect firm's value. So a lesser debt in capital structure could be a solution of this problem. Stulz (1990) emphasized that overinvestment can be controlled by raising debt. As debt borrowers commit a fixed payment to lender it would organize the managers in investment decisions by refraining them from overinvestment. However, insertion of debt would aggravate the underinvestment problem at the same time. Similarly, Lang *et al* (1996) also studied the relationship of leverage and firm investment. The study period was 1970 – 1989. By controlling for sales, Tobin's q and cash flow they found a strong negative effect of leverage on firms' investment. Denis and Denis (1993) also found that when a company increases its leverage, the capital expenditure of the company follows a significant reduction.

Similarly, McConnell and Servaes (1995) analyzed nonfinancial US firms for three years (i.e. 1976, 1986 and 1988). They divide the companies according to their Tobin's q values into two sets: high growth companies and low growth companies which have high and low Tobin's q values respectively. The result concluded that in high growth companies leverage actually address the overinvestment problem by constraining managers from investing and helps in increasing the firm's value. Whited (1992) conducted a study on 325 manufacturing firms during a time period 1975 – 1986 and asserted that leverage is an important consideration in investment policy. He examined the impact of debt and investment by employing Euler equation and stated that all firms don't have same access to finances and some firms have difficulty in obtaining debt from external markets and this difficulty in raising debt consequently impact investment expenditure of such firms.

Aivazian *et al* (2005) investigated the leverage effect on investment made by the public Canadian firms. They used two measures of leverage one was total liabilities book value to total assets book value and second was long term debt book value to total assets. Working on a sample set of 863 companies from 1982 – 1999, they documented a negative effect between leverage and investment. However, a contrasting result was observed by Rajakumar (2005), who studied the relationship between corporate financing and investment of the firm and found that investment increase with high level of debt. The reason for this was due to the more availability of funds for investment purposes. Ahn, S. *et al* (2006) also tested the impact of leverage on investment in diversified firms (firms which were operating in at least two segments) during 1982 – 1997 in United States. The result suggested that inclusion of debt constraint the investment which was generally in accordance with previous studies.

More recently Firth, M. *et al* (2008) examined the relationship between corporate investment and leverage in Chinese listed firms. The study was conducted from 1991 – 2004 on 1203 firms that obtained larger portion of their debt from state owned banks. The variables used in the study were investment, leverage, Tobin's q, sales, cash flow, state owned firms, firm size and firm age. The result revealed negative association of investment and leverage in these firms. Their result highlighted that this negative relationship is lower for the firms that exhibit weak operating performances and have low growth opportunities than those which otherwise have high opportunities and operating efficiently. Moreover they also found that this negative relationship is weaker for the firms in which there is more state ownership. They conclude that state owned banks failed to disciplined and control the overinvestment of low growth firms. Dang, V. A. (2010) examined the relationship of investment, financial leverage, debt maturity and growth opportunities. The sample included a panel of 678 UK firms from 1996 to 2003. The results affirmed that lagged investment, cash flow and Tobin's q are significantly and positively related to investment while leverage has negative effects on investment.

Li Jiming *et al* (2011) examined the relationship between debt and corporate investment. The data contained 60 Chinese real estate firms during 2006 – 2008. The control variables used in the study were cash flow, asset yield, company's value (proxy by Tobin's Q). They used multiple regression to find out that that debt financing and firms' investment exhibit a negative relationship but this negativity is more pronounced in firms with low growth opportunities than high growth opportunities. They also found a positive link between debt financing and investment for medium growth opportunity firms and firms operating performances. Furthermore they found that debt financing in the government firms have positive impact on investment while opposite holds true for non government firms.

The impact of all control variables i.e. cash flow, Tobin's Q and net asset yield was also positive with investment. Masturah Ma'in (2011) studied the impact of debt ratio on corporate investment in Malaysian companies. The variables used in the study were cash flow, Tobin's q, debt ratio and bank loans. The multivariate regression analysis was used to analyze 300 firms from 2000 – 2007. The result depicted that total debt ratio is negatively associated with firm investment. The total bank loan ratio however had a positive impact on firm investment. The cash flow and growth opportunities (measured by Tobin's q) also had a positive impact on investment. They also found that bank loan controls the manager from overinvestment. Riaz (2012) analyzed the relationship of corporate investment and debt financing while working on a Pakistan data. The sample was 144 textile companies and the time period analyzed was 2007 –

2009. The data was segregated into two groups; one with more than a billion rupees sales and other with less than billion rupees sales. The results revealed that in a billion rupees sales or more, debt is positively and significantly associated with corporate investment while in lesser than billion rupees sales this relationship was not significant.

III. Methodology

DATA

The sample of the study constitutes all non-financial firms of Karachi stock exchange for the period of 1998 – 2011. Data was mainly collected from the Annual reports of the firms and Joint Stock Balance Sheet Report of State Bank of Pakistan. Initially all non financial firms were included in the sample. However, later firms that were delisted or acquired and had less than three years of observations was dropped from the sample. After this trimming, 400 firms were left for calculation with 3607 total observations. Fixed effect and Random effect models were used on a panel data to examine the effect of leverage on corporate investment decision. Hausman test was later used to choose the appropriate method. The suitable method was selected after Hausman specification test (after Hausman, 1979). Hausman test check the null hypothesis that coefficients estimated by random effect and fixed effect are same. However the significant value of Hasuman Test was found in the study which rejects this null hypothesis and signifies that fixed effect model is more suitable (only fixed effect model results are therefore included in the studt).

Panel data methodology was used for estimating the following equation:

$$INV_{i,t} = \beta_0 + \beta_1 LEVG_{i,t} + \beta_2 CF_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 Q_{i,t} + \varepsilon_{i,t}$$

Where $INV_{i,t}$ is our dependent variable of the study and it is measured as the investment in fixed tangible assets. Leverage ($LEVG_{i,t}$) is the independent variable and it is measured as the ratio of total liabilities to total assets (Aivazian; 2005). Cash flow, Firm size and Tobin's Q are the control variables of the study. $CF_{i,t}$ (Cash flow) is computed as the sum of earning before extra ordinary items, depreciation and amortization. Firm size ($SIZE_{i,t}$) is the natural log of total assets and $Q_{i,t}$ is the Tobin's Q which is a proxy for growth and investment opportunities and is measured by the ratio of market value of assets to book value of assets (market value of assets is calculated as the sum of the book value of assets and the market value of common equity less the sum of the book value of common equity and the balance sheet deferred taxes).

IV. Results And Discussion

	Mean	Median	S.D	Min	Max	Obs.
$INV_{i,t}$	17.85	18.00	2.29	8.29	25.06	3623
$LEVG_{i,t}$	0.67	0.64	0.36	0	2.79	4941
$CF_{i,t}$	0.11	0.07	0.49	-2	27.29	4562
$SIZE_{i,t}$	20.81	20.67	1.61	12.61	26.29	4941
$Q_{i,t}$	0.62	0.39	1.65	0.013	57.44	4822

INV_{it} the investment in fixed tangible assets, $CF_{i,t}$ is is sum of earning before extra ordinary items, depreciation and amortization, $SIZE_{i,t}$ is the natural log of Total assets, $Q_{i,t}$ is the Tobin's Q calculated by market value of assets divided by the book value of assets, where market value of assets is measured by book value of assets plus market value of equity minus book value of equity, $LEVG_{i,t}$ is the Leverage of the firm which is calculated as the ratio of Total liabilities to total assets.

The Table 1 summarizes important descriptive statistics of the key variables. Corporate investment which is dependent variables has a mean value of 17.85 and a standard deviation of 2.29. The minimum value obtained in the sample is 8.29 while maximum value is 25.06. The investment variable has 3623 number of observations. Leverage is measured by the ratio of total liabilities to total assets and has a total of 4941 observations. It has a mean value of 0.67 and a standard deviation of 0.36. The minimum leverage value is zero while maximum value is 2.79. Cash flow variable (scaled by total assets) depict a mean value of 0.11 with a standard deviation of 0.49. Minimum and maximum values obtained in the sample are -2 and 27.29 respectively. Descriptive of size variable (measured by log of total assets) shows that the mean size of firms in the sample is 20.81 with variation of 1.61. The minimum and maximum value turns up to be 12.61 and 26.29 respectively. The size variable has 4941 observations.

Growth opportunities as measured by Tobin's q show a mean value of 0.62 and a standard deviation of 1.65. The lowest observation obtained for Tobin's q in the sample is 0.013 while 57.45 is its maximum value obtained. Tobin's Q (after Tobin, J, 1969) is the ratio of market value of the firm to the replacement value of its assets. if q value exceed one (q>1) it means the firm is overvalued and have good growth opportunities as the profits generated by it are higher than its cost of assets. However if q declines from one (q<1) it implies that market value of firm is less than its cost of assets, or the firm is undervalued in the market and an hostile takeover could be imminent (Servaes, H. 2012).

$$INV_{it} = \beta_0 + \beta_1 LEVG_{it} + \beta_2 CF_{it} + \beta_3 SIZE + \beta_4 Q_{it} + \varepsilon_{it}$$

Variables	β	Sig.
Const.	-5.721368 ***	.000
Leverage (LEVG)	-0.34749 **	.030
Cash Flow (CF)	0.10410**	.045
Size of the Firm (SIZE)	1.12733***	.000
Tobin's Q (Q)	0.01037	.718
R Square	0.5298 (52.98%)	
Hausman Test	0.000	

Results of regression is obtained by Fixed Effect model. (Hausman specification test confirms the use of fixed effect model). $INV_{i,t}$ (corporate investment) is the dependent variable. Independent variables are Leverage ($LEVG_{i,t}$), $CF_{i,t}$ (cash flow), $SIZE_{i,t}$ is the Firm's size, $Q_{i,t}$ is Tobin's Q. *10%significant level, **5% significant level, ***1% significant level

The result of regression is depicted in Table 2. The result shows that leverage is significantly and inversely related to investment. The coefficient of leverage variable is -0.347 which is significant at 5% significance level. It suggests that a unit increase in leverage will affect the investment of the firm inversely by 0.347. The negative relationship between leverage and investment implies that capital structure decisions play a vital role while pursing investment projects. The negative relationship was reported by Myers (1977) which explained that it is due to the debt overhang problem. He explained that when debt increased in the capital structure than managers may ignore some positive NPV (net present value) projects as profits have to be shared with bondholders. Likewise, Jensen and Meckling (1976) and Jensen (1986) argued that when firms have large cash flows but low growth opportunities then they are faced by overinvestment problem and managers of such firms get indulge in investing in risky projects that could yield negative NPVs. They advised that use of more debt would cater this overinvestment problem and discipline the managers from overinvesting, as fixed portion of funds have to be shared in shape of interest and capital payments. Other researchers like Lang *et al* (1996), Aivazian *et al* (2005), Ahn *et al* (2006), Firth *et al* (2008) Dang (2010) also substantiate these argument. The present study also points out that negative relevancy of leverage to investment is due to the reason that use of debt limits the managers from overinvestment as they have fixed commitment to provide capital and interest payment to lenders which could be banks or bondholders. Therefore debt provides a disciplining role for managers and restricts them from overinvestment which could deteriorate the company's profit afterward. Also the use of debt reduces the returns on investment projects, as a larger chunk of funds have been already committed to lenders that make investment less lucrative. While the result is in accordance with much of previous literature, it is however in contrast to Riaz (2012) which found a positive result of debt on investment. This could be due to the different sample and time period analyzed in both studies and different measures of variables.

Cash flow variable is significant and positively contributing towards investment (b=0.104, p=.045). Firm size is also found to be affecting positively towards investment with 1% significance level (b=1.127, p=.000). Tobin's q was found to be insignificant in affecting investment. The Tobin's q remains insignificant in our sample which explains its irrelevancy in determining investment in presence of other variables. This limitation could be due to the presence of bubbles in stock markets as according to Bond, S. *et al* 2004; when stock markets don't convey the true information and the stock market is prone to speculation and bubbles then Tobin's q don't reflect fully the information about investment and additional variables should be studied along with Tobin's q.

The effect of size on investment is unclear among researchers with both the results (i.e. positive as well as negative) are documented. However we experienced a positive effect of firm size on corporate investment decision. This could be due to large monopoly and control over resources, greater access to capital markets and lesser transaction costs in raising capital for these large groups, which all aids them in higher investment. Rajan and zingales (1998) also pointed out the fact that during 1980s the seventy five percent of the investment comes from already established enterprises. Therefore we also infer that the positive effect is due to the

monopoly enjoyed by large groups which have enough resources in hand to deploy for new projects. Positive effect of firm size in determining investment was also confirmed by Azam and Shah (2011) and Raza Syed (2011) in Pakistan.

Relationship between cash flow and investment has been investigated by various researchers and most of them have found a positive relationship between them. Fazzari *et al* (1988) found a positive relationship of investment and cash flow and which they interpreted as a measure of financial constraint of the firm, while Kaplan and Zingales (1997) found the same relationship in less financial constraint firms. This positive relation also supports Jensen (1986) argument that investment increases as cash flow of firm increases. According to Jensen (1986) managers have incentive of more power and control over resources when they grow the company beyond their optimal size. Myers (1990) also argued that investment of firms depends upon its liquidity position and this investment inclines when large funds are at firm's disposal. Thus in align with most of the previous researchers it is evident that when cash flow of the firm is high its investment rate will be high. Furthermore as Pakistan is a developing country and its financial markets are not much developed, hence they feel difficulty in raising capital from external source and depict high reliance on their internal source of financing (which was also argued by Love and Zicchino (2006). Increased rate of financing could also be a problem for Pakistani firms as high interest rates are generally counterproductive especially for smaller firms which encourage them to use internally generated funds for investment projects. Positive result between cash flow and corporate investment was also documented by other researchers like Alti, A. (2003), Aivazian *et al* (2005), Firth *et al* (2008), Guariglia, A. (2008), Dang (2010).

V. Conclusion And Recommendations

The main objective of the research was to investigate the relationship of corporate investment and leverage position of the company while controlling for firm's cash flow, firm's size and growth opportunities (measured by Tobin's q). The data was collected during 1998 – 2011 and includes 400 non-financial Karachi Stock Exchange firms. Fixed effect model was applied on panel data to examine the effect of leverage on investment. The results reveal that leverage is significantly and negatively affecting the investment decisions of the Pakistani firms. Our result gives credence to agency theories and concludes that leverage provides a disciplining role for managers and restricts them from overinvestment activity. Cash flow was also found to be significant and positive in determining investment decision which implies that firms with ample cash flows exhibit high investment. Additionally firm size was also found to be positive and significant in affecting the corporate investment decision which suggests that large firms have higher tendency to invest. The insignificance of Tobin's q in determining investment gives an indication of presence of bubbles in Karachi stock exchange.

The study has therefore concludes that in Pakistani context the leverage is negatively affecting the investment. It also contributes significantly and is an addendum to the existent literature and provides insight on the leverage and investment literature with respect to Pakistani context. The present study would be useful for managers, researchers and policy makers to get more insight on corporate investment behavior in Pakistan. However, limitation of the study is that as investment depends on many factors, it can further be explored by including more variables. Furthermore as the research have been conducted on the firms that are listed on

Karachi stock exchange, further research can be conducted on non listed firms to provide more insight on this subject.

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