Firm Characteristics and Cash-Cash Flow Sensitivity:

An Assessment for Pakistani Manufacturing Firms

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CERTIFICATE

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Saddiqa

Dedicated

To

*My **Beloved Parents***

All my love to them because, having them made me feel the luckiest daughter in the world.

&

*Of course my **Honorable Teachers***

Who educate me and made me believe that I can do everything.

This dissertation is for you!

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SADDIQA

Abstract

The main purpose of this study is to examine the determinants of the sensitivity of cash holdings to cash flows. The study also aims to examine whether the impact of the determinants of cash flow volatility differs across financially constraint and financially unconstraint firms, across firms having high and low Tobin's Q, and across high and low levered firms. Finally the study also examines the firm-specific determinants of positive and negative sensitivity of cash to cash flows. For this purpose, we sort out the firm-year observations where the correlation between cash and cash flow is positive and negative. To identify the financial constraint and unconstraint firms, we use WW index. Specifically, base as the median value of WW index we classify the firms into financial constraint and unconstraint. Similarly based on the median value of Tobin's Q and leverage we cluster the firms as high growth, low growth, and high levered and low levered firms. We use the two step system GMM estimations to estimate the empirical model. The study uses unbalanced firm-level annual panel data set covers the period 2000-2014.

The key findings of the study are as follows. Our results are consistent with the core rationale that constrained firms face more difficulties than their unconstraint counterparts when looking for funding from external markets. As a result, financially constraint firms are more conscience about propensity to save cash out of cash inflows than that of their unconstraint counterpart. However, the results regarding the role of growth potentials in the firm characteristics and cash and cash flow sensitivity reveal that the absolute correlation between cash and cash flow of high-growth firms are more sensitive than low-growth firms. Finally, we find that there exist the differential effects of cash flow and cash holdings across high-levered and low-levered firms. Absolute correlation between cash and cash flow of high-levered firms are positively affected by to all variables used in the model except for leverage. However, low levered firms' absolute correlation between cash and cash flow negatively affected by one period lagged size, dividend payout ratio, cash flow volatility and market to book value, whereas, they are positively related to the one period lagged absolute correlation between cash and cash flow and the leverage.

Keywords: Cash**,** Cash-Cash Flow Sensitivity, Financial Constraint, Financial Unconstraint, Liquidity, System GMM

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Abbreviations and Acronyms

ACW	Almeida, Campello and Weisbatch
CF	Cash Flow
CFSC	Cash Flow Sensitivity of Cash
CFS	Cash Flow Sensitivity
CFV	Cash Flow Volatility
CH	Cash Holding
DD	Dividend Dummy
DIV	Dividend Payout Ratio
EMU	European Monetary Union
FC	Financial Constraint
FUC	Financial Constraint
GME	Generalized Maximum-Entropy
GMM	Generalized Method of Moment
Inv	Net Investment
LEV	Leverage
MM	Modigliani and Miller
NPV	Net Present Value
R	Correlation between Cash and Cash Flow
SG	Sales Growth
SIZ	Size
TQ	Tobin's Q
US	United States
VIF	Variance Inflation Factor
WW	Whited, Wu

Chapter 1

Introduction

1.1 Background of the Study

Why do firms prefer to hold cash in their balance sheets? Why the cash holding pattern of developed and developing countries are different? Why financially constraint firms are more conscience of their liquidity? How does the value of cash differ across firms? Why do financially constraint and unconstraint firms hold different levels of cash? What firm-specific factors determine the cash flow sensitivity of cash? These are the major questions that have been attracted the attention of academia, researchers, firm managers, and policymakers to understand the cash holding behavior of corporate firms. Indeed, over the last three decades, the assessment of cash holdings of firms has achieved a great deal of concentration in both the theoretical and empirical grounds.

On theoretical grounds, Modigliani and Miller (1958) argue that there is no need of holding large amount of cash as it is irrelevant for firms for decision making, in particular, when financial markets are perfect and complete. Transaction costs do not exist when there is perfect capital market, and thus, firms can easily finance their profitable investment projects. Several researchers like Hamada (1969), Stilglitz (1972), and Hatfield et al. (1994) also supported the irrelevance theory. However, in practice, it has been observed that cash holding structure of a firm have a great deal in corporate finance, so cash relevancy does exist.

In principal, there are numerous reasons of why corporate firms hold cash on their balance sheet. According to Keynes (1936), cash holdings have two important advantages. First, cash protects firm from the liquidation of valuable assets at the time of need, so it saves the transaction costs. Second, retained cash helps firm from future

unforeseen shortfalls of cash. This reason of cash holdings is termed as the precautionary motive for cash holdings.

Another well-known and well-established explanation of cash holding benefit is that, cash holding enables corporate firms to get external financing at low cost. Specifically, costs of outsource financing are higher when there is no any systematic information between stakeholders and firm managers as explained by Myers and Majluf (1984), in the presence of costly agency issues such as under-investment by firms and disposing of liquid asset at less price, (Myers (1977) and Jensen and Meckling (1976)), in case of high transaction costs and other financial restrictions. Therefore, firms hold cash to make reduction in the cost associated with outside source of finance.

When we review the theoretical literature, we find several theories that have emphasized on explaining the corporate cash holdings. For example, in case of trade-off theory, when firms making decisions for cash reserves, they should hold some internal funds (retained earnings) and critically consider the association between cost and benefit of cash held. In this context, we can say that firms should hold a best possible level of cash by balancing the marginal benefits and marginal costs of retained cash.

Another well-known financial theory namely the packing order theory is specified by Myers and Majluf (1984). Specifically, they categorize and rank the major sources of financing that can be taken by any firm. According to this theory, the financing decision of any firm should follow a hierarchy of preferences. Firms first should use their retained cash to finance their investment or other capital requirements, then they should issue save debt followed by risky debt, and finally they should issue equity as last source of finance. In this way, firms can reduce cost

associated with asymmetric information and other expected financing cost like transaction cost. Debt will be issued when reserved cash are not enough to finance the desired investment needs.

The above mentioned theories are commonly tested in different papers for providing the relationship cash flow and cash holding. For instance, Ferreira and Vilela (2004), Saddour(2006), and Han and Qui (2007) tested the both of theories the trade-off and the packing order theory to determine appropriate cash holdings that firms retain in their balance sheets.

The free cash flow theory of Jensen (1986) argues that firm's managers have preferences for having high levels of cash with the purpose of implement larger power over firms' investment decisions. So, larger amount of cash declines the need for outsource financing and allow for further investment preferences. Likewise, the agency theory proposed by Jensen and Meckling (1976) argues that the managers of firm favor the high accumulation of cash as it can enable them to increase liquid asset under their discretion instead of paying it out to stockholders.

Reviewing the empirical literature on corporate cash holdings, we find that the previous existing empirical literature has extensively paying attention on estimating the cash holdings of firms. The largest part of earlier studies emphasized on cash reserves by coming across past history of corporate cash holdings[1]. A common findings emerging from these studies is that corporate firms prefer to hold sufficient amount of cash as reserve in their accounts.

When review empirical literature, we observe that corporate firms hold different amount of cash across different countries. For example, Ozkan and Ozkan (2004) show that UK firms hold about 10% of their assets in cash reserves during the

[1]Examples of these studies are Duchin (2010),Gracia and Mira (2015), Han and Qui (2007), Kim et al. (1998).

period 1984-1999. However,Opler et al. (1999) has shown the mean ratio of cashtototal assets 17% for large US firms. For European Monetary Union (EMU) countries' publically traded firms, Ferreira and Vilela (2004) show the cash ratio of 15% during the period from 1987 to 2000. Similarly, Guney et al. (2003) show that about 14% of cash flow firms tend to hold as cash ratio. In case of Pakistani firms on average cash reserve out of cash inflows has shown by Ahsan and Ullah (2013) and Rashid and Ashfaq (2015), is 9.8% and 8.6%, respectively.

Over the last few decades, many researchers have conducted research on empirical cash holdings and its determinants, valuation of liquid assets, cash holding and its relationship with investment and corporate governance of firms, cash holding and financial constraint firms, investment cash flow sensitivity and finally, cash and cash flow sensitivity.

For example, the determinants of the corporate cash holding are studied by Opler et al. (1999), Saddour (2006), andFerrerira, and Vilela (2004). Specifically, these studies pointed out that firm with well-built growth prospect, riskier cash flows, and investment opportunities set are positively related with cash holdings of firm. Similarly, they have shown that higher cash flows are positively related with cash holdings of firm.On the other hand, access to capital marketand high credit ratings allow firms to hold fewer cash reserves in their balance sheets.

Another strand of literature that has focused on value of cash holdings includes Denis and Sibilkov (2009),Pinkowitz and Williamson (2006), Dittmar and Mahrt-Smith (2007) and Faulkender, and Wang, (2006). For example, Dittmar and Mahrt Smith (2007) find that the value of cash is lower for U.S. firms with poor governance. Pinkowitz, Stulz, and Williamson (2006) find a similar result internationally, by taking world scope sample. Specifically, the above mentioned

studies pointed out that constraint firms held more cash in their reserves to undertake value increasing projects. They further show that there exists a positive relationship between cash holdings and growth opportunities.

The third group of the literature has focused on explaining the cash flow sensitivity of cash. The sensitivity of a firm's cash to cash flows is one of the emerging issues of corporate finance.

The first paper that introduced cash and cash flow sensitivity in the literature was Almeida, et al. (2004). Almeida et al. (2004), (here after ACW), developed new approach in the world of corporate finance literature. They develop an empirical equation to estimate the sensitivity of cash to cash flow. They also classify financial constraint and unconstraint firms.

They define constraint as, firm suffering from shortage of funds and not able to finance all net present value projects. This type of firms passes up some project today, save or retain more cash today to avail better net present value projects in future. As financial constraint firms are forced to manage liquidity, they will set aside some cash out of their cash inflows, while there seems no any systematic approach of saving funds for financially unconstraint firms.

According to them, they overcome the previous problem in the literature that the model for financial unconstraint firms has not allowed any discrepancy due to future growth opportunities. As well as, their theoretical model argues that the cash holdings of financially unconstraint firms depend on neither on cash generated from operations nor on future growth prospect.

Nevertheless, it is significant to note that the model tasted by ACW could not test the degree of financial constraints, as it is recognized even by the writers themselves. They captured financial constraint condition of the firm through the cash

flows and cash which the firm had retained as a reserve in the balance sheet. Their empirical results suggest that the financial constraint firms use a systematic cash policy to have optimal investment and earn optimal profit. However, in contrast, for financially unconstraint firms, there is no need of holding cash and bearing costs of retained cash amount in their balance sheet.

Cash holdings become important, particularly when other financial sources are insufficient to satisfy a firm's capital requirements. Capital market resistances increase cost of external funds as compared to retained liquid assets, as it is explained by Greenwald et al. (1984). The value of cash that has been held by the firm will take importance when in the market there are investment opportunities and the firm is facing financing constraints.

As supporting this view, a number of studies show that financial constraint firms hold more cash in their reserves, while financially unconstraint firms do not follow any systematic approach to hold cash for future unforeseen events. Likewise, ACW (2004) and Gracis and Mira (2015) provide evidence that financially constraint and unconstraint firms use different firm's policies because constraint firms have greater capital market friction and thus they save more cash, while financially unconstraint firms do not.

1.2 Identifying Gap in the Literature

When we review the literature on cash determinants and the relationship between cash holding and cash flows for developing countries, we find that there are only few studies that have explained this relationship for developing countries. Therefore, there is very limited empirical evidence on the sensitivity of cash and cash flow for corporate firms operating in developing countries. Further, we know less about what firm-specific determinants determine the cash-cash flow sensitively.

However, for complete understanding of the cash holding behavior of corporate firms it is important to know the factors affecting the cash and cash flow relationship. It would be also worthwhile to study whether the extent of positive and negative sensitivity of cash to cash flow differs across different firms-specific factors. However, the existing literature is silent in this respect.

1.3 Objectives of the Study

Given the paramount importance of the cash flow sensitivity of cash in policy discussions of the manufacturing firms, this study examines the relationship between cash holding and cash flows of Pakistani firms. Specifically, the study has the following objectives:

1. To examine the cash flow sensitivity of cash for Pakistani manufacturing firms.
2. To study whether the cash flow sensitivity of cash differs for financially constraintand unconstraint firms.
3. To examine the influence of market value (high vs low) of firms on cash flow sensitivity of cash relationship.
4. To investigate the differential effects of cash flow and cash holdings across high levered firms and low levered firms.
5. To explore the role of firm size in establishing the association between cash flow and cash holding.
6. To study whether the determinants of positive and negative cash-cash flow volatility differ.

1.4 Research Questions

To achieve the objectives of the study, we focused on the following questions.

1. Does the cash flow sensitivity of cash differ for financially constraint and unconstraint firms?
2. Is cash-cash flow sensitivity different for high and low levered firms?
3. What is the impact of market value on cash-cash flow sensitivity?
4. Does firm size matter for the cash-cash flow relationship?

1.5Significance of the Study

Considerable work has been done on the determinants and value of cash holding, investment-cash flow sensitivity, and cash flow sensitivity of cash in developed countries. We found it interesting in the field of corporate finance to measure this in developing country like Pakistan. Our contribution has two major aspects.

First, we empirically test the determinants of cash flow sensitivity of cash on the Pakistani listed manufacturing firms for the period of 2000 to 2014. For this we categorize our sample firms into financially constraint and financially unconstraint firms, high-levered firms and low-levered firms, and firms having high-growth and low-growth opportunities. For categorizing firms as financially constraint and unconstraint firms we use Whited Wu index.

Second, our framework to examine the sensitivity of cash and cash flows significantly differs from the existing studies. We find accumulative correlation between cash and cash flows, and then examine how firm-specific factors are related with this correlation. This approach enables us to identify the factors that are positively and negatively related with the cash and cash flow sensitivity. It should be noted that, unlike us most of previous studies have just observed the impact of cash flows on cash holdings by considering cash flows as an independent variable in their regression analysis.

Another worth noting aspect in our study is that we sort out the negative and positive correlation between cash holding and cash flow and then examine whether the negative and positive sensitivity of cash and cash flows differ for firm's having different firm characteristics. Empirical evidence on the determinants of the cash-cash flows sensitivity is not only important for firm managers but also for investors, researchers and academia to fully understand the links between cash holdings and cash flows.

1.6 Plan of the Study

The study in hand is structured as follows. In chapter 1, we have presented the background of the study, the gap in the existing literature, the various objectives of the study, and its significance. Chapter 2 provides theoretical foundation of determinants of cash-cash flow sensitivity. The existing empirical literature on relationship between cash holdings and cash flow is reviewed in chapter 3. In chapter 4, we describe data and empirical models to estimate the cash flow sensitivity of cash. The method used to financially constraint and financially unconstraint firms is also discussed in this chapter. Chapter 5 is about data analysis and discussion whereas chapter 6 concludes the study and presents suggestions and policy implications.

Chapter 2

Theoretical Foundation

2.1 Introduction

In this chapter, we discuss three well-known corporate finance theories. First, we describe the trade-off theory. After that, we elaborate the second well known theory, namely packing order theory, and finally the free cash flow theory has explained. These theories describe why corporate firms hold cash reserves in their balance sheet. As explained by Modigliani and Miller (1958) (MM hereafter) holding of cash or/and near to cash assets (liquid assets, for instance marketable securities and reserves) are irrelevant when there exists perfect capital market.

Let's suppose the cash flows of a firm surprisingly seems to be short and the firm has to obtain funds to keep effective firms financing activities and for investment purpose, in this scenario of perfect capital market, the firms can do so at zero cost. Thus, the short fall in cash reserves would not be destructive for corporate firms. In this context, corporate firms may no need to hold excess liquid assets in their hands and whenever they require funds for investment they can borrow from external markets without incurring any transaction cost.

However, when raising funds are expensive for the firm facing shortage of cash in their balances, the firms make a comparison between the costs of holdings of those liquid assets to the benefits of those retained current assets. Retaining extra amount of liquid assets tends to lessen the probability of suffering from shortage of liquid assets and as a result, it reduces the cost associated with external financing. Under the rational assumptions that the marginal benefits of retained cash decreases as holding of cash and near cash assets increase.

In most of circumstances, firms face shortage of cash reserves so, to overcome this problem, they have to reduce their investment levels, cut back the dividend payments to shareholders, or they can raise funds by selling liquid assets of the firms[2]. Another way of protecting from cash hazards is that, firms can lessen their leverage ratio or use hedging as a tool to reduce financial distress.

Different finance theories provide diverse explanations of corporate companies retain large amounts of cash. This chapter describes some important theories on optimal cash holding levels of firms. Section 2.2, describes the theory given by Myers (1977) 'the trade-off theory', in Section 2.3, we define Myers and Majluf (1984) proposed theory 'the pecking order theory'. We analyzed 'the free cash flow theory suggested by Jensen (1986) in Section 2.4 and lastly, in the section 2.5 we describe in detail the determinants of cash flow sensitivity of cash.

2.2 The Trade-Off Theory

The Myers (1977) proposed trade off theory. In his theory he suggests that firms make optimal levels of cash by comparing costs and benefits of held cash in their accounts. Cash holdings have several important benefits; some of them are as under.

First, the retained cash is helpful in minimizing the likelihood of financial costs as it overcomes unforeseen losses or out ward funds floating pressure. Second, the vital role of cash is that, it allows firms to fulfill the optimum investment funds policies designed. It leads to capture optimum level of net present value (NPV) projects to make high profits.

As of imperfect market condition, there is more difficulty in the access to the capital market and NPV project are more likely to forgo (Faulkender and Wang,

[2] For instance sale the marketable securities or any other near to cash assets.

(2006)). Therefore, a higher cash holding boosts the probability of attracting positive NPV projects that would otherwise be forgone; reserved cash could reduce the reliance's of the financial constraints firms on costly outside financing.

There are several Classic models in finance, for example Keynes (1936), and Miller and Orr (1966), build up an important demand model for liquid cash. In the study of Keynes (1936), we find that he was the first who primarily expressed the major advantage of having cash by firms in their accounts. According to him firms having cash in their accounts, enables them to accept NPV projects, when they arise in the capital market. Moreover, if firms fail to retain cash, the likelihood of incurring financial distress turn out to be high and resultantly they can't meet their obligatory debt payments, Faulkender and Wang (2006).

Another way to explain the importance of cash holding is through precautionary cash motives. With accordance to precautionary motives, firms reserve cash to safeguard themselves against adverse shocks faced by cash flows of the firm. Thus, it avoids the costs associated with liquidity constraints.

However, the costs of having outside finance or the additional cost associated with the cost of shortfalls would differ in accordance with different firm-characteristics. For instance, unconstraint firms incur minimal cash while taking funds from external environment as compared to their counterpart financial constraint firms. Corporate firms facing such a high cost might retain huge cash reserves. Otherwise, the outside financing limitations would force the firm to sacrifices the positive NPV.

In view of firm-characteristics, it would expect that the firms with the small size are maintain higher cash reserves in their accounts to avoid the fixed cost associated with the outside raising funds. As, the firm with large in size can buy in

bulk with comparatively spending smaller amount of cash as compared to the small firms.

Furthermore, firms with high-growth opportunities are more likely to retain cash in their accounts, so that they able to invest in the profitable projects. Likewise, firms with more cash flow volatility are more likely to face cash shortfalls, need to accumulate additional amount of cash.

Finally, another characteristic of firm is the dividend payouts to shareholder. Firms paying currently large amount of dividend are less likely to increase their holdings because they use cash to paying dividend to the shareholders. They are more capable of raising funds when they need by reducing the amount of cash for the dividend payments.

Hence, as in practice, it seems that there exist imperfect capital markets and there are some transactions costs associated with external raising funds, which can be avoided by hoardings of an enough cash levels.

Many papers like (ACW (2004), Han and Qiu (2007) etc.) have shown in their paper that financially constraint firms appear some deficiency of cash so, to overwhelmed their deficiency such firms increase some outside funds. This outside fund takes two types of cost namely, fixed cost and variable cost associated with those external raising funds.

Excluding the firm's having liquid assets and can be liquidate at less cost, it often seems that, there is need of funds from the external markets. Though, it is expensive to increase funds, apart from whether obtaining funds from external capital market or by dispose of some valuable assets. The fixed costs of getting into external marketplace encourage the firm to increase funds irregularly, and to use cash holdings as a buffer.

2.3 The Pecking Order Theory

The pecking order theory of Myers and Majluf (1984) explains the classification and ranking of the main resources of finance that can be used by any firm to finance their operational as well as other activities. Firm first utilize their internally generated funds or retained earnings, then they finance their capital needs by debt, and finally they issue new equity.

The packing order theory suggests that firms for no any reason retain cash in their balance sheets as a targeted cash level, while as an alternative; cash has been used as a buffer between cash holdings and investment requirements.

Therefore, when firm cash flows are enough to fulfill the required level of cash, they use that money for investment purpose, repay debt and again accumulate cash. But if the internally generated funds are insufficient to fulfill the desire level of investment, firms make use the collected cash holdings, and if required, will issue debt and finally, firm use equity as last source of finance[3].

2.4 The Free Cash Flow Theory

Jensen (1986) proposes the free cash flow theory, according to them managers hold extra cash in their accounts to intensify their control over the assets of firm, and ultimately gain the power, while making investment decisions. They retain more cash to make more investment in near future. This availability of internal funds makes investment easily without raising external financing.

This power of control enables manager to avoid external funds and even avoid providing in depth and comprehensive information about the investment projects of a

[3]See the work of Ferreria and Vilela (2004), Saddour (2006), Han and Qui (2007), and Amameh (2015).

firm. Hence, managers even avail those investment opportunities which have a negative influence on stakeholder's wealth. The accessibility of large amount of capital pressurizes them to undertake even negative NPV projects. Consequently, it is expected that cash negatively relates to the growth of firm. This would damage the shareholder's value.

Thus, by taking the growth prospects of firm as a proxy to the market value of assets, it is expected that the relationship concerning holding of cash and investment opportunity is negative.

2.5 Determinants of Cash-Cash Flow Sensitivity

2.5.1Growth opportunities

The corporations with greater growth investment opportunities have to guarantee the ability to finance available positive NPV projects. Certainly, these types of firms can experience two situations: either they will face inexistent of outside funds or costly external funding accessibility. In such circumstances, these firms have to give up some of their profitable investment projects.

On the other hand, when firms retain enough amount of cash in their accounts they able to undertake all the NPV projects available to them. Due to high investments, firms can make more cash inflows from their operations. As a result, they hoard large amount of cash from their large amount of cash inflows.

Furthermore, firms having access to high growth opportunities incurred high cost of external funds because they have to utilize all NPV projects moves to external financing environment. So these types of firms hoard large cash as a reserve to overcome lack of finance in near future.

Similarly, the trade-off theory assists the firms with healthier investment prospects have higher cost of finance, for the reason that the positive NPV of these

investments opportunities disappear, when firms face bankruptcy. So that, those firms with greater and healthier investment prospects tends to reserve cash more in their accounts to avoid monetary distress. Hence, the expected association between cash holdings and growth opportunities (market value to book value of asset or Tobin's Q)[4] tends to be positive. Therefore, it is possibly to find positive association between cash and the investment growths.

As shown by Gracia and Mira (2015) high-growth firms record positive coefficients and retained high cash from their cash inflows. On the other hand, low growth firms have less estimated coefficients. These results supports the ACW's estimation, that high growth firms (financially constraint firms) pursue the policies of greater retention of cash, (Han and Qiu (2007), Riddick and Whited (2009), and Denis and Sibilkov (2009)).

Furthermore, Tobin's Q could also affect the cash policy of firm. It is mainly significant for financially constraint firms as, they suffer from obtaining liquid asset or simply cash and making the projected investments, in near future,

The high and significant sensitivity of financially unconstraint firms reveals the high investment growth of this cluster of firms. Whereas, financially constraint firms retain liquid asset to hedge the volatility in their cash inflows, financially unconstraint firms may possibly reserve cash to improve expecting upcoming investments. For example, the sensitivity of cash and cash flow estimates reveals that the base line model estimation of Gracia and Mira (2015) reported 0.0027 (0.472), −0.0114 (0.222) for unconstraint and constraint firms respectively.[5]

[4] Note that growth opportunities, Tobin's Q, and market value to book value of asset are all interchangeably used in our study.

[5]See Table 4 of Gracia and Mira (2015).

In various empirical studies like, Harris and Raviv (1990), Opler et al. (1999), Gracia and Mira (2015), Shleifer and Vishny (1992), and Ferreira and Vilela (2004) this relationship between the growth of firm and the reserved cash level has explored. For instance, Myers and Majluf (1984) also indicate that those firms whose value is largely determined by their expected growth prospects have larger information asymmetry. In the absence of symmetric information linking investors and managers, the external financing expected to be more expensive. This asymmetric information also generate the chance of severe agency conflicts related to the debt, as a result leads to underinvestment Myers (1977), insofar as it discourages stakeholders from getting on profitable projects.

As in previous theories it has been revealed that, when the cash flows of firm increase, it tends to increase the hoarding of cash. This shows the high cash flow sensitivity of cash. Thus, we expect a positive connection between cash and Tobin's Q. It means that firms are expected to accumulate large amount of cash to invest in profitable investments.

Hypothesis 1: The cash-cash flow sensitivity is higher for high-growth firms as compared to low-growth firms.

2.5.2 Leverage

Leverage is the total debt to total assets of a firm. It increases the control on the capital market. Thus, firms use debt to capture investment projects from the capital markets. In case of firms having less debt ratio or leverage, the accumulation of cash is large as compared to their counter parts; large levered firm. In addition, debts act as a substitute of cash or liquid assets because it can be used to finance the NPV projects available in a capital market. This phenomenon forms a negative

connection between cash holdings and the debt to total asset. That is why when firms increase their leverage level, they tend to reduce cash hoarding level.

In addition, this particular ratio is used as a proxy for the capability of firms to issue additional debt. It shows that, high-levered firms have easy access to external market; they retained less cash in their balances.

Contrary to it, if firm is high-levered it means that it has more liability to pay back the liability so, if there is less cash in account, high debt tends to increase the likelihood of financial distress and bankruptcy. Eventually, to overcome the financial slack, high-levered firms are projected to hoard additional cash as a reserve. Thus, in this case, there seems inverse relationship between high-levered firms and the leverage. Since, there is no ambiguity between cash holdings and the debt ratio of firms. It is also not noticeably determine under the trade-off theory.

It can also elaborate as, in fact, if a firm's investment needs are high as compared to the cash inflows of firm, or retained cash, firm issue new debt to take the profitable investments. As a result, debt increases and cash holdings fall.

On the other hand, while investment requirements are not as much as retained earnings, firms pay back their debt and collect cash. In the world of a pecking order theory, total debt to total asset in general grows as investment needs go beyond the reserved cash and falls when investment is not as much of than retained earnings.

It can be in a few words explained as by raising the level of cash holdings of firm through retained earnings the internal source of finance, there will be less need of external financing through issuance of debt. This shows there exists inverse relationship. This association between cash holdings, debt and investments recommend that there is the existence of a negative relation between leverage and cash holdings.

Leverage is a technique to multiply the gains and the losses as a result of operational activities. Most often, the borrowed funds are used for buying assets, with belief that the purchased assets generate more income as compared to its borrowing cost. However, most often it seems that borrowing cost exceeds the income generated from those assets or gradually the price of asset fall, which leads to incurred losses. That is why, high-levered firms are more subject to examine and allow for superior managerial discretion.

Accordingly, high-levered firms are expected to hold more cash. High-levered firms are known as financially unconstraint firms despite of having more debt in their accounts, face lower financing costs. Moreover, it would be possible when there is less volatility in the earning of firms. Faulkender and Petersen (2003) have also obtained results in line with the high-levered firms are financially unconstraint and they can obtain funds without incurring much cost on borrowings. According to them, firms that are financially constraint incurred high cost on debt obtained in a particular period under consideration and therefore it could be the reason that why financially constraint firms prohibit further credit from capital market.

Hypothesis 2: High levered firms have high influence on cash flow sensitivity of cash flow.

2.5.3 The Sensitivity of Cash Holdings to Cash Flows

Cash holdings are liquid assets held by firms in their balance sheet as a reserve. And on the other side cash flows are the source of finance generating from the operations of firms. Cash flows are the inflows of cash recorded at the income

statement of a firm. Cash flows are the ready sources of liquidity and replace with cash to finance the investment opportunities[6].

The packing order theory of corporate finance also explains that, firms first prefer to utilize their internally generated funds before floating shares in capital market. Keeping in view the above discussions, it is expected that firms with large cash flows expected to keep more cash level. Among most of the studies that supports this prediction are Myers and Majluf (1984), Opler et al. (1999) (tested on US market), Ozkan and Ozkan (2004) (tested this hypothesis on British market), and Ferreira and Vilela (2004) (empirical result obtained for European Monetary Union (EMU) countries). Thus, we expect appositive relation between cash flow and cash holdings.

In an environment where the operational cash inflows of firms are high, firms prefer to use internally generated cash to finance NPV projects, cash also use to pay dividends, to repay debt obligations and finally to retained as reserve. For instance, D'Espallier et al. (2008) confirm that cash holing is highly related to cash flows. The sensitivity of cash and cash flow value for all firms of manufacturing Belgium small and medium enterprises found 0.13, which means that a 1unit increase in cash flow will lead to a 13 units increase in the cash holdings account. There sample consists of five year sample data from the period 2000 to 2004.

Thus, one could expect cash holdings will increase with cash flows levels.

Hypothesis 3:cash holding are highly sensitive to cash flows.

[6] Kim et al. (1998) declare the negative relationship between cash and cash flows, as they believe that cash flows stands as a supplementary source of liquidity for the firm so that it can substitute cash. For more details on how cash flows are important for investment purpose see the work of Kim et al. (1998).

2.5.4 Firm Size

Firm size is another important characteristic of a firm. Miller and Orr (1966) classified firms and shown how size of a firm has play vital role in cash management. They recommend that for larger firms economies of scale exists while managing cash. In this way, it would lead the large size firms to hold smaller amount cash as compared to than small size firms.

Further, it is argued that the fixed cost is not associated with the size of borrowing funds. So, the smaller firms have to incur the same fixed cost on less amount of loan while the larger firms obtained large amount of loans with the same fixed cost as incurred by small size firms. The fee incurred in obtaining fund is same regardless of large and small size firms. It shows that raising funds by smaller firms is more expensive relative to their counterpart larger firm.

In addition, it is commonly accepted that since large size firms are more diversified, expected to have lower chance to face financial distress (see,Rajan and Zingales, 1995). On the basis of the above discussions and the literature it is expected that the link between cash and size of firm is negative.

It is considering that with the increase in the size of firm the operational cash inflows of the firm will increase. Therefore, firms increase their cash holding with the increase in cash flows. As can be seen from the work of D'Espallier et al. (2008) for the smaller firms, the projected cash flow sensitivity is to some extent higher with predictable values of 0.15 for the larger firms, expected sensitivity between cash and cash flows is somewhat lower with predictable value of 0.09.

Hypothesis 4: The cash-cash flow sensitivity is high for small firms.

2.5.5 Dividend Payout to Shareholders

Those firms that at present pay dividends to their shareholders can increase cash without incurring cost or with minimal cost by reducing the level of dividend payments. In contrast, the firms which are not paying dividends to its shareholders, they have to use the capital market to raise fund. Therefore, those firms that are making dividend payments are not expected to reserve more cash in their balance. As a result, the relation between dividend payments and cash holdings would be negative.

On the other hand, cash holding of firm tends to be large when the dividends are extensively paying to the shareholders. In reality, firms which use cash to pay dividends reduce the amount of cash retained for dividend payments. Eventually, they have the choice to cut down the dividend payments in order to overcome the problem of financial distress, when firm faces. Thus, having abundance amount of cash reserves enables firms to stay away from unexpected financial fluctuations. This indicates that there exists a positive association of cash holding and the dividend payouts.

This unclear relationship between cash holding and dividend payouts is also could not determine under the trade-off theory.

As can be seen from the work of D'Espallier et al. (2008) for the firms' not paying dividends, the predictable sensitivity between cash holding and cash flows is higher with expected value of 0.14. Furthermore, for the firms that, estimate pay dividends sensitivity between cash holding and cash flows is to some extent lower with probable value of 0.10.

Hypothesis 5: The cash-cash flow sensitivity is high for no dividend paying firms.

2.5.6 Cash Flow Volatility

Firms with high volatility of cash flow face liquidity constraints and experience cash shortage which leads them to forgo some profitable investment projects. Therefore, firms with greater cash flow volatility are expected to hold more cash. This enables them to avoid liquidity constraints costs.

Cash flow volatility has a significant impact on the amount of financial slack a firm maintains and on its investment-cash flow sensitivity. Firms with high cash flow volatility maintain higher levels of financial slack than their rivals with low cash flow volatility and that the investment outlays of these firms are less sensitive to the firm's internally generated cash flows. The impact of cash flow volatility on a firm's cash holdings depend on a firm's financial constraint status. The financially constrained firm increases its cash holdings in response to an increase in cash flow volatility. In contrast, the cash holdings of financially unconstrained firms are not sensitive to cash flow volatility (Han and Qui(2007)).

Hypothesis 6: The cash-cash flow sensitivity is higher for more volatile firms.

2.5.7Financially Constraint and Unconstraint firms

Financial constraints are financing frictions that a firm face while making investment. These can be credit constraints, inability to borrow or issue equity, dependence on bank loan or liquidity of assets. Firms can mitigate the adverse effects of financial constraints by adopting a policy of greater cash retention. So constraint firms are more likely to save cash out of their cash flows (Almeida et al.(2004), and Faulkender and Wang(2006)). In the presence of low cash flows, it becomes very difficult for constraint firms with low cash balances to cover cash shortfalls through reductions in cash reserves. Cash flow sensitivity of cash is significantly lower for

low cash constraints firms than for high cash constraint firms Denise and Sibilkov (2009). So constraint firms are more likely to hold cash out of their cash inflows as compared to unconstraint firms.

ACW's (2004) paper shows that the sensitivity estimates for constrained firms vary between0.051 and 0.062 and are all statistically significant better than the 1% level (excluding the KZ index).These estimates suggest that for each dollar of additional cash flow a constrained firm will save around 5-6 cents, while unconstrained firms do nothing (see, Table III of ACW (2004)).

Hypothesis 7: Constrained firms displays significantly positive sensitivities of cash to cash flow, while unconstrained firms show insignificant cash-cash flow sensitivity.

Chapter3

Literature Review

3.1 Introduction

In the literature there has been a wide spread discussion on how to find verification for the occurrence of financial constraint conditions in a firm. Several experimental school of thoughts have thorough investigation on the magnitude of the investment growth (growth of firm to internal sources); the superior the sensitivity the stronger the relentlessness of financial constraint. This come within reach and criticized by quite a lot of researchers because the investment growth of cash flow has been originated to be non-monotonic. Therefore, a superior sensitivity cannot be in use as sign for the occurrence of higher financial constraint.

Having these limitations in mind now our concentration is on the newest string of the literature as an alternative, which is the cash flow sensitivity of cash holdings. Cash and cash flow sensitivity is basically the propensity to save cash from cash inflows. For instance, how much changes occur in cash holdings of firm when cash flows of firm changes???

In this study, we follow this latter strand by examining firm characteristics and the cash flow sensitivity of cash holdings of Pakistani area firms. This chapter includes the in-depth literature for financial constraint firms along with their cash flow sensitivity of cash (CFSC hereafter) behavior. Numerous scholars clarify the importance of cash holdings along with the necessary variables affecting it. The contribution cited in this study also discloses the proxies to be taken for financial variables like market to book value of asset (Tobin's Q), internal cash flow, leverage, investment growth opportunity, size of the firm etc.

Furthermore, this chapter has included empirical literature on CFSC for high-levered and low-levered firms, high-market value and low-market value firms, high-cash flow volatility and low-cash flow volatility firms and large-size and small-size firms. Specifically, in Section 3.2, we present the financial constraint vs unconstraint firms and cash flow sensitivity, while section 3.3 contains detailed about empirical literature on determinants of cash holdings. In section 3.4 we review in detailed the evidence on cash-cash flow sensitivity and finally we show some empirical studies on cash flow sensitivity in Pakistan.

3.2 Financial Constraint vs. unconstraint firms and Cash Flow Sensitivity

Over the past few decades the role of financially constraints and how to capture the level and consequence of it have move away considerably from one study to the next during the last decades. To explore the relationship between effects of financial constraints on firm behavior, early researchers have been concentrated all over the corporate investment demand.

One of the first studies within the range of financially constraints was Fazzari, et al. (1988).They group firms into two categories named as financially constraints and financially unconstraint. In their study they evaluated that, the manufacturing firms facing financially constraints display large amount of cash flow sensitivity. This is because for financially constraints firms externally generated loans tend to be more costly than the internally generated funds. Therefore, the volatility or variations in the cash flows are more significant factor of cost management.

When external financing is more costly than the internal financing, changes in the cash flow is more important factor of marginal capital expenditure for financially constraints firms. As a result the sensitivity of growth to cash flow will boost in the

extent of financial constraint. According to this, external and internal factors can also play central role.

The more the internal cash (cash holding) accessible to the firm, it will display healthier financial condition, as this is good sign for creditors that firm will reimburse the debt. Myers and Majluf (1984) favored the internal capital over the external capital in the pecking order theory of capital structure. According to them a firm should initially finance itself with the internal funds available. When retained earnings (held cash) are not accessible, and then go for debt financing. In the end, when there is no option left to them then the float of new equity in the market preferred. For instance, Chittenden et al. (1996) and Shyam-Sunders & Myers (1999)are also the supporter of packing order theory. So retaining cash or holding cash by a firm has playing important role in this case.

Even though, Fazzari et al. (1988) describe in detail the confirmation of consistent with their hypothesis, the explanation of their discoveries has been on the other hand challenged by Kaplan and Zingales (1997) on the theoretical and empirical basis. Kaplan and Zingales (1997) indicate inverse relationship between these variables. They were of the view that variability is also a crucial aspect which impacts on cash flow sensitivity in firms. They also question about the validity of investment cash flow sensitivity (ICFS), as a determinant of financially constraints firms. By taking figures from financial statements, they classified firms on the rank of financially constraints and come across that firms categorized as less financially constraints in reality display larger investment cash flow sensitivity. Some other scholars still hold up the use of investment cash flow sensitivity as an indicator of financially constraint condition of firms such as Allayannis and Muzomdar (2004) and Fazzari et at. (2000).

One rationalization in the results that they recommend, preferred also by Alti (2006) and as well as by Erickson and Whited (2000), is market to book value of asset is a deafening proxy for the investment growth. In case, the cash flow covers information related to the investment opportunities and the effectiveness of assets in place, fewer cash flows are more expected to regulate investment in reaction to shocks to investment opportunities as a result; they have high investment cash flow sensitivity.

On the other hand Almeida, et al. (2004) adopted an alternate approach to find out evidence on the question of whether expensive external funds affect the financial policies of firms. Rather than concentrating on the investment sensitivity to cash flow, ACW focus on the CFSC.

They measure the financially constraint firms by using firm's propensity to save cash from cash inflows. They investigate the hypothesis that financially constraint firms have positive CFSC. They estimate the CFSC using a large sample of manufacturing firms over the 1971 to 2000 period. They classified firms according to empirical proxies for financially constraint category of firms. They used five alternative approaches namely firm asset size, payout policy, commercial paper rating, bond rating and KZ index. The results show that financially constraint firms have positive CFSC, while on the other hand results declared that there is no need of systematic savings by financially unconstraint firms. Therefore their analysis revealed the CFSC is worthwhile variable to see the firm's ability to right of entry the capital market. Subsequently, Lin (2007) shows in his study that sensitivity is to be greater for firms that are likely to be financially constraint.

Likewise, Pal and Ferrando (2009) find irrespective of priori classification of financially constraint and financially unconstraint partitions of firms, all firms display positive and significant CFSC.

According to Han and Qiu(2007) best potential upcoming investment is self-governing of most favorable existing investment, so for financially constraint firms there is no need to have any precautionary motives for hoarding cash. They inspect through the number of publically traded firms and by means of quarterly information during 1997-2002. According to them a firm is identified as financially unconstraint, when it has the capacity to meet out its expenses or generate cash to invest in the optimal investments opportunity without facing any resistance of finance.

Consequently, they evidently show that constraint firms cannot make more future investments without decreasing current investment. The reason behind this is to hold some cash from their cash inflows by financially constraint firms so that protect future frictionless environment, (see as per trade of theory by majluf 1998). They used GMM for their dynamic panel data. They examined that investment variable and show that is negatively connected to cash flow volatility while it has positive connection between cash holding and future cash flow volatility.

Else and Marthe (2010) also observe financial constraint by using CFSC as a measure of financial constraint. They find common characteristics among financially constraint firms. Consistent with the previous literature they found the small firms as more constraint firms.

Some researchers like Gomes (2001) and Alti (2003) raise question about the validity of this method using a neo classical frame work. They show that cash flow sensitivity (CFS) can also be possible from the situation without any financing

resistance. They also declared that cash flow sensitivity does not certainly specify the existence of financing constraint.

A very recent paper by Gracia and Mira(2015) discovered the control of financially constraint on the sensitivity of cash and cash flows. They used Spanish manufacturing firms over data from 1996 to 2010. They used market based criteria to partition their data into constraint and unconstraint firms. According to them firms that are listed are considered as unconstraint firms and on the other hand unlisted firms are considered as constraint firms. They used GMM generalized method of moment to estimate their results. They used two empirical models namely base line model and extended model of cash flow sensitivity of cash. Like ACW (2004), Gracia and Mira (2015) have divided their sample into groups of constraint and unconstraint firms present the criteria used in previous literature for instance the size of firm, dividend payment ratio, commercial paper etc. Their results show that constraint firms (unlisted firms) have higher considerable positive affect of cash flow coefficient. So these unlisted firms retain more cash out of cash flows generated to overcome upcoming expected financial friction while listed firms do not.

3.3 Determinants of Cash holdings

Another strand of literature have considered the determinants of cash holdings with respect to their countries to investigate the significance and usage of cash held by Saddour, (2000),Ferrerira, and Vilela, (2004), and, Pastor, and Gama, (2013). In all commercial financing policy, cash holdings permanently realize an important effect.

Opler et al. (1999) observed the determinants of corporate holdings of cash and marketable Securities of publicly traded US firms from 1971 to 1994. They also show how firms make variations in their holdings over time. They used static trade off model and discovered as firms with high-growth opportunities and riskier cash flows

relatively hold high ratios of cash to total non-cash assets. According to their studies, firms that have better opportunity of access to capital market like large size firms do not go through a systematic way to retain cash in their balances. In fact the variables that generate debt more costly for firms are variable that formulate cash more beneficial.

Ozkan&Ozkan (2004) used the UK firms from 1984-1999. They analyze several important features on the observed determinants of cash holding of firms. The result of this study reveals that, firms' invetment opportunities, cash holding, liquid asset, and debt to total assets are significant in determining cash holding. They used General method of moment (GMM) technique to guarantee well controlled for the endogeneity difficulty that is possible to arise in the observed examination of cash holding. In their analysis, they shown there is a positive connection exists between cash flows and firm growth prospects while cash holding level has negative relationship with liquidity and leverage of firm.

Later, Ferreira and Vilela (2004**)** with sample of 400 EMU firms from 1987-2000 establish that cash flow, asset's liquidity and size of firm have negative association with cash holdings whereas, cash holdings have positive association with the investment opportunity. Their results show evidence that supports the trade-off theory and the packing order theory that are proposed by Modigliani-Miller (1958) and Myers and Majluf (1984), respectively.

According to Saddour (2006) over the period of 1998-2002 French manufacturing firms boost up their cash levels at the time their activities are uncertain and the intensity of their cash flows are high, while they shrink it at the time they are extremely leveraged. His results indicate that for growing companies, there is a negative connection between cash and the size. The result also shows that firm

investment growth calculated by Tobin's Q is positively connected to cash holdings. Their study consists of two major regression techniques namely the panel data and the ordinary least square model including each years and industry dummies.

The findings of Denis and Sibikov (2009) complement and extend the study of ACW (2004). ACW' (2004) results show that financial constraint firms are more probable to save cash out of their cash flows, Denis and Sibikov (2009) findings display that this performance is significantly value increasing as it permits the firms to retain valuable investment prospects. Composed, the outcome of Denis and Sibikov (2009) study and that of ACW (2004) support the understanding of firms can alleviate the unfavorable effects of financially constraint by adopting a strategy of larger cash maintenance.

Similarly Teruel and Solano (2008) have used large data from the small and medium enterprises of five year data from 1997 to 2001. Their study was comprises of an important regression analysis technique. First they run regression for a dynamic panel model to check the response of different firm's cash holdings. They used generalized method of moment technique to overcome the problem of endogeinty in their model. As well as GMM enable them to ensure the validity of instruments. Their results show that Spanish firms are regulate cash holdings levels even in much better way as compared to previous studies had shown on Spanish firms. Finally they have shown that the small and medium enterprises having large amount of debt obligation tends to increase their cash holding capacity.

Consequently, it has been clear from their work that small and median enterprises desire to accumulate the liquid assets in their accounts rather than minimizing leverage or any other firm characteristics, while facing financing hurdles.

3.4Evidence on Cash-Cash Flow Sensitivity

In previous section (section 3.2) we show the empirical evidence on financially constraint and unconstraint firms. In this section we will discuss different empirical results regarding the firm-characteristics and of cash holdings and we will see how different firm characteristics will affect the sensitivity of cash and cash flows of the firms. Furthermore, this section has included empirical literature on cash-cash flow sensitivity for high and low levered firms, high and low market value firms, high and low volatile firms and large and small size firms.

Many researchers enlighten the importance of cash holdings along with the necessary variables affecting it. The contribution cited in this study also reveals the proxies to be taken for financial variables like market to book value of asset[7], internal cash flows, leverage, cash flow volatility, dividend payouts, and size of the firm.

Denis and Sibilkov (2009) inspect the issue by taking the sample of public companies in United States over the period of 1985-2006. Several alternative approaches, used for classifying firms into constraint firms and unconstraint firms. This classification was parallel to the study of ACW. According to them the cash holding increase the value of financially constraint firms, because it enables financially constraint firms to abstain them from taking outside costly funds. They estimate their sample by using 3sls system of simultaneous equations to check the influence of cash holdings on investments after netting out the cash flow and cash holdings. As a result, these firms are unable to build adequate cash reserves, and they have shown in cash financially constraint firms I prospects highly dependents on the C Fs of firm. Likewise, Pál and Ferrando (2009) investigated for Euro-area firms between 1994 and 2003. They find all firms presented positive and significant CFSC

[7] Tobin's Q has used proxy for the growth of firm. In our study we used Tobin's Q, growth opportunity, and the market value to book value of assets interchangeably.

Meanwhile, Lin (2007), for publicly traded Taiwanese firms between 1990 and 2004, also find that, contrary to ACW, both constrained and unconstrained firms present significant CFSC but, as expected, such sensitivity is higher for constrained firms.Country level analysis has been done by the Khuran et al. (2006), they shown in their paper on average the size variable coefficient of 0.0251 has positive effect on cash-cash flow sensitivity.

Later on D'Espallier et al. (2008) evaluate two models simultaneously, commonly used for measuring financial constraints in their ability to discriminate between constrained and unconstrained firms. They provide a framework that summarizes the performance of model into a single numerical metric. They proposed GME estimation procedure. Their data includes two thousand manufacturing SMEs for five year years of data: 2000-2004.They computes firm-specific estimates for the cash flow sensitivity of cash. They show in their paper firms with high cash-cash flow sensitivity produce less cash flow and pay out smaller amount of dividends than their counter parts. They also show that high sensitivity between cash and cash flows of firms having less external fund obligations as compared to their counterpart. The investment growth, cash flow, and cash reserves are lower for high sensitivity between cash-cash flow firms. They have shown a different CFSC across small and large firms. The evidence related to the size of firm indicates by this study that larger firms have more CFSC as compared to larger firms.

A very recent paper by Gracia and Mira (2015) exposed the effect of financial constraints on the CFSC using large sample of Spanish manufacturing Spanish firms over 1996-2010. They categorized the sample into two segments unlisted firms as financially constraint firms and listed firms as unconstraint firms by using market base criteria. They used GMM generalized method of moment to estimate their

results. They used two empirical models namely base line model and extended model of CFSC and also discriminate between financially constraint and financially unconstraint firms. Like ACW (2004), Gracia and Mira (2015) have partitioned their sample into set of constraint and unconstraint firms with respect to previous criteria used in the literature. They conclude their results as unlisted firms have higher positive affect of cash flows coefficient. So unlisted firms hold more cash out of cash flows produced to overcome future expected financial friction, while listed firms do not. According to them, larger firms have lower cash-cash flow sensitivity as compared to smaller firms. They have shown in their paper positive impact of size to CFSC. They have shown the sensitivity between cash and cash flows is high for high investment growth firms as compared low investment growth firms. Further they have shown the positive influence of leverage on changes in cash holding for constraint firms while, they show the negative existence of relationship between leverage and cash hoarding for unconstraint firms.

As is customary in the literature, Faulkender et al. (2012) have involved two methods of financially constraint in estimating target leverage (size and rating). But financially constraint could also have an effect on a firm's ability to regulate toward its target leverage.

They examined the importance of the operating cash flow for the leverage adjustment of the US manufacturing firms for the 1965 to 2006 period. They show in their paper how the operating cash flow of the firm affects the cost of making leverage adjustments. Because this cash flow realization can make available opportunities to adjust their target leverage with low cost.

They analyze how financially constraint variables are concern for adjustments toward a leverage target. They explained it through two main aspects of cash flows of

firms. First cash flow creates low opportunity cost to adjust leverage. And second if firms face a fixed cost of accessing capital markets, they are more to be expected to make leverage adjustments when part of the fixed market access cost is borne by the firm's need to accommodate its cash flow imbalances. Their estimates prove that the firms having large financially constraint operations make additional variations in their capital fraction.

Guney et al. (2007) investigated cash holding behavior for large sample of data, from firms France, Germany, Japan, the UK and the US using data for 4069 firms over the period 1996–2000. They focused on the relation between cash holdings and leverage. They claim that the impact of leverage on cash holdings of firms is expected to be non-monotonic. To the extents that leverage of firms performs as a proxy for their ability to issue debt one would believe a negative relation between leverage and cash holdings. However, as leverage adds to firms are expected to collect larger cash reserves to decrease the risk of financial suffering and costly bankruptcy. Thus, one would expect a positive relationship between cash holdings and leverage at high levels of leverage. Their results provide strong and robust support for a significant non-linear relation between cash holdings and leverage.

3.5 Studies on cash flow sensitivity in Pakistan

Razzaq and Naeem-Ullah (2012) study was conducted with the propose to investigate whether Pakistani manufacturing firms listed on KSE-100 index hold more cash out of their cash holding by augmenting ACW (2004) regression equation. They observed the cash flow sensitivity by using only 24 firms out of 150 firms that meet about criteria with the estimation period from 2006 to 2010. Their results specifies that if cash flow of firm rise it will have a direct relation with cash holding which will rise because the amount of capital will rise which causes to cash holding to rise also.

The variability case is same to cash flow because the variability also will be directly related to the cash holding. The overall result shows that Pakistani manufacturing firms are hold more cash. Later Ahsan and Ullah (2013) show in their study a positive impact of CFV on cash flow sensitivity.

Chapter 4

Empirical model, Data, and Methodology

4. Empirical Framework

In this chapter, specifically, we discuss the empirical techniques used for estimation and testing our hypothesis. Our first model identifies the important factors that explaining the firm-characteristics and the sensitivity of cash from cash inflows of firm.

We next use our model to examine the influence of determinates of cash-cash flow sensitivity across financially constraint and unconstraint firms. Further, we present the empirical model where we examine whether high market value and those firms have leverage have different amount of cash-cash flow sensitivity. The data, its sources and construction of variables where required are also discussed in the same chapter. The study uses unbalanced firm-level annual panel data set covers the period 2000-2014.

4.1 The Empirical Model

We use two alternative specifications to empirically model the cash flow sensitivity of cash. To investigate the impact of firm characteristics on the cash flow sensitivity of cash, we first estimate a baseline model. We devise our baseline model as follows. The first model "absolute correlation between cash holdings and cash flows" includes the variables that we consider would capture information about sensitivity between cash and cash flows of the firm[8]. We have included those key factors that will influence firm's cash and cash flow policy. In further, next two models we split-up the base line model into two models; negative correlation model and positive correlation model.

[8] We used the word "sensitivity" or "correlation" interchangeably in our study.

The first model in our study, builds correlation between cash holdings and cash flows is a function of firm one-period lagged dependent variable, size along with leverage, Tobin's Q, cash flow volatility, and dividend payouts. It can be written as

$$|r_{i,t}| = \beta_0 + \beta_1|r_{i,t-1}| + \beta_2 SIZ_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6 DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it} \quad \text{.....(1)}$$

where $|r_{it}|$ is the absolute correlation between cash holding and cash flow of the i[th] firm at the time t. For absolute correlation between cash-cash flow, we calculated accumulated correlation. Like for 2003, we calculated absolute correlation using the data for 2000, 2001, and 2002 and for 2004 we estimated the correlation using the data for 2000, 2001, 2002, and 2003, and so on. Cash holding is defined as the ratio of cash held and marketable securities to book assets. Cash flow is measured as ratio of income before tax plus depreciation and amortization to total asset.

β_0 is intercept and $\beta_1 - \beta_6$ are the coefficients of independent variables. Similarly the dependent variable$|r_{i,t-1}|$, is correlation between cash holding and cash flow at $t-1$ time. Our model includes one-lag value period to control the inertia in the correlation between reserved cash and cash flows of the firms.

$SIZ_{i,t-1}$ is size, which is computed as the natural logarithm of total assets. It is used as a proxy for its ability to access capital markets for firm $i$in period $t-1$. Economies of scale in cash management dependents on the size of the firms, small firms (constraint firms)[9] have greater significant impact on cash-cash flow sensitivity as compared to the larger firms (unconstraint firms).

$LEV_{i,t-1}$, is leverage, is the ratio of the total debts to total assets for firm $i$in period $t-1$. Firms with high leverage levels might need to save more cash from cash

[9] Small firms considered as a financially constraint firms while large firms as financially unconstraint. Later in next chapter we have shown evidences.

inflows to meet future debt payments. It is expected high levered firms have more significant impact on cash-cash flow sensitivity as compared to low levered firms.

$TQ_{i,t-1}$, is Tobin Q for firm i at $t-1$ time, calculated as the ratio of the market value to the total assets. Tobin's Q also known as market value of asset captures the growth opportunities of a firm. Firms with greater growth opportunities possibly set aside more cash reserves from cash inflows of firm to take Positive NPV projects in near future.

$CFV_{i,t-1}$,is cash flow volatility of firm in period $t-1$. It is calculated as the standard deviation of cash flow for all firms, over the sample period. $DIV_{i,t-1}$, is defined as the dividend payout to shareholders of firm $i$in period $t-1$.Last, η_i observe firm specific effects and is assumed to be constant over time and$\theta_t$observe time specific effects. ϵ_{it} is the disturbance term.

The model of equation (1) splitting-up into two models, these models captures the positive cash and cash flow sensitivity, and the negative cash and cash flow sensitivity, separately. Equation (2) shows positive correlation between cash and cash flows while, negative correlation between cash and cash flows presented in equation (3). It would be also worthwhile to study whether the extent of positive and negative sensitivity of cash to cash flow differs through different firms-specific factors. It can be written as

$$+r_{i,t} = \beta_0 + \beta_1 +_{r_{i,t-1}} + \beta_2 SIZ_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 TQ_{i,t-1} + \beta_5 CFV_{i,t-1} +$$

$$\beta_6 DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it} \quad \text{.....(2)}$$

This model captures positive correlation between retained cash and cash flow.

$$-r_{it} = \beta_0 + \beta_1 -_{r_{i,t-1}} + \beta_2 SIZ_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 TQ_{i,t-1} + \beta_5 CFV_{i,t-1} +$$

$$\beta_6 DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it} \quad \text{.....(3)}$$

This model captures negative correlation between retained cash and cash flow.

4.2 Identifying Financially Constrained firms

In the literature it has realized that there is no any principle or benchmark to select the constraint schemes for financially constraint (FC) and financially unconstraint (FUC) firms. Which specific measures to use, is a matter of debate in the literature. Different researchers have used different scheme to measure the constraint condition of the firm. We used Whited Wu index as measure of constrained schemes.

In particular, we use this technique suggested by Whited and Wu (2006) (hereafter WW) to measure financial constraint condition of the firm[10]. We use the annual median value of the WW index measure across firms in order to distinct between FC firms and FUC firms. Further, we concisely argue this measure and review those studies that have presented WW index measure as financial constraints measures in their empirical work.

4.2.1 Whited and Wu Index

We use WW index, which was proposed by Whited Wu (2006), to identify whether firms are constrained are not. We categorized firms as financially constraint and unconstraint firms on the basis of WW index. Specifically, those firms would be specified as the financial constraint firms whose WW index specifically lies below median value of WW index for full sample in a certain particular period. Similarly, those firms whose WW index lies above median value of WW index for full sample in a similar year.

The WW index described as follows:

$$\mathrm{WWI}_{i,t} = -0.091 \times \mathrm{CF}_{i,t} - 0.062 \times \mathrm{DD}_{i,t} + 0.021 \times \mathrm{LTD}_{i,t} - 0.044 \times \mathrm{SIZ}_{i,t} + 0.112 \times \mathrm{ISG}_{i,t} - 0.035 \times \mathrm{SG}_{i,t}$$

[10]Duchin et al. (2010) also used WW index to separate financially constraint firms from financially unconstraint firs.

Where, $CF_{i,t}$, denotes the firm cash flows, defined as the ratio of income before tax plus depreciation and amortization divided by book assets. $DD_{i,t}$, is dividend dummy we assigned 1 dummy for the firm not dividend and other wise. We assigned 0 for the firm mot pays dividend.$LTD_{i,t}$, is the long term debt, is calculated as total debt to total assets[11]. $SIZ_{i,t}$, is firm size which is defines as natural log of total assets. $ISG_{i,t}$, is denoted as industry sales growth. It is calculated as first difference of log of total net sales of industry.

Lastly $SG_{i,t}$, is sales growth of firm, it is considered as the first difference log of sales of firms.

The First important objective of the study is to analyses the effect of firm's cash-cash flow sensitivity on financial constraints of manufacturing Pakistani firms. So far, the model presented in equation (1) does not allow us to be serve the differential impact of impact of the determinants of the CFSC sensitivity across financially constraint and unconstraint firms. To solve this problem, we extend our model to check separately the effects for FC and FUC firms. To attain our purpose after sorting out the firms into financial constraint and financial unconstraint firms, the estimation of the model given in equation (1) has made separately for FC and FUC firms.

In particular, we use same model of equation (1) as under:

$$|r_{i,t}| = \beta_1|r_{i,t-1}| + \beta_2 SIZ_{i,_{t-1}} + \beta_3 LEV_{i,t-1} + \beta_4 TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6 DIV_{i,_{t-1}} + \eta_i + \theta_t + \varepsilon_{it} \quad (4)$$

All variables of equation (4) are as same as equation (1). By using WW index as a measure of constraint firm, this equation lets us to notice the variations in the

[11] Note that we use total assets and total book value assets interchangeably.

response of correlation between cash and cash flows of financially constrained firms and financially unconstrained firms to the determinants of cash-cash flow sensitivity.

If the expected coefficients of FC firms; the firms with restricted access to capital market, is positive, then they are expected to retain more cash in their accounts out of cash flows of firm. As a result they will able to mitigate their financial shortfalls in near future. In the different studies, we find a number of researchers has framed the similar approach in their empirical frame work (see for instance, Almeida, et al. (2004), Cagalayan and Rahid (2014), and Gracia and Mira (2015))

4.3 Leverage and Cash-Cash Flow Sensitivities

It is explained earlier in chapter 2, that leverage used as a proxy for issuance of new debt. Therefore, it is expected that firms with greater amount of leverage ratio have easier access to capital market and ultimately hold smaller amount of cash. On the other hand, high leverage ratio boosts the likelihood of financial suffering and ultimately leads to bankruptcy. To overcome this hard situation, firms having large leverage ratio expected to hold large amount of cash from their cash inflows, as it clarifies by trade-off theory. We expect high leverage firm as FUC firms and comparatively FC firms expected to have low leverage by Faulkender and Petersen (2003).

The model is as under

$$|r_{i,t}| = \beta_1|r_{i,t-1}| + \beta_2 SIZ_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6 DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it} \quad \text{.....(5)}$$

All variables in above equation are similar to the earlier stated models. We run regression for the model given in equation (5) separately for high-levered firms and low-levered firms.

4.4 Tobin Q and Cash-Cash Flow Sensitivities

The trade-off theory expects that firms having larger investment prospects have more financial distress as the positive net present value of these investment vanishes in case of insolvency. So that, firms with better investment growth opportunities will save high levels of cash to avail optimal projects and avoid the shortage of fund. For that reason, one could anticipate a positive association between a firm's cash holdings level and its set of investment growth opportunities.

Several studies in the empirical literature confirm that high growth opportunities firms most of time record higher cash flows as compared to low growth firms (FUC firms). These studies are among ACW (2004), Han and Qiu (2007), Riddick and Whited (2009), and Denis and Sibilkov (2009).

Specifically the work of Gracia and Mira (2015) documented that high growth opportunity firm's record higher cash and cash flow sensitivity as compared to low growth firms. It means that the estimated coefficients of financially unconstraint firms show more CFSC as compared to their counterpart FC firms show less CFSC.

Our model for estimation of high-Tobin's Q and low Tobin's Q is as under.

$$|r_{i,t}| = \beta_1|r_{i,t-1}| + \beta_2 SIZ_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6 DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it} \quad \text{.....(6)}$$

All variables in above equation are similar as our previous stated models. We run regression for the model given in equation (6) separately for high-Tobin's Q firms and low-Tobin's Q firms.

4.5 Estimation Method:

Abundant studies in the literature have used a number of different estimation methods to measure firm diverse characteristics on the cash-cash flow sensitivity of manufacturing firms such as, D'Espallier et al. (2008), Silva and Carreira (2010),

Gracia and Mira (2015), Pal and Ferrando (2006) have used GMM estimator for their analysis. We also use the two-step system GMM technique. This methodology first developed by Arellano Bover (1995) and then later on Blundell and Bond (1998) have worked in detailed. See, Blundell et al. (2001) for more on how system GMM estimator improves the poor performance of the standard GMM estimator.

We estimated regression models, (1), (2), and (3) for the whole sample by using system-GMM estimation methodology. The reason behind this selection of methodology is that, it would help us to effectively overcome the problem of hetroskedasticity and endogeneity of the explanatory variables of our data.

Although, the proposed methodology of Arellano and Bond (1991) estimation is placed above all other panel data estimation techniques, this method lacks in case of quality instruments generation. So, following work of Arellano and Bover (1995), we overcome the problem of weak instruments. According to Arellano and Bover (1995), using first difference of instruments for level equation or/and for equation in difference it should be used lagged-values of the variables in levels as the instruments.

Even if we compare system-GMM and Difference-GMM we find that, the system-GMM is more well-organized and effective estimator than the standard difference-GMM estimator because it produces more efficient results. The efficient estimation of system-GMM is more possibly effective when one include lag of dependent variable in the model.

If we look at the importance of Blundell and Bond (1998) the robust two-step system-GMM technique, we find it as capable of overcome the failure of the restricteddata biased. This is possible by using the lags in first differences and the lags of the variables in level as instruments.

Finally, the two-step system-GMM technique is desirable as it merges first different equation with level equation with in order to reward all available moment conditions.

4.6 Data and the Description Analysis

The sample of this study consists of all manufacturing sectors of Pakistan listed at Pakistan Stock Exchange. The data found from the financial statement analysis of nonfinancial firms listed at Pakistan Stock Exchange prepared by SBP. This specific data is prepared by State Bank of Pakistan.

This source of data measured because it is issued by a reliable government body and the records of data are more authentic. This study covers the period 2000 to 2014. It includes all those listed firms for which the data are accessible for minimum four following years. We ignored financial institutions, parliamentary organizations and service organizations, because these types of organizations are fundamentally changed in the nature of their operations and monetary operational activities evidences are changed from non-financial data.

Following the work of Gracia and Mira (2015) included reviewed and combined financial statements. In this way we are able to avoid complications from including stand-alone firms and subsidiaries, which could misrepresent financing policy findings Raja and Zingales (1995). We are excluded firms that are with unlimited liability firms. Further we exclude those firm year that have debt go beyond total assets (i.e. near bankruptcy firms). Table 4.1presents the definitions and abbreviations of the variables we used in our empirical analysis. Overall, our study contains unbalanced dynamic panel data covering 478 firms with a total of 4938number of observations.

We calculate summary statistics and correlation matrix and additionally we performed correlation mean across firm types for all the variables.

Table 4. 1: Abbreviations and definitions of dependent and independent variables

Variables	Abbreviations	Definition
Dependent Variables		
Cash holding	CH	Cash and marketable securities/Total assets
Cash flow	CF	Income before tax + depreciation and amortization/Total assets
Correlation between cash holding and cash flow	R	Measures the correlation in cash or marketable securities as a response to the amount of cash flow generated by the firm
Independent Variables		
Size	SIZ	Natural logarithm of book assets
Leverage	LEV	Total debts/total assets
Cash Flow Volatility	CFV	The standard deviation of the cash flow for each firm over the sample period
Tobin's Q	TQ	Market value of assets/book value of assets
Dividend payout ratio	DIV	(Total dividends+ purchase of common and preferred stock)/book assets
Variables used in construction of WW Index		
Dividend Dummy	DD	1 for the firms pay dividend in that year and otherwise 0
Sales Growth	SG	First difference of log of total sales
Net Investment	Inv	Capital expenditure – depreciation)/total book assets

Chapter 5

Empirical Results

This section starts by presenting the summary statistics. Next, we report the results of the correlation matrix. We then report the results of the cash-cash flow sensitivity model of equation (1) incorporating different firm characteristics variables in the analysis including lag of the dependent variable. We continue by presenting the results for the model where we categorize firms into financial constrained and unconstrained, high-Tobin's Q and low-Tobin's Q classifications and finally, high-levered and low-levered firm categories.

5.1 Summary Statistics and Correlation Matrix

5.1.1 Summary Statistics

We present summary statistics to explore the distribution characteristics of the different variables used in our model. Table 5.1 reports summary statistics for our whole sample period: 2000-2014. Both means and standard deviations are reported. The first column of table shows the mean values of different variables used in our study, while the next second column displaces the standard (Std dev)[12] deviations of variable

The table shows that the average value of size is 6.530 and a standard deviation of 2.491. We observe the average value of leverage, which is 0.450. It shows that on average firm's 45% of assets are through debt. The standard deviation of total debt/total assets is 0.280. This states that almost the deviation from mean is

[12]Standard deviation (often abbreviated as "StdDev") provides a proof of how far the individual responses to a query diverge from the mean. Std Dev communicates the researcher about how spreads out the responses are?? Are they focused around the mean, or dispersed far and wide?

28%. Ultimately this spread out of the data indicates that our sample is consists of both the high-levered and low-levered firms.

Table 5. 1: Summary Statistics

Summary Statistics of the dependent and independent variables for different firms' characteristics are shown separately in this table (Table 5.1). The sampled firms included only manufacturing firms and the sample period is 2000 through 2014. SIZ, denotes the size of firm, is computed as the natural logarithm of total assets. It is used as a proxy for its ability to access capital markets. LEV symbolizes the leverage, is calculated as ratio of total liabilities to total assets. DIV is the dividend payout of firm calculated as total dividends plus purchase of common and preferred stock divided by book assets. CFV indicates the cash flow volatility. It is defined as the standard deviation of the cash flow for each firm over the sample period. TQ representes the Tobin's Q, calculated as the market value divided by the book value of assets. Tobin's Q captures the growth opportunities of a firm. $|\boldsymbol{r}|$ in this table indicates the absolute correlation between cash holding and cash flow. Cash holding is defined as the ratio of holdings of cash and marketable securities to total assets; cash flow is measured as ratio of income before tax plus depreciation and amortization to total asset. $-_{\boldsymbol{r}}$denotes the negative correlation between cash holding and cash flow. Negative correlation is a relationship between two variables in which one variable increases as the other decreases, and vice versa. $+_{\boldsymbol{r}}$denotes the positive correlation between cash holding and cash flow. A positive correlation is a relationship between two variables where if one variable increases, the other one also increases and vice versa. The sample consists of non-financial firms listed at Pakistan Stock Exchange. The data arecollected from Balance Sheet Analysis of Non-Financial Firm prepared by State Bank of Pakistan.

Variable	Mean	Std. Dev
SIZ	6.530	2.491
LEV	0.450	0.280
DIV	0.066	0.358
CFV	0.259	6.228
TQ	60.836	162.661
$\|\boldsymbol{r}\|$	0.456	0.287
$-_{\boldsymbol{r}}$	-0.364	0.283
$+_{\boldsymbol{r}}$	0.498	0.279

The mean value of dividend payout ratio of firms is 0.066.It indicates that there are on average only 6.6% of total assets used to pay dividend. When we look at the standard deviation it is 0.358. This implies that there is almost 36% of data scattered from mean. This large deviation from mean shows that, the data consists of the high dividend payouts firms as well as, low dividend payout firms. The summary statistics regarding cash flow volatility shows the mean value of the cash flow volatility 0.259 through firm years. The standard deviation value of the cash flow volatility is 6.228. The market to book value assets of our sample firms shows a significant growth. The average value of Tobin's Q is 60.836 while, its standard deviation presented in table is 162.661.

When we compare standard deviations of each variable, we find that Tobin's Q is more volatile as compared to all other variables whereas, the lowest variation is observed in leverage with standard deviation of 0.280.The high deviation from mean indicates that for sure there are firms with high and low growth opportunities.

In this table the sensitivity between cash to cash flows is calculated through the correlation. We calculated accumulated correlation for the absolute correlation between cash and cash flows ($|\boldsymbol{r}|$). Like for 2003, we calculated absolute correlation using the data for 2000, 2001, and 2002. Likewise for 2004, we estimated the correlation using the data for 2000, 2001, 2002, and 2003, and so on. Cash holding is defined as the ratio of cash held and marketable securities to book assets. Cash flow is measured as ratio of income before tax plus depreciation and amortization to total asset. Further we sort out the negative ($-_{\boldsymbol{r}}$) correlation and positive correlations ($+_{\boldsymbol{r}}$) for different firm characteristics.

The mean value of positive correlation is remarkably greater, related to the absolute and negative correlation between cash and cash flow. The average value of

positive correlation between cash to cash flows of whole sampled firms is 49.8%. While the average value of absolute correlation between cash holding and cash flow is 45.6%. Furthermore, the negative correlation between cash holding and cash flow indicates that on average it is -36.4% with the standard deviation of 0.28.3. The standard deviation of absolute and positive correlation between cash and cash flow is almost same; with the standard deviation of 28.7% and 27.9%, respectively. Table 5.1 shows that all variables exhibit considerable fluctuations.

5.1.2 Correlation Estimation

A correlation matrix used to explore the dependency between multiple variables at the similar time period. The result contains a table that shows coefficients between each main variable and the others. Table5.2 presents the cash-cash flow sensitivity and its significance levels through the essential variables used for the cash-cash flow sensitivity estimations. It is possible to observe that table 5.2 clearly depicts correlations are significant for most variables of the three of models; Model (1), (2), and (3), but this table also shows some insignificant correlations measures in each of the model.

The table shows four different columns. Each column, except first column explains the sensitivity between cash holding and cash flows of different firms. The first column of Table 5.2 depicts all the independent variables including one-period lagged dependent variable. Second column shows absolute correlation between cash and cash flow. It would be also worthwhile to study whether the extent of positive and negative sensitivity of cash to cash flow differs across different firms-specific factors. For this study we split the data further into two sub categories; negative and positive correlation between cash to cash flows presented in third and fourth column of Table 5.2, respectively.

Table 5. 2: Correlation Matrix

This table presents the pair-wise (Pearson) correlation coefficients between cash-cash flow correlation and independent variables for full sample. The values given in parentheses are p-values to test whether the correlation estimate is different from zero. Variable SIZ denotes the size, is computed as the natural logarithm of total assets. It is used as a proxy for its ability to access capital markets. LEV symbolizes the leverage, is calculated as ratio of total liabilities to total assets. DIV is the dividend payout of firm calculated as total dividends plus purchase of common and preferred stock divided by book assets. CFV indicates the cash flow volatility. It is defined as the standard deviation of the cash flow for each firm over the sample period. TQ representes the Tobin's Q, calculated as the market value divided by the book value of assets. Tobin's Q captures the growth opportunities of a firm. $|\boldsymbol{r}|$ in this table indicates the absolute correlation between cash holding and cash flow. Cash holding is defined as the ratio of holdings of cash and marketable securities to total assets; cash flow is measured as ratio of income before tax plus depreciation and amortization to total asset. $-_{\boldsymbol{r}}$denotes the negative correlation between cash holding and cash flow. Negative correlation is a relationship between two variables in which one variable increases as the other decreases, and vice versa. $+_{\boldsymbol{r}}$denotes the positive correlation between cash holding and cash flow. A positive correlation is a relationship between two variables where if one variable increases, the other one also increases and vice versa. The parenthesis used in this table shows the P-values. The sample consists of non-financial firms listed at Pakistan Stock Exchange. The data are collected from Balance Sheet Analysis of Non-Financial Firm.

Variable	$\|\boldsymbol{r}\|$	$-_{\boldsymbol{r}}$	$+_{\boldsymbol{r}}$
SIZ	-0.038 (0.006)	0.094 (0.000)	-0.0407 (0.018)
LEV	0.012 (0.398)	-0.053 (0.036)	-0.004 (0.779)
DIV	0.025 (0.072)	-0.089 (0.000)	-0.005 (0.731)
CFV	0.055 (0.000)	-0.035 (0.165)	0.061 (0.000)
TQ	0.022 (0.120)	0.023 (0.359)	0.028 (0.096)

The correlation estimate between size and absolute correlation between cash and cash flow is negative. Same result we find even by estimating only positive correlation between cash holding and cash flow, whereas, correlation estimate is positive in case of negative correlation between cash holding and cash flow. The

absolute and positive correlation both show that firms that have more natural logarithm of book asset have less correlation between cash to cash flows. This indicates that there exists week correlation between dependent variable and size but their coefficients are highly significant. For all the three models, this correlation is statistically different from zero.

Leverage and absolute correlation between cash-cash flow have positive correlation. However, the coefficient of correlation for negative and positive correlation and leverage is negative. The negative correlation and leverage is -0.053, which is higher than the coefficient of positive correlation between cash and cash flow that is -0.004. Over all the coefficient of cash-cash flow sensitivity and the leverage is 0.012.

The correlation between absolute and negative correlation between cash and cash flow and dividend shows significant level, while positive correlation between cash and cash flow is having insignificant probability value. Over all payout ratio is positively correlated with cash-cash flow sensitivity, while by analyzing separately it shows negative correlation exists in case of negative and positive correlation between cash and cash flow.

Over all cash flow volatility of absolute cash flow sensitivity of cash that with the increase in cash flow volatility, the absolute correlation between cash and cash flow will increase and vice versa. It shows that 1% increase in cash flows volatility; the absolute correlation between cash and cash flow will increase with 5.5%. Looking at the split-up models separately, it shows that there exists negative correlation between negative correlation between cash and cash flow and cash flow volatility. However positive correlation between cash and cash flow has positive correlation with cash flow volatility.

Lastly, market value to total book value of assets shows a positive correlation with the sensitivity of cash to cash flow but its coefficient is slightly lower for absolute correlation between cash and cash flow as compared to negative and positive cash flow sensitivity of cash. We observed this correlation estimate for different alternatives category of firms.

In short, correlation estimates offer certain initial evidence regarding the relationship between firm-characteristics and cash-cash flow sensitivity. However, to examine this relationship properly in detailed form, we estimated a number of empirical models where other firm specific factors that may have differential impacts on cash-cash flow sensitivity are presented.

Table 5. 3: Correlation Mean across firm types

This table presents the pair-wise (Pearson) correlation coefficients. It is across firm-type correlation coefficients between cash-cash flow sensitivity for full sample. We separate the full sample into financially constraint and unconstraint firm, high-levered and low-levered firm and high-Tobin's Q and low-Tobin's Q firm. We separated the firms into financially constrained and unconstrained categories of firms based on WW Index. We separately estimate for high-levered and low levered firms and High Tobin's Q and low Tobin's Q firms. The study use an unbalanced annual panel data set covering the period from 2000 to 2014. The sample consists of non-financial firms listed at Pakistan Stock Exchange. The data are collected from Balance Sheet Analysis of Non-Financial Firm.

Firm Types	$\|r\|$		$-_r$		$+_r$	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
FC firms	0.451	0.295	-0.370	0.297	0.489	0.287
FUC firms	0.460	0.279	-0.358	0.268	0.505	0.272
High Levered firms	0.470	0.292	0.518	0.288	-0.379	0.278
Low Levered firms	0.444	0.283	0.482	0.272	-0.348	0.287
High Tobin's Q	0.462	0.292	-0.396	0.290	0.492	0.288
Low Tobin's Q	0.451	0.283	-0.336	0.274	0.503	0.272

The correlation estimated presented in Table 5.3 provide evidence of different responses of determinates of cash-cash flow sensitivity to across sample firms. It specifies the correlation mean across firm types that includes financially constraint

and unconstraint firms, High-levered and low-levered firms, and high-market value and low-market value firms categories.

The correlation estimates presented in Table 5.3shows evidence of different response of cash-cash flow sensitivity to three categorized firm types. For example, the correlation mean is higher for financially unconstraint firms as compared to financially constraint firms. Specifically, the correlation mean for financially unconstraint firms is on average 46%, while this figure for financial constraint firms is about 45%. It shows a small difference between mean of financially constraint and unconstraint firms. The standard deviation from mean is high for financially constraint firms with 0.295 as compared to financially unconstraint firms with 0.279. Likewise, if we look at the same category of firm type (FC firms and FUC firms), but by excluding the positive CFSC from the absolute correlation between cash and cash flow, we find that mean value of correlation estimates is negative for negative correlation between cash and cash flow. It displays that, on average financially constraint firms have lesser mean value as compared to financially unconstraint firm, but both of them show the negative correlation (the mean values of 37% and 35%, for financially constraint firms and financially unconstraint firms, respectively).

The standard deviation from mean is high for financially constraint firms with 0.297 as compared to financially unconstraint firms with 0.268 respectively. It shows a good sign for financial unconstraint firms that have lesser scattered data as compared to financial constraint firms.

Now if we look at the positive correlation between cash and cash flow only, we find that financially unconstraint firms have more mean value and less standard deviation as compared to financial constraint firms. This clearly shows that financially unconstraint firms have higher correlation estimates in case of absolute and positive

correlation, while the negative correlation shows the opposite picture. The correlation for firm-categories, presented in table, is statistically different from zero.

Similarly, cash flows are more correlated to cash holdings of high levered firms as when we link to low levered firms. For high levered firms the absolute correlation between cash to cash flows is round 47%, while, it is approximately 44% for low levered firms. For high and low-levered firms the CFSC is positive. Though, the standard deviation of high levered firms is more deviated from mean as compared to the low levered firms. The same results we find when we look at the negative correlation model.

The mean value and standard deviation of high levered firms is more than the mean value of low levered firms. On the other side if we look at the positive correlation model, we see that there is negative correlation between cash and cash flow and leverage. High levered firms are more negatively correlated as compared to low levered firms. For high levered firms, the positive correlation is about 37%, while, it is about 34% for firms with leverage in their accounts.

Lastly, we discover that for high-growth firms, the correlation concerning the Tobin's Q and CFSC is slightly greater then low Tobin's Q firms. As shown in the table above, high Tobin's Q average value as 46% while low Tobin's Q as 45%. But the opposite relation we will find by excluding the positive correlation from absolute correlation between cash and cash flow. Standard deviation of high-Tobin's Q firms is more as compared to low-Tobin's Q firms in case of absolute correlation. By extracting the positive correlation from absolute correlation model we find that the mean value of high Tobin's Q firms is 39% negatively correlated to the dependent variable.

In sum, correlation estimates present some preliminary information about the relationship between firm-characteristics and cash-cash flow sensitivity of financially constraint and unconstraint firms, high-levered and low-levered firms and high-Tobin's Q and low-Tobin's Q firms. To observe this relationship properly, we evaluate more than a few empirical models, for firm specific factor effecting CFSC are presented.

5.2 Estimation Results

5.2.1 Results for all firms

The main purpose of this dissertation is to explore the diverse response of sensitivity between firm cash holding and cash flow to its main factors.

The study aims to explore whether financially constraint and unconstraint firms show different results of sensitivity between cash and cash flow. Similarly, it explores whether high-levered and low-levered firms have differential effects on cash and cash flow sensitivity. Finally, this study also examines the role of high-market value and low-market value firms' cash and cash flow sensitivity. However, we begin our regression analysis by estimating the equations (1), (2), and (3) all results are presents in table 5.4. We estimate three of the equations to consider the differential effects of firms-specific features variables on cash and cash flow sensitive behavior of the firm. We used the two-step system-GMM estimator to estimate the results for all firm's regression. Table 5.4 represents the results.

The panels B of this table specifically show the special effect of J-test, AR (2) test and F-test. These special effects disclose that the instruments used in model are

Table 5. 4: Estimation results of the correlation between cash holding and cash flow

The base line model and its split up models are presented in this table (Table 5.4). This table presents the results for all firms. We use the robust two-step system-GMM estimator to estimate the

model. Specifically, we estimate the following models for quantifying the effects of the empirical determinants of corporate cash holdings and cash flow sensitivity.

$$|r_{i,t}| = \beta_0 + \beta_1|r_{i,t-1}| + \beta_2\, SIZ_{i,t-1} + \beta_3\, LEV_{i,t-1} + \beta_4\, TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6\, DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it}$$

where the dependent variable $|r_{i,t}|$in first column is absolute correlation between cash holding and cash flow. Column 2 presents negative correlation between cash holdings and cash flows. Third column presents positive correlation between cash holdings and cash flows. The independent variable$|r_{i,t-1}|$ is correlation between cash holding and cash flow at $t-1$ time.β_0 is the intercept and $\beta_1 - \beta_6$ are the coefficients of independent variables.$TQ_{i,t-1}$ is Tobin Q for firm i at $t-1$ time, calculated as the market value divided by the book value of assets. $LEV_{i,t-1}$, variable is leverage, is calculated as ratio of total liabilities to total assets for firm $i$in period $t-1$. Variable $SIZ_{i,t-1}$is size, is computed as the natural logarithm of total assets. $CFV_{i,t-1}$, variable is cash flow volatility of firm $i$in period $t-1$. It is defined as the standard deviation of the cash flow for each firm over the sample period. $DIV_{i,t-1}$, independent variable is dividend payout of firm $i$in period $t-1$. Last, η_i observe firm specific effects and is assumed to be constant over time and θ_t observe time specific effects. $\varepsilon_{it}$is the disturbance term. Information regarding firm-year observations, total number of instruments, diagnostic tests, and their p-values are given in Panel B of the table. F-statistics shows the fitness of model. The J-statistic is the Hansen (1982) test for testing the orthogonally condition for the instruments used in the estimation. The AR (2) is the Arellano-Bond (1991) test for testing the presence of second order autocorrelation in the residuals. The study use an unbalanced annual panel data set covering the period from 2000 to 2014. The sample consists of non-financial firms listed at Pakistan Stock Exchange. The data are collected from Balance Sheet Analysis of Non-Financial Firm. The parentheses used in table shows the standard error. ***, and ** denote the significance at the 1%, and 5% level of significance respectively.

Panel A: Estimation results of the absolute, negative, and positive correlation between cash and cash flows

Variable	$\|r\|$	$-_r$	$+_r$
$\|r_{t-1}\|$	0.066***	-0.063***	-0.076***
	(0.003)	(0.044)	(0.003)
SIZ_{t-1}	0.098	-0.016	-0.051
	(0.191)	(0.037)	(0.140)
LEV_{t-1}	-0.092***	-0.012**	0.032**
	(0.009)	(0.006)	(0.016)
DIV_{t-1}	0.035***	-0.037***	-0. 029**
	(0.130)	(0.131)	(0. 149)
CFV_{t-1}	0.069***	-0.095***	0.043***
	(0.007)	(0.018)	(0.007)

TQ_{t-1}	0.068** (0.028)	0.026 (0.055)	0.046 (0.048)
Cons	0.116	-0.064	0.105
Panel B: Diagnostic tests			
No observation	4416	1348	2843
No of instruments	160	252	320
F-Statistics	450.100	107.530	479.140
Probability	0.000	0.000	0.000
AR (2)	-1.01	-2.050	-0.19
Probability	0.314	0.041	0.846
J Test	158.530	237.680	313.39
Probability	0.363	0.619	0.483

robust. Specifically, J-test estimations provide the evidence of accepting the null hypothesis that the instruments are statistically independent of residuals. Specifically, we find J-test's p-values as 0.363, 0.619, and 0.483 for absolute, negative and positive correlation between cash and cash flows. Similarly, we find AR (2) that p-value of 0.314, 0.04, and 0.846 for absolute, negative and positive correlation between cash and cash flows, respectively. These results did not show any major evidences of the accordance of autocorrelation in tested models. These diagnostic tests deliver the proof that the instruments are valid enough. Similarly, F-Statistics in our model also displays highly significance of p-values for both types of firms. We conclude the diagnostic test as, it approves the validity of our instruments and it also provides the evidence of robustness of our estimation.

The instruments and number of observations used in our estimation. Total number of instruments used in absolute, negative, and positive correlation between cash and cash flow are 160, 252, and 320 respectively. More than four thousand four hundred

observations are used while estimating absolute correlation between cash and cash flows.

When we observe the results of firm-characteristics and correlation between cash and cash flow, we discover that the results are agreement with our hypothesis, and also support earlier empirical work. These estimation suggest that firm's absolute cash-cash flows are positively and highly significantly related to one period lagged absolute correlation between cash and cash flow, while when we run regression by dividing the data into the negative and positive correlation between cash and cash flows, result shows the negative relationship with their one period lagged value of cash to cash flow sensitivity.

Specially, we catch the positive estimated coefficient of lagged of absolute correlation between cash holding and cash flow, provided that evidence of the persistence of cash-cash flow sensitivity. This suggests that those firms have more absolute correlation between cash and cash flows previously continue to have larger sensitivity between cash holdings and cash flows. Figures show for the coefficients of one-period lagged-value of absolute correlation as 0.066 while for one-period lagged negative and positive correlation between cash and cash flows are -0.063, and -0.076. It clearly shows that over all absolute correlation between cash and cash flow shows a positive impact with a statistically significant level while by splitting the sample, although their coefficients are negative but are significant at better than the 1% level.

The results based on the firm size measure shows that absolute correlation between cash and cash flow seen to be positively related to one period lagged size.

This suggests that size of the firms strengthens the sensitivity between cash and cash flows. The coefficient of size[13] is 0.098.

It displays that with the 1 unit increase in the size of the firm, it will increase the absolute correlation between cash and cash flow by 0.098 units. These findings are also with the few preceding studies in the literature such as, ACW (2004), and Gracia and Mira (2015) also shown the positive relation of size with cash-cash flow sensitivity of firms. Country level analysis has been done by the Khuran et al. (2006), they shown in their paper on average the size variable coefficient of 0.0251 and our study shows the coefficient of 0.098. Further the evidence shown in the studies of ACW (2004), Gracia and Mira (2015), have shown in later section[14].

The coefficient of size is also negative, when we run the regression for positive and negative correlation between cash and cash flow separately. This implies that both the Positive and negative correlation between cash and cash flow decreases, in periods when firms' size increases. Result shows estimated coefficients of -0.016, and -0.05, for negative and positive correlation between cash and cash flows, respectively.

Further, the positive influence of size on sensitivity between cash-cash flows supports the prediction of the packing order theory. Especially, the packing order theory, predicts that, firstly firms rely on their generated internally funds, then with debt, and finally with issuance of new equity. According to our estimation of size measure when size of the firm increases, it will increase the sensitivity between cash

[13] Note that each variable in the model are with one-period lagged value, so that all results are interpreted with respect to one-period lagged-values for all variables in the model.

[14] See the detail from 5.2.2 section (the estimation results for constraint and unconstraint firms section).

and cash flow. This implies that increasing size cause to increase the level of cash hoarding and this can be possible through cash flows generated by firm.

The one-period lagged-coefficient of leverage is negative and statistically significant at 1% significance level, when we run the regression for cash-cash flow sensitivity. But the coefficient of leverage is positive and significant when we run the regression for only positive correlation between cash and cash flow. Yet the leverage is negatively and significantly related with the negative sensitivity of cash holding to cash flows. This implies that the positive sensitivity of cash to cash flows increases, whereas, the negative correlation between cash and cash flow decreases in periods when firms' leverage increases. Result shows estimated coefficients of -0.092, -0.012, and 0.032 for absolute, negative and positive correlation between cash and cash flow, respectively. It explains that with 1unit increase in leverage, absolute and negative correlation between cash and cash flow will decrease with the 0.092 units. Similarly 1 unit increase in leverage leads to 0.032 units increase in the positive cash and cash flows.

Although several studies has examine the effect of leverage ratio on the cash holding and find negative relation[15], but we couldn't find reliable empirical evidence regarding the cash-cash flow sensitivity and leverage ratio. Results are consistent with the proposed hypothesis of our study. As well as, our results supports both of the prominent theories the pecking order and the agency cost theory predict negative consequence of leverage.

We find that the dividends exert positive effects on firm's absolute correlation between cash and cash flow. This specifies that cash holding of firms that pay more dividends is relatively more sensitive to cash flow (estimated coefficient is 0.035 and

[15] See for reference the work of Opler et al. (1999), Dittmar and smith (2007), Harford et al. (2008), Uyar and Kuzey (2014), Gracia and Mira (2015).

significant at 1% level) as compares to the firms not paying out dividend. This result confirms the results of prior empirical study of ACW (2004) that have been shown the positive relation of correlation between cash-cash flow with dividend payouts.

When we re-estimate the model for only positive correlation, dividend payouts shows a negative relationship. It indicates that the coefficient of dividend payouts is positive and statistically significant for positive sensitivity of cash to cash flows. Similarly dividend payouts are negative relationship with negative correlation between cash and cash flows. It depicts that while firm increasing their dividend payouts both the negative and the positive correlation between cash and cash flow will fall. That is 1unit increase in the dividend payment of firm leads to decrease 0.037 units and 0.029 units of negative and positive correlation between cash and cash flows, respectively.

The coefficient of ash flow volatility is positive and statistically significant at 1% significance level, when we run regression for absolute correlation between cash and cash flows. It is also positive and statistically significant when we run the regression for only positive sensitivity of cash and cash flows. Yet, the cash flow is negatively and significantly related with the negative correlation between cash and cash flow. This implies that the positive correlation between cash and cash flow increases, whereas, the negative sensitivity of cash to cash flows decreases in periods when firms' cash flows become more volatile. Result shows estimated coefficients of 0.069, 0.043, and -0.095 for absolute, positive and negative correlation between cash and cash flows, respectively.

Consistent with the hypothesis developed in our study, the impact of one-period lagged Tobin's Q supports theories, namely packing order theory and trade-off theory. Empirical results display there exist positive effect of the Tobin's Q on cash

and cash flow sensitivity. These finding supports the previous that firms having market to book value also build excess cash balances and cash flow sensitivity. A potential detail of this is that firm with greater market to book asset ratio, strengthen the correlation between cash and cash flow. The models showing positive impact of Tobin's Q, the estimated coefficients show, 0.068, 0.026, and 0.046 for absolute, negative and positive correlation between cash and cash flow, respectively.

On the whole, the results for the cash-cash flow sensitivity recommend those two important theories of corporate finance, specifically the pecking-order theory and the trade-off theory, are important in clarifying the relationship between cash flow sensitivity of cash. Our results are also consistent with few preceding empirical findings that have been estimated for diverse countries, through the globe such as Almeida et al. (2004), Gracia and Mira (2015), and Khurana et al. (2006).

5.2.2 Financial constraint and Cash-Cash Flow Sensitivity

The results of cash and cash flow sensitivity deals with an important evidence on the role of firms-specific characteristics. The results provide in preceding section directs that firm-characteristic factors determine the cash-cash flow sensitivity. The results of previous section did not permit us to conclude whether financially constraint firms are important in clarifying the factors of firm cash and cash flow sensitivity. However, it is very likely that the impact of firm-specific variables on the relationship between cash and cash flow differs through financially constraint and financially unconstraint firms.

To inspect the effects of firm-specific characteristics causes on firm's cash and cash flow through financially constraint firms and financially unconstraint firms, we estimate equation (4).

Following the previous empirical literature, in our study we apply Whited and Wu index constraints measure to identify financially constraint and financially unconstraint firms. We use Whited and Wu index measure to guarantee that the outcomes we offered in this dissertation are robust.

Table 5.5 presents the results of WW index measure have used in our study. When we summarize the results we notice that certain specific significant differences in response of firm's cash and cash flows sensitivity to its determinants across financially constraint and unconstraint firms.

Before debating on our main results, it would be beneficial to do some examinations on the diagnostic tests. Panel B in table reports AR (2) and J-test results. For validity of the instruments it specifically used in our empirical analysis.

Table 5.5:Estimation Results for Financial Constrained and Financial unconstrained.

This table presents the results for the empirical determinants of absolute correlation between cash holding and cash flows for financially constrained versus unconstrained firms. The study use an unbalanced annual panel data set covering the period from 2000 to 2014. We use the robust two-step system-GMM estimator to estimate the model. Specifically, we estimate the following model for quantifying the effects of the empirical determinants of corporate cash holdings and cash flow sensitivity.

$$|r_{i,t}| = \beta_1|r_{i,t-1}| + \beta_2\, SIZ_{i,t-1} + \beta_3\, LEV_{i,t-1} + \beta_4\, TQ_{i,t-1} + \beta_5\, CFV_{i,t-1} + \beta_6\, DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it}$$

where the dependent variable $|r_{i,t}|$ is absolute correlation between cash holding and cash flow. The independent variable$|r_{i,t-1}|$ is absolute correlation between cash holding and cash flow at $t-1$ time.β_0 is the intercept and $\beta_1 - \beta_6$ are the coefficients of independent variables. $TQ_{i,t-1}$ is Tobin's Q for firm i at $t-1$ time, calculated as the market value divided by the book value of assets. $LEV_{i,t-1}$, variable is leverage, is calculated as ratio of total liabilities to total assets for firm $i$in period $t-1$. Variable $SIZ_{i,t-1}$is size, is computed as the natural logarithm of total assets. $CFV_{i,t-1}$, variable is cash flow volatility of firm $i$in period $t-1$. It is defined as the standard deviation of the cash flow for each firm over the sample period. $DIV_{i,t-1}$, independent variable is dividend payout of firm $i$in period $t-1$.Last, η_i observe firm specific effects and is assumed to be constant over time and θ_t observe time specific effects. $\varepsilon_{it}$is the disturbance term. Information regarding firm-year observations, total number of instruments, diagnostic tests, and their p-values are given in Panel B of the table. The J-statistic is the Hansen (1982) test for testing the orthogonally condition for the instruments used in the estimation.

The AR (2) is the Arellano-Bond (1991) test for testing the presence of second order autocorrelation in the residuals. The sample consists of non-financial firms listed at Pakistan Stock Exchange. The data are collected from Balance Sheet Analysis of Non-Financial Firms. The parentheses used in table shows the standard error. ***, ** and * denote the significance at the 1%, 5% and 10% level of significance respectively.

Panel A: Estimation results for Constraint and Unconstraint firms

	Whited Wu Index	
Variable	Financial Constrained	Financial Unconstrained
$Corr\_abs_{t-1}$	0.060***	0.067***
	(0.047)	(0.003)
SIZ_{t-1}	0.043	0.035
	(0.032)	(0.027)
LEV_{t-1}	-0.097***	0.017*
	(0.010)	(0.010)
DIV_{t-1}	0.030***	-0.020
	(0.130)	(0.047)
CFV_{t-1}	0.071***	-0.029
	(0.092)	(0.045)
TQ_{t-1}	0.081**	-0.053
	(0.028)	(0.121)
Cons	0.017	0.089
Panel B: Diagnostic tests		
No observation	2103	2294
No of instruments	159	290
F-Statistics	401.600	62.230
Probability	0.000	0.000
AR (2)	-0.320	-1.320
Probability	0.750	0.188
J Test	159.94	274.55
Probability	0.313	0.630

In panel B J-test estimations offer the proof of accepting the null hypothesis that the instruments are statistically independent of residuals. We find J-test's p-values as 0.313 and 0.630 for financially constraint and unconstraint firms

respectively. Similarly, we find AR(2) that p-values of 0.750 and 0.188 for financially constraint and unconstraint firms, respectively for AR (2) results. These results did not show any major evidences of the accordance of autocorrelation in tested models. These diagnostic tests deliver the proof that the instruments are valid enough. Similarly, F-Statistics in our model also displays highly significance of p-values for both types of firms.

When we inspect the impact of firm-specific variables on the sensitivity of cash to cash flows, we come to the point that the effect of one-period lagged absolute correlation between cash and cash flow is positive and statistical significance for both categories (FC and FUC firms).

The estimated coefficient of the one-period lagged of absolute correlation between cash and cash flows shows that the persistent of the CFSC is higher for FC firms as compared to FUC firms.

The estimated coefficient of size suggests that the size of firm is statistically insignificant related to the sensitivity of cash and cash flows regardless whether the firms are financially constraint or financially unconstraint. This implies that for the both, financially constraint and unconstraint firms the impact of size on absolute sensitivity between cash and cash flow is positive but their level of magnetite is different.ACW (2004), have also stated the positive relation of firm size with CFSC of firms. ACW (2004), showing estimated coefficient of size as 0.062 and 0.0099 for financially constraint and unconstraint firms, respectively. Our study shows 0.043 and 0.035, respectively for financially constraint and unconstraint firm.

The above evidence depicts that financially constraint firms are more conscience about cash and cash flow behavior as compared to financially unconstraint firm, because of high sensitivity of coefficient of financially constraint firms. A

potential description for distinct effect of firm size is that FC firms appear smaller amount of FC when they are large and thus, they are expected to retain less cash reserve from their cash flows. Financially constrained firms may increase their cash holdings from generated cash flows, as they prefer to use their internal financing to fulfill their capital needs.

The estimated coefficient of leverage suggests that the total debt to total assets of firm is negative and statistically significant related to sensitivity of cash and cash flows for financially constraint firms. Conversely, the estimated coefficient of leverage suggests that the debt to total assets is positive and statistically significant related to CFSC for financially unconstraint firms. In case of financially constraint firms, the leverage ratio weakened the sensitivity between cash and cash flow, but it is highly significant at 1% level. That is, by 1unit increase in leverage the sensitivity between cash and cash flow decrease by 0.097 units. Likewise, financially unconstraint firms show the estimated coefficient of 0.017. It shows the positive relation exists between correlation between cash and cash flow and the leverage ratio. Financially unconstraint firm behavior of our study explains, as far as, the leverage ratio increases, it will strengthen the relationship between cash and cash flow. Since financially unconstraint firm has the ability to collect debt from external sources without occurring high borrowing costs, they strengthen the sensitivity between cash and cash flow.

When we observe the impact of the dividend payments, the cash flow volatility, and the Tobin's Q on absolute correlation between cash and cash flow, we find that these firm-characteristics are also differently related to sensitivity between cash accumulation and cash flows across financially constrained versus financially unconstrained firms. The estimated coefficients of the dividend payments, the cash

flow volatility, and the Tobin's Q suggest that the dividend payments, the cash flow volatility, and the Tobin's Q of firm are positive and statistically significant related to the sensitivity of cash and cash flows for financially constraint firms. But, on the other hand, these firm-characteristics are negative and insignificant related to the sensitivity of cash and cash flows for financially unconstraint firms.

Specifically, the estimates of dividend payments indicate that for FC firms, the cash-cash flow sensitivity increase with dividend payments. However, the sensitivity of cash to cash flows decreases when FUC firms pay more dividends to their shareholders. Yet their effect is statistically insignificant.

Concerning the influence of market to book value on CFSC, we find important and positive coefficients for FC firms. This suggests that with greater growth opportunity are expected to have more absolute correlation between cash and cash flow. The positive retort of sensitivity between cash and cash flow to growth opportunities is efficient as trade-off theory, as well as the packing order theory.

5.2.4 Estimation results for high-Tobin's Q firms and low-Tobin's Q firms.

In preceding section, we present significant evidence of the impacts of different firm-characteristics on absolute correlation between cash-cash flow across financially constrained and unconstrained firms. There are also different views that the effect of determinants of cash-cash flow sensitivity differs across high-Tobin's Q and low-Tobin's Q. To inspect the effects of firm-specific characteristics on firm's cash and cash flow sensitivity through high and low Tobin's Q we estimate equation (6).

Tobin's Q used as proxy to measure the growth of the firm. Firms has classified as median of Tobin's Q. Table 5.6 presents the results of high-Tobin's Q

(high-growth firms) and low-Tobin's Q (low-growth firms). The sensitivity between cash and cash flow to its determinants across high and low Tobin's Q is noticeably different.

Before debating on the differential responses across high and low Tobin's Q firms let's have a view on the diagnostic results reported in Table 5.6. Panel B reports the F-statistics, the AR (2), and the J-test results. These tests ensure the validity of the instruments, the fitness of model, and the absence of autocorrelation. We find significant statistics results show for AR (2) as 0.288and 0.646for high and low Tobin's Q, respectively. Similarly, we find p-values of J-test for high and low Tobin's Q is 0.340 and 0.438, respectively. These results ensure that the instruments are valid enough and there is no existence of autocorrelation in a model.

Table 5. 6: Estimation results for high-Tobin's Q firms and low-Tobin's Q firms

This table presents the results for the empirical determinants of absolute correlation between cash holdings and cash flows for high Tobin's Q and low Tobin's Q firms. We use the robust two-step system-GMM estimator to estimate the model. Specifically, we estimate the following model for quantifying the effects of the empirical determinants of corporate cash holdings and cash flow sensitivity.

$$|r_{i,t}| = \beta_1|r_{i,t-1}| + \beta_2\, SIZ_{i,t-1} + \beta_3\, LEV_{i,t-1} + \beta_4\, TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6\, DIV_{i,t-1} + \eta_i + \theta_t + \varepsilon_{it}$$

Where the dependent variable $|r_{i,t}|$ is absolute correlation between cash holding and cash flow. The independent variable$|r_{i,t-1}|$ is correlation between cash holding and cash flow at $t-1$ time.β_0 is the intercept and $\beta_1 - \beta_6$ are the coefficients of independent variables. Variable $SIZ_{i,t-1}$is size, is computed as the natural logarithm of total assets. . $LEV_{i,t-1}$, variable is leverage, is calculated as ratio of total liabilities to total assets for firm $i$in period $t-1$. $TQ_{i,t-1}$ is Tobin Q for firm i at $t-1$ time, calculated as the market value divided by the book value of assets. $CFV_{i,t-1}$, variable is cash flow volatility of firm $i$in period $t-1$. It is defined as the standard deviation of the cash flow for each firm over the sample period. $DIV_{i,t-1}$, independent variable is dividend payout of firm $i$in period $t-1$.$D_{i.t}^{HTQ}$Shows the dummy variable for high Tobin's Q of firm i in period t. $D_{i.t}^{LTQ}$ indicates the dummy variable for low Tobin's Q of firm$i$ in period t. Last, η_i observe firm specific effects and is assumed to be constant over time and θ_t observe time specific effects. $\varepsilon_{it}$is the disturbance term. Information regarding firm-year observations, total number of instruments, diagnostic tests (J-test, F-statistics, and AR(2) test), and their p-values are given in Panel B of the table. The study use an unbalanced annual

panel data set covering the period from 2000 to 2014. The sample consists of non-financial firms listed at Karachi Stock Exchange. The data are collected from Balance Sheet Analysis of Non-Financial Firm. The parentheses used in table shows the standard error. ***, and ** denote the significance at the 1%, and 5% level of significance respectively.

Panel A: Estimation results for high-Tobin's Q firms and low-Tobin's Q firms

Variable	High Tobin's Q	Low Tobin's Q firms
$Corr\_abs_{t-1}$	0.068***	0.063***
	(0.003)	(0.004)
SIZ_{t-1}	-0.024	-0.050
	(0.453)	(0.487)
LEV_{t-1}	-0.009***	0.002
	(0.898)	(0.020)
DIV_{t-1}	0.032**	-0.095
	(0.014)	(0.4614)
CFV_{t-1}	0.047***	-0.063***
	(0.156)	(0.203)
TQ_{t-1}	0.058**	0.042***
	(0.265)	(8.110)
Cons	0.133	0.167
Panel B: Diagnostic Tests		
No observation	2439	2421
No of instruments	187	2991
F-Statistics	486.64	1547.51
Probability	0.000	0.000
AR (2)	-1.060	-0.46
Probability	0.288	0.646
J Test	187.25	154.34
Probability	0.340	0.438

When we inspect the impact of firm-specific characteristics on the cash-cash flow sensitivity, we notice different behavior for high- growth and low-growth firms. The effect of one-period lagged absolute correlation between cash-cash flow is positive and statistically significant for both high and low growth firms but with different magnitudes. For high-growth the cash-cash flow sensitivity, is more

persistence with the coefficient of 0.068as compared to low-growth firms. The estimated coefficient of low-growth firm is 0.068, which shows less persistence of cash flow sensitivity of cash. Gracias and Mira (2015) have shown cash flow sensitivity of cash for high-Tobin's Q and low-Tobin's Q, 0.001 and 0.0003, respectively.

Another firm-specific characteristic which is included in our model is lag of size. This specific variable shows the negative relationship between cash flow sensitivity of cash and the size regardless whether the firms are high-Tobin's Q of low-Tobin's Q, but the estimated coefficients of low-Tobin's Q is higher as compared to high-Tobin's Q. It depicts that when there is 1 unit increase in size it leads to decrease by 0.024 units in the cash-cash flow sensitivity of high-growth firms. On the other side, 1unit increase in size leads to 0.050 decrease in absolute correlation between cash and cash flow.

The estimated coefficients of leverage show the significant and inverse relationship to the cash-cash flow sensitivity for high-growth firms. Whereas low-growth firm's coefficient is insignificant and positively related to the absolute correlation between cash-cash flows. In case of high-growth firms when the leverage ratio increases by 1unit, it decreases the sensitivity level between cash and cash flows. This is because high-growth firms tend to invest in high net present value projects and retained less in their balances from the generated cash flows from operations.

The next two important characteristics of firms named as dividend and cash flow volatility both show highly significant and positive impact on absolute correlation between cash and cash flow for high-Tobin's Q. Conversely, both the variables show negative relationship with the absolute correlation between cash and cash flow for low-Tobin's Q firms. The estimated coefficients of divided and cash

flow volatility for high-growth firms are 0.032 and 0.047 and for low-growth firms are -0.095 and -0.063, respectively.

Finally, we have shown the effect of growth of firm on cash and cash flow sensitivity for high and low Tobin's Q. The table shows that both have positive impact on the absolute correlation between cash and cash flow regardless of whether they are high-growth firm or low-growth firms. The estimated coefficients of high-growth firms are large as compared to its counterpart low-growth firms. It appears that high-growth firms create more strong relation between cash and cash flow of firm when their growth opportunities increase as compared to low growth firms.

Our results of the absolute correlation between cash-cash flow of high-growth and low-growth firms are influenced by firm-specific determinants of cashare consistent with our previous mentioned theories. These results suggest that the trade-off theory is significant in explaining the correlation between cash-cash flow decisions of overall high-growth and low-growth firms.

5.2.3Estimation results for high-levered firms and low-levered firms.

In preceding section, we show the significant evidence of the determinants of absolute correlation between cash and cash flow across high-Tobin's Q and low-Tobin's Q firms. It would be worthwhile to further explore how much firm-characteristic affect the sensitivity between cash and cash flow if firms are high-levered or low-levered. This particular subsection presents the results by using equation (5).

We estimate the model and run separate regressions for high-levered and for low-levered firms. We formulized our model in such a way that it produces the effect of each variable on the cash and cash flow sensitivity. We classified high-levered firms and low-levered firms based on total debt to total assets.

The panels B of this table specifically show the special effect of J-test, AR (2) test, and F-test. These special effects disclose that the instruments used in the model are robust. Specifically, J-test estimations provide the evidence of accepting the null hypothesis that the instruments are statistically independent of residuals. Specifically, we find p-values of J-test as 0.443 and 0.364 for high-levered and low-levered firms, respectively.

Table 5. 7: Estimation result for high-levered firms and low-levered firms.

This table presents the results for the empirical determinants of absolute correlation between cash holdings and cash flows for high levered firms and low levered firms. We use the robust two-step system-GMM estimator to estimate the model. Specifically, we estimate the following model for quantifying the effects of the empirical determinants of corporate cash holdings and cash flow sensitivity.

$$|r_{i,t}| = \beta_1|r_{i,t-1}| + \beta_2\, SIZ_{i,t-1} + \beta_3\, LEV_{i,t-1} + \beta_4\, TQ_{i,t-1} + \beta_5 CFV_{i,t-1} + \beta_6\, DIV_{i,t-1}\eta_i + \theta_t + \varepsilon_{it}$$

where the dependent variable $|r_{i,t}|$ is absolute correlation between cash holding and cash flow. The independent variable$|r_{i,t-1}|$ is correlation between cash holding and cash flow at $t-1$ time.β_0 is the intercept and $\beta_1 - \beta_6$ are the coefficients of independent variables.Variable $SIZ_{i,t-1}$is size, is computed as the natural logarithm of total assets. $LEV_{i,t-1}$, variable is leverage, is calculated as ratio of total liabilities to total assets for firm $i$in period $t-1$.$TQ_{i,t-1}$ is Tobin Q for firm i at $t-1$ time, calculated as the market value divided by the book value of assets. $CFV_{i,t-1}$, variable is cash flow volatility of firm $i$in period $t-1$. It is defined as the standard deviation of the cash flow for each firm over the sample period. $DIV_{i,t-1}$, independent variable is dividend payout of firm $i$in period $t-1$. Last, η_i observe firm specific effects and is assumed to be constant over time and θ_t observe time specific effects. $\varepsilon_{it}$is the disturbance term. Information regarding firm-year observations, total number of instruments, diagnostic tests, and their p-values are given in Panel B of the table. The study use an unbalanced annual panel data set covering the period from 2000 to 2014. The sample consists of non-financial firms listed at Pakistan Stock Exchange. The data are collected from Balance Sheet Analysis of Non-Financial Firm. The parentheses used in table shows the standard error. ***, and **denote the significance at the 1%, and 5% level of significance, respectively.

Panel A: Estimation result for high-levered firms and low-levered firms.

Variable	High levered firms	low levered firms
$Corr\_abs_{t-1}$	0.645***	0.669***
	(0.032)	(0.037)
SIZ_{t-1}	0.135**	-0.551
	(0.060)	(2.338)
LEV_{t-1}	-0.844***	0.1193
	(0.112)	(0.009)
DIV_{t-1}	0.568***	-0.546
	(0.143)	(0.438)
CFV_{t-1}	0.995***	-0.602***
	(0.295)	(0.008)
TQ_{t-1}	0.455**	-0.701
	(0.196)	(6.290)
Cons	0.050	0.124
Panel B: Diagnostic Test		
No observation	1994	2421
No of instruments	189	299
F-Statistics	1231.53	1547.51
Probability		0.000
	-1.230	
AR (2)	0.220	0.630
Probability		0.527
J Test	184.08	299.79
Probability	0.443	0.364

Similarly, we find AR (2) with the p-values of 0.22 and 0.527 for high-levered and low-levered firms, respectively. These results did not show any major evidences of the accordance of autocorrelation in tested models. These diagnostic tests deliver the proof that the instruments are valid enough. Similarly, F-Statistics in our model also displays highly significance of p-values for both high-levered and low-levered

firms. We conclude the panel B as, it approves the validity of our instruments, no autocorrelation exists in the model and the model is good fitted. It also provides the evidence of robustness of our estimation.

The total number of instruments used in our model is 189 and 299, for high-levered and low levered firms. Likewise, more than 1990 observations are used while estimating high levered firms and 2421 observations while estimating low-levered firms.

Turning to firm-specific characteristics of firms' absolute correlation between cash and cash flows levels, we find that the estimate of lagged correlation between cash and cash flow is 0.645 for high-levered firms while the corresponding figure is 0.669 for low-levered firms. This finding indicates that low-levered firms adjust their correlation between cash and cash flows towards the target level at slightly higher speed as compared to high-levered firms. Our results also suggest that high-levered firms increase their absolute correlation between cash and cash flows with one-period lag size. Yet, low-levered firms are expected to decrease the absolute correlation between cash and cash flows with size.

Except leverage variable, all other firm characteristics variables used in our model have positive impact on absolute correlation between cash and cash flow for high-levered firms. Low-levered firms in contrast, showing negative impact on absolute correlation between cash and cash flow for all variables except the leverage and one period lagged absolute correlation between cash and cash flow.

The coefficient of leverage is significant but negative for high-levered firms. It shows that one unit increase in leverage tends to decrease the cash flows of the firms as compared to its cash holdings. Packing order theory also suggests that firms use their cash holdings to meet out their cash requirements then they issue debt if the held

cash is not enough. That is why as firm's leverage ratio increases their sensitivity between cash and cash flows will decrease. On the other hand the coefficient of leverage for low-levered firms is positive and insignificant.

Tobin's Q for high-levered firms are statistically significant at better than 5% significance level, while Tobin's Q for low-levered firms are statistically insignificant except for cash flow volatility and one period lagged absolute correlation between cash and cash flow.

Chapter 6

Conclusion

6.1 Introduction

This study explores the financial conditions of non-financial corporations in the context of Pakistan. We developed firm classification based on firms listed at Pakistan Stock Exchange by distinguishing between three groups of firms: constraint vs unconstraint firms, high-levered vs low-levered firms and high-Tobin's Q and low-Tobin's Q firms. We sort out firm-year observations as a financially constraint and financially unconstraint firms based on the Whited and Wu (WW) index. We also show further evidence on the correlation between corporate cash holding and cash inflow.

We model a firm's correlation between cash and cash flow to develop a different test of the effect of financial behavior on corporate policies. We conduct the analysis of cash-cash flow sensitivity measured through accumulative correlation between cash and cash flow and then examined how firm-specific factors are related with this correlation. This unique approach also enables us to identify the factors that are positively and negatively related to the cash and cash flow sensitivity. Another worth noting aspect in our study is that we sort out the positive and negative correlations and then examined whether the negative and positive sensitivity of cash and cash flows for firms having different firm characteristics.

In order to mitigate the problem of endogeneity and to take into account the dynamic nature of the panel data set, we utilize the robust two-step system GMM estimator. We use unbalanced annual panel dataset covering the period 2000-2014.

6.2 Key Findings

Our results suggest that cash-cash flow sensitivity differs for financially constraint and unconstraint firms. Several studies have also found the same results, among others, ACW (2004), Gracia and Mira (2015), financially constraint firms are more conscience about the tendency to save cash out of cash flows than that of their counterpart. Our results show that financially constrained firms increase their absolute correlation between cash and cash flow with its one-period lagged value, dividend payout ratio, cash flow volatility and market to book value, while they decrease their absolute correlation between cash and cash flow with both the size and the leverage.

On the other hand, for financially unconstrained firms, we find that there is a negative relevance of absolute correlation between cash and cash flow and dividend payout ratio, cash flow volatility and market to book value, while they increase their absolute correlation between cash and cash flow with one period lagged absolute correlation between cash and cash flow, size of the firm and leverage.

The results regarding the role of growth potentials in the firm characteristics and cash and cash flow sensitivity reveal that the absolute correlation between cash and cash flow of high-growth firms are negatively affected by the firm-size and the leverage whereas, they are positively affected by the one period lagged absolute correlation between cash and cash flow, dividend payout ratio, cash flow volatility and market to book value. However, the absolute correlation between cash and cash flow of low-growth firms are negatively related to the size, the payout ratio, and the cash flow volatility, whereas, they are positively related to one period lagged correlation between cash and cash flow, leverage and Tobin's Q.

Finally, we find that there exist the differential effects of cash flow and cash holdings across high-levered and low-levered firms. Absolute correlation between

cash and cash flow of high levered firms are positively affected by the one period lagged absolute correlation between cash and cash flow, size, dividend payout ratio, cash flow volatility and market to book value whereas, only leverage is negatively affected.

However, low levered firms' absolute correlation between cash and cash flow negatively affected by one period lagged size, dividend payout ratio, cash flow volatility and market to book value, whereas, they are positively related to the one period lagged absolute correlation between cash and cash flow and the leverage. All in all, our findings suggest that the trade-off theory, the pecking order theory, and the agency theory are playing an important role in determining cash holdings and cash flow sensitivity of Pakistani corporations. The findings of the analysis are of great significance for investors, firm managers, and policymakers.

In particular, our findings suggest that there is a need to reduce the financial market imperfections and take some steps to built inter-linkages between financial intermediaries and corporate firms. So that, firms can easily approach to external financing whenever they need funds to finance their investment and other operational needs. Thus, firms may use cash reserves for productive purposes rather than keep in hand for providing a buffer against any future insolvency.

6.3 Policy Recommendations

The study adds to the literature by analyzing the firm important characteristics and its impact on the sensitivity of cash and cash flows of the firm in the context of Pakistan. This research work gives important insights to the firm and industry players in a way that industry players firms first analyze firm-specific characteristics and then generalize those characteristics with the sensitivity of cash holdings and cash inflows of the firms.

Thus our work has tried contributing to the field of corporate finance. Ultimately, it attracts the attention of investors, managers of the firm, researchers, and academia, towards the understanding of sensitivity between cash holdings and cash flows.

According to our study, financial constraint firms increase their reserved cash levels to overcome the future financial crises, but on the other hand they are missing currently available profitable investments opportunities; the investments with positive net present values. So, for optimal usage of funds, managers of firms are supposed to investigate the main characteristics of a firm and how it affects the sensitivity between cash and cash flows of the firm.

Primarily, firms should focus on the improving the quality of financial reporting because it significantly influences the firm financial decisions. The State Bank of Pakistan should take steps to improve the monitoring process of the audit firms. So that the analysis based on the available reports become more reliable.

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