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Causal and Dynamic Link Between the Banking Sector and Economic Growth in Pakistan

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Abstract

This study is aimed at estimating the causal and dynamic relationship between the banking industry and economic growth of Pakistan. A panel data set of 24 banks was used for the period 2006–2016. Panel unit root, Panel cointegration, and Panel VECM tests were applied to analyze the data. The results reveal that lending capability, bank investments, and innovation have positive and statistically significant impacts on economic growth in short-run as well as in long-run dynamics. The presence of a long-run relationship indicates workable and bilateral policy measures in the banking industry, and short-run dynamics approach consistency in the recurring policies of banks. The results of the study are consistent with economic development theory, which indicates the vital role of the financial sector in the development of emerging economies. The empirical findings suggest that state authorities and banking regulation authorities should remain vigilant at this crucial point in time because

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excessive banking development in terms of expansion, liberalization, and products may lead to an increase in non-performing loans and a reduction in investment activities, which can slow the process of growth. Evidently, the results suggest that regulatory authorities should focus less on enhancing the size of the banking sector and more on improving capacity building of its functionalities as intermediaries for the achievement of sustainable economic growth.

Keywords: banking sector, economic growth, panel cointegration, Pakistan

JEL Classification: C33, E44, F43, G21

1. Introduction

The banking sector plays a dynamic role in generating economic activities and growth due to its financial intermediary position of transferring funds from savings to the investment sector. The origin of this concept can be traced from economic development theory (Schumpeter, 1934). The theory denotes the efficiency of the banking system in accelerating the economic growth process by encouraging innovations, allocation of savings, and financial funding for productive investments. Similarly, a few other early studies, including Goldsmith (1969), McKinnon (1973), and Shaw (1973), have also endorsed the findings of the economic development theory. The discussion about the best financial structure that encourages long-run economic growth has been settled in four distinctive dimensions. The first one is bank-based, the second is market-based, the third is financial services, and the last is finance and the law system (Levine, 2005).

Bank-based analysis highlights the essential function of intermediaries in the promotion of the economic growth process. The banking industry is always considered as the engine of economic activities because of its role in funding productive investments. Thus, economic growth is indirectly linked to the spread of finance. By taking into account the microeconomic and macroeconomic bases of intermediation, the banking sector has been declared as the finest instrument for resolving market frictions (Gurley & Shaw, 1960). In addition, it condenses the cost of information (Greenwood & Jovanovic, 1990), provides liquidity, and mobilizes savings (Gorton & Pennacchi, 1990).

Although a substantial amount of literature is available on the financial sector's relationship to economic growth, results drawn from previous studies are quite inconsistent with regard to the purpose of this study and raise different questions about the connection between the banking sector and the economic growth process. For instance, several studies denote strong positive (Hou & Cheng, 2017; Imam & Kpodar, 2016) and weak relationships (Usai & Vannini, 2005), while many studies indicate negative relationships (Ductor & Grechyna, 2015; Khattab, Juliot & Abid, 2015). Few studies reveal both positive and negative connections (Ranciere & Jeanne, 2006). On the other hand, various studies demonstrate that the banking sector promotes economic growth (Abedifar, Hasan, & Tarazi, 2016; Durusu-Ciftci, Ispir, & Yetkiner, 2017; Pradhan, Arvin, Hall, & Norman, 2017), and a few studies indicate that economic growth pushes financial-sector development (Al-Yousif, 2002; Ang & McKibbin, 2007; Oluitan, 2012). However, a few studies argue that the relationship is bi-directional (Abduh & Chowdhury, 2012; Tabash & Dhankar, 2014).

Hence, the above discussion suggests that there is a need to re-explore the causal and dynamic relationship between the financial sector and economic growth, as well as the capacity of the econometric models to justify these bilateral and consistent diversions in the emerging economy of Pakistan. The arguments above also indicate that the interconnectedness between the banking industry and economic development has enormous room to improve further. This idea is novel because financial intermediation accommodates the demand and supply of funds in an economy by changing lending capacities, bank investments, innovation levels, and interest rates. Based on a sound theoretical framework, the objective of this research is to find out the real behavior of the banking sector in the context of an emerging economy like Pakistan.

Most of the previous research is based on joint samples from multiple economies, including various developed, developing, and under-developed economies (Aizenman, Jinjara, & Park, 2015; Ductor & Grechyna, 2015; Durusu-Ciftci et al., 2017), which are unable to reflect the particular behavior of any single economy because of variations across countries in the quality of financial institutions and the level of economic development (Cecchetti & Kharroubi, 2012; Demirgüç-Kunt, Feyen, & Levine, 2013; Masten, Corecelli, & Masten, 2008; Rioja & Valev, 2014); the pace of extensions in the financial market (Cecchetti

& Kharroubi, 2012; Ductor & Grechyna, 2015); certain functions of the financial sector (Beck, Degryse, & Kneer, 2014); and the “normality” of the time period under examination (Balta & Nikolov, 2013; Breitenlechner, Gächter, & Sindermann, 2015; Gambacorta, Yang, & Tsatsaronis, 2014). Hence, previous studies containing samples of multiple countries are unable to measure this relationship accurately. Keeping in mind such missing elements, we have focused on a micro-economic model based upon a single economy to extract more focused and persistent results in a juxtaposed manner.

In Pakistan, the consumption pattern is greater than the savings at present income levels due to people's preference for satisfaction of their current consumption rather than future consumption. Therefore, at present, it is necessary to reinvestigate the theoretical dynamics for an emerging economy. Moreover, the findings of this study will guide the further course of action for achieving sustainable economic growth in the country.

Following this introduction to the study, the second part presents the background literature, the third part demonstrates the methodology of the study, while the fourth part presents results and discussion and, finally, the conclusion of the study is presented in fifth section of the study.

2. Literature review

Past theoretical and empirical studies emphasized the roles of labor resources, capital, and technology as catalysts of economic growth. The majority of the earlier literature ignored the role of the banking sector in the process of economic growth. The nexus between the banking sector and economic growth started to emerge after 1970 (Goldsmith, 1969; Shaw, 1973). Since 1990, there has been a growing stream of literature that explores the link between the banking sector and the growth of an economy, but this relationship is not static: It is a dynamic relationship due to changing economic variations in modern emerging economies. For instance, the study of Goaid and Sassi (2010) concluded that the link between the banking sector and economic growth is quite heterogeneous. Similarly, Boukhatem and Moussa (2017) used pooled Fully-modified OLS (FMOLS) regression and cointegration methods on the data of 14 years from 2000 to 2014 from selective the Middle East and North Africa (MENA) countries to determine the dynamic relationships between the

banking system and economic growth. The research led to various findings. Although the relationship between bank financing and economic growth is positive, as in numerous previous studies, when it came to the quality of the relationship between bank financing of Islamic institutions and economic growth, the outcomes revealed the existence of a negative impact on the interaction, while Islamic financial development of institutions indicated a positive impact on the economy. However, further study suggested that the underdeveloped institutional framework could diminish this positive effect.

Keeping in mind the diversified results of past studies, this is an attempt to segregate all the past literature into six meaningful hypotheses to lessen the confusion of past studies. These hypotheses highlight the maximum possible outcomes of the banks-growth relationship. Moreover, the findings of this study would contribute to the literature by identifying the current trend of the banking-growth relationship.

Supply-Leading Hypothesis

The first approach is known as supply-leading. According to this approach, the banking activities serve as valuable instruments for improving the productivity of an economy. Therefore, countries with healthier banking sectors tend to grow faster (Bayoumi & Melander, 2008). A large number of theoretical and empirical studies supported this view (i.e., Abedifar et al., 2016; Durusu-Ciftci et al., 2017; Pradhan et al., 2017), including the earliest contribution by Schumpeter (1934). The advocates of this approach argue that financial institutions promote technical innovation and investments, thereby leading to economic growth. The studies of McKinnon (1973) and Shaw (1973) highlighted the significance of having a banking sector free from financial restraints such as direct credit programs, interest rate ceilings, and high reserve requirements. Such policy measures tend to be established in all economies but are particularly repeated in developing economies. The authors argued that financial suppression interrupts both investments and savings. In contrast, banking sector liberalization increases competition within the sector and permits financial deepening, which in turn encourages the process of economic growth. Similar ideas were produced by Goldsmith (1969), Hicks (1969), Galbis (1977), Fry (1978), Greenwood and Jovanovic (1990) and Thakor (1996). They recommended the banking sector as a key factor for economic growth because it facilitates capital accumulation and

increased savings, which leads to larger investments and the acceleration of the economic development process.

Historically, numerous empirical researches have admitted the supply-leading approach. An influential contribution was made by King and Levine (1993), who supported this approach by using a simple cross-country OLS regression on a large sample of countries. The study found that the financial sector is indeed an effective determinant of economic growth, and later on, the same findings were drawn by Christopoulos and Tsionas (2004). In Pakistan, Khan and Qayyum (2007) indicated the existence of a long-run relationship between the banking sector and economic growth, but in the short-run, the relationship between the banking sector and economic growth was negative. On the other hand, the findings of Hye and Wizarat (2013) contradicted Khan and Qayyum's (2007). Hye and Wizarat (2013) used a semi-log function on the data of Pakistan's economy. They reported the non-existence of a long-run relationship. Hence, it appears that there is confusion among researchers about the real impact of the banking sector on economic growth.

Demand-Following Hypothesis

The second approach is demand-following. The supporters of this theory claim that economic growth is a causal factor for the development in the banking sector. Robinson (1952) revealed that banking-sector developments follow economic growth, which suggests that as the economy grows, the demand for banking services rise. As a result, additional financial instruments, financial services, and banks come into existence in the market. Kuznets (1955) examined similar findings and suggested that as the real economy expands and reaches the intermediate phase of growth, the demand for banking services starts to increase. Thus, banking-sector development depends upon the economic development level rather than the other way around. Empirically, this view is confirmed by Al-Yousif (2002) and Ang and McKibbin (2007). Following the same argument, Oluitan (2012) also indicated that economic growth causes banking-sector development but not vice versa.

Bi-directional Hypothesis

The third approach is the bi-directional causality relationship. The proponents of this theory have proven the existence of a two-way causal connection between banking-

sector development and economic growth. Patrick (1966) was the first to identify that the development in the banking industry is a result of economic growth, which in turn promotes the process of economic growth. Several models of endogenous growth, for instance, Greenwood and Jovanovic (1990), Demetriades and Hussein (1996), Greenwood and Smith (1997), Berthelemy and Varoudakis (1997), Abduh & Chowdhury, (2012), and Tabash and Dhankar (2014) hypothesized a mutual or two-way connection between banking sector-development and economic growth. In addition, Demetriades and Hussein (1996) postulate that if banking-sector development causes growth, it is essential for the banking structure to perform well. If so, the authors believe the banking sector would help the real economy by exploiting new opportunities fully. When there is reverse causation, it is believed that as the real economy develops, there will be extra savings entering into the banking sector and, ultimately, it will allow banks to expand the volume of lending.

No-Relationship Hypothesis

Finally, the fourth approach postulates that there is no causal relationship between banking-sector development and economic growth. This approach was introduced by Lucas (1988), who stated that “economists poorly over stress the function of financial factors in the process of economic growth,” and this view was reconfirmed by Stern (1989). Similarly, Narayan and Narayan, (2013) also produced evidence of the non-existence of a relationship between the banking sector and economic growth. It has been observed in different developing countries that banking sector credit allocation only plays a role in promoting industrial growth, but increases in the volume of credit do not result in the acceleration of economic growth. It is the stability, competition, and efficiency of the banking sector that can enhance the pace of economic growth. In addition, sometimes weak liberalization of banking regulations also discourages economic growth (Mirzaei & Moore, 2016).

Negative-Relationship Hypothesis

Moreover, a few studies are also available which highlighted the negative effects of banking-sector development on economic growth. For instance, Van Wijnbergen (1983), Buffie (1984), De Gregorio and Guidotti (1995) and Khattab et al. (2015) noted potentially negative effects of the financial sector on economic growth. The outcomes of those studies

indicated that massive liberalization in the banking sector leads to declines in total real credit to domestic companies, and thus to decreases in investment activities and a slowing down of the pace of growth. Many other studies also underline the insignificant and negative impacts of the banking sector on economic growth, including Nili and Rastad (2007), Naceur and Ghazouani (2007), Kar, Nazlioglu, and Aglir, (2011).

U-shaped Relationship Hypothesis

Aside from the above hypotheses, a nonlinear relationship has been analyzed in recent studies (Beck, Georgiadis, & Straub, 2014; Chen, Wu, & Wen, 2013; Samargandi, Fidrmuc, & Ghosh, 2015); Shen & Lee, 2006. Beck et al. (2014) indicated that the banking sector positively impacts growth up to a certain level, but beyond that, further development leads to a decrease in economic growth. Therefore, a U-shaped or inverted relationship exists between the banking sector and economic growth. The same relationship was reinvestigated by Law and Singh (2014).

3. Methodology and data

The study incorporated a panel data set of 24 banks in Pakistan during the period 2006 to 2016. All the data is gathered from the annual reports of State Bank of Pakistan and World Development Indicators (WDI) source. In this study, we selected the four key microeconomic variables (Lending capability, Bank Investment, Interest Margin and Innovation) of the banking sector to analyze their impact on the overall economic growth of the country. To examine the nexus between each of the four variables and economic growth, we estimate equation (1) as:

$$Eg_{i,t} = \beta_0 + \beta_1 lc_{i,t} + \beta_2 bi_{i,t} + \beta_3 im_{i,t} + \beta_4 in_{i,t} + \mu_{i,t} \quad (1)$$

where “Eg” denotes economic growth, “lc” denotes Lending Capability, “bi” denotes Bank Investment, “im” represents Interest Margin and “in” symbolizes Innovation.

Table 1: Specifications of Variables

Variables	Description
Economic Growth	Economic growth refers to the increase in the ability of an economic system to produce goods and services when comparing one period to another. Although there are various measures of economic growth, the GDP is always considered as the best measure to use when examining the economic performance of any country. Therefore, in this study, the annual GDP is taken as the proxy for economic growth.
Lending Capability	The bank lending channel is an extremely important approach for economic development, and many studies have stressed the significance of the bank lending channel in achieving long-run economic growth (Guerra, 2017; Kapounnek, Kucerova & Fidrmuc, 2017). For this study, the loan-to-deposit ratio has been chosen as a proxy for Lending Capability because it indicates utilizations of the deposits as lending in banks. The deposits are the key sources for financing. Thus, the amount of deposits of the financial institutions affects their lending capability (Kassim & Majid, 2008; Thierry, Jun, Eric, Yannick, & Landry, 2016).
Innovation	Innovation in the banking sector has been observed to be a crucial component in accelerating the volume of financial activities that cause a greater impact on economic growth. Innovation in the banking sector includes improved quality and efficiency, as well as modified and new banking products, i.e., ATM, online transactions or M-banking (Akhisar, Tunay, & Tunay, 2015; Galindo & Mendez, 2014). In this study, we have used annual online transactions of banks as a proxy for innovation, and it is the latest determinant for evaluating the performance of branchless banking (Afshan & Sharif, 2016).
Interest Margin	The interest rate is a key attribute for explaining the business cycles of banking and their patterns in developing economies (Neumeyer & Perri, 2005). Different banks in Pakistan charge interest rates on their products under the prudential regulation guidelines of the State Bank of Pakistan. The net interest margin ratio is chosen as a proxy for the Interest Margin of each bank in the sample. This ratio explains the earning capacity of banks through the main business of banking by utilizing all assets.
Bank Investment	The recent upgradations in Endogenous Growth Theory and the Neo-Classical model have noted the significance of investment in developing economies (Bint-e-Ajaz & Ellahi, 2012; Romer, 1994). For sustainable economic development, the efficient utilization of investment and mobilization of domestic resources are the key policy focuses (Nasir, Khalid, & Mahmood, 2004). The investment-to-total assets ratio is chosen as a proxy for Bank Investment because it demonstrates the investment activities of banks with respect to their total assets, and it also highlights the portion of total assets that are used for investment purposes by banks.

In order to explore the degree of integration between variables, the study used different tests of panel unit root, including the IPS and LLC tests (Im, Pesaran, & Shin, 2003; Levin, Lin, & Chu, 2002) and the Fisher test by employing the further tests of Phillips-Perron (PP) and augmented Dickey-Fuller (ADF) (Breitung, 2000; Choi, 2001; Maddala & Wu, 1999). All these tests are used at level as well as at first difference of variables to examine their stationarity properties.

If all variables of the study obtain stationarity at first difference, then we would use the panel cointegration test for investigating the presence of long-run associations among bank indicators and the economic growth of the country. There are three different forms of panel cointegration tests. The initial test is known as the Pedroni test (Pedroni, 1999, 2004). This test is further divided into two types: group tests and panel tests. The panel test is expressed as a “within dimension” method. This test contains panel rho (ρ), panel-v, panel non-parametric (PP) and panel parametric (ADF) statistics. The group test is expressed as “between dimension.” It consists of three test statistics: group ADF statistics, group PP-statistics, and group rho-statistics. The second test of cointegration is the Kao test (Kao, 1999). This test is based on the two-step process of Engle and Granger (1987). This test imposes homogeneity on elements of the panel data set and generalizes the augmented Dickey Fuller and Dickey-Fuller test in the framework of the panel data set. The third and final test of cointegration is Fisher’s test (Maddala & Wu, 1999) which is a non-parametric test. Moreover, it does not presume homogeneity among the coefficients.

If all variables of the study prove to be cointegrated, then in the next step, the panel vector error correction model (VECM) will be used to determine the relationship (Pesaran, Shin, & Smith, 1999). For this, the process of Engle and Granger (1987) will be used to estimate long-run as well as short-run dynamics of the relationships between the variables. The following model is used for the estimation of VECM.

$$\begin{aligned}
\Delta E_{git} = & \lambda_{1j} + \sum_{s=1}^k \omega_{11is} \Delta E_{git-s} + \sum_{s=1}^k \omega_{12is} \Delta lc_{it-s} + \sum_{s=1}^k \omega_{13is} \Delta bi_{it-s} \\
& + \sum_{s=1}^k \omega_{14is} \Delta in_{it-s} + \sum_{s=1}^k \omega_{15is} \Delta im_{it-s} + \Psi_{1i} \varepsilon_{it-1} \\
& + \mu_{1it}
\end{aligned} \tag{2a}$$

$$\begin{aligned}
\Delta lc_{it} = & \lambda_{2j} + \sum_{s=1}^k \omega_{21is} \Delta E_{git-s} + \sum_{s=1}^k \omega_{22is} \Delta lc_{it-s} + \sum_{s=1}^k \omega_{23is} \Delta bi_{it-s} \\
& + \sum_{s=1}^k \omega_{24is} \Delta in_{it-s} + \sum_{s=1}^k \omega_{25is} \Delta im_{it-s} + \Psi_{1i} \varepsilon_{it-1} \\
& + \mu_{1it}
\end{aligned} \tag{2b}$$

$$\begin{aligned}
\Delta bi_{it} = & \lambda_{3j} + \sum_{s=1}^k \omega_{31is} \Delta E_{git-s} + \sum_{s=1}^k \omega_{32is} \Delta lc_{it-s} + \sum_{s=1}^k \omega_{33is} \Delta bi_{it-s} \\
& + \sum_{s=1}^k \omega_{34is} \Delta in_{it-s} + \sum_{s=1}^k \omega_{35is} \Delta im_{it-s} + \Psi_{1i} \varepsilon_{it-1} \\
& + \mu_{1it}
\end{aligned} \tag{2c}$$

$$\begin{aligned}
\Delta in_{it} = & \lambda_{4j} + \sum_{s=1}^k \omega_{41is} \Delta E_{git-s} + \sum_{s=1}^k \omega_{42is} \Delta lc_{it-s} + \sum_{s=1}^k \omega_{43is} \Delta bi_{it-s} \\
& + \sum_{s=1}^k \omega_{44is} \Delta in_{it-s} + \sum_{s=1}^k \omega_{45is} \Delta im_{it-s} + \Psi_{1i} \varepsilon_{it-1} \\
& + \mu_{1it}
\end{aligned} \tag{2d}$$

$$\begin{aligned}
\Delta im_{it} = & \lambda_{5j} + \sum_{s=1}^k \omega_{51is} \Delta E_{git-s} + \sum_{s=1}^k \omega_{52is} \Delta lc_{it-s} + \sum_{s=1}^k \omega_{53is} \Delta bi_{it-s} \\
& + \sum_{s=1}^k \omega_{54is} \Delta in_{it-s} + \sum_{s=1}^k \omega_{55is} \Delta im_{it-s} + \Psi_{1i} \varepsilon_{it-1} \\
& + \mu_{1it}
\end{aligned} \tag{2e}$$

Here, Δ indicates first difference, s denotes lag length, which is one in this case, and the serially uncorrelated error term is denoted by μ . From (2a) to (2e), the short-run causality is investigated by using the partial F-statistic's significance attached to the parallel right-hand part variables. By using the t-test, the long-run causality is examined through the level of significance of the relevant error correction term. The existence or non-existence of long-run causality may be recognized by determining the significance using t-statistics on the coefficient Ψ of the error correction term ε_{it-1} in (2a)–(2e) equations.

4. Results and discussion

The findings of different panel unit root tests are mentioned in Table 2. Each test is performed at level as well as at first difference of lending capability, economic growth, bank investment, innovation and interest margin variables. At level, most of the tests indicated non-stationarity of the data, but at first difference, the variables obtained stationarity and they are integrated of order I(1).

Table 2: Tests of Panel Unit Root

At Level	LLC	IPS	ADF-Fisher	PP-Fisher	Breitung
Economic Growth	1.28913 (0.9013)	0.72135 (0.7647)	28.1918 (0.9946)	63.8913 (0.0896)	1.56612 (0.9413)
Lending Capability	-0.78228 (0.2170)	0.39487 (0.6535)	52.7433 (0.3685)	89.7773 (0.0005)*	0.9601 (0.8315)
Bank Investment	-1.44909 (0.0737)**	2.39713 (0.9917)	23.902 (0.9994)	35.5632 (0.9387)	-1.10604 (0.1344)
Innovation	2.56711 (0.9949)	6.10873 (1.0000)	3.3602 (1.0000)	1.16762 (1.0000)	-4.63672 (0.0000)*
Interest Margin	-4.30989 (0.0000)*	-2.19923 (0.0139)**	79.976 (0.0045)*	113.793 (0.0000)*	-1.11609 (0.1322)
First Difference					
Economic Growth	-14.0092 (0.0000)*	-8.28391 (0.0000)*	177.568 (0.0000)*	181.129 (0.0000)*	3.11659 (0.0581)***
Lending Capability	-8.91409 (0.0000)*	-4.62777 (0.0000)*	116.216 (0.0000)*	206.314 (0.0000)*	-1.58651 (0.0563)***

Investment	-8.16346 (0.0000)*	-4.8313 (0.0000)*	120.536 (0.0000)*	232.025 (0.0000)*	-1.8736 (0.0305)*
Innovation	-9.96337 (0.0000)*	-3.93844 (0.0000)*	100.187 (0.0000)*	237.029 (0.0000)*	-3.36667 (0.0004)*
Interest Margin	-13.9516 (0.0000)*	-6.50988 (0.0000)*	144.843 (0.0000)*	208.268 (0.0000)*	-3.40375 (0.0003)*

Note: *, **, *** stand for level of significance at 1%, 5%, and 10%, respectively.

At level, several variables of the study could not obtain stationarity, but after attaining the first difference, all variables follow the unit root process. Therefore, we can verify the robustness by employing three types of panel cointegrations, as mentioned in the methodology.

The outcome of Pedroni's test is presented in Table 3 where most of the tests are statistically significant at the 1% level of significance, which highlights the presence of long-run connections between the variables of the study.

Table 3: Pedroni's Test

Test	Stat	Prob.	Weighted Statistics	Prob.
The Panel v-test Stat	-0.38454	(0.6497)	-0.66037	(0.7455)
The Panel rho-test Stat	2.562855	(0.9948)	2.462421	(0.9931)
The Panel PP-test Stat	-8.86231	(0.0000)*	-10.3286	(0.0000)*
The Panel ADF-test Stat	-3.64828	(0.0001)*	-3.10581	(0.0009)*
The Group rho-test Stat	4.411944	(1.0000)	-	-
The Group PP-test Stat	-20.2982	(0.0000)*	-	-
The Group ADF-test Stat	-4.71319	(0.0000)*	-	-

Note: * indicates the level of significance at 1%

Table 4 demonstrates the results of Kao's residuals panel cointegration test that reconfirm the presence of long-run connections among all variables of the study.

Table 4: Kao Test

Kao Statistics	t-Statistic	Prob.
ADF	-10.4027	(0.0000)*

Note: * indicates the level of significance at 1%

Table 5 presents the outcome of the Johansen Fisher test which further indicates the existence of cointegrated relationships among all the five variables of the study at the 1% level of significance. Hence, cointegration tests identified a panel long-run equilibrium association among all the study variables. This suggests that the banking sector indicators and economic growth progress jointly in the long run.

Table 5: Johansen Fisher Test

Variables	CE	Trace value	P-value	Eigen value	P-value	Remarks
E-Lending Capability	None	665.2	(0.0000)*	402	(0.0000)*	Cointegration exists
	At most 1	157.2	(0.0000)*	157.2	(0.0000)*	
E-Bank Investment	None	1642	(0.0000)*	531.8	(0.0000)*	Cointegration exists
	At most 1	197.1	(0.0000)*	197.1	(0.0000)*	
E-Interest Margin	None	835.6	(0.0000)*	445.5	(0.0000)*	Cointegration exists
	At most 1	180.3	(0.0000)*	180.3	(0.0000)*	
E-Innovation	None	515.2	(0.0000)*	317.5	(0.0000)*	Cointegration exist
	At most 1	264.5	(0.0000)*	264.5	(0.0000)*	

Note: * indicates the level of significance at 1%. E denotes economic growth

By considering the outcomes of panel cointegrations, we employed the VECM to identify the direction of the causality. In order to estimate the causal association between banking indicators and economic growth, the results of the Panel VECM's five equations (economic growth, lending capability, bank investment, interest margin and innovation) are presented in Table 6. The results of the test revealed long-run and short-run relationships among all variables. The single lag structure is chosen by using Schwarz and Akaike Information Criteria.

Table 6: VECM Test

	Short-run					Long-run	
	(Independent Variable)					Error Correction Term	
Dependent Variable	Economic Growth	Lending Capability	Bank Investment	Interest Margin	Innovation	Coeff.	Prob.
Economic Growth		(0.0965)*** 0.18000	(0.0000)* 18.6539	(0.2756) 1.1888	(0.0000)* 29.0845	- 1.3484	(0.000)*
Lending Capability	(0.7993) 0.0646		(0.9156) 0.0112	(0.8107) 0.0573	(0.8945) 0.0175	0.1191	(0.000)
Bank Investment	(0.0699)*** 3.2856	(0.1343) 2.242387		(0.7331) 0.1162	(0.2967) 1.0888	0.0587	(0.001)*
Interest Margin	(0.0000)* 20.9733	(0.9275) 0.00820	(0.6990) 0.1495		(0.0037)* 8.4106	0.0091	(0.000)
Innovation	(0.9357) 0.0065	(0.4879) 0.48120	(0.3483) 0.8797	* 16.6411		- 1.0601	(0.000)*

Note: *, **, *** stand for level of significance at 1%, 5%, and 10%, respectively.

The Wald test is employed to determine the significance of relationships. According to Table 5, equation (2a) shows that lending capability, bank investment, and innovation have strong positive and statistically significant effects on the process of economic growth in the short-run dynamics at the 1% and 10% levels of significance. This indicates the significance of the banking industry in the development of the economic growth process in the country. In addition, the error correction term (ECT) is also statistically significant and negative at the 1% level, which indicates the speed of adjustment towards long-run equilibrium.

The equation (2b) indicates that all variables have neither short-run nor long-run relationships with the lending capability of banks. However, the p value of the error correction term is significant but not negative.

With regard to equation (2c), economic growth positively and significantly impacts bank investment in the short run at the 10% level of significance. Lending capability, interest margin and innovation have positive but insignificant impacts on bank investment in the short run. Moreover, the error correction term is statistically significant and negative at the 1% level of significance, indicating that bank investment responds to divergences from the long-run equilibrium.

Equation (2d) indicates that economic growth and innovation have statistically significant and positive impacts on the interest margin in the short run at the 1% level of significance. The error correction term of this equation indicates the absence of a long-run equilibrium.

In equation (2e), interest margin has a statistically significant and positive impact on innovation in the short run at the 1% level of significance. Furthermore, economic growth, lending capability, and bank investment have insignificantly positive impacts on innovation. The error correction term is negative and statistically significant, which indicates the speed of adjustment towards the long-run equilibrium. Overall, the results denote the presence of bi-directional relationships among the banking indicators and economic growth, both in long-run and short-run dynamics.

5. Conclusion

Bearing in mind the above discussed results, it is apparent that there is interconnectedness between the banking industry and economic development in Pakistan. Our study thoroughly investigated the cointegration and causality relationships among the banking sector indicators and the economic growth of Pakistan during the period 2006–2016. We determined the robustness by using three cointegration tests and found the presence of long-run relationships among lending capability, bank investment, innovation and economic growth. Furthermore, the results of panel causality tests concluded that lending capability, bank investments, and innovation behave positively and have significant

impacts on economic growth in short-run as well as long-run dynamics, and these results are in line with economic development theory.

Furthermore, the study revealed that there is the existence of an overall bi-directional causality relationship between the banking sector and economic growth. Hence, this study supports the bi-directional relationship hypothesis, and the findings are consistent with Greenwood and Jovanovic (1990), Demetriades and Hussein (1996), Greenwood and Smith (1997), Berthelemy and Varoudakis (1997), Abduh and Chowdhury (2012), and Tabash and Dhankar (2014). Although a positive and bi-directional relationship exists between the banking sector and the economic growth of Pakistan, keeping in mind the past literature, the findings of this study suggest that after achieving a certain threshold level of economic growth, the economic development begins to decline (Beck, Georgiadis, & Straub, 2014; Chen, Wu, & Wen, 2013; Law & Singh, 2014). Therefore, the state authorities and banking regulation authorities should remain vigilant at this point in time because excessive banking development in terms of expansion, liberalization, and products may lead to an increase in non-performing loans which can reduce the liquidity of the banking sector and investment activities; ultimately, the banking sector may begin to negatively impact growth. The reason behind is that when banks disburse excessive credit in lieu of achieving credit targets or profit in a competitive market, they normally relax precautionary measures regarding loan repayment and sometimes disburse credit to industries or individuals having poor repayment records. Thus, this liberalization in policy may lead to nonperforming loans and loan defaults which can seriously affect the liquidity of banks. The study strongly suggests that the State Bank of Pakistan should focus less on increasing the size of the banking sector and more on improving its functions as an intermediary for achieving sustainable economic growth. In addition, the presence of a long-run relationship indicates the good policy measures of banks, and the short-run dynamics indicate consistency in the policies of banks.

Moreover, the scope of this study is limited only to the banking sector, and it does not consider the Mudaraba companies, or insurance and investment banking companies, which may play significant and contributing roles in the process of economic development.

Thus, a deeper study is recommended that incorporates the role of the equity market as well to understand the diverse functions of the financial sector in an overall economy.

References

- Abduh, M., & Chowdhury, N. T. (2012). Does Islamic banking matter for economic growth in Bangladesh? *Journal of Islamic Economics, Banking and Finance*, 8(3), 104–113.
- Abedifar, P., Hasan, I., & Tarazi, A. (2016). Finance-growth nexus and dual-banking systems: Relative importance of Islamic banks. *Journal of Economic Behavior & Organization*, 132, 198–215.
- Afshan, S., & Sharif, A. (2016). Acceptance of mobile banking framework in Pakistan. *Telematics and Informatics*, 33(2), 370–387.
- Aizenman, J., Jinjark, Y., & Park, D. (2015). *Financial development and output growth in developing Asia and Latin America: A comparative sectoral analysis* (NBER Working Papers No. 20917). New York: National Bureau of Economic Research.
- Akhisar, I., Tunay, K. B., & Tunay, N. (2015). The effects of innovations on bank performance: The case of electronic banking services. *Procedia-Social and Behavioral Sciences*, 195, 369–375.
- Al-Yousif, Y.K. (2002). Financial development and economic growth: Another look at the evidence from developing countries. *Review of Financial Economics*, 11(2), 131–150.
- Ang, J. B., & McKibbin, W. J. (2007). Financial liberalization, financial sector development and growth: Evidence from Malaysia. *Journal of Development Economics*, 84(1), 215–233.
- Balta, N., & Nikolov, P. (2013). Financial dependence and growth since the crisis. *Quarterly Report on the Euro Area 2013*, 12(3), 7–18.
- Bayoumi, T., & Melander, O. (2008). *Credit matters: Empirical evidence on US macro-financial linkages* (IMF Working Paper No.08/169). Washington, DC: International Monetary Fund.

- Beck, R., Georgiadis, G., & Straub, R. (2014). The finance and growth nexus revisited. *Economic Letters*, 124(3), 382–385.
- Beck, T., Degryse, H., & Kneer, C. (2014). Is more finance better? Disentangling intermediation and size effects of financial systems. *Journal of Financial Stability*, 10, 50–64.
- Berthelemy, J.C., & Varoudakis, A. (1997). Economic growth, convergence clubs, and the role of financial development. *Oxford Economics Papers*, 48(2), 300–328.
- Bint-e-Ajaz, M., & Ellahi, N. (2012). Public-private investment and economic growth in Pakistan: An empirical analysis. *The Pakistan Development Review*, 51(4), 61–77.
- Boukhatem, J., & Moussa, F. B. (2017). The effect of Islamic banks on GDP growth: Some evidence from selected MENA countries. *Borsa Istanbul Review*, 18(3), 231–247.
- Breitenlechner, M., Gächter, M., & Sindermann, F. (2015). The finance-growth nexus in crisis. *Economics Letters*, 132, 31–33.
- Breitung, J. (2000). The local power of some unit root tests for panel data. *Advances in Econometrics*, 15, 161–177.
- Buffie, E. F. (1984). Financial repression, the new structuralists, and stabilization policy in semi-industrialized economics. *Journal of Development Economics*, 14(3), 305–322.
- Cecchetti, S. G., & Kharroubi, E. (2012). *Reassessing the impact of finance on growth* (BIS Working Papers No. 381). Basel, Switzerland: Bank for International Settlements.
- Chen, K. C., Wu, L., & Wen, J. (2013). The relationship between finance and growth in China. *Global Finance Journal*, 24(1), 1–12.
- Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance*, 20(2), 249–272.
- Christopoulos, D.K., & Tsionas, E.G. (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73(1), 55–74.
- De Gregorio, J., & Guidotti, P. (1995). Financial development and economic growth. *World Development*, 23(3), 433–448.

- Demetriades, P., & Hussein, K. (1996). Does financial development cause economic growth? Time series evidence from sixteen countries. *Journal of Development Economics*, 51(2), 387–411.
- Demirgüç-Kunt, A., Feyen, E., & Levine, R. (2013). The evolving importance of banks and securities markets. *World Bank Economic Review*, 27(3), 476–490.
- Ductor, L., & Grechyna, D. (2015). Financial development, real sector, and economic growth. *International Review of Economics & Finance*, 37, 393–405.
- Durusu-Ciftci, D., Ispir, M. S., & Yetkiner, H. (2017). Financial development and economic growth: Some theory and more evidence. *Journal of Policy Modeling*, 39(2), 290–306.
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2), 251–276.
- Fry, M. J. (1978). Money and capital or financial deepening in economic development. *Journal of Money, Credit, and Banking*, 10(4), 464–475.
- Galbis, V. (1977). Financial intermediation and economic growth in less-developed countries: A theoretical approach. *Journal of Development Studies*, 13(2), 58–72.
- Galindo, M. A., & Mendez, M. T. (2014). Entrepreneurship, economic growth, and innovation: Are feedback effects at work? *Journal of Business Research*, 67(5), 825–829.
- Gambacorta, L., Yang, J., & Tsatsaronis, K. (2014). Financial structure and growth. *BIS Quarterly Review*, March, 21–35.
- Goaied, M., & Sassi, S. (2010). Financial development and economic growth in the MENA region: What about Islamic banking development. Carthage: Institut des Hautes Etudes Commerciales, Carthage (January 2010), 1-23. Retrieved from <https://pdfs.semanticscholar.org/b085/0dba9a948fb309e01225450598b4023e6ae1.pdf>
- Goldsmith, R.W. (1969). *Financial structure and development*. London: Yale University Press.
- Gorton, G., & Pennacchi, G. (1990). Financial intermediaries and liquidity creation. *Journal of Finance*, 45(1), 49–71.

- Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy*, 98(5), 1076–1107.
- Greenwood, J., & Smith, B. D. (1997). Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control*, 21(1), 145–181.
- Guerra, E. A. R. (2017). The economic growth and the banking credit in Mexico: Granger causality and short-term effects, 2001Q1–2016Q4. *Economía Informa*, 406, 46–58.
- Gurley, J. G., & Shaw, E. S. (1960). Money in a theory of finance. *The Economic Journal*, 70(279), 568–569.
- Hicks, J. (1969). *A theory of economic history*. Oxford: Clarendon Press.
- Hou, H., & Cheng, S. Y. (2017). The dynamic effects of banking, life insurance, and stock markets on economic growth. *Japan and the World Economy*, 41, 87–98.
- Hye, Q. M., & Wizarat, S. (2013). Impact of financial liberalization on economic growth: A case study of Pakistan. *Asian Economic and Financial Review*, 3(2), 270–282.
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53–74.
- Imam, P., & Kpodar, K. (2016). Islamic banking: Good for growth? *Economic Modelling*, 59(C), 387–401.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90(1), 1–44.
- Kapounek, S., Kučerová, Z., & Fidrmuc, J. (2017). Lending conditions in EU: The role of credit demand and supply. *Economic Modelling*, 67(C), 285–293.
- Kar, M., Nazlioglu, S., & Agir, H. (2011). Financial development and economic growth nexus in the MENA countries: Bootstrap panel Granger causality analysis. *Economic Modelling*, 28(1–2), 685–693.
- Khan, M. A., & Qayyum, A. (2007). *Trade liberalization, financial development and economic growth* (PIDE-Working Papers 2007:19). Islamabad: Pakistan Institute of Development Economics.

- Kassim, S. H., & Majid, M. S. A. (2008). The role of bank lending in the monetary transmission process of a developing economy: Evidence from Malaysia. *Savings and Development*, 32(4), 301–319.
- Khattab, A., Juliot, M. B. M., & Abid, I. (2015). Financial development, financial instability and economic growth: The case of Maghreb countries. *International Journal of Economics and Financial Issues*, 5(4), 1043–1054.
- King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, 108(3), 717–737.
- Kuznets, S. (1955). Economic growth and income inequality. *American Economic Review*, 45(1), 1–28.
- Law, S. H., & Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking & Finance*, 41, 36–44.
- Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24.
- Levine, R. (2005). Finance and growth: Theory, mechanism and evidence. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of economic growth* (pp. 865–934). North-Holland, Amsterdam: Elsevier.
- Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3–42.
- Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61(S1), 631–652.
- Masten, A. B., Coricelli, F., & Masten, I. (2008). Non-linear growth effects of financial development: Does financial integration matter? *Journal of International Money and Finance*, 27(2), 295–313.
- McKinnon, R. I. (1973). *Money and capital in economic development*. Washington, DC: The Brookings Institution.
- Mirzaei, A., & Moore, T. (2016). Banking performance and industry growth in an oil-rich economy: Evidence from Qatar. *The Quarterly Review of Economics and Finance*, 60, 58–69.

- Naceur, S. B., & Ghazouani, S. (2007). Stock markets, banks and economic growth: Empirical evidence from the MENA region. *Research in International Business and Finance*, 21, 297–315.
- Narayan, P. K., & Narayan, S. (2013). The short-run relationship between the financial system and economic growth: New evidence from regional panels. *International Review of Financial Analysis*, 29, 70–78.
- Nasir, S., Khalid, M., & Mahmood, A. (2004). Saving-investment behaviour in Pakistan: An empirical investigation. *The Pakistan Development Review*, 43(4), 665–682.
- Neumeyer, P. A., & Perri, F. (2005). Business cycles in emerging economies: The role of interest rates. *Journal of Monetary Economics*, 52(2), 345–380.
- Nili, M., & Rastad, M. (2007). Addressing the growth failure of the oil economies: The role of financial development. *The Quarterly Review of Economics and Finance*, 46(5), 726–740.
- Oluitan, R. O. (2012). Bank credit and economic growth: Evidence from Nigeria, *International Business and Management*, 5(2), 102–110.
- Patrick, H. T. (1966). Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14(2), 174–189.
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61(S1), 653–670.
- Pedroni, P. (2004). Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis, *Econometric Theory*, 20(3), 597–625.
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, 94(446), 621–634.
- Pradhan, R. P., Arvin, M. B., Hall, J. H., & Norman, N. R. (2017). ASEAN economic growth, trade openness and banking-sector depth: The nexus. *Economia*, 18(3), 359–379.

- Ranciere, R., & Jeanne, M. O. (2006). *The optimal level of international reserves for emerging market countries: Formulas and applications* (IMF Working Paper No. 6-229). Washington, DC: International Monetary Fund.
- Rioja, F., & Valev, N. (2014). Stock markets, banks and the sources of economic growth in low and high income countries. *Journal of Economics and Finance*, 38, 302–320.
- Robinson, J. (1952). The generalization of the general theory. In J. Robinson (Ed.), *The rate of interest, and other essays* (pp. 67–146). London: McMillan.
- Romer, P. M. (1994). The origins of endogenous growth. *Journal of Economic Perspectives*, 8(1), 3–22.
- Samargandi, N., Fidrmuc, J., & Ghosh, S. (2015). Is the relationship between financial development and economic growth monotonic? Evidence from a sample of middle-income countries. *World Development*, 68, 66–81.
- Schumpeter, J. A. (1934). *The theory of economic development*. Translated by Redvers Opie. Cambridge, MA: Harvard University Press.
- Shaw, E. S. (1973). *Financial deepening in economic development*. Oxford: Oxford University Press.
- Shen, C., & Lee, C. (2006). Same financial development yet different economic growth: Why? *Journal of Money, Credit and Banking*, 38, 1907–1944.
- Stern, N. (1989). The economics of development: A survey. *The Economic Journal*, 99(397), 597–685.
- Tabash, M. I., & Dhankar, R. S. (2014). Islamic banking and economic growth: An empirical evidence from Qatar. *Journal of Applied Economics and Business*, 2(1), 51–67.
- Thakor, A.V. (1996). The design of financial systems: an overview. *Journal of Banking and Finance*, 20(5), 917–948.
- Thierry, B., Jun, Z., Eric, D. D., Yannick, G. Z. S., & Landry, K. Y. S. (2016). Causality relationship between bank credit and economic growth: Evidence from a time series analysis on a vector error correction model in Cameroon. *Procedia-Social and Behavioral Sciences*, 235, 664–671.

- Usai, S., & Vannini, M. (2005). Banking structure and regional economic growth: Lessons from Italy. *The Annals of Regional Science*, 39(4), 691.
- Van Wijnbergen, S. (1983). Credit policy, inflation and growth in a financially repressed economy. *Journal of Development Economics*, 13(1–2), 45–65.