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Does Banking Sector Development have any Association with Economic Growth and Interest Rates in Pakistan?



Abstract *The study aims to examine the association between banking sector development, real exchange rates, inflation rates, federal discount rates, economic growth and bank deposits in Pakistan. The study employs Johansen co-integration method and Granger causality test. The empirical results confirm for the existence of a long run relationship between banking sector development and inflation, economic growth and federal discount rates. The results of Granger causality indicate that US interest rates affect the development of the Pakistani banking sector. This confirms the existence of spillover impact.*

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Introduction

The banking sector development is one of the most important and unavoidable part in economic growth process. Several empirical studies have identified existence of a long run relationship between banking institutions and economic growth (King and Levine 1993; Levien and Zervos 1998; Beck, Levine, and Loayza 2000; Levine, Loayza, and Beck 2000; Levine 2005; Pradhan et al. 2014). In general, the ability in banking sectors to stimulate economic growth can be affected due to instability in different macroeconomic factors. Few of these macroeconomic factors include exchange rates and inflation, as fluctuation in exchange rate and inflation can adversely affect development of banking sector, especially in less developed economies. Diamond-Dybvig et al. (1983) show that inconsistency in macro-economic factors (economic growth, exchange rate, inflation) can lead to banking crises. Chamberlain et al., (1997) show that banks which are involved with foreign currency transaction and other foreign operation are exposed to exchange rate risk. Most of the studies in developing countries have shown a significant relationship between exchange rates and banking sector performance (Isaac, 2015; Addae et al., 2014; Osuagwu, 2014).

Besides exchange rates, numerous studies have investigated the relationship between banking sector and GDP and inflation. Studies from the developing countries have resulted a positive impact of GDP and inflation on banking sector (Basir, 2003; Demircuc-Kunt and Huizinga, 1999; Sufian and Habibullah, 2010; Acaravci and Calim,

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2013; Simiyu and Ngile, 2015). On the other hand, some of the studies have found a negative impact of GDP and Inflation on Banking sector performance (Tan and Floros, 2012; Francis, 2013; Masood and Ashraf, 2012; Scott and Ovuefeyen, 2014; Khrawish, 2011). Aftab, Jebran and Ullah, (2016) empirically investigates the impact of interest rate on banking sector of Pakistan over the period of 1975-2011. Their result shows that a negative association between interest rate and banking sector. Combey and Togbenous, (2017) empirically estimate the impact of macroeconomics factors on the banking performance of Togo for the period of 2006 to 2015. Their results indicate that among macroeconomic factors economic growth and exchange rate have a negative impact on the banking performance. Lagat, Nayandema (2016) investigates the impact of foreign exchange rates on the banking performance over the period of 2006 to 2013. They found a significant positive association between firm performance and financial performance of bank in Kenya. Recent development in financial innovation and financial liberalization, have made that macroeconomic factor such as interest rates, exchange rates and inflation are not the only factors that affect the banking sector development. The developing and emerging countries' economies can also be influenced by external factors such as, US interest rates. Fluctuation in US interest rates can create a spillover effect on the banking sector of developing and emerging countries. Studies from the past have recorded such a spillover effect on the banking sector of developing countries (Bekaert, Hoerova, and Duca 2010; Chang and Fernández 2013; Rey 2013). Almahadin and Tuna, (2017) empirically investigate the long run relationship between interest rates and federal discount rate in turkey for the period of 1980 to 2015. They found that interest rate and US federal interest rates have a negative effect on the banking sector of Turkey.

Although, the availability of literature is very vast that explores the association between macroeconomic factors and banking sector, very few studies are available for Pakistan. Beside macroeconomic factors this study will also contribute to the literature by exploring the association between US policy rates and development in banking sector of Pakistan. Therefore, we aim to examine for the existence of a long run relationship between macro-economic factors, federal interest rates and development of banking sector.

The remainder of the study prosecutes as follows: section two presents' data and methodology, section 3 provides empirical finding of the study and the study conclude with section four.

Data and Methodology

Data

The study uses annual data between 1980 and 2014 containing variables, domestic credit to private sector by bank and is the value of credits provided by banking institutions to the private sector (DCP), real effective exchange rates is the nominal exchange rate (RER), Inflation rates (INF), federal discount rates (FDR), gross domestic product (GDP), and bank deposits (BD). All the variables in the model are transformed into natural logarithmic form. The data for banking sector development (DCP), real effective exchange rates (RER), Inflation Rates (I), gross domestic product (GDP) and Bank deposits (BD) are collected from the World Bank. While the data of federal discount rates are collected from International Monetary Fund.

Econometric Analysis

Before investigating the long run association among banking sector, macroeconomic factor and federal interest rate, test for unit root were applied to determine that all the variables are stationary at first difference I (1). Following unit root test are used Augmented Dickey-Fuller (ADF) (1981) and Phillips-Perron (PP) (1988). The results of the unit root test propose that all the variables in our model are stationary at first difference I (1). Therefore, this study employs Johansen and Juselius (1990) cointegration test to investigate whether a long run relationship among banking sector development, macroeconomic factor and federal interest rates exist or not. In next step, Granger- causality method is used to investigate the direction of causation among the variables.

$$\ln DCP_t = \beta_0 + \beta_1 \ln RER_t + \beta_2 \ln INF_t + \beta_3 \ln FDR_t + \beta_4 \ln GDP_t + \beta_5 \ln BD_t + \varepsilon_t \quad (2.1)$$

where, DCP represents banking sector development, RER represents real exchange rates, INF represents Inflation, FDR represents federal interest rates, GDP represents economic growth and BD represents bank deposits. $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 give the elasticity of the independent variables. \ln represents the natural logarithm.

Stationarity Test

Before any empirical examination it is important to test stationary of the variables. ADF and PP unit root test is used to determine whether variables are integrated at level of first difference. If the results of the stationary test suggest that a variable has a unit root at level, then first difference of the variable must be taken to make the series stationary. I (0), indicates that series is stationary at level. Whereas I (1), indicates that there is a unit root in the series.

For testing unit root in a series, the universal model with trend and intercept should be used Enders (1995).

$$\Delta y_{t-1} = a_0 + \lambda y_{t-1} + a_2 t + \sum_{i=2}^p \beta_j \Delta y_{t-1+i} + \varepsilon_t \quad (2.2)$$

Where y represents the endogenous variable, a represents the intercept, t represents trend. While Gaussian white noise is represented by ε_t .

Johansen Test of Co-Integration

After finding the result for unit root test, the subsequent step is to investigate the long run equilibrium association between variables. The entire variable in our model has no unit root at first difference; therefore, we employ Johansen approach to test the cointegration (Gokmenoglu et al., 2014).

The methodology of Johansen test is as follows:

$$X_t = \Pi_1 X_{t-1} + \dots + \Pi_k X_{t-k} + \mu + e_t \quad (2.3)$$

“Where X_t is vector at level and, X_{t-1} and X_{t-k} are lagged values of the variables. The coefficient matrices with (PXP) dimensions are Π_1, \dots, Π_k ; μ is intercept vector; and e_t is a vector of random errors (Katircioglu et al., 2007)”.

Granger Causality

In the final step, Granger Causality method is employed to test the direction for the interconnection among variables. Once the co-integration relationship is confirmed, Granger causality test are run to examine the direction of causality (Katircioglu et al., 2007).

The equation for Granger causality is as follows;

$$Z_t = \sum_{j=1}^m a_j Z_{t-j} + \sum_{j=1}^m b_j y_{t-j} + \varepsilon_t \tag{2.4}$$

$$Y_t = \sum_{j=1}^m c_j Z_{t-j} + \sum_{j=1}^m d_j y_{t-j} + \eta_t \tag{2.5}$$

If b_j is statistically significant; Y_t Granger causes Z_t . Whereas, if c_j is not equal to zero; Z_t Granger causes Y_t .

Results and Discussion

Stationarity Test

Variables (Level)	ln DCP	L	ln RER	L	ln INF	ln FDR	ln GDP	ln BD			
τ_T (ADF)	-1.04	0	-0.27	0	-2.45	-3.74	1	-2.51	1	-3.22*	1
τ_μ (ADF)	-0.22	0	-2.06	0	-2.4	-1.15	1	-1.01	1	-2.75*	1
τ (ADF)	-0.87	0	-1.88*	0	-0.74	-1.58	1	2.74	1	0.23	0
τ_T (PP)	-1.36	2	-0.27	0	-2.53	-2.21	2	-2.34	1	-2.39	4
τ_μ (PP)	-0.69	2	-2.01	2	-2.56	-0.79	3	-1.73	1	-2	4
τ (PP)	-0.77	2	-1.57	3	-0.73	-1.70*	2	5.3	2	0.57	9
Variables (1st Difference)	ln DCP	L	ln RER	L	ln INF	ln FDR	ln GDP	ln G	L		
τ_T (ADF)	-4.78**	0	-5.54***	0	-5.84***	-4.55***	1	-3.82**	0	-4.52***	0
τ_μ (ADF)	-4.53**	0	-4.84***	0	-5.91***	-4.63***	1	-3.84**	0	-4.57***	0
τ (ADF)	-4.50***	0	-4.33***	1	-5.99***	-4.55***	1	-2.40**	0	-4.62***	0
τ_T (PP)	-4.78**	0	-10.49***	15	-5.84***	-5.78***	2	-3.78***	3	-5.14**	14
τ_μ (PP)	-4.53**	1	-4.90***	2	-5.92***	-5.93***	2	-3.81**	3	-4.93***	13
τ (PP)	-4.50***	2	-4.49***	3	-6.00***	-4.48***	1	-2.31**	4	-4.83***	12

ADF and PP tests were employed to investigate order of integration. Table 4.1 shows the result for the unit root test. The result of both tests, ADF and PP reveals that the entire variables become stationary at first difference form I (1) and we can use Johansen co-integration test to find whether a long run relationship exists or not.

Johansen Co-Integration Results

To examine the existence of long run association among variables this study employed Johansen co-integration methodology. All the variables in equation 1, domestic credit to private sector by banks, real exchange rates, inflation rates, federal discount rates, economic growth and bank deposit are stationary at first difference. In our proposed model, domestic credit is dependent variable and represents banking sector development in Pakistan. While other macroeconomic factors (RER & INF), Federal discount rates, economic growth and bank deposit are the independent variables.

Table 2 exhibits the result of Johnson co-integration test. The result indicates that we can reject the null hypothesis at 1% in our proposed model. While, the null hypothesis of there is no co-integration at most 1 can only be rejected at 5% in our proposed model. These results suggest that at 1% there is only one co-integration vector while at 5% there are two co-integration vectors in the model. From these results we can conclude that the

existence of long run equilibrium association between banking sector development, real exchange rates, inflation rates, federal discount rate, economic growth and bank deposits.

Table 2. Johansen Co-Integration Analysis

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 % Percent Critical Value	1 % Percent Critical Value
None**	0.722145	113.1046	95.75366	104.9615
At most 1*	0.571948	70.84301	69.81889	77.81884
At most 2	0.438361	42.84216	47.85613	54.68150
At most 3	0.300523	23.80460	29.79707	35.45817

Granger Causality

As the existence of long run association between variables is confirmed by the Johnson co-integration analysis. In the following step we analyse the direction of causality among the variable by Granger Causality test. The results of Granger Causality are presented in Table 4.3. The rejection of null hypothesis of non-causality between variables means direction of causality exists between the variables.

According to table 4.3 there is a uni-directional association among Inflation and DCP, federal interest rate and DCP and GDP and DCP. These results suggest that causality is running from inflation rates, economic growth and federal discount rates to banking sector development. From the above results we can conclude that a change in inflation rates and economic growth will have an influence on banking sector in Pakistan. Similarly, the causality of US interest rate toward banking sector gives suggestions for the existence of a spillover effect indicating that changes in the US interest rate will have an effect on the banking sector of Pakistan. On the other hand, results also indicate a uni-directional relationship among some of the independent variables in the model. According to table 4.3 among independent variables, direction of causality is running from inflation toward real exchange rates and from economic growth toward federal discount rate.

Table 3. Granger Causality Test

Null Hypothesis	F-Statistic	P.
LRER does not Granger Cause LDCP	2.13295	0.1542
LDCP does not Granger Cause LRER	2.74473	0.1077
LINF does not Granger Cause LDCP	5.65123	0.0238
LDCP does not Granger Cause LINF	1.29280	0.2642
LFDR does not Granger Cause LDCP	4.80121	0.0361
LDCP does not Granger Cause LFDR	0.08180	0.7768
LGDP does not Granger Cause LDCP	4.56084	0.0407
LDCP does not Granger Cause LGDP	0.01711	0.8968
LBD does not Granger Cause LDCP	0.72311	0.4016
LDCP does not Granger Cause LBD	1.16884	0.2880
LINF does not Granger Cause LRER	4.40484	0.0441
LRER does not Granger Cause LINF	1.77766	0.1922
LFDR does not Granger Cause LRER	1.87141	0.1811

LRER does not Granger Cause LFDR	1.42887	0.2410
LGDP does not Granger Cause LRER	0.18772	0.6678
LRER does not Granger Cause LGDP	0.09111	0.9925
LBD does not Granger Cause LRER	0.04976	0.8249
LRER does not Granger Cause LBD	1.57852	0.2184
LFDR does not Granger Cause LINF	0.20383	0.6548
LINF does not Granger Cause LFDR	0.39275	0.5354
LGDP does not Granger Cause e LINF	1.06951	0.3091
LINF does not Granger Cause LGDP	1.37427	0.2500
LBD does not Granger Cause LINF	0.53075	0.4718
LINF does not Granger Cause LBD	0.85018	0.3636
LGDP does not Granger Cause LFDR	5.20184	0.0296
LFDR does not Granger Cause LGDP	0.20033	0.6576
LBD does not Granger Cause LFDR	0.01883	0.8917
LFDR does not Granger Cause LBD	1.05262	0.3128
LBD does not Granger Cause LGDP	0.56010	0.4599
LGDP does not Granger Cause LBD	1.33636	0.2565

Conclusion

The study investigates the association between real exchange rates, inflation rates, federal discount rates, economic growth, bank deposits and banking sector development of Pakistan's from 1980 to 2014. In the first step, unit root test was conducted and the result of unit root indicates that the entire variables are stationary at their first difference. In the next step Johansen test were employed to analyse long run co-integration association among the variables. The empirical results confirm the existence of a long run equilibrium relationship between macroeconomic factors, economic growth, US monetary policy and banking sector in Pakistan. In the final step, results of Granger causality confirm that a variation in inflation rates, economic growth and US monetary policy will precede a change in the development of Pakistan's banking sector.

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