Cash Flow Uncertainty, Dividend and Investment:
Evidence from Pakistan

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Dedication

I dedicate this project to my beloved Parents who supported

me and prayed for my success.

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CERTIFICATE

This is to certify that this thesis entitled **"Cash Flow Uncertainty, Dividend and Investment: Evidence from Pakistan"** submitted by **Mr. Rizwan Ali** is accepted in its present form by the Department of Economics and Finance, Pakistan Institute of Development Economics (PIDE) Islamabad as satisfying the requirements for partial fulfillment of the Degree of Master of Philosophy in Economics and Finance.

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ABSTRACT

This study aims at the findings of the impact of cash flow uncertainty upon dividend and investment decisions for the manufacturing firms listed at Pakistan stock exchange (PSX). We examine that the firms which face cash flow uncertainty neither decrease investment nor cut dividends however they give more preference to investment than dividends. The firms maintain their dividend and investment level even if there is a condition of cash flow uncertainty. In case of Pakistani manufacturing firms, external financing (particularly debt financing) is the only way to overwhelm the cash flow uncertainty. With the variation of cash flow uncertainty and investment to dividend sensitivity analysis we get a non-linear relation between dividend and investment for manufacturing firms of Pakistan.

Key words: cash flow uncertainty, dividend and Investment

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

The pioneer of the theoretical background giver on the two main financial decisions; dividend and investment decisions Miller and Modigliani (1961), stated that in the world of perfect capital market these two decisions are independent of each other as firms can obtain capital easily when they required. However in the case of imperfect capital market where firms are restricted to obtain capital for their dividend and investment decisions then firms generally depend on their internal cash flows. And when these internally produced cash flows turn out to be uncertain, then firms require to choose one of the following decisions; to decrease dividends, decrease investment, change their cash holdings or obtain external capital to resolve the uncertainty problem. This study is designed to examine the relation among dividend and investment under the condition of cash flow uncertainty for Pakistani manufacturing firms listed in Pakistan Stock Exchange (PSX) (formerly, Karachi Stock Exchange) and will also provide some evidence that how this type of uncertainty is resolved by Pakistani manufacturing firms.

This study is encouraged in the spirit of Deng et al. (2013) where they have studied the relation between dividend and investment in the condition of cash flow uncertainty for Chinese listed firms, and found some nonlinear relation between dividend and investment in condition of cash flow uncertainty. Apart from Deng et al. (2013) study, the dividend and investment decisions are broadly discussed in other studies as well. Starting from the work of Miller and Modigliani (1961) influential study, number of research studies on this topic delivered experimental suggestion on how the dividend and investment are interrelated to each other. However some studies, like study

of Fama (1974) support the work of Miller and Modigliani (1961) and suggest that the dividend and investment decisions are independent. Though some studies, like studies of Dhrymes and Kurz (1967) and Louton and Domian (1995) are inconsistent with this Fama's separation principle, and they suggest that dividend and investment decisions are inter linked with each other.

Researchers have extended the framework for dividend and investment decisions by comprising additional factors as well in their studies. Like the work of Pogue (1969) has introduced cost of external capital. Holt (2003) added financial constraints and Daniel et al. (2008) included financial flexibility with dividend and investment framework in their studies.

Maximum number of previous studies have argued that the dividend decisions have a second order position in relation to investment decisions. However study like Lintner (1956) has opposed their argument and argued that the dividend decisions are made at first order level than investment decisions. The Study of Brav et al. (2005) has stated that firms make dividend and investment decisions instantaneously and they suggested that managers of the firms are unwilling to cut the dividends and preserving the dividends has no less than importance than investment. In this regard dividend and investment are interlinked and the argument of dividend as second order importance than investment is invalid here which denies the work of earlier studies.

In response to the above mentioned contradictions concerning the relationship among dividend and investment, we speech the subject matter by detecting the dividend and investment decisions with the condition of cash flow uncertainty. As accessing external financing turn out to be more difficult when firms face uncertainty in their cash flows so they face greater cost of capital on external financing as that uncertainty directs the greater risk to the capital providers. So in this regard firms become more financially constrained and they have to depend on their own internally generated cash flows. And these internally generated cash flows now can affect the dividends as it

was examined by Chay and Suh (2009) and also effect the investment which was studied by Minton and Schrand (1999).

Cash flow uncertainty condition in dividend and investment relation allows us to well recognize this problem that how the firms make dividend and investment decisions when they face trouble in obtaining internal and external capital.

1.2 Research Question

This study seeks answers for following questions:

1) How Pakistani manufacturing firms will solve the uncertainty problem?
2) How much the uncertain cash flows effect on Dividend and Investment decisions for Pakistani firms?

1.3 Objectives of the study

Keeping in view the previous studies on the linkages between dividend and investment, we shall examine the relationship among dividend and investment decisions with the condition of cash flow uncertainty and this study will come up with its following main objectives;

a) To check the impact of cash flow uncertainty on dividends payouts by the firms.
b) To examine whether cash flow uncertainty effects the investment of the firms or not.

1.4 Significances of the study

As the study is motivated in the spirit of Deng et al. (2013) where they have investigated the relation among dividend and investment under the condition of cash flow uncertainty for

Chinese listed firms so this study will examine the same case for Pakistani manufacturing firms listed in PSX and will be benefited for the financial institutions, researchers and investors by knowing that when there is a problem of cash flow uncertainty faced by Pakistani manufacturing firms, through which method do they decide their dividend and investment decisions and through which channels do the firms resolve cash flow uncertainty problem when they face difficulty in obtaining internal and external capital.

1.5 Organization of the study

The rest of the study is organized as follows; Chapter 2 of the study is Literature Review and it delivers the brief analysis of other studies which provided the interactions of dividend and investment decisions and the impact of uncertain cash flows on these two decisions. Chapter 3 is Data and Methodology and it provides sources from the data is collected for study and it also delivers the methodology of the study. Chapter 4 is Empirical Results and it provides the study results. Chapter 5 is Conclusion where we have concluded our study.

CHAPTER 2

LITERATURE REVIEW

2.1 Related Literature:

Lintner (1956) placed the groundwork for the modern understandings of dividend policies. He argued by interviewing managers of 28 companies that managers have suggested that they usually target long term payout ratios when they were able to shape dividend policies. In his concluding remarks he added that dividend levels are decided at first level than investment decisions and firms are ready to forgo their capital budgeting for maintaining the present level of dividend payments.

Miller and Modigliani (1961) were the original explainers who theoretically explained that dividend and investment decisions are separable in the world of perfect capital market. They suggested that in perfect capital market firms always have policy to invest first then they have some residual cash for dividend payments at later bases, this implies that investment decisions have an strong impact on dividend decisions but not vice versa case. In their concluding remarks they recommended that in perfect capital markets dividend and financial policies are of no significances, as firms external source of financing and internal source of financing are perfect substitutes for each other and firm's investment decisions are independent of dividend and financing decisions of the firms.

Dhrymes and Kurz (1967) taken 181 firms over the period of 1947 to 1960 in their study. By applying single and simultaneous equation model they found that significant interdependence is there among dividend and investment decisions. They suggested that by sustaining stable dividend payments they may basket investment opportunities by reducing internal funds available

for their capital expenditure. They argued that in imperfect market where internal finance is cheaper source than external finance there results are significant as dividend decisions do impact investment decisions. In their concluding remarks they recommended that interdependence among dividend and investment decisions exist significantly.

Higgins (1972) treated dividends as a residual in corporate decisions of the firms and concluded that there is no any linkages among dividend and investment decisions. He argued that dividends were the functions of investment and profit but that dividends did not impact on investment, consistent results with Miller and Modigliani. He found that debt has negative impact on amount of dividends.

Fama (1974) in his article (an empirical relationship between dividend and investment decisions of firms) he conclude that no significant relationship exist between the two decisions. Fama suggest that the difference in results of Dhrymes and Kurz arises because Dhrymes and Kurz omitted certain lagged variable, constrained the parameters of dividend and investment model to be equal for all firms, and chose inappropriate deflators. He found the complete degree of independence between dividend and investment decisions of the firms. He used two stage least square to estimate explicit models of dividend and investment decisions. He concluded that no significant relationship exists between two decisions.

McDonald et al. (1975) experienced same results of investment and dividend decisions as Miller and Modigliani (1961) experienced. By commenting on Lintner's work he suggested that dividends were sound explained by profit and lagged dividend in the dividend model of him. Fama (1974) examined that dividend and investment decisions are not linked with each other, as there is complete amount of independence among both decisions of the firms.

McCabe (1979) examined that as external financing for the company is expensive so to avoid that cost firms which have background of greater leverage usually pay lesser amount of

dividends. He found that leverage has an adverse impact on dividend payments and dividend payments have an adverse impact on investment decisions, while external financing has a positive effect on investment decisions. As a result firms cut dividends when they experience long term debt.

Morgan and Saint-Pierre (1978) supported the Miller and Modigliani separation principle by stating that dividend decisions have a second order importance than the investment decisions but in some circumstances dividend and investment decisions are interdependent. Smirlock and Marshall (1983) produced the results supporting the separation principle which indicates that there is no causal relationship among dividend and investment decisions of the firms. Peterson and Benesh (1983) examined that sufficient amount of market imperfection can lead to conjointly determination among investment and financing decisions. In their concluding remarks they recommended that investment decisions can be influenced significantly by financing decisions.

Partington (1985) contained survey of 152 Australian large firms and he experienced from 93 responses that conflict is there among dividend and investment decisions. He recommended that residual policy of dividend is not taken by sample firms though dividend and investment decisions were taken independently. In his concluding remarks he suggested that about 39% of the senior managers responded that there was a time when dividend were preferable than investment spending, so in that case he found dependence among dividend and investment which was violating separation principle of Miller and Modigliani.

Fazzari et al. (1988) suggested that cash shortfalls can be covered through dividends cut, that's why dividends payers firms are considered less constrained. As external finance is expensive so internal finance has an advantage over it. Meanwhile investment outlay can be sensitive to the

accessibility of internal finance. In their concluding remarks they stated that firms who pay lower dividends are generally lesser, invest more and grow faster than the firms who pay high dividends.

Pruitt and Gitman (1991) by accompanying survey of 114 from 1000 large U.S. firms concluded that 90% of the defendants showed that dividend policies cannot effect present corporate investment events. They suggested that managers of the firms mark dividend decisions independently from the investment and financing decisions. DeAngelo and DeAngelo (1990) study by taking 80 New York Stock Exchange (NYSE) firms acknowledged that their results explained that firms prefer to reduce dividends, rather than to omit it.

Mougoue and Mukharjee (1994) by taking quarterly data of 100 U.S. manufacturing firms and by applying vector autoregressive modeling technique they found that there is bi-directional causality linkages among dividend and investment decisions. Their results show that the causality in dividend and investment is bi-directional and negative, while causality in investment and borrowings is also bi-directional but it is positive.

Louton and Domian (1995) in their study extended the sample period as before their study sample period was taken short so that they include sample period of 37 years and on that sample they applied Granger causality test and established that dividends relate to investment in one-third of the sample firms. They experienced unidirectional causality from dividend to investment for almost one-third of American firms. In some cases they account the effect of investment on dividend payments, consistent with the results of Miller and Modigliani (1961) and they also provided some indications of the effect of dividends on investment decisions, inconsistent with the results of Miller and Modigliani.

Minton and Schrand (1999) established that firms who faced cash flow shortages will hand over investment opportunities instead of acquire external capital. He suggested that higher volatility in cash flows is linked with lower average level of investment. In their concluding remarks they suggest that firms with higher cash flow volatility will practice internal cash flow shortfalls and will sacrifice investment.

Holt (2003) investigated dividend and investment relation under irreversibility and financial constraints situation and concluded that interdependency exists between dividend and investment under these circumstances.

Brav et al. (2005) analyzed in their survey and detailed interviews with financial executives and managers that maintaining the dividend levels is contains same importance as investment decisions. Managers of the sample firms conveyed very strong wish to escape dividend cut excluding unexpected circumstances. Though increase in dividend per share is a second order concern after investment and liquidity needs are met. In their concluding remarks they stated that dividend selections are made instantaneously with investment decisions and surveyed managers were unwilling to cut dividends rather they were willing to lose some positive net present value (NPV) projects before cutting dividends.

Bhaduri and Durai (2006) by applying panel Granger causality test on 265 manufacturing firms over the period of 15 years for emerging markets conclude that combined determination is there in financing and investment decisions of the firms in emerging markets. Their results were rejecting separation principle and they stated that magnitude of market imperfection in emerging markets clues towards combined determination in financing and investment decisions.

DeFusco and Dunham (2007) recommended that payout policy is a first order value determinant, telling interdependency among dividend and investment decisions. Using vector auto regression (VAR) model they conclude that there exists bi-directional interdependency among dividend and investment. Larger dividend responses were there when firms have more profitable investments.

Daniel et al. (2008) specified that to fulfill demands of expected dividends and investment firms while facing shortfalls in cash must do one of the following, censored dividends, change investment, sales equities to raise funds, sales assets or do decline in cash reserves. They inspected that very few firms censored dividends while the majority of firms make substantial changes in investment relative to expected levels. Changes in investment fulfill half of the shortfalls in cash while remaining was adjusted through borrowings. They provided indications that mangers are unwilling to censor dividends.

Mougoue (2008) used aggregate data to examine the relation among dividend and investment, and he found nonlinear relation among these two financial decisions. In his concluding remarks he added that linear test in consistent with separation principle however nonlinear test does not support it. Nonlinear causality discloses solid bi-directional relation among dividend and investment.

Chay and Suh (2009) identified that cash flow uncertainty is significant determinant of corporate payout policy. Cash flow uncertainty has adverse impact on amount of dividends in addition to probability of paying dividends. Its impact on dividends is higher than rest decisions including investment. To avoid future short falls in cash firms pay lower dividends when uncertainty in cash flows is high.

Wang (2010) examined that investment decisions have progressive effect on dividend decisions and financing performance for Taiwan firms though debt financing clues confidently effect on investment for Chinese firms. In his concluding remarks he added that causal relation among dividend, investment and financing decisions is due to asymmetry information in imperfect capital markets.

Sanju et al. (2011) applied dynamic panel data vector error correlation model to test co-integration among dividend and investment. Their findings indicate a long run causal relation among dividend and investment and thus they are supporting inseparable decisions of dividend and investment contradictory to Miller and Modigliani (1961) and Fama's (1974) separation principle.

Deng et al. (2013) empirically examined the relation among dividend and investment in a situation of cash flow uncertainty for Chinese listed firms. They established that facing uncertain cash flows firms do not cut dividend and investment, however firms preserve extraordinary level of investment. Further they found that finance from external market is sufficient for uncertain cash flows. They further found that nonlinear relationship is there among dividend and investment with changed levels of cash flow uncertainty.

Ijaz and Imtiaz (2015) applied multivariate vector autoregressive model, impulse response function and Granger causality test to estimate the relation between dividend, investment and profit in engineering sector of Pakistan listed in Karachi Stock Exchange (KSE). They found solid relation between dividend, investment and profit. Bi-directional causality was found in investment and dividend, though causality goes from investment to profit only just in case of investment and profit, in the event of dividend to profit direction goes from dividend to profit. Further they found

that profits were distributed through dividends paying rather than creating new investment, and external financing was main source to fund investment of firm.

2.2 Theoretical Background:

Keeping in mind the abovementioned previous studies the mostly theories argued that the firms depend on their internal cash flows when they experience the financial constrained problem. The study of Chay and Suh (2009) identified that cash flow uncertainty is significant determinant of corporate payout policy. To avoid future short falls in cash, firms pay lower dividends when uncertainty in cash flows is high. The study of Bhaduri and Durai (2006) ratify that magnitude of market imperfection in emerging markets clues towards combined determination of financing and investment decisions.

The study of Mougoue (2008) argued that nonlinear causality discloses solid bi-directional relation among dividend and investment decisions. The study of Daniel et al. (2008) investigated the dividend and investment relation under the condition of cash flow short fall and concluded that when firms face cash flow shortfall they first cut investment before dividends and shortfall was covered mostly by debt financing.

The study of Fazzari et al. (1988) suggested that cash shortfalls can be covered through dividends cut, that's why dividends payers firms are considered less constrained. As external finance is expensive so internal finance has an advantage over it. Meanwhile larger cash flow uncertainty rises the risk of external capital suppliers which causes a greater cost of external capital. So firms have to decide to decrease their investment due to restricted capital.

Minton and Schrand (1999) examined that firms which faces cash flow shortages will hand over investment opportunities instead of acquire external capital. Cash flow uncertainty is also an important element of dividend payout and it has the important impact on other dividend elements as well. Lintner (1956) added that dividend levels are decided at first level than investment decisions and firms are ready to forgo their capital budgeting for maintaining the present level pf dividend payments. Miller and Modigliani (1961) explained that dividend and investment decisions are separable in the world of perfect capital market. They recommended that in perfect capital markets dividend and financial policies are of no significances, as firms external source of financing and internal source of financing are perfect substitutes for each other and firm's investment decisions are independent of dividend and financing decisions of the firms.

Dhrymes and Kurz (1967) found that significant interdependence is there among dividend and investment decisions. They argued that in imperfect market where internal finance is cheaper source than external finance there results are significant as dividend decisions do impact investment decisions. Fama (1974) found the complete degree of independence between dividend and investment decisions of the firms. Bhaduri and Durai (2006) results were rejecting separation principle and they stated that magnitude of market imperfection in emerging markets clues towards combined determination in financing and investment decisions.

McCabe (1979) found that leverage has an adverse impact on dividend payments and dividend payments have an adverse impact on investment decisions, while external financing has a positive effect on investment decisions. Mougoue and Mukharjee (1994) results show that the causality in dividend and investment is bi-directional and negative, while causality in investment and borrowings is also bi-directional but it is positive.

CHAPTER 3

DATA AND METHODOLOGY

3.1 Introduction:

In this chapter, we describe the data from where it is taken, ample period of the study and the methodology used to obtain the study's objectives.

3.2 Data and Sample period:

In this study sample is taken for Pakistani manufacturing firms listed in Pakistan Stock Exchange (PSX) over the period of 10 years from 2004 to 2013. Study starts from 2004 as the complete annual data of all variables of selected sample firms is only available from 2004. Study has taken manufacturing firms listed in (KSE 100- Index) of 2015, firms whose data was not complete were dropped and some firms whose capital accumulation was large were taken for the sample and a final sample of 69 firms from 11 Manufacturing Sectors from which major part of firms were taken from Cement, Textile, Chemical and Pharma, Food, motor vehicle auto parts and Fuel and Energy sectors. So the study has final sample of 690 firm to year observations. Data is mostly taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP). However study has taken the data from other sources as well, like from company's own financial statements and Business Recorder of Pakistan.

3.3 Variable description:

3.3.1 Cash flow uncertainty:

Our main variable for research is cash flow uncertainty, which is defined as when firms face shortfall in their cash or face volatile cash flows. Cash flow uncertainty can be measured through two ways: the first method to measure cash flow uncertainty is cash flow shortfall which can be measured as,

$$cash\ flow\ shortfall$$

$$= expected\ investment + expected\ dividend - available\ cash\ flow$$

And the second method to measure cash flow uncertainty is cash flow volatility which can be measured by taking standard deviation of the fraction of five year's operating cash flow to one period total lagged assets.

$$Standard\ Deviation\ (SD)\ \ X\ \ \frac{5y\ Operating\ Cash\ Flow}{LAG\ (TA)_{t-1}}$$

3.3.2 Dividend:

A dividend is a sharing of a percentage of a company's incomes, in other words it is a profit on shares which company distributes to a class of its shareholders. Dividend data is taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP).

3.3.3 Investment:

An investment is an expenditure on immovable assets, intangible assets and other long term assets.   Investment data is taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP).

3.3.4 EXTCASH

External Cash means Cash flow from external financing, including equity financing and debt financing. Its data is taken from firms financial statements.

3.3.5 RANK

As Rankings of cash flow uncertainty is taken. Cash flow uncertainty is measured with cash flow shortfall and cash flow volatility. Shortfall is ranked by CashShort_TA and volatility is ranked by CFVol. There are a total of 10 rankings.

3.3.6 DUM1

Dum1 denotes Dummy 1 variable which is equal to 1 if rank is smaller than 4, to 0 otherwise.

3.3.7 DUM2

Dum2 denotes Dummy 2 variable is which equal to 1 if rank is larger than 4 and smaller than 7, to 0 otherwise.

3.3.8 CF

CF means Operating cash flow divided by lagged total assets. Its data is taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP).

3.3.9 MB

MB means the book-to-market ratio is a ratio used to find the value of a company by comparing the book value of a firm to its market value. Book value is calculated by looking at the firm's historical cost, or accounting value. Market value is determined in the stock market through its market capitalization and its data is taken from the firm financial statements and financial recorder official web site.

3.3.10 SIZE

Size means size of the firm can be measured by taking Nature logarithm of total assets. Its data is taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP).

3.3.11 ROA

ROA means return on asset which can be calculated as Net income scaled by total assets. Its data is taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP).

3.3.12 LEV

LEV means leverage which can be calculated as Total debt scaled by total assets. Its data is taken from the financial statements analysis of companies (non-financial) listed at Karachi stock exchange (KSE) by State Bank of Pakistan (SBP).

3.4 Methodology:

As cash flow uncertainty can be measured through cash flow shortfall and cash flow volatility so we are measuring cash flow uncertainty as it was measured by Deng et al. (2013) and Daniel et al. (2008) in their studies.

3.4.1 Measurement of Cash flow shortfall:

Following the study of Daniel et al. (2008) Cash flow shortfall can be measured as

$$cash\ flow\ shortfall$$
$$= expected\ investment + expected\ dividend - available\ cash\ flow$$

From above equation we can measure expected investment as; by calculating median of the industry investment first then that median of industry investment is divided by industry lagged assets, and finally by multiplying this industry value with firm's lagged asset to obtain expected investment of the firm.

$$\frac{Median\ of\ Industry\ Investment}{Indusrty's\ TA_{t-1}} = Industry\ value\ (X)\ Firms\ TA_{t-1}$$

$$= Expected\ Investment$$

So by this way we can get the expected investment, this methodology is taken by Daniel et al. (2008) in their research work. Investment contains capital expenditure for immovable assets and additional long term assets.

For expected dividend we Followed DeAngelo and DeAngelo (1990) and Deng et al. (2013) and used expected dividend as dividend paid in preceding year.

And for available cash flow we followed Deng et al. (2013) and taken available cash flow as the net cash flow from operating activities.

Now moving on to the second measure of cash flow uncertainty which is cash flow volatility.

3.4.2 Measurement of Cash flow volatility

Cash flow volatility can be measured by taking standard deviation of the fraction of five year's operating cash flow to one period total lagged assets.

$$Standard\ Deviation\ (SD)\ \ X\ \ \frac{5y\ Operating\ Cash\ Flow}{LAG(TA)_{t-1}}$$

This method is taken by Chay and Suh (2009), Deng et al. (2013) and Jayaraman (2008) in their research works.

3.4.3 How to resolve Cash flow Uncertainty?

As uncertainty is in variable cash flow and if uncertainty prevails firms face problem in their cash flows so firms has to decide to do one of the steps; to decrease dividends, decrease investment, change their cash holdings or obtain external capital to resolve the uncertainty problem. Resolve cash flow uncertainty means when firm faces shortfall or volatility in their cash flows then what will be the steps to cover that shortfall or volatility. This study first examine the

dividend and investment decisions under the condition of cash flow uncertainty for the firms given that descriptive evidence of how cash flow uncertainty is determined by firms. During the whole analysis, study adopts that there are only five instruments to determine the cash flow uncertainty. These are: dividends cutback, investment cutback, rise non-operating cash, acquire external financing and decrease cash balance

Following equation can be generated with above mentioned information:

$$Available\ cash$$
$$= Investment\ cut + Dividend\ cut + Non\ operating\ cash + External\ finance$$
$$+ Cash\ drawdown$$

Dividend cutback can be taken as the difference between expected dividend and dividend.

Investment cutback is taken as difference between Expected investment and investment.

Expected dividend and expected investment has been explained earlier that how to obtain these variables.

Non-operating cash is taken as:

$$Non\ operating\ cash = \ cash\ recieved\ from\ sale\ of\ investment +$$
$$cash\ recieved\ from\ investment\ revenue +$$
$$cash\ paid\ for\ purchase\ of\ property\ plant\ and\ equipment -$$
$$cash\ paid\ for\ purchase\ of\ subsidiaries - cash\ paid\ for\ investment\ in\ subidiaries$$

External cash is taken as:

$External\ cash$

$$= cash\ recieved\ from\ equity\ investment + cash\ recieved\ from\ debt$$

$$+ cash\ recieved\ from\ issuance\ of\ a\ bond$$

$$+ cash\ recieved\ from\ debt\ investment + cash\ recieved\ from\ dividend$$

$$- cash\ paid\ for\ equity\ investment - cash\ paid\ for\ debt$$

$$- cash\ paid\ for\ dividend\ and\ interest - cash\ paid\ for\ debt\ investment$$

Cash balance (cash drawdown) is taken as:

$$cash\ drawdown = change\ of\ cash\ and\ cash\ equivalents$$

Non-operating cash value is obtained from cash flow statement of the firm.

External cash value is obtained from statement of cash flow from its external financing portion and it includes both channels of external financing: cash from equity financing and cash from debt financing.

Change of cash and cash equivalents figure can be obtained from cash flow statement.

We have followed in this study the same methodology as it was taken by Deng et al. (2013) and Daniel et al. (2008) to examine the relationship among dividend and investment under the condition of cash flow uncertainty.

3.5 Empirical model:

We use the following empirical model in our study to examine the relationship among dividend and investment under the condition of cash flow uncertainty.

$$\frac{I_{i,t}}{TA_{i,t}} = \propto_0 + \propto_1 DIV_{i,t} + \propto_2 RANK + \propto_3 DUM1 + \propto_4 DUM2 + DIV_{i,t} * (\propto_5 RANK + \propto_6 DUM1 + \propto_7 DUM2) + RANK * (\propto_8 DUM1 + \propto_9 DUM2) + DIV_{i,t} * RANK(\propto_{10} DUM1 + \propto_{11} DUM2) + \propto_{12} EXTCASH_{i,t} + \propto_{13} CF_{i,t} + \propto_{14} MB_{i,t} + \propto_{15} SIZE_{i,t} + \propto_{16} ROA_{i,t} + LEV_{i,t} + \propto_{18} LAG(\frac{I_{i,t}}{TA_{i,t}}) + \in_{i,t} \cdots \cdots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (Equation\ 1)$$

3.6 Estimation technique:

As our model consists of dynamic panel data while having lagged value of its dependent variable in the right side of the equation and independent variables face endogeneity problem, so we use Arellano and Bond (1991) estimation technique for our dynamic panel data model. Arellano and Bond (1991) discussed the estimation of dynamic panel data models by the generalized method of moments. They suggested that this application is so much useful for unbalanced panel data and also for the generalized method of moment estimators and the serial correlation test.

CHAPTER 4

EMPRICAL RESULTS

4.1 Introduction:

This chapter deliberates the results and their interpretations. The chapter is divided into following sections; Section 4.2 describes the descriptive statistics of data, section 4.3 explains how firms resolve cash flow uncertainty by using cash flow shortfall technique. Section 4.5 explains how firms obtain external cash. Section 4.6 explains how firms resolve cash flow uncertainty by using cash flow volatility technique. Section 4.7 shows list of tables. Section 4.8 shows list of figures in our study and section 4.9 shows the nonlinear relation among dividend and investment under the condition of cash flow uncertainty.

4.2 Descriptive statistics:

Table 4.7.1 is reporting the descriptive statistics of research main variables. Pakistani manufacturing firms showing massive variation in cash flow uncertainty. Cash flow shortfall has a mean of 1313 million PKR having standard deviation of 2781million PKR. And it ranges from -2123 million to 3612 million. Cash flow volatility has a mean of 0.11 million PKR having a standard deviation of 0.18 million PKR, and it ranges from 0.0 million to 1.8 million. We have summarized the main variables of cash flow uncertainty as well, by whom cash flow uncertainty can be resolved. These are non-operating cash, cash holdings and external financing. When we see at the signs of non-operating cash and cash drawdown these have a negative sign, which is indicating that Pakistani firms do not use these two methods to resolve cash flow uncertainty. However external cash is having positive and larger amount which indicates that only external cash is used to acquire capital to resolve cash flow uncertainty. External cash has a mean of 1854

million PKR having standard deviation of 3373 million PKR. And it ranges from -747 million to
3752 million.

Table 4.7.1: Descriptive Statistics

This table shows the descriptive statistics of the key variables used in our study.
Variables are explained in detail in Appendix. However actual value variables are presented in
PKR million.

Variables	No: of Obs	Mean	Std. Dev	Minimum	Maximum
Dividends	690	1481	451	0	4085
Investment	690	2890	875	0	14041
Inv_TA	690	0.0	0.1	0	0.9
Div	690	0.04	0.0	0	1.98
CFShortFall	690	1313	2781	-2123	3612
CFShortFall_TA	690	0.47	2.15	-23.1	36
CFVol	690	0.11	0.18	0.0	1.8
Non-Op Cash	690	-403	1485	-19872	2274
Ext Cash	690	1854	3373	-747	3752
Cash Drawdown	690	-58.19	1632	-34141	1824
Extcash_TA	690	0.7451	1.406	-0.5403	36.5

4.3 Cash flow uncertainty measuring variables:

Table 4.7.2 is reporting the full sample distribution with different magnitudes of cash flow shortfall and cash flow volatility to confirm that both cash flow uncertainty measuring variables; cash flow shortfall and cash flow volatility are appropriate measure of cash flow uncertainty or not. Firstly firms are divided into five groups based on the magnitude of cash flow volatility giving cash flow volatility. Inside each group sample is further divided into five groups by cash flow shortfall. From here moving from left column to right column we can examine that with the increase of cash flow volatility, cash flow shortfall's magnitude is also increasing. Which is specifying that there is positive relation among cash flow shortfall and cash flow volatility.

Table 4.7.2 Cash flow uncertainty measuring variables:

This table shows the sample distribution with different cash flow volatility and cash flow shortfall. Firms are organized into five groups based on degree of cash flow volatility. Cash flow volatility is measured with standard deviation of five years' operating cash flow. Cash flow shortfall is estimated as expected investment + expected dividend - available cash. First row reports the value for cash flow shortfall, and the second row reports the number of observations in each groups.

CFVolt Rank		Cash Flow Short Rank				
		Quantlie1	Quantlie2	Quantlie3	Quantlie4	Quantlie5
Quantlie1	CashShort (mean)	-744.6	247.2	505.6	1306	6691
	Firm-year (obs)	33	15	27	36	29
Quantlie2	CashShort (mean)	-88.2	2162.7	6088.4	12626	33148
	Firm-year (obs)	23	16	27	44	30
Quantlie3	CashShort (mean)	-154.6	2754.2	6004.2	13609	39769
	Firm-year (obs)	30	24	26	30	25
Quantlie4	CashShort (mean)	-430.1	2428.3	5485.4	13127	49123
	Firm-year (obs)	19	46	31	17	27
Quantlie5	CashShort (mean)	-9697.4	2552.3	5661	14878	53529
	Firm-year (obs)	33	37	27	11	27
Sum	CashShort (mean)	-4205.8	2493.1	5652.9	13195	48556
	Firm-year (obs)	138	138	138	138	138

4.4 How to resolve cash flow uncertainty using cash flow shortfall:

Table 4.7.3 is reporting results for cash flow uncertainty measured with cash flow shortfall.

We distributed the data in three categories; in Panel 1 we have taken Full sample of the firms and

distributed it within five groups (0.1,2,3 and 4), in Panel 2 we have taken only positive shortfalls

data and in Panel 3 we used negative shortfall data for our estimations.

Panel 1 has distributed the full sample into five groups with the level of shortfall for all the firms.

For the investment and dividend decisions we can see from the results that, with the negative value

of Cash flow shortfall in group (0 and 1) and positive values of cash flow shortfall in group (2,3

and 4) dividend value has negative sign but somewhat positive sign in last (4th) group (2million)

where shortfall is high. However investment values are greater and decreased with increase in

shortfall but remain negative. Results are indicating that with the cash flow shortfall condition

Pakistani manufacturing firms neither cut dividends nor investments however they are spending

more payments on making investments which can be seen from the larger values of investment in

Table 4.7.3. Results also predict some nonlinear effects of cash flow shortfall on investment which

can be seen with unjust distribution of dividend and investment within the groups. As dividend

and investment are not measures of cash flow uncertainty for Pakistani firms because they are not

using these two variables to solve the cash flow uncertainty problem. So we move on to other

additional channels of cash flow shortfall, we can see from the results in Panel 1 of Table 4.7.3

that the values of non-operating cash and cash drawdown are having negative signs as well which

is suggesting that firms are not using these two channels as well to determine cash flow shortfall.

However the external cash values are highly positive than all in the groups, which is suggesting

that Pakistani firms use only this channel to resolve the cash flow shortfall problem.

These results of Panel 1 are further confirmed in Panel 2 and Panel 3 as well, where these panels

are distributing samples according to positive and negative shortfalls respectively. Positive

shortfall is suggesting that firms are having low level of cash and they must acquire cash from above mentioned five channels to resolve shortfall problem. While Negative shortfall is suggesting that firms have cash in surplus.

Results of Panel 2 are also confirming the results of Panel 1 which suggest that dividend, investment, non-operating cash and cash drawdown have negative values however only external cash has positive and large values and firms use this channel to resolve the cash flow shortfall problem. Results also suggest some relationship among dividend and investment. Dividends differ along with change in shortfall while investment retains increasing trend with the increase in shortfall which is indicating nonlinear relation among dividend and investment given different levels of cash flow uncertainty. Now when we look at the channels for resolving cash flow uncertainty, we can see that external cash is only instrument which has large positive values which increases with increase in shortfall than other instruments, which is suggesting that Pakistani manufacturing firms typically use this channel to resolve the shortfall problem.

Results of Panel 3 are stating that with cash surplus dividend first increases and then decreases while investment increased and decreased with huge amount according to cash surplus which is indicating also some relationship among dividend and investment. It also suggest that while firms have a lot of cash in reserves in group (0) of Panel 3 of table 4.7.3, even then they are taking external cash of 35 million PKR. This external finance and cash in surplus are used to make investment and pay dividends and also spend portion of it on non-operating cash and cash drawdown of the firms.

Table 4.7.3 How to resolve cash flow uncertainty using cash flow shortfall

This table shows that how firms determine the cash flow uncertainty. Expected dividend is taken as dividend paid in prior year. Cash flow shortfall is taken as the instrument to measure cash flow uncertainty. Expected investment is taken as the industry median investment divided by industry's lagged assets then these industry values are multiplied by firm's lagged assets. Available cash is taken as the net cash flow from operating activities. Cash flow shortfall is estimated as expected investment plus expected dividend minus available cash. Dividend cutback is taken as Expected dividend minus dividend and Investment cutback is taken as Expected investment minus Investment. Non-operating cash is taken from statement of cash flow while External cash is taken as cash from external financing including equity and debt financing. Cash drawdown is taken as change of cash and cash equivalent. Panel 1 shows results for full samples. Panel 2shows results for positive cash flow shortfall and Panel 3 shows results for negative cash flow shortfall. Real values are shown in million PKR.

Cash short	Firm-year Obs	Expected dividends	Expected Investment	Available cash flow	shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash	Cash drawdown

Panel 1 full sample (values in millions)

Cash short	Firm-year Obs	Expected dividends	Expected Investment	Available cash flow	shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash	Cash drawdown
0	138	795.7	629.2	1538	-113.1	-7.9	-63.3	-20.3	15.4	-37
1	138	332.2	759.4	1595.2	-503.6	-65.4	-1007.2	-146	1198.4	-483.4
2	138	947.6	1511.2	2217.4	241.4	-14.4	-352.4	-2.41	714.6	-103.8
3	138	1181.7	2222.2	3043.1	360.8	-7.2	-173.1	-14.4	554.5	1
4	138	6761.1	7485.8	10810	3436.9	2	-274.9	-27.4	3702.9	34.3

Panel 2 Positive Cash flow Shortfall (values in millions)

Cash short	Firm-year Obs	Expected dividends	Expected Investment	Available cash flow	shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash	Cash drawdown
0	129	113	398	443	68	-20.4	-197.2	2	374	-90.44
1	129	404	644	610	438	2	-440.6	-42	938.3	-19.71
2	128	848	1387	1103	1132	-10.18	-464.1	-22.6	1640.2	-11.32
3	129	1399	2350	2224	1525	-10.67	-366	-15.2	1871.1	45.75
4	128	3777	3734	5090	2421	2	-145.2	24.2	2527.9	21.1

Panel 3 Negative Cash flow Shortfall (values in millions)

Cash short Rank	Firm-year Obs	Expected Dividends	Expected Investment	Available cash flow	shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash	Cash drawdown
0	10	861	1594	3157	-702	-49.1	-280.8	-84.2	35	-322.9
1	9	7364	2912	10782	-506	-50.6	-414.9	-70.8	116.3	-86.02
2	10	2079	2381	4749	-289	5.78	-234	-104	187.2	-144
3	9	903	291	1312	-118	-21.24	-192.3	-38.9	229.9	-95.5
4	9	2301	2400	4784	-83	-29.8	-341.9	-62.2	521.8	-170.98

4.5 How to obtain external cash:

Table 4.7.4 is showing that the results from table 4.7.3 are suggesting that external cash is the only main instrument to be used to cover the cash flow shortfall problem so in this regard we are distributing external cash into its two main categories from which it obtain cash; cash from equity financing and cash from debt financing.

In Panel 1 of Table 4.7.4 is showing results of full sample of data which indicating that Pakistani firms are obtaining external cash mainly from Debt financing. While the value of equity financing is somehow increasing first with increase in shortfall and then it decreases with increase in shortfall. However with increase in cash flow shortfall, debt financing values are increasing as well.

In Panel 2 of table 4.7.4 with positive cash flow shortfall is suggesting that with the increase of shortfall values of equity and debt financing also increasing but major shortfall is covered through debt financing.

In Panel 3 of table 4.7.4 with negative cash flow shortfall which suggest surplus of cash by firms, also suggesting that Pakistani firms acquiring large external financing through equity and debt financing mostly from debt financing. Even when firms are in surplus they are taking external financing so that they can use it to make investment, pay dividends and used it on non-operating cash and cash drawdown.

Table 4.7.4 How to obtain external cash

        This table shows that how firms obtain external cash. Expected dividend is taken as dividend paid in prior year. Cash flow shortfall is taken as the instrument to measure cash flow uncertainty. Expected investment is taken as the industry median investment divided by industry's lagged assets then these industry values are multiplied by firm's lagged assets. Available cash is taken as the net cash flow from operating activities. Cash flow shortfall is estimated as expected investment plus expected dividend minus available cash. Dividend cutback is taken as Expected dividend minus dividend and Investment cutback is taken as Expected investment minus Investment. Non-operating cash is taken from statement of cash flow while External cash is taken as cash from external financing including equity and debt financing. Cash drawdown is taken as change of cash and cash equivalent. Panel 1 shows results for full samples. Panel 2 shows results for positive cash flow shortfall and Panel 3 shows results for negative cash flow shortfall. Real values are shown in million PKR.

Cash short	Firm-year obs	Expected dividends	Expected investment	Available cash flow	Shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash		Cash drawdown
									Equity	Debt	

Panel 1 Full Sample (values in millions)

Cash short	Firm-year obs	Expected dividends	Expected investment	Available cash flow	Shortfall	Dividends cut	Investment cut	Non-op cash	Equity	Debt	Cash drawdown
0	138	795.7	629.2	1538	-113.1	-7.9	-63.3	-20.3	4.62	10.78	-37
1	138	332.2	759.4	1595.2	-503.6	-65.4	-1007.2	-146	359.52	838.88	-483.4
2	138	947.6	1511.2	2217.4	241.4	-14.4	-352.4	-2.41	214.38	500.22	-103.8
3	138	1181.7	2222.2	3043.1	360.8	-7.2	-173.1	-14.4	166.35	388.15	1
4	138	6761.1	7485.8	10810	3436.9	2	-274.9	-27.4	1110.8	2592.2	34.3

Panel 2 Positive Cash flow Shortfall (values in millions)

Cash short	Firm-year obs	Expected dividends	Expected investment	Available cash flow	Shortfall	Dividends cut	Investment cut	Non-op cash	Equity	Debt	Cash drawdown
0	129	113	398	443	68	-20.4	-197.2	2	112.2	261.8	-90.44
1	129	404	644	610	438	2	-440.6	-42	281.49	656.81	-19.71
2	128	848	1387	1103	1132	-10.18	-464.1	-22.6	492.06	1148.1	-11.32
3	129	1399	2350	2224	1525	-10.67	-366	-15.2	561.35	1309.7	45.75
4	128	3777	3734	5090	2421	2	-145.2	24.2	758.3	1769.5	21.1

Panel 3 Negative Cash flow Shortfall (values in millions)

| Cash short rank | Firm-year obs | Expected dividends | Expected investment | Available cash flow | Shortfall | Dividends cut | Investment cut | Non-op cash | Ext Cash | | Cash drawdown |
									Equity	debt	
0	10	861	1594	3157	-702	-49.1	-280.8	-84.2	15	20	-322.9
1	9	7364	2912	10782	-506	-50.6	-414.9	-70.8	50.2	66.1	-86.02
2	10	2079	2381	4749	-289	5.78	-234	-104	80.1	107.1	-144
3	9	903	291	1312	-118	-21.24	-192.3	-38.9	103.3	126.6	-95.5
4	9	2301	2400	4784	-83	-29.8	-341.9	-62.2	211.4	310.4	-170.98

4.6 How to resolve cash flow uncertainty using Cash flow volatility:

　　　Table 4.7.5 is reporting results for cash flow uncertainty measured with cash flow volatility magnitude. We distributed the data in five groups for two categories; in Panel 1 we have taken Full sample of the firms and in Panel 2 we are showing that how firms obtain external cash. Panel 1 has distributed the full sample into five groups with the level of cash flow volatility for all the firms. Results are consistent with the results of cash flow shortfall magnitude in Table 4.7.3, Pakistani firms neither cut dividend nor investment with increase or decrease in shortfall in given magnitude of cash flow volatility. Results are also indicating that only the value of external cash flow has positive and large value which is indicating that firms only use this instrument to resolve cash flow shortfall problem.

In Panel 2 of Table 4.7.5 we distributed external cash into its two main categories with level of cash flow volatility and find same trend of results with table 4.7.3 and found that external financing is coming largely from debt financing for Pakistani firms. It also suggest that external financing does not decrease with increase in cash flow shortfall however it has larger value when shortfall is negative.

Table 4.7.5 How to resolve cash flow uncertainty using Cash flow volatility:

This table shows that how firms determine the cash flow uncertainty with magnitude of cash flow volatility. Expected dividend is taken as dividend paid in prior year. Cash flow volatility is taken as the instrument to measure cash flow uncertainty. Expected investment is taken as the industry median investment divided by industry's lagged assets then these industry values are multiplied by firm's lagged assets. Available cash is taken as the net cash flow from operating activities. Cash flow shortfall is estimated as expected investment plus expected dividend minus available cash. Dividend cutback is taken as Expected dividend minus dividend and Investment cutback is taken as Expected investment minus Investment. Non-operating cash is taken from statement of cash flow while External cash is taken as cash from external financing including equity and debt financing. Cash drawdown is taken as change of cash and cash equivalent. Panel 1 shows results for full samples. Panel 2 shows results for full sample for external financing through cash flow volatility magnitude. Real values are shown in million PKR.

Cash Volt rank	Firm-year obs	Expected dividends	Expected investment	Available cash flow	shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash	Cash drawdown

Panel 1 Full Sample (values in millions)

Cash Volt rank	Firm-year obs	Expected dividends	Expected investment	Available cash flow	shortfall	Dividends cut	Investment cut	Non-op cash	Ext Cash	Cash drawdown
0	140	650	2084	2615	119	-53.5	-545	-22.61	659.1	-157
1	140	754	1261	2177	-162	-149	-730.6	-74.5	1450.1	-334.3
2	135	1064	2100	3015	149	-43.21	-391.8	-75.9	615.3	-253.3
3	140	927	2024	3000	-49	-81.34	-460.3	20	710.84	-140.2
4	135	1100	2245	3310	35	-97	-270	-84	596	-180

Panel 2 Full Sample for external cash (values in millions)

Cash Volt rank	Firm-year obs	Expected dividends	Expected investment	Available cash flow	Short fall	Dividends cut	Investment cut	Non-op cash	Ext Cash Equity	Debt	Cash drawdown
0	140	650	2084	2615	119	-53.5	-545	-22.61	263	305	-157
1	140	754	1261	2177	-162	-149	-730.6	-74.5	580	870	-334.3
2	135	1064	2100	3015	149	-43.21	-391.8	-75.9	246	369	-253.3
3	140	927	2024	3000	-49	-81.34	-460.3	20	284	426	-140.2
4	135	1100	2245	3310	35	-97	-270	-84	238	357	-180

While looking to all results generally results show some relation among dividend and investment in a condition of cash flow uncertainty. Cash flow uncertainty was measured through cash flow shortfall and cash flow volatility and we found that Pakistani firms neither cut dividends nor cut investment when they face cash flow uncertainty problem, though firms are focusing more on investment as compare to Pay dividends. Results also shown that how firms resolve cash flow uncertainty problem by providing results firms mainly use only external cash to resolve the uncertainty problem. We also provided that how firms obtain external financing and results have shown that external financing for Pakistani manufacturing firms mainly come from debt financing however they also take financing from equity channel as well.

With the condition of cash flow uncertainty we depict some relation based on our previous results in graph in fig: 4.8.1 and 4.8.2.
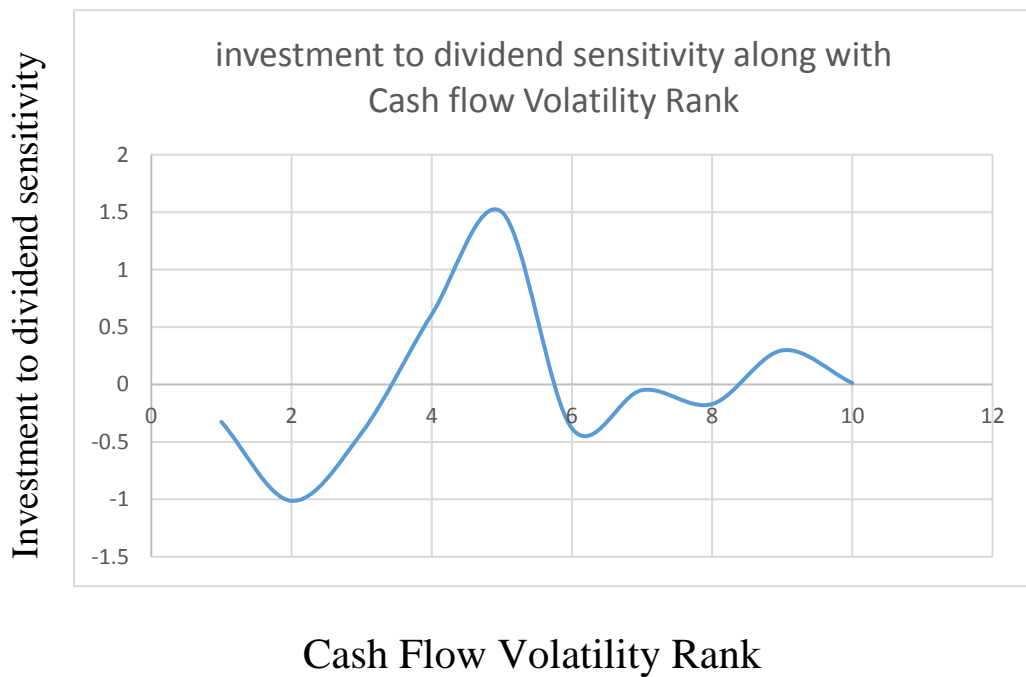
4.8 List of figures:

Graphically representation of Dividend and Investment Relationship under the condition of cash flow uncertainty.

4.8.1 Figure: investment to dividend sensitivity with cash flow shortfall

Cash flow Shortfall Rank

4.8.2 Figure: **investment to dividend sensitivity with cash flow volatility**

Cash Flow Volatility Rank

In Figure 4.8.1 and 4.8.2 we initially plot investment to dividend sensitivity, which is factor of regressing investment on dividends which is controlled for all additional variables, to the cash flow uncertainty to analyze that how the relation among dividend and investment fluctuates with cash flow uncertainty. Level of cash flow uncertainty, which is measured by cash flow shortfall and cash flow volatility is shown in horizontal axis, while coefficient of investment to dividend is shown in Vertical axis. In figure 4.8.1 the nonlinear shape of the curve is labeling the relation among dividends and investment with different levels of cash flow uncertainty measured with cash flow shortfall rank. Investment and dividend have negative linkages when cash flow uncertainty is low. As long as uncertainty increases relation among two decisions become positive, however it again become highly negative when uncertainty is in between 6 to 8 somehow. After that relation becomes highly positive with increase in cash flow uncertainty.

From this we can state that when uncertainty is low firms have strong incentive to make investment and pay dividends without cutting anyone of them which suggest that dividend and investment sensitivity is positive and increasing, however when uncertainty reaches at medium part at point 6 it stars declining which illustrate dividend to investment has negative sensitivity so firms have to cut investment and dividends to make it positive after point 7. So after point 7 it starts increasing and positive dividend to investment sensitivity is there so firms make investments and pay dividends very easily.

In figure 4.8.2 the nonlinear shape of the curve is labeling the relation among dividends and investment with different levels of cash flow uncertainty measured with cash flow Volatility rank. Investment and dividend have negative linkages when cash flow uncertainty is low. As long as uncertainty increases and reaches in between 3 to 6 relation among dividend and investment

becomes highly positive reached to the peak then it declines and for rest of high uncertainty it remained positive with low magnitude.

The nonlinear relation among the dividend and investment is further designated in piecewise regression in Table 4.7.6

4.9 Justification of nonlinearity:

Table 4.7.6 shows the justification of the nonlinear relation among dividend and investment with the condition of cash flow uncertainty with our piecewise regression. The whole data observations are scattered in relation to cash flow uncertainty, into ten groups. And we call it as cash flow uncertainty rank. And this rank was introduced to basic investment to dividend regression framework. Two dummies (Dum1 and Dum2) are also introduced for the different cash flow uncertainty ranks. We put Dummy 1 equals 1 if the cash flow rank is less than 4, otherwise 0. And Dummy 2 equals 1 if the cash flow rank is in between 4 and 7, otherwise 0. Thus the coefficient of the interaction term for dividend and ranks may serve as a benchmark. Though the coefficient of interaction term for dividend, Ranks and two dummies reveal the incremental effects of different levels of cash flow uncertainty. The following piecewise regression model of (Equation 1) has been employed to examine the impact of cash flow uncertainty on the basic investment to dividend relation:

$$\frac{I_{i,t}}{TA_{i,t}} = \alpha_0 + \alpha_1\,DIV_{i,t} + \alpha_2\,RANK + \alpha_3\,DUM1 + \alpha_4\,DUM2 + DIV_{i,t} * (\alpha_5\,RANK + \alpha_6\,DUM1 + \alpha_7\,DUM2) + RANK * (\alpha_8\,DUM1 + \alpha_9\,DUM2) + DIV_{i,t} * RANK(\alpha_{10}\,DUM1 + \alpha_{11}\,DUM2) + \alpha_{12}\,EXTCASH_{i,t} + \alpha_{13}\,CF_{i,t} + \alpha_{14}\,MB_{i,t} + \alpha_{15}\,SIZE_{i,t} + \alpha_{16}\,ROA_{i,t} + LEV_{i,t} + \alpha_{18}\,LAG(\frac{I_{i,t}}{TA_{i,t}}) + \epsilon_{i,t} \cdots \ldots \ldots \ldots \ldots \ldots \ldots \text{(Equation 1)}$$

To support the nonlinear relation among dividend and investment with the condition of cash flow uncertainty we assume that $\alpha_5 + \alpha_{10}$ are greater than 0, $\alpha_5 + \alpha_{11}$ are less than 0 and α_5 is greater than 0. Results of our piecewise regression in Table 4.9 illustrate that the coefficient of interaction term for the three variables are negative significantly. And the coefficient of Dum2 is lesser than the coefficient of Dum1. Summation of the benchmark coefficient (α_5) and incremental coefficient can calculate the total impact of cash flow uncertainty on investment to dividend sensitivity. The

incremental coefficient of Dum1 is negative when the cash flow uncertainty is low, however it is lesser than the benchmark coefficient, such that the total impact ($\alpha_5+\alpha_{10}$) is positive, which is showed by the curve indicating the growing investment to dividend sensitivity when the cash flow uncertainty rank is less than 4. Correspondingly the total effect ($\alpha_5+\alpha_{11}$) from the incremental coefficient of Dum2 is negative, which indicates that when cash flow uncertainty is moderate the investment to dividend sensitivity is negative and has declining tendency. Results of this regression model can be seen from our figures (4.8.1 and 4.8.2) as well.

Now relation of other independent variables with dependent variable i.e. Investment in condition of cash flow uncertainty can be seen as;

The relation of Dependent variable with Dividend is negative this implies that when under the condition of uncertainty firms pay more intention to investment than dividend payments will decline. In our case one percent change in investment leads to -0.404 percent change in dividend payments. The relation of External cash with the dependent variable is positive, as firms is acquiring more external cash it also increases the investment values of the firms.

Operating cash flows has also positive relation with investment as firms investment increases so it will also increase its operating cash flows. Book to Market ratio has also positive relation with our dependent variable as firms increase their investment level so value of MB will also increases. Same is the case with size of the firm as size of the firm increases so it will also increase the investment opportunities of the firm as well. Return on asset has also positive relation with investment, as Returns increases for assets so it will also increase the investment of the firm. Leverage has a negative relation with investment. The constant is showing on average change i.e. -0.4.

Table 4.7.6 Justification of nonlinearity:

This table shows the piecewise regression outcomes by regressing investment on dividend. All variables are well-defined in Appendix. Cash flow uncertainty is measured with cash flow shortfall and cash flow volatility in two columns respectively. Robust t-value is described in parentheses. While *, ** and *** represent coefficients that are statistically significant at the 10%, 5% and 1% levels, respectively.

Dependent Variable:	Cash flow Uncertainty Measure	
Investment	Cash flow Shortfall	Cash flow Volatility
DIV	-0.404**	-0.034**
	(0.019)	(0.017)
RANK	0.012***	-0.002
	(0.000)	(0.186)
DUM1	0.046***	-0.058
	(0.000)	(0.097)
DUM2	0.024***	-0.289
	(0.000)	(0.163)
DIV*RANK	0.020**	0.005**
	(0.019)	(0.014)
DIV*DUM1	0.539**	2.730***
	(0.012)	(0.000)
DIV*DUM2	0.762**	0.166**
	(0.038)	(0.045)
RANK*DUM1	-0.022***	0.012**
	(0.000)	(0.474)
RANK*DUM2	-0.021***	0.041

	(0.000)	(0.235)
DIV*RANK*DUM1	-0.271***	-0.863***
	(0.000)	(0.000)
DIV*RANK*DUM2	-0.106**	-0.121**
	(0.041)	(0.034)
EXTCASH	0.083***	0.043***
	(0.000)	(0.000)
CF	0.003***	0.0038***
	(0.000)	(0.002)
MB	0.0000501**	0.0000224
	(0.043)	(0.129)
SIZE	0.0098***	0.002***
	(0.000)	(0.002)
ROA	0.118***	0.134***
	(0.000)	(0.000)
LEV	-0.285***	-0.251***
	(0.000)	(0.000)
LAG(I_TA)	0.266***	0.193***
	(0.000)	(0.000)
CONSTANT	-0.432***	-0.117**
	(0.000)	(0.035)

CHAPTER 5

CONCLUSION

5.1 Introduction:

This chapter covers conclusion of the study starting with introduction in section 5.1, in section 5.2 we discuss key findings of the study. Section 5.3 states policy implementation and section 5.4 provides future research on this study.

The study has empirically examined the relation among dividend and investment in the condition of cash flow uncertainty and discovered that by what method firms determine the cash flow uncertainty problem. This study is conducted using the nonfinancial data of Pakistani manufacturing firms listed in Pakistan Stock Exchange over the period of 2004 to 2013. Cash flow uncertainty was measured with cash flow shortfall and cash flow volatility. Study has first provided the descriptive suggestions that how Pakistani manufacturing firms have determined the cash flow uncertainty problem. Study results show that the Pakistani manufacturing firms do not reduce dividends and investment when they face cash flow uncertainty problem however they preserve their investment decisions more than their dividend decisions. External financing is the main channel in this study for Pakistani manufacturing firms which is used to overwhelm the problem of cash shortfall. Other channels for resolving cash flow uncertainty like, non-operating cash and cash holdings are not used by Pakistani firms under the condition of cash flow uncertainty. Corresponding to these illustrated results, our study also shows that there is a nonlinear relation among dividend and investment decisions by plotting the different levels of cash flow uncertainty into investment to dividend sensitivity analysis.

5.2 Key findings:

Our key findings include that Pakistani manufacturing firms in a condition of cash flow uncertainty do not cut their dividends and investment however they prefer to invest more than pay dividends, though they resolve cash flow short fall by acquiring external financing mostly from debt financing channel. Further study's finding is that the nonlinear relationship is there among dividend and investment under the condition of cash flow uncertainty.

5.3 Policy implications:

Keeping in mind the results of the study which shows that Pakistani manufacturing firms are obtaining there external financing to pay dividends and make investments and for extending the business they mostly rely on their Debt financing channel. This might be the reason that Pakistani firms may not issue their stocks on regular basis, so Government should make a policy for registered companies in which firms may gain capital through their equity selling as well as it is practically happened in developed countries.

5.4 Future Research:

This research can be extended for taking the sample of Pakistani financial firms for future research. Researchers can also increase the sample period of the study and take different methodologies to estimate the relationship among dividend and investment under cash flow uncertainty condition. Researchers can also introduce other variable in dividend and investment relation for Pakistani firms as well.

REFERENCES

Arellano, Manuel, and Stephen Bond. "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *"The review of economic studies* 58.2 (1991): 277-297.

Bhaduri, Saumitra N., and S. Raja Sethu Durai. "Empirical relationship between the dividend and investment decision: do emerging market firms behave differently?." *Applied Financial Economics Letters* 2.3 (2006): 155-158.

Brav, Alon, et al. "Payout policy in the 21st century." *Journal of financial economics* 77.3 (2005): 483-527. Chay, Jong-Bom, and Jungwon Suh. "Payout policy and cash-flow uncertainty." *Journal of Financial Economics* 93.1 (2009): 88-107.

Daniel, Naveen D., David J. Denis, and Lalitha Naveen. "Dividends, investment, and financial flexibility." *AFA 2009 San Francisco Meetings Paper*. 2007.

DeAngelo, Harry, and Linda DeAngelo. "Dividend policy and financial distress: An empirical investigation of troubled NYSE firms." *The Journal of Finance* 45.5 (1990): 1415-1431.

DeFuscoa, Richard A., Lee M. Dunhamb, and John M. Geppertc. "The Dynamic relation among investment, earnings and dividends." (2007).

Deng, Lu, et al. "Dividends, investment and cash flow uncertainty: Evidence from China." *International Review of Economics & Finance* 27 (2013): 112-124.

Dhrymes, Phoebus J., and Mordecai Kurz. "Investment, dividend, and external finance behavior of firms." *Determinants of investment behavior*. NBER, 1967. 427-485.

Fama, Eugene F. "The empirical relationships between the dividend and investment decisions of firms." *The American Economic Review* 64.3 (1974): 304-318.

Fazzari, Steven M., et al. "Financing constraints and corporate investment."*Brookings papers on economic activity* 1988.1 (1988): 141-206.

Higgins, Robert C. "The corporate dividend-saving decision." *Journal of Financial and Quantitative Analysis* 7.02 (1972): 1527-1541.

Holt, Richard WP. "Investment and dividends under irreversibility and financial constraints." *Journal of Economic Dynamics and Control* 27.3 (2003): 467-502.

Hussain, Ijaz, and Imtiaz Ahmad. "DYNAMIC RELATIONSHIP BETWEEN INVESTMENT, EARNINGS AND DIVIDENDS: EVIDENCE FROM ENGINEERING SECTOR OF PAKISTAN." *PAKISTAN BUSINESS REVIEW*: 785.

Lintner, John. "Distribution of incomes of corporations among dividends, retained earnings, and taxes." *The American Economic Review* 46.2 (1956): 97-113.

Louton, David A., and Dale L. Domian. "Dividends and investment: further empirical evidence." *Quarterly Journal of Business and Economics* (1995): 53-64.

McCabe, George M. "The empirical relationship between investment and financing: a new look." *Journal of Financial and Quantitative Analysis* 14.01 (1979): 119-135.

McDonald, John G., Bertrand Jacquillat, and Maurice Nussenbaum. "Dividend, investment and financing decisions: empirical evidence on French firms." *Journal of Financial and Quantitative Analysis* 10.05 (1975): 741-755.

Metron, Miller, and Franco Modigliani. "Dividend Policy, Growth and Valuation of Shares." *Journal of Business* 34 (1961)..

Minton, Bernadette A., and Catherine Schrand. "The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing." *Journal of Financial Economics* 54.3 (1999): 423-460.

Morgan, Ieuan, and Jacques Saint-Pierre. "Dividend and investment decisions of Canadian firms." *Canadian Journal of Economics* (1978): 20-37.

Mougoue, Mbodja, and Tarun K. Mukherjee. "AN INVESTIGATION INTO THE CAUSALITY AMONG FIRMS'DIVIDEND, INVESTMENT, AND FINANCING DECISIONS." *Journal of Financial Research* 17.4 (1994): 517-530.

Mougoue, Mbodja. "An empirical re-examination of the dividend–investment relation." *Quantitative Finance* 8.5 (2008): 533-546.

Partington, Graham H. "Dividend policy and its relationship to investment and financing policies: empirical evidence." *Journal of Business Finance & Accounting* 12.4 (1985): 531-542.

Peterson, Pamela P., and Gary A. Benesh. "A reexamination of the empirical relationship between investment and financing decisions." *Journal of Financial and Quantitative Analysis* 18.04 (1983): 439-453.

Pruitt, Stephen W., and Lawrence J. Gitman. "The interactions between the investment, financing, and dividend decisions of major US firms." *Financial review* 26.3 (1991): 409-430.

Sanju, P. S., P. S. Nirmala, and M. Ramachandran. "Dividend, investment and the direction of causality." (2011).

Smirlock, Michael, and William Marshall. "An examination of the empirical relationship between the dividend and investment decisions: A note." *The Journal of Finance* 38.5 (1983): 1659-1667.

Wang, David Han-Min. "Corporate investment, financing, and dividend policies in the high-tech industry." *Journal of business research* 63.5 (2010): 486-489.

APPENDIX: Variables Definition

INVESTMENT	Expenditures on fixed assets, intangible assets and other long-term assets scaled by total assets
I_TA	Investment divided by lagged total assets
DIVIDEND	Dividend per share
DIV	Dividend per share divided by lagged total assets per share
CFShortFall	Cash flow shortfall estimated from the equation, Cash flow shortfall = Dividend cutback + Investment cutback + Non-operating cash + External cash + Cash drawdown.
CFShortFall _TA	Cash flow shortfall divided by lagged total assets
CASHVOLT	Standard deviation of five years' operating cash flow scaled by lagged total assets
CFVol	CashVolt scaled by lagged total assets
EXTCASH	Cash flow from external financing, including equity financing and debt financing
RANK	Rankings of cash flow uncertainty. Cash flow uncertainty is measured with cash flow shortfall and cash flow volatility. Shortfall is ranked by CashShort_TA and volatility is ranked by CFVol. There are a total of 10 rankings.
DUM1	Dummy variable is equal to 1 if rank is smaller than 4, to 0 otherwise.
DUM2	Dummy variable is equal to 1 if rank is larger than 4 and smaller than 7, to 0 otherwise.
CF	Operating cash flow divided by lagged total assets
MB	Market to book ratio
SIZE	Nature logarithm of total assets
ROA	Net income scaled by total assets
LEV	Total debt scaled by total assets