

*Full Length Research Paper*

## Impact of financial leverage on firm investment

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The purpose of this study was to analyze the relationship between financial leverage and firm's investment in the presence of certain control variables such as (Tobin's Q, cash flow, liquidity, return on equity and sale). Relationship was analyzed by applying different methodologies such as pooled regression, fixed effect model and random effect model. Housman test was performed for selection between fixed and random effect model. Data was taken from balance sheet analysis of joint stock companies, annual reports of the companies, B recorder and Karachi Stock Exchange. Data was collected for nine years from 2000-2008, but analyses were performed for eight years because 2000 was taken as a lag. This study found that financial leverage has significant negative impact on firms' investment. It shows that as leverage increases firm's investment decreases, we may say that highly levered firms invest less. The result confirms that leverage overcome overinvestment bias and attenuate agency problem. The results of the common effect model supported that capital structure plays a vital role in the decisions of firms on how to invest. But whenever we extended the model to incorporate the time and individual effect, then no relationship were seen. The relationship between liquidity and investment is positive but insignificant. Tobin's Q has also shown positive but slightly insignificant relationship with investment for the target samples.

**Key words:** Tobin's Q, cash flow, liquidity, return on equity, sale, Karachi stock exchange.

### INTRODUCTION

Corporate sector is considered to be the backbone of any economy. Corporations play a vital role in contributing to the economic growth. In today's dynamic environment, firms generally face intense competition and should therefore need to act in response. To respond to global competition, firms need to make huge investment in modern technology, infrastructure, land, building, machinery, quality management, innovation and product development etc. Such factors will help organization to promote efficiency and effectiveness and gain competitive advantage. A firm needs cash or money to invest in land, building, machinery and to take care of day to day operations. The money which firm's or businesses invest in purchasing land, machinery or other fixed assets is called capital investment. In other words, investment can define as spending on capital goods by firms which ultimately amplified production of consumer goods.

According to Reilly and Brown (2003), investment is the current commitment of funds for a period of time in order to derive future payments that will compensate the investor for, the time the funds are committed, the expected rate of inflation and the uncertainty of the future payments. But a very important question rises here that how such fund will be generated. The two main sources of fund generation, pointed out in Literature includes, equity financing and debt financing.

Equity financing means rising funds for company activities or operations by issuing stocks to individual and institutional investors. These stocks can be common or preferred. These individual and institutional investors become creditors and receive ownership interest in exchange for their funds. On the other hand, when a company raises fund through the issuance of bonds or borrowing from banks or other financial institution, it is

called debt financing. In return, these individuals and institutions receive promise that they will receive interest periodically and principal amount at maturity. When a company uses mix of these sources, it is called capital structure. The purpose of this study is to investigate, whether the financing which a company or firm generate through debt has effect on investment or not.

There is vast literature regarding the inclusion of leverage in capital structure of a firm. According to Odit and Chittoo (2008) in 1930 and 1940s, the inclusion of debt in capital structure were considered as evil. And it was considered as taboo and the basic source of bankruptcy and financial distress. But the concepts were changed by Modigliani and Miller (1958). They claimed that the value of a firm is independent of its capital structure in a frictionless or complete world, where there is no transaction cost, no default risk, asymmetric information and no taxes. But, whenever any assumption is relaxed, the irrelevance value of firm and its capital structure does not hold any more. If the irrelevance theory is correct then the market value of firm can increase, as it takes more and more debt. It suggests that high levered firm will provide tax shield advantage, which in turn increases the value of firm. However, it is not common practice to observe firms that use only debt for financial considerations. The question arises here are, what are the reasons that prevent firms from debt financing? Literature suggests bankruptcy cost and agency cost to be the primary sources that leads to optimal capital structure. Therefore, agency cost is considered as important issue in corporate sectors. The separation of ownership and control in corporate sector is a source of agency problem. It may be in the form of inefficient effort from manager, investing on their own preferences, or failing in maximizing shareholder wealth or value of the firm.

Bankruptcy costs also discourage borrowing or limits leverage in capital structure. Bankruptcy cost represents the cost associated with liquidation and reorganization. Myers and Robichek (1966) argued that the cost of financial distress is incurred when the firm comes under the threat of bankruptcy, even if it can be avoided.

Theory suggest that the choice of capital structure may help to reduce these agency cost. Harris and Raviv (1991) argued that greater leverage may affect managers and may reduce agency cost through the threat of liquidation, which causes personal losses to manager in the form of low salaries reputation etc. On the other hand, Berger and di Patti (2006) comments that when leverage increases the expected cost of financial distress, bankruptcy, the agency cost of outside debt may magnify the agency cost of outside equity, so further increase in leverage result in higher total agency cost. Therefore, they argued that high leverage may cause agency problem between bondholder and equity holder. The study of Cantor (1990) highlights the relationship between leverage and investment. According to him, a firm with a

huge amount of average cash flow can accumulate a large amount as a reserve which can be drawn upon to make an investment, when a firm faces shortage of cash flow in a particular year. On the other hand, a highly levered firm with a small amount of average cash flow does not maintain reserve and may need to cut investment back in the year when firm faces shortage of fund. It means that investment is more sensitive to cash earning in highly levered firm. Therefore, the leveraged firm shows greater variability in its investment over time.

### Significance of the study

A significant but controversial issue in corporate finance, is the impact of leverage on a firm's investment decisions. Modigliani and Miller (1958) demonstrated that leverage is unrelated to a firm's investment choices and to firm value. However, in a world where there are incomplete markets and significant agency costs, leverage may have a wide-ranging and complex impact on investment. For example, managers of highly levered firms may, in some circumstances, be induced to pass by positive net present value (NPV) projects (Myers, 1977) because some or all of the benefits from the investment may accrue to debt-holders; this is known as the debt overhang problem and leads to underinvestment. Alternatively, Jensen (1986) argues that high leverage or (high portion of debt in capital structure) in low growth firms are used to discourage management from investing in non-profitable businesses or projects. Here, debt pre-commits firms to pay cash as interest and principal and such commitments in low growth firms can reduce managerial discretion over free cash flows that may have otherwise been allocated to negative NPV projects. In other words, the banks and other debt-holders perform a beneficial monitoring and disciplinary role in low growth firms where a high level of debt can limit the over-investment bias caused by managerial agency problems. In recent years, empirical studies have been undertaken to examine the relevance of the leverage and capital investment theories. Lang et al. (1996), Aivazian et al. (2005a) and Ahn et al. (2006) reported a negative relation between investment and leverage, although the correlation is much stronger for firms with low growth. This evidence is consistent with the over investment story (Stulz, 1990), where leverage inhibits managers of low growth firms from investing in non-profitable capital expenditures. These studies use data from the U.S. and Canada where long-term debt finance is provided by profit maximizing banks and public bond markets. Here, the debt-holders keep an eye on and discipline the firms they lend to. Nonetheless, the result from these studies is not necessarily generalize to transitional economies where the relations between lenders and borrowers are more complex and subtle. Transitional economies are characterized as having nascent stock markets, an absence of public debt markets (or, at most, embryonic

public debt markets) and a reliance on bank borrowing. Furthermore, most banks are state owned and their decision making often reflects the policies dictated by government. Khwaja and Atif (2005) and La Porta et al. (2002) argued that state-owned banks are controlled by politicians who use the banks to maximize their own political and personal objectives, such as providing jobs for political supporters and bailing out poorly performing firms. In these cases, the banks' incentives to put forth disciplinary pressures on firms are compromised. This could be particularly true for the poorly performing and loss-making firms because the state-owned banks often have the obligation to support (Dobson and Kashyap, 2006). An investigation into the link between leverage and investment in an environment where banks are state owned can therefore, provide a useful addition to the literature. Privately owned banks in developed countries generally use commercial criteria in making lending decisions, although, in some occasions political considerations may impose on the decision process. In transitional or emerging economies, where banks are owned by the state, political considerations are likely to weigh very heavily on lending policies.

So, the purpose of this study is to scrutinize empirically the relationship between financial leverage and firm investment of non financial Pakistani firm's. Literature revealed that many studies relating to capital structure and investment has been conducted in developed countries like America, Japan, United Kingdom and Canada. But the body of literature on leverage and investment is still very small on Asian firms. This study aims to apply those models in Pakistani setting and to add to the applicability of those models in developing countries.

### **Objective of the study**

The objective of the study is to find the relationship between financial policy (measured as financial leverage) and firm investment for Pakistan non financial sector.

### **Contribution of the study**

According to the limited knowledge of the author, this is the first comprehensive investigation of the relationship between financial leverage and investment in Pakistan. So, it will make some contribution to the literature from the developing economy.

### **LITERATURE REVIEW**

The relation between leverage and investment opportunities has been a topic of interest among finance scholars for many years. According to Oditi and Chittoo (2008) in 1930 and 1940s the inclusion of debt in capital structure were considered as evil. And it was considered as the

basic source of bankruptcy and financial distress. Modigliani and Miller (1958) proposed a theory regarding capital structure, they claimed that the value of a firm is independent of its capital structure in a world with no taxes, no default risk, no transaction cost, and perfect and frictionless market. Myers (1977), for example, demonstrates that, with sufficiently high leverage, the firm's share holder does not want to issue new stock due to debt overhang. Owing to this, most projects with positive net present value (NPV) can go unfunded.

Stulz (1990) predict a negative relation between leverage and investment. Stulz (1990) demonstrates that investment is negatively related to firm investment and profitability. Therefore, high profit firms should have a lower leverage. In the last two decades, empirical studies have been undertaken to study the relationship between leverage and investment decisions. Lang et al. (1996) reported a negative relationship leverage and firm investment, but its effect is stronger for small firms with low growth. Similarly, Aviazion et al. (2005) found that a higher percentage of long term debt in total debt significantly reduces the firm investment especially in firms with high growth opportunities. In contrast, he found no significant relation in debt maturity and firm investment for firm with low growth opportunities. Likewise, Firth et al. (2008) investigated the relationship between leverage and investment in china. Their result depicts a negative relationship between leverage and investment. The researcher further investigated that, negative relation is weaker in firm with low growth and poor operating companies while it is stronger for firms with high growth opportunities and good operating performance. On the other hand, McConnel and Servaes (1995) found that, for firms with low P/E ratio or low growth opportunities value is positively related to the degree of leverage while for high P/E ratio or high growth opportunities leverage is negatively associated with firm value. Such finding is also supported by Aggarwal and Kyaw (2008), they revealed that leverage is positively and significantly related to firm's growth, for low firm's Q ratios. The researchers further suggested that, leverage is value creating for firms with low growth opportunities while it is value reducing for firms with high growth opportunities.

Norvaisienė et al. (2008) investigated the relationship between loan capital, investment and growth. They demonstrate that firm's debts and agency problem (between managers, shareholder and creditors) causes under investment or overinvestment, which in turn, has a negative impact on corporate investment, growth and firm value. Similarly, the finding of Mehmet and Oruc (2009) also showed a negative relationship between leverage and investment but only for low growth firm's. And it was the finding of one – way error components model.

However, no relationship were found when he extended the model to include time effect in a two way component model. Similarly, Firth et al. (2008) examined the relationship between leverage and investment under a state-

owned bank lending environment in china. They concluded their study with three major findings: first, that there is negative relationship between debts and growth. Second, that this, negative relationship is weaker for firms with low growth opportunities and bad operating performance, while stronger for firms with good operating performance and high investment opportunities. Third, that this relationship is weaker for firm's with greater and high level of state shareholding then firm's with low level of state shareholding. They further explained that state-owned bank in china, impose less restrictions on investment expenditure of firm's with low growth opportunities, which create overinvestment problems in these firms. A strong negative relationship between financial leverage and R and D expenditure were also reported by Singh and Faircloth (2005). The negative relationship is strong to changes in model specifications and sample periods. More significantly, the results showed that, it is higher leverage that leads to lower R and D expenditure.

On the other hand, Jo et al. (1994) investigated the relationship between financing decisions and investment opportunities set, and reported a positive relationship between debt ratio and measure of investment opportunities. The study was conducted in Japan, data was taken from Pacific-Basin Capital Markets database for the period of five year, that is, from 1986-1990. The sample size was 1044 Japanese firms. Jo et al. (1994) further argued that such relationship were negative in USA due to agency conflicts, which were mitigated in Japanese firm's because of their institutional arrangements. The study of Anderson and Makhija (1999) found that bond debt is inversely related to growth opportunities while bank debt is positively related to growth opportunities.

Similarly, Ahn et al. (2005) found positive relationship between leverage and firm value but it is weaker for firms with low growth opportunities and stronger for firms with more growth opportunities. Childs et al. (2005) examined the interactions between the financing and investment decisions in model of agency conflicts (between shareholder and bond holder). They found in their study that short term debt is significantly helpful in reducing agency costs on under-investment and over-investment. However, such decline in agency costs could not cause any increase in leverage level, as the firm early debt level choice depends on the type of growth options in its investment opportunity set.

## RESEARCH METHODOLOGY

This chapter contains the measurement of variable, the methods and sources of data collection. It also highlights the different methodologies that have been used to determine the relationship between financial leverage and investment.

### Sample and data collection

This study highlight the methods and sources of data collection and the sample size used in the study. In this study, the relationship

between financial leverage and firm investment is based on secondary data. The data for the study are extracted from the annual reports, Karachi Stock Exchange, B recorder and balance sheet analysis of joint stock companies for the period of nine years (from 2000-2009). Data for the study was collected for nine years but analysis was conducted for eight years, 2000 was taken as lag year. Initially, the sample included all non financial companies (435) which are listed on Karachi Stock Exchange, but after screening, the data firms with incomplete data were dropped from the sample. After screening 343 firms remained for Panel data estimation. Financial firms such as banks, insurance companies, leasing companies, Mudarrabas etc were excluded from sample due to regulations complications and different capital structures. The sample includes 342 firms from 27 different sectors. Sector wise classification are as shown in Appendix 1.

### Measurement of variables

For this study, we have taken from literature for measuring investment. The model has been used by Lang et al. (1996) and Aviazian et al. (2005) which is as follows:

$$\frac{I_{it}}{K_{it-1}} = \alpha + \beta_1 \left( \frac{CF_{it}}{K_{it-1}} \right) + \beta_2 (Lev_{it-1}) + \beta_3 (Tobin's Q_{it-1}) + \beta_4 \left( \frac{Sales_{it-1}}{K_{it-1}} \right) + \varepsilon_{it} +$$

In the proposed model, the  $I_{it}$  is the net investment of the firm  $i$  at time  $t$ ; while  $K_{i,t-1}$  is the lagged net fixed assets;  $CF_{it}$  is the cash flow of firm  $i$  at time  $t$ ;  $Lev_{i,t-1}$  is the lagged Tobin's Q;  $Lev_{i,t-1}$  is lagged leverage;  $Sale_{i,t-1}$  is lagged net sales of firm  $i$ ;  $\alpha$  is a constant effect;  $\varepsilon_{t-1}$  is the error term.

### Description of variables

In the proposed model, investment  $i_{it}$  is the ratio of net capital expenditure (capital expenditure – depreciation) of firm  $i$  at time  $t$  to total to the lagged net fixed asset;  $Lev_{i,t-1}$  is the lagged one time period ratio of total liability to total asset. In the literature, other dimension have also been used for its calculation such as ratio of long term liability to total asset and ratio of short term liability to total asset. We will follow prior literature to control for firm cash flows, cash flow $_{i,t}$  is the ratio of operating cash flow of the firm to the lagged net fixed assets. Other control variable such as Tobin's Q and sale is also included in the model. It is a proxy for growth; its value greater than 1 represent high growth opportunities and less than one represent low growth opportunities.

Tobin's Q is lagged one time period. It is the ratio of market value of total asset of the firm to book value of the firm. The market value of the firm can be calculated as the value of the common stock and the estimated value of the preferred stock.  $Sale_{i,t}$  is the ratio of net sale to lagged one time period fixed assets. Sale will be measured as a sale deflated by net fixed assets.

### Investment

An important debate in corporate finance is that whether gearing ratio or leverage ratio effect investment policies. The purpose of this study is also to check such relationship. We have measured investment as the ratio of net investment to lagged fixed assets. Net investment was calculated as capital expenditure-depreciation. The same ratio has been used by Lang et al. (1996), Aivazian et al. (2003) and Odit and Chittoo (2008).

$$Investment = \frac{\text{net investment}}{\text{lagged net fixed assets}} =$$

$$\frac{\text{capital expenditure} - \text{depreciation}}{\text{lagged net fixed assets}}$$

### Leverage

In this study, financial policy of a firm is measured with leverage. There are deferent measure of leverage such as long term debt to total assets, short term debt to total assets and total liability to total assets. We have used total debt to total assets as a measure of leverage. The same measure has been used by Pamela et al. (1983), Mehmat (2009) and Ahn et al. (2005).

$$\text{Leverage} = \frac{\text{Total liability}}{\text{Total assets}}$$

### Control variables

In this study, the relationship between financial leverage and investment is investigated in the presence of certain control variables, these are Tobin's Q (it is a proxy of growth opportunities of firms). Its value greater than 1 represent high growth opportunities and low then 1 represent low growth opportunities. It is measured as market value of the total assets of the firms divided by the book value of the assets of the firm's. Market value of the assets was calculated as (book value of total debts + market capitalization). Other control variables include cash flow, sale, liquidity and ROE. Cash flow was calculated as; earnings before interest and taxes + depreciation / total fixed assets. Sale was measured as; the ratio of gross sale to fixed assets. Liquidity was measured as the ratio of current assets to current liability. The profitability was measured with ROE and is the ratio of net income to total equity. We have used these control variables to clearly identify the impact of leverage on firm investment, because literature revealed that these variables have a significant impact on firm investment.

### Cash flow

According to Whited (1992), investment of a firm is more sensitive to cash flow, but its effect is greater to high levered firms as compared to low levered firms. Fazzari et al. (1988) found that investment is positively related to inter funds. And this impact is stronger for financially constraints firms. Cash flow is the ratio of cash flow before extraordinary income to lagged fixed assets.

$$\text{Cash flow} = \frac{\text{Operating cash flow}}{\text{Lagged net fixed asset}}$$

This ratio has also been used by Odit and Chittoo (2008).

### Tobin's Q

Q measures the performance of a firm. And it is the ratio of market capitalization of the, firm + book value of the debt to book value of the assets. From the literature, it is clear that Tobin's Q has a significant impact on investment. Gomes (2001) describe that the investment of a firm is very much sensitive to Tobin's q and cash flow. Researcher further argued that the availability of external financing makes no difference. The idea was also supported by Cooper and Ejarque (2003), they solved a model with quadratic adjustment costs and a concave revenue function and also found that investment is strongly related to Tobin's q and cash flow.

In order to find out the exact relationship between financial leverage and firm investment, we controlled for both Tobin's Q and cash glow.

$$\text{Tobin's } Q = \frac{\text{Market value of total asset of the firm}}{\text{Book value of the firm}}$$

### Sale

Sale of a company is also taken in to consideration, and is calculated as follows.

$$\text{Sale} = \frac{\text{Net sale}}{\text{lagged net fixed assets.}}$$

### Return on equity (ROE)

To control for the impact of profitability on firm investment, we have taken Roe as` a proxy for firm profitability. It is the ratio of net income to shareholder equity.

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholder Equity}}$$

The ratio was also used by Odit and Chittoo (2008).

### Panel data estimation

This study checked the relationship between financial leverage and firm investment. The relationship was checked by applying panel data. From panel data, we got two dimensions of data such as time series and cross sectional. Panel data have certain advantages such as it offer a wide range of observations which better estimates the parameters. Panel data outsource more information to the analyst and account for the dynamic behavior of parameters. Panel data was estimated by three different methodologies; Pooled regression or common constant model, fixed effect model and random effect model.

### Common effect model

Common effect model or pooled regression analyzes the relationship with the assumption that all the intercept will remain constant all over the years and across sectors. Practically the common constant method implies that there are no differences between the estimated cross section and it is useful under the hypothesis that the data set is a priori homogeneous. This assumption is too much restrictive and behind the reality. To take in to consideration the time effect and individual effect we had applied the fixed effect and random effect model.

### Fixed effect model

Fixed effect model is similar to polled regression but it allows the constant to vary across individual. It is also called least square dummy variable (LSDV) estimator, because it uses dummy variables for taking different constant in to account (Gujrati, 2006). Different intercept concept is logical because our sample consist of heterogeneous set of non financial firms relating to diverse sectors.

$$y_{i,t} = \alpha + \beta_1 X_{i,t} + e_{i,t}$$

Where

$y_{i,t}$  = dependent variable of firm i at time t.

$\alpha$  = intercept

$\beta_1$  = slope of the independent variable.

**Table 1.** Descriptive statistics.

	Investment	Leverage	Liquidity	Sale	Cash flow	ROE	Tobin's Q
Mean	-0.0420846	0.712605	1.726046	9.303822	0.3858371	0.296877	1.155924
Standard deviation	0.9877884	0.487996	5.839397	54.54453	1.544653	3.217851	1.355087
Minimum	-46.08571	0.018124	0.009915	-47.1111	-44.38889	-41.579	0.078104
Maximum	5.495758	9.117647	265.0227	1236.261	38.05714	137.6667	42.93401

$X_{i,t}$  = independent variable of firm  $i$  at time  $t$ .

$e_{i,t}$  = error term of firm  $i$  at time  $t$ .

Dummy variable is the one that allows us to take different group specific estimates for each of the constants for every different section. Despite of its strength, the model also faces certain problems such as: Firstly, it ignores all explanatory variable that do not vary over time. Secondly, it is inefficient because it estimate a very large number of parameter. Therefore, it is not good to use fixed effect model without considering another model such as random effect model.

#### Random effect model

The random effect model not taking intercept as constant or fixed but as random parameters. Random effect model assume that there is not a constant or fixed intercept for each company but a random drawing from much larger population with a common mean value for the intercept. As this model don't discriminate between the intercept of companies, it allows the error terms to take in to considerations all the differences in the in the individual intercept.

$$y_{i,t} = \beta_1 + \beta_2 X_{i,t} + \varepsilon_i + u_{i,t}$$

where

$y_{i,t}$  = Dependent variable of firm  $i$  at time  $t$ .

$\beta_1$  = Mean value of all intercept.

$\beta_2$  = Slope of the independent variables.

$X_{i,t}$  = Independent variable of firm  $i$ , at rime  $t$ .

$\varepsilon_i$  = Deviation of individual intercept from mean.

$u_{i,t}$  = Error term of all the firm  $i$ , at time  $t$ .

One major disadvantage of random effect model is that it needs to make specific assumption about the distribution of the random components. Also if the unobserved group specific effects are correlated with the explanatory variables then the estimates will be biased and inconsistent. Having this disadvantage this model has certain advantages as well.

Firstly, it has fewer parameters to estimates as compared to fixed effect model. Secondly, it allows us for additional explanatory variables that have equal values for all observations within a group. In general, the difference between the two possible ways of testing panel data model is this; fixed model assumes that each variable differ in its intercept terms while random model assumes that each variable differ in its error term. According to Dimitios Asteriou, when the panel is balanced, the fixed effect model will best work. On the other hand, when the sample contain limited observations of the existing cross sectional unit, the random effects model might be more appropriate. But statistically, Housman test will show that which model is appropriate to use.

#### Housman specification test

A Housman test is formulated to choice in the selection of fixed

effect and random effect. Housman state the hypothesis that:

$H_0$ : Fixed effect model and random effect model estimators are not different.

$H_1$ : Fixed effect model and random effect model estimators are different.

On the basis of  $p$  values, the appropriate model is decided, whether fixed effect model or random effect model.

## RESULTS AND DISCUSSION

The purpose of this section is to provide detail empirical evidence of the study. These empirical evidence are structured to provide an in depth results which includes descriptive statistics, correlation, three panel data models such as common effect model, random effect model and fixed effect model. For comparison between fixed effect and random effect Housman test were performed.

Table 1 provides summary of descriptive statistics of the dependent and explanatory variables used in the study. The sample of the study consists of 342 non financial firms which are listed on Karachi Stock Exchange during 2000-2008, with a balance panel of 2736 observations. The mean of the investment to fixed assets is -0.0420846 while its standard deviation is 0.9877884. The results show that the firm investment is negative on average. And its standard deviation is quite high. This implies that the investment of Pakistanis firm's move on either directions. On the other hand, there is a greater variation in investment with a minimum value of -46.08571 and a maximum value of 5.495758. The mean value of leverage is 0.7126046 with a standard deviation of 0.4879956. The minimum level of debt that Pakistanis firm uses are 0.0181237 while the maximum limit for the studied firms are 9.117647. The mean ratio for liquidity is 1.746024 with a standard deviation of 5.839397. The minimum ratio of liquidity is 0.0099148, which implies that some of the firm are facing severe liquidity problems.

Whereas, the maximum limit is 265.0227. The mean value of Tobin's Q is 1.155924, it represent that there exist growth and investment opportunities for firms. At the same time, there exists some variation in these opportunities between Pakistanis firms. The results indicate that investment opportunities can move upward or downward with a magnitude of 1.355087 from the mean. As we have taken the data from heterogeneous sectors therefore, it shows so much variability. The minimum value of Tobin's Q is 0.078104 while the maximum is 42.93401. The mean value of sale is 9.288776, while its

**Table 2.** Correlation.

	Investment	Leverage	Liquidity	Sale	Cash Flow	ROE	Tobin's Q
Investment	1						
Leverage	-0.0106	1					
Liquidity	-0.0041	0.0288	1				
Sale	-0.0576	-0.0409	-0.0009	1			
Cash Flow	-0.05464	-0.0737	0.008	0.1718	1		
ROE	-0.0048	-0.0137	-0.0002	-0.0017	0.1486	1	
Tobin's Q	0.0309	0.2486	0.0068	0.0403	-0.0275	-0.0344	1

standard deviation is approximately 6 times more than the mean. From these statistics, we can interpret that sale of Pakistanis firms suffers from greater deviation. Sale can move upward for the selected firms up to 1236.261, on the other hand it falls to -47.1111. The mean of ROE is 0.2968767, which implies that shareholder on average receive (30%) return on their investment. minimum value for ROE is -41.75895 and the maximum is 137.6667.

In this study, we conducted correlation (Table 2) analysis to check out whether their exist multicollinearity in the model or not. As Cuthbertson (1996) pointed out in his book that multicollinearity exists in the model when the explanatory variables are strongly related to each others. In this study, multicollinearity were checked by checking the correlation between leverage, liquidity, Tobin's Q, Sale, cash flow and return on equity. All the coefficients are less then 0.148, which suggests that multicollinearity is not a serious problem in our model. The relationship between leverage and investment is negative which is an indicator of inverse relationship between these two variables. Investment has a positive relationship with Tobin's Q and negative relationship with all other explanatory variables. Leverage has a positive relationship with liquidity and Tobin's Q, while it has a negative relationship with sale, cash flow and Roe. Liquidity represents a positive relationship with cash flow and Tobin's Q and negative relationship with all other variables. Tobin's Q has a negative relationship with ROE and Cash flow, while it has a positive relationship with all other variables. Cash flow also has a positive relationship with sale and liquidity.

### Common effect model

The value of overall Table 3 is shown R square is 0.3093; it means that there is 30.93% variation in the dependent variable owing to independents variables. The value of overall R square is not highly satisfactory, but it is acceptable for panel data. There may be certain other variables which also influence the investment decisions of the firms, that is, way the value of R square is 0.3093. The results revealed that the level of debt does have a significant negative impact on firm investment. The

coefficient value of leverage is -0.1076574). It indicate that when leverage of a firm is increased by 1 unit its investment decreased by 0.1076574 units. These findings support the theory that leverage has an important role in over coming over investment. It supports the inverse relationship between financial leverage and firm investment. These results are consistent with those of the Firth et al. (2008), they also concluded inverse relationship between these two variables. McConnell and Servaes (1995) also concluded that the value of U.S. firms is negatively correlated with leverage for high growth firms (indicated by high Tobin's Q), and positively correlated with leverage for low growth firms (or low Tobin's Q). These results are also consistent with that of Lang et al. (1996), they found that leverage is negatively associated with investment but only for firms with low growth opportunities.

Aivazian et al. (2005) also found negative association between leverage and investment and its effect stronger for firm with low growth opportunities as compared to high growth opportunities. Similarly Ahn et al. (2006) document that the negative relation between leverage and investment in diversified firms is significantly stronger for high Q segments than for low Q business segments and is significantly stronger for non-core segments than for core segments. Among low growth firms, the positive relation between leverage and firm value is significantly weaker in diversified firms than in focused firms. The results of polled regression indicates that, capital structure's plays a very important role in firm investment decisions. The relationship between liquidity and investment is positive but insignificant. Tobin's Q has also shown positive but slightly insignificant relationship with investment for the target samples.

The regression coefficient of sale is 0.0007, and is significant with P value less than 0.05 and z value greater than 2. This result indicates that 1 unit increase in sale leads to 0.0007 units increase in investment. It means that both are in the same directions, when sale of a firm increases its investment is also increased.

The relationship between cash flow and investment is negative and is highly significant. 1 unit increased in cash flow causes 0.3737 unit decrease in investment.

Finally, the result of ROE indicates that profitability and investment moves in the same direction. When

**Table 3.** R square.

Variable description	Coefficient	z-statistics	P-value
Intercept	0.1410078	4.41	0
Leverage	-0.1076574	-3.08	0.002
Liquidity	0.0009181	0.34	0.736
Sale	0.0007379	2.39	0.017
Cash flow	-0.3737831	-35.18	0
ROE	0.0251835	5.1	0
Tobin's Q	0.1410078	1.54	0.124
Wald Chi <sup>2</sup>	1256.04		
R Square	0.3433		

**Table 4.** Fixed effect model.

Variable description	Coefficient	t-statistics	P-value
Intercept	0.120401	2.94	0.003
Leverage	-0.0328595	-0.67	0.500
Liquidity	0.0033532	1.09	0.275
Sale	0.0012827	2.87	0.004
Cash Flow	-0.4248858	-35.23	0.000
ROE	0.0285548	5.48	0.000
Tobin's Q	-0.0012129	-0.08	0.936
F statistics	209.63		
R Square	0.345		

profitability increases by 1 unit, investment of Pakistanis firms increases by 0.025 units. It is significant at (000) level and its t-value is greater than 5.

### Fixed effect model

The fixed effect model (Table 4) shows that that there is no significant relationship between leverage and investment. It means that a firm financial policy is irrelevant to its investment decisions. The results suggest that whenever we extend the model to incorporate the individual effect the relationship between financial leverage and investment disappears. But the results of sale, cash flow and ROE is somehow similar to that of common effect model. The results of the fixed effect are similar to those of the Firth et al. (2009), they estimated fixed effect model with two way error component but their results were also insignificant for leverage and investment.

The results of the random effect model (Table 5) are mostly similar to that of common effect model. Leverage inversely influences firm's investment. Investment has significant and positive relationship with sale and ROE, but it has a positive but insignificant relationship with liquidity and Tobin's q. it has a significant negative relationship with cash flow.

Housman specification test (Table 6) was used to

check the appropriate methodology for this study, that is, either fixed effect or random effect. The random effect model assumes that there is no correlation between the group specific random effects and the regressors.

However, the fixed effects model does not make such assumption and the possibility remains that the assumption of zero correlation in random effects model is not feasible. The Hausman test checks whether the correlation assumption is statistically evident or not. The null hypotheses for the Hausman test is that the group specific random effects and the regressors are not correlated and thus if the Hausman test shows a parameter value of more than 0.05 than it would mean that fixed effects model is inefficient and random effects model is better Girma and Görg (2006).

The result of Housman suggests that fixed effect model is appropriate to use. Housman rejects the null hypothesis that there is no significance difference in fixed effect and random effect. So we accept the alternative that both the models are not the same. On the basis of Chi square and P value <.05, the fixed effect model was considered appropriate to use.

### Conclusion

This study examined the relationship between financial



**Table 5.** Random effect model.

Variable description	Coefficient	t-statistics	P-value
Intercept	0.1410078	-4.41	0.000
Leverage	-0.1076574	-3.08	0.002
Liquidity	0.0009781	0.34	0.736
Sale	0.0007379	2.39	0.017
Cash flow	-0.3737831	-35.18	0.000
ROE	0.0251835	5.1	0.000
Tobin's Q	0.0189451	1.54	0.124
Wald Chi <sup>2</sup>	1256.04		
R Square	0.3433		

**Table 6.** Housman test.

	Coefficients		
	( b)	( B)	(b -B)
	Fe	re	Difference
Leverage	-0.0328595	-0.1076574	0.0747979
Liquidity	0.0033532	0.0009181	0.0024351
Sale	0.0012827	0.0007379	0.0005448
Cash Flow	-0.4248858	-0.3737831	-0.0511027
ROE	0.0285548	0.0251835	0.0033713
Tobin's Q	-0.002129	0.0189451	-0.0210741
Chi 2 (6)	91.59		
Prob > Chi 2	0.000		

leverage and firm investment, for Pakistani non financial sector. The investigation is motivated by the theoretical work of Myers (1977), Jensen (1986), Stulz (1990) and by empirical work of McConnell and Servaes (1990).

The relationship was analyzed by controlling certain variables that had an influence on investment. These variables are cash flow, Tobin's Q, sale; return on equity and liquidity. This study amalgamates information on a large balance panel from 342 non financial firms for 8 years from (2001 - 2008). Panel data techniques (common effect model, random effect model and fixed effect model) were used for such analysis.

This study examined that whether financial policy (leverage were taken as a proxy for financial policy) influence investment decisions of firms causing under-investment or over investment incentives. This study found that financial leverage was significantly negatively related to firms' investment. It shows that as leverage increases firm's investment decreases, we may say that highly levered firms invest less. This evidence is consistent with the over investment story of Stulz (1990), where leverage inhibits managers from investment in non profitable capital expenditures. Here the debts enforce the manger to pays extra funds as interest and principal, that may otherwise been allocated to poor investments

projects. Thus, leverage helped in overcoming the over-investment problems and alleviating agency problems. The results of the study provide support to the agency theories of corporate leverage, and especially to the theory that leverage has a disciplining role in overcoming the over-investment problems. Thus, the result of the study is consistent with the hypothesis that leverage attenuate to invest in poor projects. The results of the common effect model supported that capital structure plays a vital role in the decisions of firms on how to invest. But whenever we extended the model to incorporate the time and individual effect, then no relationship were seen. The relationship between leverage and investment were checked in the presence of certain control variables. The result shows negative relationship between investment and cash flow. Strong relationship was seen between investment and cash flow. The results indicate that investment and cash flow sensitivity is very strong for Pakistani non financial firms. Whenever, we checked the relationship between investment and ROE (proxy for profitability) positive relationship were found by applying common effect model. The result depicts that when profitability increased by 1 unit, investment of Pakistanis firms was increased by 0.025 units. It was significant at (000) level and its t-value was greater than 2.

Sale had a positive and significant impact on investment, which shows that as sales of Pakistani firms increases its investment also move in the same direction. No relationship was seen between liquidity and investment for the selected sample. Tobin's Q had also showed insignificant relationship with investment. We may conclude that despite of different debts market and banking structure between developed countries and developing country, the relationship remained same for financial policy (measured as financial leverage) and investment.

## RECOMMENDATION FOR FUTURE RESEARCH

The empirical model of this study can be extended which can generate further information. The model can be extended by various ways, by enlarging panel data set or by increasing the number of predictors' variables. Increasing the data set will further enhance the applicability of the research. Secondly, companies classifications that whether it is a high growth company or low growth company have been entirely excluded from the study so future research may be conducted in a way that classify between companies. Thirdly future research may also make sector wise comparison in non financial sectors. Fourthly the relationship between financial leverage and firm's investment can also be conducted in financial sector of Pakistan. In this study we have used book value have used to measure debt and it would have been better if market values were available for debt which may have improved the model fit. Future research may measure this variable with market value of debts.

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**APPENDIX****Appendix 1.** Sector wised classification.

<b>Sectors</b>	<b>Number of firms</b>
Textile spinning	74
Textile weaving	10
Textile composite	37
Woolen	6
Synthetic and rayon	9
Sugar and allied industries	25
Cement	12
Tobacco	4
Refinery	6
Power generation and distribution	6
Oil and gas marketing companies	5
Oil and gas exploration companies	4
Engineering	10
Automobile assembler	8
Automobile parts and accessories	6
Cable and electrical goods	7
Transport	5
Technology and communication	4
Fertilizer	8
Pharmaceuticals	7
Chemicals	19
Paper and board	7
Vanaspati and allied industries	4
Leather and tanneries	4
Food and personal care-products	14
Glass and ceramics	6
Miscellaneous	35
<b>Total number of firms</b>	<b>342</b>