Sensitivity Analysis of Domestic Credit to Private Sector in Pakistan: A Variable Replacement Approach Application with Con-integration

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ABSTRACT

This study examines the short and long run relationship between Domestic Credit to Private Sector (DCPS) and its selected determinants namely, Domestic Credit to Public Sector, Gross Domestic Savings, Gross Domestic Product, Industrial Value Addition, Money Supply (M2), and the Total Volume of Trade in Pakistan over the period from 1980 to 2009. The relationship is determined using Johansen and Juselius’s framework and NLS and ARM based Error Correction Model to complete the long run and short run relationship analysis. We have conducted Variable replacement based sensitivity analysis of our model by examining two sets of exogenous variables and found that DCPS has no relationship with Economic Growth in Pakistan so far. The implications that we derive from this study is that in Pakistan the Development of Financial Sector is not making any contribution to the Economic Development. Further due to heavy Government Borrowings for non development Expenditures the lending actions of the Banks are becoming oligopolistic in nature, which is hindering the conventional flow of financing to private sector for economic development. Therefore, the monetary authority in Pakistan should adopt steeper target oriented policies for Financial Sector to extend credit for Economic Development.

Keywords: Sensitivity Analysis, credit, Economic Development, private sector

JEL Classification:    G01, G15, G17, G21

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INTRODUCTION

Researches so far have revealed that Domestic Credit to Private Sector (DCPS) has contributed significantly towards Economic Development and Financial Growth of a country (Levine et al, 2000). For determination of DCPS empirical studies focus on GDP, interest rates, and price indices in any form (Backe and Zumer, 2004). A common result of these studies so far is that interest rates and income are the most dominant variables that can explain DCPS (Backe and Zumer, 2004). Further, while discussing the relation between Finance and Income inequality (Clarke et al, 2002) states that the inequality decreases as the provision of finance increases in the economy.

In Pakistan during the last 30 years there have been political instabilities that also affected the financial sector in some awkward directions in comparison with the international trends in Finance. While work done so far reveal that the level of financial development can significantly predict economic growth (King and Levine, 1993a, b; Levine and Zervos, 1998; Neusser and Kugler, 1998; Rousseau and Wachtel, 1998, Levine et al, 2000), but there is no work available about analysis of DCPS in Pakistan in order to examine the existence of similar relationship. It is therefore quite relevant to study the Dynamics of DCPS in Pakistani Economy and analyze the variables that affect the DCPS as exogenous variables and also to analyze whether there exists any relationship between the development of the economy, and the growth in DCPS. For the purpose of our study therefore the following are the objectives:

Whether there exist any relationship between Economic Development and DCPS in Pakistan?

In doing so we will also examine the following additional issues relating to DCPS in Pakistan:

- What contributes more to GDP, Economic Development or Financial Performance?
• As a country where Government Borrowings dominates the Financial Sector Lending abilities, we will also examine the impact of government borrowing impact on DCPS in Pakistan?

These questions are significant since in Pakistan Financial Sector has shown significant developments during the last ten years, even in the present era when the economic development is at its minimal and the Government Borrowings have been increased manifold (SBP, 2010). For similar situations in their studies (Backe and Zumer, 2004) argued that such financial expansion would erode gradually if the underlying economic development fails to trigger at the same rate. Therefore for examining such relationships it appears relevant to initiate some co-integrated analysis to study how the DCPS relationship varies in the short run and in the long run with respect to inclusion and exclusion of variables in a specific model.

For the purpose of our research we have adopted three variables each relating to Financial and Non Financial Sector of the Economy. Johanson’s Co-integration approach has been used to analyze long term effects of co-integration between such variables and ECM has been applied for Short Term relationship. Further we will study the Sensitivity of the DCPS with respect to changes in the number and type of variables and effects of co-integration after mixing the Non Financial Variables with the Financial Variables and vice versa.

**Literature Review**

Loans to private sector are characterized by many factors over and above its interest rates (Baltensperger (1976); Field and Torero, (2006)). The abilities of the Financial Institutions to make DCPS therefore can also get
stretched and eventually adversely affected if the underlying economic growth is not accompanied with it (Backe and Zumer, 2004). Many studies of DCPS have been made so far which deal primarily with its demand and supply to analyze its contribution in various segments of the economies and the economies as a whole as well. As in some countries the growth of DCPS has left positive impacts on economic and financial growth therefore the literature relating to such developments also provides a base for this study. An analysis of the literature available in the areas as indicated above also shows that many studies have been made only by including the Non Financial Variables like GDP, price indices etc., to predict the relationship between the Financial Development and Economic Growth without considering the variables that relate directly to the Financial Sector (for instance, the Money Supply).

As regards the finance-growth relationship, certain propositions state a positive relationship between financial sector development and GDP growth (Terrones and Mendoza, 2004; Mooslechner, 2003). While conducting such studies during the phases of credit expansions, prominent studies emphasize many activities, such as “(i) real business cycles caused by technological or terms-of-trade shocks (with highly procyclical output elasticity of credit demand), (ii) financial liberalization of an initially repressed financial system, (iii) capital inflows triggered by external factors, and (iv) wealth shocks originating e.g. from comprehensive structural reforms” (Gourinchas et al., 2001). Furthermore, politically driven policies such as exchange rate-based stabilizations also contribute in accelerating credit expansions by blowing up a weak consumption expansion trend (Calvo and Vegh, 1999).
Further investigations into the mechanisms also reveal very interesting DCPS dynamics. An interesting finding made by Backe and Zumer, 2004 was that “positive real shocks, by raising asset prices, impacts the agent’s net worth and eventually his ability to borrow”. However if such shocks raise the expectation about future earnings then such affects will increase the vulnerabilities and eventually the DCPS will decrease leading to negative correction.

We find the following evidences on the DCPS from the literature available so far:

Most of the work done on DCPS is in high income countries where there main findings about income, and interest rates as exogenous variables of DCPS. Although they do consider that supply of money affects DCPS but the strong relation there comes out to be with output in the long run. The studies state that DCPS-to-GDP has a significant positive correlation with GDP. This process is termed in financial literature as “Financial Deepening”. Concerning the researches on credit supply, studies have looked into the prevalence and the significance of the credit channel for a range of countries, using both macro and micro data. Although the findings take many dimensions, yet many researches including some papers on CEE countries reveal facts in favor of the credit channel. About the positive relations between finance and growth, pragmatic work has studied the direction of causality; where much of the findings are about financial deepening which stimulate economic development (Beck et al., 2000).

The significance of Domestic Credit to Private Sector is also relevant while conducting research on financial crises and in particular while discussing their forecasting, rapid increase in DCPS has been observed as a pivotal factor for financial crises. Although many financial crises also initiate economic depressions however, one cannot conclude from
this literature that lending booms typically lead to financial crises. As Gourinchas et al. (2001) point out, “while the conditional probability of a lending boom occurring before a financial crisis may be quite high, this does not tell much about the converse, i.e. the conditional probability that a financial crisis will follow a lending boom”. In this regard we have evidences from analysis of DCPS in Pakistan during the period from 2001-2007 when the interest rates were at its minimum and the DCPS in Pakistan was booming and during the period 2008-2009 when the interest rates are on the rise and DCPS and Economic Growth are decreasing yet the Financial sector is evidencing growth (SBP, 2010).

The literature available on DCPS is quite limited to many extents. A milestone research in this regard was conducted by Cottarelli et al. (2003). He analyzed DCPS in 15 countries of Central and Eastern Europe and the Balkans. Analyzing at DCPS-to-GDP progress from the period between 1990s and 2000s, three categories of the countries (early birds, late risers and sleeping beauties) were developed. Using the econometric estimates of the expected long term DCPS-to-GDP ratios it was opined that DCPS in 2002 were not inconsistent with the structural characteristics of the economies under examination.

Coricelli and Masten (2004) also elaborate short term pragmatic results which state that financial market progress, with increasing DCPS-to-GDP ratios, in the sample countries as indicated above may also impact GDP in positive growth direction, which will also aid in reducing abrupt variations in GDP. Koivu (2002) further states that financial progress, due to movements in interest rate margins, has positive relationship with GDP in qualitative terms, whereas quantitative indicators of financial development failed to spur any help in output growth in 25 transition economies in the period from 1993 to 2000. In the explaining such cause she states that DCPS development in that period preceded the period
under examination in this article, which was not sustainable and in some cases may have led to a decline in growth rates.

In empirical researches so far it has been quite clear that DCPS has been geared by macro macroeconomic stabilizations and privatization in the financial sector in major economies. This has leaded such countries into suitably geared and liberalized financial systems. Healthy output growth has underpinned credit growth, at the same time increasing speculations about income and profit rise have stimulated intertemporal substitution, thus further increasing DCPS. This process is still in its adolescence and also, in some countries in its infancy; therefore the growth of Financial Institutions will most likely remain fast in the new or accelerate further.

In Pakistan where DCPS has slowed down over the last two years due to the very heavy public sector borrowings (SBP, 2010), dynamics behind DCPS are therefore expected to be especially low over the long terms, as liquidity hindrances on economic segments which did not receive credit in the past (small and medium-sized enterprises, households) are expected to remain and the debt levels in such sectors are not expected to benefit which is not rationale from an intertemporal perspective. Therefore, in the longer run, DCPS expansion is expected to be mainly driven by the convergence process in per capita GDP terms (Backe and Zumer, 2004).

IMF working papers (WP/10/49) emphasizes that the financial sector attempts to reduce the cost of capital and encourages the efficient distribution of capital which helps promote the DCPS. Rajan and Zingales (1998) also stated that the firms receiving majority of their operational fundings from financial institutions do not expand normally
in the economies which are financially developed. Fisman and Love (2004) in their studies stated similar results in the short run Horizon development of financial sector helps in the redistribution of finances to industries which have high growth rates. Hartman et al. (2007) also showed similar results stating that capital reallocation should not be underestimated as it is a driving force of financial development in most of the studies. According to of Hsieh and Klenow (2009) the achievements of the high performers of last decade mainly China and India have also been credited to the reassignment of financial resources from lesser to higher productive sectors.

What would be importance of financial development for growth? The empirical literature available provides multiple viewpoints emphasizing that a financial system that performs well encourages competition, lessens and reassigns the cost of capital and capital efficiently respectively. In the economies which are financially developed, innovation also becomes higher than their counterparts in less developed economies which also yield higher returns. The large impact of capital reassignment in quantitative terms observed by Hsieh and Klenow (2009) also support the views of higher returns as stated hereinabove.

There is no research available that takes into account Financial and Non Financial Variables at the same time and also studies sensitivity of the model with respect to inclusion or exclusion of variables, or analyzing the effects on a Financial Variables based model of adding a Non Financial Variable in Pakistan.
Methodology

Econometric Models

Model to be evaluated:

\[ \log_{10} \text{DCPS} = a_0 + a_1 \log \text{IND VA} + a_2 \log \text{M2} + a_3 \log \text{T_TADE} + \varepsilon \]

Basic Alternative Models to be evaluated for Sensitivity of DCPS to Change in Variables:

\[ \log_{10} \text{DCPS} = a_0 + a_1 \log \text{CPT} + a_2 \log \text{GDP} + a_3 \log \text{GDS} + \varepsilon \]

\[ \log_{10} \text{DCPS} = a_0 + a_1 \log \text{GDP} + a_2 \log \text{IND VA} + a_3 \log \text{LM2} + \varepsilon \]

Definitions of the Variables:

- DCPS = Domestic Credit to Private Sector
- IND VA = Industrial Value Addition
- M2 = Supply of Money
- T_TRADE = Total Trade of Import and Export
- GDP = Gross Domestic Product
- GDS = Gross Domestic Savings
- DCPT = Domestic Debt to Public Sector
- \( \varepsilon \) = The Error Term

Econometric Methodology

Unit Root Tests:

The first step in Error Correction Model is to determine whether the variables under consideration are stationary or not since most macroeconomic variables are not stationary, that is, they tend to exhibit a deterministic and/or stochastic trend. In this paper I have applied Augmented Dicky-Fuller (ADF, 1979) test to check the order
of integration. However, for the purpose of our research we have taken the logs of data before taking unit root tests.

**Co-integration Test:**

After evaluating stationarity of each variable and specifying optimal lag length, the next step is to find out whether they are co-integrated or not, using Johansen and Juselius’s (1990) framework. To carry out this test have to formulate the following model:

$$Y_t = \Gamma_1(L)Y_{t-1} + \Gamma_2(L)Y_{t-1} + \ldots + \Gamma_p(L)Y_{t-1} + \varepsilon_{t-p}$$

Where $Y_t$ represents independent variables where applicable, is a column vector and $\Gamma_i(L)$ with $i=1,\ldots,p$ is a lag operator, $\varepsilon$ is the white noise residual of mean and constant variance. The order of the model, $p$ must be determined in advance using Schwartz Information Criterion (SIC). The null hypothesis that there is a fewer co-integrating vectors have be tested using Maximal Eigen Value Test.

**Maximal Eigen value Test:**

This test evaluates the null hypothesis $H_0: r=r_0$ against $H_A: r=r_0+1$

$$\tau_{\text{max}} = -T \ln (1-\lambda_{r+1})$$

In this test the null hypothesis of $r$ co integrating vectors is tested against the alternative of $r+1$ co-integrating vectors.

**Error Correction Model:**

In order to calculate the long term relationship among the variables of the model NLS and ARMA least squares techniques have been used to construct Error correction model which was used by Sargan (1964) and thereafter by Engle and Granger (1987). After confirmation of Co-integration in the first stage the lag order of the variables will be selected using $R^2$, or Akaike Information Criteria, or Schwarz Bayesian Criteria or
by Hannan-Quin Criteria. In the next step of the determination of the lag order, coefficients of the model for long run have been estimated and then estimations are carried out followed by the Error Correction Model (ECM), using the following ECM equation where ζ is the Error Correcting Term:

\[ \Delta LDCPS = a_1 \log \text{IND\_VA} + a_2 \log \text{M2} + a_3 \log \text{T\_TADE} + \zeta (LDCPS_{t-1} - \beta_0 - \beta_1 \text{IND\_VA}_{t-1} - \beta_2 \text{M2}_{t-1} - \beta_3 \text{LT\_Trade}_{t-1})\]

**Collection of Data:**

The study uses annual data on Domestic Credit to Private Sector, Gross Domestic Product, Gross Domestic Savings, Money Supply (M2), Domestic Credit to Public Sector and Total Trade for the period 1980-2009. The data obtained from World Development Indicators of World Bank 2010. All the Variables are in Pak Rupees.

**Results and Interpretation:**

The first step in determining long run relationship using Error Correction Model is to check the variables under consideration are stationary or not. A univariate analysis of each variable is carried out to check the stationarity properties of the data. Table 1 and 2 present the results from Dickey-Fuller (ADF) test statistics for the log levels and first differences of logs of the variables Domestic Credit to Private Sector, Industrial Value Addition, Money Supply (M2), Total Trade, Gross Domestic Product, Gross Domestic Savings and Domestic Credit to Public Sector respectively. According to the results shown in Table 1, the test indicate that level of the series contain a unit root. In order to make the data stationary, unit root tests are re-run by taking first difference of the series. Results reported in Table 2 show that first difference series are stationary in first difference form. The series are in level form at I(0) and in level form they are I(1) (Engle and Granger 1987).
### Table 1, Augmented Dicky-Fuller Tests : Level Series

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>C.V (5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDCPS</td>
<td>0.6103</td>
<td>-2.9677</td>
</tr>
<tr>
<td></td>
<td>(0.9873)</td>
<td></td>
</tr>
<tr>
<td>LIND_VA</td>
<td>-1.5875</td>
<td>-3.0048</td>
</tr>
<tr>
<td></td>
<td>(0.4719)</td>
<td></td>
</tr>
<tr>
<td>LM2</td>
<td>-0.6563</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.8419)</td>
<td></td>
</tr>
<tr>
<td>LT_TRADE</td>
<td>0.9491</td>
<td>-2.9677</td>
</tr>
<tr>
<td></td>
<td>(0.9948)</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.6774</td>
<td>-2.9677</td>
</tr>
<tr>
<td></td>
<td>(0.9895)</td>
<td></td>
</tr>
<tr>
<td>GDS</td>
<td>-1.7071</td>
<td>-2.9762</td>
</tr>
<tr>
<td></td>
<td>(0.4165)</td>
<td></td>
</tr>
<tr>
<td>LCPT</td>
<td>-0.6651</td>
<td>-2.9677</td>
</tr>
<tr>
<td></td>
<td>(0.8402)</td>
<td></td>
</tr>
</tbody>
</table>

Note: For 1 Null hypothesis is that the series has a unit root

### Table 2 AD Unit Root Tests : 1st Difference

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>C.V (5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLDCPS</td>
<td>-4.4687*</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.0015)</td>
<td></td>
</tr>
<tr>
<td>ΔLIND_VA</td>
<td>-2.9955*</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.0476)</td>
<td></td>
</tr>
<tr>
<td>ΔLM2</td>
<td>-3.7105*</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.0095)</td>
<td></td>
</tr>
<tr>
<td>ΔLT_TRADE</td>
<td>-5.2671*</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td></td>
</tr>
<tr>
<td>ΔLGDP</td>
<td>-4.5433*</td>
<td>-2.9762</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td></td>
</tr>
<tr>
<td>ΔGDS</td>
<td>-6.4756*</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td></td>
</tr>
<tr>
<td>ΔLCPT</td>
<td>-4.5565*</td>
<td>-2.9718</td>
</tr>
<tr>
<td></td>
<td>(0.0012)</td>
<td></td>
</tr>
</tbody>
</table>

Note: For 1 Null hypothesis is that the series has a unit root 2: * denoted rejection of null hypothesis at 5% level of significance.
Testing for Co-integration:

Having established that all the variables in the study are integrated of order one i.e., I(1), the second step is to test whether they are co-integrated or not (Engel and Granger, 1987). For this purpose Johansen likelihood co-integration is applied. To proceed further in the application of Johansen’s test lag length has been considered as 1.

Table 3: for Johansen Co Integration Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalues</th>
<th>Maximum Eigen Statistic</th>
<th>5% CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDCPS</td>
<td>None*</td>
<td>0.7387</td>
<td>36.2343</td>
<td>28.5881</td>
</tr>
<tr>
<td>DLIND VA</td>
<td>At most 1</td>
<td>0.4606</td>
<td>16.6675</td>
<td>22.2996</td>
</tr>
<tr>
<td>DLM2</td>
<td>At most 2</td>
<td>0.2872</td>
<td>9.1438</td>
<td>15.8921</td>
</tr>
<tr>
<td>DLT TRADE</td>
<td>At most 3</td>
<td>0.1340</td>
<td>3.885</td>
<td>9.1645</td>
</tr>
</tbody>
</table>

Note: * at None indicates only 1 co-integrating equation.

The estimated co-integrating relationship and standard errors are given in equation:

\[ \log\text{DCPS} = -0.033899 - 1.123972 \log\text{LIND VA} + 1.431781 \log\text{M2} + 0.836699 \log\text{LT TRADE} \]

\[ \text{S.E} = (0.01813) (0.42760) (0.28349) (0.20985) \]

Johansen Co-integration Results are reported in Table 3. Results of Maximal Eigen Value Tests suggest the existence of unique co-integrating relationship among the variables under consideration at 5% level of significance. This implies that the series under consideration are driven by at least one common trend. This represents the existing relationship among Domestic Credit to Public Sector, Industrial Value Addition, Money Supply (M2) and Total Trade is not spurious.

The equation above exhibits the normalized and co-integrating variables. The signs of the variables are also in line with the economic theory.
except the sign of Industrial Value Addition the sign of which was also expected to be positive. The reason for such negative relationship might be higher cost of funds resulting from tacit collusion among Financial Institutions. This appears also true in Pakistani context where the focus of Central Bank is firstly on protecting Financial Sector due to the fact that they are the only sector showing progress, and secondly in generating funds for government Operations. Also the effect of the magnitude of Money Supply(M2) on DCPS is higher than any other variable in the model which reflects that the ability of the Banks to Finance Private Sector depends heavily on the Supply of Money in the country. An interesting fact about the negative relationship of DCPS with Industrial Value Addition and positive relationship with Total Volume of Trade which suggests that Banks are not willing to Finance Industrial Production but are rather interested in Financing Trade as one of the prime area of their business. From this we can also infer that tendency in Pakistan economy towards using imported goods is increasing.

**The Error Correction Model:**

**Table 4: Table of Error Correction Model**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>T-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆LIND_VA</td>
<td>0.3219</td>
<td>0.3383</td>
<td>0.9515</td>
</tr>
<tr>
<td>∆LM2</td>
<td>0.2393</td>
<td>0.2382</td>
<td>1.0046</td>
</tr>
<tr>
<td>∆LT_TRADE</td>
<td>0.3035</td>
<td>0.1461</td>
<td>2.5651</td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.3693</td>
<td>0.1779</td>
<td>-2.0753</td>
</tr>
<tr>
<td>Constant</td>
<td>2.0082</td>
<td>1.2721</td>
<td>1.5786</td>
</tr>
</tbody>
</table>

R²          0.4844  
F Statistic 2.8191  
Probability 0.0309  
DW Stat     2.2494
The results of the Error Correction Model reveal that our model is a good fit as the Value of Error Correcting Term EC(-1) is negative and significant at 5% level of significance which means that our model is convergent. Further -0.3693 value of EC (-1) shows that error in our model will be removed in 3 periods with 36.93% approx of the values in the will converge in time 1\textsuperscript{st} period and the remaining 63.07% will converge in next two periods. Also the value of R\textsuperscript{2} shows that our model is able to predict 48.44\% dependence of DCPS on the exogenous variables which we have chosen for our study. Overall relationship of this Error Correcting Model is also significant at 5\% level of significance as the value of F Statistic is within acceptable range with its probability at 0.0309. As we have used panel data therefore Durbin Watson Test Statistic is also important which is near 2 and is also within its acceptable range.

**Sensitivity Analysis:**

We have also checked the sensitivity of our model by analyzing the effects of two sets of exogenous variables in order to find out the results on the long term relationship of our dependent variable with the growth of our Economy. The first set of exogenous variables was Domestic Debt to Public Sector, Gross Domestic Product and Gross Domestic Savings. These variables represent Economic Development and Government Financing for the purpose of the economy. According to the results in Table S-1 it has been observed that although the value of EC (-1) is still convergent and significant at 5\% level of confidence. The value of R\textsuperscript{2} has been reduced by more than 20\% from 48.44\% to 37.11\%. The value of F statistic has also been reduced to 1.7704 which is also not significant at 5\% level of confidence. The second set of exogenous variables were Gross Domestic Product, Industrial Value Addition and Supply of Money. In
other words we have now included only variable representing Economic Development in our model. According to the results given in table S-2 it has been observed that although the overall relationship represented by F statistic 2.6268 is significant, however the value of Error correcting term is insignificant.

### Results for Sensitivity Analysis: Table S-1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>T-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLDCPT</td>
<td>0.0758</td>
<td>0.1277</td>
<td>0.5936</td>
</tr>
<tr>
<td>ΔLGDP</td>
<td>0.6517</td>
<td>0.2818</td>
<td>2.3126</td>
</tr>
<tr>
<td>ΔLGDS</td>
<td>-0.0918</td>
<td>0.0725</td>
<td>-1.2666</td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.3692</td>
<td>0.1781</td>
<td>-2.0720</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.4046</td>
<td>0.4519</td>
<td>-0.8952</td>
</tr>
</tbody>
</table>

R² 0.3711

F Statistic 1.7704

Probability 0.1467

### Results for Sensitivity Analysis: Table S-2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>T-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLGDP</td>
<td>0.6603</td>
<td>0.2575</td>
<td>2.5636</td>
</tr>
<tr>
<td>ΔLIND_VA</td>
<td>0.2896</td>
<td>0.3594</td>
<td>0.8057</td>
</tr>
<tr>
<td>ΔLM2</td>
<td>0.5161</td>
<td>0.2453</td>
<td>2.1036</td>
</tr>
<tr>
<td>EC(-1)</td>
<td>-0.1669</td>
<td>0.1585</td>
<td>-1.0526</td>
</tr>
<tr>
<td>Constant</td>
<td>1.8360</td>
<td>1.2915</td>
<td>1.4215</td>
</tr>
</tbody>
</table>

R² 0.4668

F Statistic 2.6268

Probability 0.0408

### Conclusion

The paper examines empirically the relationship between Domestic Credit to Private Sector and Economic Development in Pakistan. As a
Using Johansen’s multivariate approach to co-integration findings suggest that Domestic Credit to Private Sector is co-integrated with Industrial Value Addition, Money Supply (M2), and Total Trade Volume of Trade. The long run relationship is determined using NLS and ARMA Error Correction Model. The test results indicate that the model is convergent and it indicates more than 36.93% of the values in 1st period.

In the sensitivity analysis of our model we first took variables that represent Economic Development and Government Financing for the purpose of the economy. It has been observed that the growth in Domestic Credit is not supported by the Growth in the Economy, because our alternative Model shows insignificant F Statistic. In another sensitivity analysis we included only one variable that represents Economic Development in our model. This made the Error Correcting Term very insignificant. This shows very alarming situation as in many research DCPS is used as an indicator of Economic Development. Also it is evident from our research that the data relating to variables in our basic model basically stem from the operations of the Banks, from where we can infer that the growth in Domestic Debt to Private Sector is purely a financial phenomenon and has very low linkages with economic development. This also leads us to the conclusion that Financial Sector in Pakistan is economically ineffective and is not contributing towards the economic development of the country. State Bank of Pakistan Report for September 2010 also shows similar results where it has been reported that Profitability of the Banking Sector has increased over the years while the growth of the economy has slowed down over the same period (SBP, 2010).
This requires serious policy considerations from the Monetary Authorities of the country to push steeper targets for FI’s for extending Credits to prioritized Domestic Sector and also by making the cost of funding cheaper. Finally, the government also needs to reduce its borrowings for Non Development Expenditures which is also a cause of this anomaly in the development of financial sector without economic development which is oligopolistic nature. We can observe from our model that Public Sector Borrowings also have very strange significant positive impact on DCPS, mainly because such borrowings just enable Financial Institutions to issue loans without considering the development requirements of the country.
References


• SBP Monthly Bulletin October, 2010


• Data Source, World Development Indicators 2010 accessed on 5th of October 2010.