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Does Government Borrowing Crowd out Private Sector Credit in Pakistan

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Does Government Borrowing Crowd out Private Sector Credit in Pakistan

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Abstract

We investigate the impact of government borrowing from the scheduled banks on the credit to private sector in Pakistan, using monthly data from 1998:M6 to 2015:M12. We find that a one percentage point growth in the government borrowing leads to 8 basis points crowding out of the private sector credit in four months. Albeit small, there is negative impact of government borrowing on the private sector credit. The results remain unchanged even after implementation of the interest rate corridor since August 2009.

Keywords: Private sector credit, Government policy and regulation, Government borrowing, Emerging economies

JEL Classification: E5, G18, H47

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Non-technical Summary

The impact of government budgetary borrowing on the private sector credit has always been an important subject, especially in developing countries. The main premise is that government borrowing leads to crowding out of private sector credit due to resultant reduced availability of the loan-able funds. On the other hand there are arguments that investment in government securities increases the risk appetite of the banking sector and their desire to lend to relatively risky avenues. Thus, in the end, whether government borrowing substitutes or complements the private sector credit is an empirical question, which we attempted to address in this paper.

We investigated private sector credit response to the government borrowing, after controlling for an array of banking and macro variables. The period of analysis is from June 1998 to December 2015. For our analysis, we followed a variant of theoretical model by Ehrmann et al. (2001) in which equilibrium private sector credit equation is derived from loan demand and loan supply equations. However, instead of using cost of government borrowing as a determinant of private sector credit we used volume of the government borrowing for the same purpose. Thus, we have regressed growth in private sector credit mainly on the government budgetary borrowing growth. We also included an array of supply and demand side control variables namely, discount rate to control for the monetary policy, total deposits net of banks' balances with SBP to measure the impact of lending capacity, headline inflation and industrial production/ large scale manufacturing index to control for demand side dynamics.

We found that in Pakistan government borrowing from the scheduled banks crowds out private sector credit. To decipher the impact of change in monetary regime we use dummy variable for interest rate corridor introduced by State Bank of Pakistan (SBP) in August 2009. The results show that there is no significant difference between the impact of government borrowing on the private sector credit before and after the implementation of the interest rate corridor. Hence it may be concluded that there is, in general, a significant negative, albeit small, impact of government borrowing on the private sector credit.

1. Introduction

Borrowing by the governments in domestic market is a common phenomenon both in developed and developing countries. In fact, developed countries have relatively larger share of such borrowing as their spending on the provision of public services is high. On the other hand, developing economies mostly borrow to finance infrastructure projects with longer gestation period which loosens their control over expenditures. This in addition to limited revenue generation necessitates borrowing for deficit financing (Morrison (1982), Ramamurti, (1992), Bua,G. and Pradelli, J.(2014)): Pakistan is no exception. The rigidities in country's tax collection system along with liberalization of trade regime have led to loss of a considerable amount of revenue sources.¹ On the other hand, public sector expenditure has remained rigid and high, leading to large fiscal deficits. Within these constraints, government relies on domestic and international borrowing to finance the budget deficit.

The financing of budget deficit through commercial bank borrowing is believed to crowd out private sector credit. These concerns and their adverse implications have been highlighted in various flagship publications of the State Bank of Pakistan as well.² It is alleged that government borrowing has led the commercial banks to earn massive risk free returns, making them captive to hassle free profit making. Resulting complacency on commercial banks' part has lead to crowding out of private sector credit. On the contrary, it has been argued that the lending to the government increases the risk appetite of the banks and consequently banks may increase lending to private sector. This premise, if true, may dampen the crowding out and even result in crowding in. It is very much interesting to explore whether government borrowing leads to crowding out or crowding in.

Generally, the literature focuses on estimating the impact of government borrowing on the private investment. The government borrowing may crowd out private investment or it may complement the latter (crowding in). Apart from crowding out and crowding in channel, literature also discusses the importance of financing of fiscal expenditure, since the financing channel is of great importance for the size and sign of the fiscal multiplier (Choudhary et.al (2016)).

The focus of our study, however, is to investigate the impact of the government borrowing from scheduled banks on the availability of credit to the private sector, particularly the magnitude of crowding out. That is, when the government increases its borrowing from scheduled banks, the available funds for the private sector may shrink, leading to a decrease in the quantity of loans to be given to the private sector.³ Another motivation for this study is driven from the regime change in 2009 - the introduction of interest rate corridor. After the adoption of a sort of interest rate targeting regime, the central bank is bound to provide/absorb liquidity, in case of shortage/excess, to/from the market for keeping interbank overnight weighted average repo rate around the policy rate. Hence, a priori, after the implementation of the interest rate corridor regime, the crowding out effect of the government borrowing may fade away. In this respect, our study contributes to address this gap by investigating how this structural change in the monetary policy regime has impacted the crowding out/in hypothesis.

The results of our study show that for every 1 percentage point increase in the growth of government borrowing from the banking system there is, on average, 8 basis points decrease in private sector credit growth in four months. After the introduction of the interest rate corridor the coefficient for the

¹ Fenochietto and Pessino (2013), Ahmed, and Robina (2014).

² SBP Monetary Policy Statements for February 2013, August 2012, and July 2011.

³ Alternatively, when government borrows from the banks, interest rate rises, and cost of borrowing from the banks goes up leading to a decrease in demand for bank loans by the corporate firms.

government borrowing from the banking system is not significantly different from that of pre-corridor period.

Rest of the study is structured as follows. Section 2 reviews the literature, Section 3 highlights the stylized facts about Pakistan's economy and Section 4 illustrates the data and econometric specification. In section 5 we report the results and section 6 concludes the study.

2. Review of Literature

The literature on crowding out generally identifies two channels: price channel of crowding out and quantity channel of crowding out. Classical and neo-classical economists advocate free markets and supports price channel of crowding out i.e. government borrowing may crowd out private investment through increase in interest rate due to reduced level of funds available for private sector. On the other hand, quantity channel analyzes the magnitude of the crowding out effect of government borrowing from the banks on private sector credit (Emran and Farazi (2009)).

The empirical literature investigating the quantity approach is rather limited. By focusing on the volume of credit to the private sector, Emran and Farazi (2009) explored the crowding out of private credit in developing countries. The results showed that there is significant crowding out effect of government borrowing from domestic banks on private credit. Fayed (2012) and Shetta and Kamaly (2014) established same results for Egypt.

Government borrowing and its crowding out impact on private investment has been intensively discussed in literature especially for less developed countries (LDCs). However, various studies provide different results for developing countries including evidences both of crowding in and crowding out (Choudhary et. al. (2016), Atukeren (2005) and Afsono and Aubin(2009)). Similarly, studies have also been carried out for developed countries, which came to the same conclusion (Mahmoudzadah et. al. (2013), Ahmed and Miller (1999)).⁴

Some studies have also been conducted to investigate the phenomenon of crowding out in Pakistan. For instance, Khan et.al. (2016) developed a theoretical model for dominant borrower (government) from banks for financing of fiscal deficit. The study also proved empirically that dominant borrower Syndrome (DBS) leads to crowding out of private sector investment and rise in interest rate spreads.

Ahmed (2016), while estimating banks supply side equation, also found that government borrowing from banks had crowding out effect on private sector credit. Khan and Gill (2009) examined the existence of crowding-out effect of public borrowing on private investment in Pakistan in the long run, using co-integration test. They concluded crowding in instead of crowding out of private sector investment in the long run. Their conclusion was based on the evidence of excess liquidity in the banking system and significant development expenditure resulting in "positive externalities". Hussain et. al. (2009), using co-integration technique, concluded that expenditure on defense and debt serving crowds-out private investment whereas spending on infrastructure, health and education crowds-in private investment in the long run. However, using ECM technique they concluded that results were insignificant in the short term. Saeed et. al. (2006) estimated the impact of public investment on private investment in agriculture and manufacturing sector and in overall economy using unrestricted structural VAR models. Their study concluded that the increase in public investment persuades private investment in agriculture sector (i.e. crowding in) and it dampens private investment in manufacturing sector (i.e. crowding-out). For overall economy, no significant impact of public

⁴ Please see **Annexure A** for detailed literature review.

investment on private investment was found. Rashid (2005) employed impulse response function (IRF), variance decompositions (VDC) and multivariate co-integration approach to examine the relationship between public and private investment. His empirical results showed that public investment crowds in private investment in the long run. The estimates of VDC presented weak proof, whereas IRFs supported a positive response of private investment to a shock of public investment. Naqvi (2002) examined the relationship between the GDP, fixed capital formation and public capital formation by using co-integration and VAR. His paper provided evidence that government complements private investment in the long run, in Pakistan.

Hyder and Qayyum (2002) tested the crowding-out hypothesis for Pakistan by using vector error-correction (VEC) framework and impulse response function. Their findings confirmed the complementarities between public and private investment. Looney (1995) investigated the effect of public sector crowding-out of private capital formation for manufacturing sector in Pakistan. By using Granger causality test his results suggested that private investment in large scale manufacturing (LSM) underwent real crowding out due to the government's non-infrastructure investment projects. Burney et. al. (1989) investigated the empirical relationship between government budget deficit and nominal interest rates. They concluded that there is no relationship between the overall government budget deficit and the nominal interest rates. However, budget deficit has positive impact on the nominal interest rates only under specific circumstances, such as knowledge of future inflation rate. Moreover, the study linked the deficit with higher nominal interest rate only if the deficit was financed by bank borrowing, hence, ending up in crowding out of private investment and consumption expenditures.

Empirical studies carried out for Pakistan so far depict mixed results, mostly supporting crowding in of private investment as a result of fiscal spending, therefore it is difficult to generalize the findings at this stage. This study is another effort of investigating crowding out of private sector credit by the government borrowing from banks and to estimate extent of crowding out, if any. We also explore the impact of introduction of interest rate corridor regime upon crowding in/out hypothesis in Pakistan.

3. Some Stylized Facts

This section presents stylized facts about the revenue position of the government, government borrowing from the scheduled banks, private sector credit and a review of regime shift in monetary policy operation in Pakistan during 1998 to 2015. Brief descriptive analysis of these variables aims at providing an understanding of the trends in these variables over time.

Revenue generation capacity has remained one of the major concerns for Pakistan. Structural problems like narrow tax base, tax evasion and administrative weaknesses, have taken a toll on tax collection. These issues kept tax to GDP ratio lower in Pakistan (Annexure B-I). Apart from taxes, decline in statutory tariff rates have caused gradual decrease in government's revenue sources, which was largely due to liberalization of trade regime.⁵

Due to limited revenue resources, government borrowing from scheduled banks has remained dominant source of financing the budget deficits in Pakistan. Government, in recent years, has opted to borrow more from domestic sources whereas credit to private sector has expanded at slower pace

⁵ The corporate tax regime has also been relaxed since 1992-93. The tax rate on banking, public and private companies has been reduced from 66, 44 and 55 percent in 1992-93 to a flat rate of 35 percent for all categories of corporate entities whereas the tariff rate, which was 80 percent in 1993-94, was curtailed to 25 percent by 2006-2007. Similarly, the effective rates on dutiable imports and total imports were respectively slashed from 38 and 25 percent in 1993-94 to 12 and 7 percent in 2006-2007.

(Annexure B-II). Besides crowding out the private sector credit, government fiscal operations also created substantial challenges for monetary management through abrupt movements in market liquidity and growth in monetary variables (Annexure B-III).

Apart from these facts, SBP also adopted a new framework for management of its monetary operations. It introduced, with effect from August 17, 2009, a 300 basis points interest rate corridor for the money market overnight repo rate. In this framework, SBP reverse repo rate (discount rate) represented a 'ceiling' rate and the SBP repo rate provided a 'floor' to the corridor. With effect from February 11, 2013, the width of the corridor was reduced to 250 basis points. The width was further reduced to 200 bps in May 2015. Further refinement in this framework was announced in May 2015 by setting Target rate (policy rate) between the ceiling and floor rates of the corridor. In this framework SBP uses its liquidity management tools more frequently to keep the money market weighted average overnight rate close to the target rate. Before the introduction of corridor, the overnight money market repo rate remained highly volatile, which often diluted the monetary policy signals and weakened the transmission of monetary policy.

Thus after the introduction of the corridor framework, the central bank focuses on keeping the interbank overnight repo rate within the ceiling and the floor rate of this corridor. This is primarily a regime shift from monetary targeting to a sort of interest rate targeting.⁶ Generally, the liquidity in the interbank may be affected through various endogenous and exogenous factors. For instance, various tax payments by the depositors to the government decrease the liquidity in the interbank. Similarly, government auction (borrowing) of treasury bills or bonds in the primary market drains interbank funds causing interest rate to surge in money market. However, after the adoption of an interest rate targeting type regime, the central bank is bound to provide/absorb liquidity, in case of shortage/excess, to/from the market for keeping interbank overnight weighted average repo rate around the policy rate. Hence, a priori, after the implementation of the interest rate corridor regime, the crowding out effect of the government borrowing may weaken. It is, therefore, very much interesting to investigate how this structural change in the monetary policy regime have impacted the crowding out hypothesis for the case of Pakistan.

4. Data and Econometric Specification

The period of analysis is from June 1998 to December 2015.⁷ For our analysis, we followed a variant of theoretical model by Ehrmann et al. (2001) in which equilibrium private sector credit equation is derived from loan demand and loan supply equations. However, instead of using cost of government borrowing as a determinant of private sector credit we used volume of the government borrowing for the same purpose. Thus, we have regressed growth in private sector credit mainly on the growth in government budgetary borrowing. We also included an array of supply and demand side control variables. Specifically, we used discount rate⁸ to control for the monetary policy and total deposits net of banks' balances with SBP⁹ to measure the impact of lending capacity of the scheduled banks.

⁶ Although analysis post changes in Interest Rate Corridor (IRC) introduced in May 2015 would have been more pertinent for our study, however, due to data constraints we have used information since the introduction of corridor in Pakistan for estimation purposes.

⁷ Our analysis starts from 1998 as prior to this we do not have break up of government borrowing from scheduled banks and State Bank of Pakistan.

⁸ Since the changes in corridor framework in May 2015 policy rate is different from the discount rate, which is the penal rate.

⁹ Total deposits have been netted out with banks' balances with SBP as given in monetary survey. In this data, banks' balances with SBP are not segregated between required and excess reserves that is why reserves and balances have been used interchangeably.

Similarly, we employed headline inflation and industrial production/ large scale manufacturing index to control for demand side dynamics. For estimation purposes, we employed OLS upon the specification 1, closely following Kashyap and Stein (2000):

$$P\dot{S}C_t = c + \sum_{j=1}^m \alpha_j P\dot{S}C_{t-j} + \sum_{j=0}^m \mu_j \dot{G}B_{t-j} + \sum_{j=0}^m \varphi_j \Delta DISR_{t-j} + \sum_{j=0}^m \gamma_j \dot{L}C_{t-j} + \sum_{j=0}^m \delta_j IPLSM_{t-j} + \sum_{j=0}^m \pi_j CPI_{t-j} + \sum_{k=1}^{11} \rho_k Months_k + \varepsilon_t \quad (1)$$

Where,

$P\dot{S}C_t$ = The dependant variable is the monthly growth of the total amount of loans granted to the private sector by the banking system in month t ,

$\dot{G}B_{t-j}$ = the monthly growth in the government borrowing from the scheduled banks in month $t-j$,

$\Delta DISR_{t-j}$ = the change in discount rate in month $t-j$

$\dot{L}C_{t-j}$ = the growth in lending capacity measured by the total deposits net of reserves in month $t-j$.

$IPLSM_{t-j}$ = Growth in the index of Industrial Production/Large Scale Manufacturing in month $t-j$.

CPI_{t-j} = CPI inflation in month $t-j$

$Months$ = dummy for month k

C = intercept, and

m (maximum lag) is set to four.

As discussed earlier, the paper also estimates the impact of shift in monetary regime on private sector credit due to introduction of interest rate corridor in August 2009. To control for this regime shift we introduced a dummy for interest rate corridor which takes a numerical value of one during September 2009 and December 2015, and zero otherwise. Moreover, we introduced interaction between this dummy and government borrowing to estimate the difference, if any, of government borrowing on the private sector credit after the implementation of the interest rate corridor. In this particular case we estimated the following.

$$P\dot{S}C_t = c + \sum_{j=1}^m \alpha_j P\dot{S}C_{t-j} + \sum_{j=0}^m \mu_j \dot{G}B_{t-j} + \sum_{j=0}^m \varphi_j \Delta DISR_{t-j} + \sum_{j=0}^m \gamma_j \dot{L}C_{t-j} + \sum_{j=0}^m \delta_j IPLSM_{t-j} + \sum_{j=0}^m \pi_j CPI_{t-j} + IRC (\omega + \sum_{j=0}^m \mu_j \dot{G}B_{t-j}) + \sum_{k=1}^{11} \rho_k Months_k + \varepsilon_t \quad (2)$$

IRC is a dummy to control for interest rate corridor regime. The interaction term $IRC * \dot{G}B_{t-j}$ is used to gauge the differential impact of the government borrowing on the private sector credit during interest rate corridor regime.

5. Results

In Table 1(Annexure B) baseline model shows the results of specification (1) with and without including time trend in the model. Lagged values of dependent variable i.e. private sector credit growth have a positive impact on its current period growth. Our main coefficient of interest is μ which

measures the potency of the crowding out or crowding in. This coefficient is -0.082 demonstrating a negative and statistically significant impact of government budgetary borrowing on the private sector credit. More specifically, a 1 percentage point growth in government borrowing from scheduled banks, crowds out growth in private sector credit by around 8 basis points in four months.¹⁰ Although this coefficient is economically small, it is statistically significant and robust to changes in specifications. Thus, the coefficient suggests the direction of the impact of government borrowing on private sector credit. Ahmed (2016) also finds that if real interest rate on treasury bills increases by 1 percentage point, it would decrease the real private sector credit by 3 basis points. Excluding last couple of years of government performance, government spending on non-developmental projects due to certain pressures could have been a main reason for crowding out phenomenon. As it is believed that government developmental spending is helpful for development of private sector and its demand for bank financing.

On the other hand, lending capacity of the banks has a significant positive effect on private sector credit. In particular, a 1 percentage point growth in lending capacity increases the growth in private sector credit by 87 basis points in four months time. Although the coefficient for the discount rate appears negative but is statistically insignificant. A potential reason could be that there is a very low variability in the discount rate during the period under consideration. Moreover, the impact of monetary policy may not be perfectly gauged using aggregate data. In this regard panel data give better results. For instance, Zaheer et al.(2013) show that monetary policy in Pakistan works mostly through small banks as after a monetary tightening small banks are more likely to cut their private sector credit. On demand side, industrial production /large scale manufacturing index has significantly positive impact on the lending to the private sector credit. The estimated coefficient for the variable is 0.124. The impact of CPI on the private sector credit is statistically insignificant. We also included the time trend in the model to check the robustness. The results support our earlier findings on the crowding out.

Table 2 in Annexure B exhibits the results of the specification (2), where we attempted to disentangle the impact of IRC. Again, the main coefficient of interest is μ which gauges the strength of the crowding out impact. The coefficient shows a negative and statistically significant impact of government borrowing on the lending to the private sector by the banks. Thus before the implementation of the interest rate corridor a 1 percentage point increase in government borrowing from the banks crowded out the private sector credit by around 8.2 basis points in four months. After the introduction of interest rate corridor in August 2009, the coefficient of the crowding out impact of government borrowing remains statistically significant and the coefficient is -0.081. It shows that statistically there is no significant difference between the coefficient of government borrowing, before and after the introduction of interest rate corridor. The possible reason for this indifferent result may be that initially middle of the corridor was not explicitly announced as the target rate. In this period the weighted average overnight rate mostly remained close to the discount rate due to a host of other factors.¹¹ Thus, it is potential subject for future research, as more data would be available in future for post-policy rate period.

6. Conclusion

The impact of government budgetary borrowing on the private sector credit has been a subject of interest of researchers, especially in developing countries. The main premise is that government

¹⁰ If annualized this is equal to 24 basis points decrease in private sector credit growth against four percentages points increase in government borrowing growth.

¹¹ Less developed market, liquidity constraints, exchange rate considerations etc.

borrowing leads to crowding out of private sector credit due to reduced availability of the loan-able funds. On the other hand there are arguments that investment in government securities increases the risk appetite of the banking sector and banks' desire to lend to relatively risky avenues.

We investigated private sector credit response to the government borrowing, after controlling for an array of banking and macro variables. We found that in Pakistan, government borrowing from the scheduled banks crowds out private sector credit. To decipher the impact of change in monetary regime we use dummy variable for interest rate corridor introduced by the SBP in August 2009. The results show that there is no significant difference in the impact of government borrowing on the private sector credit before and after the implementation of the interest rate corridor. Hence it may be concluded that there is, in general, a negative impact of government borrowing on the private sector credit.

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Annexure A

Literature Review for Developed and Developing Countries				
No	Topic	Country/Region/Data	Model/Variables	Main Findings
1	Fiscal Spending and Crowding out Effect: A Comparison between Developed and Developing Countries (Mahmoudzadeh et al, 2013)	Developed and Developing Countries (2000-2009)	Engle-Granger co-integration (real private investment; inflation rate; real income (gross domestic product); real government, investment expenditure; real government consumption expenditure; real government deficit)	Financing budget deficits crowd out private investment in developed countries whereas it crowds in private investment in developing countries.
2	Interactions Between Public and Private Investment: Evidence from Developing Countries (Atukeren, 2005)	Developing Countries (1970–2000)	Co integration, Granger-causality and probit regression (private investment, public investment and GDP)	There is no bottom-line on the impact of public investments on private investments i.e. crowding out/crowding in. The results differ from country to country.
3	Lazy Banks? Government Borrowing and Private Credit in Developing Countries (Emran and Farazi, 2009)	Developing Countries (panel data on 60 developing countries period 1975 to 2006)	OLS (Private credit as a percentage of GDP, government borrowing as a percentage of GDP, log of GDP and growth rate of per capita GDP, inflation rate, level of financial intermediation, institutional quality, and lending rate)	For developing countries, the estimates prove the strong negative effect of government borrowing from the domestic banking sector on the volume of private credit.
4	Crowding-Out and Crowding-In Effects of the Components of Government Expenditure (Ahmed and Stephen, 1999)	Developed and Developing Countries (39 countries for the period of 1975 to 1984)	OLS, fixed-effect, and random-effect models (private investment, public investment, government current expenditure and government capital spending)	Debt-financed aggregate government expenditure brings higher investment in developing countries and lower investment in developed countries. The disaggregated analysis reveals that only transportation and communication expenditure crowds in investment in developing countries. Whereas for developed countries, there exists no positive relationship.
5	Does Public Borrowing Crowd-out Private Investment? The Bangladesh Evidence (Majumder, 2007)	Bangladesh (1976-2006)	ECM (Public borrowing, GDP and interest rate)	Findings of the study do not agree with the crowding-out hypothesis; rather, provide the proof of crowding-in effect. They suggested that government can depend on domestic sources other than central bank for meeting the deficit as long as excess liquidity exists in the financial system.
6	Crowding-Out or Crowding-In? Public and Private Investment in India (Girish Bahal, Mehdi Raissi, and Volodymyr Tulin, 2015)	India (1950-2012)	SVECM (GDP, public and private sector gross fixed capital formation)	Results suggest that while public-capital accumulation crowds out private investment in India over 1950-2012, the opposite is true when we restrict the sample post 1980 or conduct a quarterly analysis since 1996Q2. This change can most likely be attributed to the policy reforms which started during early 1980s and gained momentum after the 1991 crises.
7	Has Government Investment Crowded Out Private Investment in India? (Mitra, 2005)	India (1969-2005)	SVAR (government investment, private investment, and gross domestic product)	The findings do not establish a substantive link between government and private investment or more specifically deficits and interest rates

8	Crowding-Out or Crowding-In? Analyzing the Effects of Government Spending on Private Investment in Turkey (Şen and Kaya, 2013)	Turkey (1975-2011)	Modified version Aschauer's (1989) model, Johanson Cointegration (private investment, government current spending, government current transfer spending, government capital spending, government interest spending, GDP)	The empirical findings of the paper support the crowding out of private investment in response to government current transfer spending, government current spending, and government interest spending whereas government capital spending crowds-in private investment.
9	Crowding out effect of government spending on private investment in Turkey: A Cointegration Analysis (Başar et al, 2011)	Turkey (1987Q1-2007Q3)	Johansen-Juselius co integration analysis-VAR (fixed private investment, gross domestic product, annual rediscount interest rate, government investment spending, government interest payment, total government)	Total government spending and government interest payments confirmed crowding in due to their positive impact on fixed private investment.
10	Crowding Out Effect of Public Borrowing: The Case of Egypt (Fayed, 2012)	Egypt (1998-2010)	VECM (private credit as a percentage of industrial production, government borrowing also as a percentage of industrial production, log of industrial production, level of financial intermediation, institutional quality, the lending rate)	Paper concludes greater than proportional crowding out of private sector credit due to government borrowing. Moreover, result states that government borrowing from banks is not the only reason for crowding out. Increase in banks' holdings of government securities also show banks' behavior of investing in a low risk high return avenue.
11	Does The Budget Deficit Crowd-Out Private Credit From Banking Sector? The Case of Egypt (Shetta and Kamaly, 2014)	Egypt (Q1-1970 to Q2-2009)	VAR (private credit, government borrowing, GDP)	A greater than proportional crowding out of private credit was observed owing to government borrowing from domestic banks.
12	The Crowding Out Effect of Budget Deficits on Private Investment in Nigeria (Asogwa and Okeke, 2013)	Nigeria	OLS and Granger Causality (Private investment, Budget deficit, External Debt Stock, Inflation, Public debt servicing, Net Export)	Crowding out of private investment is confirmed while analyzing the budget deficits.
13	When Does Government Debt Crowd Out Investment? (Traum and Yang, 2015)	USA (1983:Q1 to 2008:Q1)	Structural DSGE approach (real aggregate consumption, investment, labor, wages, nominal interest rate, gross inflation rate, and fiscal variables— capital, labor and consumption tax revenues, real government consumption and investment, and transfers) New Keynesian model with a detailed fiscal specifications	Estimation results of the study imply that there is no systematic reduced-form relationship between government debt and real interest rates. Crowding out of private investment due to government debt depends on the policies and projects financed by government debt.
14	New estimates of direct crowding out (or in) of investment and of a peace dividend for the U.S. economy (Blackley, 2014)	USA (1956Q1–2010Q2)	ARDL (Private investment, Private consumption, Exports, Government purchases, Domestic consumption and investment, Military purchases, Military consumption, Military investment, Unemployment rate, Profits, Real interest rate)	Opposite to some earlier findings, public investment has a significant crowding in effect on private investment while military purchases have a considerable crowding out effect.

15	Does government investment crowd out private investment in China? (Xu and Yan, 2014)	China (1980 to 2011)	SVAR model VAR framework (private fixed asset investment, government fixed asset investment in the public goods and state infrastructure, government fixed asset investment in private goods, mainly through SOEs)	The results propose that government investment in public goods “crowds in” private investment significantly, while government investment in the private goods, “crowds out” private investment.
16	Macroeconomic Rates of Return of Public and Private Investment: Crowding-In and Crowding-Out Effects (Afonso, and Aubyn, 2009)	17 Developed Economies	VAR and Impulse Response Function	Results show the existence of positive effects of public investment and private investment on output. Whereas, the crowding-in effects of public investment on private investment differ across countries.
17	Government Budget Deficits and Interest Rates: An Empirical Analysis for Pakistan (Burney et al, 1989)	Pakistan (1970-1989)	OLS overall government budget deficit, deficit financed through domestic borrowing ,deficit financed through borrowing from the domestic banking system, call money rate, inflation	They concluded that there is no relationship exists between the overall government budget deficit and the nominal interest rates. However, they linked the deficit with higher nominal interest if financed through borrowing from the banking system and suggest that it may end up in crowding-out private investment and consumption expenditures.
18	Public Sector Deficits and Private Investment: A Test of the Crowding-out Hypothesis in Pakistan's Manufacturing Industry (Looney, 1995)	Pakistan (1984-1993)	Granger Causality GDP, GDP Price Deflator, fiscal deficit, public sector borrowing, Infrastructure investment, Non-infrastructure investment, government consumption, defense expenditure	Results suggest that private investment in Large Scale Manufacturing (LSM) suffered from real crowding out due to the government’s investment in non-infrastructure projects.
19	Crowding-out Hypothesis in a Vector Error Correction Framework: A Case Study of Pakistan (Hyder and Qayyum, 2001)	Pakistan (1964-2001)	Vector Error Correction and Impulse Response Real GDP, Real Private Investment, Real Public Investment	The results show that public investment has positive effect on private investment- hence crowding in of private investment.
20	Crowding-in or Crowding-out? Modeling the Relationship between Public and Private Fixed Capital Formation Using Co-integration Analysis: The Case of Pakistan 1964-2000 (Naqvi, 2002)	Pakistan (1964-2000)	Co-Integrating VAR GDP, fixed capital formation and public capital formation.	Results of the paper supports that government investment had a positive impact on private investment
21	Public / Private Investment Linkages: A Multivariate Cointegration Analysis (Rashid, 2005)	Pakistan (1964-2004)	Impulse Response Function (IRF) Variance Decompositions (VDC) and Multivariate Co-integration Public investment, Private Investment, Change in Output, Interest Rate	Empirical findings advocate crowding-in phenomenon in the long run.
22	The Impact of Public Investment on Private Investment: A Disaggregated Analysis (Saeed and Ali, 2006)	Pakistan (1973-2006)	Unrestricted structural VAR model Real Public Investment, Employed Labour Force, Real GDP,Real Private Investment,Employed Labour Force (AgrI), Real Value added (Agri),Real Private Investment (Agri), Real Public Investment (Manuf.),Employed Labour Force (Manuf.),Real Value	The study concluded that increase in public investment encourages private investment in agriculture sector, i.e. crowding-in and it discourages private investment in manufacturing sector, i.e. crowding-out. For overall economy no significant impact of public investment on private investment has been found

			Added (Manufacturing), Real Private Investment (Manuf.), Real Public Investment (Agri)	
23	Effectiveness of Government Expenditure Crowding-In or Crowding-Out: Empirical Evidence in Case of Pakistan (Hussain et al, 2009)	Pakistan (1975-2008)	OLS, ECM, Co- Integration defense expenditure, health and Education expenditure, Social Welfare Expenditure, transportation, infrastructure and communication expenditure, debts servicing expenditure, GDP, Gross fixed capital formation	Research concluded that expenditure on defense and debt servicing crowds-out private investment whereas spending on infrastructure, health and education crowds-in private investment
24	Crowding Out Effect of Public Borrowing: A Case of Pakistan (Ejaz and Gill, 2009)	Pakistan (1971-2006)	Co-integration Private investment, Public borrowing, Gross domestic product, Interest rate	Study concluded the absence of crowding-out effects in Pakistan, rather, the crowding-in effect was evident due to excess liquidity in the banking system and significant development discharging “positive externalities”.
25	The Dominant Borrower Syndrome: The Case of Pakistan (Choudhary et al, 2016)	Pakistan	Vector Auto regression (VAR) model Real Output, Credit Spread, Government Borrowing, Borrowing by Private Sector, Inflation	Dominant Borrower Syndrome (DBS) leads to crowding out of private sector investment and rise in interest rate spreads

Annexure B

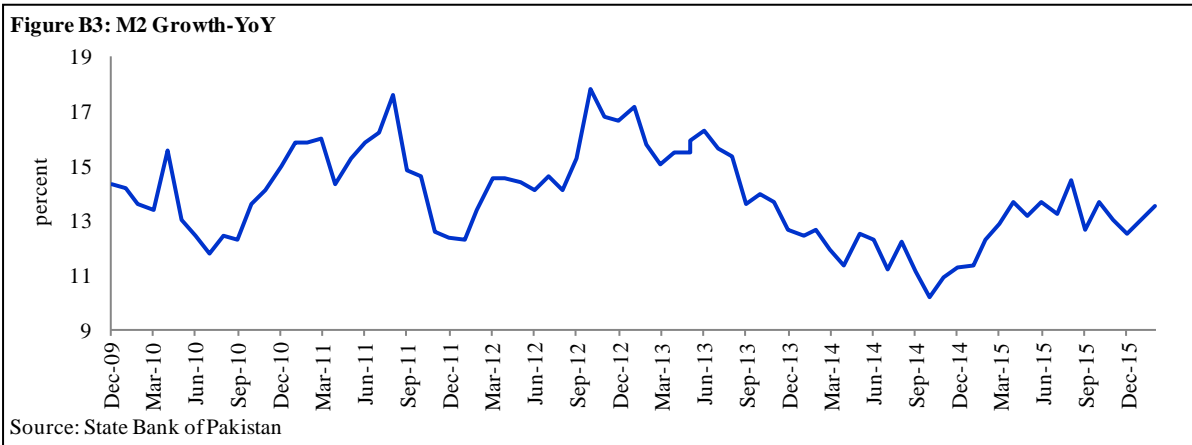
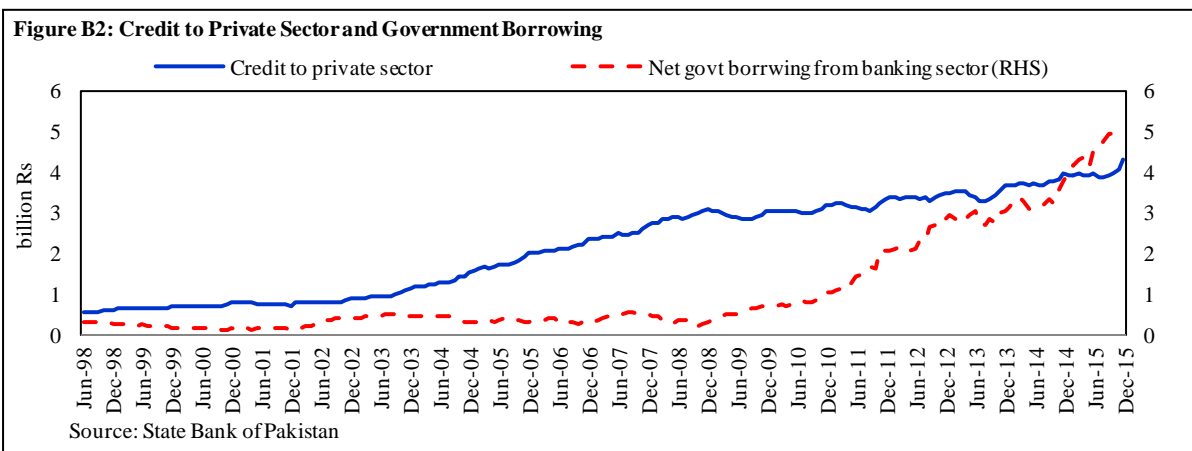
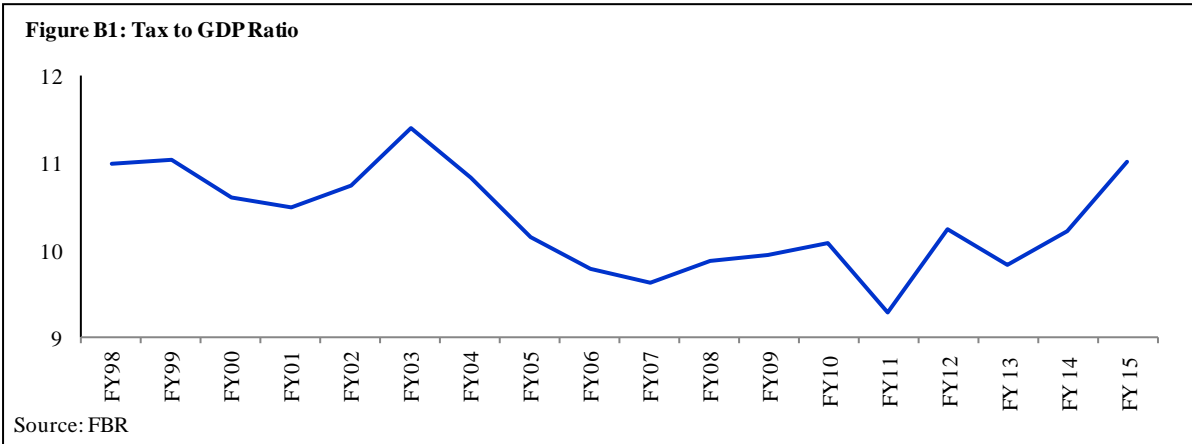


Table 1

S. No.	Variable name	Model (1)		Model (1) with time trend	
		Coefficients	Probability	Coefficients	Probability
1	C	1.830	0.000	2.172	0.000
2	$\sum_{j=1}^m \alpha_j P\dot{S}C_{t-j}$	0.315	0.013	0.270	0.038
3	$\sum_{j=0}^m \mu_j \dot{G}B_{t-j}$	-0.081	0.001	-0.080	0.002
4	$\sum_{j=0}^m \varphi_j \Delta DISR_{t-j}$	-0.067	0.862	-0.073	0.849
5	$\sum_{j=0}^m \gamma_j \dot{L}C_{t-j}$	0.869	0.000	0.906	0.000
6	$\sum_{j=0}^m \delta_j IPLSM_{t-j}$	0.124	0.006	0.122	0.007
7	$\sum_{j=0}^m \pi_j \dot{C}PI_{t-j}$	-0.090	0.693	-0.002	0.995
	R ²	0.77		0.78	
	Adjusted R ²	0.72		0.72	
	Durbin-Watson stat	2.05		2.05	
	Monthly Dummies	Yes		Yes	
	Trend	No		Yes	

The dependent variable $P\dot{S}C_t$ is the growth in the total amount of the loans granted to the private sector by banking system in month t . The independent variables are: $P\dot{S}C_{t-j}$ which is the growth of the total amount of the loans granted to the private sector by banking system in month $t-j$, $\dot{G}B_{t-j}$ which is the growth in government borrowing in month $t-j$, $\dot{L}C_{t-j}$ which is the growth in the lending capacity of the banks measured by the total deposits net of reserves. $IPLSM_{t-j}$ which is growth in the index of Industrial Production/Large Scale Manufacturing and $\dot{C}PI_{t-j}$ which is CPI inflaion. The estimations use 206 monthly observations.

Table 2

S. No.	Variable name	Model (2)		Model (2) with time trend	
		Coefficients	Probability	Coefficients	Probability
1	C	1.925	0.000	1.833	0.000
2	$\sum_{j=1}^m \alpha_j P\dot{S}C_{t-j}$	0.232	0.090	0.228	0.098
3	$\sum_{j=0}^m \mu_j \dot{G}B_{t-j}$	-0.082	0.004	-0.083	0.004
4	$\sum_{j=0}^m \varphi_j \Delta DISR_{t-j}$	-0.170	0.675	-0.186	0.651
5	$\sum_{j=0}^m \gamma_j \dot{L}C_{t-j}$	0.900	0.000	0.896	0.000
6	$\sum_{j=0}^m \delta_j IP\dot{L}SM_{t-j}$	0.129	0.004	0.130	0.004
7	$\sum_{j=0}^m \pi_j CPI_{t-j}$	-0.002	0.992	-0.015	0.952
8	IRC	0.342	0.164	-0.418	0.282
9	IRC* $\sum_{j=0}^m \mu_j \dot{G}B_{t-j}$	0.001	0.932	0.002	0.897
10	(3)+(9)=0	-0.081	0.001	-0.081	0.001
	R ²	0.78		0.78	
	Adjusted R ²	0.73		0.72	
	Durbin-Watson stat	2.04		2.04	
	Monthly Dummies	Yes		Yes	
	Trend	No		Yes	

The dependent variable $P\dot{S}C_t$ is the growth in the total amount of the loans granted to the private sector by banking system in month t . The independent variables are: $P\dot{S}C_{t-j}$ which is the growth of the total amount of the loans granted to the private sector by banking system in month $t-j$, $\dot{G}B_{t-j}$ which is the growth in government borrowing in month $t-j$, $\dot{L}C_{t-j}$ which is the growth in the lending capacity of the banks measured by the total deposits net of reserves. $IP\dot{L}SM_{t-j}$ which is growth in the index of Industrial Production/Large Scale Manufacturing and CPI_{t-j} which is CPI inflation. The estimations use 206 monthly observations.