Sensitivity of Firms' Investment and Cash Flow: A Case Study of Manufacturing Sector of Pakistan

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Abstract

This study investigates that either the firms in manufacturing sector of Pakistan are facing external financial constraints or not along with that this study also explores investment cash flow sensitivity in different regimes. We used a panel data of 500 manufacturing sector firms over the period of 1974 to 2010 and the sample is divided into different time periods on the basis of different political regimes, pre and post financial sector reform era in the history of Pakistan. Generalized Method of Moments, one step and two step estimation techniques have been applied for analysis. Results obtained for the full sample indicates that overall firms are not facing external financial constraint. The analysis of financial constrains in different political regimes reveals that merely from 1978 to 1988 firms were facing external financial constraints whereas empirical results for pre and post financial sector reform periods reveals that firms were facing tight external financial constraints in pre financial sector reform era as compared to post financial sector reform era.

Keywords: Credit Constraints, External Financial Constraint, Investment Cash Flow Sensitivity, Pre and Post Financial Reforms, Political Regimes, Manufacturing Sector of Pakistan, Imperfect Capital market,

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Introduction

Economic growth has always been the central focus of many researchers. Complex econometric modeling was introduced from past to up till now to unfold the aspects which were directly or indirectly linked to the economic growth phenomena. Economic growth and development of a country is dependent on the growth of various sectors operating within the economy. One of the most important sectors in this perspective is manufacturing sector, whose growth and investment is linked with the overall economic growth. So, by keeping in view these important linkages it is important to focus on manufacturing sector in context of investment and financial constraint.

Firms finance their investment projects by using various sources of finance. These sources include external finance (debt and equity) and internal finance (cash flow). The provision of finance from the external sources (banks and capital markets) depend on firms' characteristics' i.e. financial performance, risk involved and asset base of firms because of the risk averse nature of financial institutions. Access to external finance and its cost is an important hindering constraint for the growth of firms"[4], along with the imperfect financial markets in Pakistan (Ahmad and Naveed, 2011). Size and other characteristics were also important determinants for financial access in Pakistan.[5] Asymmetric information causes agency cost[6] due to which investment of the firms is hampered (Stein, 2003) and firms have to rely on internally generated funds for financing available investment opportunities.

Literature in case of Pakistan focus on the capital structure of firms by using five to ten years of the data and tries to dig out the optimal capital structure for the firms or an attempt was taken by dividing firms into constraint and non-constraint on the basis of cash flow volatility[7]. Some of the work has been done by incorporating the size and age in the investment model to access their impact on investment behavior. Investment of firms in the context of credit constraint is not explored too much.[8] This study tries to fill this gap in case of Pakistan by using firm level data of publicly listed firms in the manufacturing sector ranging from 1974-2010.

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[4] For more detail see Binks and Ennew (1996).
[5] See Hamnna and Hamid (2011) for more detail.
[6] For more detail see Stein (2003).
[7] For more detail see Sehrish*et.al.* (2013).
[8] Hashmi (2011) concluded that firms of manufacturing sector of Pakistan are financially constraint. Firms face imperfect competition in product market and do not follow optimal investment path.

Investment cash flow sensitivity: A useful measure for credit constraint

There are two schools of thought in this regard whose debate moves around the validity of investment cash flow sensitivity as a measure of credit constraints. Pioneer work in context of credit constraint and firms investment were conducted by Bond and Meghir (1994), Fazzari et al. (1998), and Bernanke et al. (1998). They analyzed investment cash flow sensitivity of firms for the empirical evidence of credit constraint and develop the dynamic equilibrium model which incorporates credit market frictions in the business cycle fluctuations. Their work broadens the depth and diversity in this meadow. Fazzari et al. (1988) was the first one to use investment cash flow sensitivity as an empirical evidence of imperfect capital markets and they develop the hypothesis that firms having high sensitivity of investment to cash flow are termed as credit constraint as compared to firms having insignificant impact of internal finance on investment.

The second school of thought in this regard is opposite to that of the Fazzari et al (1988) argument. Kaplan and Zingales (1997) were the first ones to critique the high investment cash flow sensitivity as an evidence of credit constraint. Kaplan and Zingales (1997) have investigated either the cash flow sensitivity is a useful measure to capture the credit constraint by classifying the firms on the basis of qualitative and quantitative data. They found that the relation proposed by Fazzari et al. (1988) is not correct; there exists high sensitivity of cash flow to investment in the group of firms which were declared as non-financial constraint by Fazzari et al. (1988) and vice versa. Kaplan and. Zingales (1997) argued that firms having high sensitivity of investment to cash flow are less credit constraint as compared to the firms having low sensitivity of investment to cash flow and latter this was by verified by Cleary (1999) and Almeida et al. (2004).

Fazzari and Hubbard et al. (2000), made a comment on the paper of Kaplan and. Zingales (1997), argued that their model didn't capture the previous literature and the data they used only consist of 49 low dividend paying companies that is not enough to conduct such type of analysis.

Investment cash flow sensitivity is barely a good measure of credit constraint (George, et al., 2005; Iona et al., 2006) verified by many other researchers. Bushman et al. (2012) did recent work in this regard by decomposing the earnings before depreciation in to cash flow from operations and working capital accruals, their findings suggest that internal finance is not completely captured by the cash flow but there exist a strong relation between the fixed capital and working capital (Bushman, et al., 2012). The debate on the validity of investment cash flow sensitivity as a measure of credit constraint still continues but most of the researchers use this approach to measure the degree of credit constraint.

Political regimes, pre and post financial reform era in Pakistan

From the beginning to up till now the key focus of Pakistan polices is to enhance the economic growth and to decrease the poverty. These polices in different political regimes have different impact on the institutions and economic growth of the country. To access or analyze the impact of different polices Hussain (2002) has classified economic history of Pakistan over the years into different political regimes. This section explains the results for different political regimes in the history of Pakistan and the impact of major policy shifts regarding financial sector reforms. For this purpose, firstly, sample is divided into different time periods to find out that in which period firms in manufacturing sector of Pakistan were facing external financial constraint. In the next section, degree of credit constraints of firms in pre financial sector reform and post financial sector reform era is explored.

In literature, it is evident that the division into different time periods was done on the bases of even distribution of time or by including time dummies to access the particular event effect. This study divides the sample on the bases of different political regimes in Pakistan's history. Due to the limited availability of data beyond 1974, this study doesn't access the impact before 1974. The aim to divide the firms on the base of political regimes is to access the degree of financial constraints of firms across different political regimes. During each political regime everyone came up with different mindset and these different mindsets, by using different policy tools have affected the economy differently. To accomplish this task study follows the division of Hussain (2006). This study analyses the four political regimes Bhutto's era (1974 to 1977), Zia's era (1978 to 1988), Democratic interlude (1989 to 1999) and Mushraf's era (2000 to 2008.

Analysis has also done in context of two major policy shifts regarding to the financial sector reforms namely the nationalization of financial institutions in 1974 and decentralization of financial institutions in 1991. For the purpose of analysis, data is divided into two parts. One part comprised of the data from the period of 1974 to 1990 that is the period of nationalization of financial institutions and the other part comprises on the data from 1991 to 2010 that is the period of decentralization of financial institutions in Pakistan. In other words, the period from 1974 to 1990 is pre financial sector reform era and the period from 1991 to 2010 is post financial sector reform era. Nationalization of the financial institutions was started in 1974 when Bank Nationalization Ordinance was implemented, according to which all the banks in Pakistan were under the control of federal government. In 1991 another abrupt policy change was introduced by the government by issuing ten licenses to the private financial institutions and by privatizing the four national commercial banks.

Estimation methodology

To access the impact of credit constraint on firms' investment behavior, this study follows Euler model of investment which is closely related to the work of Frobes (2007). The base of all this work is on Bond and Meghir (1994).

Following equations are used for estimations one lag of sale[9] is added in the equation by following the work of Terra (2002).

$$\left(\frac{I_{it}}{K_{it-1}}\right) = \theta_1\left(\frac{I_{it-1}}{K_{it-2}}\right) + \theta_2\left(\frac{Sales_{it}}{K_{it-1}}\right) + \theta_3\left(\frac{Cash\ Flow_{it}}{K_{it-1}}\right) + \alpha_i + \delta_t + \varepsilon_{it}$$

(2.1)

$$\left(\frac{I_{it}}{K_{it-1}}\right) = \theta_1\left(\frac{I_{it-1}}{K_{it-2}}\right) + \theta_2\left(\frac{Sales_{it}}{K_{it-1}}\right) + \theta_3\left(\frac{Cash\ Flow_{it}}{K_{it-1}}\right) + \theta_4\left(\frac{Sales_{it-1}}{K_{it-2}}\right) + \alpha_i + \delta_t + \varepsilon_{it}$$

(2.2)

2.1 is the general equation which is used for the estimation. α_i is the firm specific parameter and δ_t are the time dummies. Here for analysis lag of capital is used in spite of current year capital in denominator.[10]

Similarly θ_1, θ_2 and θ_3 are the coefficients with the investment to capital, sales to capital and cash flow to capital ratio respectively. The key variable of concern here is cash flow to capital ratio. If the coefficient of cash flow to capital ratio θ_3 is found to be positive and significant then as per hypothesis the firms are considered to be more credit constraint whereas if it appears to be negative or insignificant than the firms are considered to be non-financial constraint.

Estimation technique and test for analysis

This study applied Generalized Method of Moments (hereafter GMM) one step and two step techniques, for the estimation of dynamic investment model, on the panel data set. Panel data set have many advantages over the other data sets. It increases the observation for analysis that is the primary need to obtain the effective and efficient estimates. GMM one step and two step estimation technique are used to tackle the problem of endogeniety which occurred due to the inclusion of lag of dependent variables and individual effects. This study uses Arellano and Bond (1991) one step and two step specifications for the analysis. This study reports the Levin, Lin and Chu & Breitung (2000) and Im, Pesaran and Shin (2003) test. The results of the panel unit root test for the variables used in this study are reported in table 1. Results obtained clearly states that all the variables used for analysis are stationary at 5% level of significance. J statistics is also known as Sargan test or Hensen test.

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[9] For more detail see Terra. (2002)
[10] For more detail see Badia and Slootmaekers (2009).

Variables Construction

This section explains variables used for analysis. The data on variables used by this study is collected from "Financial Statement Analysis of the Joint Stock Companies" prepared by State Bank of Pakistan. This study analyzes 500 firms of manufacturing sector of Pakistan for the period from 1974 to 2010. Brief description, composition, calculation and standard accounting definition of the variables are given below.

Capital (K): Capital includes property, plant, equipment and machinery. Capital is calculated as the expenditure on the fixed assets of the firms by deducting the depreciation. By deducting the depreciation form the fixed asset at cost we obtained the capital for the analysis. Depreciation shows wear and tear of the capital counted on annual basis.

$$Capital\ (K) = Expenditure\ on\ fixed\ asset - Depreciation$$

This is one of the important factors in determining the performance of firms. By using this in combination of other variables one can access the performance of the firm in different ways. Increase in the capital of firms indicates the increase in production capacity of firms.

Investment (I): Investment is defined as the expenditure on the fixed assets. Fixed assets include plant, machinery and equipment. It is calculated by deducting the current year expenditure on fixed asset (K_{it}) from the previous year expenditure on fixed asset (K_{it-1}) and adding the depreciation. Depreciation shows wear and tear of the capital counted on annual basis. Following formula is used to calculate the investment.

$$I_{it} = K_{it} - K_{it-1} + D_{it}$$

Where I_{it} show the investment, K_{it} is the current year fixed asset, K_{it-1} is the past year fixed asset and D_{it} is the deprecation. Investment is also an important indicator of measuring the performance and growth of companies. Higher the investment means higher the production capacity which will accelerate the profit of firms.

Cash Flow (CF): It is used to explain the variability of the internal finance and as a proxy for the financial constraint of the firms. By including this variable in the regression analysis, the study add liquidity into model to access the impact of credit constraint on firms' investment and growth. In this study, the sensitivity of cash flow to investment is given key importance. Calculation of cash flow is defined below:

$$CF = R + Deprication$$

CF is the cash flow; R is the retention in business.

Retention in the business is obtained after deducting tax provision and dividends from the income. Cash flow is of vital importance for the firms. Higher cash flow indicates that high internal finance generated by firms which can be used as source of investment for the potential investment opportunities. In the financing hierarchy, cash flow is the cheapest source available for the investment. Huge literature use cash flow for assessing that either the firms are financially constrained or not through investment-cash flow sensitivity.

Sales *(S):* This variable is of significance importance for the firms. This shows revenue generated by the firms. The ultimate goal of the firms is to maximize the sales for their growth. The purpose to include this variable is to capture the demand side or the investment opportunities for the firms. The rationale behind this is that when sales of firms' increases in the market this gives a signal to the firms for higher expected future demand due to which the investment opportunities for the firms increases. For the sake of profit firms want to invest more to capture the demand from the market. This variable is used in place of Tobin's Q11 to capture the investment opportunities for the firms. A lot of studies use this variable and explored to it an important determinant of firms' growth and investment.

Growth: Growth is calculated by the taking difference of investment on the physical assets like plant and machinery in logarithm form. In order to calculate the growth, this study firstly calculate investment in fixed assets12 and takes the difference of current and previous year investment on fixed asset in logarithm form. The following formula is used to calculate the growth.

$$Growth_{it} = Log\left(I_{it} - I_{it-1}\right)$$

I_{it} Shows the investment on fixed asset in current year and I_{it-1} is the investment on fixed asset in the previous year. This variable is of vital importance because it directly indicates the performance of firms either they are growing or not. In most of the studies, growth is used as dependent variable for analyzing the factors that affect growth of the firms. Carpenter and Peterson (2002) use this variable in combination of internal finance to access either the growth of small firms is constrained by internal finance or not.

Results and discussion
Credit constraint and firms' investment

This section explains the results for the full sample during the time frame 1974-2010. The results for the overall sample by estimating equation 2.1 and

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[11] For detail see more Fazzari et al. (1988).

[12] $Investment = Fixed\ Asset_{it} - Fixed\ Asset_{it-1} + Deprication$

equation 2.2 are reported in table 2 in the **Annexure**. Equation 2.1 is estimated by including the current year sales whereas equation 2.2 contain one lag of the sale to capital ratio to properly incorporate the investment opportunities of the firms to maximum extent[13]. The key variable of concern in this study is cash flow to capital ratio. Firstly, this study estimates the equation by including current year sales to capital ratio. Results obtained by this study indicate that the effect of cash flow to capital ratio is positive and insignificant at all significance levels. The lag of dependent variable[14] turned out to be the negative and significant at 1% significance level in both equations. Lag of dependent variable shows the adjustment cost[15] that firms bear in moving from one level of investment to the next level. Negative sign of dependent variable in case of this study indicates that current year investment spending don't have any spillover effect on the investment of next year, rather are followed by lower investment rate over the next years. Sale to capital ratio also explored to be significant at 1% level of significance with positive sign for equation 2.1 implying the increase in the investment opportunities or the demand of the firms' products. Effect of sale to capital ratio is also significant and positive at 5% level of significance in equation 2.2. Sale to capital ratio shows that 1% increase in the sales to capital ratio causes 0.24% increase in the investment spending of the firms that indicates the presence of investment opportunities for the firms in manufacturing sector of Pakistan.

Results acquired by adding lag of sale to capital ratio shows that past year sales also have positive impact on the investment decision of the firms. The effect of lag of sale to capital ratio explored to be significant with positive magnitude at 5% level. The effect of lag of sale to capital ratio points out that 1% increase in the marginal productivity of capital cause 0.009% increase in investment spending of the firms. If there is increase in the sale of the past year it pushes the firms to invest more.

Increase in the demand of firms' products in the market sends signal to the firms to increase their investment spending because as per sales accelerator theory of investment, firms invest more if they expect their demand is rising in the market. Due to this, investment of the firms varies with the past year sale to capital ratio. Lag of dependent variable is also significant at 5% level of significance with negative sign because of the adjustment cost that the firms' bear during expansion from one level of investment to the next level of investment. The results on this issue are similar to the findings of Terra (2002).

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[13] For detail see Terra (2002).

[14] Lag of dependent variable here also shows the relation between current year investment decisions to that of the previous year investment decision.

[15] For more detail see Harrison *et a*l. (2004) and Love (2003).

The significance of instruments is tested by Sargan test. Second order serial correlation among the residuals is represented by m2. The null of no serial correlation is accepted by this study and instruments used explored to be valid. This indicates that results estimated by this study are independent form the problem of the serial correlation among the residuals. The insignificant effect of the cash flow to capital ratio in accordance to the hypothesis indicates that firms in manufacturing sector of Pakistan are not credit constrained or facing no external financial constraint. Because of this firms of manufacturing sector do not rely on internally generated funds to finance its working capital and investment needs.

External financial Constraints in different political regime's
The empirical results obtained for different political regimes are reported in table 3. The discussion on results obtained is as follow:

Bhutto's era (1974 to 1977)
The effect of past year sale to capital ratio is also positive and significant in Bhutto's era indicating the presence of investment opportunities for the firms. Bhutto's era is termed as an era of growth and nationalization. The effect of cash flow explored to be non-significant in the periods from 1974 to 1977 indicates that investment of firms in these periods were independent from the internal finance because the most prominent policy change that had occurred in Bhutto's regime was the nationalization of the 43 large industrial units in 1972. The nationalized industrial units consisted on cement, chemical, oil refining, engineering, cooking oil, flour, cotton and rice husking mills.

The results obtained from the analysis indicate that the firms in Bhtto's era were not facing external financial constraints because heavy subsidies were provided to both agriculture and industry. In agriculture sector the subsidies are provided in the form of subsidized inputs (water, fertilizer, pesticides) that was a part of the elite farmer strategy. In industry subsides were provided directly and indirectly such as an over-valued exchange rate, subsidized credit and tax incentives to an industrial sector that was inefficient and lacked export competitiveness (Hussain, 2006).

Zia's era (1978 to 1988)
The period of 1978 to 1988 was Zia's regime that witnessed economic growth, religious extremism and prelude to recession. The Zia regime was considered to be the starting point of the religious extremism that up till now is a significant constraint for the private sector investment due to lack of confidence on the security related matters. For the sake of gaining political and economic support Zia's government became part of the US policy in the war against Soviet Union. Zia's government gave financial support to the madras' for jihad in Afghanistan. This helped Zia's government to gain a massive financial aid and support to

reschedule its foreign loans from the west that leads to the ease in the budget deficit. Another important factor that eases the pressure on the budget deficit in Zia's era was the massive movement of human capital to the Middle East that increased the remittances and helps to boost up the macro figures (Hussain, 2006). Firms' investment to cash flow is significant in this period that indicates that firms face external financial constraint in the period from 1978 to 1988. During this era (1978 to 1988), financial flow from west to meet the severe budget deficit, heavy provision of cheap credit, high remittances and friendly protection polices causes the domestic demand to rise whereas financial sector at that time was not developed enough to meet the demand so the firms in this regime were facing tight external financial constraints.

Democratic interlude (1989 to 1999)

The period of 1989 to 1999 was considered to be the democratic interlude that had experienced deepening crises of economy. The decade of the 1990's was marked by democratically elected regimes attempting to practice authoritarian forms of power within an ostensibly democratic order (Hussain, 2006). The effect of cash flow explored to be non-significant in the period 1989 to 1999 indicating that firms in this period were not facing external financial constraints along with that effect of past year sale to capital ratio is also positive and significant shows the presence of investment opportunities for the firms in these regimes. Total investment (as a percentage of GDP) declined from 17.9% in the period 1988-93 to 16.3% in the period 1993-1998[16] . During this decade there were a lot of significant factors that had found to be the reason of adverse effect on private investment and GDP growth. The private sector investment in this sector did not increase and remained constant at 9% so plenty of external financial resources were available for the need of existing firms in the private sector.

PML Q[17] era (2000 to 2008)

The period of 2000 to 2008 was Mushraf's regime which was stated as reverberation of history (Hussain, 2006). In the PML Q's regime political and economic reforms were occurred because of this GDP growth accelerated to 6% and all other macroeconomic indicators performed well. Budget deficit was tolerable but the poverty level remains in the red spot. This high GDP growth that had been occurred in this regime was based on the growth of large scale manufacturing sector.

The effect of cash flow discovered to be significant but have negative sign for the period 2000 to 2008. This indicates that firms in the manufacturing sector

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[16] For more detail see Hussain (2006).
[17] Pakistan Muslim League Quaid Azam

of Pakistan during the time period (2000 to 2008) were not facing the problem of getting external finance because of the investment friendly policies of PML Q.

Empirical investigation of impact of financial reforms on credit constraint and firms' investment

The results for the credit constraint and investment during the period of nationalization of financial institution and decentralization of financial institution are reported below in table 4 of the **Annexure**. Results indicate that the effect of cash flow is positive, significant and causes 0.20% increase in the investment to capital ratio with the 1% increase in the internal finance in pre financial sector reform period. The effect of lag of sale to capital ratio is positive and significant at 1% level of significance in pre financial sector reform era. The coefficient of lag of sale to capital ratio shows that 1% increase in the lag of sale to capital ratio causes 0.017% increase in investment to capital ratio. This indicates that investment spending of the firms is dependent on the past year marginal productivity of capital. Similarly, current year sale to capital ratio also appeared to be positive and significant. This is an indication of investment opportunities of firms in pre financial sector reform period.

The effect of internal finance is positive and significant in post financial sector reform period at 5% level of significance. In post financial sector reform period results shows that with the 1% increase in the internal finance there is 0.020% increase in the investment of the firms that is lower than the period of pre financial sector reform period. The effect of lag sale to capital ratio is positive and significant at 1% level. Similarly, current year sale to capital ratio for the period of post financial sector reform era is positive and significant at 1% level of significance. The lag of dependent variable is negative and significant in both pre and post financial sector reform period that shows the adjustment cost which the firms bear in moving from one level of investment to next level.

Results for investment and credit constraint in pre and post financial sector reform shows that firms were facing external financial constraint in both pre and post financial sector reform era but firms in pre financial sector reform were facing tight external financial constraint as compared to post financial sector reform era. One of the important initiatives of Bhutto's government was the nationalization of industrial units. This took in two sets, first set of nationalization hits large industries while second set hits the small and medium industries. These initiatives widen the functions of government along with expenditures so targeted credit dispersion took place in this era. Due to this firms face tight external financial constraint in pre financial sector reform period while decentralization polices decrease the concentration and increase the competition and efficiency due to which firms' in post financial sector reform era face less external financial constraint as compared to pre financial sector reform era.

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Annexure

Panel Unit Root Test

Variables	LLC Test Stat	p − value	IPS Test Stat	p − value	Conclusion
$\dfrac{S_{it}}{K_{it-1}}$	-13.2857	0.0000	-9.88416	0.0000	Stationary
$\dfrac{I_{it}}{K_{it-1}}$	-484.99	0.0000	-36.8008	0.0000	Stationary
$\dfrac{CF_{it}}{K_{it-1}}$	-17.1144	0.0000	-22.9179	0.0000	Stationary
$Sales\ Growth_{it}$	-46.2073	0.0000	-52.5213	0.0000	Stationary
$Growth_{it}$	-220.916	0.0000	-64.2175	0.0000	Stationary

Note:

- LLC denotes the Levin, Lin and Chu panel unit root test while IPS is the Im, Pesaran and Shin panel unit root test.
- (S_{it}/K_{it-1}), (I_{it}/K_{it-1}), $(C\,F_{it}/K_{it-1})$ are Sales to capital ratio, investment to capital ratio, cash flow to capital ratio, sales growth and Growth in the investment of fixed assets.

Credit Constraint and Investment (1974-2010): Dependent Variable $\left(\dfrac{I}{K}\right)_{it}$

Estimates of Equation 2.1		Estimates of Equation 2.2	
Explanatory Variables	Coefficients	Explanatory Variables	Coefficients
$\left(\dfrac{I_{it}}{K_{it-1}}\right)_{t-1}$	-0.0027 (0.0002)*	$\left(\dfrac{I_{it}}{K_{it-1}}\right)_{t-1}$	-0.0144 (0.0049)*
$\dfrac{S_{it}}{K_{it-1}}$	0.2443 (0.0076)*	$\dfrac{S_{it}}{K_{it-1}}$	0.0053 (0.0072)**
$\dfrac{CF_{it}}{K_{it-1}}$	0.0130 (0.0093)	$\dfrac{CF_{it}}{K_{it-1}}$	0.0077 (0.0138)
−	−	$\dfrac{S_{it-1}}{K_{it-2}}$	0.0098 (0.0032)*

Estimates of Equation 2.1		Estimates of Equation 2.2	
Explanatory Variables	Coefficients	Explanatory Variables	Coefficients
m2 (Statistics Value)	0.0170	m2 (Statistics Value)	0.0001
Sargan (p value)	0.0310	Sargan (p value)	0.083

Note

➢ $(I_{it}/K_{it-1})_{it-1}$ is the Investment to Capital ratio it is the lag of the dependent variable, (S_{it}/K_{it-1}) is Sales to Capital ratio and (CF_{it}/K_{it-1}) cash flow to capital ratio.

➢ GMM two step estimates.

➢ Standard errors are in parenthesis.

➢ m2 is the second order serial correlation tests based on residuals asymptotically distributed as N (0, 1) under the null of no serial correlation.

➢ Sargan is the test of instruments' validity asymptotically distributed as χ^2 under the null that instrument is valid.

➢ Statistics significant at 1%, 5% and 10% is denoted by *, ** and *** respectively.

➢ Constant and Time dummies are included. (Not reported).

Table 3

Credit Constraint Under Different Political Regimes:

Dependent Variable $\left(\dfrac{I_{it}}{K_{it-1}} \right)$

Explanatory Variables	Coefficients			
	1974 to 1977	**1978 to 1988**	**1989 to 1999**	**2000 to 2008**
$\left(\dfrac{I_{it}}{K_{it-1}} \right)_{t-1}$	-0.2675 (0.0760)*****	-0.0163 (0.0064)**	-0.0499 (0.0105)*	-0.0046 (0.0018)**
$\dfrac{S_{it}}{K_{it-1}}$	0.1807 (0.036)*	0.0146 (0.0042)*	-0.0052 (0.0022)**	0.0016 (0.0026)
$\dfrac{CF_{it}}{K_{it-1}}$	0.1408 (0.2227)	0.2707 (0.0574)*	0.0115 (0.0256)	-0.0022 (0.0031)*
$\dfrac{S_{it-1}}{K_{it-2}}$	0.0541 (0.0202)*	0.0102 (0.0021)*	0.0126 (0.0036)*	0.0035 (0.0016)**
m2 (Statistics Value)	0.745	0.00007	0.0000	0.00003
Sargan (p value)	0.4947	0.33172	0.17159	0.2906

Note

➢ 1974 to 1977 is Bhutto's era, 1978 to 1988 is Zia era, 1989 to 1999 is democratic era, and 2000 to 2008 is Mushraf era.

➢ Statistics significant at 1%, 5% and 10% is denoted by *, ** and *** respectively.

➢ Constant and Time dummies are included. (Not reported).

➢ For the detail of variables, estimation technique and computation methods see table 5.1

Table 4

Pre and Post Financial Sector Reform Analysis

Explanatory Variables	Coefficients for Pre and Post Financial Reform Periods	
	1974 to 1990	**1991 to 2010**
$\left(\dfrac{I_{it}}{K_{it-1}}\right)_{t-1}$	-0.0660 (0.00453)*	-0.0123 (0.0014)*
$\dfrac{S_{it}}{K_{it-1}}$	0.0053 (0.0022)**	0.0155 (0.0033)*
$\dfrac{CF_{it}}{K_{it-1}}$	0.2012 (0.04201)*	0.0207 (0.0125)**
$\dfrac{S_{it-1}}{K_{it-2}}$	0.0174 (0.0017)*	0.0084 (0.0013)*
m2 (Statistics Value)	0.0014	0.0001
Sargan (p value)	0.1683	0.0698

Note

➢ 1974 to 1990 period is Pre Financial Reform era and 1991 to 2010 is Post Financial Reform era

➢ Standard errors are in parenthesis.

➢ M2 is the second order serial correlation tests based on residuals asymptotically distributed as N (0, 1) under the null of no serial correlation.

➢ Sargan is the test of instruments' validity asymptotically distributed as χ^2 under the null that instrument is valid.

➢ Constant and Time dummies are included. (Not reported).