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. Besides growing inflationary pressure, many economies including South Asian region suffered twin deficits and stagnant economic growth. Several of them used monetary policy as a stabilization tool, and raised their interest rates to ensure stable macroeconomic environment. However, this rule could not aid countries like Pakistan who are confronting the issue of fiscal dominance - a situation in which "*the effectiveness and credibility of monetary policy is jeopardized by the size of fiscal imbalance*" (Sidaoui, 2012). Although State Bank of Pakistan (SBP) broadly aims at achieving price stability that can provide an environment conducive for businesses and thus stimulates economic growth; but the degree of effectiveness of monetary policy in Pakistan still depends upon the size as well as sources of financing fiscal deficit.

In the absence of fiscal discipline, growing fiscal imbalances - emanating from less buoyant revenues and fewer external financing options - require seigniorage revenues to meet the fiscal financing requirements which ultimately 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 SBP cannot ensure price stability (Choudhri and Malik, 2012). Thus following an interest rate rule to fight inflation under fiscal dominance reduces the supply of loanable funds and leads to crowding out of the private sector, which reduces output and thus ultimately dampens the economic growth. Since long term sustainable economic growth depends upon a flourishing industrial sector, this study aims at exploring the balance sheet channel of monetary policy, and observes the behavior of corporate sector of Pakistan during 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 sub 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 observed 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. Adding to the existing literature, this study observes how net worth erosion and cash flow squeeze hampers the economic growth and estimates the length of these effects over the balance sheets of corporate sector. In second part, following the economic theory that 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), 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.

Road map of the later sections of this paper is as follows. 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.

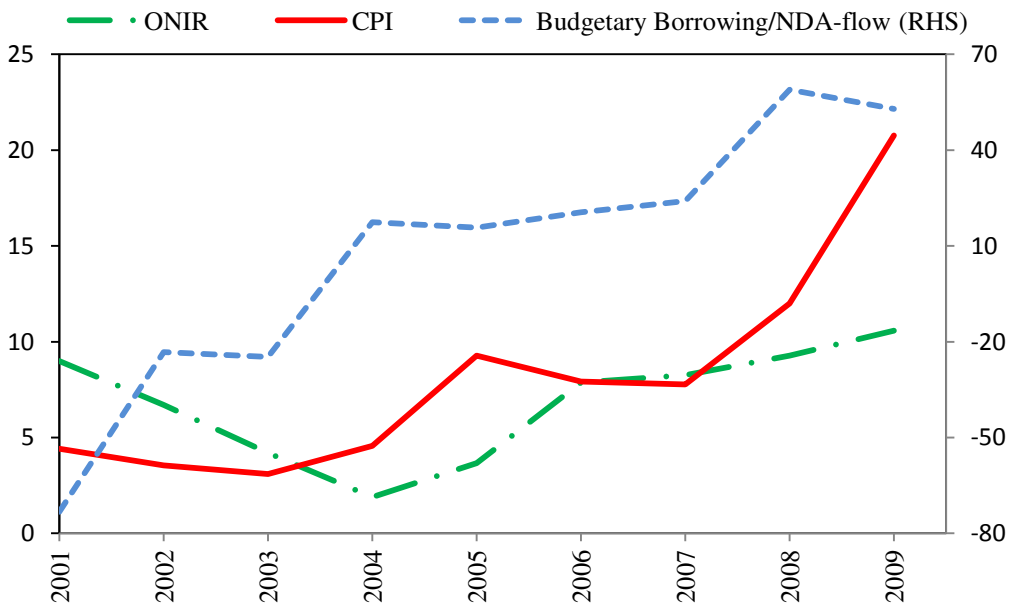
2. Monetary Transmission, Fiscal Dominance and Economic Growth

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 & services sector and generates further employment opportunities. Like fertilizer and automobile sectors supports and improves the productivity of agriculture sector; growing textiles, pulls the cotton and ginning industry and generates demands for inputs mainly from agriculture sector. Energy sector not only affects the productivity of corporate sector itself, but it also affects the productivity of other sectors including agriculture and services sector. Growth of cement sector is directly linked with the growth of real GDP, and is also reflexive of housing and infrastructure development in the country. Additionally, strong industrial sector promotes the export which in turn improves the balance of payment of the country. Given the importance of industrial sector, we explore how monetary policy affects the productivity and profitability of corporate sector.

The impact of monetary policy primarily transmits to the industrial sector through balance sheet channel. The usual inverse relationship between interest rate and demand for loanable funds also holds in Pakistan economy. However, during the phase of growing fiscal imbalances government's appetite for seigniorage revenues increased which changed the composition of money supply and resulted into higher government's budgetary borrowing to Net Domestic Assets (NDA) ratio and translated into higher inflationary pressure. Thus fiscal constraints redirected the

monetary policy and SBP raised interest rates during 2004-2011 to stabilize the price level, which could not bear fruitful results (**see Figure 1**).

Figure 1: Monetary Policy Behavior under Fiscal Dominance



Literature on fiscal dominance also 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 under fiscal dominance as happened in case of Pakistan economy (Zhou, 2012; Choudhri and Malik, 2012; Kumhof et.al 2010; Sidaoui 2003; Sargent and Wallace, 1981).

Monetary tightening under fiscal dominance broadly hits the industrial sector in three ways. Firstly, 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, evidence on financial accelerator in Pakistan suggests, "*pass-through of policy decisions to borrowers is greater during monetary contractions*" (Choudhry et. al 2012); banks reallocate their funds and divert credit towards large firms who are also capable of mobilizing credit through various resources, including the option of issuing commercial 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. Detailed analysis shows that almost 70 of the credit demands by firms are only meant for financing their working capital. High interest rates thus increase 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 sections 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 define output buoyancy of *i*th firm and link these variables with the output buoyancy of the firms to see how balance sheet channel of monetary policy transmits into economic growth.

2.1.1 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 textiles, 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 sub channels; i) The Net worth channel ii) The Cash

flow channel. We then observe how monetary transmission affects the economic growth.

2.1.2 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 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 businesses close their operations. Moreover, banks extend credit to the firms on the basis of their credit worthiness. During monetary contraction, net worth of the firms deplete sharply, and due to limited supply of loanable funds, banks redirect their funds from small firms to large firms assuming them less 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 and 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:

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

Where, NW is net worth to Asset ratio of ith firm observed over the period t, u_i is between-entity error, $\mathcal{E}_{it}$ is within-entity error while, X is a set of independent variables:

$$X = f(\text{ONIR, FINS, SDA, LDA, DA, SDS, INVS}),$$

Where, ONIR is defined as 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. Selection of these variables is made on the basis of economic theory and existing literature on monetary transmission through balance sheet channel. 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:

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

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 in Annexure. 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:

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

The results obtained are reported in Table 1.

2.1.3 The Cash Flow Channel

Cash flow channel measures the impact of monetary contraction over the liquidity position of the firm. Rise in interest rates increases the financial expenses of the firms and create liquidity issues for the firms, thereby leading to cash flow squeeze. Literature suggests this impact can be observed on balance sheets of the firms at the end of the first quarter, since this study uses annual audited accounts of the firms, we successfully capture the impact of monetary contraction over the balance sheets of corporate sector of Pakistan (Wesche ,2000; Zaderey, 2003; Guariglia and Mateut, 2006; Karim and Zulkefly, 2010; Özlü and Yalçin, 2010).

Following Karim and Zulkefly (2010), cash flow variable is calculated as a sum of firm's net profit and depreciation & 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 *i*th 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 use robust standard errors in the model to control for heteroskedasticity. Moreover, to observe 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.

2.1.4 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 changes 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:

$$OB_{it} = \alpha_i + X_{it}\beta_1 + u_i + \mathcal{E}_{it} \qquad i= 1, 2, 3\ldots. 213 \qquad (6)$$

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 presented in Table 3 in 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 that states monetary contraction reduces the net worth of firms and rise in interest rates reduces the value of borrower's collateral and affects her credit worthiness. Our estimates shows that the impact of rise in ONIR over the net worth of a firm lies between 1- 9 percent, which affect the short term borrowing pattern of the firms and translates into an increase in the financial expenses of the firms. Additionally banks use 3 month and 6 month KIBOR as bench mark for lending, and link their long term lending rate with KIBOR. In this scenario, any increase in policy rate immediately increases the financial expenses of the firms and also hit the long term liabilities of the companies. We observe this impact range between 4-12 percent. Since, a large part of the corporate borrowing is meant 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 following year 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 2nd 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 2nd and 3rd periods (t + 1 and t + 2), which supports the cash flow of the firm.

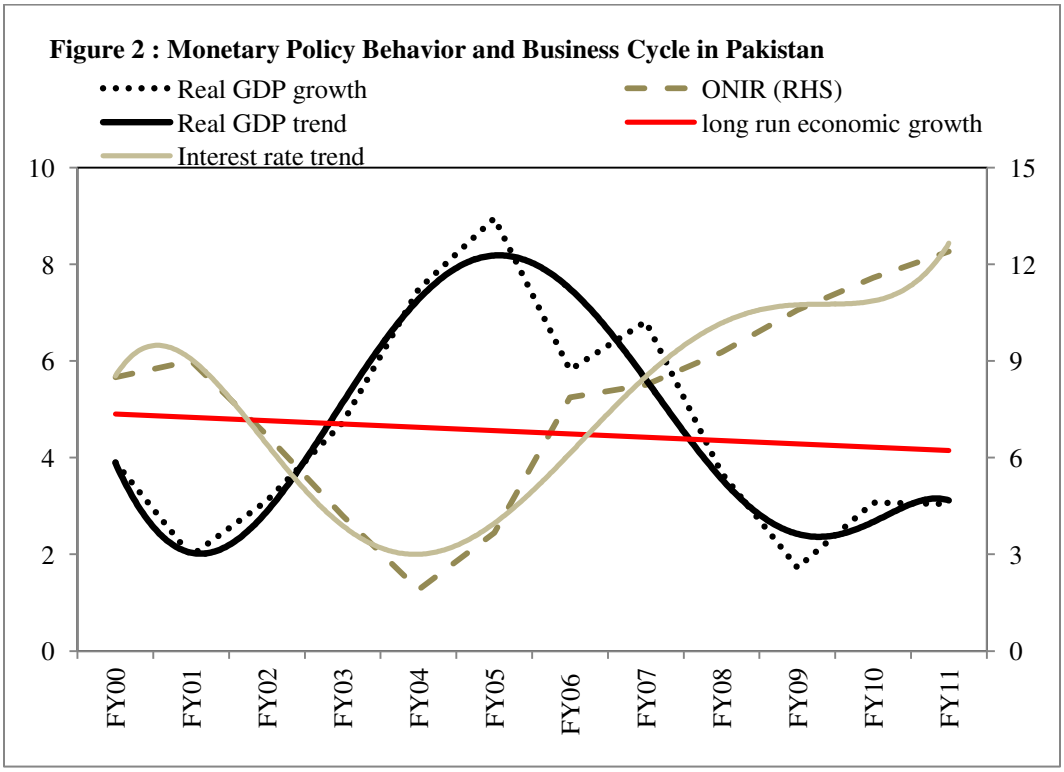
Table 3 provides empirical findings on relationship between NW, CF and other debt variables with output buoyancy (OB). The value of OB greater than 1, which suggests that OB is highly influenced with the cash flow, and borrowing behavior of the firm. This supports the argument that liquidity is the key 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. Nonetheless the importance of net worth to have access to the loanable funds cannot be denied. Moreover, 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 businesses. Monetary tightening 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-financial 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).

Figure 2 : Monetary Policy Behavior and Business Cycle in Pakistan



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).

Figure 3: Average Corporate Profitability,and Economic Growth

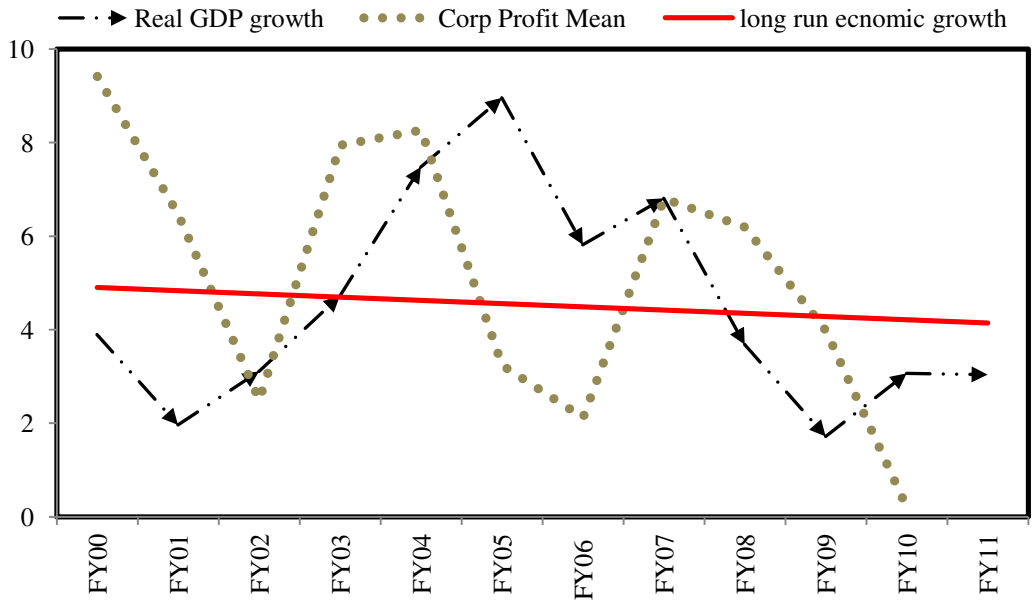
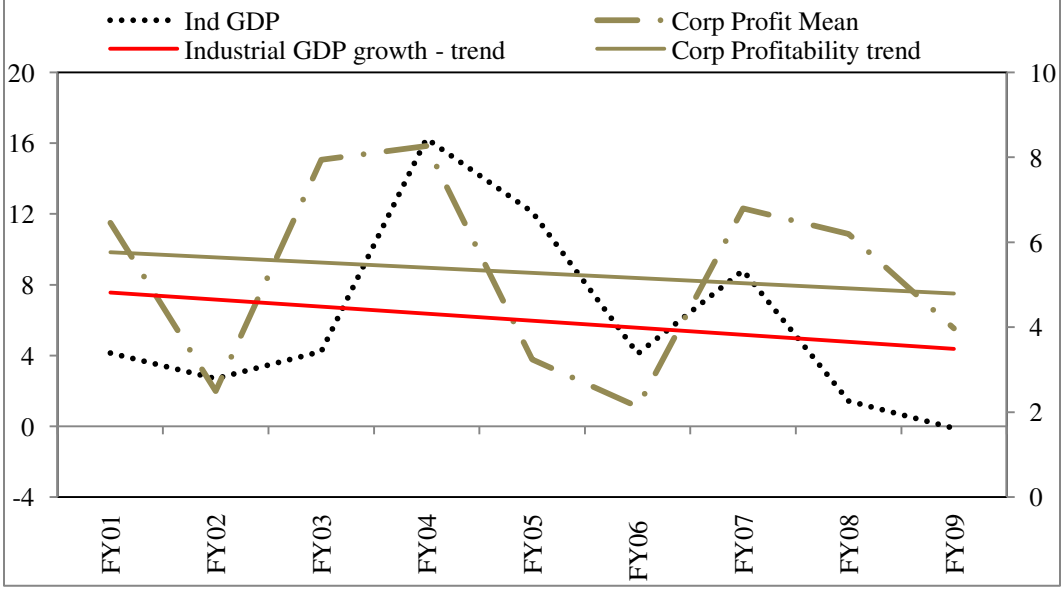


Figure 4 : Corporate Profitability and Real GDP Growth of Industrial Sector



As proved in the earlier section, monetary policy stimulates economic growth through balance sheet channel, while corporate profitability drives the industrial GDP growth and thus the growth of economy as a whole. However, in order to assess the speed of mean reversion during peak and trough of business cycle, we use Fama and MacBeth (1973) methodology and find asymmetric behavior of mean reversion during peak and through which implies, monetary contraction during recession may lead to prolonged economic recession.

3.1 Research Methodology

Following the methodology of Fama and MacBeth (1973) 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 regressions and use their average slopes and time series standard errors to draw inferences.

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:

$$Y_{it} / A_{it} = \alpha_i + X_{it}\beta_1 + u_i \qquad i = 1, 2, 3, \ldots. 213 \qquad (7)$$

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 in Annexure.

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

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

By estimating equation 9, we find the rate of reversion ($-\beta_1$) tends 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 in Annexure.

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

Some studies on the mean reversion of the firms came across a non-linear behavior. 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:

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

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 in Annexure. 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. These estimates are also 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. This result also imply that in the presence of an effective balance sheet channel, monetary policy can work as a stabilizing tool to achieve macroeconomic stability, and recession may stay longer if SBP increase the interest rate during recession. However, in the presence of fiscal dominance when seigniorage revenues directly add to the inflation, it is very challenging for SBP to stimulate the economy and maintain price stability.

4 Conclusion

In the wake of limited external financing option, fiscal imbalances, emanating from low tax revenues and inelastic current expenditure force the government to

borrow from internal resources. As long as government reliance is on the non-bank resources and does not lead to financial disintermediation in the economy, fiscal policies do not hamper the economic growth. However, when government's reliance on banking resources increases, it affect the economy in two ways, borrowing from commercial banks lead to crowding out of the private sector, while seigniorage revenues from the central bank directly translates into inflationary pressures.

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. In response to fiscal dominance, when SBP followed the interest rate rule and increased the policy rate to maintain price stability, it reduced the net worth of firms and lead to cash flow squeeze, which lowered the corporate profitability and hampered the economic growth.

Empirical findings of the paper shows that effects of monetary policy transmitted through the balance sheet channel to the corporate sectors, which deteriorated their net worth and led to cash flow squeeze. Our estimates shows that the impact of rise in ONIR over the net worth of a firm lies between 1- 9 percent, which affect the short term borrowing pattern of the firms and translates into an increase in the financial expenses of the firms. Additionally firms borrowing at flexible interest rate are usually linked with benchmark interest rates (say KIBOR), any increase in policy rate immediately increases the financial expenses of the firms and also hit the long term liabilities of the companies. This impact is observed within the range of 4-12 percent.

Investigating the cash flow channel, we find that liquidity is the key driving force behind a sound business. ONIR translated through financial expenses hits the cash

flow through SDA and LDA and lasts for almost three years. Additionally, we do not find evidence of inventory accumulation during the same period. In case of Pakistan, we observe inventory accumulation in 2^{nd} and 3^{rd} periods (t + 1 and t + 2), which supports the cash flow of the firm. Introducing output buoyancy of the firm, we investigate the impact of cash flow channel and net worth channel over economic growth and found that cash flow is one of the most important factors. Moreover, monetary policy affects the economic growth for three years.

Observing the behavior of 213 non-financial listed companies over a complete business cycle, this 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 implies that expansionary monetary policy may stimulate the economy; however, this is contingent to fiscal discipline. The spiral of fiscal dominance, when leads to monetary contraction reduces the output and thus corporate profitability. Since corporate tax rate is stable at 35 percent, lower profits leads to lower tax revenues for the government, which in turn adds to fiscal imbalances. Empirical findings of this paper suggests that monetary contraction is not a feasible option under fiscal dominance as it deteriorates the net worth of firms, lead to cash flow squeeze, reduces the

corporate profits, lowers output. Additionally, graphical analysis shows that, following interest rate rule under fiscal dominance does not lead to price stability either.

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. Moreover, impact of extrinsic inflation is yet to explored.

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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 Parentheses: *** 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 parentheses: *** 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	0.38
t(Mn)	(9.837)	(-14.419)	(-8.506)				(17.36)		
Mean	0.276***	-0.085***		-0.001***	0.007***	0.002**8	0.085***	151	0.39
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	0.45
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	0.22
t(Mn)	(-10.114)	(-14.983)			(-4.845)		
Mean	-0.240***		-0.247***		-0.008***	192	0.22
t(Mn)	(-10.114)		(-14.983)		(-3.363)		
Mean	-0.240***			-0.247***	-0.009***	192	0.22
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	0.25
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	0.23
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	0.47
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	0.34
t(Mn)	(-1.388)	(0.947)	(-0.610)	(-0.775)	(2.242)	(0.504)	(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	0.29
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	0.20
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	0.28
t(Mn)	(-13.172)	(-8.586)	(5.826)		
TROUGH	**Yt /At**	**CP**	**Int**	**Obs**	**R-squared**
Mean	-0.196***	-0.231***	-0.006	193	0.17
t(Mn)	(7.743)	(-6.478)	(-1.621)		