Investment-Cash Flow Sensitivity Determinants: Evidence from Pakistan

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DEDICATION

"To My Father Associate Professor Sardar Muhammad Khan (Late), My Mother and My Brother & Sisters for their un-conditional love, prayers, and support to make my dreams come true."

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ABSTRACT

This study investigates that how investment in any company is sensitive to cash flow of the company. Leverage, Tobin's Q, Asset Tangibility, and Dividend Payout Ratio are used as control variables. Study compares the Cement, Chemical, Engineering, Miscellaneous, Sugar and Textile Sectors. We have taken 268 non-financial dividend paying firms that were collected from Balance sheet analysis of joint stock companies listed on the Karachi Stock Exchange issued by the State Bank of Pakistan which were investigated from the period of 2001 to 2008. The results indicate that there exists a positive relationship between investments made by the companies and cash flows in cement, chemical and sugar sectors and negative relationship in engineering, miscellaneous and textile sectors.

Keywords: Cash flow, Investment.

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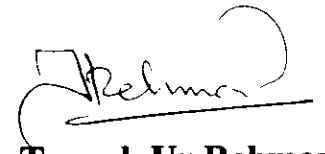

Tayyab Ur Rehman

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ABBREVIATIONS

GDP	Gross Domestic Product
I	Investment
AT	Asset Tangibility
LR	Leverage Ratio
NYSE	New York Stock Exchange
KSE	Karachi Stock Exchange
FHP	Fazzari, Hubbard, and Petersen
FEM	Fixed Effect Model
REM	Random Effect Model
CEM	Common Effect Model
DPR	Dividend Payout Ratio
BSA	Balance Sheet Analysis
BECO	Batala Engineering Company
PECO	Pakistan Engineering Company
CNC	Computer Numerical Control
CFA	Cash Flow Approach
R & D	Research and Development
OLS	Ordinary Least Squares
NPV	Net Present Value

DECLARATION

I hereby declare that this thesis, neither as a whole nor as a part thereof, has been copied out from any source. It is further declared that I have prepared this thesis entirely on the basis of my personal effort made under the sincere guidance of my supervisor.

No portion of the work, presented in this thesis, has been submitted in support of any application for any degree or qualification of this or any other university or institute of learning.

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FORWARDING SHEET

The thesis entitled "Investment-Cash Flow Sensitivity Determinants: Evidence from Pakistan" submitted by Mr. Tayyab Ur Rehman in partial fulfillment of M.S degree in Management Sciences with specialization in Finance, has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow him to submit this thesis for further process as per IIU rules & regulations.

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1.1. Introduction

The relationship between investment and cash flow has had a confused history. It was extensively studied in the 1950s and 1960s (Meyer and Kuh, 1957). However cash flow after all has vanished from the investment literature until its restoration in the 1980s following the expansion of models of asymmetric information, and an observed improvement in 1988 by Fazzari, Hubbard, and Petersen. Due to agency problem and asymmetric information linked with the acquiring of extra external funds, A commonly held belief is that the internal funds available to a firm is the most important determinant of its real investments. The conventional vision put forward by Fazzari et al. (1988, 2000) proposed that investment accepted by the firms facing strict financing constraints are more sensitive to its cash flows. This argument was supported by many paper but studies like Kaplan & Zingales (1997, 2000) and Cleary (1999) find opposing finding: Firms that are least financially constrained show greater investment cash flow sensitivity.

Financing constraints firms have positive link with cash to cash flow sensitivity. If the company expected that in future they will face financial constraints that will hold more cash in order to meet the investment needs in future. Cash flow is likely to have a superior effect on the investment of firms more likely to face financial constraints and understand this as an indication for the survival of information-driven capital market limitation. But there is still controversy, why cash flow issues for investment. Several researchers have argues that instead of being cause by financing constraints, the connection between cash flow and investment could stem from the association between cash flow and lost or mis-measured investment opportunities that are not confined by standard measures, mainly Tobin's Q. Therefore, numerous efforts have been made at making substitute measures of investment opportunities to check whether, once these opportunities are more sufficiently measured, cash

flow still plays an important result on firms' investment (Erickson and Whited, 2000; Bond et al., 2002).

Further researchers have re-scrutinized the indication in the original FHP (1988) paper and have re-deduced the consequences, According to (Kaplan and Zingales 1997) the investment-cash flow sensitivity is not a suitable sign of financing constraints, though their line of dispute is dissimilar. Kaplan and Zingales first demonstrate in an easy two-period model that more constrained firms may not inevitably show higher sensitivity of investment to cash flow than less constrained ones. They also observe whether the firms in the low dividend expenditure group of FHP are in fact constrained. Using qualitative and quantitative data on the firms in this sample, Cleary (1999) verifies the outcome by indicating in a larger sample that firms that appear to be constrained based on dividend cuts have lower sensitivities. Only some papers have required proof of financing constraints using measures other than the investment-cash flow sensitivity. Lamont (1997) observes the reaction of investment by non-oil subsidiaries of oil companies to 1986 oil upset and discovers that these firms extensively decreased their investment.

The use of Tobin's Q is stands on the proposal that investment opportunities, which are onward looking, can be seized by equity market contributors, who are also onward looking. In particular, securities' prices and consequently financial markets' assessments of investment predictions are a source in papers supported on the Q-theory. Though, in the existence of information asymmetries in capital markets, a stress is directly introduced by the use of Tobin's Q. In such situations providers of external funds are incapable to exactly evaluate firms' investment opportunities, and it is somewhat possible that there will be spaces in the information sets of the firm's insiders and outsiders. Tobin's Q will therefore only confine outsiders' estimate of opportunities. It is probable that cash flow extensively

influences investment simply because it is associated with the insiders' assessment of opportunities, which are not captured by Tobin's Q (Carpentar and Guariglia, 2003). Tobin's Q model supposed to overcome the future growth opportunities. If in an investment model cash flow variables are included with Tobin's Q, these cash flow variables may still be made up of opportunities not confined by Tobin's Q. This may be difficult to separate the effect of expectations from the one of liquidity constraints in the concern estimate of the cash flow variable (Vogt, 1994). Chirinko and Schaller (1995) show that standard Tobin's q is imperfect as it replicates the average return on a company's total capital whereas it is the marginal return on capital that is significant. Gugler, Mueller and Yurtoglu (1999) develop a method to measure subsidiary Tobin's q and test the degree of cash flow sensitivity to investment in different Tobin's q situation to distinguish between cases with asymmetric information and agency problems.

Cash flow has a strong effect on investment expenditure in firms with low-dividend payout policies. This result is consistent with the concept that low-payout firms are cash flow-constrained because of asymmetric information expenditure related with external financing. The basis on these firms keeps dividends to a minimum to defend on cash flow from which they can finance beneficial investment expenditures. Fazzari and Petersen (1993) find that this same group of low-payout firms horizontal fluctuations in cash flow with working capital to keep preferred investment levels. This result is reliable with the Myers and Majluf (1984) finding that liquid financial assets (slack) can moderate the underinvestment problem beginning from asymmetric information. A substitute clarification for the strong cash flow/investment relationship is that managers deflect free cash flow to unbeneficial investment spending. The firms that come out less financially

constrained shows extensively greater sensitivities than firms that come out more financially constrained. By definition, the more constrained firm has more limited entrance to external financing and reaches this nominal investment period more quickly. As a result, the less constrained firm is likely to exhibit greater investment–cash flow sensitivity than the more constrained firm, when internal cash flow are mostly low. We dispute that negative cash flow is a useful proxy for distinguishing firms that are in such financially concerned situations, and present evidence on firm characteristics such as growth rates, debt ratios, and dividend changes, confirming the validity of this substitute (Allayannis and Mozumdar, 2004).

When market cannot differentiate between high and low quality investment opportunities than firms, with high quality of opportunities is more possible to finance their projects internally. The significant unfavorable choice increases the cost of external financing compared to internal financing structuring a clear hierarchy for firm's basis of financing (Myers and Majluf, 1984). As the financing hierarchy hypothesis investigated by Fazzari et al, (1988), they find that firms' investment strategies are definitely sensitive to their cash flow variations and that most financially constrained firms have superior cash flow sensitivity than least constrained firms. Investment is sensitive to cash flow in the frictionless standard because cash flow contains information about investment opportunities. Additionally the cash flow anticipation for each year (anticipation taken at the beginning of the year) reflects information that is already in the information set of the firm, whereas the disclosure component of cash flow reflects new information acquired within the year. As a result, investment is sensitive to both the expected and the surprise components of cash flow (Alti, 2003).

1.2. Objectives of the study

1. The primary objective of this study was to find the relationship between cash flow and investment.
2. This study helps in determining which sector Investment is sensitive to Cash flow.

1.3. Significance of the Study

This study enhances the body of knowledge at the academic level. The study investigates the relationship between investment and cash flow in a sector wise comparison in developing country like Pakistan. In addition, results generated by this study might help the firm's regulators and policymakers to find certain gaps and place as this study can facilitate them in expertise new and better policies for the future. This research provides guidance to the professionals so that they can look into new dimensions of the Cash flow and Investment activities in Pakistan.

1.4. Organization of the Study

Chapter 1 contains the Introduction, in chapter 2 we described in detail the work done by scholars and practitioners in the past. 3rd chapter contains Empirical Model, Data & Methodology. In Chapter 4 the main empirical results and findings shows the firms sector wise relationship between cash flow and investment. Chapter 5 contains conclusion & Chapter 6 contains bibliography. And in the last section references are presented.

2. Literature Review

From last few decades a tight relationship exists between internal funds and investment. This relationship leads to the broad expansion of neoclassical models of investment (Hall and Jorgenson, 1967). These models explain that real interest rate and taxes are the main sources of investment spending. The interest rates are independent of firm's financial structure because they are position in centralized security markets. The Q-theory of investment is consider to be a reformation of the neoclassical theory, the ratio between the market value of the firms capital stock and it substitute cost can be enlightened by investment demand. In determining investment neither the Q-theory nor the neoclassical acknowledged any task of financial variable. With the expansion of theoretical models of asymmetric information the significance of how investment is financed was revitalized. Akerlof's (1970) put a mile stone study on the position of asymmetric information by demonstrating how markets break down when buyers and sellers work under different information sets in the market for "lemons" insolvent with traditional economic theory. Stiglitz and Weiss (1984) also accepted that the firms obtaining funds from lenders also face related influences.

An important paper was published by Fazzari et al., (1988) they scrutinized the differences in sensitivity of investment to cash flow amongst the firms which face additional or fewer financial constraints across the groups. This attitude permitted them to differentiate amongst the different possible roles of cash flow. As internal finance is easily available and cheaper than external finance and capital markets are inadequate, so cash flow could consequence investment. In this situation, a better role of cash flow can be expected on the investment of the firms more possibly to face financial constraints. Fazzari et al., (1988) separated the firms according to the dividend policy, their finding demonstrated that low dividend firms are more

likely to face financial constraints and high dividend firms are less likely to face financial constraints. Their finding also show that low dividend firms was effected by cash flow more than that of high dividend firms, sustaining the hypothesis that because of capital market imperfections cash flow influence firms investment.

Instantly, research started on Q as a determinant of investment opportunities. In the existence of financial constraints, the standard Euler equation is unspecific as financial variable belong in it and in the nonexistence of financial constraints, derived under the hypothesis of perfect capital markets the standard Euler equation should hold. Whited (1992), Hubbard et al. (1995) anticipated that an Euler equation and standard Euler equation is increased with the financial variables for various groups of firms. They found by using US data, that only for firms less probably to face financial constraints, the standard Euler equation holds.

2.1. Cash Flow/Investment Relationship

Most of the authors explains that internally generate funds are the main methods for firms finance investment expenditure. Gordon Donaldson (1961) concludes that internal generated funds are more important for the organization and external funds must be excluded except for some special unavoidable need of new funds. Pinegar and Wilbritch (1989) also find from 176 corporate managers that they favor cash flow more than external sources to finance new investment, about 84.3% of sample respondent shows positiveness for financing investment with cash flow. The conventional perspective initially put forward by Fazzari et al. (1988) that firms that face tense financing constraints, i.e., a larger cost discrepancy between internal and external funds, have to depend more on internal cash for making investments. They also find that in firms with low dividend pay out policies cash flow has a strong effect on investment expenditure. They also argue that due to asymmetric information this outcome is dependable with the

perception that low pay out firms is cash flow constrained. These firms can finance beneficial investment expenditure by keeping dividends to a minimum.

Fazzari and Petersen (1993) find that to maintain preferred level of investment levels this group of low payout firm's level variations in cash flow with working capital. This result is reliable with the Myers and Majluf (1984) findings that liquid financial assets can moderate the underinvestment problem occurring from asymmetric information. Whited (1992) finds that because of financial distress a firm can face debt financing constraints. He also finds the indication of a strong relationship between cash flow and investment expenditure for firms with high debt ratio. Cash flow can strongly persuade both capital and R & D expenses, Asymmetric information make external financing very expensive effects linked with such firms because they compelling them to fund expenses internally (Himmelberg and Petersen, 1994).

For strong cash flow investment relationship a substitute justification is that managers avert free cash flow to unbeneficial investment expenditures. Oliner and Rudebusch (1992) evaluated the comparative importance of agency problem; they investigate some firm features that may persuade the cash flow investment relationship. To enlighten the influence that cash flow has on firm investment spending, owner ship structure and insider share holders (agency problems proxy variables) to little. Insider stock trading chatter shows a reasonably strong influence. And they also bring to a close that for the explanation of asymmetric information a weak support has shown. For data limitation the generality of these conclusions about ownership structure may restrict. To test the free cash flow theory Carpenter (1993) focuses on the interactions among debt structure, debt financing and investments pending. He also explain that by replacing large amount of

external equity with debt financing the firms that recognize their investment spending contrast to non-organized firms. He also includes that unpredictable result with free cash flow performance, because cash flow dedicated to debt maintenance should be linked with decreases in consequent investment spending.

For larger firms the impact of cash flow on investment expenditure is greater. One justification is that larger firms have more varied ownership structures, and further influenced by shareholders agency problem (Devereux and Schiantarelli 1990). Approximately most of the studies accept the belief advanced by Fazzari et al. (1988) to apply investment – cash flow sensitivity in measuring a firm's financial constraints position. These studies argue that financially constraints firms shows larger than average investment cash flow sensitivity. Though numerous studies argument this interpretation. Kaplan and Zingales (1997) demonstrate that firms that come out less financially constrained also show a considerably higher sensitivity than firms that come out more constraints. Cleary (1999) also examine that investments of the firms with less creditworthiness are considerably less sensitive to internal funds than more creditworthy firms. Kadapakkam et al. (1998) exhibit that smaller firms illustrate less investment cash flow sensitivity and anticipated to have more financial constraints. Allayanis and Mozumdar (2004) explain that more financial constraints firms and less financial constraints firms are not dissimilar from each other. Some of the studies also demonstrate that significance of investment - cash flow sensitivity as a gauge of financial constraints. The firms need not to show considerable investment cash – flow sensitivities if they are facing financing constraints (Gomes 2001; Alti 2003). For testing firm's financial

constraints Almeida et al. (2004) used a new measure of cash – cash flow sensitivity instead of investment – cash flow sensitivity.

If firms face wedge between internal and external costs of funds than they are said to be financial constraint. Through this definition all the firms are possible to be classified as constrained but a little cost of raising external funds would be enough to put the firms into this class. If the wedge between internal and external cost of funds increases than this firm is considered to be more financially constraint. And those firms with comparatively large amount of liquid assets and net worth are less constrained or less constrained firms (Kaplan & Zingles 1988). As both asymmetric information and free cash flow depend on the statement that the cost of external financing go beyond the cost of internally generated funds, We will check that the pragmatic relationship can be credited to liquidity constraints. The most liquidity constraints firms are those that condense their dividends or desist from repurchasing their shares (Fazzari, Hubbard and Petersen 1988). Myers and Majluf (1984) discussed that due to asymmetric information a deficiency of internally created funds will guide to corporate underinvestment. This will arise when firms have a smaller amount of information about the correct NPV of the project and when firms look inadequate funds to finance an investment project. Still for high value projects, the average project quality reveals because the less conversant financial markets requires a risk premium. This risk premium might be considered extremely high for several projects that in fact do exceed the management's problem which suitably reveal the project risk. Likewise, in the debt markets the firm may face credit rationing due to the presence of information asymmetries (Stiglitz and Weiss 1981). Therefore, as a result

of information asymmetric management may be enforced to over take some positive NPV projects.

When the management of an or else general firm controls a large equity stake than underinvestment problem is estimated to be more important (Hadlock 1998). With falling levels of insider ownership the positive correlation between cash flow and corporate investment or by asymmetric information will reduce. Management intentionally will invest in a negative NPV projects and also accept the too much risk premium of the financial markets if they owns a small stake in an extensively large seized firm (Hadlock 1998). The informational asymmetry among the institution and the firm decreases the large block holding of a financial institution (Kahn and Winton 1998). Shleifer and Vishny (1986) also discussed that if the risk is adequately big than a shareholder has an inducement to collect information about the firm, block holding by financial institutions is estimated to decrease information asymmetries among the firm and the capital market because of institutions capability and dynamic capital market contribution. In this situation, the firm heavily depend on external sources of financing, whose cost will be much nearer to the firms exact cost of capital. The underinvestment problem is estimated to be more for high growth companies with high Tobin's q if there are liquidity constraints. When large amount of the firm's value can be credited to the growth opportunities the information asymmetry is more ruthless (Myers and Majluf, 1984).

2.2. Investment and Tobin's Q

From the last few decades investment has been studied so broadly. It plays basic role in explaining constant growth. For more than two decades the observed relationship between investment and q has been examined with unreliable degrees of success.

Furstenberg (1977) basic empirical study built directly on Tobin's (1969) dispute that investment is an increasing function of q, and these studies simply regressed cumulative investment on q. Mussa (1977) also derived that a description of the q theory can be resulting thoroughly from a model of investment by a firm facing convex costs of modification.

2.3. Leverage and Investment

Modigliani and Miller (1958) anticipated a theory concerning capital structure they declared that the value of the firm is independent of its capital structure in a world with no taxes, no default risks, no transaction cost and perfect and frictionless market. With adequately high leverage, the firms share holders don't want to issue new stock due to debt extension. Due to this most projects with positive net present value (NPV) can go no funded (Myers 1977). A negative relationship between investment and leverage is shown by (Stulz 1986). He expresses that investment is negatively related to firm investment and profitability. As a result high profit firms should have a lower leverage. Lang et al. (1996) report negative relationship between leverage and firm investment, but its result is stronger for small firms with low growth. A higher proportion of long term debt in total debt extensively decreases the firm investment especially in firms with high growth opportunities. In difference no considerable relation in debt maturity and firm investment for firm with low growth opportunities (Aviazion et al., 2005).

McConnel and Servaes (1995) find that for firms with low P/E ratio or low growth opportunities value is positively connected to the degree of leverage while for high P/E ratio or high growth opportunities leverage is negatively connected with firm value. Such finding is also supported by Aggarwal and Kyaw (2006), they disclose that leverage is

positively and significantly linked to firm's growth, for low firm's Q ratios. Some researchers more propose that leverage is value making for firms with low growth opportunities while it is value- falling for firms with high growth opportunities.

Jo et al (1994) examined the relationship between financing decisions and investment opportunities set and reported a positive relationship between debt ratio and measure of investment opportunities. The study was accomplished in Japan; data was taken from Pacific – Basin Capital Markets database for the period of five year from 1986-1990. The sample size was 1044 Japanese firms. He more argued that such relationship were negative in USA due to agency conflicts which were alleviated in Japanese firm's because of their institutional provisions. Bank debt is positively connected to growth opportunities and bond debt is inversely related to growth opportunities (Anderson and Makhija 1999). Similarly a positive relationship between leverage and firm value was found by Ahn et al., (2005) but it is weaker for firms with low growth opportunities and stronger for firm with more growth opportunities.

2.4. Asset Tangibility and Investment

More tangible assets maintain additional external financing tangibility which alleviates contractibility problems, the value that can be recalled by the creditors in non payment status would be increased by asset tangibility. In the tangibility of constrained firm's assets investment cash flow sensitivity will be increasing but in financially unconstrained firm's tangibility have no effect on investment cash flow sensitivity (Almeida and Campello 2007). Why investment cash flow sensitivities increase for some firms with asset tangibility and not for others? Kiyotaki and Moore (1997) shows that this variation occurs from a credit multiplier effect. The fundamental perception is simple. Within a

cross-section of financially constrained firms consider investigating the impact of a cash flow innovation on investment expenditure. i.e., firms that is incapable to tire out their beneficial investment opportunities due to credit market resistances. Since it is most favorable for constrained firms to re-invest their internal funds, the direct collision of the income surprise on investment is similar for all such firms. Though, there is also an indirect cause linked with that surprise, which stems from an inside organization change in borrowing ability. For a certain change in investment, the change in borrowing capability will be bigger for those firms whose assets generate the highest collateral values that is, firms that invest in more tangible assets. This oblique enlargement effect makes distinctions in investment—cash flow sensitivities across financially constrained firms. When assets have higher tangibility than credit multiplier will be larger, constrained firms that spend in more tangible assets will be more sensitive to cash flow surprise. According to the similar reason, however, asset tangibility will have no consequence on the investment policy of firms that are capable to tire out their beneficial investments opportunities that is financially unconstrained firms (Almeida and Campello 2004).

2.5. Dividend Payout and Investment

With constant expected return, Gordon (1962) constant dividend growth model illustrates that high dividend payout should be compensate by either a high P/E or low expected earnings growth. Miller and Modigliani (1961) dividend irrelevance theorem forecasts that with constant expected return and unaffected investments, higher dividend payout will be pursued by lower growth (Ibbotson and Chen 2003). Additionally, from the perception of capital structure, "pecking order theory" (Myers 1984) assumes that

companies with large growth opportunities will favor internally generated cash flows to external resources of funds. These assumptions propose that companies with abundant growth opportunities will have low dividend payouts. Observed studies on the determinants of dividend payout usually sustain the idea that dividend payout is inversely associated with investment opportunities (Fama and French 2002; Rozeff 1982).

Dividends are likely to be paid as they become mature, recognized firms, reasonably reflecting a financial life cycle in which immature firms face comparatively plentiful investment opportunities with limited resources so that retention controls distribution, while mature firms are superior candidates to pay dividends because they have higher prosperity and less attractive investment opportunities. Fama and French (2001), Grullon et al., (2002), and DeAngelo and DeAngelo (2006) all proceed life-cycle justifications for dividends that rely, explicitly or implicitly, on the exchange between the compensation (e.g., flotation cost savings) and the costs of retention (e.g., agency costs of free cash flow). The trade-off between retention and circulation evolves over time as profits build up and investment opportunities decline, so that paying dividends becomes gradually more advantageous as firms mature. The literature suggests only a rough empirical proposal of the characteristics that distinguish firms that pay dividends from those that do not. Most remarkably, Fama and French (2001) find that firms with recent high-profitability and low-growth rates have a propensity to pay dividends, while low profit/high-growth firms have a propensity to keep profits.

2.6. Overview of Pakistan Cement Industry

In Pakistan economy cement industry palys an imporatant role. The last few years have been a golden period for cement manufacturers, when the government increased spending

on infrastructure development. High commercial activity and rising demand for housing on account of higher per capita income has kept cement off take growth in double digits. Few years back Pakistan cement industry entered the export markets and has established its status as a high-quality product. During the financial year-07, cement sales registered a growth of 31 percent to 17.53 million tonnes as against 13.5 million tonnes sold last year. The cement sales during July-February-08 showed an increase, both in domestic and regional markets to 18.17 million tonnes. The domestic sales registered an increase of 7.2 percent to 14.4 million tonnes in the 2008 period as compared to 13.5 million tonnes last year whereas exports stood at 3.7 million tonnes as against 1.8 million tonnes in the corresponding period last year, showing an increase of 110 percent.

The cement sector is contributing Rs 30 billion to the government funds in the form of taxes. This sector has invested about Rs 100 billion in capability growth over the last few years. The listed companies on stock exchange are four foreign companies, three armed forces companies and 16 private companies listed. The industry is divided into two broad regions, the northern region and the southern region. The northern region has over 87 percent share in total cement dispatches while the units based in the southern region contributes 13 percent to the annual cement sales.

2.7. Overview of Pakistan Chemical Industry

The chemical sector is one of the five highest increase and worldwide traded sectors. During the last fiscal year 2006-07, the world market for chemical sector remained at $1.8 trillion and is mostly dominated by USA, Europe and Japanese companies. During 2006-07 Pakistan imported chemicals value nearly billion of rupees that is 12 percent of the total imports while exports were only $200 million that is 1.3 percent of the total

Pakistan exports. The import was mostly concentrated in the, organic, inorganic chemical, plastics and special chemicals etc. For the last few years the demand for chemical products was high, mainly the fertilizer inputs, Chlor-Alkali, pesticides and plastic inputs for use in packing, auto, electronics, house hold items, cables, pipes and fittings etc, besides the high use of chemicals in the processing of textile, leather, carpets etc. The high spending of chemicals in a range of sub sectors of the economy now speaks of the high potential in the local manufacturing, value addition and formulation etc. Due to absence of apparent policy framework on the development of chemical sector with any road map and benchmarks has resulted into growth, which has been random and on short-term need basis. The chemical sector has no benchmarks at this moment in terms of its total productive capacity, sales turnover, and contribution to GDP and taxes, manpower employed value addition benchmarks in contrast to global trends and other indicators of the sector.

2.8. Overview of Pakistan Engineering Industry

Engineering industry in incorporated in year 1951. Setup by an entrepreneur migrated from India and was the pioneer light engineering products company listed on the stock exchanges of the country in the name of Batala Engineering Company (BECO). Within a period of fifteen years it became leader in light engineering goods manufacturing with the help of European & American technology and their team of engineers to produce High Quality Machine Tools, Pumps, Power Looms, Concrete Mixers, Cranes, Power Presses, Electric Motors, Bicycles, Steel Rolled Products, Electricity Transmission Towers, Structure and General Fabrication. The industry was set up at Badami Bagh, old city of Lahore on land area of 34 acres, and whole nearby area was subsequently converted into

steel center of Pakistan. Due to rapid addition of products, the land area became insufficient for further expansion. In the same city of Lahore 247 acres land was acquired in 1960 at Kot Lakhpat industrial zone, for further expansion.

After take over by the Government in the year 1972 under the economic improvements, it was renamed as Pakistan Engineering Company (PECO). The areas focused after take over were Steel Making where three Electric Are Furnaces of 10 tons each, Steel Rolling Mills to roll bigger size steel angles were added in line with future trends. Modern laboratory for Mechanical, Chemicals, Non-Destructive Tests etc. equipped with Universal Tensile Testing, Hardness Brielle & Rockwell, 32 Channels Direct Emission Spectrometer for analysis of Ferrous and Non-Ferrous base metals, Metallographic, Ultrasonic Flaw Detector, Magnetic Particle Separator was also setup.

For improved accuracy, state of the art CNC machines for Punching, Marking & Shearing of Steel angles of size up to 200 mm along with CNC machine for plate punching up to thickness of 40 mm and Hydraulic plate punching, shearing of Billet, Bars of different shapes, steel angles of various sizes, cup cutting were also installed in the years 1983 and 2007. In the year 2003, the Corporate Structure of the company was changed. Some portion of the Government shares was off loaded through stock exchanges to have a Private – Public partnership in order to manage the company operations in more efficient manner. Thus private shareholding increased to 67% and Government Share holding 33%. The private share holders elected directors therefore got effective role, which has resulted in improving efficiency in all areas. The company has turned around, and is not only earning profits, but also continuously improving its

profitability and financial health. The shareholders are being paid cash dividend much higher than bank rates. The market price of its share is now highest in the engineering sector companies in Pakistan. The Foundry is also available in house to produce castings of Pumps, Electric Motors and Machine Tools. It is in the process of up gradation to cater for high quality castings for Tractors and Auto Sector.

2.9. Overview of Pakistan Sugar Industry

In Pakistan the main industrial and cash crop is sugar cane. In sugar producing countries Pakistan is an important and ranked fifth in sugar cultivation in term of its area, 15th in sugar production and 60th in yield. After textiles it is the second largest agro-industry in which sugarcane is grown on over a million hectares and gives raw materials for its sugar mills. In manufacturing sugar sector comprise 4.2%. Sugar sector is equivalent to cement sector in size and has an indirect socio economic collusion in overall terms which is extensively larger than its direct role to GDP because of it's backward (sugarcane growers) and forward connections (food processors) in the economy (Raheman et al., 2008).

2.10. Overview of the textile Industry

In the export of Pakistan textile sector plays an important role as in Asia, Pakistan is the 8th largest exporter of textile products. This industry contributes 8.5% to total GDP. About 15 Million people employment is provided by this industry which is almost 30% of the country work force of about 49 Million. The total world textile trade is US$18 trillion annually which is increasing at 2.5% in which Pakistan shares is less than 1%. The improvement of the Manufacturing Sector has been given the key priority since Pakistan's founding with main pressure on Agro-Based Industries. As Pakistan is one of

the leading producers of cotton in the world, so the improvement of a Textile Industry making full utilization of its plentiful resources of cotton which has been a priority area towards industrialization. Pakistan is the world's 4th largest producer and 3rd largest consumer of cotton. Currently, there are 1,221 ginning units, 442 spinning units, 124 large spinning units and 425 small units which produce textile products. From the last 50 years the textile and clothing industry has been the major driver of the Pakistani economy in terms of jobs creations and foreign currency. For future growth of the economy this industry is so important because there is no substitute industry or service sector that has the potential to advantage the economy with foreign currency earnings and new job creation. Pakistan's Textile Industry had proved its potency in international market during the last four decades. It has proved its strength even in post quota period by not only sustaining its position but, also showing growth during 2005 to 2007, but declined to $11.1 billion in 2008 due to financial and economic meltdown globally.

3. Methodology

3.1. Analytical Model

We have used panel estimation technique for testing the relationship between investment and cash flow. Baltagi (2008) recommended that there are different reasons for using panel data techniques. By this technique, individual heterogeneity can be controlled as suggested by panel data that individual units are heterogeneous. From panel data we obtain two magnitudes of data, such as time series and cross sectional. Moreover, there is less collinearity and data is more informative & efficient in panel data than in cross sectional and time series data. Wooldridge (2002) declared that through panel data we can seems into vibrant relationships that cannot be observed with cross sectional or time series data.

The model used in this study was used by (Hovakimian 2009);

$$(I/K)_{it}=\beta_0+\beta_1 (CF/K)_{it}+\beta_2 (\text{Tobin's Q})_{it}+\beta_3 (Lev)_{it}+\beta_4 (AT)_{it}+\beta_5 (DPR)_{it}+\varepsilon_{it}$$

Where: I is the investment, deflated by the beginning-of-period net fixed capital (K)

CF denotes cash flow, deflated by the beginning-of-period net fixed capital (K)

Tobin'Q_{it} of i firm in year t

Lev_{it} represents leverage of i firm in year t

AT_{it} is the return on equity of i firm in year t

DPR_{it} is the dividend payout ratio of firm i in year t

ε_{it} is the error term in year t

3.2. Sample

This study contains a population of 435 non financial firms that were listed on Karachi Stock Exchange from the period 2001 to 2008. As the main focus of this study is to find the relationship between investment and cash flow, as sample only those firms were selected for this study that satisfied the following criteria:

1. Firms that from time to time paid out dividends to their shareholders
2. Availability of data

Based on the abovementioned criteria 313 firms were chosen because these firms paid dividends to their stockholders, therefore satisfying the 1st criteria. After a through inspection 45 more firms were screened out because of unavailability of data. The final sample of the study that satisfied both the necessities of the study contains 268 non financial firms representing 27 sectors. Because of setting out these limitations, we will apply sampling methodology known as convenience sampling. We will select a large enough and simplifyable sample because a sample selected through convenience sampling would be insufficiently representative of the whole population.

3.3. Data

Data were collected from "Balance sheet analysis of joint stock companies listed on the Karachi Stock Exchange" issued by the State bank of Pakistan that includes nine years of past financial data from the annual reports of firms that are listed on KSE (Karachi Stock Exchange). Data was collected from the period of 2001 to 2008. Although the final analysis was done from the period of 2001 to 2008, data of the year 2000 was also included in the study in order to find the lag value of various financial inputs.

3.4. Variables and Measurement

The main objective of this study is to find a relationship between Investment and cash flow. For this relationship finding we have taken investment as the dependent variable while cash flow is taken as the explanatory variable, along with rest of controlled variables.

3.4.1. Investment

The basic point of this study is also to check relationship between investment and cash flow. We will use investment as used by Lang et al. 1996, Aivazian et al. 2005 and Odit and Chittoo 2008, the ratio of net investment to lagged fixed assets. Net investment was calculated as (capital expenditure – depreciation).

$$\textbf{\textit{Investment}} = \frac{\textbf{\textit{Net investment}}}{\textbf{\textit{Lagged net fixed assets}}} = \frac{\textbf{\textit{Capital expenditure}} - \textbf{\textit{Depriciation}}}{\textbf{\textit{Lagged net fixed assets}}}$$

3.4.2. Cash Flow

For stronger financially constrained firms, Investment is positively correlated to inter funds (Fazzari et al 1988). Investment of a firm is more sensitive to cash flow; however its effect is smaller for low levered firms and greater for high levered firms (Whited 1992). Cash flow is the ratio of cash flow before extraordinary income to lagged fixed assets, which is been used by (Odit and Chittoo 2008).

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

3.4.3. Controlled Variables

Some researchers clarify that there are certain other variables that have a considerable collision on investment and could also affect the result of the study (Peasnell et al. 2000;

Lee and Choi, 2002; Chen et al. 2003). We have controlled the effect of the following variables to avoid bias in our results.

- Tobin's Q
- Leverage
- Asset Tangibility
- Dividend Payout Ratio

3.4.3.1. Tobin's Q

Tobin's Q has a considerable impact on investment. Investment of the firm is very much responsive to cash flow and Tobin's Q (Gomes 2001). Tobin's Q measures the performance of a firm and it is the ratio of (market capitalization of the firm + book value of the debt) to book value of the assets. In order to find out the accurate relationship between cash flow and firm investment we controlled for both Tobin's Q and leverage.

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

3.4.3.2. Leverage

With skipping the variables that are associated with earning management will create severe problems. They acknowledged leverage as one of the variable that should be controlled while dealing with the earnings management studies (Bartov et al. 2000).

The calculation of leverage is given as:

$$\textbf{Leverage} = \frac{\textbf{Total Liabilities}}{\textbf{Total Assets}}$$

3.4.3.3. Asset Tangibility

To find out exact relationship between Investment and Cash flow we also control asset tangibility which can measure by (Almeida and Campello 2004).

Asset Tangibility is calculated as;

$$AT = \frac{Fixed\ Assets\ after\ deducting\ accumulated\ depreciation}{Total\ Assets}$$

3.4.3.4. Dividend Payout Ratio

In order to determine dividend policy it has been taken as proxy (Holder et al. 1998; Lambert et al. 1989; Wang et al. 1993; Kato et al. 2002; Grullon et al. 2002;) Dividend payout ratio is indicated as the percentage of income that is being paid out to the shareholders in the shape of dividends. By the help of dividend payout ratio, we can find how well a firm's income can hold up the dividend payments that are being made to the shareholders.

Dividend Payout ratio is calculated as:

$$DPR = \frac{Dividend\ per\ share}{Earnings\ per\ share}$$

4. Results and Analysis

In this section we will discuss empirical evidence of the study in details. These empirical evidences include descriptive statistics, correlations and fixed effect model. We have divided our data in sections like Cement, Chemical, Engineering, Miscellaneous, Sugar, and Textile sectors.

4.1. Descriptive Statistics

Descriptive statistics signify the mean, standard deviation, maximum and minimum values. In our study the numbers of observations for each variable are 2136 for the period of 2001 to 2008.

Table 4 summarize summary of descriptive statistics of the dependent and explanatory variables used in the study. The whole study consists of 268 non financial firms which were listed on Karachi Stock Exchange and each variable set contains 2136 observations from the period of 2001 to 2008. From Table 1 it is deduced that mean of the investment is (.0845309) while its standard deviation is (.1261399). The results explain that the firm investment is positive and its standard deviation is also high. This means that the investment of Pakistanis firms move on positive directions. On the other side there is a greater variation in investment with a minimum value of (-2.087174) and a maximum value of (.769224). The mean value of Cash flow is (625.2071) with a standard deviation of (3030.774). The minimum level of Cash flow is (-13435.73) while the maximum limit is (53710.16). The mean ratio for leverage is (.6321217) with a standard deviation of (.3414487). The minimum ratio of leverage is (.0139018) while the maximum limit is (5.62069). The mean value of Tobin's Q which is (1.236372) signifies that there exist growth and investment opportunities for firms. Similarly there exists some variation in

these opportunities between Pakistanis firms. The result shows that investment opportunities can move upward or downward with a standard deviation of (1.984737) from the mean. The minimum value of Tobin's Q is (.078104) while the maximum is (42.93401). The mean value of asset tangibility is (.4951175) while its standard deviation is (.2191082). The minimum value of asset tangibility is (0) while the maximum is (.9678799). The mean of DPR is (.6312323) which is approximately equal to 63.1%, which means that firms paid 63.1% dividend in relation to their earnings per share (EPS). The standard deviation of DPR is (.7086803) which is also high. The selected firms paid dividend to their shareholders from time to time, the minimum value of DPR is (-10.26667) and maximum value (12.66667). Here, 0 means that however firms in a particular year had zero EPS but they still paid out dividends to the shareholders and on the other side, 12.66667 describe that firms paid a very high amount of dividend in relation to their earnings per share.

4.2. Correlation Matrix

Table 5 explains the correlation matrix which demonstrates the linear association of one variable with other variables. Correlation coefficient basically explains the direction and the magnitude of relationship among variables. Table5 shows that, Investment is positively correlated to cash flow, Asset tangibility and dividend payout ratio. It means that investment, cash flow, Asset tangibility and dividend payout ratio move in the same direction. Whereas leverage and Tobin's Q is moving in the opposite direction that of investment which means that, an increase in investment would decrease leverage and Tobin's Q. Cash flow is negatively correlated with leverage, Asset tangibility and Dividend payout ratio. Leverage is positively related with Tobin's Q, Asset tangibility

and Dividend payout ratio. Tobin's Q is negatively related with Asset tangibility and Dividend payout ratio. Dividend payout ratio is positively related with Asset tangibility. After descriptive statistics and correlation matrix we converted the cross sectional and time series data into panel data by using the statistical package STATA V.10. for running the panel data analytic models. The panel data constructed to test for the relationship between explained and the explanatory variables is strongly balanced as the number of years in each cross sectional unit is equal.

4.3. Cement Sector

According to Table 6, the value of R square is .1761 which means that 17% variations in dependent variable are explained by independent variables. In panel form the value of R-Square being a bit low.

The primary objective of this study is to find relationship between cash flow and investment. Table 6 shows that there is significant relationship between cash flow and investment after controlling for Leverage, Tobin's, Asset tangibility and dividend payout ratio as the t-value is greater than 2 and P value is less than 0.05. As for as control variables are concerned, for Tobin's Q and asset tangibility t value is greater than 2 and P-value is less than 0.05 which shows that these variables are also significant and influencing the dependent variable.

The coefficient of cash flow is 0.0000243 which shows a positive relationship between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000243. Coefficient of leverage is -.0711901 showing a negative relationship between leverage and investment. Also, the coefficient characterizes that marginal increase in leverage would decrease investment by

0.0711901. The coefficient of Tobin's Q is 0.0370668 which shows a positive relationship between Tobin's Q and investment and represents the marginal change in independent variable that would change the dependent variable by .0370668. The coefficient of asset tangibility is 0.2954204 which shows a positive relationship between asset tangibility and investment and represents the marginal change in independent variable that would change the dependent variable by 0.2954204. Coefficient of dividend payout ratio is -.0041329 showing a negative relationship between dividend payout ratio and investment. Also, the coefficient characterizes that marginal increase in dividend payout ratio would decrease investment by 0.0041329.

4.4. Chemical Sector

According to Table 7, the value of R square is .0853 which shows 8% variations in dependent variable are explained by independent variables. Table 7 shows that there is significant relationship between cash flow and investment after controlling for Leverage, Tobin's, Asset tangibility and dividend payout ratio as the t-value is greater than 2 and P value is less than 0.05. As for as control variables are concerned, for leverage t value is greater than 2 and P-value is less than 0.05 which shows that this variable is significant and influencing the dependent variable.

The coefficient of cash flow is 0.0000154 which shows a positive relationship between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000154. Coefficient of leverage is -0.1507538 showing a negative relationship between leverage and investment. Also, the coefficient characterizes that marginal increase in leverage would decrease investment by 0.1507538. The coefficient of Tobin's Q is -.0058242 which shows a negative

relationship between Tobin's Q and investment and the coefficient characterizes the marginal increase in Tobin's Q would decrease investment by -.0058242. The coefficient of asset tangibility is 0.1071083 which shows a positive relationship between asset tangibility and investment and represents the marginal change in independent variable that would change the dependent variable by 0.1071083. Coefficient of dividend payout ratio is -.0127722 showing a negative relationship between dividend payout ratio and investment. Also, the coefficient characterizes that marginal increase in dividend payout ratio would decrease investment by 0.0127722.

4.5. Engineering Sector

According to Table 8, the value of R square is .0761 which shows 7% variations in dependent variable are explained by independent variables. Table 8 shows that there is an insignificant relationship between cash flow and investment after controlling for Leverage, Tobin's, Asset tangibility and dividend payout ratio as the t-value is less than 2 and P value is greater than 0.05. As for as control variables are concerned, for asset tangibility t value is greater than 2 and P-value is less than 0.05 which shows that this variable is significant and influencing the dependent variable.

The coefficient of cash flow is -2.17e-07 showing a no relationship between dividend payout ratio and investment. Also, the coefficient characterizes that marginal increase in cash flow would decrease investment by 2.17e-07. Coefficient of leverage is -.0035468 also showing a negative relationship between leverage and investment. And, the coefficient characterizes that marginal increase in leverage would decrease investment by 0.0035468. The coefficient of Tobin's Q is 0.009579 which shows a positive relationship between Tobin's Q and investment and represents the marginal change in independent

variable that would change the dependent variable by 0.009579. The coefficient of asset tangibility is 0.0978017 which shows a positive relationship between asset tangibility and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0978017. The coefficient of dividend payout ratio is 0.00154495 which shows a positive relationship between dividend payout ratio and investment and represents the marginal change in independent variable that would change the dependent variable by 0.00154495.

4.6. Miscellaneous Sector

Table 9 shows that there is no significant relationship between cash flow and investment after controlling for Leverage, Tobin's, Asset tangibility and dividend payout ratio as the t-value is less than 2 and P value is greater than 0.05. As for as control variables are concerned, for asset tangibility t value is greater than 2 and P-value is less than 0.05 which shows that this variable is also significant and influencing the dependent variable. The coefficient of cash flow is 0.0000268 which shows a positive relationship between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000268. Coefficient of leverage is .0652583 showing a positive relationship between leverage and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0652583. The coefficient of Tobin's Q is -0.0029041 showing a negative relationship between Tobin's Q and investment. Also, the coefficient characterizes that marginal increase in dividend payout ratio would decrease investment by 0.0029041. The coefficient of asset tangibility is 0.1969926 which shows a positive relationship between asset tangibility and investment and represents the marginal change in independent

variable that would change the dependent variable by 0.1969926. Coefficient of dividend payout ratio is -.0016163 showing a negative relationship between dividend payout ratio and investment. Also, the coefficient characterizes that marginal increase in dividend payout ratio would decrease investment by 0.0016163.

4.7. Sugar Sector

Table 10 shows that there is significant relationship between cash flow and investment after controlling for Leverage, Tobin's, Asset tangibility and dividend payout ratio as the t-value is greater than 2 and P value is less than 0.05. As for as control variables are concerned, for leverage and asset tangibility t value is greater than 2 and P-value is less than 0.05 which shows that these variables are also significant and influencing the dependent variable.

The coefficient of cash flow is 0.0000755 which shows a positive relationship between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000755. Coefficient of leverage is -.0549896 showing a negative relationship between leverage and investment. The coefficient characterizes that marginal increase in leverage would decrease investment by 0.0549896. The coefficient of Tobin's Q is -.000572 which shows a negative relationship between Tobin's Q and investment. The coefficient characterizes that marginal increase in leverage would decrease investment by 0.000572. The coefficient of asset tangibility is 0.2694765 which shows a positive relationship between asset tangibility and investment and represents the marginal change in independent variable that would change the dependent variable by 0.2694765. Coefficient of dividend payout ratio is 0.106374 showing a positive relationship between dividend payout ratio and investment, represents

the marginal change in independent variable that would change the dependent variable by 0.106374.

4.8. Textile Sector

Table 11 shows that there is no significant relationship between cash flow and investment after controlling for Leverage, Tobin's, Asset tangibility and dividend payout ratio as the t-value is less than 2 and P value is greater than 0.05. All control variables have also no significant relationship with dependent variable because t value is less than 2 and P-value is greater than 0.05. The coefficient of cash flow is 9.45e-07 which shows a positive relationship between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 9.45e-07. Coefficient of leverage is -.007092 showing a negative relationship between leverage and investment. The coefficient characterizes that marginal increase in leverage would decrease investment by 0.007092. The coefficient of Tobin's Q is -.0043842 which shows a negative relationship between Tobin's Q and investment. The coefficient characterizes that marginal increase in leverage would decrease investment by 0.0043842. The coefficient of asset tangibility is -.0048452 which shows a negative relationship between asset tangibility and investment. The coefficient characterizes that marginal increase in leverage would decrease investment by 0.0048452. Coefficient of dividend payout ratio is 0.0087681 showing a positive relationship between dividend payout ratio and investment, represents the marginal change in independent variable that would change the dependent variable by 0.0087681.

4.9. All Sectors combined Cash flow

Table 12 is the combination of all sectors cash flow in which cement sector coefficient of cash flow is 0.0000243 which shows sensitivity between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000243. In chemical sector coefficient of cash flow is 0.0000154 which shows sensitivity between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000154. In engineering sector coefficient of cash flow is -2.17e-07 showing no sensitivity between dividend payout ratio and investment. Also, the coefficient characterizes that marginal increase in cash flow would decrease investment by 2.17e-07. In miscellaneous sector coefficient of cash flow is 0.0000268 showing no sensitivity between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000268. In sugar sector coefficient of cash flow is 0.0000755 which shows sensitivity between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 0.0000755. In textile sector coefficient of cash flow is 9.45e-07 showing no sensitivity between cash flow and investment and represents the marginal change in independent variable that would change the dependent variable by 9.45e-07.

5.1. Conclusion

We examine the relationship between cash flow and investment, and found indication of cash flow and investment practices in Pakistan. It means that there is a significant impact of cash flow on the investment. As we have taken sector wise comparison so in our study there is high sensitivity between Cash flow and Investment in Cement, Chemical and Sugar sectors and low sensitivity in Engineering, Miscellaneous and Textile sectors. This relationship was found after controlling the effects of leverage, Tobin's Q, Asset tangibility and dividend payout ratio.

As investment is strongly cash flow sensitive these decisions will be either the agency costs of cash flow when managers with excessively much prudence overinvest or of asymmetric information when managers owning equity are under investing if the market insist too high a risk premium, Cashflow dependent investment policy outcome mostly from agency problems significantly positive investment-cash flow sensitivity and verify that this sensitivity depends on insider ownership. For companies in which insider power rises, cash flow sensitivity is reduced. If inside ownership is at reasonable levels, cash flow sensitivity increases which might be explicate by a high level of entrenchment which permits for the utilization of a high level of classified settlement. On other side in higher inside ownerships when management adopts huge changes in the firm's values, investment cash flow sensitivity decreases. For high insider ownership levels, that is, when management internalizes a large fraction of the changes in the firm's value resulting from their actions, the investment-cash flow sensitivity decreases. There is also impact of outsiders' like the government, financial institutions, industrial and commercial corporations which reduces the sensitivity of cash flow and investment. Stiglitz (1974) &

Jenson and Meckling (1976) consider the situation of an entrepreneur who has an access to an investment project, but doesn't have the funds to finance it. If the entrepreneur raises the funds by issuing equity, than since he will have a less than 100 % interest in the project, he will not manage it as carefully as he should from the point of view of all owners. The findings of this study are consistent with the study of Pawlina and Renneboog (2005) who investigated the same relationship in London Stock Exchange. They have also found a significant relationship between Cash flow and Investment. Alti (2003) also shows that for all firms there is a positive and statistically significant investment – cash flow sensitivity. Gilchrist and Himmelberg (1995) indicate no relationship between cash flow and investment.

Cash flow is a major determinant of investment because cash flow basis companies uses internal funds for further investment not relying on market, In our study Cement, Chemical and Sugar sectors can go for more investment due to their high cash flow and Engineering, Miscellaneous and Textile sectors cannot go for more investment due their low cash flow. The primary objective of this study was to find sensitivity between cash flow and investment in Pakistan. The basic idea behind conducting this research was to test for cash flow as an active driver of Investment practices in Pakistan.

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Figure 1

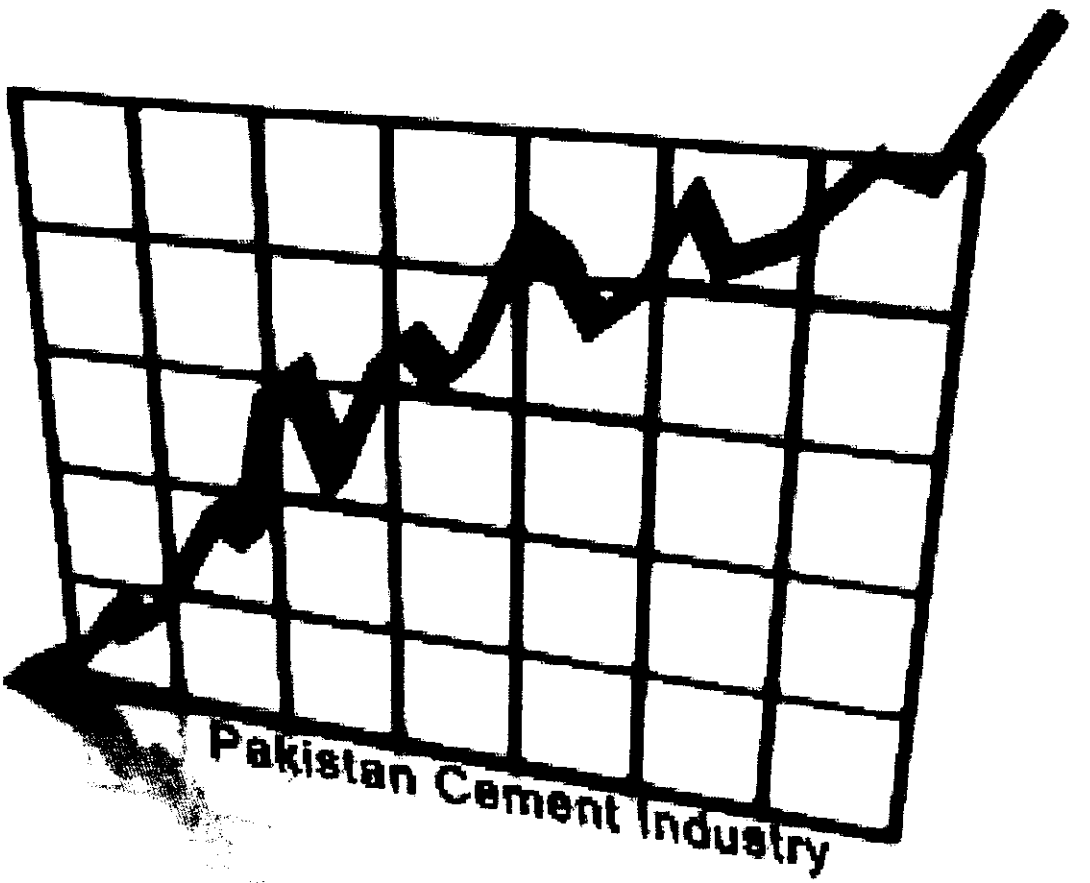

Table 1 **Sugar Cane Yield of World**

Country	Cane Yield (T/ha)	Sugar Recovery (%)	Sugar Yield (t/ha)
Australia	100.4	13.8	13.85
Egypt	110.8	11.5	12.74
Brazil	68.4	14.5	9.91
USA	80.2	11.7	9.38
Colombia	80.5	11.5	9.26
Mexico	79.5	11.6	9.22
India	66.9	9.9	6.64
Pakistan	49.0	9.2	3.54
World Avg.	64.4	10.6	6.82

Source: *www.pakboi.gov.pk/word/Sugar%20.doc*

Table 2

	1990	2000	2004	2005	2006	2007	2008
World Textile	104,354	157,295	195,541	202,657	220,367	240,364	250,198
World Clothing	108,129	197,722	260,569	276,802	309,142	345,830	361,888
Total	212,783	355,017	456,110	479,479	529,509	586,194	613,086
Pakistan Textile	2,663	4,532	6,125	7,087	7,469	7,371	7,186
Pakistan Clothing	1,014	2,144	3,026	3,604	3,907	3,806	3,906
Total	3,677	6,676	9,151	10,691	11,376	11,177	11,092
% Age of World Trade	1.73%	1.88%	2.01%	2.23%	2.15%	1.91%	1.81%

Source: *Ministry of Textile*

Table 3 **Number of firms selected from each sector**

	NUMBER OF FIRMS
CEMENT	12
TOBACCO	3
WOOLEN	3
REFINERY	3
SYNTHETIC and RAYON	9
ENGINEERING	7
TEXTILE SPINNING	71
TEXTILE WEAVING	5
TEXTILE COMPOSITE	35
POWER GENERATION and DISTRIBUTION	6
OIL and GAS MARKETING COMPANIES	5
OIL and GAS EXPLORATION COMPANIES	2
SUGAR and ALLIED INDUSTRIES	25
TRANSPORT	2
AUTOMOBILE PARTS and ACCESSORIES	6
CABLE and ELECTRICAL GOODS	5
AUTOMOBILE ASSEMBLER	7
TECHNOLOGY and COMMUNICATION	3
FERTILIZER	4
LEATHER and TANNERIES	3
FOOD and PERSONAL CARE-PRUDUCTS	11
GLASS and CERAMICS	5
MISCELLANEOUS	11
PHARMACEUTICALS	7
CHEMICALS	12
PAPER and BOARD	4
VANASPATI and ALLIED INDUSTRIES	2
TOTAL NUMBER OF FIRMS	**268**

Table 4 **Descriptive Statistics**

Variables	Observations	Mean	Std. Dev	Min	Max
INV	2136	.0845309	.1261399	-2.087174	.769224
CFO	2136	625.2071	3030.774	-13435.73	53710.16
LR	2136	.6321217	.3414487	.0139018	5.62069
TQ	2136	1.236372	1.984737	.078104	42.93401
AT	2136	.4951175	.2191082	0	.9678799
DPR	2136	.6312323	.7086803	-10.26667	12.66667

Table 5 **Correlation Matrix**

Variables	INV	CFO	LR	TQ	AT	DPR
INV	1					
CFO	0.0413	1				
LR	-0.0334	-0.0573	1			
TQ	-0.0415	0.0021	0.1038	1		
AT	0.1921	-0.0129	0.2188	-0.0290	1	
DRP	0.0094	-0.0366	0.0591	-0.0660	.0643	1

Table 6 **Cement Sector**

Variable Description	Coefficients	T statistics	P-Value
Intercept	-.1111808	-1.30	.195
CFO	.0000243	2.64	.010
LR	-.0711901	-1.21	.230
TQ	.0370668	2.24	.027
AT	.2954204	3.31	.001
DPR	-.0041329	-0.46	.644
F Statistics	.0033		
R-Square	.1761		
Adjusted R-Square	.1303		

Table 7 **Chemical Sector**

Variable Description	Coefficients	T Statistics	P-Value
Intercept	.0863459	1.98	.049
CFO	.0000154	3.43	.001
LR	-.1507538	-2.08	.039
TQ	-.0058242	-1.10	.272
AT	.1071083	1.81	.071
DPR	-.0127722	-0.45	.653
F Statistics	.0051		
R-Square	.0853		
Adjusted R-Square	.0607		

Table 8 **Engineering Sector**

Variable Description	Coefficients	T Statistics	P-Value
Intercept	.0154495	0.92	.358
CFO	-2.17e-07	-0.16	.873
LR	-.0035468	-0.16	.875
TQ	.009579	1.06	.290
AT	.0978017	4.76	.000
DPR	.00154495	0.81	.417
F Statistics	.0002		
R-Square	.0761		
Adjusted R-Square	.0606		

Table 9 **Miscellaneous Sector**

Variable Description	Coefficients	T Statistics	P-Value
Intercept	-.0227184	-1.05	.293
CFO	.0000268	1.91	.057
LR	.0652583	2.15	.032
TQ	-.0029041	-1.58	.115
AT	.1969926	7.72	.000
DPR	-.0016163	-0.30	.765
F Statistics	.0000		
R-Square	.2316		
Adjusted R-Square	.2157		

Table 10 **Sugar Sector**

Variable Description	Coefficients	T Statistics	P-Value
Intercept	-.0359899	-1.71	.089
CFO	.0000755	4.46	.000
LR	-.0549896	-3.86	.000
TQ	-.000572	-0.26	.796
AT	.2694765	6.46	.000
DPR	.106374	0.60	.522
F Statistics	.0000		
R-Square	.2432		
Adjusted R-Square	.2237		

Table 11 **Textile Sector**

Variable Description	Coefficients	T Statistics	P-Value
Intercept	.0928464	3.28	.001
CFO	9.45e-07	0.14	.885
LR	-.007092	-0.37	.709
TQ	-.0043842	-0.55	.582
AT	-.0048452	-0.20	.838
DPR	.0087681	0.39	.700
F Statistics	.7921		
R-Square	.0025		
Adjusted R-Square	-.0027		

Table 12 **All Sectors Combined Cash Flow**

Variable Description	Coefficients
CFO of Cement sector	.0000243
CFO of Chemical sector	.0000154
CFO of Engineering sector	-2.17e-07
CFO of Miscellaneous sector	.0000268
CFO of Sugar sector	.0000755
CFO of Textile sector	9.45e-07