

The Role of Cash Holding in Mitigating Refinancing Risk: Evidences from Pakistan



By

Adeel Khaliq

29/M.Phil-EAF/PIDE/2014

Supervisor

Dr. Hasan M. Mohsin

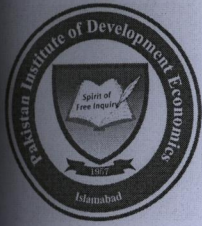
Head, Department of Economics and Finance
PIDE, Islamabad

Department of Economics & Finance

Pakistan Institute of Development Economics

Islamabad, Pakistan

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PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS, ISLAMABAD

CERTIFICATE

This is to certify that this thesis entitled “**The Role of Cash Holding in Mitigating Refinancing Risk: Evidences from Pakistan**” submitted by **Mr. Adeel Khaliq** 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.

Supervisor:

Dr. Hasan Muhammad Mohsin
Senior Research Economist
PIDE,
Islamabad.

Internal Examiner:

Dr. Ahsan ul Haq
Assistant Professor,
PIDE,
Islamabad.

External Examiner:

Dr. Fatima Sharif,
Assistant Professor
QAU,
Islamabad.

Head, Department of Economics and Finance:

Dr. Hasan Muhammad Mohsin
PIDE,
Islamabad.

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A Dissertation is submitted to the Pakistan Institute of Development Economics for the Partial Fulfillment of the Requirement of the degree of Master of Philosophy in Economics and Finance

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Adeel Khaliq

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Supervisor

Dr. Hasan M. Mohsin

Head, Department of Economics and Finance

PIDE, Islamabad

Department of Economics & Finance

Pakistan Institute of Development Economics

Islamabad, Pakistan

2017

Dedicated to my Grandfather (Mr. Wali Mohammad)

And Parents

I am here today because of them. They are the reason I am. They are all of my reasons.

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Abstract

This study focuses to empirically investigate the role of cash holdings in mitigating refinancing risk. The specific objectives of the study are to investigate the role of cash holdings in mitigating refinancing risk and to examine impact of debt maturity on cash holdings. This study is based on panel data of 101 Pakistani manufacturing firms, which are listed at Pakistan Stock Exchange from the period of 2010-2014. In this study, long term debt and short-term debt are used as the proxy of refinancing risk. In this study the model is based on a simultaneous equations framework similar to the one used by Harford et al. (2014). The results of the study suggested that through short term debt maturity the refinancing risk can be mitigated because there is the positive relation between short term debt maturity and cash holdings. Long term debt maturity shows negative but significant relation between cash holdings and refinancing risk. This study concluded the policy formulation for firms that are facing the choice between short term debt and long term debt in order to mitigate risk arising from refinancing. More cash holdings are important for the firms having short-term debt maturity.

Keywords: Cash holdings, Refinancing risk and Debt maturity

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Chapter 1

Introduction

1.1 Background of the Study

In corporate finance, the relationship between cash holdings and debt maturity is an important issue. Why cash holdings are considered important for mitigation of refinancing risk? How debt maturities affect the cash holdings in mitigating refinancing risk? How increasing cash holdings can reduce refinancing risk? Above questions motivate the managers, investors, policy makers and researchers to examine the impact of debt maturity on cash holdings in order to mitigate refinancing risk.

“Risk for a firm that it could have difficulty repaying its debt, is an important source of risk for many firms known as refinancing risk.” This risk makes unable to refinance a debt in future date. There is huge risk involved in the person defaulting on the amount of loan. Refinancing risk leads to bankruptcy because of this type of risk the refinancing will be restrained. Refinancing risk increases the interest rate because of delay in repayment of loan. There are several indications of refinancing risk, the cost of finance may be higher than expected or it may be unreachable or only available on terms that are not compatible with the existing transaction structure. Incapability to refinance will result in default, and a refinancing on more heavy terms will affect the company profit and may require the injection of additional equity.

Term of cash holdings refers a “portion of portfolio of investment.” Cash holding is the amount of cash money firms keep to meet expenditures. Such a cash holding can be utilized for the payment of short term debt as well. Almost every firm holds cash because of its crucial role in meetings short-term loans. Firms that lack sufficient cash holdings can go for credit. There are a few more reasons to hold cash; Cash holdings are necessary for the firms having insufficient funds to finance expenditures. It is said that firms or organizations with high cash reserves can mitigate refinancing risk. Firms also keep cash in situations when there exists insufficient opportunities for profitable investment.

The risk has always been part of financial activity. Risk is the chance of losing investment value. It shows the chance in which there is difference between actual and expected return of investment. There is a possibility of higher expected returns than the actual returns. But investor may lose some or all of the original investment in risk. Risk is often used for downside risk, “means the return uncertainty and potential for financial loss.” Uncertainty that an investor is willing to take to realize investment gain is measured by risk.

Saving cash from cash flows can mitigate refinancing risk. In other words, cash holdings play a hedging role in mitigating refinancing risk. Maxwell et al. (2013) emphasize that cash holdings play a vital role in mitigating refinancing risk for short-term debt firms. Firms having short-term loans face more refinancing risk, it can be alleviate by increasing or having more cash holdings. Firms face more refinancing risk that have short term debt but firms having more cash holding can mitigate this risk easily because it is widely believed that risk is reduced by more cash holdings.

Harford et al. (2014) examine that cash reserves are more important for the firms, which are facing refinancing risk, and it is also documented that the cash reserves value is higher for the firms to mitigate underinvestment problem. In other words, large cash reserves reduce underinvestment problem, which is associated with refinancing risk. It is explained in this way that those firms which maintain the more cash holdings enable themselves to utilize short-term debt in order to mitigate refinancing risk. Harford et al. (2014) explored that by holding more cash reserves, refinancing risk incite by debt rollover could be mitigated. When the crisis prevails in debt market, firms are able to pay debt with reserved cash without getting more debt from capital markets. In this scenario, for pressing refinancing risk, holding cash serves as a hedge device. There exists a negative relation between cash holdings and refinancing risk.

Weisbenner et al. (2010) examine that in periods of credit crisis firms with more debt that is coming due suffer more from underinvestment problem. It follows that firm with short-term debt and large cash holdings could be particularly useful to avoid underinvestment. Cash has more valuable role in saving firms from underinvestment and mitigate refinancing risk. In high market conditions, the cash value increases in case of short-term debt. If firms hold additional cash to reduce refinancing risk then cash value must be more in time of risk. Firms, which prefer short maturity loans, hold more cash to compensate in times of difficulty in refinancing debt. Market value of rupee shows incremental for those firms that depend on short-term debt or firms facing reinvestment risk. In short, there is an indirect relation between market value of cash holding and firms' debt maturity and it exist when there is tight market conditions and high refinancing risk. Up till now we show that cash holdings determined by refinancing risk.

Cash holdings are more important for those firms, which are financially constrained rather than financially unconstrained. Cash holdings result in increase in investment for both constrained as well as unconstrained firms but investment's marginal value is higher for constrained firm. So, higher cash holdings allow constrained firms to take up the value increasing projects. Cash holding increases investment and decreases risk, which arises from refinancing. Cash holdings are used as the precautionary tool in underinvestment period as well. Thus, to mitigate refinancing risk, firms which are relative flexible having greater cash reserves are able to borrow at short-end of debt maturity spectrum. When the long-term debt of firms has shortened maturity, it shows the increase in cash holdings fractions. By shortening maturity of debt there is an increase in potential costs arises from refinancing risk. Thus, firms having short maturity of long-term debt face more refinancing risk. Joha et al. (2015) empirically investigate interlinks between refinancing risk and debt composition. Zhao et al. (2014) also explain the debt maturity choices by the channel of refinancing risk.

Reserves of cash enable firms to make investment in its good opportunities. Firms have ability to mitigate high refinancing risk shows increase in investment because it is obvious that they have more cash holding to tackle the problem of risk (refinancing). When firms cannot refinance its funds then cash holdings help out in avoiding the selling firms' assets.

When there is an increase or a decrease in short maturity debt there will be increase or decrease in cash holdings and it gets weaken when there is less debt or strict conditions of credit market. Firms face low refinancing risk when it has shortage of debt or strict conditions of credit market. Short-term debt maturity firms and long-term maturity firms can be taken as the opposite to each other in terms of refinancing risk aspect. Firms that rely on long-term debt maturity have minor refinancing pressure. Firms that have to pay debt in far future have minor refinancing

needs and so they may not take refinancing risk seriously. Previous research shows that short-term debt helps to mitigate the costs of agency problems, namely debt-overhang (Myers, (1977)). Stulz et al. (2009) find that shortening maturity of debt explains about 32% overall increase in cash holdings. On the other hand, literature by He and Xiong, (2012) shows that building up short-term debt financing exposes firms to refinancing risk. It means that firms with a significant percentage of shorter maturing debts may be unable to exchange them with new loans. Duchin, Ozbas, and Sensoy (2010) and Almeida, Campello, Larajaira, and Weisbenne (2012) examine that firms with high maturing debt during the 2007–2009 financial crisis experienced a weighty drop in corporate investment. This discussion shows that firms may need to take into account refinancing risk when selecting maturity terms of debts they issue. Diamond (1991) states that in absence of liquidity risk, short-term debt is preferred. If liquidity risk is present, then long-term debt can be preferred.

1.2 Gap in the Literature

Empirical work on the relationship between cash holding and refinancing is limited in corporate finance. After reviewing literature we find that there are only few studies such as Harford et al. (2014), Sun (2014), and Mcmeeking et al. (2015) to examine the role of cash holdings in mitigating refinancing risk for developed countries like the USA. Therefore, we know less about the impact of debt maturity on cash holdings. When we review the literature on cash holdings and refinancing risk, we find few studies such as Harford et al. (2014) and Mcmeeking et al. (2015) that have explained the impact of cash holdings on refinancing risk. In the literature regarding Pakistan, we do not find any study particularly focusing to explore the linkage between cash holding and refinancing risk. Therefore, examining this relationship for Pakistani firms' would be a significant contribution into the literature. Further, we know less

about the debt maturity effect on cash holdings that helps in mitigating refinancing risk. However, for the complete understanding of cash holdings role in alleviating refinancing risk, it is important to know the relationship of debt maturity and cash holdings. It would also be important to study whether there is a negative or a positive relation between cash holdings and refinancing risk.

1.3 Research Questions

To accomplish the objectives of the study, we consider the following questions.

1. What is the impact of debt maturity on cash holdings?
2. What is the effect of cash holdings on refinancing risk?
3. Do levels of debt affect cash holdings?
4. What is the link between cash holdings, debt maturity and level of debt?

1.4 Objectives of the Study

We have discussed the gap in the existing literature; our study focuses to achieve the following objectives.

Objectives of this study are discussed below.

1. To study the role of cash holdings in mitigating refinancing risk.
2. To observe the effect of debt maturity on cash holdings.
3. To investigate the impact of level of debt on cash holdings.

1.5 Hypothesis of the Study

Based on the study by Harford et al. (2014) that firms hold more cash to mitigate refinancing risk, we construct the following hypothesis:

Hypothesis 1:

Cash holdings have a significant role in mitigating refinancing risk.

Hypothesis 2:

There is a direct relation of short-term maturity of debt with cash holdings.

1.6 Significance of the Study

There is insufficient work available on the mitigating of refinancing risk through increasing cash holdings. It is interesting to explore the role of cash in reducing underinvestment problem in developing countries like Pakistan. Our contribution has some major aspects.

Firstly, we point out that firms having short-term debt maturity face more refinancing risk. Secondly, refinancing risk can be alleviating by holding more cash from cash flows. We have also shown that cash holdings are also important for financially constrained firms and investment is higher for those firms, which are financially constrained because of high investment marginal value, Hence from the above discussion it is obvious that our study is significant for Pakistan's industry and the stakeholders. It helps in getting loans after taking guidance whether short maturity loan is beneficial or long-term loan. Investors also get attraction when the chances of reducing underinvestment problem exist. Managers can use this study for the purpose of increasing cash flows in order to eliminate risk.

1.7 Thesis Outline

This study is presented as follows: In Chapter one background of the study, gap in the literature, objectives of the study, and significance of the study has been discussed. Chapter two provides the present empirical literature on cash holdings, debt maturity and refinancing risk, relationship between cash holding and refinancing risk, and hypothesis of the study. Chapter three presents theories related to our study. In Chapter four we describe the data and econometric methodology used to achieve the objectives of this study. In chapter five estimation and results of the study are presented. Finally, Chapter six concludes the whole discussion based on the findings of the study and suggests some policy recommendations.

Chapter 2

Literature Review

In this chapter, we first briefly review the findings of previous research on corporate cash holdings. We will discuss the research findings regarding debt maturity and refinancing risk respectively. We will discuss the relationship between cash holdings and refinancing risk

2.1 Literature on Cash Holdings

Explanations of corporate cash holdings have previously focused mostly on financing frictions, agency conflicts and capital structure. However, modern studies also offer new explanations, for example based on taxes and the spread between cost and return of cash holdings.

Previous studies like Modigliani and Miller (1958), and Vogel and Maddala (1967) show that holding cash is more useful for the firms which are financially constrained rather than for financially unconstrained firms. Modigliani and Miller (1958) argue that firms having difficulties in obtaining external funds must rely on internal funds: cash holdings and cash flow. Cash holdings are necessary for the firms having insufficient funds to finance expenditures. Vogel and Maddala (1967) examine that balances of cash have declined by the passage of time, and then large firms tend to have lower ratios regarding cash. The result guides that economies of scale can be achieved in transaction motive for cash. John (1993) shows that firms want to hold high level of cash when there is high financial torment cost. He concludes that firms having low tangible asset ratios and high market to book ratios lead to more cash holdings.

Williamson et al. (1998) explore the applications and determinants of cash holding of US firms. By tests of time series and cross section, they found supportive proof of a tradeoff model of

holding cash. Opler et al. (1999) measure corporate cash holdings by employing the cash ratio and short-term investments to total net assets. In this regard several studies have been found that focus on accumulating more cash. According to Opler et al. (1999), firms facing higher risk enjoy strong growth opportunities and small size firms enjoy abundance of cash as compare to large size firms. They also find the factors and implications of cash holding including publicly traded USA firms form the period of 1971-1994. Firms, which have the maximum approach towards capital market, are considered as high leverage firms (Opler et al. (1999)). Cash holdings are positively affected by the investment opportunity set and cash flow and negatively affected by asset's liquidity, size and leverage (Ferreria and Vielelela (2003)). The negative relationship between cash holding and size provides support to the trade-off argument. Weisbach et al. (2004) prove that firms with great constraints in getting external finance save more cash than frictionless firms.

Recent studies also support the view of holding more cash by firms in which its value is higher like (Wang et al. (2006) and Williamson (2006)). Ozkan (2007) find the leverage connection with corporate cash holdings in established markets of US, UK, France and Germany from a span of 1996 to 2000. Above discussed markets are known by various legal and recognized settings. The findings, explain a significant positive relationship at higher levels of leverage and vice versa. At the low leverage levels, the firms have capability to borrow and maintain low cash levels according to their desire.

Han and Qui (2007) examine the cash holdings needs through categorizing firms into constrained firms and unconstrained firms. His findings are relevant with the view that financially constrained firms hold large cash portion in relation to increase in cash flow instability.

Acharya et al. (2007) show the positive impact of cash in investment is strong for friction firms with high hedging needs. According to Smith et al. (2007), firms regularly hold large amount of cash where there is poor corporate governance. Maxwell et al. (2008) examine significant negative relationship amongst corporate governance and cash holdings in the USA market. Their results show that firms having poor corporate governance may lead to hold greater amounts of cash on their balance sheet, and they regularly spend cash on acquisition and capital expenditures. In the study of cash holdings by Harford et al. (2008) focused on determinants and their relation with corporate governance. Baum et al. (2008) examine the relationship between an optimum level of firm's liquid assets and uncertainty. According to Stulz et al. (2009), an average firm can fulfill all debt relating obligations with the help of its cash holdings. They prove that firms' cash flows become riskier because of increase in cash ratios. Stulz et al. (2009) also suggest that precautionary motive for holding cash has a crucial role in explaining the increase in cash ratios. From their study, they find no homogeneous proof that agency conflicts cause to the increase. Existence of weak corporate governance leads the corporations to hold less cash and cash holdings by diversified corporations do not effected by strong corporative governance (Tong (2009)).

Denis and Sibilkov (2010) indicate the findings from their study that high cash holdings are resulted from high investment level for financially constrained firms and the relation between investment and value of cash holdings is more for constrained firms rather than for unconstrained firms. Overall their findings are in favor of the view that more cash holdings of constrained firms cause value-increasing response to costly external financing. Denis and Sibilkov (2010) also show the reason why constrained firms hold less cash even they know that there will be high

cash value for them. Findings show that internal funds and costly external funds restrain them to hold more cash that can be used for meeting expenditures and also for mitigating risk.

More specifically, several studies like Denis (2010) shows firms having less cash have lower Altman's Z-score, cash flow margins, interest coverage ratios than the firms having more cash holdings. According to Carrascal (2010) the financing decision of small firms, have limited approach to financial markets. Therefore, firms, which are financially constrained more, rely on cash flows. According to Gryglewicz (2011) firms hold high amount of cash in high instability situation and low uncertainty level in case of future profitability. He characterizes above impacts on cash holdings in case of short and long-term cash flows and profitability of firms. Tsai (2012) examines the link between cash holdings and corporate governance for firms listed on the over the counter market. He proposes that decisions of cash holdings of affiliated firms differ from those of nonaffiliated firms. His study reveals that affiliated firms with strong governance hold more cash and have more growth opportunities than nonaffiliated firms.

2.2 Literature on Debt Maturity

Myers (1977) examines that close relationship with the lender can mitigate underinvestment problems based on agency costs of underinvestment firms maintaining, that container result from risky debt financing and lead firms to forego valuable projects. Therefore, especially firms with superior future growth opportunities are more likely to have these closer relations with concentrated private debt holders such as banks. This kind of relationship will also help overcome problems related with asset substitution. Due to the concept of limited liability and its indirect incentives, shareholders have an incentive to substitute low risky assets with riskier ones, thereby increasing the instability of assets and in turn the value of equity (Jensen and Meckling (1976)).

Diamond (1991) examines that the optimum maturity structure trades off a preferences for short maturity due to presuming, then credit rating improve, in contradiction of liquidity risk, the risk that borrowed will lose the non-assignable rents due to unnecessary liquidation motivations of lenders is liquidity risk. Borrowers preferred short-term debt due to high credit ratings and with low credit ratings they prefer long-term debt. Short-term debt matures before the cash flows come from a firm's financing and must be refinanced at terms that vary on its upcoming credit ratings. When, long-term debt, in contrast, has maturity matching the timing of the cash flows. Smith et al. (1995) find that firms with further growth options in their investments opportunity sets issue extra short-term debt. Structured firms issue more long-term debt. They provide evidence of a strong relationship amongst firm size and debt maturity. Large firms issue a significant higher percentage of long-term debt. According to Krishnaswami et al. (1999), two problems disturb a firm's debt position structure, which are, agency costs of underinvestment and asset substitution.

Short debt maturity generates liquidity risk because sometimes the borrower is incapable to refinance and the lender liquidates. Financing through huge amounts of shorter maturity debt than the cash flows from investments give significant control to lenders.

Yogo et al. (2009) examine that the firm although in better financial health, can readjust its maturity structure more rapidly in response to change in its asset value. Ideally the firm would protect the long term financing just earlier to when it financed, health may deteriorate. Through this strategy, the firm can protect financing for the longest constant period possible without rollover failure avoiding ineffective restructuring cost, put differently, the objective of the firm with long-term assets is to increase the effective maturity of its liabilities through some refinancing cycles, relatively to maximize the maturity of the current bonds outstanding.

According to Custodio et al. (2011), firms are using more short-term debt irrespective of their characteristics. This surprising factor of debt maturity is more important than changing firm characteristics in explaining the decline in maturity of debt. The choice between short-term and long-term debt has important special effects on actual corporate behavior, such as investment spending in the existence of credit and liquidity shocks. Custodio et al. (2011) find that firms with advanced information asymmetry are the ones responsible for the lessening in debt maturity.

2.3 Literature on Debt Maturity and Refinancing Risk

Literature on the relationship between debt maturity and refinancing risk shows that refinancing risk heavily depend on debt maturity. Firm with short maturity debt shows not good performance. Flanner (1986) examines the asymmetric information model; he considers the situation that creditors avoid rollover maturing short-term debts for high-risk firms. Naturally, high-risk firms chose long-term debt to prevent from refinancing debts in difficult times. Yet, for extremely high-risk firms, they are excluded from the long-term debt market because of excessive asset substitution risk. He also predicts a non-monotonic link between debt maturity and credit risk. Diamond (1991) is the first person that shows the debt role in refinancing risk scenario. It is shown in studies of Diamond et al. (1991,1993) that it confronts with refinancing risk when firm finances a high portion of asset finance by short term debt. Sufi (2007) examines the supply side effect. He finds that the growth of syndicated loan market causes the shortening of debt maturity. The arrangement of syndicated debt shares and the risk across multiple creditors, leads to a shorter maturity. Almeida et al. (2009) support the view that in credit crises when there is excessive short-term debt the refinancing risk increase and investment opportunities distort and this drag firm to early liquidation.

Diamond et al. (2011) show that if risky short-term debt is matured then it can impose a stronger debt overhang effect, which is more than long term. They derive the structure of maturity, which is based on trade-off between long term overhang in good times and short-term overhang in bad times. Bo Li (2012) points out the importance of structure of debt maturity for financing and policies of investment. According to Bo Li (2012), different set of issues are discussed like risk shifting behavior which arise from refinancing risk where firms had large part of their long term debt maturing is empirically examined. In case of high refinancing risk, he shows that structure of long-term debt maturity can increase the agency conflicts between shareholders and creditors because of rollover losses. In a dynamic global-games setting, He and Xiong (2012a) model a firm with time varying fundamental, which finance its long term assets by rolling over short term debts with many creditors. The maturity dates of the firm's debt always spread across the time. The creditors confront a risk that 1) the firms fail to commit a contract of debt; 2) the future creditors refuse to overcome the maturing debts. In narrow sense, they drive a different safety threshold after considering dynamic coordination among creditors. They show that as long as when the threshold is under the current fundamental of the firm, each creditor chooses to rollover the maturing debts. Moreover, He and Xiong (2012b) emphasis on the impact of short debt maturity increasing rollover risk in credit crunch. They find that the problem of interest between credit holders and equity holders depends in crisis periods, forcing firms into early liquidations. Firms chose to default early when the losses firms suffer from rolling over maturing debts are absorbed by equity holders and not by debt holders.

Xiong et al. (2012) show that when debt market liquidity worsens, firms face refinancing losses from issuing new bonds replace maturity bonds. The rise in refinancing losses can be a reason to default firm at a higher fundamental inception. In real world, refinancing risk is

considered a cause of downgrade firms and can be upgraded after completion of refinancing activities. Brunnermeier and Oehmke (2013) argue that when a borrower is unable to commit an aggregate maturity structure, he has an opportunity to shorten the maturity of an individual creditor's loan for it dilutes the value of the remaining creditors. Therefore, in equilibrium, all the creditors shorten maturity dates of their contracts.

Due to high rollover frequency, the firm is likely to find itself trying to refinance at an inappropriate time of high interest rates. In bad situation, the firm has to sell its assets at cruel prices due to inability to paying off the maturity debt. In the worst-case scenario, creditors start to underestimate the fundamental value of the firm and prefer to liquidate it early. Extremely short debt maturity caused by the "maturity rate race" is always costly and less efficient (Brunnerneies and Oehmke (2013)).

Custodio et al. (2013) address the question about US firms that why the firms are using more short-term debts and attribute the downward trend to the booming of small size firms when there is high asymmetry information. Ohemke et al. (2013) support these findings that extremely short-term maturity of debt is costly and harmful for firm's image. Sujio et al. (2014) investigates the disparities in the effects of traditional factors of debt maturity distributions. All this is explained in context of refinancing risk. When firm rely on short-term debt it suffers high rollover cost when there is ride in interest rate or business downturns.

Harford et al. (2014) establish that holding more cash can mitigate refinancing risk persuaded by debt rollover. When firm is unable to pay off its debt then it starts selling its assets even at low prices that cause the liquidation of it. Harford et al. (2014) also show that cash holding is a way of lowering refinancing risk and examines that when there is maturity extension

firm can also hedge against refinancing risk. Firms that is more subject to refinancing risk like speculative grade firms have strong impetus to tackle their maturity in advance. While less exposed firms to refinancing risk like investment grade firms simply refinance when there are outstanding bonds. Diamond and He (2014) criticize that it is fatal mistake in previous studies to treat short-term debt as riskless. Xu et al. (2014) study supplements several studies on refinancing risk. He studies activities of refinancing in bond market and its indication for capital and debt maturity structure. Xu et al. (2014) provide evidence that particularly for speculative grade firms, early refinance to increase debt maturity. It also concludes that longer maturity is used as an insurance against refinancing risk in future.

To sum up, in existing literature it has been observed that the intrinsic risk embedded in extreme debt maturity cases, especially on the short end of the spectrum. Using short-term debt lessons incentive provisions. However, reliance on short-term debt mitigates liquidity risk. Long-term debt increases refinancing risk, but more reliance on long-term debt can result in severe debt overhang.

2.4 Cash Holdings and Refinancing Risk

The volume of cash holdings relative to a firm's total assets is used as a proxy of refinancing risk. According to Harford et al. (2014) and the rationale is that a firm can hedge the risk that it will not be able to refinance its debt upon maturity by holding cash. Cash holdings should work as a hedge of refinancing risk because a firm can use cash upon the maturity of debt to either retire the issue or signal financial strength. A difficulty in using cash holdings as a proxy for refinancing risk is that cash can be said to correlate with most metrics in a firm's balance sheet, income statement and cash flow statement. Opler et al. (1999) studied the factors of cash holdings and find significant positive correlations with the market-to-book ratio, cash

flow, capital expenditures, research and development expenditure and an industry risk statistic. They also find significant negative relationships with firm size, net working capital, total leverage, payment of dividends and operations in regulated industries.

In this chapter, we first briefly reviewed the findings of previous research on corporate cash holdings. We discussed the research findings regarding debt maturity and refinancing risk respectively. In this chapter we also discussed the relationship between cash holdings and refinancing risk.

Chapter 3

Theoretical Framework

The following chapter introduces the different theories. In this chapter we will discuss the different theories, which are related to our study such as capital structure theories. In section 3.1 we will discuss capital structure theories. In section 3.2 Modigliani-Miller theorem will be discussed. After introducing the theory of Modigliani and Miller (1958), the two prominent financial theories will be presented, i.e. the trade-off theory and pecking order theory.

3.1 Capital structure theories

In corporate finance, capital structure theories refer to a direct approach to financing of business activities after combining equities and debts. In these theories the relationship among debt financing, equity financing and firm's market value is explored. In our study we focused on debt maturity, cash holding and refinancing risk. There are several theories of capital structure. If we have look on traditional approach we will come to know that this approach guides us that the debt financing usage has a clear and definite limit. Any debt capital, which is not in this limit, will cause devaluation of firm and leverage, which is not necessary.

Another approach suggests famous capital structure theory, named as Modigliani and miller approach. It proposes that expected future earnings will be increased by financial leverage. As when we consider our study it also investigates that relationship between debt level and cash holding. Leverage is also important variable is in our study. When our earnings increase by leverage then it will give rise to cash holding by firms and causes the decrease in refinancing risk. Pecking- order and trade-off theories will also be discussed in order to clear the picture of debt level, which is the part of capital structure.

3.2 Modigliani-Miller Theorem

Modigliani-Miller theory was presented in 1958 by Franco Modigliani and Merton Miller. This theorem builds the modern approach regarding capital structure. The theorem proposed that earning power and risk of a firm determines the firm value, and the value of firm can independently decide whether to finance its investment or to spend it in dividend distribution. One of the key assumptions of the M & M approach is that there is no debt effect on earnings of a firm before interest and taxes. In Modigliani and Miller's capital structure irrelevance proposition, it is assumed that no tax benefits will be granted on a firm's borrowing. There is another approach that is Modigliani and Miller's trade-off leverage theory, in which it is assumed that benefits will be given to leverage within a capital structure.

Modigliani and Miller took the initiative to present such a theory for capital structure, which could be generally accepted. They start with supposing that the firm has a specific set of expected cash flows. When the firm selects a certain ratio of debt and equity to finance its assets, all that it does is to divide up the cash flows amongst investors. Investors and firms are supposed to have equivalent approaches to financial markets, which allows for homemade leverage. The investor can generate any leverage that was wanted but not accessible, or the investor can get rid of any leverage that the firm took on but was not desired. Therefore, the leverage of the firm has no impact on the market value of the firm.

Fundamentally, there are two different types of capital structure irrelevance propositions. The classic arbitrage-based irrelevance propositions specify settings in which arbitrage by an investor keeps the value of the firm independent of its leverage. In addition to the original Modigliani and Miller paper, important contributions incorporate papers (Hirshleifer (1966) and Stiglitz (1969)). A second kind of capital structure irrelevance is related with multiple

equilibriums. In models of this kind, equilibrium conditions pin down the collective amount of debt and equity in the market. But the model does not identify how these collective quantities get divided up amongst the firms. According to Miller (1977) consideration of both personal and corporate tax determines an economy-wide leverage ratio, but there are multiple equilibriums in which debt is issued by different firms. A related kind of firm-level capital structure irrelevance is established (Auerbach and King (1983)).

As an empirical proposition, the Modigliani-Miller irrelevance proposition is not easy to test. With debt and firm value both probably endogenous and determined by other factors such as profits, collateral, growth opportunities, etc., we cannot develop a structural test of the theory by regressing value on debt. Though, the fact that there are rather reliable empirical relations among a number of factors and corporate leverage, while not disproving the theory, does make it seem an unlikely classification of how real businesses are financed.

A popular defense has been to claim as follows. “While the Modigliani-Miller theorem does not provide a realistic description of how firms finance their operations, it provides a means of finding reasons why financing may matter.” This explanation delivers a reasonable interpretation of much of the theory of corporate finance up to maybe the 1980s. Therefore, it manipulated the early development of both the trade-off theory and the pecking order theory.

3.3 The Trade-Off Theory

The debate over the Modigliani and Miller theorem cause to grow genuine version of trade-off theory. Many authors also explain several theories related to tradeoff theory. These theories explain the behavior of managers regarding leverage costs and benefits analysis. Usually, it is assumed that there should be an internal solution to stable the marginal costs and benefits. The originality of tradeoff theory is based on the Modigilani-Miller theorem.

Modigliani and Miller (1963) generate a benefit of debt and serve an earning shield from taxes at the time of corporate income tax addition. As we know that firms' objective function is linear and it also shows the absence of balancing cost of debt, in this case it indicates the 100 percent debt financing.

In order to avoid this extreme prediction, there is need to balance cost of debt. Kraus and Litzenberger (1973) specify a classic statement of the theory that optimal leverage reveals a trade-off between the tax benefits of debt and the deadweight costs of bankruptcy. According to Myers (1984) a firm that follows the trade-off theory sets a target regarding debt-to-value ratio and then regularly moves towards the target. The target is determined by balancing debt tax shields against costs of bankruptcy. Initially, the goal is not being directly observed. This may be evaluated from evidence but it varies by adding a structure. Several research papers added that format in different means.

According to the hypothesis of trade-off argument that optimal levels of cash holdings are determined by trade-off among the marginal cost and marginal benefits analysis of cash holdings. Large cash balances lead to the several benefits of firms. At the first place, firms with large cash balance provide safe surface in case of unexpected losses or external fundraising constraints. At the second place, if firms overcome the problem of financial limitations, cash holdings would help firms to make optimal investment policies in order to continue with positive net present value (NPV). Finally, cash holdings provide opportunities to bring costs of raising external funds to its minimum level. Marginal cost of holding cash reserves is the opportunity cost because of its low return on liquid assets (Tong (2010)).

3.3.1 Agency Problems

There are more incentives to increase firm's value as compare to the incentives to increase equity value (La Rocca, Cariola, and La Rocca (2008)). Therefore, an optimal cash holdings level gradually tends to conflicts among managers, creditors, and stockholders. Specifically, there are two types of agency problems, i.e. the principal agent problem that takes place among owners and managers and the other one is among managers and creditors. In investment strategies, these problems can be associated with overinvestment and underinvestment problems.

3.3.2 Leverage

A technique which involves the use of borrowed funds in order to purchase an asset, with the expectation that after sometime the asset price will be appreciated as compare to borrowing cost. There is not complete understanding has been found about the relationship between the cash holdings and leverage in theories. Generally it is accepted that high leverage increases the chances of financial turmoil due to the pressure on firms' funds management. It suggests that firms having high leverage ratios would have high levels of liquid assets in order to decrease the chances of experiencing financial problems (Guney, Ozkan and Ozkan (2007)). Further, financially constrained firms also have incentives to maintain large cash balances as they face constraints to raise external capital (Guney et al. (2007), Fazzari, Hubbard and Petersen (1988), and Hovakimian et al. (2003)). Consequent to these arguments, we have considered a positive relation between leverage ratio and cash holding level in our hypothesis.

3.3.3 Firm Size

The large firms take more benefits as compare to small firms in times of controlling cash and rising external financing. Large firms get more economies of scale in case of cash management

Miller and Or (1966). This enables the large firms to hold high level of cash than the small size firms. Large firms are also better than small firms because of their cost experience in getting external financing. It is claimed that there is no correlation between size of the loan and processing fee of the loan, signifying the fixed nature of the processing fees (Peterson and Rajan (2003)). This makes the external funds expensive for small size firms that force them to hold more cash. Titman and Wessels (1988) and Zingales et al. (1995) study another advantage of large firms that these firms have lower probability of financial crises. Above all arguments describe the inverse relation between firm size and cash holdings.

3.4 Pecking Order Theory

Pecking order theory is one of the theories of capital structure, which is believed to be the most dominant theories in the world of corporate finance. Myers introduced pecking order theory in 1984. This theory shows the variety of sources of funds. In this theory it is discussed that firm will prefer external finance resources like firstly, debt will be taken and then firms will go for equity. It is believed that firms prefer financing hierarchy because of its motive to lessen the asymmetric information cost and other types of cost arises from financing. This theory supports the debt usage only in the time of excess investments over retained earnings. Though, when the retained earnings are more than investment then the part of outstanding debt is paid to lower the debt level. Accordingly, this shows that cash holdings will rise in the opposite direction to the level of debt and investments. At the time of retained earnings are not enough to finance investments and excess fund requirements need to be financed through debt the cash holdings will fall. In contrast, cash holdings will rise when retained earnings are not sufficient to finance investments. This type of inter-relationships among cash holdings leverage and investments give suggestions about the negative link between cash holdings and leverage.

As we consider size as independent variable. It also relates with pecking order theory. According to Daskalakis and Psillaki (2008) pecking order theory can be applied with no difficulty in small size firms due to reason that small firms take debt for investment purpose instead of getting optimal level of capital structure. Firms having large size probably are expected to be more successful because of holding more cash, after controlling for investment (Opler et al. (1999)). The same direct relation is also recommended for the level of cash flows after controlling for other variables and it is expected that firms will have more cash with high cash flow.

Myers (1984) claims that negative selections imply that retained earnings are superior to debt and debt is considered better than equity. This ranking was interested with reference to the Myers and Majluf (1984) opposing selection model. The ordering, however, stems from a diversity of sources including agency conflicts and taxes. Further, most firms prefer to hold some internal funds like cash and short-term investments, even when rising outside funds. This is observable that it is infrequently considered in tests of the pecking order. It is entirely supposed that these funds are held for reasons that are outside the theory, such as for transactions. Therefore, almost all discussions support some version of an “other things equal” interpretation of the relative use of internal and external funds.

3.4.1 Net Working Capital (NWC)

Cash conversion cycle suggests direct link with more cash holdings. Long cash conversion period indicates the sign of having more cash by firms. Cash conversion cycle length relates with the working capital holdings. So, long conversion period shows a huge amount of stock and account receivables. It is also claimed that firms having low level of net working capital hold less amount of cash. On the other hand, there is indirect link between net working

capital and cash. When firms have more net working capital it holds less cash. Current assets can be converted into cash whenever needed. Therefore, we can posit a hypothesis that there will be an inverse relationship between the levels of net working capital and cash holdings.

In this chapter we discussed the different theories, which are related to our study. We discussed the capital structure theories and Modigliani-Miller theorem (1958). After introducing the theory of Modigliani and Miller (1958), the two prominent financial theories presented, i.e. the trade-off theory and pecking order theory.

Chapter 4

Data and Methodology

This chapter describes the data and its sources. In section 4.1 we will discuss about data in detail and the selection procedure of companies. In section 4.2 we will briefly explain our variables and also explain that why we use these variables and which previous studies use these variables. In section 4.3 we will describe the detailed methodology for debt maturity and cash holdings. In section 4.4 we will explain the empirical model.

4.1 Data

Our study uses financial panel data of manufacturing firms of Pakistan, which is listed in the Pakistan stock exchange of the span consisting from 2010 to 2014. Firstly, we take all the listed firms of Pakistan stock exchange that are active. By following a standard practice of preceding empirical studies on this subject, we didn't include financial companies (banks, asset management companies, insurance companies, mutual fund) and also exclude those companies, which do not provide the information about long-term and short-term loans. These leave us with a total 200 non-financial firms. Data sample was chosen after using various criteria. Firstly, those firms are not included in the sample because of missing data of the whole sample period. Secondly, firms that were excluded from the lists of Pakistan stock exchange during the sample period also not included in the final sample. The final sample consisted of 101 firms from different sectors of Pakistan Stock Exchange.

The data is gathered from financial statements of companies, which are published in the annual reports of the companies. Our financial variables include cash, short-term loan, and long-term

loan, book value of total assets, total debt, net working capital, sales, operating income and dividend.

4.2 Variables

4.2.1 Debt Maturity {Long-term debt (“LTD/TD”) and Short-term debt (“STD/TD”)}

Debt maturity is our dependent variable, and it is used to find its impact on cash holdings. Basically we are using two different proxies to measure debt maturity; first one is long-term debt within the next years to total debt while second one is short-term debt to total debt.

We include the fraction long term debt to total debt due to its significant effect on cash holdings considered by Harford et al. (2014) all else equal; an increasing part of this long-term debt in the very near future increases the cash holdings of a firm. As exposed in their study, there is a decrease in the average maturity of firms’ long-term debt over the study’s 1980 to 2008 sample period which the authors trace back to the growth in the syndicated bank loan market originating typically short term debt maturity, a result in line with (Sufi (2007)). So, the debt maturity variable is included in order to isolate the effect that the debt maturity is predicted to have on cash holdings.

Orman et.al (2015) used the ratio of long-term debt to total debt in their study, where long-term debt is any debt maturing in more than one year. To study long-term debt as a fraction of total debt; we much carefully focus on the decision of debt maturity. Our dependent variable, denoted DebtMat (LTD/TD and STD/TD), is a measure of the maturity structure of debt calculated at the firm level. Following convention, we define DebtMat (LTD/TD and STD/TD) as the share of long-term debt to total debt, where long-term debt is any debt maturing in more than one year in our first model. The effect of debt maturity on cash holdings is not clear. Firms that depend on

short-term debt must renegotiate regularly their credit terms, and are focus to the risk of experiencing financial distress if constraints are met to the renewal of credit lines. Thus, controlling for other variables, one would expect debt maturity have negative impact on cash holdings. Opler et al. (1999) measured Debt maturity as total debt less debt repayable in less than one year divided by total debt. In our second model we use short-term debt to total debt as a proxy for debt maturity in equation 3. We expect that there is a positive relationship between short-term debt and cash holdings.

4.2.2 Cash

Cash is our dependent variable in second stage regression. We define this variable as sum of cash and short-term investment divided by total assets (Opler et al. (1999) and Harford et al. (2014)). The motive that short-term investments are involved is that for most intent and purposes they are equal to cash. This is specifically so for the significant protective motive. A possible disadvantage of this aggregated variable is that it adds to the problem of measuring the opportunity cost of cash holdings. Though, the impediments to correctly assessing said costs are not determined by extrication the variables, which removes the attractiveness of doing so. The reason for scaling cash holdings by total assets is that we want to remove the natural effect of firm size, i.e. that firms with more activities hold more cash.

Opler et al. (1999) use cash and marketable securities divided by net assets, i.e. total assets less cash and marketable securities. The original motive is that a firm's ability to produce future profit streams is dependent to its net assets. Ozkan (2004) on the other hand, only use the ratio of total cash and equivalent items to total assets. In order to identify the possible differences in our research, both methods are used individually and comparison of empirical results is made. Above methodology can be matched to the once used by Garcia-Tereul et al. (2008).

4.2.3 Natural logarithm of Book Assets (size)

We include the natural logarithm of total assets (“Size”) as measure of firm size approaching information asymmetry as show by Fama et al. (1985) and Diamond et al. (1991) and as proxy for economies of scale in cash holdings as examined by (Opler et al. (1999)). Also, according to Johnson et al. (1997) firm size also associate with the choice of debt financing concerning monitoring costs. The transaction-cost models by Baumol (1952) and Miller & Orr (1966) recommend that cash holdings comparative to firm size should be decreasing with firm size, i.e. there are economies of scale in handling cash. Larger firms may also have easier approach to external finance, decreasing the need for precautionary cash holdings. Ozkan (2004) and Opler et al. (1999) measured total assets in terms of real. Nominal values are used in his study, which is consistent with the studies of Garcia- Tereul et al. (2008) and Ben and Yuanjian (2007). In previously examined, large firms manage to hold comparatively low cash level due to economies of scale in management of cash, less information asymmetries, and fewer agency problems. So, we expect that firm size have negative impact. Size of firm is potentially linked with maturity of debt due to some reasons, which is studied by Smith et.al (1995).

4.2.4 Market-to-book equity and Capital Expenditure

To understanding for firm specific future growth options, we use two control variables: market to book equity (“MtB”) and Capital expenditures divided by book assets (“CapExp”). These variables have been used also by Opler et al. (1999) and Harford et al. (2014) in their individual cash holdings models, Further, according to Jung et al. (1996) approximating growth and valuable investment opportunities, especially market-to-book equity substitute for information asymmetry between firms and investors about a firms forecasts. Therefore, to avoid underinvestment problems caused by being unable to increase external funds or by increasing

them only at high costs. These firms are supposed to be holding more cash and to depend much on shorter maturity debt (Myers et al. (1977)). Firms with high expenditures can be assumed to have higher costs of financial distress. Bates et al. (2009) examine that these firms a reason to gather cash and to borrow more from banks. According to Bates et al. (2009) as capital expenditures proxy for a firm investment level firm that invest more in form of capital expenditures are forecast to have lesser cash reserves. The protective purpose for holding cash should be growing with the amount of growth opportunities a firm has because they increase the possible cost of underinvestment and financial distress. Since only the market value includes growth opportunities, we must see a higher market-to-book ratio for firms with extra growth opportunities. Adding the book value of liabilities to the market value of common equity and dividing by total assets construct the measure. The balance sheet of firms does not incorporate intangible assets like options for growth. So, more options for growth raise the firm's market value in relation to its book value (Smith and Watts (1992)).

4.2.5 Dummy Control Variable

To differentiate whether a firm pays dividends, we introduce a dummy control variable ("Div") set as one in years when a firm pays dividends and otherwise as zero. Doing so allows us to study the effect of dividend payments on cash holdings according to Opler et al. (1999) and Harford et al. (2014) dividend payments are probable to have an inverse effect on cash holdings as firms paying dividends have probably better approach to external funding's and then need lesser cash holding. Dividends can be cut if need be, which makes them a possible source of internal finance. Firms that pay dividends are also more likely to be recognized and have easier approach to external finance. Both reasons reduce the need for cash holdings under the protective purpose. A firm that now pays dividends can increase funds at low cost by decreasing its

dividend payments, in compare to a firm that does not pay dividends, which has to use the capital markets to increase funds. Therefore, it is predictable that firms that pay dividends hold less cash than firms that do not pay dividends. Agency problems can be related to cash holdings (Jensen (1986)). He argued that this relation is caused by overinvestment problem. There is an approach to mitigate above problem is to pay out dividends. Therefore, those firms who face overinvestment problems have dividends, which are inversely correlated to cash holdings. Ozkan (2004) examined that dividends can be considered as negative equity and to the extent a firm can increase funds by cutting dividends down. So, there should be an inverse relationship between cash and dividends. Opler et al. (1999) incorporate a dummy variable as dividend payments while Ozkan (2004) defines the similar variable as dividend payments to total assets.

4.2.6 Operating Profitability

Operating profitability (“OpProf”) computes the ratio of earnings before interest and tax to sales controls for the idea that more profitable firms are less financial constrained and therefore, need less cash for protective reasons according to (Harford et al. (2014)). Operating profitability is also significant from an agency cost perception as the cash creation that monitors operating profitability increases such costs according to (Jensen et al. (1986)). According to Harford et al. (2014) controlling of operating income tackles the issue that more profitable firms are less expected to be financially constrained and need large cash balances for defensive goals. In addition, it also controls the possibility of more profitable firms suffer from large agency costs associated with managerial discretion.

4.2.7 Leverage

The control variable leverage (“Leverage”) as measured by total debt divided by total assets explains the probability that higher level of leverage reason higher interest payments that limit firms’ ability to accrue cash holdings by Jensen et al. (1986). It is usually observed that bankruptcy is caused by leverage because firms have to face the pressure for rigid payment plans. In order to reduce the possibility of confronting financial problems, firms with high leverage are predictable to hold more cash. At the other side, leverage ratio acts as a proxy for the capability of the firms to issue more debt, it would be predictable that firms with high leverage (higher capability to raise debt) hold low cash. So, the expected link between cash holdings and leverage is unclear. In pecking order theory, debt usually grows at the time of exceeding investment over retained earnings and falls when retained earnings exceed investment. This relationship among cash holdings, debt and investments suggests the inverse relation of leverage and cash holdings.

Like the previous findings, empirical studies primarily analyzed decisions regarding debt maturity in segregation from decisions of capital structure. For example, Barclay and Smith (1995) did not consider the leverage in their regressions of maturity. In contrast, Stohs and Mauer (1996) control leverage without studying its nature as an endogenous variable. Much following work including Barclay, Marx, and Smith (2003), and Johnson (2003) has showed simultaneous decisions about capital structure and debt maturity. Above studies usually have found that firms that prefer high leverage also prefer long term debt maturity. Firms having high leverage may prefer long term debt maturity for the purpose to avoid liquidity risk (Diamond (1991)). This also helps in delaying bankruptcy risk (Leland and Toft (1996)). Thus, we consider decisions of capital structure and debt maturity jointly.

4.2.8 Net Working Capital

We define NWC as net working capital divided by total assets accounts for the alternate effect networking capital may have on cash holdings according to (Opler et al. (1999), and Harford et al. (2014)). In applied terms, this means non-cash components of working capital can be transformed into cash relatively fast. As examined under the protective purpose, NWC can be a source of internal funds and is as such a substitute for cash holdings. Therefore, we suppose an inverse relationship between NWC and cash holdings. The interval of the cash conversion cycle may show a direct relationship with more cash holdings and with the increase in conversion period the firm starts to keep more cash. Ferreira and Vilela (2004), and Garcia-Teruel and Martinez-Solano (2008) use the net working capital to total assets as a proxy for liquid asset that can be simply and comparatively cost-effective when conveyed into cash holdings.

4.3 Methodology

Our model is based on a simultaneous equations framework similar to the one used by Harford et al. (2014). However, instead of studying the relationship between debt maturity structures and refinancing risk approximated by cash holdings we analyze the use of debt maturity and refinancing risk approximated by cash holdings. We employ a simultaneous equations framework treating cash holdings and the use of debt maturity as endogenous to account for their joint determination. In our two-stage least squares (2SLS) model, we first estimate an OLS regression for debt maturity and then estimate cash holdings after including the determined values from the first-stage regression as input variable in the second stage regression.

4.3.1 Empirical Framework

Cash holdings and the debt maturity are likely determined together. Here we use a simultaneous equations framework to explore the effect of debt maturity on cash holdings in which cash holdings and debt maturity variables are treated as endogenous. We use two stages least square (2SLS) technique. It is a widely used statistical technique in which structural equations analysis. 2SLS is the extension of OLS. This technique is used in the time of correlation among independent variables and errors of dependent variables.

This method also allows us to get consistent structural coefficient estimates at the time of exactly identified and over identified. We use two-stage least squares (2SLS) equations system through which the coefficients of standard errors are cooperated for the collection of observations at the level of firms. The 2SLS technique explains the correlation between the error terms of the debt maturity and cash holdings model that are beginning with unnoticed effects on cash holdings and debt maturity.

4.3.2 The Empirical Model

Basically, two models are used to analyze the impact of debt maturity and cash holdings. As we cannot directly capture the effect of refinancing risk so, we are going to use levels of debt maturity in other models. We follow Opler et al. (1999) and Harford et al. (2014) for model of cash holdings. We measure cash holdings as the natural log-arithmetic of cash deflated by book assets.

In our first stage regression we estimate the proportion of debt maturity (long-term debt/total debt) to account for any endogeneity in cash holdings and debt maturity. To do so, we propose the following model of debt maturity for the firm i in year t :

$$LTDTD_{it} = \alpha + \beta_1 MtB_{it} + \beta_2 Size_{it} + \beta_3 NWC_{it} + \beta_4 CapEx_{it} + \beta_5 Leverage_{it} + \beta_6 OpProf_{it} + \beta_7 Div_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

Based on the beta estimation of the first stage regression we predict a long-term debt/total debt (LTDTDP) for firm i in year t (LTDTDPit). In order to investigate the impact of debt maturity on cash holdings in the second stage we estimate the following model by including the predict values from the first stage regression for firm i in year t:

$$CASH_{it} = \alpha + \beta_1 LTDTDP_{it} + \beta_2 MtB_{it} + \beta_3 Size_{it} + \beta_4 NWC_{it} + \beta_5 CapEx_{it} + \beta_6 Leverage_{it} + \beta_7 OpProf_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

In this model we used short-term debt/total debt (STDTDit) as debt maturity in our first stage regression.

$$STDTD_{it} = \alpha + \beta_1 MtB_{it} + \beta_2 Size_{it} + \beta_3 NWC_{it} + \beta_4 CapEx_{it} + \beta_5 Leverage_{it} + \beta_6 OpProf_{it} + \beta_7 Div_{it} + \varepsilon_{it} \dots \dots \dots (3)$$

In our cash model we used predict values of short-term debt/total debt (STDTDPit) to estimate the effect of debt maturity on cash holdings.

$$CASH_{it} = \alpha + \beta_1 STDTDP_{it} + \beta_2 MtB_{it} + \beta_3 Size_{it} + \beta_4 NWC_{it} + \beta_5 CapEx_{it} + \beta_6 Leverage_{it} + \beta_7 OpProf_{it} + \varepsilon_{it} \dots \dots \dots (4)$$

α Is the intercept and β_1 – β_7 are the coefficient of independent variables.

LTDTD = Long-term debt/total debt

STDTD = Short-term debt/total debt

CASH = Cash at the end of year/book assets

NWC = Net working capital/book assets

Size = Natural logarithm real book value of assets

MtB = Market-to-book assets

CapEx = Capital expenditures/book assets

Div = Dividend paying dummy

OpProf = Operating income/book assets

Leverage = Total debt/book assets

LTDTDP = The predict value of long-term debt/total debt

STDTDP = The predict value of short-term debt/ total debt

In this chapter described the data and its sources. We discussed about data in detailed and the selection procedure of companies. We briefly explained our variables and also explained that why we use these variables and which previous studies use these variables. We described the detailed methodology for debt maturity and cash holdings. We explained the empirical model in detailed.

Chapter 5

Multivariate Results and Analysis

In this chapter, we summarize the outcomes of first stage regression predicting the proportion of debt maturity by using the proxy of debt maturity. In section 5.2 we estimate the impacts of the debt maturity level on cash holdings and compare our results with previous research findings. In section 5.3 we analyze the debt maturity effects on cash holdings and its implications.

5.1 Summary Statistic

Our sample consists of panel data covering 101 firms listed at Pakistan Stock Exchange from different sectors with non-zero sales and has long-term and short-term debt during the span of five-years from 2010-2014. All firm specific data is obtained from the financial statements of company's annual reports. We measured the debt maturity as the ratio of long-term debt and total debt and also as the ratio of short-term debt and total debt. Cash is defined as the ratio of total cash at the end of year and total assets. Firm size is measured by natural log-arithm of total assets. The market-to-book equity ratio is calculated as the firm's market capitalization split by total assets. The capital expenditure variable is the cash flow statement figure of capital expenditure split by total assets. We demonstrated dividend variable as dummy variable showing a firm pays dividend in the defined year. Operating profit is the earnings excluding interest and tax divided by sales. Leverage is defined as the ratio of firm's total debt and total assets. NWC is the net working capital divided by total assets.

Table 5.1
Summary Statistic

Table 5.1 reports summary statistic for the sample data of 101 Pakistani firms which are listed in Pakistan Stock Exchange with non-zero sales and which have long-term & short-term debt over the period 2010 to 2014. All firm specific data is obtained from financial statements by company's annual reports.

| Variables | Mean | Std. Dev. | Min | Max |
|------------------|-------------|------------------|------------|------------|
| MtB | 0.453 | 0.768 | -0.819 | 6.785 |
| Size | 22.015 | 1.460 | 17.919 | 25.298 |
| Nwc | 0.038 | 0.812 | -1.612 | 12.067 |
| CapEx | 0.049 | 0.103 | -0.007 | 1.554 |
| Leverage | 0.429 | 0.524 | 0 | 5.309 |
| OpProf | 0.094 | 1.021 | -9.809 | 9.756 |
| Cash | -0.010 | 0.216 | -2.915 | 0.447 |
| Div | 0.523 | 0.499 | 0 | 1 |
| LTDTD | 0.462 | 0.295 | 0 | 1 |
| STDTD | 0.532 | 0.295 | 0 | 1 |

Table 5.1 provides the descriptive statistics of all-firm's characteristics. In our first model of debt maturity we take long-term debt/total debt as dependent variable. Its mean value is 0.462 and the standard deviation is 0.295, which shows that there is no outlier in the data. The average value of market-to-book ratio is 0.45 and standard deviation is 0.768. The mean of firm's size is much high than the all other variables, which are 22.015, and standard deviation is 1.46, which is showing the normality of data. When we look at the average value of net working capital its mean is low it is 0.038 and standard deviation is 0.812. The mean of Capital expenditure is 0.049 and standard deviation is 0.103. The mean of leverage is 0.42 and standard deviation is

0.524.operating profitability mean is 0.094 and standard deviation is 1.021. Dividend is a dummy variable; its mean value is 0.523 and 0.499 is standard deviation. In our second model of debt maturity we consider short-term debt/total debt as dependent variable. Its mean value is 0.532 and standard deviation is 0.295. The standard deviation of dependent variables of both models is same. For the cash holding model dependent variable is cash. Its mean value is -0.01, which shows the negativity of mean. Standard deviation of cash is 0.216.

5.2 Multivariate Result – First Stage Regression

In this section we are going to present the results from the first stage regression results of debt maturity which are estimated by using proxy of it. In our first model the ratio of long term debt to total debt is used and in second model the ratio of short term to total debt is used.

Table 5.2

First Stage Regression of Debt Maturity

The table 5.2 shows the first-stages results of the structural equation that elaborates the debt maturity estimation considering the 2SLS technique. This table presents the outcomes for both models (long term debt to total debt and short term debt to total debt). In model 1 the first-stage structural equation explains that LTD/TD as the dependent variable which is proxy for debt maturity, and the independent variables for model 1 are the market-to-book assets, the natural logarithm of real book assets, net working capital/total assets, capital expenditure/total assets, total debt/total assets, operating income/total assets, dividend paying dummy. In model 2 the first-stage structural equation that explains STD/TD has total short-term debt/total debt as the dependent variable which is proxy for debt maturity, and the independent variables for model 2 are the market-to-book assets, the natural logarithm of real book assets, net working capital/total assets, capital expenditure/total assets, total debt/total assets, operating income/total assets, dividend paying dummy. The levels of significance where coefficient estimates are non-zero are shown in brackets.

| Variables | Model 1 LTD/TD | Model 2 STD/TD |
|------------------|---------------------------|---------------------------|
| Intercept | 0.026 (0.898) | 1.006*** (0.000) |
| MtB | 0.079*** (0.000) | -0.079*** (0.000) |

| | | |
|---------------------------|----------------------|---------------------|
| Size | 0.019*** (0.043) | -0.020** (0.028) |
| Nwc | 0.034** (0.035) | -0.035** (0.028) |
| CapEx | -0.416*** (0.007) | 0.373* (0.015) |
| Leverage | 0.052** (0.054) | -0.041 (0.127) |
| OpProf | -0.033* (0.012) | 0.034* (0.011) |
| Div | -0.025 (0.354) | 0.017 (0.533) |
| R ² – adjusted | 6% | 6% |

***, **, * Show the level of significance at the 1%, 5% and 10% respectively.

Values in parentheses are showing the probabilities.

Table 5.2 provides results for the first stage regression of debt maturity of both models LTD/TD and STD/TD. As results are shown in the table 5.2 and the mostly coefficients are same as discussed in the literature and theories. The Outcome variable in the first Model is the fraction of a firm's long-term debt to total debt. In first model coefficient of market to book ratio is significantly positive which shows that if there is one unit increase in market to book ratio the long-term debt will be increased by 0.079 units. The Coefficient of firm size is positive and statistically significant. The long-term debt will increase by 0.034 units if there is one-unit change in net working capital, which is positively significant. The coefficient of capital expenditures is showing negative value. It means there is increase in capital expenditures will decrease the long-term debt value. Leverage is significantly positive in first model it shows that increase in its value will increase the long-term debt value. Operating profits and dividend have

negative coefficients that will increase the long term debt value by 0.033 and 0.025 units respectively after having one-unit in their values. Operating profitability is significant but dividend is not significant in first stage regression. After that we discuss the significance of variables of first model. All the variables are significant except dividend. In this model the constant has positive value, which is 0.026, which will also have impact on model value.

The dependent variable in the second model was the ratio of a firm's short-term debt to total debt. In this model the dependent variable is short-term debt to total debt and now we are going to show the effects of independent variables on it. The market to book ratio is significantly negative that shows there is any increase in the market to book ratio will decrease in short term debt to total debt. The firm size has a negative impact on short-term debt to total debt and is statistically significant; it shows that the short-term debt will decrease after increase in firm size. The coefficient of net working capital is -0.035, which is significantly negative impact on short-term debt to total debt, which tells, as that value of short-term debt will reduce by increase in net working capital. Capital expenditures has positive impact on the short-term debt and statistically significant. When there is one-unit change occur in leverage variable the short-term debt will decrease by 0.041 units. It is also an insignificant variable on 5% level of significance. Operating profit and dividend have the positive impact on dependent variable but dividend is statistically insignificant. All the variables are significant at 5% level of significance except dividend and leverage. Intercept will also increase the value of model by 1.006 units.

5.3 Multivariate Results – Second Stage Regression

Having estimated the debt maturity proportion in the first stage regression, now we have included the predicted values of debt maturity in the second stage regression. Table 5.3 reports the results.

Table 5.3

The Effect of Debt Maturity on Cash Holdings

Table 5.3 is showing the second stages outcomes for the structural equation. In this equation, the cash holding estimation is explained by using the 2SLS technique. This table presents the outcomes for both models (long term debt/total debt and short term debt/total debt). Model 1 shows the second-stage structural equation that elaborates the cash as total cash at the end of year/total asset which is used as the dependent variable, and the input variables are the determined value of the long-term debt/total debt, and market-to-book assets, the natural logarithm of real book assets, net working capital/total assets, capital expenditure/total assets, total debt/total assets, operating income/total assets. In model 2, the second-stage equation explains cash as total cash at the end of year/total asset as the dependent variable, and the independent variables for model 2 are the determined value of the short-term debt/total debt, market-to-book assets, the natural logarithm of real book assets, net working capital/total assets, capital expenditure/total assets, total debt/total assets, operating income/total assets. The levels of significance are shown in parentheses.

| Variables | Model 1 | Model 2 |
|------------------|----------------------|----------------------|
| LTD/TD | -2.532*** (0.001) | ----- |
| STD/TD | ----- | 3.747*** (0.001) |
| Intercept | -0.007 (0.965) | -3.841*** (0.001) |
| MtB | 0.242*** (0.000) | 0.339*** (0.000) |
| Size | 0.048*** (0.002) | 0.077*** (0.001) |
| Nwc | 0.091*** (0.002) | 0.137*** (0.001) |
| CapEx | -1.505*** (0.000) | -1.850*** (0.000) |

| | | |
|---------------------------|----------------------|----------------------|
| Leverage | 0.167*** (0.001) | 0.189*** (0.000) |
| OpProf | -0.073*** (0.008) | -0.116*** (0.004) |
| R ² – adjusted | 6% | 6% |

***, **, * Show the level of significance at the 1%, 5% and 10% respectively.

Values in parentheses are showing the probabilities.

Table 5.3 gives results for the second stage regression of cash holding of both models LTD/TD and STD/TD. Table 5.3 provides the results for the effect of debt maturity on cash holdings of both models (LTD/TD and STD/TD). As result shown in table 5.3 the mostly coefficients are same as discussed in the literature and theories. The dependent variable is cash holding for both models that is defined as the sum of cash and short-term investment divided by total assets. In the second stage regression we use the predict value of LTD/TD in our first model. While in the first model LTD/TD is negatively significant which shows the negative effect on cash holding. In our first model debt maturity has a negative effect on cash holdings.

The market to book ratio is significantly positive, which shows that market to book ratio has the positive effect on cash holdings corresponds to our expectations and the findings of previous research by Opler et.al (1999) and Harford et.al (2014). Coefficient of the firm size is showing the positive effect on cash holding according to previous research by Harford et.al (2014). NWC has the significantly positive impact on cash holdings according to our expectation. Capital expenditure is significant but negative impact on cash holdings confirm our expectations and are in line with the findings in (Harford et.al (2014)). One unit increase in capital expenditures, firms decrease its cash holdings by 1.505 units. Leverage has the positive impact on cash holdings, which is not according to our expectations. We find that there is a negative relationship between

operating profitability and cash holdings but statistically significant, if a firm increase one unit of operating profitability, cash holdings will change by 0.073 units.

In the second stage regression we use the predict value of STD/TD in our second model. While in the second model STD/TD is positively significant, which shows the positive effect on cash holding according to our expectations and corresponding to previous studies (Harford et al. (2014)).

The market to book ratio is significantly positive, which shows that market to book ratio has the positive effect on cash holdings corresponds to our expectations and the findings of previous research by Opler et.al (1999) and Harford et.al (2014). Coefficient of the firm size is showing the positive effect on cash holding according to previous research by Harford et.al (2014). NWC has the significantly positive impact on cash holdings according to our expectation. Capital expenditure is significant but negative impact on cash holdings confirm our expectations and are in line with the findings in (Harford et.al (2014)). One unit increase in capital expenditures, firms decrease its cash holdings by 1.850 units. Leverage has the positive impact on cash holdings, which is not according to our expectations. We find that there is a negative relationship between operating profitability and cash holdings but statistically significant, if a firm increase one unit of operating profitability, cash holdings will change by 0.116 units. The negative effect is in line with our expectations that more profitable firms are more likely to have better approach to capital markets and hence are less financially constrained and then do not accrue (excess) cash holding.

Table 5.4**Coefficient Summary Second Stage Regression**

This table gives an overview of our cash determinant regression coefficients estimated relative to our study and relative to findings in previous research. “n/a” means not available. Here we compare our study with Harford et al. (2014) and Opler et al. (1999).

| Variables | Coefficient | Harford et al. (2014) | Opler et al. (1999)* |
|------------------|--------------------|----------------------------------|---------------------------------|
| Intercept | - | - | - |
| MtB | + | + | + |
| Size | + | + | - |
| Nwc | + | - | - |
| CapEx | - | - | - |
| Leverage | + | - | - |
| OpProf | - | + | (n/a) |

* Opler et al. (1999) results are based on the cross-sectional regression.

5.4 The Level of Debt and Refinancing Risk

Firm should show the higher level of refinancing risk in both types of debts. Therefore, in case of mitigating refinancing risk, the short term debt shows direct relation with cash holdings. It is also more obvious in the case of firms with high levels of debt. To examine this prediction, it is to be recognized that levels of firm’s debt are both determined with its debt maturity and cash holdings. Table 5.3 is showing the outcomes of our analyses that there is direct link between short term debt and cash holdings. Above proof is related to our explanation that mitigation of refinancing risk that leads to the non-negative relationship between short-term debt maturity and cash holdings.

Chapter 6

Conclusion

6.1 Introduction

In this study we examined the role of holding cash in mitigating refinancing risk. I investigated the effects of debt maturity on cash holdings. This study is based on panel data, which was consisted of 101 firms listed at Pakistan Stock Exchange. The sample period was of 5 years, 2010-2014. Balanced panel data set had total 505 firm-year observations. Objectives of the study were to examine the effect of debt maturity on cash holdings. In this regard 2SLS technique was employed to check the correlation among error terms in the models of cash holdings and debt maturity.

The major findings of the study show that cash holding is an important factor in mitigating refinancing risk. Long-term debt is significant but has negatively impact on cash holdings. Short-term debt has significant but positively related to cash holdings. So, it is obvious that short term debt is helpful in mitigating refinancing risk as we have introduced refinancing risk as debt maturity. Capital expenditures and operating profit both are significant and negatively related to short term debt as well as long-term debt. This study recommends some policy formulation for firms facing the choice between short-term debt and long-term debt in order to mitigate risk arising from refinancing.

6.2 Key Findings

Our study investigated that firms can mitigate refinancing risk that arises from short term debt maturity by holding high level of cash. Supporting the above stated assumption, we found that short term debt maturity has direct impacts on preference of firms to holding a large portion of cash reserve. It is also observed that short term debt maturity has positive relation with saving more cash which is raised by cash flows. It has been noticed that the non-negative relationship among short-term debt maturity and cash holdings are more distinct for the firms having high borrowing level. These firms would face huger concern with refinancing risk. Steady with the role of cash holdings in minimizing costs causing from refinancing risk, it is documented that the direct impact of holding cash on investment is much obvious for the firms with short-term debt maturity.

Long-term debt to Total Debt ratio has negative but empirically significant estimated coefficient. We found that ratio of long-term debt and total debt shows an indirect relation with cash holdings. This indicates that firms that are showing long-term refinancing risk issue loan contract with a shorter maturity.

We documented that refinancing risk can also arise from long-term debt financing. Unlike short-term debt financing, refinancing risk related with long term debt financing arises when a significant part of maturing long-term debts needs to be refinanced. It means that if a firm has a significant proportion of maturing long-term debt, then the firm may surface a refinancing problem. A stimulating feature of the maturing long-term debt is that its risk is not directly related to the current risk. The reason is that the decision in issuing long-term debt is done in the distant past and not probable to be correlated to the current risk.

We concluded that firms having high levels of debt and low levels of debt should be the

reason of rising refinancing risk. We have also observed that in case of refinancing risk mitigation there is positive relation between short term debt maturity and holding cash.

6.3 Policy Implications

Findings of our study further suggest the policies for the firms, which have to mitigate the refinancing risk through raising level of cash holdings. These are shown below.

- 1) More cash holdings are important for the firms having short-term debt maturity.
- 2) Firms can tradeoff costs of having high level of cash reserves with the advantage arising from decrease in refinancing risk.
- 3) This study provides guidance for managers to manage the cash holdings in order to mitigate the refinancing risk. Managers can easily implement policies if they are informed about the factors that are helpful in mitigate refinancing risk.
- 4) Investors can also get information about the risk associated with refinancing after looking the cash holdings of firms.
- 5) Policy makers can make further policies keeping in view the relationship between cash holdings and debt maturity level.

6.4 Limitations of the Study

Now we are going to point out the limitation of our analysis.

- 1) Data is taken only of 101 firms due to unavailability of long-term debt and short-term debt.

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Appendixes

Table 5

Correlation results of first model

| | Ltdtd | MtB | Size | NWC | CapExp | Leverage | OpProf | Div |
|-----------------|--------------------|-------------------|--------------------|-------------------|-------------------|--------------------|-------------------|-------|
| Ltdtd | 1.000 | | | | | | | |
| MtB | 0.1598 (0.000) | 1.000 | | | | | | |
| Size | 0.1034 (0.021) | 0.1332 (0.002) | 1.0000 | | | | | |
| NWC | 0.0757 (0.089) | 0.0757 (0.089) | -0.0405 (0.364) | 1.000 | | | | |
| CapExp | -0.0667 (0.134) | 0.4061 (0.000) | -0.1382 (0.001) | 0.0995 (0.025) | 1.000 | | | |
| Leverage | 0.0537 (0.228) | 0.1701 (0.000) | -0.1684 (0.000) | 0.0673 (0.131) | 0.3811 (0.000) | 1.000 | | |
| OpProf | -0.0961 (0.031) | 0.1118 (0.012) | 0.1069 (0.016) | 0.1631 (0.000) | 0.2702 (0.000) | 0.1241 (0.005) | 1.000 | |
| Div | -0.0192 (0.666) | 0.2025 (0.000) | 0.1170 (0.008) | 0.0523 (0.240) | 0.1429 (0.001) | -0.1174 (0.008) | 0.0258 (0.562) | 1.000 |

Values in parentheses are showing the probabilities.

Table 6**Correlation result of second model**

| | Stdtd | MtB | Size | NWc | CapExp | Leverage | OpProf | Div |
|-----------------|--------------------|-------------------|--------------------|-------------------|-------------------|--------------------|-------------------|------------|
| Stdtd | 1.0000 | | | | | | | |
| MtB | -0.1669 (0.000) | 1.0000 | | | | | | |
| Size | -0.1138 (0.011) | 0.1332 (0.002) | 1.0000 | | | | | |
| NWc | -0.0795 (0.074) | 0.0757 (0.089) | -0.0405 (0.364) | 1.0000 | | | | |
| CapExp | 0.0581 (0.192) | 0.4061 (0.000) | -0.1382 (0.001) | 0.0995 (0.025) | 1.0000 | | | |
| Leverage | -0.0371 (0.404) | 0.1701 (0.000) | -0.1684 (0.000) | 0.0673 (0.131) | 0.3811 (0.000) | 1.0000 | | |
| OpProf | 0.0945 (0.033) | 0.1118 (0.012) | 0.1069 (0.016) | 0.1631 (0.000) | 0.2702 (0.000) | 0.1241 (0.005) | 1.0000 | |
| Div | 0.0000 (1.000) | 0.2025 (0.000) | 0.1170 (0.008) | 0.0523 (0.240) | 0.1429 (0.001) | -0.1174 (0.008) | 0.0258 (0.562) | 1.0000 |

Values in parentheses are showing the probabilities.