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

Muhammad Yasir Saeed*
Department of Business Management Sciences, Preston University, Islamabad, Pakistan
Muhammad Ramzan
Department of Business Management Sciences, Preston University, Islamabad, Pakistan
Kashif Hamid
Institute of Business Management Sciences, University of Agriculture, Faisalabad, Pakistan

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

*Corresponding Author, Address: Islamabad Capital Territory, Pakistan. E-mail: mr.yasirsaeed@gmail.com

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, Jinjarak, & 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 Goaied 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, Nazlıoglu, 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, Fıdrmuc, & 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:

$$Eg_{i,t}=\beta_{o}+\beta_{1}lc_{i,t}+\beta_{2}bi_{i,t}+\beta_{3}im_{i,t}+\beta_{4}in_{i,t}+\mu_{i,t} \quad (1)$$

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; Kapounek, 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 in to two types: group tests and panel tests. The panel test is expressed as a "within dimension" method. This test contains panel rho (r), 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.

$$\Delta Eg_{it} = \lambda_{1j} + \sum_{s=1}^{k} \omega_{11is}\,\Delta Eg_{it-s} + \sum_{s=1}^{k} \omega_{12is}\,\Delta lc_{it-s} + \sum_{s=1}^{k} \omega_{13is}\,\Delta bi_{it-s} + \sum_{s=1}^{k} \omega_{14is}\,\Delta in_{it-s} + \sum_{s=1}^{k} \omega_{15is}\,\Delta im_{it-s} + \Psi_{1i}\varepsilon_{it-1} + \mu_{1it} \quad (2a)$$

$$\Delta lc_{it} = \lambda_{2j} + \sum_{s=1}^{k} \omega_{21is}\,\Delta Eg_{it-s} + \sum_{s=1}^{k} \omega_{22is}\,\Delta lc_{it-s} + \sum_{s=1}^{k} \omega_{23is}\,\Delta bi_{it-s} + \sum_{s=1}^{k} \omega_{24is}\,\Delta in_{it-s} + \sum_{s=1}^{k} \omega_{25is}\,\Delta im_{it-s} + \Psi_{1i}\varepsilon_{it-1} + \mu_{1it} \quad (2b)$$

$$\Delta bi_{it} = \lambda_{3j} + \sum_{s=1}^{k} \omega_{31is}\,\Delta Eg_{it-s} + \sum_{s=1}^{k} \omega_{32is}\,\Delta lc_{it-s} + \sum_{s=1}^{k} \omega_{33is}\,\Delta bi_{it-s} + \sum_{s=1}^{k} \omega_{34is}\,\Delta in_{it-s} + \sum_{s=1}^{k} \omega_{35is}\,\Delta im_{it-s} + \Psi_{1i}\varepsilon_{it-1} + \mu_{1it} \quad (2c)$$

$$\Delta in_{it} = \lambda_{4j} + \sum_{s=1}^{k} \omega_{41is}\,\Delta Eg_{it-s} + \sum_{s=1}^{k} \omega_{42is}\,\Delta lc_{it-s} + \sum_{s=1}^{k} \omega_{43is}\,\Delta bi_{it-s} + \sum_{s=1}^{k} \omega_{44is}\,\Delta in_{it-s} + \sum_{s=1}^{k} \omega_{45is}\,\Delta im_{it-s} + \Psi_{1i}\varepsilon_{it-1} + \mu_{1it} \quad (2d)$$

$$\Delta im_{it} = \lambda_{5j} + \sum_{s=1}^{k} \omega_{51is}\,\Delta Eg_{it-s} + \sum_{s=1}^{k} \omega_{52is}\,\Delta lc_{it-s} + \sum_{s=1}^{k} \omega_{53is}\,\Delta bi_{it-s} + \sum_{s=1}^{k} \omega_{54is}\,\Delta in_{it-s} + \sum_{s=1}^{k} \omega_{55is}\,\Delta im_{it-s} + \Psi_{1i}\varepsilon_{it-1} + \mu_{1it} \quad (2e)$$

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

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

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)***	(0.0000)*	(0.2756)	(0.0000)*	1.3484	(0.000)*
		0.18000	18.6539	1.1888	29.0845		
Lending Capability	(0.7993)		(0.9156)	(0.8107)	(0.8945)	0.1191	(0.000)
	0.0646		0.0112	0.0573	0.0175		
Bank Investment	(0.0699)***	(0.1343)		(0.7331)	(0.2967)	- 0.0587	(0.001)*
	3.2856	2.242387		0.1162	1.0888		
Interest Margin	(0.0000)*	(0.9275)	(0.6990)		(0.0037)*	0.0091	(0.000)
	20.9733	0.00820	0.1495		8.4106		
Innovation	(0.9357)	(0.4879)	(0.3483)	(0.0000)*		- 1.0601	(0.000)*
	0.0065	0.48120	0.8797	16.6411			

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.

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