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An Anatomy of Credit Booms in Pakistan: Evidence from Macro Aggregates and Firm Level Data

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An Anatomy of Credit Booms in Pakistan: Evidence from Macro Aggregates and Firm Level Data

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Abstract

We identify private credit booms in Pakistan, using fully modified HP filter, and analyze the behavior of selected macroeconomic aggregates around these booms based on annual data over the period 1960-2018. We observe that credit booms are associated with economic expansions, increasing asset prices, appreciating REER and widening of current account deficit in Pakistan. Micro data analysis shows an association between credit booms and measures of corporate leverage, valuations and profitability. Our analysis of bank level data shows similar cyclical patterns in lending activity and profitability in banking system. Lastly, we find that credit booms in Pakistan are associated with sudden stops and currency crises but not with banking crisis. These results are in line with existing evidence on credit cycles' dynamics in emerging markets.

JEL Classification: E32, E51, G28

Key Words: Credit Booms, Business Cycles, Macroprudential Supervision

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Non-technical Summary

Private sector credit is considered as one of the sources of economic growth in developed as well as developing economies. However, excessive credit expansion raises concern being an indicator of peak of economic growth cycle followed by a deceleration phase. Credit expansion beyond country specific ‘threshold’ can trigger and amplify financial sector woes eventually leading to decelerating economic activities. Accordingly, policy makers all over the world, as well as in Pakistan, have established legitimate interest in monitoring the credit demand growth to keep credit supply in check. This has led to the development and use of tools for identifying and taming the credit booms to safeguard the banking system, and the economy, against any potential losses.

In this study, we identify private credit booms in Pakistan and investigate the behavior of selected macroeconomic aggregates and firm level financial as well as non-financial indicators around these booms. We use annual data over the period 1960-2018. We apply ‘threshold’ method to identify the credit booms in the country. This method entails decomposing the real private credit series into cyclical and trend components and identifying episode(s) in which credit exceeds its long-run trend (by using a threshold level generally used in the literature) over the business cycle. We identify two episodes of credit booms for Pakistan: one in 1972-73 and other in 2007-08.

At macro level we observe that credit booms in Pakistan are linked with increased economic activities, higher asset prices and deterioration in current account balances. We also find that credit booms in Pakistan are associated with sudden stops and currency crises. However, we could not find any association between credit booms and banking crisis in Pakistan – which we attribute to proactive banking supervision by the State Bank of Pakistan. Micro data analysis of listed non-financial firms shows an association between credit booms and measures of corporate sector leverage, valuation and profitability. Lastly, analysis of bank level data shows similar cyclical patterns in profitability of banks in the country. Most of the findings in this study are in line with existing evidence on credit cycles’ dynamics in emerging markets and with the scant observations reported in the relevant literature on Pakistan’s economy.

1. Introduction

It is documented in literature that credit booms, manifested by excessive growth in credit, are harbinger of financial crises (Eichengreen and Arteta, 2002). The excessive growth in assets prices fueled by availability of easy credit has been a major factor that led to Global Financial Crisis (GFC) in 2007-08¹. Thus, rapid expansion in credit (beyond normal business cycles) can trigger and amplify financial crisis eventually leading to economic meltdown. The GFC of 2007-08 triggered by failure of financial giant Lehman Brother and resulted in turmoil in financial markets of the US, which affected both developed and developing economies. Pakistan was not an exception (Chart 1 in Appendix-C).

Accordingly, policy makers in Pakistan as well as in other countries have always had an interest in monitoring the credit markets to keep the excessive growth in credit supply in check. Regulators and policy makers have constructed surveillance tools for effectively identifying buildup of abnormal credit cycles to safeguard the banking system against potential losses (Mendoza and Terrones, 2008). For example, a set of reforms mainly targeting bank capital (Basel-III) was a major step in this direction. The underlying philosophy of counter cyclical capital buffers is to protect banking system against possible future losses. Thus, these reforms, coupled with additional measures make financial system safer.

In existing literature, researchers have studied credit cycles mostly in the context of developed world. However, a few, like Mendoza and Terrones (2008) and Arena *et al.* (2015) have also investigated emerging economies' credit booms and their association with macroeconomic dynamics besides developed economies. Such studies in the literature on credit booms used a threshold method to identify the credit cycles. This method entails splitting the underlying variable into cyclical and trend components and identifying an episode in which variable of interest exceeds its long-run trend by more than a threshold². Using the threshold method, these studies found that credit booms/busts are associated with economic expansion/contractions, deteriorating/improving external balances, rising/falling asset prices at macro level; and procyclical movements in firms level indicators (like share of external financing) and bank level indicators (like non-performing loans).

As most studies explain underlying dynamics on aggregate basis for both emerging and developed economies which hides the country specific dynamics. Thus, there is a need for studying the credit booms and their relationship with major macroeconomic, firm and bank level indicators along with macro-prudential supervision measures for informed policy making in a developing country like Pakistan.

A main feature of threshold method in studying booms is that it entails separating trend from cyclical fluctuations. Most studies in the literature have used conventional HP filter to identify the underlying trend. HP filter is not without limitations. Two major issues stand out. First, this technique uses an arbitrary value of smoothing parameter λ . Second, it introduces bias at the end points of series (Hanif *et al.* 2017). This can greatly affect the estimated trend of an underlying series which serves as a base for booms to appear in the threshold method.

More importantly, studies on individual countries are rare. In the case of Pakistan, studies exploring credit booms are non-existent to the best of our knowledge. We have not come across any study that specifically explores credit cycles and their association with relevant indicators at macro level or at

¹ More fundamentally this was caused by evolution of weak financial institutions after radical financial deregulation that began in 1970 in the US (Crotty, 2009).

² Threshold is proportional to standard deviation of series over the cycle.

firm/bank level or both for Pakistan despite its importance for monetary and financial stability. However, there are a few studies which have attempted to document business cycle features based on real GDP of Pakistan. The earliest study in this regard was that of Arby (2001) who attempted to separate the trend and cyclical components of GDP based on which the author identified three business cycles using yearly data over the period 1950-2001. Choudhary and Pasha (2013) developed a real business cycle (RBC) model to capture cyclical fluctuations in output of Pakistani economy. They looked at relevant macroeconomic linkages to explain short run fluctuations in Pakistan's output. Recently, Tahir *et al.* (2018) also attempted to identify business cycles for Pakistan using quarterly GDP data and found that business cycles in Pakistan span over 8 years. Scope of all of the above studies on Pakistan was limited to identify business cycles in the output (and not credit). Identification of credit cycle in Pakistan and analyzing its linkages with the macroeconomic dynamics of the country at macro and micro level is an unexplored research area.

To address the aforementioned gap, this paper uses threshold method used in Mendoza and Terrones (2008) to identify credit cycles in Pakistan over period of 1960-2018, using fully modified HP filter developed by Hanif *et al.* (2017), and explores their linkages with other major macroeconomic and financial indicators of the country. We also conduct similar analysis at firm level for both financial and non-financial listed companies.

The rest of the paper is structured as follows: next section describes literature on credit booms followed by the section on description of the methodology used in the paper. This section specifically discusses why the chosen method is preferable to alternatives. Next, we discuss data and present some stylized facts from our sample. We then present a section on key features of credit booms in Pakistan. In next section, we present results of analysis conducted at macro level followed by a section on association between credit booms and various types of financial and economic crises. Thereafter, we provide the micro level analysis of credit booms for both financial and non-financial firms. Finally, we put down concluding remarks.

2. Literature Review

In this section, we have provided a brief overview of theoretical literature on credit booms. Then, we critically review the studies which have investigated credit booms empirically.

We find the literature on credit cycles to be scant compared to a large body of research on business cycles. We have found the Economic theory on credit cycles to be nascent. Notwithstanding the money-less Walrasian models and financial sector less early DSGE modeling attempts, indicators of credit cycles and output cycles have been found highly autocorrelated (Jermann and Quadrini, 2012). A number of developments, including financial market liberalization motivated by Gurley and Shaw (1955), have made credit cycle behaviour an important driver of business cycle fluctuations (BIS, 2018). In the following, we have explained theoretical underpinnings of 'credit cycle and output cycle nexus' from existing literature.

One of the causes of credit booms is the result of over indebtedness by firms which is caused by the new opportunities to invest at a big prospective with borrowed money (Fisher, 1993). He cited this as the main reason behind over indebtedness in 1929. He further argued that when volume of over indebtedness becomes unsustainable, it leads to liquidation attempts and thus prices fall making way for depression to set in.

More recently, researchers have explored 'credit cycle and output cycle nexus' through balance sheet effects and credit market frictions. Bernanke and Gertler (1989) and Bernanke *et al.* (1999) used

different models to show how the position of borrowers' balance sheet propagate and amplify output fluctuations. Bernanke and Gertler (1989) developed a neo classical model in which borrower's balance sheet conditions determine output dynamics: when borrowers' net worth increases their agency cost decreases which leads to higher investment and thus boom and vice versa. Bernanke *et al.* (1999) introduced credit market frictions to a general equilibrium model. They attempted to investigate the role of credit markets frictions in explaining economic fluctuations. The theoretical grounds for introducing credit markets into standard macroeconomic general equilibrium models was based on the idea of information asymmetries between lenders and borrowers (Akerlof, 1970). Contract that links lender and borrower reduces the cost of information and mitigates principal agent problem of credit markets. When these informational asymmetries worsen agency cost, the real cost of extending credit increases which results in lack of financial intermediation. This lack of credit availability can have widespread real effects.

In another study, Kiyotaki and Moore (1997) theorized how small shocks in credit market results in business cycles in aggregate economic activity. More recently, Brunnermeier and Sannikov (2014) has shown that amplification effect may be nonlinear in the sense that economy's response could be even larger to large shocks and smaller to small shocks. Azariadis (2018), as against the findings of Kiyotaki and Moore (1997) which argued that collateralized debt generates and amplifies the business cycle, using a standard stochastic growth model comprising of large number of firms facing idiosyncratic shocks, showed that unsecured part of the debt strongly commoves with the output.

A number of empirical studies have also investigated the effects of credit cycles on real economic activity. These studies explored behavior of relevant economic indicators pertaining to overall economy and firm/bank level data pertaining to credit and output cycles. For Example, Mishkin (1978) showed the impact of household balance sheet changes on the business cycle developments of the great depression period. He showed that increased indebtedness of consumers and drop in the value of their financial assets led to sharp fall in consumption, resulting in economic contraction. Gourinchas *et al.* (2001) showed that lending booms are associated with output gains. However, lending booms increase the vulnerability of the banking sector and the balance of payments to crisis. Collins (2002) examined the link between lending booms, asset price cycles, and financial crises across East Asian economies. They found empirical evidence to support relationship between bank lending and asset price inflation especially in real estate markets. They further showed that lending booms generated asset bubbles affected different economies differently. Cottarelli *et al.* (2005) studied rapidly increasing growth in private sector credit in Europe and concluded that rise in lending boom was structural thus the study called for evaluation of macroeconomic and financial stability implications. Ottens (2005) investigated credit booms as important warning signal for banking crises in the context of emerging market economies. His results suggested that credit booms were indeed a prelude for banking crises.

Mendoza and Terranes (2008) used a rather simple methodology for identifying credit booms in emerging and industrial economies over the past four decades. Authors have analyzed the behavior of major macroeconomic aggregates and firm level indicators around episodes of credit booms. Their findings showed a systematic relationship between credit booms and economic expansions, rising asset prices, real appreciations, and widening external deficits.

Following above literature, we identify two important gaps to fill in this study. Firstly, we have observed that no earlier attempt has been made in this regard i.e. to study credit cycles and their dynamics as reflected in the behavior of macro aggregates and/or firm level indicators around those cycles for Pakistan. While Mendoza and Terranes (2008) have unearthed important insights. They have approached through panel data thus their findings might not reflect country specific dynamics despite

being useful at aggregate basis. Secondly, well-known issues (of fixed smoothing parameter and end-point bias) in HP filter – that has been used in the credit cycle and business cycle studies for extracting the cyclical component may undermine the existing studies. Accordingly, in this study we have employed FMHP filter developed by Hanif *et al.* (2017) for extraction of cyclical components.

3. Methodology

In the literature, two different methods have been used to study credit booms. Gourinchas *et al.* (2001) introduced a threshold method for identification of credit booms. Subsequently majority of the studies have used GVL method for empirical analysis of credit booms including Cottarelli *et al.* (2005) and Ottens *et al.* (2005). However, Mendoza and Terrones (2008) proposed a slightly different threshold method for identification of credit booms. We have used the same methodology to identify the credit booms and analyze their relationship with macroeconomic aggregates as well as firm level indicators for the case of Pakistan. As in Mendoza and Terrones (2008), the analysis in this work on the association between credit booms and macroeconomic aggregates is related to the literature on business cycle models that incorporate adverse shocks in credit market which are amplified through balance sheet effects.

The methodology of Mendoza and Terrones (2008) is robust relative to GVL³. They define a credit boom as an episode in which credit to private sector growth exceeds a typical business cycle expansion. Let l_t denote the deviation from the long-run trend in the logarithm of real credit per capita in Pakistan. Let $\sigma(l)$ denote the standard deviation of the cyclical component of the log of real credit per capita. We have estimated the long run trend using FMHP Filter⁴. With this, the country is assumed to experience a credit boom if one or more contiguous dates are identified for which the following credit boom condition holds.

$$l_t \geq \varphi\sigma(l) \quad (1)$$

Per-capita-real-credit is calculated using $RCPC = \left(\frac{C_t}{P_t} * \frac{I_t}{N_t}\right)$ whereas, N_t and I_t denote nominal and real investment respectively, and P_t refers to population. Accordingly, natural log of per capita real credit can be defined as per equation (2) which can be used to estimate l_t .

$$L_t = \ln(RCPC_t) \quad (2)$$

In inequality (1), φ is referred to as the boom threshold factor. Thus, during a boom condition deviations from trend in credit exceed the typical expansion of credit over the business cycle by a factor of φ or more. The notation φ is called the boom threshold and it is calibrated based on empirical literature. We have used a baseline value of $\varphi=1.50$ and conducted sensitivity analysis for 1.75 and 2.

The date of peak of the boom is denoted by (\hat{t}) which is the date that yields the maximum difference between l_t and $\varphi\sigma(l)$ from the set of adjacent dates that satisfy the boom condition. Given \hat{t} , the starting date of the credit boom is a date t^s such that $t^s < \hat{t}$ and t^s yields the smallest absolute difference as follows:

$$|l_t \geq \varphi^s\sigma(l)| \quad (3)$$

³ For details on differences between two methods and their quantitative implications, see Mendoza and Terrones (2008).

⁴ Authors have provided the MATLAB code for running this filter and the same is available at http://www.sbp.org.pk/publications/wpapers/2017/MATLAB_Code/Code-WP88.txt.

Similarly the ending date t^e is a date $t^e > \hat{t}$ that yields the smallest difference as follows

$$|l_t \geq \varphi^e \sigma(l)| \quad (4)$$

In inequalities (3) and (4) φ^s and φ^e are the start and end thresholds. As in Mendoza and Terrones (2008) we also use baseline values $\varphi^s = \varphi^e = 1$ and tried using values including 0, 0.25, 0.5 and 0.75. Once the starting and ending dates are set, the duration of the credit boom is simply the difference between $t^e - t^s$.

As mentioned in the section on introduction, a major problem with calculating long term trends in variables of interest using conventional HP filter is that it involves parameter λ whose values are fixed based on a rule of thumb⁵. This, along with end points bias, has implications for estimated cyclical component (Cogley and Nason 1995⁶ and Hanif *et al.* 2017⁷) and its standard deviation subsequently. Thus, this has implications for identifying a boom episode. Accordingly, in this study, we have used FMHP filter for decomposition of a time series (of variables of interest) into trend and cyclical components.

4. Data and Stylized Facts

The sample in this study consists of fiscal-year⁸ data for the period 1961-2018⁹. Real credit has been calculated by using investment deflator which is the ratio of nominal investment to real investment¹⁰. List of the variables along with their sources and definitions have been provided in Table 1 at the Appendix-A

In Table 2 of Appendix-A, we provide summary statistics on credit and other macro variables for Pakistan. On average, consumption takes most of the share in GDP. Average investment remains low at 16 percent. Average year-on-year inflation is about 8 percent. Current account has remained mostly in deficit and volatile over the sample period.

In Table 3 of Appendix-A, we provide correlation matrix of the variable of interest (per capita real credit) and macro aggregates. One can see the per capita real credit is strongly associated with per capita real GDP, per capita real consumption, per capita real investment, asset prices index, and capital inflows. However, the same is negatively related to current account. While, the relationship with effective exchange rate is statistically insignificant.

Similarly, Table 4 of Appendix-A provides correlation matrix for per capita real credit with indicators of non-financial firms. The correlation appears to be strong with indicators of long term leverage indicating that corporates lever up when credit availability is high (see TL to MV). The correlation with profitability is modest (0.26) indicating there is more to it than mere credit availability (e.g. efficiency

⁵ See Choudhary *et al.* (2014).

⁶ Authors argued that the HP filter produces series with spurious dynamic relations that have no basis in the underlying data-generating process.

⁷ They argued that there are certain issues with HP filter including fixed value of λ across the series/countries and over time in addition to bias at end points. They have proposed a Fully Modified HP filter to address these issues. They showed through simulations that their FMHP filter outperformed a variety of conventional filters in a power comparison as well as in observed real data (univariate and multivariate) analytics for a large set of countries/series.

⁸ Fiscal year in Pakistan runs from July to June.

⁹ The data on credit and population was available on calendar year basis. Accordingly, the same have been converted to fiscal year basis by averaging the values at t and t-1.

¹⁰ We also tried GDP deflator instead of investment deflator. Our results did not differ much.

and productivity). Interestingly, the relationship with indicators of short term leverage is negative which suggests that firms prefer to reduce leverage in the short term.

5. Key Features of Credit Booms in Pakistan

Figure 1 of Appendix-B shows boom episodes estimated through FMHP Filter. Two episodes of credit boom can be clearly observed. One in 1972-73 and the other in 2007-08¹¹. Note that, even though, the episode of 1986 does not qualify as an episode it comes very close to meeting the criterion¹².

Table 5 of Appendix-A shows boom episodes and average expansion in cyclical component of the Real Credit Per Capita (RCPC¹³) spanning over the period 1961-2018. The expansion in real per capita credit reached above 28 percent at the peak of credit boom of 1973 and almost 33 percent at the peak of 2007-2008 episode. Our results regarding the deviation in real credit per capita are closer to as reported by Mendoza and Terrones (2008) for emerging economies as a tad above 30 percent.

Table 6 of Appendix-A shows the duration of credit booms for different starting and ending thresholds and the length of the corresponding expansion and contracting phase for the boom episodes identified by FMHP Filter in years 1972-73 and 2007-08 separately. The average duration of booms, irrespective of thresholds, is 4 years for the episode of 1972-73 and 7.6 years for the 2007-08 episode. The overall average comes to by 5.8 years. Note that the duration is fairly robust to the values of beginning and end thresholds. The average duration of the credit booms is in accordance with results reported in Mendoza and Terrones (2008) who found the durations of credit booms to last between 6-7 years¹⁴ for emerging markets.

Another observation in Table 6 of Appendix-B is that the upswings last longer than downturns. This is true for both episodes. Overall upswings account for 67 percent of the credit boom duration as compared to 33 percent downturns. This indicates that the recovery phase is rather quick. The average upswings and downturns for emerging markets calculated by Mendoza and Terrones (2008) were 45 percent and 38 percent respectively. The difference is considerable when compared to aggregates for emerging markets.

6. Credit Booms and Macroeconomic Dynamics

In this section we examine the business cycle behavior of Pakistan's economy during credit boom events to see the relationship between credit booms and behavior of main macroeconomic indicators leading up to the boom and their trajectory afterwards. Specifically, we looked at behavior of domestic demand, aggregate prices, and developments in external sector including real effective exchange rate.

Using event analysis, we construct a seven-year window of cyclical components of macroeconomic variables that are normalized to time when credit boom was at peak. We then plot GDP (Y) consumption (C), investment (I), the real exchange rate (REER) and current account-output ratio (CAY). The trend

¹¹ Figure 1b shows boom episodes estimated through conventional HP filter. In contrast, HP filter identifies two additional booms each one occurring in years 1986 and 1966. This is an important difference between the two filters. Comparing Figure 1a and Figure 1b reveals much about why HP filter identifies two additional episodes. Note that the trend appears more visible in FMHP Filter than in HP filter which apparently does not smooth out cyclical components fully. Accordingly, FMHP filter helps clear that cyclical nature. Therefore, we think, it is more appropriate to study cyclical dynamics for any series using FMHP filter than HP Filter.

¹² Mendoza and Terrones (2008) identified one credit boom for Pakistan in the year 1986. Note that their sample period was relatively short (1961-2006).

¹³ We also used nominal GDP to credit ratio. There is no considerable difference in results from two different indicators for Pakistan so debate on choice of indicators is trivial on the hindsight.

¹⁴ Mendoza and Terrones (2008) used HP filter so any difference could be due to that especially in 1972-73 episode.

components of all these variables are separated from their cyclical components (except REER and CAY) using FMHP filter. We conduct this analysis for two boom periods of 1972-73 and 2007-08.¹⁵

6.1 Credit Booms and Real per Capita Credit

Figures 2a and 2b of Appendix-B provide results for per capita real credit. In the two figures, cyclical component of the real credit per capita has been plotted against time in a seven-year event window centered at peak of the credit booms. In both periods leading up to the boom, the real credit per capita increased which then collapsed following the boom. In the boom episode of 1972-73 the real per capita credit reached 28 percent above the trend at the peak whereas in the episode occurring in 2007, the same indicator shot up to 32 percent above its trend.

6.2 Credit Booms and GDP, Consumption and Investment

Consider Figure 3 of Appendix-B now and its panels (a) and (c) indicating behavior of the cyclical component of the real GDP in a seven-year window centered at peak of the credit boom episode. Clearly, the GDP was rising sharply leading up to the peak and fell just as quickly before the peak of the boom during the 2007-08 credit boom. It continued to decline for a longer period of time showing prolonged slump in downturn phase. Similarly, in the episode observed in 1972-73 the GDP was rising before the peak but it eventually came down. This rise appears to be more sharp compared to the episode of 2007-08. Note that there was a quick fall and rise prior to peak of the boom episode in 1972-73. This behavior is not reminiscent of the 2007-08 episode boom. The country was deep in to the cold war between USA and Russian in neighboring country so the sudden collapse and rise in cyclical component of GDP can be attributed volatility brought about by the war. Also global oil price shock could be another factor.

Turning now to consumption and investment. Figure 4a and 4c of Appendix-B show behavior of consumption for boom episodes of 2007-08 and 1972-73 respectively whereas Figures 4b and 4d show the path of investment in two boom episodes respectively. These figures show the cyclical components of consumption and investment in a seven-year window centered at peak of each credit boom episode. Two things are immediately clear. The behavior is much clear and intuitive in the episode of 2007-08 than that of 1972-73. The less clear or opaque business cycle behavior of 1972-73 episode can be attributed to volatility brought about global supply shocks and onset of cold war. Despite these dynamics hold (except in Figure 4d) whereby both consumption and investment rose sharply leading up to the peak of crises and fell down sharply in the downturn phase of the cycle. In Figure 4d investment was falling sharply prior to the peak but rose sharply in the recovery phase.

6.3 Credit Booms and External Sector

Figures 5a to 5d of Appendix-B illustrate behavior of external sector around two boom episodes. Specifically, the plots containing cyclical components of the current account to GDP (CAY) are shown in panel (a) and (c) of Figure 5. Similarly, the cyclical components of the capital inflows to GDP ratio (KIY) are shown in panel (b) and (d) for boom episodes of 2007-08 and 1972-73 respectively. Two important behaviors in the current account are visible. First, in the expanding phase, the deficits widen near the peak of the boom. Secondly, the deterioration was higher in magnitude in credit boom episode

¹⁵ As identified by Mendoza and Terrones (2008) two important caveats apply to the foregoing event study graphs. First, the graphs only show unusually large expansion as defined by threshold level but do not indicate if they themselves are undergoing a boom. The second caveat is that the graphs only show point estimates which may not necessarily be statistically significant. These caveats can be addressed in future research agenda.

of 2007-08 than it was in the episode of 1972-73. Specifically, current account deficit rose 6.6 percent of the GDP in the boom episode of 2007-08 compared to 2.2 percent at t-1 for the episode of 1972-73. It actually fell down to a much lower level of 4.3 at t+2 i.e. two years after the per capita real credit peaked above its trend. Again, the volatility may be attributed to relatively closed feature of the economy and global oil supply shock of 1970s while dynamics of 2007-08 may be attributed to integration of Pakistan's economy over the years. Clearly, the economy was more integrated in 2007-08 than it was in 1972-73¹⁶. In line with dynamics in current account, capital inflows (KIY) rose sharply in the credit booms episodes of 2007-08 and 1972-73. The capital flows came in sharply leading up to the peak and then suddenly declined post boom periods. This behavior is in accordance with the standard literature on sudden stops where capital inflows rise during the time of growing economic activity and they dry up when economy goes into the downturn phase (Cavallo *et al.*, 2015).

6.4 Credit Booms and Aggregate Prices

Figure 6 of Appendix-B illustrates evaluation of cyclical dynamics of aggregate prices around two boom episodes. Specifically, the cyclical components of inflation are shown in panels (a) and (b) for boom episodes of 2007-08 and 1972-73 respectively whereas cyclical components of the asset prices¹⁷ are plotted in (c) and (d) of Figure 6. These graphs help explain the inflation in economy during two episodes of credit boom. Note that in the credit boom of 2007-08 cyclical components of inflation in general prices level and asset prices rose sharply leading up to the peak of boom but fell equally sharply after the peak (see Figure 6 panel a and c). This result may be driven by high inflation era in Pakistan global commodity price shock of 2008. For the 1972-73 episode, however, the results do not seem to be similar. Consider first, Figure 6(b) wherein the inflation started rising just before the peak of boom episode but then came down sharply until t+3. Thereafter the trends appear to slide downwards. Asset prices follow a different pattern in the episode of 1972-73 credit boom. Assets prices fell sharply until t-1 but then reverted sharply before peak of the credit boom only to fall again after peak at time t. Thus in general the relationship of booms and assets prices seems to be more volatile in the episode of 1972-73. Clear dynamics in assets prices in 2007-08 episode could be attributed to financial sector reforms started in 1989-90 and continued throughout the decade of 2000s.

6.5 Credit Booms and Exchange Rate

Figures 7a to 7b in Appendix-B show the behavior of the real effective exchange rate (REER) centered around the credit booms of 2007-08 and 1972-73 respectively. Both graphs show similar dynamics albeit with different magnitudes. One can see that REER appreciated close to 2 percent leading up to the peak of 2007-08 credit boom episode and fell down sharply until t+1 (Figure 7a). However, thereafter it appreciated again very quickly exceeding 3 percent for a year before changing its direction. This effect is more severe in 1972-73 showing overvaluation by as much as 43 percent leading up to massive correction that took place just before the peak of credit boom. However, it started rising again at t-1 (Figure 7b). This massive overvaluation can be attributed to exchange rate regime in place at the time (see Ejaz *et al.*, 2017). Also, note that the highest inflation of 33 percent in Pakistan also occurred in the early 1970s. So, in general, the adjustment in REER before and after the boom is associated with the then state of the economy.

¹⁶ This is evident from the fact that foreign investment flows (inward as well as outward) were a meager 0.66% of the GDP in FY1972 compared to 6.15% of GDP in FY2018.

¹⁷ Asset prices are proxied by stock prices.

6.6 Association of Credit booms and Banking & Currency Crises

In this section, we see if there is an association of credit booms with banking and currency crises (collectively called as financial crisis) and sudden stops for Pakistan using frequency analyses. Credit booms are often cited as culprit behind financial crises (Eichengreen and Arteta, 2002). If this is true, then financial crisis should closely associate with episode of credit booms. To see this, we simply show the percentage of financial crises and episodes of sudden stop that occurred in Pakistan during the seven-year window of credit boom episode of 2007-08 of the country in Table 5¹⁸. The criteria for occurrence of these financial crises and sudden stops have been obtained from empirical literature. First, the dates for banking crises have been identified using one of the four criteria proposed by Demirguic-Kunt and Detagiache (2006)¹⁹ in which the ratio of non-performing assets to total assets exceeded 10 percent. Secondly, to identify episodes of currency crises we have relied on the method used by Eichengreen and Bordo (2002). We use their method to develop a currency crises index²⁰ for Pakistan for the period 1983 and 2015 which covers credit boom episode of 2007-08. We use this index to identify²¹ the dating of currency crises for their mapping around episode of credit boom of 2007-08. Third, the dates for sudden stops have been obtained from Ejaz (2017).²² Turning now to the results, Table 5 shows that about 28 percent of the credit booms is associated with currency crisis, and 42 percent with sudden stops. The credit booms are not associated with banking crisis solely upon the criteria of NPLs we used in this study. These equivalent figures for emerging markets reported in Mendoza and Terrones (2008) were 68 percent, 55 percent and 32 percent respectively. Thus in Pakistan, credit booms are associated with financial crises but not banking crisis as empirical evidence reveals. First, Arena *et al.* (2015) found the occurrence for banking crises in low income countries (LIC) is to be low at 10 percent. Secondly, banking crises are more likely to occur if the booms are longer Arena *et al.* (2015).

It is intriguing that credit booms did not cause banking crisis in the case of Pakistan. Two explanations could be offered in this respect. First, the banks in Pakistan's credit markets were not well integrated with the world credit markets. That argument appears less tenable since financial sector has integrated over the years due to globalization²³. Secondly, it can be argued that central bank as a regulator used prudential tools proactively to keep the credit expansion in check. To see this, we have developed an index²⁴ capturing prudential actions invoked by State Bank of Pakistan (SBP) during 7-year event window centered at the peak of 2007-08 to see if this index was related with the growth in cyclical component of the per capita real credit in that window. The results in Figure 8 panel (a) and (b) show that SBP's prudential actions created tight credit conditions before the peak of credit boom indicating

¹⁸ Due to data paucity we could not carry out this exercise for 1972-73 episode of the credit boom.

¹⁹ Other conditions of crises were as follows: 2) cost of banking system bailouts exceeds 2% of GDP; 3) large scale bank nationalization; 4) bank runs or new depositors' protection measures. The banking crisis episode was said to have occurred if a country met at least one of the aforementioned conditions.

²⁰ The index consists of exchange market pressure, calculated as a weighted average of the percentage change in the exchange rate, the change in the short-term interest rate, and the percentage change in reserves, all relative to the same variables.

²¹ A crisis is said to occur when this index exceeds one and a half standard deviations above its mean.

²² Their strategy to identify Sudden Stops include two requirements which needed to be satisfied for a Sudden Stop episode to occur. First, the sudden stop signal which is defined as a fall in year-on year (yoy) flows exceeding two standard deviations below the mean. It shows Sudden Stop as an episode that begins when change in net external flows falls below one standard deviation of its historical mean (conditional that it subsequently falls below two standard deviations below the mean) and ends when the series exceeds one standard deviation above the mean.

²³ Total Net FX exposure of the Pakistan's banking system as of December, 2008 was close to 499 billion PKR which amount to 8.22 billion USD when converted using period average of PKR/USD exchange rate 60.6376 for 2007-08. This turns out to be 9% of the total banking assets as of Dec-2008.

²⁴ Index contains specific prudential actions pertaining to credit markets such as reserve requirements, provisioning requirement, repo-market (with central bank only), targeted lending invoked by SBP in form of circulars and guidelines during 2004-2012. The value of index ranges from 1 to -1 where 1 indicates tightening credit conditions, -1 indicates easing of credit conditions and 0 shows no effect (see Table-8 to Appendix-A).

why the boom did not turn into a banking crisis. This observation is also vindicated by findings of Cerutti *et al.* (2017) who found that emerging market used prudential policies more actively before the 2007-08 crisis.

7. Credit Booms and Micro Dynamics

In the previous sections, we investigated association between credit boom and selected macroeconomic indicators. Specifically, we saw a pattern of economic expansion followed by contraction around episodes of credit boom in GDP, investment, consumption, current account, aggregate prices and exchange rate. It is logical to look for effects of these credit cycles in the financial conditions of banks as well as listed corporates.

7.1 Corporate Leverage and Credit Booms

In this section, we examine balance sheet data of corporates to see if dynamics present in financial indicators of the corporates around episodes of credit boom are cyclical or counter-cyclical. As in previous section, we built 7-year window around episodes of credit booms centered at the peak of credit booms of 1972-73 and 2007-08. We use the consolidated balance sheet positions of all listed corporates over the sample period 1961-2016 and construct financial indicators which represents firm behavior.

We calculate four indicators of corporate leverage and profitability. The leverage indicators are as follows: 1) ratio of fixed liabilities to book value of equity, 2) ratio of fixed liabilities to market value of equity 3) ratio of current liabilities to market value of equity and 4) ratio of current liabilities to sales. 1) and 2) are shown in Figure 9 and its sub panels while 3) and 4) are shown in Figure 10. Results in Figure 9 show that leverage ratios rise considerably in the buildup phase and reduce in the contraction phase. Note that leverage ratios based on market value is high in the episode of 1972-73 but much lower in the episode of 2007-08 reflecting the impact of higher and lower equity prices (see Figure 6 earlier) in the two episode respectively. On average, Figures 9a and 9b show a difference of about 40 percent from minimum to its peak in the buildup phase, which is double the 20 percent for emerging markets found by Mendoza and Terrones (2008). In the short turn, leverage synchronizes with credit booms as evident in Figures 10c and 10d. Current liabilities to sales ratio reached 42.4 percent in 2007-08 episode while it was 52 percent just before the peak of credit episode of 1972-73. For emerging markets, this ratio was found to be close to 50 percent by Mendoza and Terrones (2008). Current liabilities to market value ratio is off by a huge margin especially for the episode of 1972-73 (Figure 10b). We attribute this mainly to the calculation of market value which we take as market capitalization of ordinary shares instead of all shares due to data paucity.

7.2 Corporate Valuations, Profitability and Credit Booms

We estimate two indicators of corporate valuations and one indicator for profitability as follows: 1) ratio of market to book value, 2) ratio of market value plus fixed or non-current liabilities to book value. Profitability is estimated by 3) ROA calculated as a ratio of net profit before tax to total assets (current plus non-current). The behavior of these indicators is shown in Figure 11. The indicators of corporate valuations show higher valuations in the expanding phase which decline in the subsequent phase. Similarly, the profitability also increased considerably in the buildup phase in the episode of 2007-08 and collapsed in the downturn phase (Figure 11e). However, this is not the case for boom episode of 1972-73, wherein the ROA of corporates declined even in the buildup phase until t-2 and it rose sharply at the peak of credit boom before collapsing (Figure 11f). These results are consistent with those firms related findings reported in Mendoza and Terrones (2008).

7.3 Credit Booms and Banking System

In this sub section we look at indicators of profitability, asset quality, capital adequacy and lending activity around the credit boom episode: these indicators are calculated for privately owned commercial banks as follows: 1) Profitability is measured by ratio of net income to average assets at t and $t-1$. 2) Asset quality is calculated by gross non-performing loans of banking system to gross advances. 3) We use advances to deposit ratio as a proxy for lending activity in the banking system. Lastly, capital adequacy is measured by CAR which is ratio of regulatory capital to total risk weighted assets of the banking system. Due to data paucity, we limit this analysis only to the credit boom episode of 2007-08.

Figure 12 of Appendix-B shows event study of the financial indicators of banks in Pakistan. Lending activity was high in the buildup phase. ADR reached 76 percent at the peak of boom which collapsed to 53.6 percent in the contraction phase (Figure 12b). It can also be shown in Figure 12d that NPLs rose very sharply leading up the peak of boom and even beyond from a low of 6.9 percent in the buildup phase to a high of 15.7 percent in the contraction phase as against 2.5 percent and 11 percent respectively for emerging markets in Mendoza and Terrones (2008). However, the capital adequacy kept on rising (Figure 12a) through the expansionary and contractionary phases showing extremely prudent regulatory policy which may have led to consolidation²⁵. Profitability was also high in the buildup phase which collapsed to its lowest at the peak of credit boom. However, it recovered sharply in the buildup phase (Figure 12c).

8. Conclusion

This paper has used threshold method based on fully modified HP Filter for identification and documenting credit booms for Pakistan over the period 1961-2018. We identify two episodes of credit boom during 1972-73 and 2007-08. Around these episodes, we conduct an event study analysis of macroeconomic aggregates and micro-level financial as well as corporate sector indicators. Our results show that credit booms in Pakistan are associated with economic expansion in the buildup phase that is followed by contraction in the declining phase. In general, output measured by GDP and expenditures measured by consumption and investment rose in the buildup phase and dropped below trend in the second phase which had significant implications for inflation in the country. These findings are consistent with the Mendoza and Terrones (2008) whose macro event study showed that the credit booms in emerging economies are associated with a well-defined pattern of economic expansion in the build-up phase of the booms following by contraction in the declining phase. Micro data analysis also shows an association between credit booms and measures of corporate leverage, valuations and profitability. Our analysis of bank level data shows similar cyclical patterns in profitability and lending activity in banking system. We also find that credit booms are associated with currency crises and sudden stops but not with banking crisis in Pakistan.

²⁵ Khan (2017) documented 59 instances of mergers & acquisitions of which dates of 29 instances over the period of (1996-2015) are falling within the 7-year window around credit boom episode of 2007-08.

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Appendix-A

Table-1: Data Sources and Variables Definitions

Variable	Definition	Data Source
Macro and Financial Indicators of Banking System		
ncredit	nominal credit in millions of Rs from IFS line 22D. Monetary, Banking Institutions, Claims on Private Sector (Non-Standardized Presentation) Domestic Currency. Available until 2007. Data between 2007 to May 2018 has been obtained from SBP.	IMF's International Financial Statistics (IFS) and State Bank of Pakistan (SBP)
rcredit	ncredit divided by investment deflator	Author's calculation
cpi	Consumer price index is the value of index as of 30-june of each fiscal year (Base Year 2007-08)	SBP
ngdp	Nominal GDP is GDP at Current Market Price in Rs. Millions (Base Year 2005-2006) Table-2 under national Accounts	PBS
rgdpcp	Real GDP is GDP at Constant Market Price in Rs. Millions (Base year 2005-2006) Table-3 under national Accounts	PBS
pop	Total annual Population in Millions	World Development Indicators (WDI)
rcn	Real Consumption is defined as consumption at constant Market Price in Rs. Millions (Base Year 2005-2006) Table-3 under national Accounts	PBS
ninv	Nominal Consumption is defined as consumption at constant Market Price in Rs. Millions (Base Year 2005-2006) Table-3 under national Accounts Table-2 under national accounts	PBS
rinv	Real investment is investment at constant Market Price in Rs. Millions (Base Year 2005-2006) Table-3 under national accounts	PBS
lspi	Log of SBP General Index of Share Prices as of 30-june of each fiscal year	SBP
ex	Nominal USD/PKR exchange rate as at 30 June of each fiscal year	SBP
reer	Real effective exchange rate as at 30-june of each fiscal year	SBP
ca	Current account to real GDP where current account is net position as at 30-june of each fiscal year obtained from chapter-7 of handbook on state of Pakistan's economy.	Author's calculation based on data from SBP
kiy	Capital inflow. Defined as ratio of credit side of the financial account to real GDP. The former is obtained from chapter-7 of handbook on state of Pakistan's economy as of 30-june of each fiscal year.	Author's calculation based on data from SBP
resv	Total SBP reserve consisting of Gold, SDR and SBP Foreign Exchange	SBP
cmr	Overnight call money rate as at June 30 of each fiscal year.	SBP
Corporate and Bank Level Indicators (Micro)		
leverage	Fixed liabilities to Book Value of listed non-financial companies Fixed liabilities to market value of listed non-financial companies Current liabilities to market value of listed non-financial companies Current liabilities to sales ratio of listed non-financial companies	Handbook on Statistics of Pakistan Economy. Chapter 5.8, Balance Sheet Analysis of Non-Financial Companies, State bank of Pakistan
roa	Ratio of net income to total assets of listed non-financial companies	
tq1	Market capitalization to book value of listed non-financial companies	
tq2	Market value plus fixed liabilities to book value of listed non-financial companies	
nplr	Non-performing loans divided by total assets as at 30 June of each calendar year	Financial Soundness Indicators and Quarterly Compendium
car	Capital adequacy ratio as at 30 June of each calendar year.	of the Banking System for Sep-2009 and Dec-2013 quarters available at http://www.sbp.org.pk/ecodata/fsi.asp
roa	Return on Assets of banks as at 30 June of each calendar year.	
adr	Advance to Deposit Ratio as at 30 June of each calendar year.	

Table-2 Summary Statistics from Sample

Variable	N	Mean	Std. Dev.	Min	Max
Pvt. Sector Credit (Rs. Millions)	58	1,011,343	1,501,418	2,107	5,539,202
GDP (Rs. Millions)	58	5,685,139	9,094,359	27,045	34,400,000
Consumption (Rs. Millions)	58	5,121,740	8,415,210	24,399	32,500,000
Investment (Rs. Millions)	58	937,746	1,426,692	4,510	5,649,451
Inflation	57	8.05	5.72	0.10	33.42
Log of Shares Price Index	58	6.36	1.95	4.23	10.39
Current Account (Millions USD)	58	-2,003	3,556	-15,961	4,070
REER	50	-	66.6506	7.5844	385.8543
Exchange Rate (Millions)	58	-	34.053	4.770	121.497
Population (Millions)	58	109.7155	47.10343	45.4466	199.3801

Table-3 Correlation Matrix between Per Capita Real Credit and Macroeconomic Indicators

	<i>lrpc</i>	<i>pcrgdp</i>	<i>pcrcn</i>	<i>pcrin</i>	<i>lspi</i>	<i>ca</i>	<i>ki</i>	<i>reer</i>
<i>lrpc</i>	1							
<i>pcrgdp</i>	0.87*	1						
<i>pcrcn</i>	0.85*	0.99*	1					
<i>pcrin</i>	0.84*	0.88*	0.88*	1				
<i>lspi</i>	0.77*	0.92*	0.92*	0.76*	1			
<i>ca</i>	-0.48*	-0.59*	-0.61*	-0.66*	-0.60*	1		
<i>ki</i>	0.72*	0.71*	0.69*	0.78*	0.64*	-0.70*	1	
<i>reer</i>	0.06	-0.02	-0.01	-0.01	-0.14*	0.03*	-0.13*	1

* indicates statistically significant at 5%

Table-4 Correlation Matrix between Per Capita Real Credit and Firm Level Indicators

	<i>lrpc</i>	<i>TL to BV</i>	<i>TL to MV</i>	<i>ST to MV</i>	<i>STL to Sales</i>	<i>Tobin(Q1)</i>	<i>TobinQ2</i>	<i>ROA</i>
<i>lrpc</i>	1							
<i>TL to BV</i>	0.04	1.00						
<i>TL to MV</i>	-0.30*	0.73*	1.00					
<i>ST to MV</i>	-0.32*	0.54*	0.90*	1.00				
<i>STL to Sales</i>	-0.24	-0.28*	-0.15	-0.04	1.00			
<i>Tobin(Q1)</i>	0.63*	-0.25	-0.67*	-0.62*	-0.14	1.00		
<i>TobinQ2</i>	0.66*	0.08	-0.45*	-0.46*	-0.23	0.95*	1.00	
<i>ROA</i>	0.27*	-0.58*	-0.58*	-0.53*	-0.07	0.46*	0.28*	1.00

*indicates statistically significant at 5%

Table-5 Episodes of Credit Boom in Pakistan

Trend using Fully Modified HP Filter		
Boom Period	Avg. Expansion in RCPC	Peak
1972-73	28.13%	28.14%
2007-08	32.14%	32.57%

Table-6 Duration, Upswings and Downturns of Credit Booms in Pakistan

Trend using Fully Modified HP Filter						
Starting and Ending Threshold	1972-73			2007-08		
	Duration (Years)	Upswing	Downturn	Duration (Years)	Upswing	Downturn
0	4	67%	33%	9	62%	38%
0.25	4	67%	33%	8	71%	29%
0.5	4	67%	33%	7	67%	33%
0.75	4	67%	33%	7	67%	33%
1	4	67%	33%	7	67%	33%

Table-7 Percentage of Various Types of Crises around Episodes of Credit Booms

Episode of CB	Banking Crises				Currency Crises				Sudden Stops ²⁶			
	B	P	A	T	B	P	A	T	B	P	A	T
2007-08	0.0	0.0	0.0	0.0	0.0	0.0	14.3	14.3	0.0	14.3	14.3	28.6
Total	0.0	0.0	0.0	0.0	0.0	0.0	14.3	14.3	0.0	14.3	14.3	28.6

²⁶ As defined in Ejaz (2017).

Table-8 Regulatory Policy Decisions during the Boom Episode Window of (2004-2012)

Date	Regulatory Instructions/Guidelines	Decision	Credit Conditions
May-04	BSD Circular No. 4 of 2004	DFIs subjected to reserve requirements of (1% cash and 15% SLR on all TDL)	Tightened
May-04	BSD Circular No. 4 of 2004	MCR requirements (1 billion free of losses) and CAR of 8% imposed on DFIs.	Tightened
May-04	BSD Circular No. 8 of 2004	Overall reserve requirement enhanced to 20% from 15% for DFIs	Tightened
Aug-04	No. ACD/2014-2034 /PD(P)-08/2004	Revised Indicative Per Acre Credit Limit for Major Crops	Eased
Aug-04	BSD Circular No. 12 of 2004	MCR on banks increased to 2 billion from 1 billion (to be achieved by Dec-2005). Capital charge for market risk introduced.	Tightened
Mar-05	Circular letter No. ACD/ 01 /PD (P)/05	Poultry Feed Making Industry included for credit under SBP Supervised Agricultural Credit Scheme	Eased
Oct-05	BSD Circular No. 6 of 2005	MCR enhanced to 3 bn Dec-2006	tightened
Nov-05	BSD Circular No. 7 of 2005	Majors amendments in PRs. Increased in provisioning requirements. Ageing criteria for classification of loans made stricter. Criteria to avail FSV benefit made strict.	tightened
Feb-06	BSD Circular No. 3 of 2006	Total reserve requirements of 13% (5% CRR and 8% SLR) imposed on IBs/IBBs	Tightened
Jul-06	BSD Circular No. 10 of 2006	CRR requirements for IBs/ IBBs enhanced to 7% from 5% bringing overall RR to 15% from 13% previously.	tightened
Jul-06	SME No. 16 of 2006	Cost of financing facilities from SBP enhanced to 9.5% from previously 9%	Tightened
Aug-06	ACD Circular No. 01 of 2006	Issued guidelines to Banks/FIs which was expected to considerably enhance the credit flow to livestock financing.	Eased
Nov-06	OSED Circular No. 1 of 2006	CRR and Special Cash Reserve Requirement (SCRR) on FE-25 imposed on IBs/IBBs offering FE-25 deposits. The rates were set 5% and 6% respectively bringing overall RR at 11%.	Tightened
Jul-07	BPRD Circular No. 11 of 2007	Cost of financing facilities from SBP enhanced to 10% from previously 9.5%	Tightened
Aug-07	BSD Circular No. 4 of 2007	Time Deposits of tenor 1 year or less exempted from CRR	Eased
Oct-07	BSD Circular No. 7 of 2007	FSV benefit completely withdrawn for all Corporate, SME and Consumer financing as on Dec-2007 with the exception of housing finance which was also substantially reduced downwards in first two years of financing following which it was also completely withdrawn in 3 rd year.	Tightened
Dec-07	BSD Circular No. 9 of 2007	SCRR on FE-25 deposits reduced substantially to 5% from 15% imposed in 2002 on banks/DFIs. Over all reserve requirements on CRA an SCRA became 10% from 20%.	Eased
Jan-08	ACD Circular No. 1 of 2009	Scheme announced for group base lending to small farmers	Eased
Jan-08	BSD Circular No. 2 of 2007	1 st issue of the Karachi Shipyard & Engineering Works Limited (KSEW) Sukuk declared as an eligible security for SLR maintenance to IBs/IBBs	Eased
Jan-08	BPRD Circular No. 1 of 2008	Cost of financing facilities from SBP enhanced to 10.5% from previously 10%	Tightened
Mar-08	BSD Circular No. 7 of 2008	MCR revised on Microfinance Institutions upward.	Tightened
Apr-08	BSD Circular No. 8 of 2008	Cash reserve requirements on FE-25 deposits reduced to 2% from 6% for IBs/IBBs. However, the overall reserve requirements were still 11% as required earlier for IBBs in 2006.	No effect
May-08	BSD Circular No. 10 of 2008	CRR 9% (from 8% earlier) and SLR 19% for all banks. Overall 27%	Tightened
May-08	BSD Circular No. 11 of 2008	Reserve Requirements enhanced to 18% from 13% previously for IBs/IBBs	Tightened
May-08	BPRD Circular No. 5 of 2008	Cost of financing facilities from SBP enhanced to 12% from previously 10.5%	Tightened
Jun-08	BSD Circular 14 of 2008	SCRR enhanced to 15% bringing over all RR to 20% from 10% previously for banks/DFIs	Tightened
Jun-08	BSD Circular 15 of 2008	RR on FE-25 revised with CRR 5% and SCRR 6% for IBs/IBBs. However overall requirements remained same.	No effect.
Jul-08	BPRD Circular No. 8 of 2008	Cost of financing facilities from SBP enhanced to 13% from previously 12%	Tightened
Aug-08	BSD Circular 18 of 2008	TFCs issued by IESCO FESCO LESCO GEPCO declared eligible securities for meeting SLR to banks/DFIs	Eased

Table-8 Regulatory Policy Decisions during the Boom Episode Window of (2004-2012)

Date	Regulatory Instructions/Guidelines	Decision	Credit Conditions
Sep-08	<u>BSD Circular 19 of 2008</u>	MCR requirements for FB and DFIs also revised upwards. CAR also increased. MCR requirements for locally incorporated banks raised to 23 billion, which was to be achieved in a phase manner until 2013.	Tightened
Sep-08	<u>ACD Circular No. 5 of 2008</u>	enhanced indicative per acre credit limits on an average of 70% for major & minor crops, orchards and forestry.	Eased
Oct-08	<u>BSD Circular 20 of 2008</u>	Reserve Requirements reduced to 17% from 18% previously for IBs/IBBs	Eased
Oct-08	<u>BSD Circular 21 of 2008</u>	CRR 7% (from 9% earlier) and SLR 19% for all banks/DFIs. Overall 26%	Eased
Oct-08	<u>BSD Circular 25 of 2008</u>	CRR 5% (from 7% earlier) and SLR 19% for all banks/DFIs. Overall 24%	Eased
Oct-08	<u>BSD Circular 26 of 2008</u>	Reserve Requirements reduced to 14% from 17% previously for IBs/IBBs	Eased
Oct-08	<u>BSD Circular 27 of 2008</u>	Banks advised to cap their ADR at 70%. Action plan required to be submitted by banks in breach	Tightened
Nov-08	<u>BSD Circular 29 of 2008</u>	CRR 5% (from 7% earlier) and SLR 19% for all banks/DFIs. Overall 24%	Eased
Nov-08	<u>BPRD Circular No. 14 of 2008</u>	Cost of financing facilities from SBP enhanced to 15% from previously 13%	Tightened
Nov-08	<u>BSD Circular 30 of 2008</u>	Banks/DFIs advised to achieve CAR of 9% in a month's time by Dec-2008 and 10% by Dec-2010.	Tightened
Dec-08	<u>BSD Circular 31 of 2008</u>	MFIs exempted from maintaining SLR against borrowing from SBP and interbank.	Eased
Dec-08	<u>BPRD Circular 15 of 2008</u>	Introduced Pakistan Microfinance Credit Guarantee Facility ("MCGF") to facilitate and promote channelization of funds from banks/DFIs to MFIs.	Eased
Jan-09	<u>BSD Circular 02 of 2009</u>	FSV benefit of 30% allowed to banks/DFIs against corporate/SME/Consumer financing for three years from date of classification.	Eased
Mar-09	<u>BSD Circular 06 of 2009</u>	Sukuk issued by National Industrial Parks Management and Development Company notified as approved security for the purpose of Statutory Liquidity Requirement (SLR)	Eased
Apr-09	<u>BSD Circular 07 of 2009</u>	MCR requirements brought down significantly from 23 billion to be met in 2013 to 10 billion amid global slowdown in growth. CAR however kept unchanged.	Eased
Apr-09	<u>BPRD Circular No. 7 of 2009</u>	Cost of financing facilities from SBP reduced to 14% from previously 15%	Eased
Aug-09	<u>DMMD Circular No. 2 of 2009</u>	Cost of borrowing from SBP reduced as The SBP Overnight Reverse-Repo (Ceiling) rate was reduced from 14.0% to 13.0% p.a.	Eased
Oct-09	<u>BSD Circular 10 of 2009</u>	FSV benefit enhanced to 40% from 30% earlier allowed to banks/DFIs against corporate/SME/Consumer financing for three years from date of classification.	Eased
Nov-09	<u>DMMD Circular No. 3 of 2009</u>	Cost of borrowing from SBP reduced as The SBP Overnight Reverse-Repo (Ceiling) rate was reduced from 13.0% to 12.5% p.a.	Eased
Dec-09	<u>ACD Circular No. 2 of 2009</u>	all agri. loans of small farmers having outstanding balances as on 30-6-2009 were written off in the war torn areas of Malakand division	Eased
Feb-10	<u>BSD Circular 01 of 2010</u>	PIA Sukuk declared eligible security for MCR and liquid asset.	Eased
Jun-10	<u>BSD Circular 02 of 2010</u>	Enhanced FSV benefit extended	Eased
Jul-10	<u>DMMD Circular No. 1 of 2010</u>	Cost of borrowing from SBP enhanced as the SBP Overnight Reverse-Repo (Ceiling) rate was increased to 13.0% to 12.5% p.a.	Tightened

Table-8 Regulatory Policy Decisions during the Boom Episode Window of (2004-2012)

Date	Regulatory Instructions/Guidelines	Decision	Credit Conditions
Sep-10	<u>DMMD Circular No. 2 of 2010</u>	Cost of borrowing from SBP enhanced as the SBP Overnight Reverse-Repo (Ceiling) rate was increased to 13.0% to 13.5% p.a.	Tightened
Nov-10	<u>BSD Circular 02 of 2010</u>	Provision requirements in flood affected areas deferred for 1 year	Eased
Nov-10	<u>BSD Circular 07 of 2010</u>	MCR requirements for MFIs revised upward	Tightened
Nov-10	<u>DMMD Circular No. 3 of 2010</u>	Cost of borrowing from SBP enhanced as the SBP Overnight Reverse-Repo (Ceiling) rate was increased to 14% from 13.5% p.a.	Tightened
Jul-11	<u>DMMD Circular No. 12 of 2011</u>	Cost of borrowing from SBP reduced as the SBP Overnight Reverse-Repo (Ceiling) rate was decreased to 13.5% from 14% p.a.	Eased
Sep-11	<u>AC&MFD Circular Letter No. 01 of 2011</u>	General provision requirement for secured loans withdrawn for Microfinance banks. For all other loans the requirements reduced from 1.5% to 1%. (PR-12)	Eased
Oct-11	<u>DMMD Circular No. 16 of 2011</u>	Cost of borrowing from SBP reduced as the SBP Overnight Reverse-Repo (Ceiling) rate was decreased to 12% from 13.5% p.a.	Eased
Oct-11	<u>BSD Circular 07 of 2010</u>	FSV benefits enhanced substantially to all Corporate, SME and consumer financing for indefinite period of time	Eased
Jun-12	<u>AC&MFD Circular No. 03 Of 2012</u>	Easing of funding constraints. increasing funding availability and diversification of sources for MFBs/MFIs by allowing them to raise funding from non-bank/capital markets.	Eased

Appendix-B

Figure 1: Credit Booms for Pakistan (1960-2018)

Fig. 1 Log of Per Capita Real Credit
Trend using FMHPF

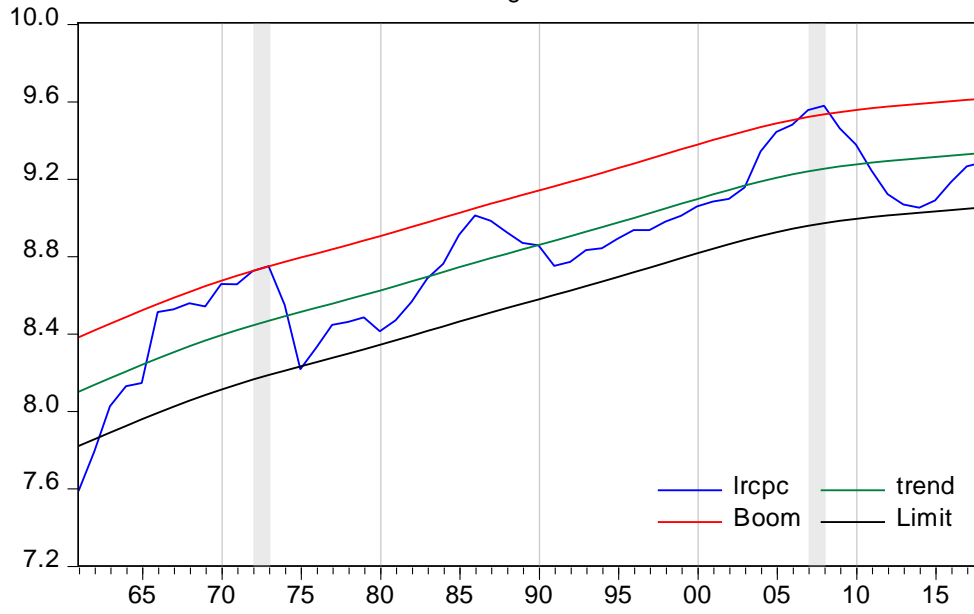


Fig. 1b Log of Per Capita Real Credit
Trend using HFP

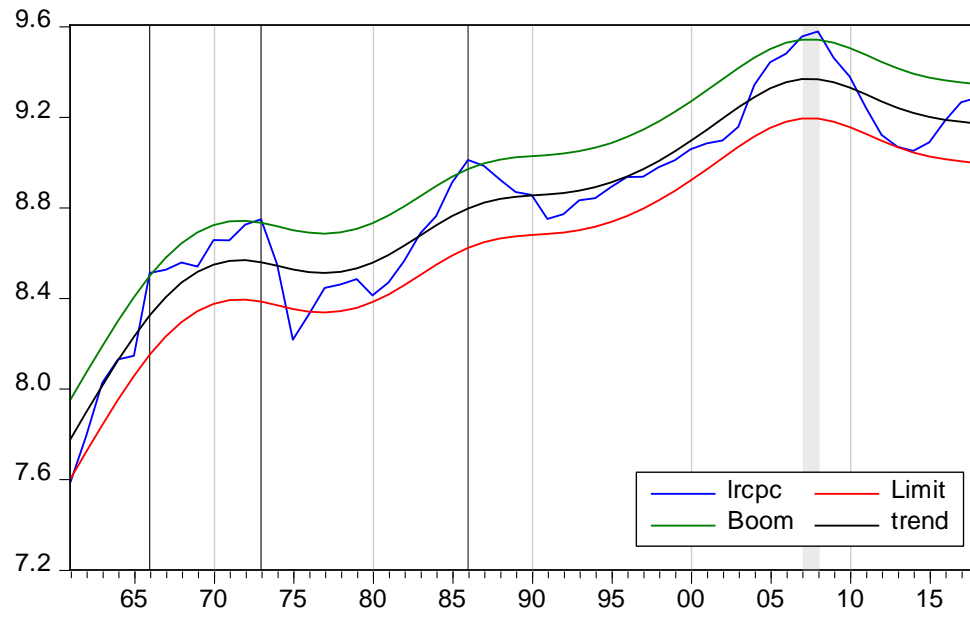


Figure 2: Credit Booms for Pakistan using Log of per Capita GDP and Credit to GDP Ratio

Fig. 2(a) Log of Per Capita Real Credit
Boom Episode (2007-08)

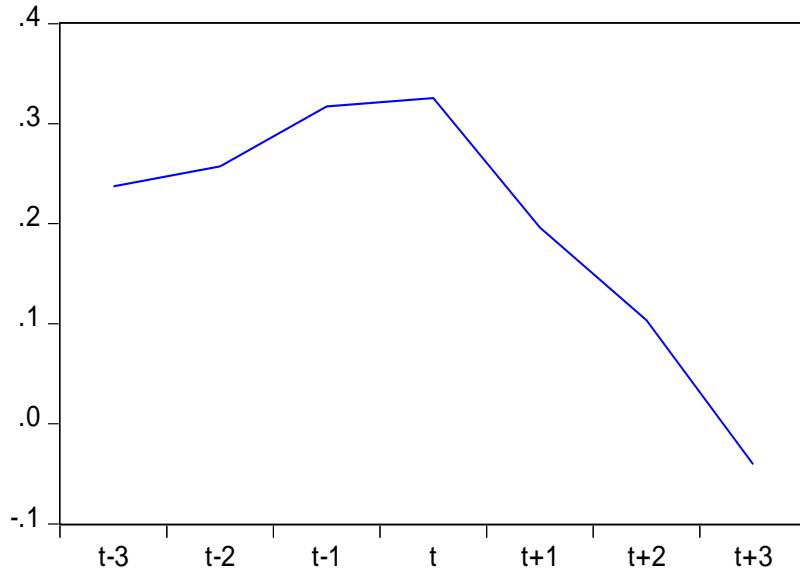
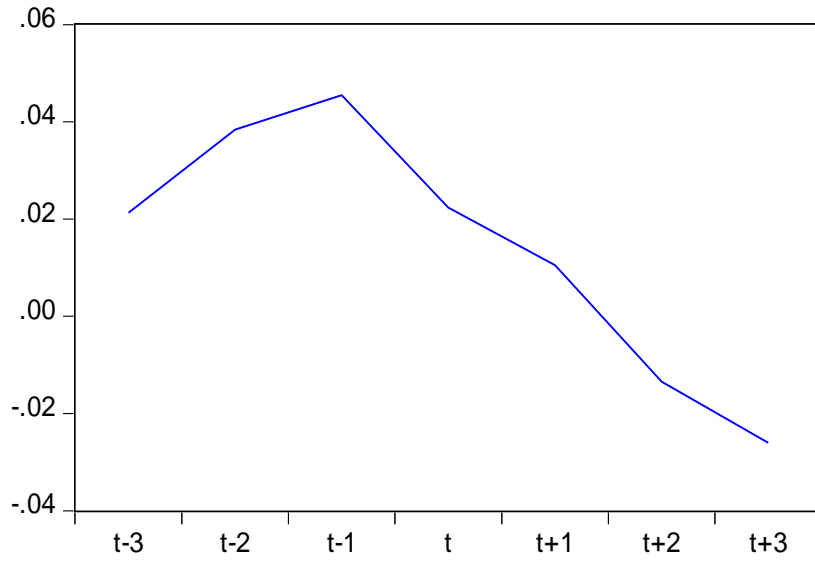


Fig. 2(b) Log of Per Capita Real Credit
Boom Episode (1972-73)



Figure 3: Credit Booms and Real GDP for Pakistan

**Fig. 3a. Cyclical Component of the Output
Boom Episode 2007-08**



**Fig. 3b. Cyclical Component of the Output
Boom Episode 1972-73**

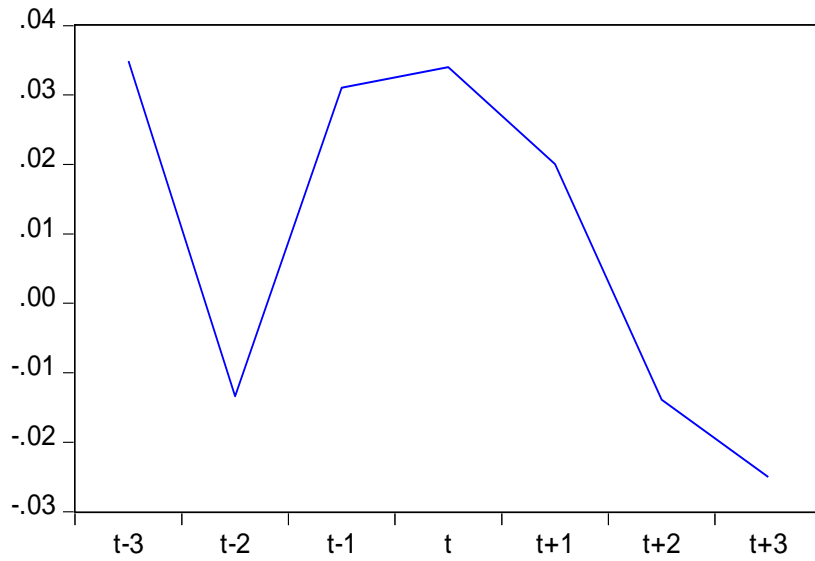


Figure 4: Boom Periods and Domestic Demand-Pakistan

Fig. 4a. Cyclical Component of the Consumption Boom Episode (2007-08)



Fig. 4b. Cyclical Component of the Investment Boom Episode (2007-08)

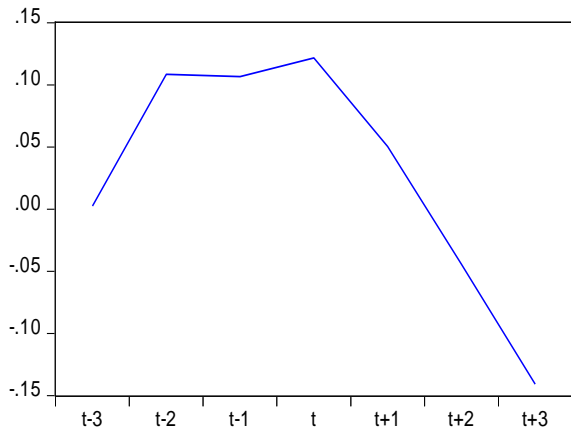


Fig. 4c. Cyclical Component of the Consumption Boom Episode (1972-73)



Fig. 4d. Cyclical Component of the Investment Boom Episode (1972-73)

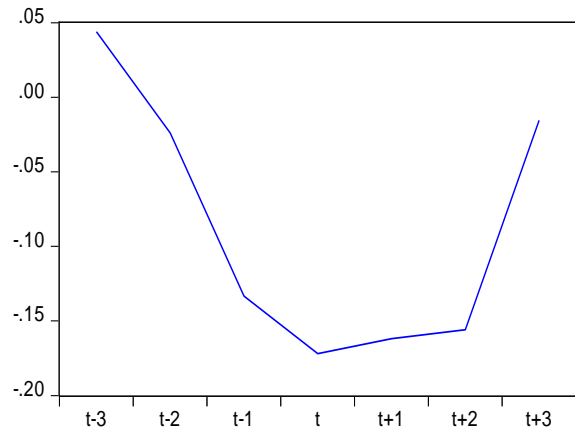


Figure 5: Boom Periods and External Sector-Pakistan

Fig. 5a. Cyclical Component of CAY
Boom Episode (2007-08)

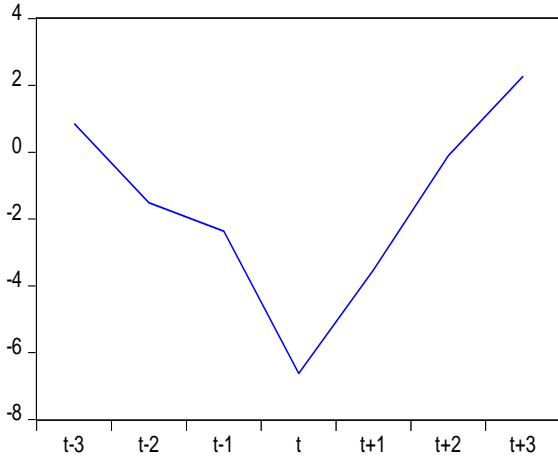


Fig. 5c. Cyclical Component of CAY
Boom Episode (1972-73)

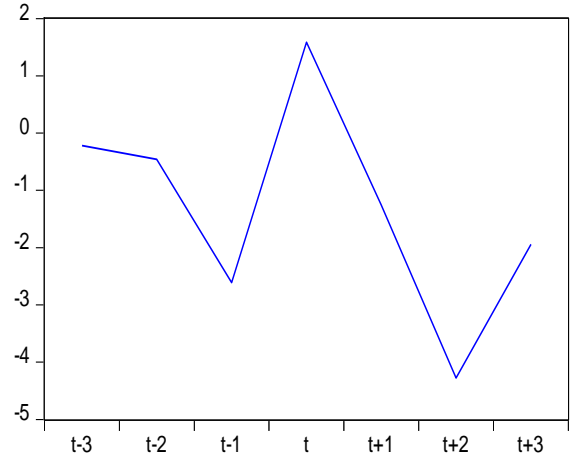


Fig. 5b. Cyclical Component of KIY
Boom Episode (2007-08)

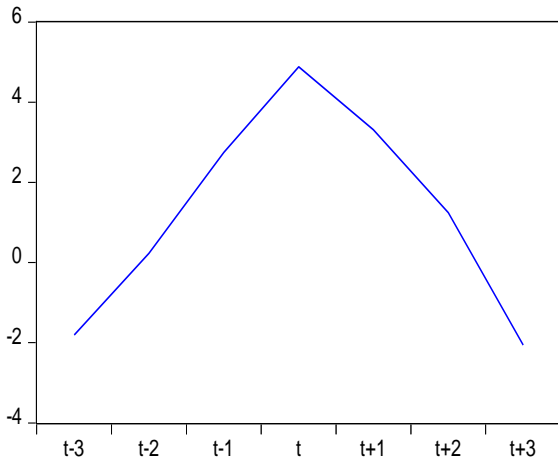


Fig. 5d. Cyclical Component of KIY
Boom Episode (1972-73)



Figure 6: Boom Periods and Aggregate Prices

Fig. 6a. Cyclical Component of the Inflation
Boom Episode (2007-08)

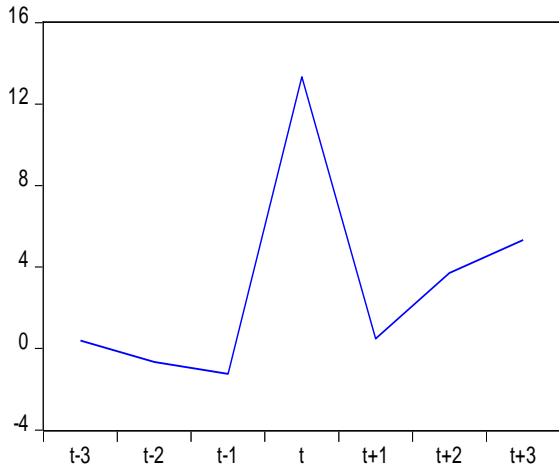


Fig. 6b. Cyclical Component of the Inflation
Boom Episode (1972-73)

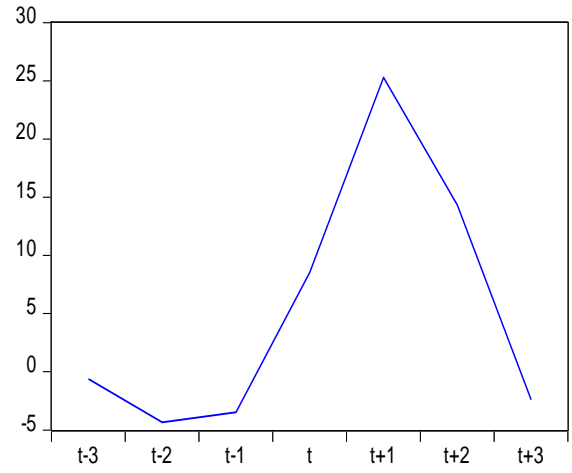


Fig. 6c. Cyclical Component of the Asset Prices
Boom Episode (2007-08)

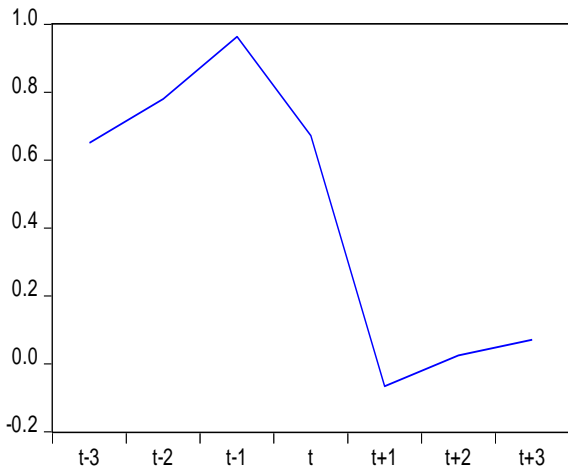


Fig. 6d. Cyclical Component of the Asset Prices
Boom Episode (1972-73)

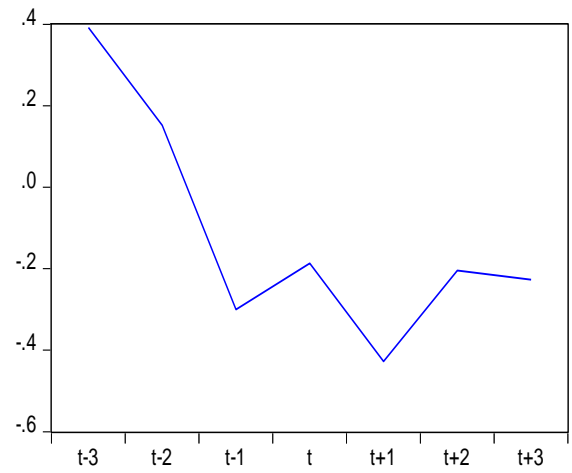


Figure 7: Boom Periods and Real Effective Exchange Rate

Fig.7a. Cyclical Component of REER
Boom Episode (2007-08)

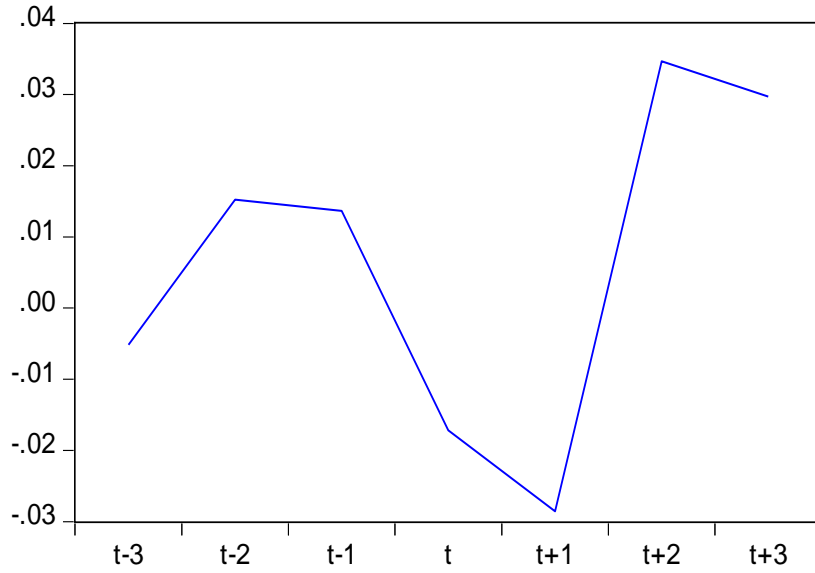


Fig.7b. Cyclical Component of REER
Boom Episode (1972-73)

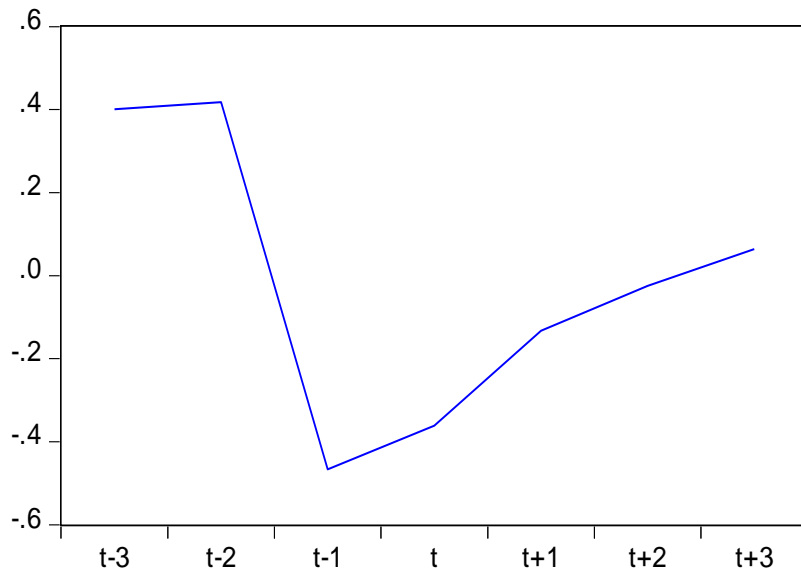


Figure 8: Cyclical Component and Diffusion Index of Boom Episode

Fig. 8a. Cyclical Component of Per Capita Real Credit Boom Episode (2007-08)

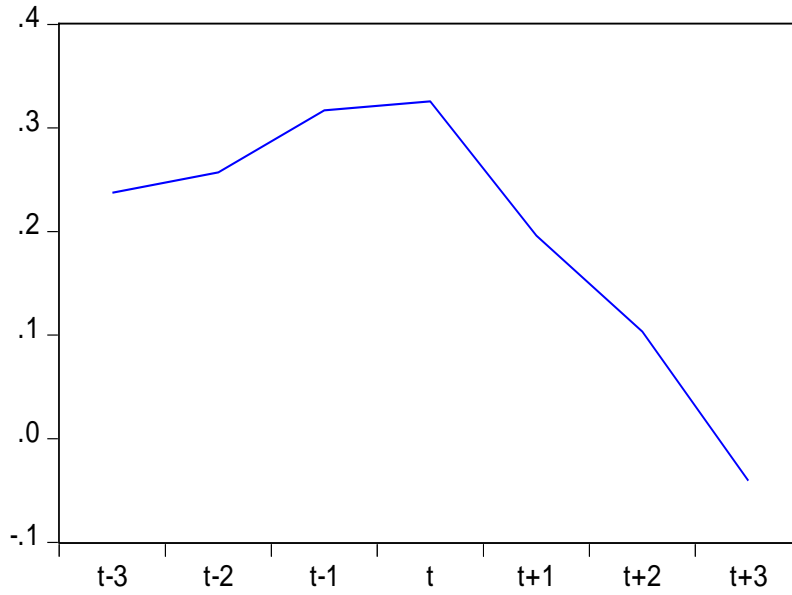


Fig. 8b. Diffusion Index Boom Episode (2007-08)

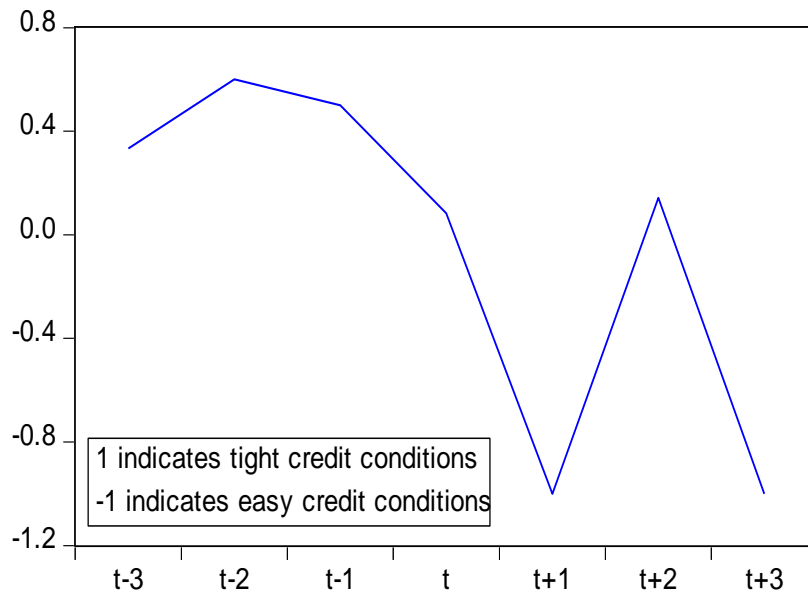


Figure 9: Corporate Leverage (Long Term) around Episodes of Credit Boom

Fig. 9a. Fixed Liabilities to Book Value
Boom Episode (2007-08)

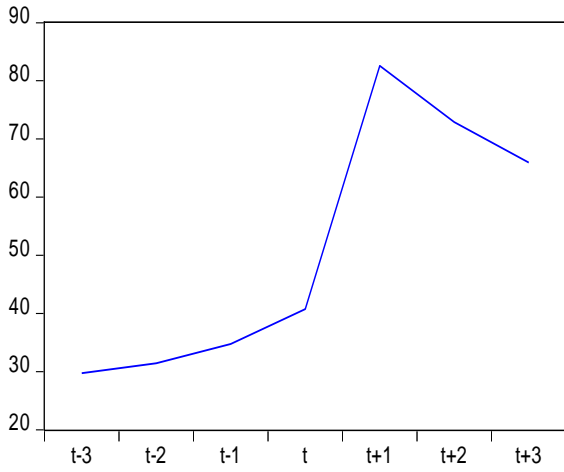


Fig. 9b. Fixed Liabilities to Book Value
Boom Episode (1972-73)

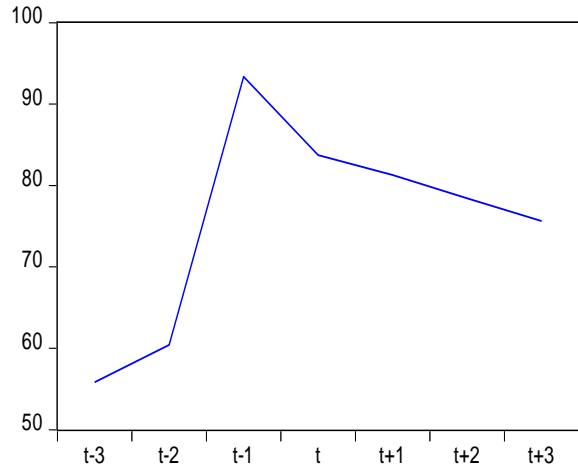


Fig. 9c. Fixed Liabilities to Market Value
Boom Episode (2007-08)

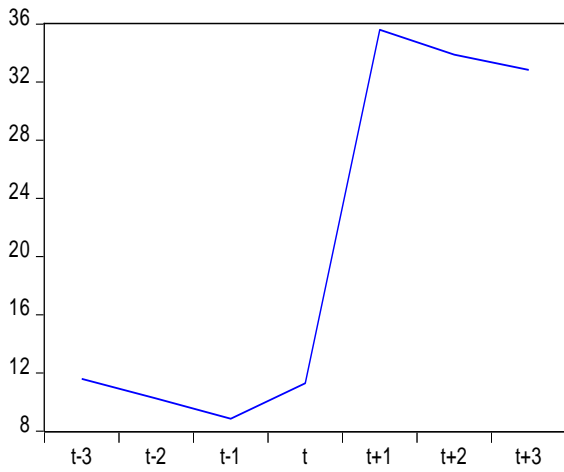


Fig. 9d. Fixed Liabilities to Market Value
Boom Episode (1972-73)

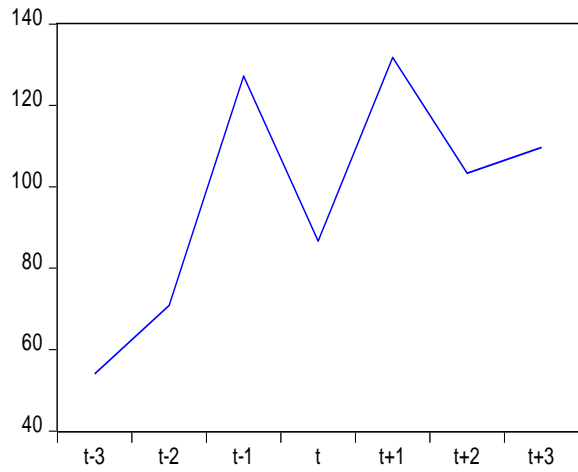


Figure 10: Corporate Leverage (Short Term) around Episodes of Credit Boom

Fig. 10a. Current Liabilities to Market Value
Boom Episode (2007-08)

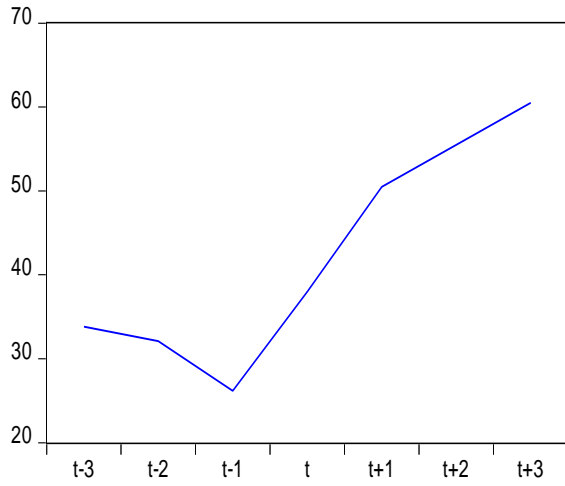


Fig. 10b. Current Liabilities to Market Value
Boom Episode (1972-73)

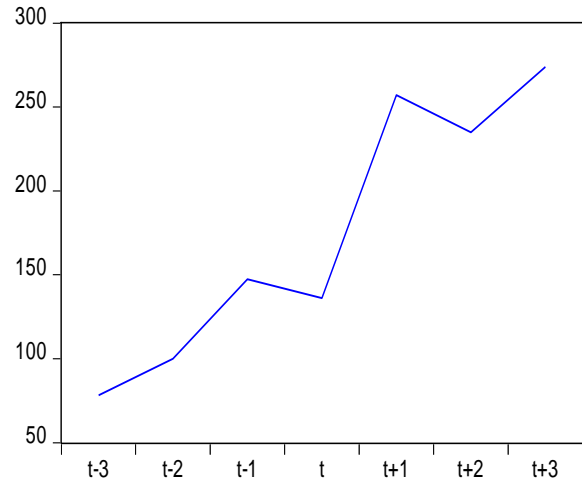


Fig. 10c. Current Liabilities to Sales ratio
Boom Episode (2007-08)

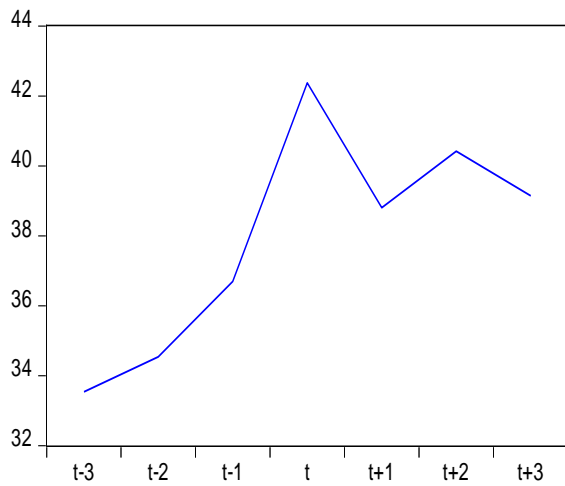


Fig. 10d. Current Liabilities to Sales ratio
Boom Episode (1972-73)

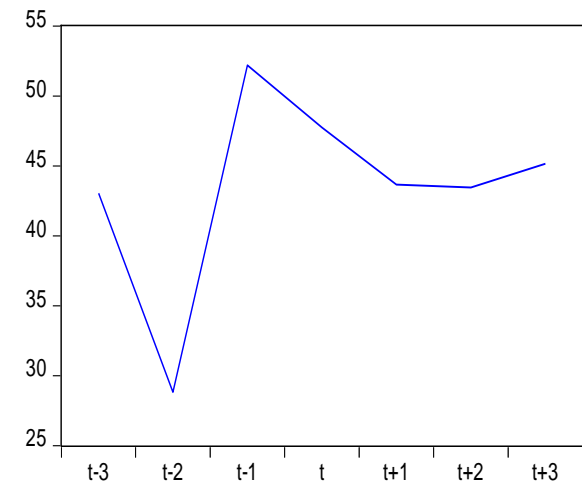


Figure 11: Corporate Valuation and Profitability around Episodes of Credit Boom

Fig. 11a. Market Cap. to BV (TQ1)
Boom Episode (2007-08)

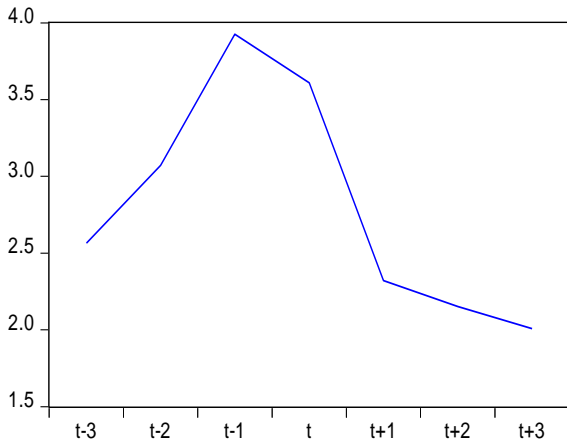


Fig. 11b. Market Cap. to BV (TQ1)
Boom Episode (1972-73)

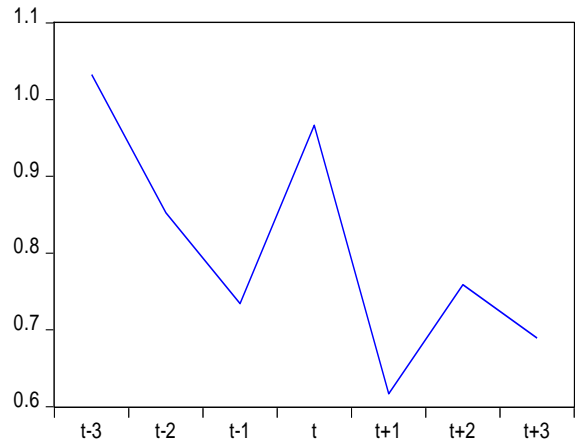


Fig. 11c. MV+Fixed Liabilities to BV (TQ2)
Boom Episode (2007-08)

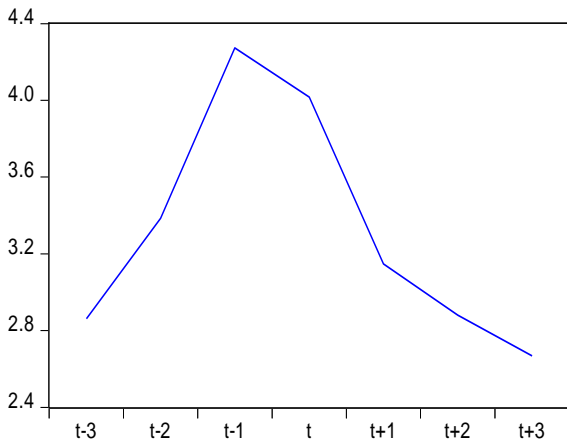


Fig. 11d. MV+Fixed Liabilities to BV (TQ2)
Boom Episode (1972-73)

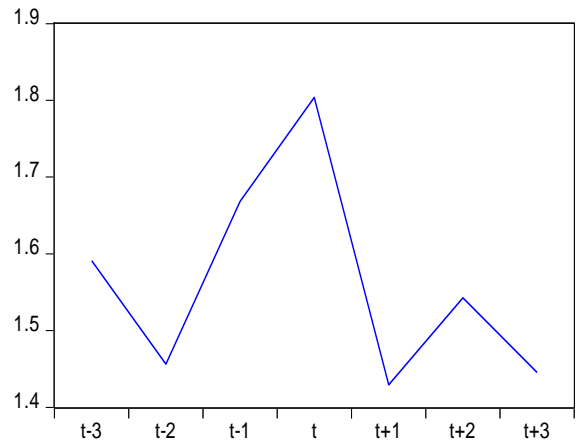


Fig. 11e. Return on Assets
Boom Episode (2007-08)

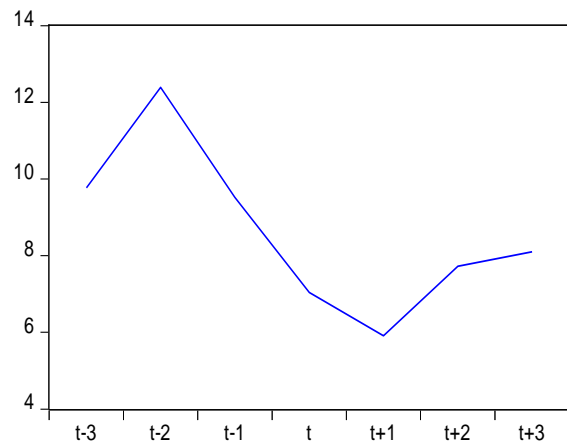


Fig. 11f. Return on Assets
Boom Episode (1972-73)



Figure 12: Credit Booms and Banking System

Fig. 12a. Regulatory Capital to Risk Weighted Assets -
(Capital Adequacy)
Boom Episode (2007-08)

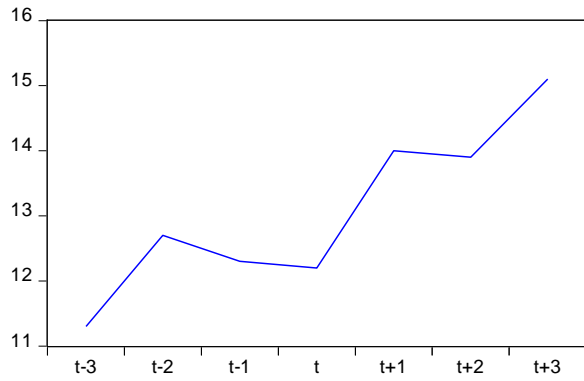


Fig. 12b. Deposits to Advances Ratio (Lending Activity)
Boom Episode (2007-08)

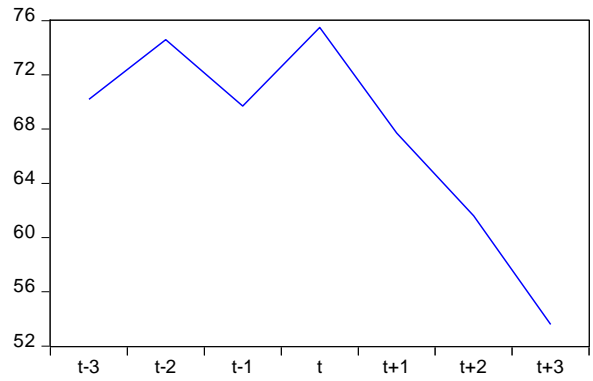
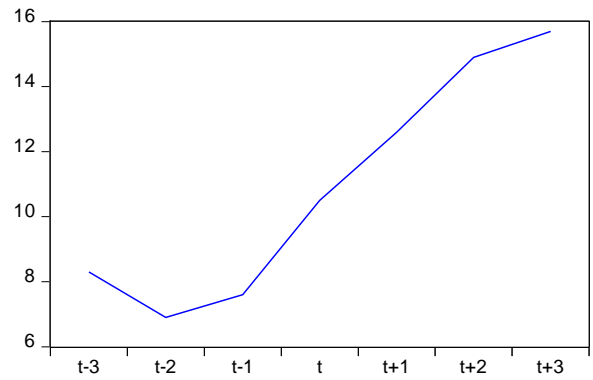


Fig. 12c. Return on Assets (Profitability)
Boom Episode (2007-08)



Fig. 12d. Gross NPLs to Advances Ratio (Asset Quality)
Boom Episode (2007-08)



Appendix-C

Chart 1. Real GDP Growth of Pakistan

