# Determinants of Corporate Investment Decision: An Evidence from Pakistan

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**Abstract**

   *This paper analyzed the trends in corporate finance in Pakistan, and uses a panel data model for empirically identifying the factors which influence corporate investment decisions, during the period 2014-18. The findings revealed that firm level factors such as cash flow, fixed capital intensity, leverage and firm size are significant in determining corporate investment decisions. At macro level, cost of borrowing and effective tax rate is significant in influencing corporate investment decisions negatively. The results of the study generally contribute in existing literature on the impact of macroeconomic variables and certain firm level factors on corporate investment decisions. The main value of this paper is to consider broad based approach to analyzing the determinants of corporate investment decisions from developing market context.*

**Keywords**: Corporate investment, corporate governance, cash-flow, financial leverage, Pakistan

## 1. INTRODUCTION
### *1.1 Background of the Study*
Corporate investment means the quantity of capital, which is invests or spent with the expectation that it will be able to generate income or

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will be appreciate in the future. It refers to the amount of capital spent on increasing the total assets of a firm. New investment in a firm consists of addition to its existing assets for the purpose of producing more output. These investments could be financed either by internal sources of funds, such as, accumulated profits in the form of various reserves, depreciation provision, etc., or by external sources of funds, such as, borrowed capital, fresh capital raised, etc. At micro level, private corporate behavior is characterized by three main decisions, namely, investment, financing and profit allocation. Firms have scarce resources that must be allocated among competing uses. Hence firms in the private corporate sector must decide the way in which they should allocate resources and the manner in which it would be wise for them to invest. The private corporate sector should provide the framework for its constituent firms to make the above decisions wisely (Kumar, 2011). Accordingly, the investment decision of a firm is defined to include not only those investments that create revenues and profit, but also those that save money by reducing expenditure. Investment decisions though mainly taken at the Board level, these have been influenced by financial performance, financing pattern and economic conditions prevailing in the country and also the global developments to some extent. In the past few years there has been an increasing interest in the role that firm specific factors play in corporate investment decisions along with the economic conditions. This interest stems from the effect that financial performance of the corporate sector had on shaping the most recent economic cycle. Recent theoretical developments have also shown that cash flows and the structure of a firm's balance sheet may have an important influence on investment decisions. The potential link between investment and financial performance implies that some of the changes in the performance indicators of the private corporate sector in the past decade could have altered the dynamics of the investment cycle. Establishing a link between cash flows, leverage and investment may also provide insights into the way in which monetary policy and cyclical factors more generally influence the corporate sector. If cash flows are an important determinant of investment, changes in monetary policy (by changing some interest rates) will influence investment of indebted firms through a cash flow effect as well as through altering the rate at which the returns to investment are discounted (Chen, 2012). If this is the case, the higher

leverage of the corporate sector implies, other things being equal, that monetary policy may have a larger impact on investment than in the past. Moreover, it implies that changes in monetary policy may not be transmitted evenly across the corporate sector. The cash flows of highly geared firms will be more sensitive to changes in interest rates than cash flows of firms with lower leverage. Ascertaining a link between investment and financial conditions imply that changes in the structure of corporate balance sheets would significantly alter the dynamics of the investment. Smaller firms are generally considered to be more sensitive to changes in financial conditions. External funding tends to be relatively more expensive for them because providers of finance have less information about their creditworthiness. Smaller firms also have limited access to securities or equity markets and are thus more reliant on intermediated funding as a source of external finance. Cash flows are a significant source of funding for them. Economic shocks that alter cash flows or change the lending behavior of intermediaries are thus likely to have a more significant influence on the investment decisions of smaller firms (Kumar, 2011).

### 1.2 Problem Statement

Investment expenditures are crucial to enhance growth and productivity, particularly in economies dominated by the presence of small and medium enterprises (SMEs). Due to the importance of investment to the growth path of the economy, several studies analyzed the investment behavior from a macroeconomic perspective, often focused on large and developed economies. Although macroeconomic variables play massive role in formulation of policies at country level, the microeconomic variables also have its own significance. Nowadays researchers are in views to find out over all factors that affect investment decision at firm level. They are seeking answer of questions like: (1) what factors influence the investment decisions of firms? (2) To what extent is investment decisions affected by the opportunities available to the firms? and, (3) do these factors have equal effect on all types of firms? These questions have agitated the minds of the researchers.

### 1.3 Gap Analysis

Added to this, a large level of empirical literatures followed, namely (Aggarwal, 2006) who used the Panel Data version of the VAR

methodology to examine the determinants of investment in scientific firms for the U.S., France, and Japan during the period 1979- 1989. They found that there were tighter relations between investments on the one hand, and profits, sales, and cash-flow on the other hand and these differ from country to country. Hubbard (1998) analyzed various factors (e.g., inventory investment, research and development, employment, business formation and survival, pricing, and corporate risk management) which determine the link between cash flow and investment decisions by using the U.S. data. Hubbard's results strongly support that there was a significant relationship between investment and changes in net worth. Moreover, Carpenter and Guariglia (2008) also analyzed financial factors affect investment decisions with supportive findings. They observed that cash flow could not explain the sensitive nature of investment decisions for large firms; however, its explanatory power was still the same for small firms. It implies that the significance of a cash-flow variable in the investment equation could be caused by information asymmetries in the capital market.

Nevertheless, Kaplan and Zingales (2007) implied that the less the financial constraints a firm faces in corporate investment decisions, the more sensitive to the availability of cashflow they are. In addition, (Gomes, 2001) showed that the presence or the absence of financial frictions is neither sufficient for significant cash flow effects nor necessary to obtain these cash flow effects. These empirical studies are somewhat controversial as they relate to what probably caused the observed relationship between investment opportunities, cash flow and investment decisions at a firm level.

Furthermore, there are certain micro level factors (i.e., past investment, firm size, profitability, cash flow and growth opportunities which are available to firms and all are significant in forecasting investment decisions (Bokpin, 2009). Ruiz-Porras and Lopez-Mateo (2011) documented that the effects of firm size, cash-flow, and investment opportunities are mostly positively significant on investment decisions. Nonetheless, Saquido (2003) concluded that liquidity and firm size are insignificantly related to investment; but there remains a significant relationship between investment and revenue growth and fixed capital intensity. Aviazian (2005) showed that the link between leverage and investment is negative, and that effect is significantly stronger for firm with low growth opportunities

than those with high growth opportunities. Nevertheless, the findings showed significantly the relationship between debt financing and corporate investment decisions. (Barbosa, 2007) analyzed some factors involved with the impact on investment decisions of private enterprises in the Mekong River Delta. Nonetheless, in this research other variables such as investment opportunities, region, or business risk, and macroeconomic factors which might have an influence on investment decisions at the firm level have not been analyzed.

Most of the studies about determinants of corporate investment decision are founded in developed countries like US, UK, Canada and China. But it is not possible to generalize the results of those studies which are conducted in other developed countries due to higher information asymmetry, different market dynamics and characteristics, different ownership structure, limited access to debt financing and nature of business ownership. There is very limited work in Pakistan which is related to determinants of corporate investment decision, for instance, in Pakistan most of businesses are family owned business, while making good investment decision is become a big issue in the recent years. Secondly most of the studies investigate about micro level determinants of corporate investment decision however this study aims to analyze and investigate both micro and macro level determinants of investment. In the current study, different determinants of corporate investment decision are analyzed in the context of Pakistani non-financial firms. In Pakistan, various few studies have been carried to investigate investment decision with similar variables by selecting different sample but there is limited literature available regarding determinants of corporate investment decision. Therefore, this research study examines the determinants of corporate investment decision at macro and firm specific level.

### 1.4 Research Objectives

The aim of this study is to investigate macro and firm specific level factors that affect investment decisions of corporate sector in Pakistan. In terms of macro level factors this study took cost of borrowing and tax, and in term of firm level factors this study examines cash flow, leverage, fixed capital intensity and firm size effect on the investment decisions. This study will be time period from 2014 till 2018. This research will contribute to the gap in literature by

identifying the both internal and external determinants of investment decisions of quoted non-financials firms in Pakistan. By conducting this study, we would be able to evaluate the impact of different determinants on firm investment decisions. The specific objectives are to:

- Examine the effect of cash flow on corporate investment decision of quoted non-financials firms in Pakistan.
- Examine the effect of leverage on corporate investment decision of quoted non-financials firms in Pakistan.
- Examine the effect of fixed capital intensity on corporate investment decision of quoted non-financials firms in Pakistan.
- Determine the effect of firm's size on corporate investment decision of quoted non-financials firms in Pakistan.
- Determine the effect of cost of borrowing on corporate investment decision of quoted non-financials firms in Pakistan.
- Examine the effect of tax on corporate investment decision of quoted non-financials firms in Pakistan.

## 1.5 Research Questions

How can macro and firm specific level factors influence corporate investment decision in context of Pakistan?

## 1.6 Significance

This study is useful for policy makers for making investment related decision as it identifies the factors that derives corporate investment decisions, these factors can help finance managers/investment advisors in managing investment risk. Corporate investment is generally an important aspect in business because investment will help in generating more revenue or higher return but it may be influence by internal and external market factors. This study will be beneficial for financial professionals and investment advisors. So, they can understand or focus on those factors which play a significance role on investment decision at corporate level. Also, the study demonstrates the role and nature of these specific determinants which may increase awareness and help institution as well as individual investor to boost their investment return by making good investment decision.

## 2. THEORETICAL FRAMEWORK

Investment decision at firm level varies with respect to various issues which directly affect firm in long run. There are three main issues, agency cost, transaction cost and market value, that can explain fluctuations in the investment. Firstly, agency costs theory developed by Jensen and Mackling (1976) can answer the problem as to why a firm that is confronting the costs of higher interest rate does not try to get money from other sources (i.e., debt, equity market). Agency problems arise when there is a conflict of interests between managers, creditors, and shares holders because of differing goals. Secondly, the costs of a transaction combined with the issue of debt and equity might increase the cost of external financing. It is supposed that debt is the only channel of external funds available to the firm. Debt financing allows the creditors to be entitled to interest payments, and to have their principals at the expiry date. If scheduled payments are not being made, then the payment assets of firm will be sold to raise funds. This depends on the firm's ability and the degree to which it can redeploy its assets. There are usually non-redeploy able durable assets in a highly specified investment project; thus, it is quite difficult to recover funds from liquidation. In this circumstance, in order to protect the creditors' interests, they will create disadvantages for the debtors with higher interest payments, restricting the size of loans and so forth. Thirdly according to the q-theory of Tobin (1969) and extended into a proposed model by Hayashi (1982), investment demand could be predicted by the ratio of the market value of a firm's capital stock to its replacement cost under perfect market assumptions (symmetric information, no transaction costs, no default risk, and no taxation); and its market value could also explain further investment opportunities. However, Akerlof (1970) indicated that this theorem will only be correct in a world of perfect capital markets. It cannot interpret investment decisions at the micro level if there is asymmetric information in the market. Concretely, imperfect markets exist in developing countries, firms have more information about the profitability and risks of investment projects than the suppliers of funds have. Besides, corporate finance theory also suggests that market imperfections may repress the capacity of the firms to fund investments and would perpetually influence the investment decisions of firms.

## 2.1 Firm level financial determinants

Financial determinants play a limited role in traditional models of investment but the relation between investment and financing decisions constitutes a central issue in corporate finance. According to the neoclassical theory of optimal capital accumulation, firms choose inputs of capital (and labor) in order to maximize the present discounted value of their income streams, with financial factors entering only through the cost of capital, which, in turn, is independent of the way the firm finances itself. This independence arises because capital markets are assumed to be perfect (Modigliani, 1958), thus, investment is not constrained by the availability of adequate cash flows nor the firm's financial characteristics influence its cost of capital. There are several reasons to believe that this independence between real and financial factors would not occur in practice. Firms' financial choices may affect their investment decisions because taxes, issuance costs, agency conflicts and information problems associated with debt and equity will affect the cost of capital, creating a difference between the cost of internal and external funds and changing managers' incentives to take different types of projects. Financial factors are generally included in standard investment models through information asymmetries or agency costs. The introduction of these assumptions helps explain how a given level of investment will be funded and how a firm's financial position will influence its investment (Gertler, 1994).

Informational asymmetries, where managers have more information about a firm than potential debt or equity holders, turn it difficult for potential creditors and equity holders to evaluate the prospects of different firms. If creditors cannot distinguish between good and poor-quality potential borrowers then good quality borrowers would eventually be charged a higher interest rate than they would in a perfect information market (Greenwald, 1990). Similarly, new equity issues may trade at a discount to their value implied by the underlying prospects of a firm (Myers, 1984). The firm may also face agency costs, that is, costs borne by owners of the firm resulting from potential conflicts between managers, debt holders and equity holders (Harris, 1991). The effect of these information problems is to boost the cost of external finance relative to internal finance (Aggarwal, 2006). These cost differentials provide some insights into how a given level of investment will be funded, that is, explain the

preference for a financing hierarchy where cash flows will be preferred to debt which, in turn, will be preferred to new equity issuance. Thus, the theoretical extent of asymmetric information problems and agency costs can be shown to be a function of the structure of a firm's balance sheet, which influences its investment decisions, with shocks to the balance sheet altering the evolution of investment over time.

## 2.2 Cashflow and corporate investment decisions

Even firms with access to external funding will rely more heavily on cash flows as a source of finance. There are direct costs involved in raising external funding, such as underwriting and administrative fees and there are also potential financial distress costs associated with using external finance. Finally, issues of taxation, shareholder dilution, control of information, need to maintain flexibility and liquidity may also have an impact on a firm's financing choices (Eriotis, 2007). As stated by (Lewellen J. L., 2016), theoretically, the positive influence of cash flow on investment could be explained by three reasons: i) internal funds are less costly than external funds; ii) managers may overspend available internal funds; and iii) cash flow may be correlated with investment opportunities. Thus, the investment-cash flow sensitivity can be interpreted as a consequence of financial constraints (Gatchev V. P., 2010) or the result of managerial risk aversion to excess debt and managerial discretion and overinvestment (Degryse, 2006).

In a study of manufacturing firms in Belgium, France, Germany and the United Kingdom, for the period 1978-1989, (Bond, 2003) conclude that cash flow is more important for funding investment in UK firms than in the other countries. Thus, economies with market-based financial systems seem to face greater difficulties in canalizing funds to firms' investment than economies with bank-based financial systems. As stated by (Martínez-Carrascal, 2008), several studies have criticized the empirical tests based on the cash flow sensitivity as meaningful evidence on favor of the existence of financing constraints. For instance, (Gomes, 2001) shows that the existence of financing constraints is not sufficient to establish cash flow as a significant regressor in a standard investment equation, while (Ericson, 2000) evidence that the investment sensitivity to cash flow in regressions including Tobin's Q is to a large extent due to a

measurement error in Q. Notice that, regarding Tobin Q theory (Tobin, 1969), if firms' market value is higher than the value of their assets, i.e., if the Tobin Q ratio is above 1, firms tend to increase the level of investment. If the Tobin Q is below 1, the inverse happens, with firms reducing their level of investment. Finally, (Gatchev V. P., 2010) develop a multi equation model where firms make financing and investment decisions jointly subject to the constraint that sources must equal uses of cash. Their results evidence that when facing cash flow shortfalls firms maintain their investments by borrowing. Recently, (Lewellen J. L., 2016) show that for US firms from 1971 to 2009 financing constraints and free cash flow problems are important for investment decisions.

Given that the degree of asymmetric information and agency costs depends on firm characteristics, certain firms may be more sensitive to financial factors than others. For instance, smaller firms are generally considered to be more sensitive to changes in financial conditions. External funds tend to be relatively more expensive to them because providers of finance have less information about their creditworthiness, so that cash flows may be an important and sometimes unique source of funds for investment (Kadapakkam, 1998). Nevertheless, larger, thus probably more mature firms may reduce their investment levels, potentially due to the firm's technological decreasing returns to scale and/or increasing returns to scale in the cost of external financing, thus yielding a negative relation between size and investment (Gebauer, 2017).

### 2.3 leverage and corporate investment decisions

In this paper we will focus not only on the link between investment and profitability but also on other balance sheet indicators. Debt overhang models explain why more or less leveraged firms may be reluctant to use debt, albeit much less empirical work has been done on the analysis that variables such as indebtedness or debt burden have on firm's investment decisions. (Whited, 1992) shows that the investment of highly leveraged firms may be more sensitive to cash flows than that of firms with lower leverage. The increased debt servicing obligations resulting from higher leverage mean that the available cash flows are smaller and firms have less of a buffer against disturbances. So, it could be expected a negative relationship between investment and debt servicing. Also, (Cantor, 1990) shows

that investment is more sensitive to earnings for highly leveraged firms and (Lang, 1996) show that investment relates, respectively, negatively and positively, with leverage and cash flow. On the contrary, (Kopcke, 1994) using balance sheet variables as separate regressors in the investment equation argue that those variables are not important and (Chen, 2012) argue that investment-cash flow sensitivities have completely disappeared during the 2007-2009 credit crunch. Considering that various studies conclude that SMEs financing decisions are in accordance with the predictions of pecking order theory, it could be expected that, when internal cash flow is insufficient SMEs with higher levels of investment depend on debt to fund their investment needs, thus debt may be a determinant factor of small firms' investment (Ferreira, 2004). The sign for the relationship between investment and leverage is essentially an empirical question. (Vermeulen, 2002) shows that leverage is more important in explaining investment during downturns and for small firms. (Aivazian, 2005) show that leverage is negatively related to investment and that this negative effect is significantly stronger for firms with low growth opportunities than for those with high growth opportunities. In the same line, (Hernando, 2008) indicate that the impact of indebtedness and debt burden on investment is non-linear, becoming relatively more intense when financial pressure exceeds a certain threshold. That threshold is above the one identified by (Goretti, 2013), who also find strong negative effects of debt on investment in their sample of euro area firms. Using a large sample of non-financial firms from six euro area countries, (Martínez-Carrascal, 2008) evidence that indebtedness and debt burden exert a negative impact on investment, while cash flow is positively linked to it. In terms of country differences, the authors find that firms located in the Netherlands and Italy present the highest marginal impact of financial pressure on investment rates, whereas German firms present the lowest sensitivity. Nevertheless, notice that debt may have some desirable properties, allowing financing projects in the absence of internal funds (Gatchev, V., Pulvino, T., Tarhan, V, 2010). One of the most comprehensive studies on this subject is (Siedschlag, I., O'Toole, C., Murphy, G., O'Connell, B, 2014), which analyze firms from eleven European countries, including Portugal. The authors evidence positive and significant effects of cash flow and leverage on investment, being these effects stronger during the recent financial

crisis. Recently, (Gebauer, 2017), using firm-level data from 2005-2014 for five peripheral euro area countries (also including Portugal), evidence that the investment sensitivity of debt increased after 2008 when financial distress intensified and firms had a lower capacity to finance investment from internal sources of funds.

The majority of these studies were based on listed and large firms, located in highly developed economies and with an easy access to capital markets, with the focus on SMEs and less developed economies being much more recent. Notice that SMEs are in fact those thought to be more vulnerable to asymmetric information problems and hence more likely to face a higher external finance premium (Ferreira, M., Vilela, M, 2004). A recent publication from Banco de Portugal (2016) concludes that, in a general way, financial ratios seem to explain better the investment dynamics than the qualitative answers given by firms in a comprehensive survey. Concerning the investment-financial situation issue, in the last three decades only a handful of empirical papers used data for Portuguese firms. (Farinha, L., Prego, P., 2013), using data from 1986 to 1992 concludes that the availability of internally generated funds affects investment decisions of smaller firms. (Oliveira, B., Fortunato, A, 2006) use balance sheet data of manufacturing firms for the period 1990-2001 and find that smaller and younger firms have higher growth-cash flow sensitivities than more mature firms, a result that could be explained by the fact that cash-flow realization is particularly important for those firms, not necessarily indicating the existence of financing constraints. (Barbosa, 2007) analyze the period from 1995 to 2005 and find that the impact of firm indebtedness on investment depends on firm size, the number of bank lending relationships and credit default history. More recently, (Farinha, L., Prego, P., 2013), using data from 2006 to 2011, evidence that, particularly for smaller firms, the financial position is relevant in explaining investment decisions, with the burden of servicing debt, the cost of capital and leverage all displaying a negative relation with investment, whereas profitability has a strong and positive relationship.

## 3. RESEARCH METHODOLOGY

### 3.1 Data Sources

The research employs data of firms that are listed on the Pakistan stock market. As of Dec 2018, there were 546 firms listed on Pakistan' stock market. However, the study only analyzes non-financial firms because the determinants of their investment decisions are different from that of financial companies. In particular, enterprises which operate in the financial sector have different Balance Sheets from those of the nonfinancial firms. Besides that, this paper excludes companies about which there is no five-year information on Financial Statements are available and consider only high market capitalization companies. Therefore, the sample creates a balanced panel data which cover a 5-year period from 2014 to 2018 with 600 observations of 20 listed firms. The information about these firms is mainly obtained from Pakistan's stock exchange websites; others are from companies' websites.

### 3.2 Econometric model

To form the association between corporate investment and its determinants, model has been established and projected. The study uses a quadratic function to imprisonment the structures of parabolas and to find the vortex, i.e. the point of inflection beyond which the relationship between explained and explanatory variable changes. The study model developed is expressed in Equations below which are the hypotheses of the study:

$$\text{Investment Rate} = \alpha + \beta 1CF + \beta 2LV + \beta 3FC + \beta 4FS + \beta 5COB + \beta 6ETR + \varepsilon i$$

Where investment rate is a predicted variable, is used as a proxy of corporate investment, CF is identifying as cash flow whereas LV represent leverage. FC and FS is the symbol for fixed capital intensity and firm size where as α is the constant. COB and ETR is used for cost of borrowing and effective tax rate respectively, and lastly ε is the error term.

### 3.3 Dependent variable
### 3.3.1 Investment rate:
Investment rate reflects corporate investment decisions. This variable is the ratio of investment expenditure to capital stock; and, described by following formula below, in which capital stock equals fixed assets. This variable is taken from Balance Sheets of firms

Investment rate= (Capital Expenditure ending- Capital Expenditure beginning / Capital stock)

### 3.4 Independent variable
### 3.4.1 Cash-flow:
Cash-flow is used as a proxy for the internal net worth of a company. Cash flow generated from operating activities, can be easily find out in cash flow statement of companies. This variable is taken from statement of cash flow. Cash-flow is an important determinant for investment decisions of firms because if firms have enough cash inflows, it can be utilized in investment activities. In other words, firms already know about potential investment opportunities; However, they cannot invest because access to external funds is limited. When cash-flow is improved, they can participate in attractive opportunities that might be otherwise unavailable. The expectation of the link between investment rate and cash-flow is a positive sign.

*Hypothesis 1: There is a significant relationship between cash-flow of firms and investment decision.*

### 3.4.2 Leverage:
Leverage is the ratio of total liabilities to total assets. This variable is calculated from the Balance Sheets of each firm. Leverage might have a negative impact on corporate investment decisions through two channels. First of all, an increase in leverage might strengthen bankruptcy risks; managers may be afraid that shareholders would be move to decline borrowings and/or reduce investment. Secondly, higher levels of debt result in the reduction of funds in hand; therefore, leverage has an inverse effect on investment decisions at the firm level. The relationship between investment decisions and leverage is expected to be negative or positive.

*Hypothesis 2: There is a significant relationship between leverage and investment decision.*

### 3.4.3 Fixed capital intensity:

This is measured by fixed assets divided by total assets that are taken from the Balance Sheets of firms. It is clear that when fixed capital increases, it means firms invest more in machinery to satisfy demand for production. Hence, this variable is expected to have a relationship with investment.

*Hypothesis 3: There is a significant relationship between fixed capital intensity and investment decision.*

### 3.4.4 Firm size:

From previous research, there are three measurements of firm size, such as log value of total assets, total revenue, and total number of employees. Some information is not complete because the Annual Reports of some firms contain information about the number of employees, while others do not. Additionally, since total asset is easily available in every company financials so it is used for measuring firm size. On one hand, (Bokpin, 2009) proved that firm size is a negatively significant determinant of investment decisions. One the other hand, (Kumar, 2011) have made opposite findings. The reason is that large firms should have better access to external capital sources, more stable cash flows and be more diversified than small ones. Hence, this leads to incentive investment activities. Therefore, this variable is expected to be a mix associated with investment.

*Hypothesis 4: There is a significant relationship between size of firms and investment decision***.**

### 3.4.5 Cost of borrowing:

Cost of borrowing is measured as the interest rate prevailing in market at that point of time. The investments can be funded through either equity or debt. Depending on the market condition, especially that relating to interest rate, firms may undertake new investments when the interest rates are lower. On the other hand, firms may defer their investment proposals when the interest rates are higher.

Hypothesis 5: There is a significant relationship between cost of borrowing and investment decision

### 3.4.6 Effective Tax rate:

We argue that taxation leads to decreased investment and that higher tax liabilities at the firm-level decrease investments even further.

E.g., (Degryse, 2006) document that major industrialized nations of the world are rather tax-competitive in attracting large profitable corporate investments. Therefore, taxes are an empirically and theoretically important determinant of investment.

*Hypothesis 6: There is a significant relationship between corporate tax and investment decision.*

### 3.5 Panel Regression and Correlation analysis

Panel regression is a modeling method adapted to panel data. These are Models that combine Cross-sectional and Time-Series Data. Panel data comprise observations of multiple phenomena gained over multiple time periods for the similar firms (Gebauer, 2017). Normally, methods of estimation for panel data are Ordinary Least Squared (OLS), Fixed Effects Model (FEM), and Random Effects Model (REM). Particularly, the researchers assumed the unobservable individual effect is zero and employ pooled OLS regression to estimate the investment equation. This assumption leads to the problem of heterogeneity across industries and across firms within the same industries. Hence, FEM and REM are used to cope with this problem. Nonetheless, it is difficult to choose which one is the most appropriate. Before regression analysis correlation analysis is also used in order to know the strength of relationship among both the variables. It is a method of statistical assessment used to know the strength of an association between two, continuous and numerically measured variables.

### 3.6 Hausman test

To decide between FEM and REM, the research runs the Hausman test where the null hypothesis is that the coefficients estimated by the efficient RE estimator are the same as the ones estimated by the consistent FE estimator. After that, based on the Chi-squared statistic the null hypothesis will be rejected at the 10 percent level of significance. The result will suggest that FEM or REM which one is more appropriate. Nonetheless, there are econometric issues which may affect the estimator.

# 4. RESULTS & DISCUSSION

## 4.1 Descriptive statistics

Table 1 reports the overall observations' mean, standard deviation, minimum, and maximum values. Information from this table reflects a high variation of investment among the listed firms on the Pakistan's stock market. The mean of investment rate is 0.07, while its standard deviation is 0.11, whereas min and max rate of investment were -0.09 and 0.39 respectively. The mean of leverage ratio is 0.33 although its std, min and max value is 0.19, 0.12 and 0.63 respectively. This suggests that there is a significant reliance on debt by some companies in Pakistan's listed firms. Additionally, the sample mean of cash flow is 9.19, whereas std is 5.40 and min and max figures lie between 2.23 and 20.6. Besides this, the mean for fixed capital intensity is 0.52 and this shows majority of the companies under study are capital intense across the sample. It is also observed that the mean of firm size is 15.80. Finally, cost of borrowing and corporate tax rate records the mean of 0.098 and 0.250.

**Table 1: Basic statistics of the key variables**

| Variables | Mean | Std | Min | Max |
|---|---|---|---|---|
| Investment Rate | 0.071 | 0.110 | -0.090 | 0.390 |
| Cash Flow | 9.190 | 5.400 | 2.230 | 20.610 |
| Leverage | 0.330 | 0.190 | 0.120 | 0.630 |
| Fixed Capital Intensity | 0.520 | 0.230 | 0.031 | 0.780 |
| Firm size | 15.800 | 1.400 | 12.201 | 18.901 |
| Cost of Borrowing | 0.098 | 0.080 | 0.063 | 0.150 |
| Corporate tax rate | 0.250 | 0.101 | 0.202 | 0.300 |

## 4.2 Correlation analysis

Table 2 reports the correlations among the independent variables. Specifically, the research uses the pairwise correlation analysis to assess collinearity problems. Furthermore, there are some inverse relationships among these variables (i.e., cash-flow and fixed capital intensity, leverage, cost of borrowing and tax has negative connections). Meanwhile, there are also some direct relationships among these variables (e.g., firm size and leverage, fixed capital intensity, cost of borrowing has positive links). Overall, these variables are less than 0.4. This suggests that multi-collinearity is not a serious issue.

**Table 2: Correlation coefficients of the explanatory variables**

| Variables | Cash flow | Leverage | Fixed capital intensity | Firm size | Cost of borrowing | Corporate tax rate |
|---|---|---|---|---|---|---|
| Cash Flow | 1 | | | | | |
| Leverage | -0.11 | 1 | | | | |
| Fixed Capital Intensity | -0.23 | 0.06 | 1 | | | |
| Firm size | 0.30 | 0.37 | 0.35 | 1 | | |
| Cost of Borrowing | -0.10 | 0.20 | 0.08 | 0.15 | 1 | |
| Corporate tax rate | -0.25 | 0.07 | 0.09 | 0.01 | 0.13 | 1 |

## 4.3 Hausman test

Hausman proposed a test to facilitate the choice of an appropriate technique from among the two competing approaches namely the fixed effects and the random effects. This test tells us that difference between the fixed effect and the random effect estimators is significant or not. In this study we applied Hausman test to identify the suitable technique. Results indicate that Chi-square value of cross section is 37.48 having p-value of 0.0017. Hence the Hausman test recommends fixed effects model to be employed in order to obtain consistent and efficient estimates.

## 4.4 Econometric model analysis

Table 3 summarizes the results of regressions on determinants of corporate investment decisions from panel data for the period from 2014 to 2018. From the result of Hausman test which suggested that FEM is more appropriate. The regression result of FEM shows that cash-flow, fixed capital intensity, leverage, and firm size are the main factors which interpret the investment activities of firms. It provides the empirical result of FEM with estimator as follows: cashflow, fixed capital intensity, firm size and leverage. In particular, cash-flow is statistically significant and positively associated with investment decisions at the micro level. This result shows that an increase of 1% in cash-flow might lead to an increase of 0.66% in investment whilst other independent variables are constant. In other words, this indicates that cash-flow is an important determinant of corporate investment decisions and can help stimulate investment. In addition, there is definitely a positive statistically significant relationship between fixed capital intensity and corporate investment decisions at a 1 percent level of significance. The estimated coefficient of 2.755

indicates that an increase of 1% in fixed capital intensity will cause an increase of 2.755% in investment decisions at the firm level. Therefore, firms have to change technology and machinery to meet these standards. This means fixed capital intensity contributes to the investment activities. In terms of firm size, the estimated coefficient of this variable is -0.567, which indicates that firm size is negatively statistically significant when associated with investment decisions at 1% and 5% respectively. This finding suggests that the larger the firm is, the less investment it will make. Next, leverage is statistically significantly correlated with investment decisions in the FEM regression.

**Table 3: Regression analysis of investment equation**

| Variables | Coefficient | t-statistics | P Value |
|---|---|---|---|
| (Constant) | 0.488 | 1.864 | 0.000 |
| Cash Flow | 0.661 | 2.77 | 0.003 |
| Fixed Capital Intensity | 2.755 | 5.351 | 0.002 |
| Firm Size | -0.567 | 2.345 | 0.001 |
| Leverage | -0.335 | 1.115 | 0.000 |
| Cost of borrowing | -0.483 | 1.215 | 0.000 |
| Effective tax rate | -0.461 | 2.435 | 0.000 |
| R Square | 66.48% | | |
| F | 260.962 | | |
| Sig.(F-stat) | 0.000 | | |

The results of cost of borrowing revealed that investment decisions and cost of borrowing have a negative relationship (-0.483) and are statistically significant. This indicates that cost of borrowing does play an important role for investment decisions of listed firms. Effective tax rate is also negatively correlated with investment activities but also significant in statistics. Specifically, effective tax rate is statistically significant and negatively associated with investment decisions. The effective tax rate coefficient of -0.461 reveals that if investment opportunities grow by 1%, the investment rate will go down by 0.461% on the condition that the other independent variables are held constant. Furthermore, there is an inverse statistically significant association between cost of borrowing and investment decisions at a significant 5 percent level. It means that cost of borrowing will be a disincentive to investment activities of the listed firms. This result indicates that cost of borrowing is also an important determinant of corporate investment decisions. The

coefficient of - 0.483 points out that if cost of borrowing rises by 1%, investment will drop by 0.48% on the condition that the remaining predictor variables are unchanged.

### 4.5 Discussion

This result shows that an increase of 1% in cash-flow might lead to an increase of 0.661% in investment whilst other independent variables are constant. In other words, this indicates that cash-flow is an important determinant of corporate investment decisions and can help stimulate investment. This result is also matched with the findings of, Aivazian, (2005), Azzoni and Kalatzis (2006), Adelegan and Ariyo (2008), Jangili and Kumar (2010), Nair (2011), Ruiz-Porras and Lopez-Mateo (2011). The fixed capital intensity coefficient of 2.75 reveals that if investment opportunities grow by 1%, the investment rate will go up by 2.75% on the condition that the other independent variables are held constant. This result is the same expected sign and is logical with the following research, Saquido (2003), Aivazian et al. (2005), Baum et al. (2008), Carpenter and Guariglia (2008), Bokpin and Onumah (2009), Li et al. (2010). This finding suggests that the larger the firm is, the less investment it will make. In addition, it is the same as the expected sign and consistent with previous research such as that of Adelegan and Ariyo (2008), Li et al. (2010), Ruiz-Porras and Lopez-Mateo (2011). Next, leverage is statistically significantly correlated with investment decisions in the FEM regression at the 1% level of significance. Besides, the sign of this estimated coefficient is as expected and is logical with the following studies: Azzoni and Kalatzis (2006), Ninh L.K. et al. (2007), Adelegan and Ariyo (2008), Jangili and Kumar (2010), and Nair (2011).

### 5. CONCLUSION

From our research results, some following conclusions should be made. First of all, cash flow is approximately positive and significant in statistics across regressions. This result implies that cash-flow (or internal funds) is the key determinant of investment decisions at the firm level. It also indicates that firms use their own capital to finance their investment activities besides external funds. Secondly, fixed capital intensity is absolutely positive and statistically significant associated with corporate investment decision across all estimators. It

indicates that fixed capital intensity helps investment activities to be intensive. The finding also affirms that fixed capital intensity is a major determinant of investment decisions for improving product quality and productivity. Thirdly, firm size is mostly positive and statistically significant related to investment decision across regression. This result reveals that firm size or investment opportunity does stimulate the investment activities of listed firms in the Pakistan stock market. Fourthly, leverage and investment have a negative and statistically significant relationship across regressions. It reveals that leverage does not help stimulate investment activities of firms. This result can be explained as follows: because leverage is large which will affect potential profitability, the firms will be careful in making investment decisions. Fifth, cost of borrowing is negative and statistically significantly associated with investment decisions across fixed effect models. This result implies that cost of borrowing is the main determinant of corporate investment decisions. Sixth, the connection between effective tax rate and investment decision is definitely negative and significant in statistics across estimators. It demonstrates that tax is a key element in making investment decisions at the firm level.

## 5.1 Policy recommendation

From research implementation viewpoint, this research will support finance managers in financial strategy decision making, opting for understanding key factors and their effect on investment decisions through detailed consideration after considering all the factors. The study will help in managing and promoting the importance of cash flow, leverage, firm size, and cost of borrowing relationship with investment, as it is vital for managers to boost their financial performance. The study has great importance as its benefit's financial managers, especially those who are aiming to increase profitability and performance through investment. Thus, it is useful for the managers to get the knowledge of these implications.

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