

Sensitivity of Investment to Internal Funds and its Impact on Asset Sales and Performance: Case of a Developing Economy

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Abstract

This study aims to fulfill three main objective i.e. finding financial constraints using the model that suits Pakistani environment best, determining the impact of asset sales on investment for financially constrained firms and finally determining the impact of investment and asset sales on firm' performance. Analysis is performed on 223 financially healthy firms for the period of 10 years. This study separates the firms into constrained and unconstrained groups exploiting the techniques of four papers and finds out the best model working in Pakistani environment. Due to the linear relationship and exogeneity of age and size, SA Index is a better alternative. Moreover all the variables of SA Index are statistically significant and well supported by the literature. So, the research accepts hypothesis that SA Index is a better model for financial constraint determination. Applying this model, 98 companies are found to be financially constrained. This paper further investigates the relationship between capital expenditure and proceeds from asset sales. The study gives strong evidence that financial constraints have a significant impact on investment. It therefore, accepts the hypothesis that sales has a significant impact on investment expenditure and that investment decisions of financially constrained firms are sensitive to internal funds. It is also evident that firm's investment decisions are significantly affected by the firm's financial constraints. Prior studies on sensitivity of investment also support these evidences. As reported by previous research, this study finds a significant and positive relation between invest decision and firm performance for financially healthy firms. It also finds a positive and significant relation between asset sales and firm performance financially healthy firms.

Keywords: Financial Constraints, Capital Expenditure, Asset Sales, Growth Opportunities

1. Introduction

Firms often face financial constraints which hamper their investment abilities. Financial constraints refer to obstacles that limit firms from pursuing their desired investment opportunities. These constraints may take many forms like difficulties in arranging external funds, issue new equity, lack of managerial knowledge, hurdles in liquidity of assets and many more. By financial constraints we do not refer to risk of bankruptcy, financial distress or economic distress. These phenomena have different reasons and affect managerial decisions in different manner.

Impact of liquidity constraints on investment decisions is a well versed topic. The studies after 1980 challenged the classical theory of investment decision making because of the impact of external financing. According to classical theory, investment decisions depend solely on product prices and a firm's financial position is irrelevant of investment decision. Future research indicates internal and external cash is a suitable alternative to investment decision. This view is supported by Modigliani and Miller (1958) who claims that in the existence of a perfect market, a firm financial status does not affect its investment decisions. This classical theory is challenged by Fazzari, Hubbard, and Petersen (1988). They claim that with imperfect estimations in financial decisions, internal funds prove to be the flawed alternate to costly external financing. This costly external financing creates a gap; to reimburse lenders, cash flows from the investment should increase. Therefore, investment is positively related to cash flows. Denis and Sibilkov (2010) claims that cash holdings for constrained firms are more important than for unconstrained firms. Constrained firms retain higher level of cash due to higher hedging needs and higher level of capital expenditure. Further constrained firms have a strong link with investment and return. Constrained firms demonstrate a significant impact between investment and return due to greater cash retention. This allows these firms to pursue more risky projects that they may not consider otherwise. On the other hand, firms which consistently display low cash holdings also have low cash flows. Constrained firms which exhibit tirelessly decreasing free cash flows over a period of time fail to retain sufficient cash reserves and

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as a result they are forced to rely on their current cash flows. Another perspective on this approach is that firms facing hurdles in raising external finance retain greater cash (Almeida, Campello, and Weisbach (2004); Faulkender & Wang (2006); Harford, Pinkowitz, Stulz & Williamson (2006). Collectively, these studies support the view that retention of higher cash holdings are more important for financially constrained firms.

Hovakimian and Titman (2006) goes a step ahead and investigates the relation between voluntary asset sales and investment expenditure. They report that proceeds from asset sales is an important source of investment for constrained firms and that firms invest more when they get money from assets sale. Therefore, asset sale is a helpful advancement to avoid bankruptcy. However as mentioned earlier this is not an enduring solution to the problem.

When we consider financially constrained firms, they are usually in need of selling their assets in order to meet their financial requirements. It is for this reason that voluntary asset selling is important. Moreover performance of such companies is of immense importance as to how the investments from asset sales affect them and help them survive. A few studies capture the performance of constrained firms (Poulsen & Stulz 1995; Hill & Snell, 1988) however they are not recent. Hence, a comparison of performance of constrained and unconstrained firms with respect to proceed from asset selling would be a significant advancement in the current financial/economical environment. Lastly this topic is addressed by Hovakimian et al. (2006) but he separates constrained firms from unconstrained firms using KZ index on which SA index (Hadlock et al. 2010) cast serious doubts so the results are not reliable and needs to be readdressed. Moreover prior study addresses this issue in developed economies e.g. UK. So this study examines a developing economy and. It further gives a comparative analysis of financially constrained and unconstrained firms and advances to relate investment from asset sales to the performance of both divisions.

A vast amount of literature discusses the impact of liquidity constraints on investment and firm value but the impact of liquidity constraints on firm performance is still an open question. Financially healthy firms always perform well but performance of liquidity constrained firms is always under question. It is for this reason that such firms are urged to sell their assets to generate capital for investment. So, to study the impact of investment expenditure on their performance as compare to financially healthy firms would be an important advancement in corporate finance. Therefore, this research paper intends to find the relationship between capital investment expenditures, performance and asset sales while taking into account the financial constraints. Researchers argue that corporate investment expenditures are highly volatile for the firms which are somehow unable to generate funds internally. It is evident from literature that for new, financially constrained and independent firms, investments are much more volatile. There could be a number of reasons for financial constraints as limited research and ideas of managers, misjudged market and liquidity position, misleading financial statistics etc. Previous literature suggests that asset sales have a negative correlation with the above mentioned constraints. Literature also suggests that if the voluntary asset selling is undertaken because of poor business health, there must be no relation between asset sales and investment opportunities and vice versa. This research will figure out whether or not asset sales and sensitivity of investment are correlated with financial constraints and firm's position in developing economy like Pakistan. In addition to that this research proceeds further and find the relation between asset sales, investment and firm performance. As mentioned above, when assets are sold for survival basis, performance analysis is must so as to know the usefulness of such decision. This is because if the decision of selling asset is not performance oriented, it must be quickly addressed.

1.1 Research Objective

This study intends to find the relationship between investment expenditures and asset sales while taking into account the financial constraints. In addition to this the impact of investment from asset selling on firm's performance is also an area of interest. Few researchers have taken into account the relationship between investment expenditures and asset sales but none has worked so far on the impact of investment from asset selling on firm's performance. Former studies have focused on the data from companies which no longer exist however, working on going concern companies would be worthwhile as it will highlight the weaknesses and will be able to give recommendations on survival basis. For this purpose, the data is collected from all the listed companies of Pakistan (KSE) for the period of 10 years.

The dependent variable is capital investment expenditures and independent variables are growth opportunities, liquidity, performance and proceeds from assets sales. The controlled variables for this research are coverage ratio and financial leverage along with growth opportunities.

This research utilizes the approach of SA index (Hadlock et al. 2010) which is the recent application. It starts with categorization of firms into constraints based on qualitative factors and then use firm age and size as interpreters of financial constraints as proposed by SA index. It further exploits the KZ index and WW index to give a comparative analysis between three approaches. The study exploits the approach of cross-sectional analysis by running 10 cross-sectional regressions one for each year. In this way change in the slope indicate regime change. It says that the parameters are varying in time where time shows effect of regime. Parameters are set of qualitative events which influence environment of model. This approach shows continuous regime change and helps identify possible reason for that. It also allows more detailed analyses and gives a comparison between three samples of data sets.

1.2 Research Questions

- Which is the better model for the determination of financial constraints in Pakistani environment?
- Does asset sale impact investment expenditure significantly?
- Are investment decisions of financially constrained firms more sensitive to internal funds than that of unconstrained firms?
- What is the impact of investment expenditure and asset sales on performance?

1.3 Significance

Prior studies take cash flow as the proxy to measuring internal financing source. It is under much debate because it measures growth opportunities as well as firm liquidity. Asset sales are unlikely to be associated with growth opportunities therefore; this study has an important contribution to the existing literature. The study proceeds further with the impact of asset sales and investment on firm performance which is an important contribution too. As indicated by the results, constrained firms do not perform well when they sell their assets as a replacement of external financing. It will give an alert to the managers to rethink on their decision in time.

2. Literature Review

A vast amount of literature can be found on the relationship between investment expenditures and internal and external fund raising for financially constrained and unconstrained firms. The most related topics include high cash holdings, external fund raising, exporter's dilemma etc. Developing countries and transition economies often report financial constraints to be the major impediment and obstacle to the way of their investment decisions and growth strategies. Financially constraint firms find it difficult to acquire external financing which confines their economic and industrial growth.

2.1 Asset Sales and Capital Expenditure Analysis

Denis and Sibilkov (Jan, 2010) throws light on two central concepts in their work. First one is why cash holding is too high for financially constrained firms and secondly why some constrained firms appear to hold too little cash. They claim that cash holdings for constrained firms are more important than for unconstrained firms. Constrained firms retain greater cash due to higher hedging needs and higher level of capital expenditure which is a value-adding response to costly external fund raising. This proves that a strong correlation exist between investment and return for financially constrained firms. This is the reason why constrained firms are able to pursue risky projects by retaining greater cash which they may not be able to continue otherwise. On the other hand, constrained firms which consistently display low cash holdings point toward their low cash flows. They support the view that constrained firms do so in order to extend their business by excessive investment. With reference to the second question, the researchers argue that constrained firms which display tirelessly low and waning free cash flows over a period of time fail to retain sufficient cash reserves and as a result they are forced to rely heavily on their current cash flows.

Retained cash seems exclusively handier when firm is incurring low cash inflows with waning internal resources of cash and is unable to meet the capital needs of business. In these circumstances constrained firm think it more appropriate using retained cash for their capital needs or generate money

from asset sales. This view is supported by Almeida, Campello, and Weisbach (2004) who provides the proof that firms facing hurdles in raising external finance retain greater cash to facilitate investments. Their view is further supported by the recent work of Pinkowitz and Williamson (2006). Proceeds from asset sales determine corporate investment and these proceeds are more sensitive for the financially constrained firms (Hovakimian, Gayane & Titman, 2006). On the whole, these studies support the perspective that retention of higher cash holdings are more important for financially constrained firms. This is the point where the concept of net working capital ratio comes into play. Firms with a net working capital ratio (NWCR) of greater than 1 are able to meet their short term obligations while firms with less than 1 NWCR go towards acquisition of bank loans or sell their fixed assets to overcome the situation. If the situation persists for a longer span of time, they usually go bankrupt.

Faulkender and Wang (2006) while working on difference that arise in cash holdings due to corporate financial policy investigates the impact of cross-sectional variation on marginal value of cash holdings. They work on variations in stock returns over a period of one fiscal year and their empirical results show that with larger cash holding the marginal value of cash declines. They also document a negative impact of external finance, leverage and dividend. Their view is further backed by Li, Erica, and Zhang (2006) who provide new evidence on the magnitude of inconsistency in investment, asset growth and value premium and report that stock return deviation is more frequent in liquidity constrained firms. Their findings are based on asset pricing model which is investment based and is augmented with expensive external funding. Deviations and uncertainties in returns make investment more sensitive for liquidity constrained firms which lead to negative relation between investment and discount rate.

2.2 Financial Constraint Measurements

We consider financial constraints and its impact on financial decision making but there must be some criteria to account for the severity of financial constraints. This issue is addressed by many researchers which include sensitivity of investment cash flow by (Fazzari et al. 1988), KZ index proposed by Kaplan and Zingales, (1997), WW index presented by Whited and Wu (2006) and other categorization techniques based on different firm characteristics. Since every technique is based on some experimental or hypothetical assumptions, there exist a long debate on their merits and demerits. The selection criteria also depend on endogenous financial choices that often don't have any connection with constraints. For instance, high cash retention may be interpreted as a sign of improving firm's constraint status and at the same time it may be due to future potential investment or a precautionary measure to avoid any possibility of bankruptcy. Primarily financial constraints can be tested by the use of equation based on investment, profitability and internal funds. In a perfect market situation, investment is not sensitive to internal funds and the lenders and investors are indifferent to the use of internal or external funds. However, if cash flows show any effect on investment, firm is said to be constrained. Such firms can only invest if they have sufficient internal cash as they can't rely on external finance. The more the cash they have, larger will be their investment.

Another research headed by Opler, Pinkowitz, Stulz, and Williamson (1999) presents a completely different idea. They associate cash holdings as negatively correlated to the bond rating. They argue that firms having low bond rating hold more cash as compare to the firms with high bond ratings. Matching their results are the results of Kim, Mauer and Sherman (1998) and Harford (1999). They find out that industry cash flow instability is positively associated with cash holdings i.e. industries whose cash flows are more uncertain hold greater cash to meet their day to day requirements and among them low bond rating firms hold even more cash in order to avoid the risk of taking costly external finance.

Kaplan and Zingales (1997) in their KZ index propose a solution to it. They categorize firms on the basis of their level of financial constraint which is based on quantitative and qualitative analysis from information in their financial reports. They set leverage ratios and cash flows as a bench mark to determine the level of their financial constraint. Based on their selection criteria they conclude that less a firm is financially constrained, more sensitive will be its investment decisions to the availability of cash flow. So they provided important facts to use sensitivity of investment cash flows as a tool for the measurement of financial constraints. Later studies on it refuse their model.

Whited and Wu (2006) presents a different approach by making use of Euler equation to create WW index. In this model by making use of Compustat data, six different factors are created which they use as regressors. The results indicate that there are only three variables with significant results which are according to the expectations. Out of these three variables, two are same as used by KZ index i.e. leverage and cash flow. The only new variable comprising WW index is size of firm which is logical. Smaller firms have limited resources so they are expected to be more constrained than larger firms. Hence WW index is based on leverage, cash flows and firm size.

Instinctively firm size and age are a good measure of financial constraints which is in use traditionally in corporate finance. Recently Hadlock and Pierce (May 2010) have developed SA index which is based on these two measures. They studied the relationship between different variables commonly taken as a measure for constraints along with constraint categories. They found some variables to be statistically insignificant. The only variables with significant results were firm size and age and this is because these variables are least endogenous than other variables. Most of those variables are the proxies of age and size. If firm size and age are controlled, the other variables that predict constraint are leverage and cash flows. However because of their endogenous nature, they don't recommend any measure based on factors derived from these two variables.

2.3 Asset Sales and Performance

The performance of constrained firms is always under question. To answer the riddle, Lamont, Polk, and Requejo (2001) conducts a research to find if financial constraints impact firm value and if so, whether this impact is reflected in stock returns as well. To check the variations in stock returns, they divide their data into portfolios which are based on characteristics correlated with financial constraints as used in KZ index. Their results depict that financially constrained firms undergo shocks and show a similar movement over time. They argue that financially constrained firm's performance is low as compare to unconstrained firms as indicated by their stock returns. Contrary to them are the results of WW index. Financially constrained firms perform better than unconstrained firms as reflected by their higher stock returns but their results are not significant. It is always difficult to reporting the conflicts without any model specification having close tie with risk and return. Livdan, Sapriz, & Zhang, (2009) use investment based asset pricing model to serve the purpose. Their results reveal that financially constrained firms seem to be riskier than unconstrained firms and exhibit higher returns.

Financial constraints seem to be a great hurdle in decision making process especially in emerging economies and hinder their growth one way or the other. As small firms constitute a major portion of economies in developing countries, hurdles in external fund raising restrict economic development. In a paper Rajan and Zingales (1998) unfolds the fact that access to cheap external funds gear up the economic growth if the lending institutions are well developed. They conclude that industries that are in need of more external funds are more productive and show more growth nationally and internationally in countries with developed financial markets. Their view is further supported by the recent work done by Becker and Greenberg (2005) and Manova (2005) who document that capital intensive industries have more collateralizable assets and are always in need of more finance so well-developed financial Markets tend to invest in such industries. As a result, these industries have better prospects of growth nationally and internationally and are less constrained.

Not much work is done on financial constraints, external fund raising and exporting and the available literature gives mixed outcomes. An empirical work is done on Spanish manufacturing firms by Campa and Shaver, (2002) who develops a link between exports and firm fiscal condition. They conclude that exporters perform better than non-exporters in a way that their cash flows are more consistent and less sensitive to internal cash flow than those of non-exporters. Another work is done on UK firms which give the evidence that multinational firms and exporter are better performers and less constrained than others. Similar work with different variables is done by Greenaway et al. (2007). They take into consideration leverage and liquidity ratios and stumble on the point that exporter's performance is better than non-exporters and finds no relation between financial position of a firm and its exports. These findings are not backed up by any literature except that of Chaney (2005). He analyses that entrance in foreign markets require some guarantees and hence has some fixed costs. Constrained firms that are unable to manage those costs are unable to enter foreign markets unless or until they have planned for

that. Not only the constrained firms but if other firms also are unable to manage fixed costs, even they are unable to enter foreign markets. These findings are not empirically testified.

Internal funds are very important for the exporting firms especially for the firms which are financially constrained. Firms with consistent cash flows and sales can benefit from diversification by selling in foreign markets when their business cycle is on a decline in their native homeland. Firms with consistent cash flows are less likely to fall short of their financial obligations which make them creditworthy and hence they can easily get external funds (Campa & Shaver 2002). Exporting firms are relatively more stable, productive and have more earnings. Due to this reason they can easily get loans on favorable terms and their investments are less sensitive to the internal funds i.e. they are mostly not financially constrained (Delgado et al, 2002). All this debate concludes that financially constrained funds that have no future planning and internal funds to meet the threshold of fixed cost barrier to entering foreign markets can't compete. On the other hand constrained firms with ample funds to meet fixed cost can explore local and foreign markets and make them stable.

2.4 Theoretical Framework and Hypothesis Development

In accordance with the above literature review and theoretical framework, this study utilizes the following hypotheses in order to address the proposed research questions:

- H_{1A}:** KZ Index is a better model for financial constraint determination
- H_{1B}:** WW Index is a better model for financial constraint determination
- H_{1C}:** SA Index is a better model for financial constraint determination
- H₂:** Asset sales has a significant impact on investment expenditure
- H_{3A}:** Investment decisions of financially constrained firms are sensitive to internal funds (asset sales)
- H_{3B}:** Investment decisions of financially unconstrained firms are sensitive to internal funds (asset sales)
- H_{4A}:** Performance of financially constrained firms depend on investment expenditure
- H_{4B}:** Performance of financially unconstrained firms depend on investment expenditure
- H_{5A}:** Performance of financially constrained firms depend on asset sales expenditure
- H_{5B}:** Performance of financially unconstrained firms depend on asset sales expenditure

3. Methodology

Our population includes all the Pakistani companies listed in KSE Index. Due to unavailability of data it is not possible to collect data of some companies. Financial institutions are excluded in order to avoid any biasness in the results as these institutions usually are not financially constrained. Because this study intends to find the relationship between investment and asset sales, firms which do not sell their assets in the sample period are exempted. Since this study focuses essentially on financially constrained firm and not distressed firms, this study also exclude all the distressed firms in the sample to avoid any biasness in the results. This is because financially distressed firms sell assets for different reasons and including them in the sample will misrepresent the results. A firm is said to be financially distressed if its EBITDA is less than 80% of its interest expense for 1 year or its EBITDA is less than interest expense for two consecutive years. Following this criteria, 112 firms are distressed and hence are not a part of this study. However some tests are also done on them so as to make an evidence for the preceding theory.

Table No. 1: List of Companies

Titles	No of companies
KSE Listed companies	445
Unavailable Data	96
No Asset Sales activities	15
No Cash Flow activities	10
Newly Established Firms	12
Delisted firms	16
Final Sample	223
Financially Constrained Firms	98
Financially Unconstrained Firms	125
Distressed Firms	112
Sample Period	2005-2016
Total Firm Years	2150

There are a total of 445 listed companies in KSE out of which data for 96 companies is unavailable. Furthermore, 15 companies exhibit no asset sales and 10 exhibit no cash flow activities. Hence they are also excluded from the sample. The sample includes 12 newly established and 16 delisted firms as well so as to include maximum of constrained firms. Since many firms are excluded from the sample either due to unavailability of data or being distressed, the data may have selection bias. To moderate this bias, maximum of delisted and newly established firms are included even if their data is available for 5 years only. The final sample consists of 223 firms including 98 constrained and 125 unconstrained firms. In this empirical study all the quantitative data is collected from the financial statements of the selected companies for a period of 12 years (2005-2016). Asset sale is the main variable hence only those firms are a part of sample who exhibit Asset Sale activity at least once during the whole sample period. Furthermore as lagged variables are created; only those firms are a part of sample whose complete data is available for at least four consecutive years. There is no survival base for firms so a subsequent number of firms are a part of sample that ceased to exist (35). This is very important because financially distressed firms are already excluded from the sample and further limitation on availability of complete data for whole period will possibly exclude most of the constrained firms.

Size of firm is measured by its total assets and firms have a wide range of size distribution. Sample is not constrained by firm size or asset sale tradeoffs. Due to this reason asset sale is a small portion as compare to fixed assets which is different from other studies. The sample has asset sales for 1898 out of 2070 firm years which have an average transaction size of 0.67% of capital as compare to prior studies who report it in the range of 14% to 40%. This difference may arise due to the fact that this study only encounter cash proceeds while rest of studies may have taken into account exchanged securities as well. As data is also divided into sub groups so descriptive statistics for all of them are reported separately.

3.1 Model and Variables

3.1.1 Sensitivity of Investment to Asset Sales

The software used in this research are MS excel and STATA. Variables are generated in MS excel and the model is run in STATA. This is the base model of this research:

$$\text{Investment}_{it} = f(\text{growth opportunities, liquidity, asset sales, controlled variables})_{it} + \varepsilon_{it} \dots (1)$$

To the left side of this equation i refers to the company, t refers to the time and investment, the proxy for which is the capital expenditure for the year. Since we are concerned about investment for the generation 2 of cash hence, we only include the capital expenditure made for long term investment point of view. This includes investment in fixed assets, intangible assets, and investment in subsidiaries and buying new technologies during the year. This is the more valid measure of investment as this study is primarily concerned with constrained firms having little or no access to external capital.

$$\text{Investment} \rightarrow \text{Capital Expenditure} = \text{Investment in fixed asset} + \text{Intangibles Asset} + \text{Subsidiaries} + \text{New Technologies}$$

In the right hand side, market to book ratio is the proxy used for growth opportunities which is calculated by dividing sum of total liabilities and market value of equity by the book value of total assets. Liquidity is the proxy of cash flow which is equivalent to EBITDA and financial slack which is equivalent to cash and cash equivalents and short term investment in the financial year. Asset sales is another source of liquidity and is taken as proceeds from sales of fixed assets including property plant and equipment extracted from the respective cash flow statements. It doesn't include divested assets in exchange for debt or equity but only covers cash incomes. Leverage is a control variable and its proxy is coverage ratio calculated as interest expense divided by EBITDA in investment regression and as short term and long term debt divided by total assets in cross sectional regression. Extreme values are winsorized to reduce the effect of outliers (Hovakimian et al. 2006).

3.1.2 Variables for Sample Categorization for Financial Constraint Status

Following variables are used for the categorization of sample into financially constrained and unconstrained firms.

Tobin's Q: A higher Tobin's Q is an indication that the firm has more growth opportunities hence are in greater need of finance so there are more chances that they may be liquidity constrained. It can also be that market recognizes firm's worth. Banks give them easy lending and such firms tend to be less constrained (Hovakimian et al. 2006; Kaplan et al. 1997)

Cash: Literature gives mix opinion on cash holdings. Some researchers debate on fact that firms with high cash holdings are liquidity constrained and they do so to prevent any chance of bankruptcy (Calomiris, Himmelberg&Wachtel (1996); Fazzari, Hubbard & Petersen (1996); Kim, Mauer & Sherman (1998)). Calomiris et al. (1996) argue that firms which are financially constrained are also more sensitive to investment and cash flows. While the other school of thought is that high cash holding is an indication that firms can finance their investment whenever they need without any dependence on other resources (Kaplan et al. 1997; Kashyap et al. 1994).

Cash Flow: KZ index takes into consideration cash flow as well for the categorization of sample. A higher cash flow is an indication that the firm is performing well in the market and therefore has less chances of bankruptcy. It is a positive sign for the market so firms with a high cash flow are less likely to be financially constrained (Kaplan et al. 1997).

Leverage: A high leverage reduces the availability of cash for investment because huge cash goes to the lenders to pay back debt as argued by Lang et al. (1996). Leverage also abstain the firm from taking more loans as these firms are supposed to be more risky and have less assets to pledge and also poses as a hurdle to the way to issuing more equity (Myers, 1977; Jensen &Meckling, 1976). Hence financial institutions hesitate in lending loans to firms with high leverage.

Size: it is a very common variable used for the determination of financial constraints (Devereux & Schiantarelli, 1990; Oliner & Rudebusch, 1992). Most of the studies argue that size is correlated with financial constraints. Larger firms are less likely to be constrained due to many reasons. For small firms transaction cost of new issues of securities and stock is higher which make raising equity costly. Lending institutions also feel reluctant to lending money to small firms due their less diversified portfolios and greater likelihood of bankruptcy. Therefore, unavailability of financing make small firms more sensitive to cash holding and forces them to under invest (Myers & Majluf, 1984). The diversified portfolios of larger firms make it easy for them to approach external finance and make risky decisions more easily. Literature gives a mixed outcome for size. Some studies report that with a large data set and diversified firm size, smaller firms are more liquidity constrained and face difficulties in accessing external funding. Other researchers report that with small data set and large firm sizes results are either insignificant or investments are more sensitive to cash flow (Schiantarelli, 1996). Size is the natural log of book value of assets.

Age: Age is also likely to be correlated with financial constrained as banks feel hesitation in lending loans to new firms with no or less brand image (Devereux et al., 1990; Oliner et al.,1992). Age is the number of years for which a firm is registered in KSE.

Dividend Paid: Similar to size and age, dividend payment is also the measure to determining the level of financial constraint. Constrained firms do not pay dividends. This paper creates a dummy for dividend paid and marks 1 if dividend is paid in the fiscal year and zero otherwise (Kaplan et al. 1997).

Industrial and Firm Growth: WW Index uses firm growth and industrial growth as significant determinants of financial constraints. Firms growing well in the competing arena are mostly unconstrained (Whited et al. 2006).

3.1.3 Firm Performance

$$NPM_{it} = \alpha + \beta_1 Inv_{it} + \varepsilon_{it} \dots\dots\dots (2)$$

$$ROCE_{it} = \alpha + \beta_1 Inv_{it} + \varepsilon_{it} \dots\dots\dots (3)$$

$$NPM_{it} = \alpha + \beta_1 Asset Sales_{it} + \varepsilon_{it} \dots\dots\dots (4)$$

$$ROCE_{it} = \alpha + \beta_1 Asset Sales_{it} + \varepsilon_{it} \dots\dots\dots (5)$$

Two ratios are analyzed here to check the performance of constrained and unconstrained firms. Net profit margin (NPM) shows how much part of revenues is covered by profit. Return on capital employed (ROCE) also measure performance and access the return earned on capital employed. A clear picture of all the variables and their proxies is as under.

Table No. 2: Variable Description

Variable/ Abbreviation	Proxy/ Definition	Calculation
Size	<i>Total Assets:</i> Size is taken as the natural log of total assets	Size = LN size
Fixed Assets (FA)	<i>Fixed Assets:</i> fixed assets is the long term investment of a firm in property plant and equipment	FA = Fixed Assets
Age	<i>Age:</i> Age is the number of years a firm is operating in the market	Age = Number of years a firm is operating in the market
Dividend Dummy (Divd)	<i>Dividend:</i> Dividend is the amount a company pays to its share holders in the given year	Divd = 1 if firm is paying dividend and 0 otherwise
Firm's sales growth (FG)	<i>Firm's sales growth:</i> Firm's sales growth is the percentage increase/decrease in sales of a firm as compare to the previous year	$FG = \frac{NV-PV}{PV}$ PV (firm's sales)
Industrial sales growth (IG)	<i>Industrial's sales growth:</i> Industrial's sales growth is the percentage increase/decrease in sales of a firm as compare to the previous year	$IG = \frac{NV-PV}{PV}$ PV (industrial sales)
Investment (CE)	<i>Capital Expenditure:</i> It includes all the investment made during a fiscal year with the intension of growth and profit earning.	Investment = Inv in fixed asset + Intangibles Asset+ New Technologies + Subsidiaries
Growth opportunities (MTB)	<i>Market to book ratio:</i> It is the comparison of book value and market value of firm which reflects the gain in firm's worth	$MTB = \frac{MV \text{ of Equity} + TL}{\text{Book value of Assets}}$
Liquidity (CF, Cash)	<i>Cash flow:</i> It represents the Income earned by a firm during a fiscal year before interest, tax, depreciation and amortization	Cash Flow = EBITDA
	<i>Cash:</i> It is the most liquid asset with the firm available to meet day to day expenses and liabilities	Financial Slack = Cash + Short Term Investment
Asset sales (AS)	<i>Proceeds from asset sales:</i> It refers to the disposal of less or non-income generating assets for the better utilization	AS = Proceeds from sales of property, plant and equipment
Leverage (Cov R, STD, LTD)	<i>Interest coverage ratio:</i> It is amount of debt a company takes for investment as compare to its assets. Debt must always be less than assets to refrain from bankruptcy risk	Coverage Ratio = $\frac{\text{Interest Exp}}{EBITDA}$
	<i>Short term debt:</i> it is the amount of debt payable in the current year	STD = Current liabilities
	<i>Long term debt:</i> It is the amount of debt payable in more than 1 year	LTD = Non-current liabilities
Performance (NPM, ROCE)	<i>Net profit margin:</i> It describes how much portion of revenue is earned as profit	$NPM = \frac{\text{Net profit}}{\text{Sales}}$
	<i>Return on Investment:</i> It is ratio describing the amount of profit earned on total investment i.e. capital employed	$ROCE = \frac{\text{Net profit}}{\text{Equity}+LTD}$

3.2 Sample Categorization Technique

The first aim of the study is to categorize the firms as financially constrained and unconstrained. To reach the solution, the study utilizes the approaches formally adopted by Kaplan et al. (1997) in KZ index, Whited et al. (2006) in WW Index and Hadlock et al. (2010) in SA Index. Three approaches are utilized while research indicates SA Index as an adequate measure of financial constraint that has not been tested in a developing economy. Therefore, in order to judge which one suits Pakistani environment best, the study test all of three techniques. To serve the purpose, the variables account for firm's constraint status by different researches are used for the qualitative analysis as is used by Fazzari et al. (1988). This serves as the base for all the three models i.e. KZ Index, WW Index and SA Index. For this purpose all the firms are rated from 1-5. According to the theories stated above, a firm is said to be financially constrained if its leverage is high, MTB is less, does not pay dividends, CF and financial slack are low, size is small or firm is newly established and vice versa. Based on these theories, all the firms are divided

into 5 categories i.e. code 1 if firm is financially unconstrained, code 2 if it is likely to be unconstrained, code 3 if it is neutral, code 4 if it's likely to be constrained and code 5 if its constrained.

Table No. 3: Constraint Criteria

Variables	Financially Unconstrained 1	Likely to be Unconstrained 2	Neutral Firms 3	Likely to be Constrained 4	Financially Constrained 5
Leverage	Above =1	<1	<0.8	<0.6	<0.4
MTB	Above =2.5	<2.5	<1.5	<0.8	<0.4
Age	Above 29	<30	<20	<10	<5
Dividend	Above 99,999	<100,000	<10,000	<1,000	<100
Cash Flow	Above 999,999	<1,000,000	<100,000	<10,000	<1000
Cash	Above 999,999	<1,000,000	<100,000	<10,000	<1000
Size (Assets)	Above 99,999,999	<100,000,000	<10,000,000	<1,000,000	<1,00,000

This is the qualitative scheme which is intuition based and factors included in this scheme are supposed to be directly related to firm's financial constraints. This quantitative scheme is proposed by Fazzari et al. (1988) and it serves as the base for all the three indices to compute their indexes. After this, probit regression is run on all the three indexes. probit regression is run because the dependent variable is binary i.e. 1 if financially unconstrained and 2 if financially constrained. Variables are multiplied to their respective beta' and are added up to differentiate between constrained and unconstrained firms.

3.3 Cross-Sectional Differences in Investment

If asset sales of financially constrained firms are correlated to capital expenditure then the logic says that the sensitivity of assets sales that arise from selling of assets must vary cross-sectionally i.e. firms that are more constrained should be more sensitive (Hovakimian et al. 2006). To address this issue, most of the researchers split their samples into subgroups. This division is based on information related to the degree of financial constraints. After this, regression is run on each group separately. The drawback of it is the assumption on which it is based. It assumes that the points where a group is split into subgroups are known but the fact is that the extent of constraint faced by any firm is not exactly observable. In fact some firms are expected to be less constrained than the others and it is not possible to judge it to perfection. A few cases however are the exception e.g. (Hoshi, Kashyap et al. 1991). Other researchers set a threshold for sample separation purely based on their judgments. Because of this reason the results of the regression may be biased and may change with the change of sample split points. Due to this reason the results of different researchers give different findings specifically when there is a consistency between sensitivity of investment to cash flow and financial constraints (Kaplan et al. 1997). Some papers utilize the switching regression model (Hovakimian et al. 2006; Hu & Schiantarelli 1997; Maddala & Nelson 1994; Maddala, 1986). The switching regression approach is based on a priori firm classification into constrained and unconstrained groups. The assumption on which it is based is that the points of structural change are not known but the regime into which the sample is divided is known. Switching regression has two advantages over other approaches. First one is that it determines those characteristics that are supposed to be the determinants of financial constraint. Secondly it also estimates the extent to which sensitivity of investment fluctuates across different regimes and both of these are done simultaneously. Hadlock et al. (2010) divides the data into two regimes with the assumption that one regime shows higher sensitivity to the availability of asset sales then the other. They further hypothesize that this fluctuation is associated to the level of financial constraint faced by the firms.

With the use of switching regression, there is no need to divide the data into a number of subgroups and also allow them to control for multiple indicators that jointly determine the regime a firm belong to. So, instead of relying on many factors, they need only one or two factors to split a sample though the use of single factor is not very successful as other factors are not addressed and controlled for. This is the reason why sensitivity of investment of firms operating in the similar group also varies. In this way, use of selected factors allows them to achieve statistical significance for the factors selected to determine the degree of financial constraint a firm is facing. The selection regression also integrates more information for the estimation of investment regimes then the use of dummy variables. This approach is based on the method of maximum likelihood.

The drawbacks to this technique are that though the use of multiple factors for the classification of regimes increases the interaction points, it also decreases the size of each subgroup which may lead to vague results. Secondly it splits sample into two regimes based on factors less likely to be associated to financial constraints as is argued by (Hadlock et al. 2010). It uses the variables for regime determination as used by KZ Index on which SA Index casts serious doubts and that is why it gives no results in Pakistani environment as discussed in later stage of this study. Thirdly, it takes into consideration only two regimes when there are possibilities of more regimes too. Lastly it separates the firm year into two regimes where this study intends to base its findings on constrained firm not constrained years. There are two simple ways to incorporate continuous regime change. One is the model of trend which has the issue that it incorporate unidirectional regime change, it will not show if regime change has reversed. Following approaches can do this.

First way is to run 10 cross-sectional regressions one for each year. In this way change in the slope indicate regime change. Second way is to use these 10 equations and run SME which adds one more assumption that time periods are contemporaneously correlated. Third way is to use random coefficient model which will provide 10 equations estimated in panel data framework which add another assumption that firms are generally same in all other factors which are not included in the study. This study utilizes first approach. It says that the parameters are varying in time where time shows effect of regime. Parameters are set of qualitative events which influence environment of model. This approach will show continuous regime change and will help identify possible reason for that. It will allow more detailed analyses. It will also give a comparison between three samples of data sets.

3.4 Performance

The advancement of this research is the study of performance of financially constrained and unconstrained firms which is an unaddressed area so far. Net profit margin (NPM) and return on capital employed (ROCE) are the measures of firm performance. As discussed earlier, it is very important to know if the decision of asset selling for investment is profitable or not due to underlying opportunity cost. Four regressions are run in stata to check the performance with investment and asset sales.

4. Results

The results for descriptive statistics for all firms, constrained and unconstrained firms are separately presented in table 4. Correlation results are presented in table 5. It can be seen that cash flow and MTB are positively correlated and the relationship is strong. It proposes that the sensitivity of investment to cash flow may be endorsed because of future growth of a firm which is not accounted by MTB. Unlike cash flow, MTB and asset sales are negatively correlated which is an indication that asset sales do not offer any growth opportunities rather it is mostly an activity to get through difficult times. This is the main objective of this study. Asset sales and coverage ratio are also positively correlated suggesting that companies are interested in selling their asset when they have high leverage and external financing sources are vanishing. Investment and asset sales has a positive correlation too which is quiet logical. These results are in agreement with the results of Hovakimian et al. (2006) who conducted the research on a developed economy.

TABLE 4
DESCRIPTIVE STATISTICS

Variable	All Firms		Constrained Firms		Unconstrained Firms	
	Mean	Median	Mean	Median	Mean	Median
Total Assets (TA)	13660656	3246295.5	3970401	1380406	25,394,159.3	7,619,451.5
Fixed Assets (FA)	6403820.593	1411490.5	2258202	665529.5	11,423,567.5	2,919,304
MTB	6.821	0.948	11.198	0.904	1.465	1.033
CE/K	1.024	0.120	1.631	0.091	0.282	0.153
AS/K	0.114	0.002	0.130	0.003	0.094	0.002
CF/K	0.808	0.314	0.905	0.268	0.689	0.380
Cash/FA	1.689	0.053	2.544	0.039	0.642	0.096
TD/TA	0.560	0.576	0.584	0.584	0.531	0.560
STD/TA	0.373	0.370	0.379	0.371	0.367	0.369
LTD/TA	0.187	0.141	0.206	0.152	0.163	0.134
Cov R	0.273	0.211	0.310	0.245	0.228	0.175

TABLE 5

CORRELATION COEFFICIENTS						
Variable	CE/FA ₀	CF/FA ₀	AS/FA ₀	Cash/FA ₋₁	Cov R ₋₁	MTB ₋₁
CE/FA ₀	1.0000					
CF/FA ₀	0.4954	1.0000				
AS/FA ₀	0.1160	0.5459	1.0000			
Cash/FA ₋₁	0.4856	0.6469	-0.0909	1.0000		
Cov R ₋₁	-0.0114	-0.0357	0.0134	-0.0335	1.0000	
MTB ₋₁	0.0006	0.0027	-0.0009	0.0016	-0.0096	1.0000

4.1 Sample Categorization

The first portion of results refers to hypothesis I. Table 6 presents the results for KZ Index probit regression. It is evident from the table that only two variables i.e. dividend dummy and financial slack are significant contributors of financial constraints. The coefficients of CF, cash and Tobin's Q are very small and insignificant. Their signs are also opposite to what theory suggests. As discussed earlier, theory suggests a negative relation between increasing constraints and Tobin's Q and cash which is not the case. Further when the equation is evaluated for all the years separately, only a few firm years appear to be constrained which is illogical. Except 2 all the firms are financially constrained according to this model. This study rejects the hypothesis I (a) that KZ Index is a better model for constraint determination.

Probit regression results for WW Index are presented in table 7. This model gives better results than the previous model. Here cash flow, dividend dummy and firm size are significant contributors of financial constraint. However, leverage, industrial growth and firm growth do not contribute significantly. Moreover leverage must increase with increasing financial constraints but here the relationship is negative. These results are inconsistent with the findings of (Hadlock et al. 2010). Therefore, this study also finds a mixed opinion on WW Index. When this equation is evaluated for all the years separately, the results are quiet different to that of KZ Index. The study rejects the hypothesis I (b) that WW Index is a better model for constraint determination.

Lastly, table 8 shows results of probit regression for SA Index showing that all the four variables are significant contributors. Both age and size have a negative correlation with financial constraints which supports the logic and theory stated above. Larger firms have more sources of generating finance so depend less on external sources. Even if they do so, they have more assets to pledge. Likewise older firms have a good will in the market and are supposed to be more stable. Their good reputation in business society makes it easy for them to borrow in difficult times and hence they are less likely to be constrained. With the increase in age and size, firms get more and more stable and their degree of financial constraint decreases. The other reasons could be that operational cost of issuing new securities may decrease making outsourcing more costly. It can also be because larger firms have diversified portfolios and less likely to be liquidated. Due to this reason constrained firms invest less. All the results are statistically significant and when the sample is equated for SA Index, It mostly gives similar results as WW Index. Due to statistic significance and strong connection with the theory, it is evident that SA Index is the best suitable determinant of financial constraints in Pakistani environment. Therefore, this study accepts hypothesis I (c) i.e. SA Index the best model for constraint determination.

TABLE 6
KZ INDEX REGRESSION

Firm Const status	Coefficient	Std. Err	t-statistics	P t
CF/FA	-0.00006	0.00274	-0.22	0.824
Tobin's Q	2.20e-06	.000037	0.06	0.953
Dividend Dummy	-.4253	0.02297	-18.51	0.000
TD/SHE	.0030	0.0008	3.65	0.000
Cash/FA	.0005	0.0004	1.25	0.211
Intercept	1.949	0.0209	93.19	0.000
Adjusted R ²	16.46%			
No of Observations	2110			

TABLE 7
WW INDEX REGRESSION

Firm Const status	Coefficient	Std. Err	t-statistics	P t
CF	-3.01e-09	9.16e-10	-3.28	0.001
Dividend Dummy	-0.3121	.0203	-15.40	0.000
LTD/TA	-0.0441	.0377	-1.17	0.243
LNTA	-0.2869	.0122	-23.44	0.000
IG	-0.0034	.0019	-1.79	0.073
FG	-0.00015	.00012	-1.20	0.230
Intercept	3.783	.0802	47.12	0.000
Adjusted R ²	38.2%			
No of Observations	2110			

TABLE 8
SA INDEX REGRESSION

Firm Const status	Coefficient	Std. Err	t-statistics	P t
Age	-0.0124	.0011	-11.21	0.000
Size	-1.1908	.0524	-22.64	0.000
Age ²	0.0007	.00001	6.17	0.000
Size ²	2.95e-9	1.89e-10	15.63	0.000
Intercept	2.0813	.0259	80.36	0.000
Adjusted R ² _{kz}	28.67%			
No of Observations	2108			

4.2 Asset Sales and its Impact on Sensitivity of Investment

Table 9 presents the result for least square regression run on the three samples. To control for fixed effect, this regression uses first difference for all the variables. The model is run on a data set of 10 years first of all on whole sample and then on financially constrained and unconstrained firms separately. For the estimation of OLS-regression, the model includes all the current and lagged values of all the independent variables results of which are as under.

Beginning of the year cash flow and lagged and beginning of the year financial slack have a positive and significant relation with the investment in all firms and constrained firm's regression. They are the significant contributors of investment. But unconstrained firms behave differently. They have a negative relation in same year and positive relation in following year suggesting that they have long term plans and their return on investment starts a year later. Similarly growth opportunities also play their role with a small and negative coefficient which means that growth opportunities either don't contribute to the investment decision making or have a weak and negative influence. The relationship is inverse and insignificant in 2nd lag. Other researchers however report a weak but positive relationship (Brown, D.T., C.M. James, R.M. Mooradian, 1994; Hovakimian et al. 2006). According to the results firms with high leverage invest less. These results are in consistent with the research work of Lang et al. (1996) and Hovakimian et al. (2006).

Further results illustrates that proceeds from the sale of assets have a very strong and significant association with the capital expenditure. All firms and constraint firms have positive and significant relation in both lead and lag years but in beginning of the year the relationship is negative and insignificant. For unconstrained firm sample the relationship is insignificant and negative in lag year. This

is a clear indication that the sample contains a large number of financially constrained firms which have greater influence on sample. This is because constrained firms need to sell their assets prior to their capital expenditure. The fact that capital expenditure has negative relation with beginning of the year asset sales is an evidence that firms are constrained and do not invest money in the same year when assets are sold rather it is made in following years. It is also clear that constrained firms sell their assets even after their investment to support it which means they do not have excess to external finance.

Unconstrained firms on the other hand show inverse relation in following year because they have funds available to back their investments. It can also be taken as evidence that the firms are not investing for growth rather they are just replacing their damaged or old assets with the new ones. Since growth opportunities have essentially weak and inverse correlation, financial constraint is the main driving force behind sensitivity of investment to internal funds and its effect on asset sales. This fact is investigated further in cross sectional analysis. So the study accepts hypothesis II i.e. asset sales has a significant impact on investment expenditure.

4.3 Cross-Sectional Analysis

Table No. 9: Investment Regression

CE/FA ₋₁	All Firms		Constrained Firms		Unconstrained Firms	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Intercept	0.760*	10.25	0.7507*	6.71	0.175*	1.89
CF/FA ₀	0.165*	6.82	0.194*	6.66	-1.182*	-12.66
CF/FA ₋₁	-1.687	-37.33	-1.979	-36.37	1.8445*	16.83
AS/FA ₊₁	.5662*	15.43	0.1059	1.41	0.1165*	1.02
AS/FA ₀	-.9664*	-13.10	-0.7895*	-8.71	0.6225*	4.88
AS/FA ₋₁	1.682*	12.09	6.483*	9.39	-0.3154	-1.72
MTB ₋₁	-.0062*	-0.25	-0.0006*	-0.23	-0.1073*	-2.35
MTB ₋₂	-.0034	-0.14	-0.00029*	-0.11	-0.0142	-0.27
Cash/FA ₋₁	.6297*	35.85	0.6624	30.59	0.1891*	-3.79
Cash/FA ₋₂	.0276*	4.84	0.0314*	4.92	.0904*	-2.23
Cov R ₋₁	-.0733*	-0.72	-0.1039*	-0.81	-0.0892*	-0.67
Cov R ₋₂	-.0749*	-0.71	-0.0873*	-0.63	-0.1101*	-0.67
Adjusted R ²	0.691		0.7866		0.3016	
No of Observations	2230		1177		962	

In the next step regression is run on all the three data sets year wise to get a graphical representation and have a clear picture of how investment decisions affect all the variables, essentially asset sales and subsequent cash flows. It takes into account the continuous regime change year after year. For instance in graph 2, regime is changing every year. Regime change means that level of financial constraint is varying year by year. The downward movement means firms are more constrained in that year as compare to the previous year and vice versa. A sharp curve is an indication of sudden change in business environment which to which all the industries responded quickly. This is evident in year 2009 and 2014 due to Benazir assassination and OPTI Dharna as explained in shortly. Along with regime change, upward and downward movement of graph also represents the change in that variable. Graph 2 and 3 presents the results for cash flow for beginning of the period and the lagged year. It is evident from the graphs that in beginning of the year cash flows are significant and negative but are significant and positive in lagged year. It shows that capital expenditures start giving their returns in the following year. Another important observation is that the graphs show a sharp slope in 2008-09. This is because of the assassination of Benazir Bhutto when Pakistan stock exchange took a nose dive due to the political uncertainty and terrorism. It can also be seen that financially constrained firms do not take much effect of the overall environment. Perhaps financially constrained firms do not utilize external funds and, therefore, remain unhurt from the overall business change. Again in 2014 cash flows of firms overall and constrained segment dropped down but here unconstrained segment performed well. This is the time frame when Pakistan was under extreme threats of terrorism and political instability due to PTI dharnas.

Cash and cash equivalents show a sharp slope in 2008 during world crises and political and law and order instability in 2014 too due to the same reason.

In graph 4, 5 and 6 asset sales have negative relation with capital expenditure in beginning of the year. In both lead and lag periods the results reveal that during 2008-09 (assassination of Benazir Bhutto) all the firms sold their assets the most. Financially healthy firms and overall firms sold more assets in 2007 and 2009 as compare to 2008. Unlike them, unhealthy firms sold their assets in 2008 most. Again during political and law and order instability, firms sold their assets and regime changed. Constrained firms here behaved more aggressively in following year. This is clear evidence that firms sell their assets most during difficult times especially crises when external financiers are reluctant to invest. So, the study accepts hypothesis III (a & b) that investment decisions of financially constrained and unconstrained firms are sensitive to internal funds. In graphs 7 and 8 growth opportunities are also responding to the environmental changes but the relation is insignificant and with a very small coefficient. In graph 9 and 10 cash represents financial slack. In graph 9 the relationship is insignificant. The relation of investment and financial slack is under much debate as some studies suggest a negative and some evidence positive relation. Empirical findings in this research show a negative relation. However, in case of constrained firms, the relationship is positive. This is quiet logical. Financially healthy firms do not retain much cash (VladManoleet al. 2010). Conversely in order to avoid extra cost of external financing, financially constrained firms retain more cash because of their high investment needs. This is the reason why such firms are able to pursue these projects with positive NPV. It gives them a valve-addition to their high leverage (David J. Denis et al. 2010). Coverage ratio in graph 11 shows a negative relation with investment indicating that a high leverage prevents financiers from investing in such firms. Constrained firms have even higher leverage than other two samples. It is also evident from the graphs that interest coverage is not taking much effect of the overall change in business environment.

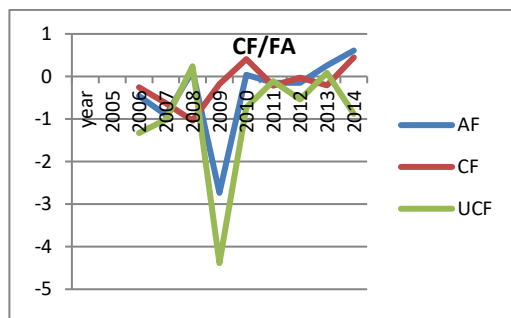


Figure 1: CF/FA

Note: CF= Cash Flow, FA= Fixed Assets

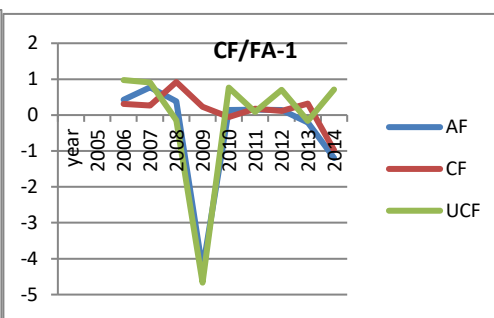


Figure 2: CF/FA-1

Note: CF= Cash Flow, FA₋₁= Fixed Assets₋₁

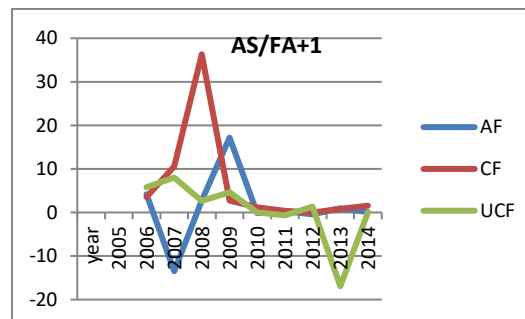


Figure 3: AS/FA+1

Note: AS= Asset Sales, FA₊₁= Fixed Assets₊₁

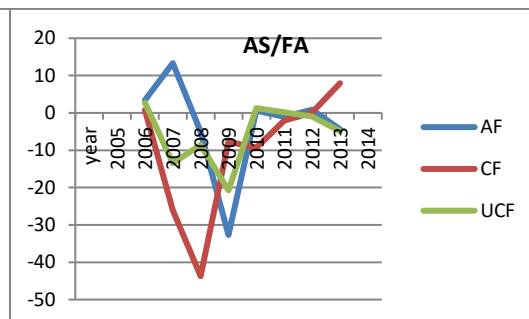


Figure 4: AS/FA

Note: AS= Asset Sales, FA= Fixed Assets

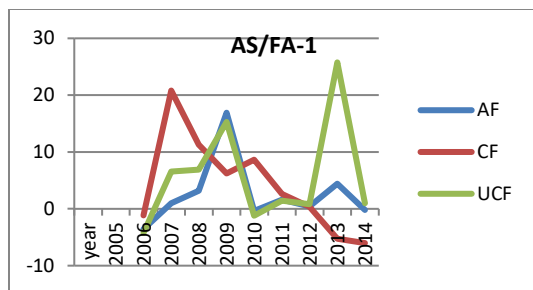


Figure 5: AS/FA-1

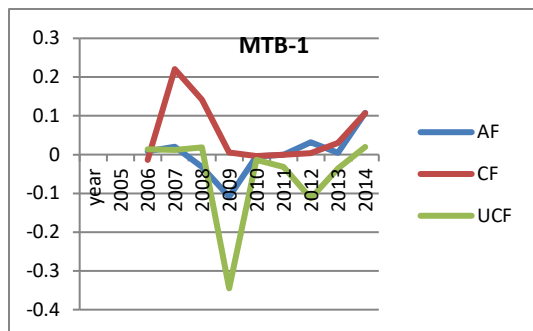
Note: AS= Asset Sales, FA₋₁= Fixed Assets₋₁

Figure 6: MTB-1

Note: MTB-1 = Market-to-book Ratio-1

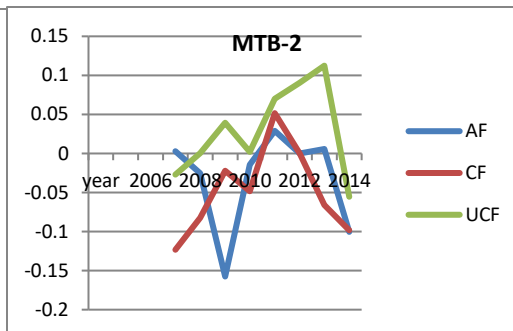


Figure 7: MTB-2

Note: MTB-2 = Market-to-book Ratio-2

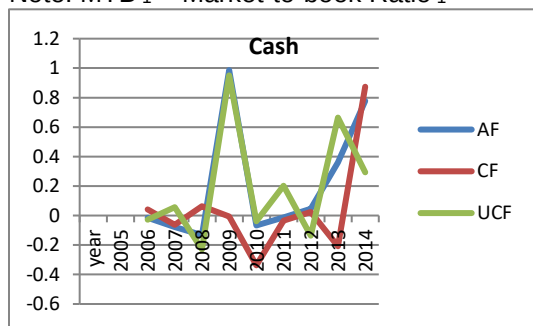


Figure 8: Cash-1

Note: Cash-1 = Financial Slack-1

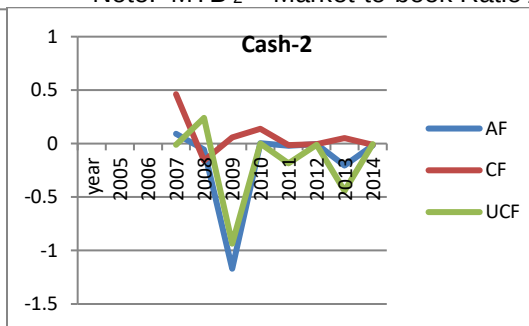


Figure 9: Cash-2

Note: Cash-2 = Financial Slack-2

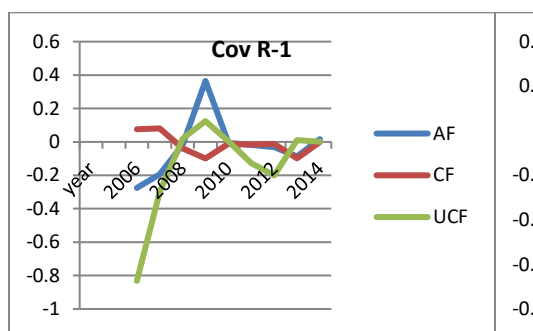


Figure 10: Cov R-1

Note: Cov R-1 = Coverage ratio-1

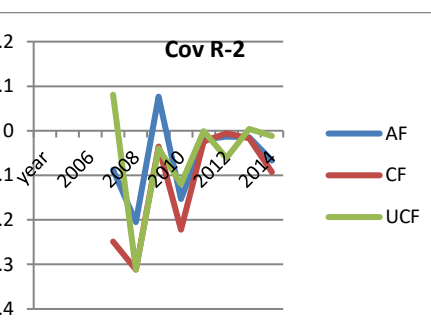


Figure 11: Cov R-2

Note: Cov R-2 = Coverage ratio-2

4.4 Effect of Asset Sales on Firm' Performance

Regression results on performance presents that capital expenditure has a positive and significant effect on net profit margin (NPM) for unconstrained and all firms. However, constrained firms show a

positive but insignificant relationship and negative adjusted R^2 . Unconstrained firms and all firms also show positive and significant relation of return on capital employed (ROCE) with capital expenditure. Constrained firms show positive but insignificant results. It concludes that unconstrained firms when invest from asset selling perform well. But the coefficient is very small suggesting that the investments are getting inadequate returns. On the other hand constrained firms show weak and insignificant returns. Constrained firms when invest from asset sales as a replacement of external finance perform poorly. So the study rejects hypothesis IV (a) and accepts hypothesis IV (b).

Similar results are seen between performance and asset sales. The coefficient is very small suggesting a weak, positive and significant relation for unconstrained firms and all firms. Constrained firms on the contrary show positive but insignificant relation with asset sales as in case of capital expenditure. It is clear evidence that asset sales is not a good alternate source of finance and firms exercise it only when they find no other sources or costly else wise. It could also be interpreted that firms sell their assets just as to replace old ones and up gradation of technology. So the research accepts the null hypothesis in case of constrained firms and vice versa. Analysis performed on distressed firms show positive and insignificant results too for the same reason.

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TABLE 10
NPM VS INVESTMENT REGRESSION

NPM	All Firms		Constrained Firms		Unconstrained Firms	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Intercept	0.0696*	5.51	0.0572**	2.44	0.0794***	19.88
CE	4.58e-09***	1.96	2.60e-08	0.91	4.03e-09***	8.11
Adjusted R ²	0.0013		-.0001		.0633	
No of Observations	2138		1177		961	

TABLE 11
ROCE VS INVESTMENT REGRESSION

ROCE	All Firms		Constrained Firms		Unconstrained Firms	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Intercept	0.1041**	31.05	0.0797***	16.04	0.1355***	30.70
CE	1.68e-09***	2.71	3.24e-09	0.53	6.93e-10	1.26
Adjusted R ²	0.0030		-.0006		.0006	
No of Observations	2138		1177		961	

TABLE 12
NPM VS ASSET SALES REGRESSION

NPM	All Firms		Constrained Firms		Unconstrained Firms	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Intercept	0.6912***	5.57	.0456*	2.06	0.0797***	22.34
AS	6.82e-08***	3.94	862e-07***	4.80	5.38e-08***	15.99
Adjusted R ²	0.0067		.0184		.2098	
No of Observations	2138		1177		961	

TABLE 13
ROCE VS ASSET SALES REGRESSION

ROCE	All Firms		Constrained Firms		Unconstrained Firms	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
Intercept	0.1043***	31.69	0.0799***	16.66	0.1344***	31.56
AS	2.03e-08***	4.43	3.43e-08	0.89	1.63e-08***	4.06
Adjusted R ²	0.0086		-.0002		.0159	
No of Observations	2138		1177		961	

Note: Performance regression for 223 financially healthy Pakistani manufacturing firms that sold fixed assets for cash proceeds at least once over the period of 2005-14. The dependent variable is ROCE which is return on capital employed and is calculated as net income divided by capital employed. AS is asset sales which is income from sales of fixed assets. Its value is taken from cash flow statement.

5. Conclusion

This study aims to fulfill three main objective i.e. finding financial constraints using the model that suits Pakistani environment best, determining the impact of asset sales on investment for financially constrained firms and finally determining the impact of investment and asset sales on firm' performance. Analysis is performed on 223 financially healthy firms for the period of 10 years.

This study separates the firms into constrained and unconstrained groups exploiting the techniques of four papers and finds out the best model working in Pakistani environment. Exploiting the approaches of KZ Index, WW Index and SA Index, it is found that KZ Index does not work in Pakistani environment. WW Index is a better technique but three of the variables of this model are statistically insignificant out of six. As argued by Hadlock and Pierce (2010) some of the variables are the proxies of

age and size hence they do not predict financial constraints. The other good determinants which constitute WW Index are cash flow and leverage. This is the reason why the results of these two indices are more or less same. Due to the linear relationship and exogeneity of age and size, SA Index is a better alternative. Moreover all the variables of SA Index are statistically significant and well supported by the literature. So, the research accepts hypothesis that SA Index is a better model for financial constraint determination. Applying this model, 98 companies are found to be financially constrained.

This paper further investigates the relationship between capital expenditure and proceeds from asset sales. The study gives strong evidence that financial constraints have a significant impact on investment. It therefore, accepts the hypothesis that sales has a significant impact on investment expenditure and that Investment decisions of financially constrained firms are sensitive to internal funds. Substantial literature on sensitivity of investment to asset sales and cash flow also reports the consistent findings e.g. (Hovakimian et al. 2006). Sensitivity of investment to cash flow however is under debate because of its relation with growth opportunities and this is not the objective of this study too. Proceeds from asset sales are a handy source of financing especially when external sources are dried up. Firms exercise more investing activities when cash is generated from internal sources. This fact is more evident when the firm is financially constrained. It is also evident that firm's investment decisions are significantly affected by the firm's financial constraints. Prior studies on sensitivity of investment also support these evidences. As cash flow measures both growth opportunities and liquidity, it is criticized much but Hovakimian et al. (2006) prove the fact that cash flows are least likely to be associated with growth opportunities. This study supports their findings in the developing economy too. This is because constrained firms avoid risk taking and tend to invest safe.

As reported by previous research, this study finds a significant and positive relation between invest decision and firm performance for financially healthy firms. It also finds a positive and significant relation between asset sales and firm performance financially healthy firms. The results are entirely opposite in case of constrained firms in a developing economy. It may be because constrained firms execute panic asset selling and do not explore their full potential. An alternate explanation may be that such firms sell their assets to upgrade their technologies in order to compete in the market which starts getting returns late. These results contradict with the findings of Lang, L., Poulsen, A., &Stulz, R. (1995) who argues that constrained firms exhibit worst performance and are highly leveraged. So for these firms asset selling on good price is handy. So, the empirical research shows that such constrained firms do not perform well before selling their assets. This study accepts the hypothesis that performance of financially unconstrained firms depend on investment expenditure but rejects the hypothesis that performance of financially constrained firms depend on investment expenditure. Similarly performance of financially unconstrained firms depends on asset sales expenditure and performance of financially constrained firms depends on asset sales expenditure.

5.1 Implications

The study sidesteps the use of different indexes for the prediction of financial constraints and strongly recommends SA Index on the basis of empirical findings. The study also provides evidence that firms invest more when funds are generated internally so the non productive assets should be utilized efficiently as should be considered as a replacement of costly external financing. This will increase the future profitability of the firm. The study further recommends that for financially constrained firms, asset sales are not a good decision. This is because sensitivity of investment to asset sales increases with increasing financial constraints. Even if asset sale decision is taken by a constrained firm, managers should take only those projects with positive NPV.

5.2 Future Research

This study explains to some extent why firms grow more when they sell their assets and do not proceed further in finding the causal relationship between the two. One possibility is that financially constrained firms take on existing positive NPV projects that they would have otherwise passed up when they receive the proceeds from an unrelated asset sale. Another possibility is that financially constrained firms choose to finance new growth opportunities by selling assets. These explanations need financial constraints to take into account. But the cause behind asset sale and investment is unknown. In reality both expiations are valid which can be analyzed in future. Other explanations are also possible hindering

the course of business which can also be searched for because the constraints may be due to reasons other than finance. They could be related to managerial decisions, time limitation or others. Infected different firms may have different reasons for it depending on their needs and demand of business.

This paper does not report why managers do not foresee their asset selling and investment opportunities efficiently in good times. It may be because they do not realize their strengths or may not want changes in usual course of business. It may also be because of limited managerial knowledge. Future research may also examine if asset sales is a panic decision because of increased bankruptcy chances, market pressure for business or any other reason.

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