A study on the impact of Investors' sentiments on corporate investment efficiency through mediating effect of Credit Financing

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This study investigates the effect of investors' sentiments on the corporate investment efficiency of the selected sector companies of Pakistan's stock exchange with the mediation effect of credit financing. Mainly, four sectors, among which only 13 public listed companies are selected. Panel techniques are used and data is collected from the published financial reports of the companies of last 10 years (2006 to 2015). Share turnover is used to examine the investors' sentiments. This study discovers that there is a positive relationship between the investors' sentiments and over-investment of the organizations and vice versa, while investors' sentiments have a significant impact on investment efficiency with the partial mediating role of credit financing but only in case of underinvestment. Investors' sentiments do have a significant effect on overinvestment but it is not due to the mediating role of credit financing. Due to the optimistic investors' sentiments, the credit supply is increased, but firms would have more funds to invest which may cause abuse of corporate funds, but due to strong supervision functions, this problem is also reduced.

Keywords: Investors' sentiments, corporate investment efficiency, credit financing, bank loans, overinvestment and underinvestment

INTRODUCTION

Investment is an essential factor not only one which determines the business climate and the net value of the listed companies, but also an important component of the economic development. It helps to identify the firm status and trends prevailing in the market. Previously, standard finance theory assumed that rational decisions are made by the investors in the capital market, whereas this theory assumes that there is a perfect market which does not exist in reality. However, another emerging financial discipline that is affecting the corporate investment efficiency is behavioral finance, developed in the 1980s. It states that investors' decisions are not always rational. Now a days, investors' sentiments have been considered as an important part of the investment decisions made by the corporations. Behavioral finance basically explains the behavior of the market investors who become the cause to manipulate the firms' stock prices. These sentiments affect the firms' financing and investment related decisions and ultimately, they influence the market share prices (Baker et al. 2007).

The existing evidence does not prove that future cash flows and investment risk are the results of the perception of the investor (DeLong et al. 1990a). But many research studies have also found that share prices in the capital market and financing needs of the corporation are affected by the sentiment of the investors. These studies have shown the direct and strong relationship of the corporate investment time and the investment cost with the investors' sentiments. The management of the company includes the investors' sentiments while evaluating the project and raises their investment expenditures when optimistic sentiments are observed and reduces their investment when pessimistic sentiments are there

so the valuable investment opportunities are dropped to match the investors' sentiments (Zhao-Hui Zhu, 2016). Now a days, investors' sentiments have become the best excuse for fulfilling management's own objectives.

Investors' sentiments are the emotions of the investors, which induce them to take irrational investment decisions without any fundamental analysis. Investors may have optimistic sentiments about a particular stock which cause high-flying investors' sentiment or pessimistic sentiments which in turn cause a downcast in investors' sentiment. *This paper investigates the problem that how high-flying investors' sentiments affect corporate investment efficiency of different companies related to 4 different sectors with the mediating role of credit financing* and explains it in the context of financing constraints and agency problems relating to Pakistani listed companies as this relationship has not yet been conducted on the Pakistani companies. Consequently, it is interesting to conduct this study on the PSX's companies. Investors' sentiments are investigated through a proxy named as share turnover in the context of PSX's listed companies in different sectors under this research study (Su-Sheng Wang).

The significance of this study is that it helps the Pakistani investors to better understand the impact of their sentiments on companies' stock and how it would increase their credibility which would lead them towards the overinvestment due to loose banks' controlling functions by the financial management or institutions and it also decreases the problem of underinvestment. In the current study, companies of different sectors (fertilizer, transport, refinery and automobile assembler) are selected on which impact of the investors' sentiments is evaluated.

The aim of the study is to analyze the impact of investors' sentiments on the company's investment efficiency relating to the different sectors of Pakistan, with the mediating role of credit financing. The main objectives of the study are;

- To study the impact of investors' sentiments on corporate investment efficiency (Overinvestment or underinvestment) with the controlling effect of free cash flows, growth, ROA, size, ratio of independent directors and top shareholdings
- To study the impact of credit financing on corporate investment efficiency (Overinvestment or underinvestment) with the controlling effect of free cash flows, growth, ROA, size, ratio of independent directors and top shareholdings
- To study the investment efficiency among companies related to different sectors of Pakistan in the presence of investors' sentiments through credit financing with the controlling effect of free cash flows, growth, ROA, size, ratio of independent directors and top shareholdings

LITERATURE REVIEW

As found out by Modigliani and Miller (1958), it is not important to know what type of capital structure a company is using to obtain the funds for making investments in case of perfect capital markets as perfect capital markets do not exist, so in an imperfect capital market it does matter what kind of capital structure is adopted for financing the investment of the corporations like cash flow raised internally or externally. Inefficient investment decisions are the main cause of the disaster in the imperfect capital market. Moreover, when stakeholders' interests mismatch with each other, two main problems arise. First is overinvestment and the second is underinvestment. These are the indicators through which corporate investment efficiency is measured.

Investment management has to bear the risk to get the optimal returns at some cost. These are functions of investment efficiency and there are barriers that the corporations have to manage. (T.M. Hodgson, 2000). Overinvestment arises when manager invests blindly in inefficient projects and loose supervision by the financial institutions, whereas underinvestment is a state where a shortage of cash is observed for financing any new efficient project (NASDAQ).

Information asymmetry theory states that corporate managers and supervisors are in beneficial condition than the investors trading in the financial market. The company's investment is the only way for the investors to make predictions about the company's future. When investors' predictions are positive about the company's future, then they would invest their money in the stocks of that company which would increase the share prices in the capital market and vice versa.

A company that makes investment decisions would analyze the effect of investors' sentiments as it becomes an important element to investigate. Otherwise, the company may face disaster and at the end, it would influence the corporate investment efficiency (Zhao-Hui Zhu, 2016). According to *the monetary overinvestment theory* presented by Hayek and Mises in 1933, which states that there must be a balance between consumption and investment pattern to achieve the equilibrium point of economy. The distribution of the investments must be equal among all the industries, so that all industries could equally participate to fulfill the demand of the consumer. Excess cash in the corporations might increase the agency problems where managers' interest does not match with the shareholders' interest and they make useless investment by just viewing the investors' sentiments prevailing in the market (Vosvrda, 2000).

In *tradeoff theory* presented by the Myers in 1984, it is simply stated that increase in capital through the channels of debt, is most desirable by the organizations because it causes to reduce the tax liability as there is no tax liability on the debt. More debt would be arranged by the firms to get the advantage of tax shield (Myers, 1984).

While *Pecking theory* describes that, firms which want to indulge their cash in capital investment for earnings and making more cash, this can only be done through the internal funds or by the way of external funds. But according to this theory, there is a condition to obtain external loans or funds for capital financing that is, external financing would only be availed when internal funds are insufficient to fulfill the requirements of capital investments. If this condition is not fulfilled or internal funds are enough to invest in capital investments, then external financing sources could not be used. Firms would have many benefits if they adopt internal financing. First of all, there would not be any external person who has control on the firms' working, as involvement of the third party in the companies' affairs would be eliminated. Secondly, there would be no obligation to pay off the interest payments against the funds obtained (Myers, 1984).

Another theory that relates to this study is *Agency cost theory* which states that all the interested parties have their own personal purposes and intention which create a gap with other stakeholders' objectives and aims. Best capital structure for the firm is that in which all the interested parties are comfortable or interests of all stakeholders are negotiable in the sense that whether they should accept external financing or internal financing, due to these settlements between dealers and management, conflicts are reduced.

Investors' sentiments are the emotions of the investors, which induce them to take irrational investment decisions without any fundamental analysis. Investors may have optimistic sentiments about a particular stock which causes a high-flying investors' sentiment or pessimistic sentiments which cause downcast in investors' sentiments (Chen, 2016).

Financial markets have a long tradition to use the efficient market hypothesis (EMH) theory for describing the price variations of the securities. According to this theory, all the relevant information about the stock is reflected in the stock prices. But only weak and semi-strong efficient market hypothesis theory is considered under this study as strong efficient market hypothesis theory is a matter of the perfect market which does not exist in reality. EMH was the main reason of the clashes that markets have to suffer earlier because investors have neglected the impact and significance of the sentimental judgment and decisions. (Li, 2008).

Noise investors are existed in the financial markets, but it all depends upon the market whether it is able to control its effects, which cause misrepresentation of the stock market because of them. If the overall impact of these traders is not balanced then it causes greater risk for the speculators (Rehman, 2013). Berthelsen & Schade (2015), have used investors' mood as proxy of investors' sentiments and analyzed it in many ways (i.e. results of the sport and through sunshine etc.) which concluded investors' sentiment have an impact on stock market returns with the moderating role of culture. The finding of the study was that the culture has a significant moderating impact between the investors' sentiments and stock market returns. According to Edmans et al. (2007) research, soccer games, which were held and played by European national teams, are used for investigating the moods of investors and it was observed that winning the soccer game made an optimistic impact on investors' moods and in return the prices were increasing. Moreover, it also caused positive expectations of the investors.

Standard finance only includes the rational decisions and does not consider those decisions affected by risk. Previously, a study was conducted to observe the impact of psychological factors that are affecting the decisions relating to investments with the mediating role of risk perception (Hunjra, 2015). According to the findings, risk perception has an important part to consider in making decisions about investment (Mahmood et al. 2011).

Investor sentiment and corporate investment efficiency

The marginal value of the project is the only decisive factor that is to be considered by the companies for making an investment. Many other studies have investigated that noise diversification would have a significant impact on the market efficiency that encourages the companies to invest in projects which are not the best option to choose for the company's welfare (Chen et al. 2012).

Level of investment can be altered because of investors' sentiments, by including the channels of corporate credit financing that ultimately cause corporate investment efficiency to change. Problems of overinvestment's deterioration, when low supervision functions exist, are involved by the financial institution and alleviation of the underinvestment occur by raising the investment level in corporations. However, by reducing the investment level, the reverse effect may occur that is alleviation of overinvestment and deterioration of underinvestment. (Huang & Liu, 2014).

Being the management of the company, investments depend on the investors' sentiments, that results in optimistic sentiments of management of the company and induce them to continue with credit financing more effectively. This approach further increases the expectation of the investors so that the chain will start again and this time management might abuse the fund obtained from banks to pursue their own objective rather than to pursue firm's objectives (Jin, 2016).

However, investor influenced by the sentiment will raise the overinvestment of the organizations, whereas eliminates the problem of underinvestment faced by the organizations. But in case of pessimistic investors' sentiments about the particular stock of the particular firm, this position also affects the corporations as it will limit the management to make investment blindly because during this period, financing cost will be increased and corporations have to face difficulties to access the funds due to lower credibility. Credit financing facilities through the banks will vary according to the prevailing environment (Huang and Liu, 2013).

A study conducted by the Ulrike Malmendier and Geoffrey Tate in 2005, in which it is stated that over-confidence of the higher management creates distortion in company's investments. CEOs of the companies who are overconfident about the prospects of the new projects usually overestimate the project's return and debt financing is considered as costly. CEOs of the companies invest extensively when more cash is available internally, including personal opinion, whereas they limit their investment when external financing is obtained. 500 CEOs are investigated using panel data. The study significantly concluded that overconfident CEOs make over-investment when internal cash flows are involved.

A study conducted by Mobeen ur Rehman (2013) on investors' sentiment as an independent variable is affecting the stock market returns whereas sentiments are measured and analyzed using six proxies. The result of the study was that in the weak efficient market hypothesis, investors' sentiments do have an essential impact on stock market returns in the KSE (Karachi stock exchange). It shows that stock market returns' volatility is not only affected by the sentiments, but investors also do some technical analysis of listed companies so that they could make wise decisions for trading the shares of the companies. (Rehman, 2013).

For measuring the irrational traders' sentiments, different proxies are identified that are considered important which are named as trading size of the investors in the market, flows of mutual funds, the investors' survey, moods of the investor, dividend premium, close ended fund discount, retailing traders, average return of the IPOs, the size of the IPOs, volatility of the implied option, insider traders and equity shares (Baker and Wurgler, 2006). These proxies are used by different researchers as a measure of investors' sentiments which affect the stock returns in the short run as well as in the long run.

H1a: Investors' sentiments have significant positive impact on overinvestment

H1b: Investors' sentiments have significant negative impact on underinvestment

Bank Credit financing and investments' efficiency

Problems faced by the corporations, due to the financial constraints can be removed with the help of debt financing channels which may either be bond financing or bank credit financing (Chava & Roberts, 2008). According to the opinion of Yu et al. In 2012, barriers of finance have been successfully reduced and more funds can be obtained by the corporations through bank credit financing. Credit financing has become one of the main networks to raise finance for the corporates whereas it not only serves as a financial tool, but also provides a key structure of governance for all the companies.

There are a lot of previous studies that has analyzed the impact of firm liabilities on its decisions relating to investment opportunities. These studies have shown two results or we can probably say problems. Firstly, as viewed by Myers (1977), problem of underinvestment is raised, that is a situation when high debt ratio has caused the reduction of funds in hand due to which the management has to drop the beneficial investment opportunity. This case shows that firms having a high debt ratio are unable to adopt the positive net present value project than the companies having a lower debt ratio. The second problem is about overinvestment, as pointed out by Jensen (1986) and Stulz (1990), in which high debt ratio limits the corporate management for misusing the funds for free cash flow. Banks or financial institutions play their role to reduce the problem of over investment by doing proper supervision, disciplining and controlling functions in corporations having a high debt ratio but bearing low growth (Zeng, 2014).

In previous studies, it has been verified that increasing funds from the bank loans alleviate the problem of underinvestment in firms having high growth and low growth through the investment opportunities. But, due to the controlling effect of the bank loan ratio, over investment in the firms are controlled and reduced, which ultimately reduces the overall liabilities of a firm. Firms' fixed investments have an inverse correlation with the credit financing ratio. This relation is also applicable in Pakistani listed companies. This relation is mostly popular with the less growing firms. Firms are unable to invest aggressively in investment projects as banks have strict and strong controlling functions over the companies due to which overinvestment in the firms is reduced. In addition, corporations having more internal cash flow can invest aggressively without any accountability to any external party. Now-a-days, credit financing as liabilities is becoming an important factor to be considered for making investment decisions.

By the view of Jensen (1986), due to the inverse relation of credit financing and companies' investments, aggravation of the over investment is also controlled by avoiding the managements' own purposes. Overinvestment is made by the management to fulfill their own objectives which are necessary for managers, but not for the company's future prosperity (Faris Nasif, 2012). Companies depend on growth opportunities for avoiding over investment through credit financing. In other words, companies having a low growth are more likely to avoid over investment through bank loans or liabilities (Jensen, 1986). As pointed out by Stulz (1990), Jensen (1986), Moore and Hart (1995), bank loans limit the overinvestment in companies. Important reasons behind this are a large interest repayment or obligations, which not only increase the risk of bankruptcy, but also companies' free cash flow is reduced due to these large payments which induces the top management to decrease its fixed investments and dissolve the non-profitable business or a particular division (Kazuyuki, 2011)

In case of bank loan, organizations are also forced to pay back the loan amount and induce them to work on the projects which have attractive returns so they could pay back the loan amount with interest. Supervision functions bound the organizations not to invest blindly and must take investment decisions in which expected returns are optimistic. But in case when there is no proper supervision and controlled functions on companies, companies will abuse the bank loan or funds. The above situation was the first aspect of the barrier. (Tempel, 2011).

First of all, the problem of overinvestment exaggerates due to more availability of cash; second effect is that credit financing also prevents overinvestment by the way of supervision functions; now last but not the least effect is, it removes the problems of lessened cash or underinvestment in the firm. In this study, impact of loans is analyzed on investment efficiency by the way of credit financing that has been discussed.

A China based study, in which relationship of the bank credit and corporate investment efficiency (over-investment, under-investment) is explained, has concluded that a bank's credit loan is significantly related to the corporate investment efficiency (Chen, 2016), yet another China based study states that the bank loan ratio has stronger indirect relation with corporate investment when strong controlling function is involved by the financial institution. (Kazuyuki, 2011)

H2a: Credit financing has significant positive impact on overinvestment

H2b: Credit financing has significant negative impact on underinvestment

The credit financing mediation effect by which investors' sentiments affect corporate investment efficiency

In this study, investors' sentiments are evaluated with a proxy to properly analyze its impact on corporate investment efficiency (over-investment, under-investment) with partial mediation role of a bank loan or credit financing. In the underlying study, other variables like culture, catering of the controlling shareholder, stock volatility, etc. that may affect the relationship of the investors' sentiments and corporate investment (over-investment, under-investment) are not eliminated but here only the partial role of bank credit is investigated and analyzed.

Controlling variables that are being used in this study are also carried by several studies. A China based study, which investigated the relationship of the investors' sentiment and investment efficiency (over-investment, under-investment) with the moderating role of controlling shareholders' catering have used controlling variables named as the cost of administration (ADM), capital occupied by the major shareholders (ORA), Asset turnover (TAT), Return on asset (ROA) and free cash flow (FCF) to measure the above variable relationship (Z. H. ZHU, 2016).
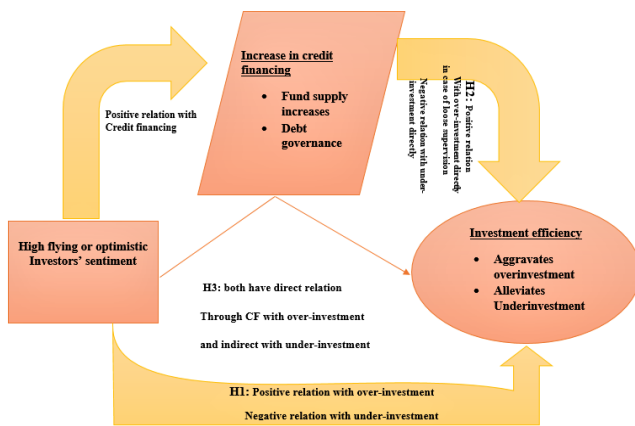
Another study presented by Chen in 2016, same control variables like cost of administration (ADM), capital occupied by the major shareholders (ORA), Asset turnover (TAT), Return on asset (ROA) and free cash flow (FCF) are used, in addition to these, ownership, growth, size of the firm, seasoned equity offering (SEO), ratio of the independent directors, top shareholding and some macro level control variables are also used to investigate the relationship between the investors'

sentiments and corporate investment efficiency. Therefore, this study shows the effects of investors' sentiments are investigated on the corporate investment efficiency with the mediating role of credit financing. Corporate investment is measured through the Richardson model (2006) which decides whether a firm is having overinvestment or underinvestment. Whereas control variables for this study are growth, size, the ratio of the independent directors, top shareholding, return on asset (ROA) and free cash flow (FCF).

H3a: Investors' sentiments through credit financing aggravates over investment

H3b: Investors' sentiments through credit financing partially alleviates underinvestment

The research model of the study is explained in the following diagram;

METHODOLOGY

This study explores the relationship between the investors' sentiments and corporate investment efficiency with the mediating role of credit financing, with the philosophy of positivism and deductive approach. The methodology of the research is quantitative because computations and numerical data are used and research design of the study is explanatory in which causal relationship is investigated.

The suitable strategy for this study is archival research as data is collected from the annual reports of the corporates for the year 2006 to 2015. All the data is collected from the official websites of the companies, open doors website, PSX (Pakistan stock exchange) and many other websites where data is available. Panel techniques are used and panel is developed according to the companies involved. Research sample of this study is listed companies of the PSX related to the four sectors named as automobile assemblers, fertilizers, refinery and transport. These sectors are selected because at least two companies of each of these sectors are amongst the top companies according to the PSX 2014 to 2015. Therefore, research sampling is systematic sampling and unit of analysis are 13 organizations after screening process.

Investors' sentiments are calculated through a proxy named share turnover, whereas corporate investment efficiency is measured through the Richardson model (2006) by the

following equation (EQ 4) which provide residual values. If the residual values are more than zero, it would be regarded as overinvestment and if less than zero then it is underinvestment. Moreover, controlling variables are also added to properly evaluate the relationship. To include the corporate governance, two variables, i.e. ratio of independent directors and top shareholding are included. To include the internal financing sources, free cash flows are used. For measuring growth, operating revenue, for size, book value of total assets and for profitability, return on asset (ROA), are included respectively.

To operationalize the ratio of independent directors, numbers of independent directors are divided by the total number of board of directors. For investigating the top shareholding, ratio of shares held by the largest shareholder to total equity of last year is used. Free cash flows are being analyzed by taking the difference between operating cash flows and the regression fitting value of Richardson's model and then divided by the total asset of the last year.

Growth is measured by taking the difference between operating revenue of this year and operating revenues of last year divided by the operating revenue of last year. Return on asset is calculated by dividing the net profit and total asset at the end of the year. The size of the firm is obtained by the taking the natural logarithm of the book value of total assets at the year end.

Panel estimation techniques are used for analysis, as data is settled into form of panel of companies, i.e. overinvestment panel and underinvestment panel. Following Model 1, 2 and 3 are run in STATA to test first, second and third hypothesis one by one using the panel. Moreover, fixed and random effect model is executed separately, Hausman test, normality test, heteroscedasticity test and descriptive test is implemented and executed in STATA software.

Hence, the following is the econometric model of the research.

To test the first hypothesis, following model is used with controlling variables

$Overinvestment_{i,t}$ or $|underinvestment|_{i,t} = \alpha i + \alpha t + \beta_1 senti_{t-1} + \beta_2 IND_{i,t-1} + \beta_3 TS_{i,t-1} + \beta_4 FCF_{i,t-1} + \beta_5 Growth_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 Size_{i,t-1} + \varepsilon$ ………………………………………………………….. EQ (1)

To test the second hypothesis, another model is constructed to check whether the investment efficiency is affected by the credit financing,

$Overinvestment_{i,t}$ or $|underinvestment|_{i,t} = \alpha i + \alpha t + \beta_1 CF_{t-1} + \beta_2 IND_{i,t-1} + \beta_3 TS_{i,t-1} + \beta_4 FCF_{i,t-1} + \beta_5 Growth_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 Size_{i,t-1} + \varepsilon$ ………………………………………………………….EQ (2)

To test the third hypothesis, following model is used with controlling variables:

$Overinvestment_{i,t}$ or $|underinvestment|_{i,t} = \alpha i + \alpha t + \beta_1 senti_{t-1} + \beta_2 CF_{t-1} + \beta_3 INDE_{i,t-1} + \beta_4 TS_{i,t-1} + \beta_5 FCF_{i,t-1} + \beta_6 Growth_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_7 Size_{i,t-1} + \varepsilon$………………………….. EQ (3)

For obtaining the residual of the corporate investment, whether it is over-investment or under-investment, following model is used:

$INVESTi,t = \beta_0 + \beta_1 TQ_{i,t-1} + \beta_2 Lvg_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Age_{i,t-1} + \beta_5 Size_{i,t-1} + \beta_6 RET_{i,t-1} + \beta_7 INVEST_{i,t-1} + \varepsilon$ ………………………………………………………………….. EQ (4)

Where:

Senti = Investors' sentiment (Share Turnover)

IND = Proportion of Independent directors

TS = Top Shareholdings

FCF = Free Cash Flow

CF = Credit Financing

RET=Net Income/Last Year Shareholders' Equity

➢ Lvg= Leverage

➢ Cash= Cash in hand

➢ Age = Age of the Firm

➢ TQ =Tobin's Q

➢ INVEST = Last Year Investment

EMPIRICAL RESULTS AND DISCUSSION
Descriptive statistics

As per finding of the Richardson's model (2006), overinvestment sample is 50 and underinvestment sample is 80 from the total sample 130. This also verifies the finding of the Xin et al. (2007) and Hua et al. (2010), which describe that underinvestment sample is more than the sample of overinvestment. Here, descriptive analysis is stated on the basis of these sample.

Table 1: Descriptive results

Variables	Mean	SD	Min	Max	Obs.
Overinvestment	.3135552	.1310815	.0079774	.6812697	50
Underinvestment	.2342029	.1361538	.00714	.56863	80
Investors' sentiment (ST)	.0041783	.0057733	.0000408	.0396558	130
Credit financing	.2975227	.5719606	.000031	6.270564	130
IND	.2441354	.2179202	0	.8571429	130
TS	-.025013	1.854	-16.87868	12.55683	130
FCF	.079582	.1513535	-.3605323	.572634	130
Growth	-.3317319	5.85214	-62.05868	9.920904	130
ROA	.0496327	.1402396	-.3572274	.4050366	130
SIZE	23.53484	1.169349	20.47854	25.79852	130

Multiple regression results

As explained in the methodology section, the whole sample is divided into overinvestment and underinvestment panels, both are strongly balanced panels. For the analysis of all three models, following procedure is used; to run the regression on each data panel separately, random and fixed effect is executed first to check which effect is better according to the data set. For the section of the effect, Hausman test is implemented separately on underinvestment panel data and overinvestment panel data to observe which effect is better for further analysis. After that, Pesaran test is run to check the autocorrelation which describes there is no serial correlation in the data, then normality of data is tested which is also positive that the data is normally distributed. By following the above stated procedure, the multiple regression results of model 1 (EQ 1) of both the panels are given in following table.

Overinvestment= Random effect regression results
Underinvestment= Fixed effect regression results

Table 2: Regression results of model 1 (EQ 1)

Variables	Overinvestment	Underinvestment
Sentiment (ST)	4.250	-.0204
	0.024**	0.14
IND	- 0.134	0.0029
	0.163	0.884
TS	7.754	-.006
	0.000***	0.004***
FCF	0.608	.0813
	0.031**	0.342
Growth	-0.014	-.009
	0.167	0.06*
ROA	-0.607	-.602
	0.000***	0.000***
Size	-0.071	.05334
	0.002***	0.001***
No of obs.	50	80
Adjusted R²	0.68	-

Note: *, **, *** statistical significance at 10%, 5% and 1% respectively

It is shown in above stated table that there is a highly significant and direct relationship exist between the investors' sentiments and overinvestment (H1a). Coefficient of correlation and significance level is 4.25 and 0.024 respectively. On the other hand, there is an insignificant negative relationship exists between the investors' sentiments and underinvestment (H1b). This relation is insignificantly negative at 0.14, while the coefficient of correlation is -0.0203 these findings are according to the view of Hua et al. (2010). According to Hua et al. (2010), optimistic investors' sentiments caused a rise in the problems of overinvestment in a firm but also reduced the problems regarding the underinvestment. These findings are proving the first hypothesis of the study that is investors' sentiments have significant impact on overinvestments which is accepted (H1a) but insignificant towards underinvestment in the presence of controlling variables that is rejected (H1b).

Controlling variables have their own relation with the corporate investment efficiency and investors' sentiments. In the above stated results, independent director's ratio have insignificant negative impact on overinvestment of the firm means external directors do not allow the company to abnormally use the fund and they protect shareholders' wealth. Direct relation of top shareholdings and overinvestment state that large shareholders just want to raise their short-term income by raising investment in useless projects which may also cause to suffer lose. Significant direct relation of free cash flows and overinvestment show that managers use internal funding for making excessive investments according to the market sentiments. Overinvestments in the firm might also be due to internal cash availability (Artur Morgado, 2003). Insignificant negative impact of growth on overinvestment shows that low growth companies cannot afford to make excessive investment in poor yielding projects than the companies with high growth. Significant negative relation of ROA and size with overinvestment which clearly explain that firms having low profits and heavy liabilities are not capable to invest money blindly in unprofitable projects just to capture the market situations which in result cause to more unprofitable situation for the firm in long run.

While in case of underinvestment, an insignificant direct ratio of independent directors' show that as more independent directors are involved in the board of directors that would cause the increase the problem of under investments as they would focus on the short-term benefits or profits. Top shareholding has significant negative impact on the under investments of the firm means shareholders try to avoid the underinvestment situation in a firm. Free cash flow has insignificant positive impact on underinvestment which states that the firm have enough internal source to solve the problem of shortage of funds for investing in positive yield projects. Significantly negative relation of ROA with under investments which clearly explain that firms having low profits is unable to mitigate the problems of under investments for capturing the market sentiments but through external financing it can be mitigated (Hutten). Significant direct relation of the size with underinvestment shows that when size of the firm is increased

it would raise the underinvestment problem in the firm because company is investing money in asset rather than investing money in valuable project (Hutten).

Adjusted R^2 of the overinvestment panel is 68% this shows that 68% variation is explained by the variables used in the overinvestment model and in the underinvestment panel data, generalized least square regression is run to avoid the problem of heteroscedasticity which does not provide the value of the R-Square because it is a concept of ordinary least square.

By applying the analysis procedure stated above, the following table shows the regression results of model 2 (EQ 2) of the both panels, as explained in the methodology section in which effect of a bank loan or credit financing is analyzed on the corporate investment efficiency,

Overinvestment= Random effect regression results
Underinvestment= Fixed effect regression results

Table 3: Regression results of model 2 (EQ 2)

Variables	Overinvestment	Underinvestment
CF	-0.028	-0.332
	0.058*	0.004***
IND	-0.126	0.081
	0.20	0.17
TS	7.328	-3.817
	0.001***	0.009***
FCF	0.557	0.273
	0.05**	0.001***
Growth	-0.023	-0.0131
	0.025**	0.08*
ROA	-0.060	-0.046
	0.000***	0.000***
Size	0.091	-0.078
	0.000***	0.000***
No. of Obs.	50	80
Adjusted R^2	0.67	-

Note: *, **, *** statistical significance at 10%, 5% and 1% respectively

A bank loan is a famous source to obtain funds and utilizing it for making investments among the listed companies in our country. This financing source has the significant impact on the companies' overinvestment and underinvestment of Pakistan listed companies. According the regression results it is shown that firms raise credit from the financial institution due to which availability of funds are raised and decrease the possibilities of underinvestment but at the same time, overinvestment is also controlled, not aggravated, because financial institutions have strong disciplining and supervision functions on the corporates so that firms are unable to invest blindly in the useless projects.

In case of overinvestment panel (H2a), credit financing has significantly negative impact on the company's overinvestments because of the controlling functions implemented by the banks and organizations themselves, through corporate governance. This relation is significant at 0.058 whereas the coefficient correlation is -0.028. While in underinvestment panel (H2b), there is a significant negative association between credit financing and company's underinvestment which means regardless of controlling functions implemented by the banks still it reduces the problems of underinvestment. This relation is significant at 0.004 whereas the coefficient correlation is -0.332. These results are partially consistent with the Luo et al. (2012) and

partially not consistent. In other words, credit financing does not raise the misuse of the funds in the corporate in the presence of corporate governance and financial institution governance. This is not according to Lou et al. (2012) but credit financing does reduce the problem of underinvestment in the corporation because after all supervision and liabilities, payment, at least the underinvestment problem is alleviated due to funds raised.

According to findings of model 2 (EQ 2) as presented in the methodology section, our second hypothesis (H2a) is rejected and results are consistent with the view of Jensen (1986) which explain about the overinvestment and credit financing negative relationship, while (H2b) is accepted according the view of Lou et al. (2012), which described that credit financing has negative impact on underinvestment. Adjusted R^2 of the overinvestment panel is 67% and in the underinvestment panel data it is not provided, this shows that 67% variation is explained by the variables used in the overinvestment model.

In model 2, mostly controlling variables have negative correlation with overinvestment (H2a) which restrain the firms for making excess investment, but stakeholders encourage overinvestment through internal cash. Banks do not allow firms to make overinvestment by using bank's money.

While in case of underinvestment (H2b), mostly controlling variables have negative correlation with underinvestment (H2b) which reduce the problem of underinvestment in firms to avoid the long-term disaster situations. Banks help the firms to control the problems of underinvestment by using bank's money.

Lastly, this study continues to investigate the impact of investors' sentiments on the corporations' investment efficiency through the mediating role of credit financing or bank loan. By applying the analysis procedure stated above. The random effect model is considered better by the Hausman test for further analysis. Then Pesaran test, normality test and heteroscedasticity test are run which are negative. Regression results of both the panels of model 3 (EQ 3) are given in table below;

Table 4: Regression results of model 3 (EQ 3)

Variables	Overinvestment	Underinvestment
Sentiments (ST)	3.816	-0.161
	0.036**	0.299
CF	-0.026	-0.024
	0.05**	0.024**
IND	-0.034	0.015
	0.22	0.54
TS	7.271	-0.020
	0.00***	0.386
FCF	0.617	0.130
	0.02**	0.20
Growth	-0.0182	-0.009
	0.068*	0.17
ROA	-0.066	-0.616
	0.000***	0.001***
Size	0.085	0.042
	0.000***	0.015**
No. of Obs.	50	80
Adjusted R^2	0.725	0.36

Note: *, **, *** statistical significance at 10%, 5% and 1% respectively

It is observed from the results that by including the credit financing as a mediator between investors' sentiments and overinvestment (H3a), the significance level has increased from

0.024 in model 1 to 0.036 in model 3 but is still significantly related to each other. Significance level between investors' sentiments and underinvestment (H3b) is also increased from 0.132 in the first model to 0.299 in third model which shows that the third model impact of investors' sentiment is not significant by including credit financing and correlation coefficient is decreased from -0.0245 in the first model and -0.0161 in the third model.

According to the results, it is stated that investors sentiments have significant positive impact on overinvestments of corporations, but the reason behind it, is not the mediating role of credit financing, there are many other factors that cause overinvestment in firms (H3a) and insignificant negative effect on under investments with the mediating role of credit financing (H3b) and results are not completely aligned with the view of Luo et al. (2012). In case of under investments, results are consistent with Luo et al. (2012) that optimistic investors' sentiments have a positive impact on credit financing, which raise the credibility of the firm to obtain loans from the financial institutions which ultimately reduce the problem of under investment in the firm after the payments and supervisions of (H3b) and vice versa.

In case of over investment (H3a), results state that positive sentiments of the investors have the direct impact on the company's credibility, but due to the involvement of the supervision and disciplining functions by the bank, it has a negative effect on firms' overinvestment. This describes that the sentiments of the investors do change underinvestment of the public listed firms, but insignificantly, through the mediating role of credit financing, whereas credit financing does not play a mediation role in case of investors' sentiments and overinvestment of the public listed firms. The third hypothesis of this study is proved as investors' sentiments have insignificant impact on underinvestment (H3b) of public listed companies as the constraint for obtaining funds is reduced this result is consistent with the view of Lou et al. (2012) but in the case of overinvestment (H3a) it is rejected as investors' sentiments do have a positive impact on overinvestments of the firm but it is not due to mediating role credit financing it may be due to free cash flows of the firms this is consistent with the findings of the Wang et al. (2012) which stated that privately owned companies do not have the problems of overinvestment due to strong controlling function by the bank and corporate governance element (Chen, 2016).

Controlling variables have played their important part between investors' sentiments and corporate investment efficiency by the way of bank loan. In the above stated results (H3a), independent director ratio has insignificant negative impact on the overinvestment of the firm means external directors do not allow the company to abnormally use the fund and they protect shareholders' wealth. Direct relation of top shareholdings and overinvestment state that large shareholders just want to raise their short-term income by raising investing money in useless projects which may be the main reason to suffer lose. Significant direct relation of free cash flows and overinvestment shows that managers use internal funding for making excessive investments when sentiments are positive just to obtain their own private benefits. Significant negative relation of ROA with overinvestment which explain that firms having low profits are not capable to invest money blindly in unprofitable project just to capture the market sentiments. Significant direct relation of the size with overinvestment due to positive investors' sentiments shows that eventually when size of the firm is increased it would raise the overinvestment in the firm.

While in case of underinvestment (H3b), independent director ratio has insignificantly positive impact on the under investments of the firm means external directors are biased for getting their own personal benefits which may cause the situation of under investments. Insignificant inverse relation of top shareholding and underinvestment state that large shareholders want to raise their long-term income by raising investing money in beneficial projects which ultimately give profit to them and raise the firm wealth and value. Free cash flow has insignificant positive impact on under investments which states that the firm have enough internal source to solve the problem of shortage of funds for investing in positive yield projects. Significantly negative relationship of ROA with underinvestment state that firms having low profits are unable to mitigate the problems of underinvestment but through external financing it can be mitigated. While, insignificant direct relation of the size with underinvestment due to positive investors' sentiments shows that when size of the firm is increased it would raise the underinvestment in the firm because company is investing money in asset rather than investing money in valuable project but this can be overcome through the credit financing or bank loan.

Adjusted R^2 in model 3 of the overinvestment panel is 72% and in the underinvestment panel data it is 36%, this shows that 72% and 36% variation is explained by the variables used in the overinvestment and underinvestment models respectively.

CONCLUSION

This research study analyzed that how the behavior of investors' sentiments influence the Pakistan stock market related to particular stock and investigated their effect on investment efficiency of the corporate (over-investments and under-investments) by the way of a bank loan or credit financing obtained by the financial institutions and emphasizes the public listed companies of selected sectors whether these companies suffer the problem of overinvestments or under-investments.

The findings of the study have shown that there is a highly significant positive correlation between the sentiments of the investors and over-investments of the corporation (H1a) and insignificant negatively correlated with under-investments (H1b). Whereas, credit financing is significantly negatively correlated with over-investment (H2a) and under-investment (H2b) as the strict corporate governance is implemented by the firm and bank. As the whole, results have shown the significant positive impact of investors' sentiments on overinvestment (H3a) but this relation is not due to mediating role of bank loan or credit financing in case of overinvestments because bank

loan or credit financing have an inverse relation with the over-investments of the company.

The reason behind it, are strong and strict controlling measures applied by the Pakistani banks or financial institutions on the firms. So that this relation might be due to other factors not mentioned in this study or might be due to controlling variables like internal financing sources (free cash flows). Financial problems and agency problems are reduced due to the high flying of investors' sentiments, but firms also have strict supervision functions by the financial institutions or corporate governance.

While there is a negative correlation between the investors' sentiments and underinvestment but insignificant through the mediating role of credit financing (H3b). There is no doubt that agency problems and financial constraints are reduced due to optimistic investors' sentiments which raise the access of funds through bank loans. Due to the involvement of strict disciplinary functions and governance impact on external financing, not only problem of underinvestment is eliminated, but banks also look after the overinvestment's problem and take controlling measures so that misuse of funds by the management of the firm is reduced. According to findings of the study, first hypothesis is fully accepted while second hypothesis is half rejected (H2a) and half accepted (H2b). In case of overinvestment (H2a), it is rejected and in case of under-investments (H2a), it is accepted. Lastly, third hypothesis is same as half accepted and rejected as investors' sentiments aggravate the overinvestments but it is not due to the factor of credit financing (H3a) and does alleviate the problem of under-investment through credit financing (H3b).

Limitation and Future Indications

Limitation of the study is that it does not include companies from all the sectors of PSX and data is only collected for a period of 10 years. Many other proxies are available for analyzing investors' sentiments like closed mutual funds and dividend premium etc. Besides the credit financing, there are many other factors that may affect the corporate investment efficiency like monetary policy or cyclical factors, etc. For further expanded analysis, more sectors might be included and can be grouped according to their ownership rights. Moreover, different sectors can be grouped for meaningful analysis.

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