Balance Sheet Channel of Monetary Policy and Economic Growth under Fiscal Dominance: Evidence from Pakistan

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Balance Sheet Channel of Monetary Policy and Economic Growth under Fiscal Dominance: Evidence from Pakistan

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Abstract

Using micro data on non-financial listed companies in Pakistan, over the period of 2000-2010, this paper emphasizes over the impact of monetary policy on economic growth through balance sheet channel. At first step, monetary tightening deteriorates the net worth of the firms and leads to cash flow squeeze; of which later affects the economic growth. We find this impact to last for three years over the balance sheets of the firms. Since, industrial sector drives the economic growth; we forecast corporate profitability at the second step. Empirical investigation shows that corporate profitability reverts to its mean at the rate of 25 percent. During Peak, mean reversion is 30 percent while it is 19 percent during trough implying that recession stays relatively longer and economic revival is slow during recessionary phase.

JEL Classification: *E52, E50, H32, C33, G12*

Keywords: *Monetary policy, monetary transmission, balance sheet channel, forecasting, profitability*

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1. Introduction

The period of recent past has witnessed profound changes at the international economic arena, particularly in the wake of financial crisis. Many economies, including South Asian region, suffered twin deficits as well as monetary overhang. Monetary policy, which is primarily used as a stabilization tool to achieve long term macroeconomic stability, played a crucial role. Many of them followed tight monetary policy which helped them to achieve stable macroeconomic environment. However, countries like Pakistan who are facing the issue of fiscal dominance could not reap the full benefits of monetary policy.

Monetary policy in Pakistan broadly aims at attaining long term sustainable economic growth by achieving price stability. Although the impact of monetary policy transmits through various transmission channels, the ultimate strength of a particular channel depends upon its degree of effectiveness for stimulating economic growth. In the absence of fiscal discipline, growing fiscal imbalances emanating from less buoyant revenues and low external financing options, require seigniorage revenues to meet the financing requirements which build strong inflationary pressures on the economy. In these circumstances, unless fiscal authority makes a commitment to maintain the primary deficit in a feasible range State Bank cannot ensure price stability (Choudhri and Malik, 2012). Thus following an interest rate rule to fight inflation under fiscal dominance leads to crowding out of the private sector, which ultimately dampens the economic growth.

Since industrial sector is considered as an engine of economic growth, we explore the balance sheet channel of monetary policy and observe the behavior of corporate sector of Pakistan over a complete business cycle. This paper is distributed into two parts. In first part, following the theoretical groundings set by Bernanke and Gertler (1995), we compute the impact of monetary contraction over the balance sheets of the corporate sector and find that monetary tightening affects the borrower's balance sheet through two channels, i.e. net worth channel and cash flow channel. Under net worth channel, tight monetary policy erodes the net worth of the firms which reduces the value of their collateral and lowers the credit worthiness of a firm. While in later, with a rise in interest rate, financial expenses of the firms rise, their output drops and profits decline. Shabbir (2012)

classified firms into SME and large and found that tight monetary policy worsens the net worth of both the SMEs and large firms, with SMEs getting more hit on their cash flows, short-term borrowing, and revenues. Moving one step ahead, in this paper we compute the impact of monetary tightening over the corporate sector at aggregate level and observe the length of these effects over the balance sheet of corporate sector by including lags. In addition, we observe how net worth erosion and cash flow squeeze hampers the economic growth. For this purpose, we define output buoyancy of ith firms and investigate the length of impact of monetary policy. Our results show that liquidity is the most important factor in a firm's life, and it is the cash flow squeeze, which affects the output buoyancy. The effect of monetary tightening lasts for three years over the balance sheet of the firm, which gradually subsides over three years.

Economic theory suggests that under competition, the rate of return on investment tends towards equality and profitability is mean reverting within as well as across industries (Stigler, 1963; Fama and French, 2000, Fama and MacBeth 1973; Allen and Salim, 2002; Ahmed 2005). In the later section of this paper, we investigate whether profitability is mean reverting in Pakistan and observe the behavior of non-financial corporate sector of Pakistan during a complete business cycle. Since, the sample under observation covers almost 76 percent of industrial GDP; we draw inferences for long run economic growth in Pakistan. Using the methodology of Fama and MacBeth (1973), we forecast corporate profitability through year-by-year cross section regression and use their average slopes and time series standard errors to draw inferences. We find that corporate profitability reverts to its mean at the rate of 25 percent during a complete business cycle, while the mean reversion rate is calculated as 30 percent during Peak and 19 percent during Trough. These asymmetric behaviors of mean reversion imply that recession lasts relatively longer than the expansion; and monetary contraction during recession may push the economy into prolong recessions.

Road map of the later sections of this paper is as follows. Using the data of 213 non-financial listed companies at stock exchange of Pakistan, section 2 empirically investigates the monetary transmission mechanism under fiscal dominance and observes the impact of monetary tightening over economic growth. Section 3 links the balance sheet channel of monetary transmission with corporate profitability and the business cycle fluctuations. Section 4 concludes the

paper and provides policy recommendations for the researchers and policy makers.

2. Monetary Transmission, Fiscal Dominance and Economic Growth

Owing to growing fiscal imbalances and government's appetite for seigniorage revenues, government's budgetary borrowing as percent of Net Domestic Assets (NDA) is increasing over time, which has led to persistently high inflation and a crowding out effect on private investment. To stabilize the price level, State Bank of Pakistan (SBP) followed monetary tightening during 2004-2011, which could not bear fruitful results due to growing fiscal dominance (**see Figure 1**). Literature on fiscal dominance suggests that central bank cannot ensure price stability unless fiscal authority makes a first move and ensure fiscal discipline by defining the level of primary deficit. Thus, without the coordination of both the monetary and fiscal policy, central bank cannot follow interest rate rule and ensure price stability as well as macroeconomic stability (Zhou, 2012; Choudhri and Malik, 2012; Kumhof et.al 2010; Sidaoui 2003; Sargent and Wallace, 1981).

Sustainable long term economic growth cannot be achieved without a growing industrial sector. Though, industrial sector of Pakistan holds almost 26 percent share in GDP, it pulls the overall economy through backward and forward linkages in the agriculture and services sector and further generates the employment opportunities. The impact of monetary policy primarily transmits to the industrial sector through balance sheet channel. Evidence on financial accelerator in Pakistan suggests, "*pass-through of policy decisions to borrowers is greater during monetary contractions*" (Choudhry et. al 2012). Monetary tightening under fiscal dominance broadly hits the industrial sector in three ways. First, government's financing requirements reduces the supply of loanable funds. Banks find it more lucrative to invest in risk free government securities than to extend credit to private sector businesses. Additionally, banks reallocate their funds and divert credit towards large firm who are capable of mobilizing credit through various resources, including the option of issuing credit papers. Whereas small firms fail to tap resources from financial sector and get bigger hit (Shabbir, 2012). Hence, government being a lucrative and big borrower crowds out the private investment. Secondly, rising interest rates increases the cost of doing

business. Almost 70 percent of credit demand by the firms is to meet their working capital requirements. High interest rate increases their debt liabilities as well as financial costs, which erodes their net worth and leads to cash flow squeeze and ultimately dampens the economic growth. Thirdly, fiscal dominance jeopardizes the power of monetary policy to stabilize the overall price level at a certain level. Growing inflation not only reduces the real money holdings, but spiral of growing inflation leads to extrinsic inflation persistence, which increases input cost of the firm, and reduces their gross profits. However, the degree of extrinsic inflation persistence in Pakistan is yet to be explored.

Following the theoretical groundings set by Bernanke and Gertler (1995), subsequent parts of this section explores the effect of monetary policy on the net worth and cash flow of the corporate sector of Pakistan. We use lag variables of net worth and cash flow to compute the length of impact of monetary policy decision over the balance sheets of the firms. Later we link these variables with the output buoyancy of the firms and see how balance sheet channel of monetary policy transmits into economic growth.

2.1 Data and Research Methodology

To explore the balance sheet channel of monetary transmission, we study the behavior of 213 non-financial companies over the period of 11 years (2000-2010). These companies are listed at Karachi Stock Exchange and broadly belong to textile, cement, chemical, sugar, automobile, energy, and fertilizer sectors. These companies hold almost 76 percent share in Industrial GDP. Micro information on the audited financial accounts of these companies is collected through their annual reports. Due to limited availability of annual reports of listed companies, the analysis is constrained to 213 companies observed over 11 years. However, the length of this database is enough to cover a complete business cycle of Pakistan economy.

Prime source of key variables – share holders equity, surplus on revaluation of assets, short term and long term debt liabilities of the companies, inventories, total assets, selling and administration expenses, net sales, financial expenses, income tax, profit before tax, profits after tax, depreciation are the annual financial accounts of these companies. Information on capital employed, total dividend, current assets is collected from "Balance Sheet Statistics of Joint Stock

Companies Listed at Karachi Stock Exchange" published by SBP. Data on number of shares, face value of shares, cash dividend, and stock dividend is collected from Karachi Stock Exchange. To collect information on break up of real and nominal GDP, and inflation, we used various editions of "Pakistan Economic Survey" annually published by Ministry of Finance. While data on overnight interest rate and government's budgetary borrowing is collected from SBP.

We compute the effects of monetary transmission on the balance sheets of the corporate sector through two channels; i) The Net worth channel ii) The Cash flow channel. At the next step we see whether the impact of these channels transmits in to economic growth and we compute balance sheet channel and economic growth at third step.

2.1.1 The Net Worth Channel

Monetary contraction increases the interest rate, depletes the asset prices and directly affects the credit worthiness of borrowing firm by eroding the value of its collateral. Weak firms back the depleting value of their equity with the surplus on revaluation of their assets, which provide them a cushion for a short time. However, if the financial health of the firm does not improve, their net worth turns negative and they close down their business. Additionally, banks extend credit to the firms on the basis of their credit worthiness. During monetary contraction, banks reallocate their funds and redirect funds from small firm to large firms assuming them risky (Oliner and Rudebusch, 1996; Wesche, 2000; Guariglia and Mateut, 2006; Gertler and Gilchrist, 1994). Following the definition of Bernanke and Gertler (1995), we define net worth as the difference between total assets and total liabilities of a firm.

We use linear panel data models of fixed effects and random effects to estimate the effect of monetary contraction over the net worth of the firm. The baseline model is defined as:

$$NW_{it} = \alpha + X_{it}\beta + u_i + \mathcal{E}_{it} \qquad i = 1, 2, \ldots N \qquad (1)$$

NW is net worth to Asset ratio of ith firm observed over the period t,

X = f(ONIR, FINS, SDA, LDA, DA, SDS, INVS),

u_i is between-entity error, while ε_{it} is within-entity error. ONIR is overnight rate, FINS is the ratio of financial expenses of the firm to its assets, SDA is the ratio of short term debt of firm to its assets, LDA is the ratio of long term debt of the firm to its assets, DA is total debt of ith firm to its asset, SDS is ratio of short term debt of a company to its sales, INVA is the ratio of inventories to assets, while INVS is the inventories ith firm as a ratio of its output. To capture the effect of individual heterogeneity across the sample firms, we use the same set of variables to estimate fixed effect model of linear panel data model as:

$$NW_{it} = \alpha_i + X_{it}\beta + u_i + \varepsilon_{it} \qquad i = 1, 2, \ldots N \qquad (2)$$

We use Hausman test to decide between using the fixed effect model and the random effect model. Since the value of Hausman is 0.85 (Prob > chi^2 = 0.85) which suggest using the random effect model. We, therefore, report the results obtained from random effect model in Table 1. Additionally, robust standard errors are used to control for heteroskedasticity in the model. To see the length of effect of monetary policy over the net worth of the firm, we take lag of net worth to asset ratio. The model takes the following form:

$$NW_{it+k} = \alpha + X_{it}\beta + u_i + \varepsilon_{it} \qquad k = 1, 2, 3, \ldots N \qquad (3)$$

The results obtained are reported in Annexure Table 1.

2.1.2 The Cash Flow Channel

The impacts of monetary contraction through a rise in interest rates increases the financial expenses of the firms and create liquidity issues for the firms, thereby leading to cash flow squeeze. (Wesche ,2000; Zaderey, 2003; Guariglia and Mateut, 2006; Karim and Zulkefly, 2010; Özlü and Yalçin, 2010). We define cash flow variable using the definition of Karim and Zulkefly (2010) and calculate it as a sum of firm's net profit and depreciation and amortization. Depending upon the value of Hausman test, which turns out to be lower than 0.5, we use linear panel data model of fixed effects to estimate the cash flow channel. The linear panel regression takes the following form.

$$CF_{it} = \alpha_i + X_{it}\beta + u_i + \mathcal{E}_{it} \qquad i = 1, 2, \ldots 213 \qquad (4)$$

Where CF is ratio of cash flow of ith firm to its assets over time period t. X is the set of explanatory variables that include FINS, SDA, LDA and INVA, defined above. Though heteroskedasticity is hardly an issue for micro panel models with less than 20 years, but based on results of WALD test for group wise heteroskedasticity, we control for heteroskedasticity by using robust standard errors in the model. To see the length of monetary policy effect over the cash flow of the firm, we take the lag of CF_{it}. We find this impact to last for 3 years, i.e. from t to t+2. Thus the baseline regression is defined as:

$$CF_{it+k} = \alpha_i + X_{it}\beta + u_i + \mathcal{E}_{it} \qquad k = 1, 2, 3, \ldots N \qquad (5)$$

Empirical results from these regressions are presented in Table 2 in Annexure.

2.1.3 Balance Sheet Channel and Economic Growth

To examine the impact of monetary transmission on economic growth, we define output buoyancy as a ratio of percentage change in firms output to the percentage change in industrial GDP. The presumption behind defining this variable is to observe how a company's output responds to the change in total output of the economy. We then observe the behavior of output buoyancy in response to changes in cash flow and net worth of the firm along with other key variables. Empirical model of fixed effect[†] linear panel data model, therefore, takes the following form:

$$OB_{it} = \alpha_i + X_{it}\beta_1 + u_i + \mathcal{E}_{it} \qquad i = 1, 2, 3 \ldots N \qquad (6)$$

OB is output buoyancy of ith firm over time t. while X = f (NW, CF, DA, INVA, ONIR, FINS). Based on the results from WALD test for group wise heteroskedasticity, we use robust standard errors to tackle the issue of heteroskedasticity. Further to estimate the length of current monetary policy over economic growth, we take lags of OB_{it} as done in the previous parts of this section. The results are then presented in Table 3 of Annexure.

[†] The value of Hausman test turns out 0.11. Thus we use fixed effect linear panel data model.

2.2 Empirical Findings

Empirical results obtained for net worth channel are reported in Table 1 in Annexure. These results are in line with the theoretical groundings of balance sheet channel. Monetary contraction reduces the net worth of firms. The impact of rising interest rates reduces the value of borrowers collateral and affects her credit worthiness. The impact of rise in ONIR over the net worth of a firm lies between 1-9 percent. Rise in interest rates immediately increases the financial expenses of the firms through short term debt, when borrowed at higher interest rates affecting the long term liabilities of the firms as banks link their long term lending to bench mark rate, which in turn increases the cost of their long term liabilities. We observe this impact range between 4-12 percent. Since, a large part of the corporate borrowing is meant to for working capital; SDA hits the net worth of the firm by 60 percent, while it is 37 percent for total debt liabilities (DA), implying high liquidity constraints of the corporate sector of Pakistan. At second step, we take lag of NW in first period, and find that monetary tightening in period one affects the DA in 2^{nd} period and this impact is minimum 5 percent. These results are significant at 1 percent. Unlike the literature on balance sheet channel that states firms start inventory accumulation during the first quarter, we do not find any evidence of inventory accumulation by firms during first year. However, we observe this trend in 2^{nd} period.

Results from cash flow channel are reported in table 2. These results are also in line with the economic theory. We find that SDA affects the cash flow by 22 percent, while the impact of LDA is relatively low (3 percent). The wave of monetary tightening affects the cash flow of a firm for almost three years, however, the impact of SDA and LDA decelerates over time. These results are significant at 1 percent and 5 percent. We find evidence for inventory accumulation in 2^{nd} and 3^{rd} periods (t+1 and t+2), which supports the cash flow of the firm.

Table 3 provides empirical findings on relationship between NW, CF and other debt variables with OB. The value of OB greater than 1 suggest that OB is highly influenced with the cash flow, and borrowing. This supports the argument that liquidity is the driving force behind a sound business. High cash flow keeps the firm solvent and helps running the business. We do not find any evidence that net worth of the firm matters for the long term growth of economy. Our results for

NW are not significant. Additionally, we find that impact of cash flow affects the economic growth for 3 years, though the degree falls in 2nd and 3rd years.

3 Monetary Transmission, Corporate Profitability and Business Cycle

Long run sustainable economic growth depends upon a flourishing corporate sector, which cannot be achieved unless stabilizing policies provide a macroeconomic environment conducive for business. Monetary transmission as observed in previous section, affects the cash flow of firms, and reduces their profit margins over time, which may alter the course of long run economic growth and push economy into prolonged recession. To investigate this hypothesis, we use the micro data on financial accounts of the non-manufacturing sector, utilized in the earlier section. The length of this data is enough to observe the behavior of corporate sector in response to monetary policy over a complete business cycle (see Figure 2).

Literature on corporate profitability suggests that under competition, rate of return on investment across industries equalizes over time, implying that profitability of corporate sector reverts to its mean within as well as across industries. High competition within and across industry does not allow the firms to earn monopoly profits for a longer period of time and thus reduces the profit margin of firms over time and corporate profitability reverts to its mean value. Extending this phenomenon to economic growth, this theory implies that once the path for the long run economic growth is set, industrial sector will follow the same trend. Graphical analysis, done on the basis of empirical findings of the subsequent section shows that corporate profitability in Pakistan reverts to its mean, but Pakistan economy has a slightly downward trend for long term economic growth, which keeps the economy moving in the same spiral (see Figure 3 and Figure 4). Additionally, following the methodology of Fama and MacBeth (1973) we estimate the speed of mean reversion during Peak and Trough of business cycle and find that monetary contraction may reduce the speed of mean reversion and thus increase the length of economic recession. Nevertheless, we can draw inference that monetary policy may stimulate economic growth, but setting this downward sloping path to upward position will now require more effort and strict fiscal discipline.

3.1 Research Methodology

Following the methodology of Fama and MacBeth (1973) used by Fama and French (2000) to compute and forecast the profitability and earnings of corporate sector, we forecast the profitability of corporate sector of Pakistan and compute the mean reversion rate during peak and trough of business cycle. Instead of using a time series model which may not provide precise estimates due to shorter time series, we use year-by-year cross section regression and use their average slopes and time series standard errors to draw inferences. We, therefore, forecast the corporate profitability in 3 steps.

Step 1: Measuring the level of corporate profitability

To determine the expected profitability of the firm, we define the baseline cross section regression for each year. The model takes the following form:

$$Y_{it} / A_{it} = \alpha_i + X_{it}\beta_1 + u_i \qquad i = 1, 2, 3, \ldots N \qquad (7)$$

Y_{it} / A_{it} is profit before tax of ith firm as percent of its assets,

$$X_{it} = f(\text{DIVE, DD, TQ, LEV, CURR, CAPP}),$$

and u_i is error. We define DIVE as dividend to equity ratio, DD a dummy variable which is equal to 0 for dividend paying companies, and 1 for non-dividend payers, TQ is Tobin Q, which is calculated as the ratio of market capitalization of each firm to its assets, LEV is the leverage ratio defined as total liabilities of the firm to its shareholder's equity, CURR is the ratio of current assets of ith firm to its assets during time t, and CAPP is indicator of capital intensity computed as the ratio of capital employed of a company to its output. The results obtained from the regression are reported in Table 4 in annexure.

Step 2: Linear Partial Adjustment Model for Forecasting Corporate Profitability in Pakistan

Based on the estimates obtained from cross section time series regression in equation 7, we estimate the following linear partial adjustment model to forecast corporate profitability:

$$CP_{it+1} = \beta_{ot} + \beta_{1t} DFE_{it} + \beta_{1t} CP_{it} + u_{it+1} \quad (8)$$

We define $CP_{it+1} = Y_{it+1}/A_{it+1} - Y_{it}/A_{it}$; $DFE_{it} = Y_{it}/A_{it} - E(Y_{it}/A_{it})$ and $CP_{it} = Y_{it}/A_{it} - Y_{it-1}/A_{it-1}$

CP_{it+1} is the corporate profitability in period 2, DFE_{it} is the deviation of corporate profitability from its mean value, $E(Y_{it}/A_{it})$, estimated from equation 7 and CP_{it} is the change in corporate profitability, while u_{it+1} is the error term. The estimates of this regression are presented in Table 5.

Following Ahmed (2005), we assume that all firms revert towards one equilibrium level of expected profitability and estimate the model as:

$$Y_{it+1}/A_{it+1} - Y_{it}/A_{it} = \beta_{ot} + \beta_{1t}(Y_{it}/A_{it}) + \beta_{2t}(Y_{it}/A_{it} - Y_{it-1}/A_{it-1}) + u_{it+1} \quad (9)$$

By estimating equation 9, we find the rate of reversion ($-\beta_1$) towards the long run equilibrium, which is the long run growth path of Pakistan economy. Results of this regression are reported in Table 6 in Annexure.

Since data under consideration covers a complete business cycle, we compute the speed of adjustment for the corporate sector in Pakistan to its mean value during Peak and Trough using equation 8 and 9. These findings are presented in Table 8.

Step 3: Non-Linear Partial Adjustment Model for Forecasting Corporate Profitability in Pakistan

Some studies on the mean reversion behavior of the firms found a non-linear behavior of the firms. For example Brook and Buckmaster (1976) observed that changes in earnings reverse from one year to another and speed of reversion towards mean is higher when the changes are strong. While estimating the speed

of reversion towards mean for the listed companies in US, Fama and French (2000) also found evidence for the presence of non-linearities in the corporate profitability. We, therefore, also model the non-linearities using the Fama and French (2000) methodology. Our model takes the following form:

$$CP_{t+1} = \beta_{ot} + \beta_{1t}\, Y_{it}/A_{it} + \beta_{2t}\, E(Y_{it}/A_{it}) + \beta_{3t}\, NDFE_{it} + \beta_{4t}\, SPDFE_{it} + \beta_{5t}\, SNDFE_{it} + \beta_{6t}\, CP_{it} + \beta_{7t}\, NCP_{it} + \beta_{8t}\, SNCP_{it} + \beta_{9t}\, SPCP_{it} + u_{it} \quad (10)$$

In equation 10, $NDFE_{it}$ is defined as DFE_{it} , when DEF_{it} is negative; $SPDFE_{it}$ is the square of DFE_{it} when $SPDFE_{it}$ is positive; $SNDFE_{it}$ is the square of DFE_{it} when DFE_{it} is negative; NCP_{it} is CP_{it} when CP_{it} is negative; $SNCP_{it}$ is the square of CP_{it} when CP_{it} is negative; $SPCP_{it}$ is the square of CP_{it}, when CP_{it} is positive.

Results obtained from the equation are reported in Table 7. Value of t(Mean) is insignificant for the variables included to capture the non-linearities. Thus we do not find any evidence for the presence of non-linearities in our model.

3.2 Empirical Findings

Findings of the equation 7 are presented in Table 4. We regress Y_{it}/A_{it} over three different sets of sub-equations created by using the set of X defined in equation 7. Our results show that DIV, CURR, and CAPP increase the profitability of the firm. Since net worth of corporate sector of Pakistan is very weak, firms use surplus on revaluation of their assets to back their equity, high market capitalization in the wake of huge losses by the firms implies a weaker corporate sector. Thus aggregate profitability is pulled by the profitable firms, who are solvent, and making huge profits. Based on results obtained in table 4, we then forecast the level of corporate profitability. Estimates obtained by using 3 regression equations in Table 4 produce almost same results. We, therefore, rely on Model 3 in the later section.

Fama and French (2000) pointed out that variance of average slopes are very small, and thus standard errors of the average slopes should be inflated by 40 percent (t(Mean) > 3.00). Value of t(Mean) in our results are higher than 3.00, so our results are significant at 1 percent.

Table 6 provides the estimates for mean reversion within industry as well across industry. Our estimates are in line with theory, Y_{it}/A_{it} holds the negative slope, while the slope of E (Y_{it}/A_{it}) is positive. Fama and French (2000) mentioned that "If there is little error in the prediction of E(Y_{it}/A_{it}), then the two slopes should have equal absolute values". We find the mean reversion rate of the industry to be at 26 percent, while the speed of convergence towards the long run mean is 25 percent.

We observe the mean reversion rate during Peak and Trough of the business cycle. Results are reported in table 8. Our results show asymmetric behavior in the mean reversion rate during Peak and Trough. Findings show that during Peak, industry reverts to its mean at the rate of 31 percent, while this rate is 21 percent during recession, implying a slow recovery in recession. Focusing on the perspective of path for long term economic growth, we calculate the mean reversion rate during the whole cycle across all industries. Our estimates show that mean reversion gets even slower when the whole industrial sector is recession. Speed of reversion during Peak is 30 percent, while it is calculated as 19 percent during Trough. In the presence of an effective balance sheet channel, monetary policy can work as a stabilizing tool to achieve macroeconomic stability. However, in the presence of fiscal dominance, it might be very challenging for SBP to stimulate the economy through price stability.

4 Conclusion

State Bank of Pakistan aims at achieving long term economic growth through price stability, which requires the coordination of both the fiscal and monetary policy. However, in the presence of growing fiscal deficit as well as primary deficit and lack of commitment by the government to stabilize the fiscal indicators, it is not possible for State Bank to determine and stabilize the price level within a narrow band. SBP, however, in response to growing inflation contracted the monetary policy since 2004, which hampered the economic growth.

Empirical findings of the paper shows that effects of monetary policy transmitted through the credit channel to the balance sheets of the corporate sectors, which deteriorated their net worth and led to cash flow squeeze. We find this impact to

last for 3 years on the borrower's balance sheet. Exploring the channel with respect to economic growth, we find the liquidity as the key driving force behind a sound business.

Observing the behavior of 213 non-financial listed companies over a complete business cycle, study also calculates the mean reversion rate for the corporate sector of Pakistan. We find that corporate profitability reverts to its long run mean with the speed of 25 percent. However, the speed is asymmetric during Peak and Trough. Corporate profitability reverts to its mean by 30 percent during peak, while this rate is 19 percent during Trough. This implies that once the path for the long run growth is set, corporate profitability will follow the trend. However, in case of Pakistan we experience a stagnant economic growth, with a slightly downward slopping curve. Though evidence is limited, but we can infer on the basis of micro data, that continuous downward movement of corporate profitability may change the steady state equilibrium of the economy. Effectiveness of balance sheet channel also imply that expansionary monetary policy may stimulate the economy, however, this is contingent to fiscal discipline. As heavy budgetary borrowing by the government directly translates into inflation. Due to data limitations, scope of this study is limited to compute the effect of monetary contraction to the balance sheets of the corporate sector through credit channel, however, linkages from other channels including exchange rate channel may affect the input costs of the raw material during recession and rupee depreciation. Additionally, impact of extrinsic inflation is yet to explore, which may reduce the net profit margins of the corporate sector, which cannot be controlled under fiscal dominance.

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Annexure

Figure 1: Monetary Policy Behavior under Fiscal Dominance

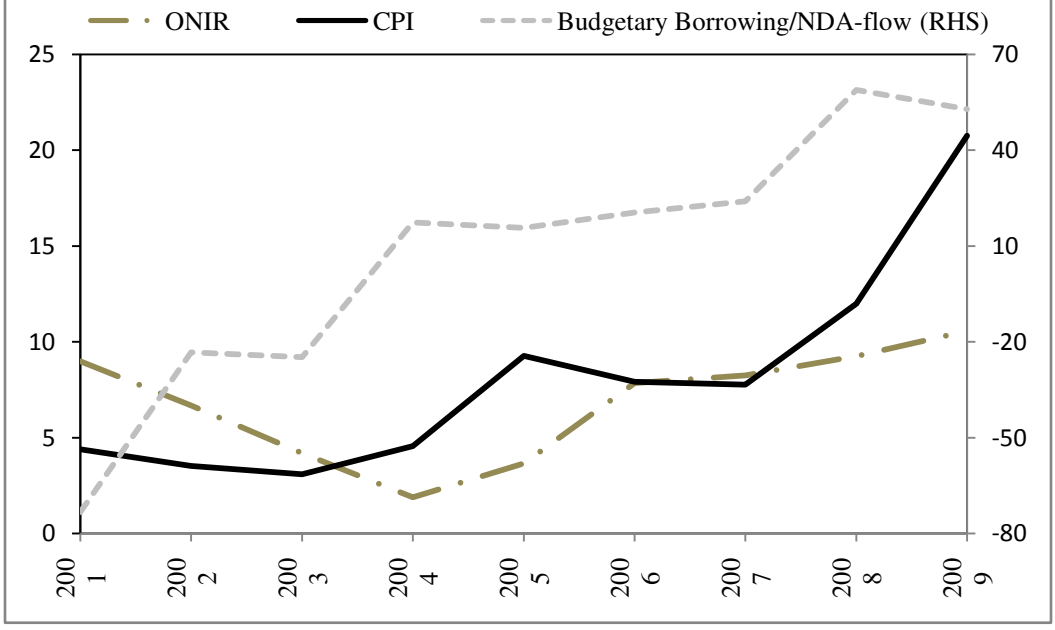

Figure 2 : Monetary Policy Behavior and Business Cycle in Pakistan

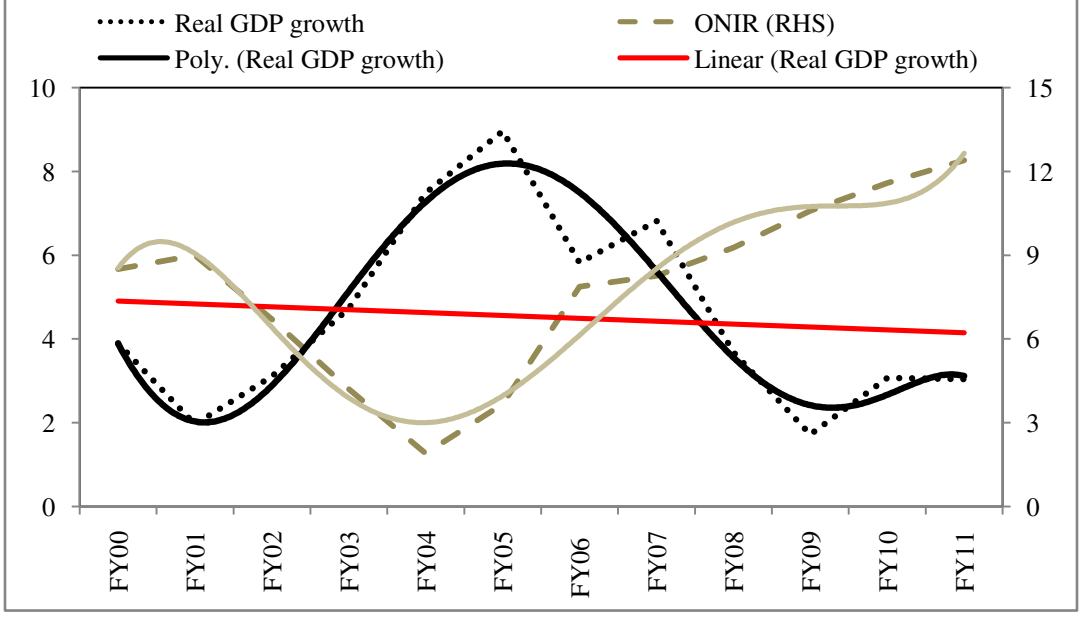

Figure 3: Average Corporate Profitability and Real GDP Growth

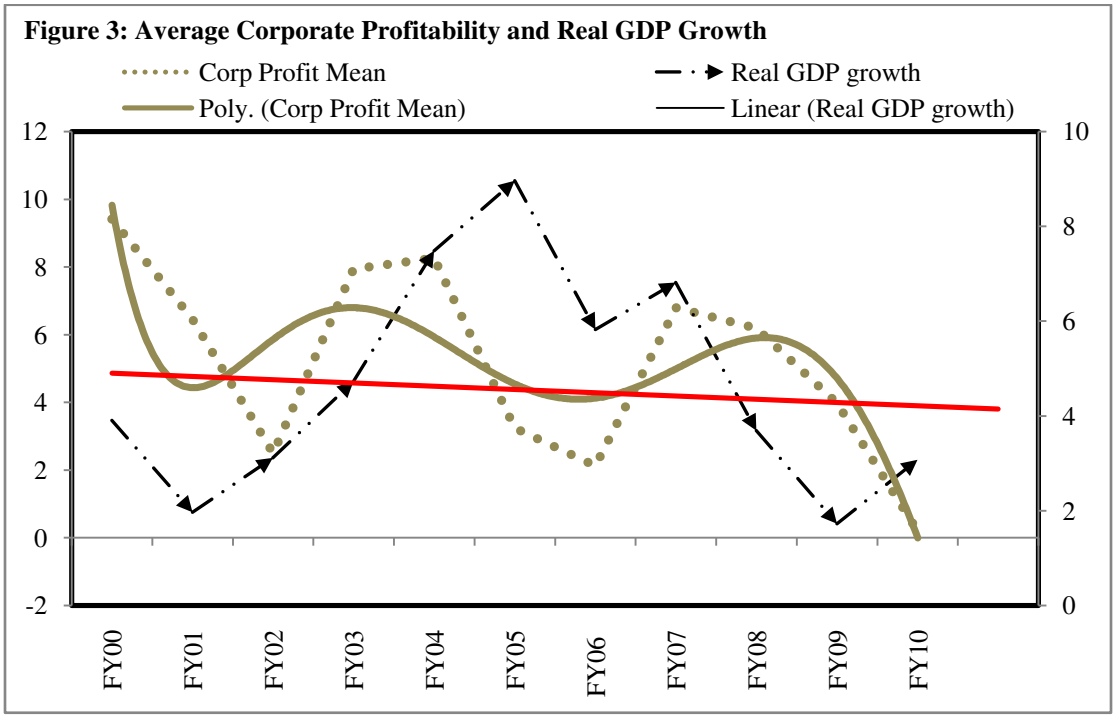

Figure 4 : Corporate Profitability and Real GDP Growth of Industrial Sector

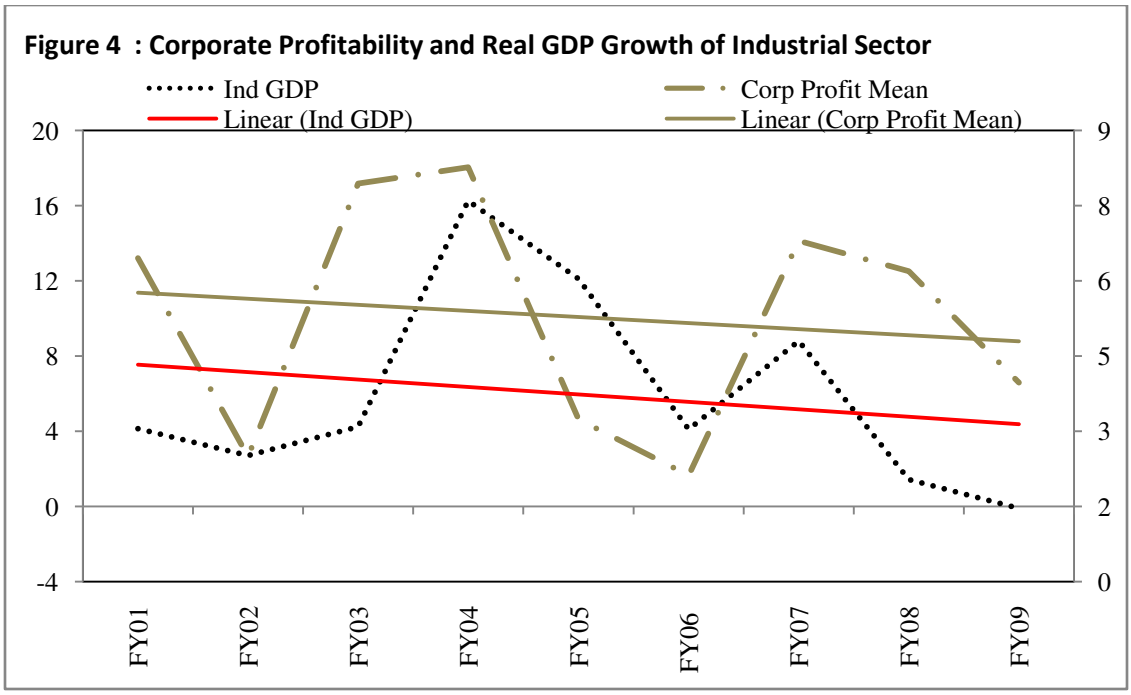

Table 1: Effects of Monetary Tightening over Net worth of Corporate Sector

	NW	NW	NW	NW	NW	NW	NW (t+1)	NW (t+1)	NW (t+1)
	(I)	(II)	(III)	(III)	(V)	(IV)	(V)	(VI)	(VII)
ONIR	-0.0973*	-0.0165***	-0.0128***						
	(0.0524)	(0.0031)	(0.0016)						
FINS				-0.122***	-0.122***	-0.0444*	-0.0573***	-0.0837***	-0.176***
				(0.0012)	(0.0009)	(0.0236)	(0.0029)	(0.0287)	(0.0511)
DA						-0.379***		-0.180***	-0.164***
						(0.0303)		(0.0371)	(0.0377)
SDA				-0.595***	-0.581***				
				(0.0588)	(0.0586)				
LDA				0.00135					
				(0.0138)					
INVS									0.00340**
									(0.0016)
SDS		-0.00108***	-0.000952***						
		-0.000403	(0.0004)						
Int	0.00704	0.420***	0.421***	0.443***	0.440***	0.449***	0.318***	0.387***	0.387***
	(0.2830)	-0.0345	(0.0119)	(0.0108)	(0.0106)	(0.0101)	(0.0155)	(0.0123)	(0.0123)
Obs	2,254	1,860	1,702	1,859	1,860	1,471	2,053	1,461	1,461
Number of Firms	213	208	185	208	208	138	209	138	138

Robust standard errors in parenthes: *** p<0.01, ** p<0.05, * p<0.1

Table 2: Effects of Monetary Tightening on Cash Flow of Corporate Sector

	CF	CF	CF	CF (t+1)	CF (t+1)	CF(t+2)	CF(t+2)
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
FINS	-0.00376***	-0.00184***	-0.00379***	-0.00279***	-0.00283***	-0.00261***	-0.000622*
	(0.0003)	(0.0004)	(0.0011)	(0.0004)	(0.0004)	(0.0003)	(0.0003)
SD		-0.229***		-0.0503**	-0.0701***		0.00595
		(0.0202)		(0.0206)	(0.0218)		(0.0324)
LDA		-0.0349***		-0.0174***	-0.0171***		-0.0324***
		(0.0055)		(0.0056)	(0.0056)		(0.0042)
INVA			-0.0267		0.0537**		0.0312
			(0.0216)		(0.0240)		(0.0293)
Int	0.0653***	0.111***	0.0717***	0.0779***	0.0717***	0.0662***	0.0646***
	(0.0055)	(0.0061)	(0.0080)	(0.0060)	(0.0066)	(0.0050)	(0.0075)
Obs	2,082	1,858	2,030	1,838	1,838	2,038	1,829
Number of Firms	209	208	209	208	208	209	208

Robust standard errors in parenthes: *** p<0.01, ** p<0.05, * p<0.1

Table 3: Monetary Transmission through Balance Sheet Channel and Economic Growth

	OB	OB	OB	OB	OB	OB(t+1)	OB(t+1)	OB(t+2)
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
FINS	-0.0296***			-0.0231***	-0.169***			
	(0.0044)			(0.0048)	(0.0646)			
ONIR						-0.0653*		
						(0.0336)		
CFA		4.759***	6.428***	5.892***	6.450***			
		(1.4070)	-1.174	(1.6250)	(1.1420)			
NW		0.0056			-1.167		-1.239	
		(0.0064)			(0.0050)		(1.5810)	
CF							0.0218***	0.0103*
							(0.0080)	(0.0058)
DA			2.247***				3.719*	-0.00155
			-0.65				(2.1240)	(1.7320)
INVA			(0.5000)					
			-1.584					
Int	1.277***	0.872***	0.1680	0.876***	1.226***	1.591***	0.573	1.274**
	(0.0990)	(0.1260)	-0.369	(0.1450)	(0.1940)	(0.2850)	(0.8340)	(0.5430)
Obs	1,988	2,069	1,467	1,984	1,984	2,090	1,435	1,418
Number of Firms	209	213	141	209	209	213	138	138

Robust standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1

Table 4 : Regression for the level of Profitability

	DIVE	DD	TQ	LEV	CURR	CAPP	Int	Obs	R-squared
Mean	0.343	-0.101	-0.079				0.102	164	0.379
t(Mn)	(9.837)	(-14.419)	(-8.506)				-17.36		
Mean	0.276	-0.085		-0.001	0.007	0.002	0.085	151	0.387
t(Mn)	(12.928)	(-15.452)		(-7.331)	(-5.115)	(-3.281)	(-16.859)		
Mean	0.397	-0.058	-0.065	-0.002	0.007	0.003	0.083	127	0.451
t(Mn)	(13.568)	(-8.966)	(-5.645)	(-8.287)	(-4.143)	(-2.751)	(-13.019)		

Table 5 : Forecasting Profitability

	CP	DFE1	DFE2	DFE3	Int	Obs	R-squared
Mean	-0.240	-0.247			-0.012	192	0.218
t(Mn)	(-10.114)	(-14.983)			(-4.845)		
Mean	-0.240		-0.247		-0.008	192	0.218
t(Mn)	(-10.114)		(-14.983)		(-3.363)		
Mean	-0.240			-0.247	-0.009	192	0.218
t(Mn)	(-10.114)			(-14.983)	(-3.629)		

Table 6: Mean Reversion within Industry

	Yt/At	E(Yi,t/Ai,t) - Industry	CP	Int	Obs	R-squared
Mean	-0.264	0.373	-0.248	-0.011	192	0.250
t(Mn)	(-15.273)	(5.905)	(-10.339)	(-2.941)		

Mean reversion in long run: Across industry

	Yt/At	CP	Int	Obs	R-squared
Mean	-0.255	-0.240	0.009	192	0.231
t(Mn)	(-14.251)	(-10.114)	(3.421)		

Table 7: Incorporating the Non- Linearities in Mean Reversion Regression

	Yt/At	E(Yt/At) - firm	NDFE	SPDFE	SNDFE	CP	NCP	SNCP	SPCP	Int	Obs	R-squared
Mean	-0.479	0.463	-0.639	-0.240	-0.464	0.086	0.269	0.645	-0.609	-0.006	192	0.474
t(Mn)	(-4.119)	(3.899)	(-3.289)	(-0.435)	(-0.94)	(0.888)	(1.779)	(2.313)	(-1.549)	(-1.638)		

	Yt/At	E(Yt/At) - Industry	NDFE	SPDFE	SNFE	CP	NCP	SNCP	SPCP	Int	Obs	R-squared
Mean	-0.123	0.113	-0.084	-0.217	0.375	-0.051	0.090	0.775	-1.083	-0.002	192	0.335
t(Mn)	(-1.388)	(0.947)	(-0.610)	(-0.775)	(2.242)	0.5043142	(0.553)	(2.704)	(-2.871)	(-0.495)		

Table 8: Mean Reversion and Business Cycle Fluctuations

Mean Reversion in Industry

PEAK	**Yt/At**	**E(Yt/At) - Industry**	**CP**	**Int**	**Obs**	**R-squared**
Mean	-0.317	0.591	-0.250	-0.011	195	0.2934
t(Mn)	(-14.393)	(6.612)	(-8.533)	(-2.057)		
TROUGH	**Yt/At**	**E(Yt/At) - Industry**	**cp**	**Int**	**Obs**	**R-squared**
Mean	-0.210	0.155	-0.246	-0.011	197	0.1968
t(Mn)	(-7.842)	(1.734)	(-7.144)	(-2.103)		

Mean reversion towards grand mean

PEAK	**Yt/At**	**CP**	**Int**	**Obs**	**R-squared**
Mean	-0.302	-0.248	0.020	197	0.2786
t(Mn)	(-13.172)	(-8.586)	(5.826)		
TROUGH	**ytat**	**cp**	**Int**	**Obs**	**R-squared**
Mean	-0.196	-0.231	-0.006	193	0.1698
t(Mn)	-7.743	(-6.478)	(-1.621)		