

# IMPACT OF BANK EFFICIENCY ON BANKING SECTOR DEVELOPMENT IN SRI LANKA

ISSN: 2772 128X (Online)

ISSN: 2792 1492 (Print)

 SLJESIM

VOLUME 1 ISSUE 2

December 2022

sljesim@sab.ac.lk

[www.sab.ac.lk/sljesim](http://www.sab.ac.lk/sljesim)

*M.A.A. Asha and A.W.G.C.N. Wijethunga*

---

**Received:** 06 October 2021 **Revised:** 12 March 2022 **Accepted:** 02 May 2022

**How to Cite this Article,** Asha M.A.A. and Wijethunga A.W.G.C.N. (2022). *Impact of Bank Efficiency on Banking Sector Development in Sri Lanka*, *Sri Lanka Journal of Economics, Statistics and Information Management*, 1(2), 25-45

---

## **Abstract**

*Bank efficiency is momentous for enhancing banking sector development in developing economies which ultimately directs to economic progress. Therefore, this research aims to analyze the short-run and long-run impact of bank efficiency on banking sector development in the Sri Lankan context. The study utilized both the Autoregressive Distributive Lag model and three stages of analysis procedure to enhance study aims. The data was collected from the World Bank's database over the sample period from 1977 to 2018. The dependent variable of banking sector development is measured via developing a composite index utilizing different proxies for banking sector size, stability, and banking access. Private sector credit to GDP is used as the measure of the independent variable of bank efficiency. Economic growth, inflation, trade openness and financial openness represent the macro-economic determinants of the banking sector development. The study found that bank efficiency, economic growth, and trade openness have a significant positive impact on banking sector development in the long run. The economic growth shows a statistically significant negative impact on banking sector development in the short run. Thus, the banks should encourage lending against preferring specific business industries and the government should avoid the finance for the budget deficit from the private sector to crowd out the private sector investments. Additionally, the financial reforms should further strengthen to reap large sums of foreign exchanges.*

**keywords:** Banking access, bank efficiency, banking sector development, financial openness, trade openness

## INTRODUCTION

The financial sector is considered the backbone of the economy, which includes financial markets, banking and non-banking institutions, intermediaries and regulatory bodies. In the financial sector, the banking sector is nominated as a key finance provider that mobilizes the financial resources among financial surplus units and financial deficit units. Therefore, the development of the financial sector requires its banking sector to be developed. Accordingly, the financial sector development is the development of the size, efficiency, and stability of the financial market along with increased access to financial services (Guru & Yadav, 2019). The well-developed financial sector channelizes the savings to profitable investments, and reduces information costs, thereby leading to better capital allocation and boosting technical innovations.

Usually, a high level of the developed financial sector is supported by the profitability and efficiency of the banking sector. The prior studies have identified that the size of the banking sector, bank efficiency, banking sector stability and access to banking services are the major requirements of the banking sector development which affects the entire banking sector too (Aluko & Ajayi, 2018; Karunaratne & Fernando, 2018). The Sri Lankan banking sector has experienced a rapid change to improve the efficiency of banks and develop the banking sector. It could be seen that the banking sector of Sri Lanka has introduced innovative products and services, the adaption of new technologies and emerging partnerships between banks. Also, the recent initiative by the Central Bank of Sri Lanka has aimed at establishing a less-cash society. In Sri Lanka, the digitalization of financial transactions originated in the 1980s. Since then, banking customers have experienced a better competitive advantage through digital banking, electronic Know Your Client (e-KYC), solar ATMs, green banking, green loans, green credit cards and the usage of artificial intelligence.

In the modern competitive environment, the banking sector is offering a wide range of products and services. However, banks operating within such an environment is not enough to distinguish themselves only through a certain number of products and services, but it is essential for them to build a competitive advantage with the perspective of profitability and efficiency. An efficient and developed banking sector facilitates the development of the other sectors. In general, efficiency is how a firm uses its resources to obtain the maximum output. The efficiency and effectiveness of the banking sector impact the stability of the financial system of the whole economy because the banks play a key role in managing the funds of an economy. However, during the past decades, the global financial crisis brought many consequences to the whole world as well as the Sri Lankan economy. Economists have identified that the poor efficiency of the banks become a pivotal cause for the global financial crisis. In the Sri Lankan context, Jayamaha and Mula (2010) proved that the recent collapses of financial institutions happened due to ineffective financial practices and inefficient allocation of financial resources. Also, the financial distress

caused higher funding costs, limiting the opportunities for growth, decreased the efficiency of the banks and increased the bank's commitment to safeguarding financial and economic stability. Under this scenario, the Asian countries are considered as the most emerging countries to suffer the highest potentials of the global financial crisis.

Moreover, the bank's ultimate goal is profit maximization and cost minimization, and nowadays, bank efficiency is defined as achieving a goal using as little time, effort and energy as possible with the greatest human satisfaction from scarce resources (Priya & Velnampy, 2013). As mentioned above, to capture the expected development potentials of the banking sector, the banking sector must perform in an effective and efficient manner. The various changes in the banking sector increased the competition among banks, which forced banks to be more efficient.

The developing countries depend on the banking sector as a main pillar of the financial sector, and the countries require a well-functioning banking sector for economic development, with the aim of establishing a well-functioning banking sector capable of mobilizing savings and channelling them to productive investments. However, the Sri Lankan banking sector development wasn't looking good, and it shows a mild decrease trend compared to other Asian countries, and it shows considerable variations in the pattern of banking sector development described by the percentage of broad money to GDP over the period from 1968 to 2018. It shows an upward trend of broad money in most selected Asian countries than Sri Lanka, which reflects the inefficient use of currency in the form of deposits in the Sri Lankan banking sector. The Sri Lankan banking sector suffered from the worst financial crisis in 1997 and 2007. It further proved that the Sri Lankan banking sector is moderately developed, and it has not reached the maximum level of development yet. Lower rates indicate that the banking sector development should be further analyzed and there is a fault wherever. However, bank efficiency is an important component of the health of the banking sector and the inefficient banking sector causes credit misallocation, market frictions, motive other financial intermediaries and lowers the quality of borrowings, mobilizing savings and investment activities. Therefore, to meet the maximum level of growth and development of the financial sector, Perera and Ichihashi (2016) suggested improving the efficiency of the Sri Lankan financial markets to meet the standards of international financial markets. The prior studies (Awdeh, 2012; Aluko & Ajayi, 2018; Karunarathne & Fernando, 2018; Guru & Yadav, 2019) have identified the level of bank efficiency as a major requirement of the banking sector development. Also, previous studies (Takyi & Obeng, 2013; Omoruyi & Osawmonyi, 2013) concluded that the effective and efficient use of financial resources promotes the banking sector development. Thus, the study answers the question of whether bank efficiency is significantly associated with the banking sector development in Sri Lanka.

The literature on the nexus between bank efficiency and banking sector development appears scant. Also, previous studies in Sri Lanka (Liyanagamage, 2021;

Weerasuriya, Rathnayake, and Fernando, 2021) have used single-stage and two-stage procedures for analysis purposes. Therefore, there is a vacuum in this area in the Sri Lankan context and three-stage analysis process. Thus, this study attempts to investigate the short-run and long-run impact of bank efficiency on banking sector development in Sri Lanka.

## LITERATURE REVIEW

The impacts of bank efficiency on banking sector development have already been proven through a few numbers of empirical studies in various countries. A study has been conducted separately on banking sector efficiency and banking sector development. Some empirical studies focus on financial sector development besides the banking sector development. However, there is a literature gap on the nexus between bank efficiency and banking sector development of the Sri Lankan banking sector.

Usman, Wang, Mahmood, and Shahid (2010) defined bank efficiency as the utilization of resources to maximize production and it is also expressed as maximization of outputs and minimization of inputs. The bank efficiency provides insight into the performance of banks. Thus, measuring the efficiency of banks is important for key stakeholders as monitoring criteria and it is also important for depositors to make decisions about their savings. Also, Jayamaha and Mula (2010) stated that sound financial practices have a significant association with the efficiency of banks and financial institutions. Further, it provides evidence that locally, recent collapses of financial institutions happened due to the ineffective financial practices applied within the institutions. Thus, the findings of the study confirm that good financial practices contribute to enhancing efficiency. Accordingly, Liyanagamage (2016) found that the inefficiency of banks tougher the economy.

Moreover, Arafat, Warokka, Buchdadi, and Suhermanet (2013) explained that financial institutions are facing a much tougher operating environment due to financial distress, including the credit crisis. It also caused higher funding costs, increased defaults and limited growth opportunities. As a result, the banks are being forced to give more weight to reducing costs. Priya and Velnampy (2013) provide evidence that efficiency measures how productively resources are used to achieve a goal and it underlined that nowadays, modern banks are constantly looking for ways to improve their profitability with limited resources. Therefore, the scholars defined bank efficiency as achieving a goal with as little time, effort, and energy as possible and also efficiency is the greatest human satisfaction from a scarce resource. Particularly, Sulaeman, Moelyono, and Nawir (2019) stated that efficiency is the performance parameter of banks and it helps to identify ways the improve the banking sector. Additionally, it underlined that to achieve economic efficiency the banks must be technically efficient. Accordingly, to achieve maximum efficiency, the banks must be able to produce the maximum level of output with a minimum level of inputs and must produce outputs at a certain price level.

Anwar, Shahzadi, and Nasreen (2017) stated that the developed financial system includes the banking sector, insurance companies, financial markets, intermediaries, and regulatory bodies. Particularly, Aluko and Ajayi (2018) mentioned that the banking sector plays a leading role in the financial intermediation process in most developing and developed countries. Thus, the financial sector of most countries is bank-based, and the banking sector is a major segment in many nations. Besides, Khan and Fozia (2013) proved that the effective use of technology causes growth and development in the banking sector. Technological development in the banking sector increases access to the banking system, increases cost-effectiveness, creates new markets, improves the productivity and efficiency of banks, and offers new products and services. Through this, the banking sector contributes to the overall expansion of the economy.

Further, Jung (2017) expressed that a well-developed financial sector facilitates financial transactions, mobilizes savings and transfers mobilized funding to development activities. Also, the lower level of financial development causes credit misallocation and lowers the quality of borrowings. However, when the stock and bond markets become well-developed, people can acquire more opportunities for investments and funding from stock and bond markets turn out to be more liquid than conventional savings. Thus, imperfect capital markets cause market friction and motivate the development of financial intermediaries, especially banks. Interestingly, Bist (2018) proved that economically backward countries need a more active and well-developed financial system for economic growth, whereas countries that are developed do not need an active financial system. Correspondingly, Guru and Yadav (2019) mentioned that the financial sector development is the development of the size, efficiency and stability of financial markets along with increased access to the financial markets. For instance, the well-developed financial system channelizes the savings to profitable investments, and reduces information costs, thereby leading to better capital allocation and boosting technical innovations.

The banking sector is the main portion of the financial system, and it is considered the backbone of the economy. As such, several studies suggested that bank efficiency is a fundamental requirement for improving banking sector development. Interestingly, Murthy & Al-Muharrami (2014) examined the impact of financial sector development on bank profitability in the banking sector and the findings of the study show that the banking sector development has no impact on bank profitability and stock market development has a strong positive impact on bank profitability. Moreover, Thao and Thuy (2015) investigated the effect of banking sector development on bank efficiency and the relationship between the banking sector development and bank efficiency of Vietnamese commercial banks. The method of analysis involves panel regression analysis, covering the period from 2000 to 2013. The results pointed out that the banking sector development has a significant impact on the bank's efficiency. However, the results also reveal no evidence of the relationship between banking sector development and bank efficiency. Accordingly, Tran, Walle, and Herwartz (2018) analyzed the causal impact of local financial

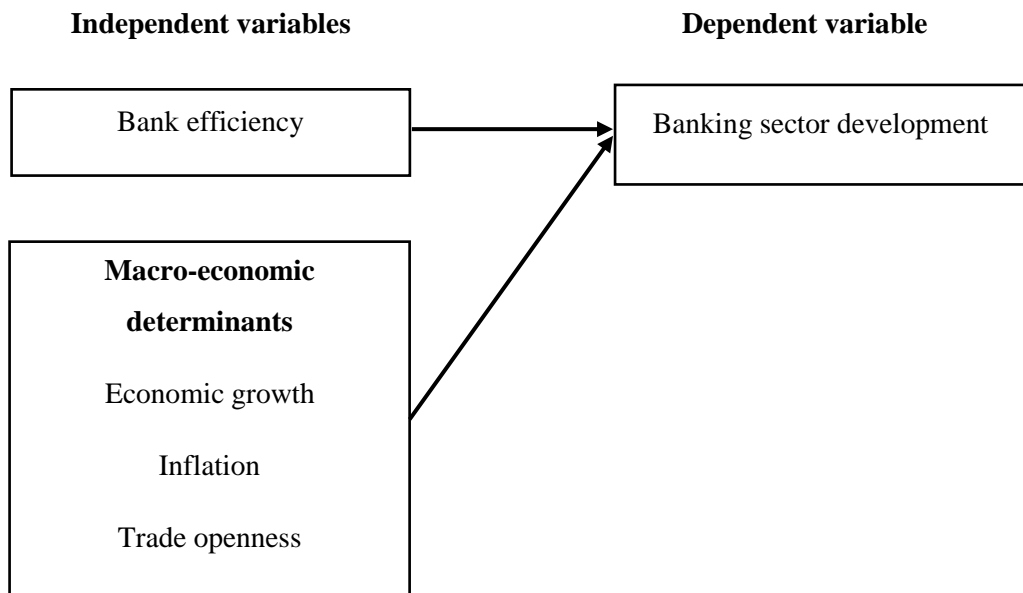
development on firm performance and The results show that province-level financial development has a positive impact on the performance of small firms in Vietnam.

From the review, it is evident that the literature on the nexus between bank efficiency and banking sector development appears scant. Therefore, we identified a vacuum in this area in the Sri Lankan context. Moreover, previous studies (Liyanagamage, 2021; Weerasuriya et al., 2021) have used single-stage and two-stage procedures for analysis purposes. However, the present study performs three stages of analysis, which also include assessing the efficiency level of the Sri Lankan banking sector, developing a composite index, assessing the level of banking sector development in Sri Lanka and finally, analysing the short-term and long-term impact of banking sector efficiency on banking sector development in Sri Lankan context. Thus, there is an empirical gap and methodological gap between previous research and the current situation. Therefore, this study attempts to fill that gap by investigating the short-run and long-run impact of bank efficiency on banking sector development in Sri Lanka

## **METHODOLOGY**

This study uses a three-stage analysis procedure to achieve the objectives of the study. In the first stage, the level of banking sector efficiency will be estimated using traditional efficiency ratio analysis. In the second stage, the level of banking sector development in Sri Lanka will be estimated by developing a composite index of banking sector development using the various proxy measures of banking sector development. Finally, the estimated efficiency scores are regressed with the composite index of banking sector development using the ARDL model. Below figure 1 depicts the conceptual framework of the study.

The banking sector has four dimensions namely size or depth, efficiency, stability, and access to banking services (Aluko & Ajayi, 2018; Karunarathne & Fernando, 2018). To assess the banking sector development, various measures are used in the literature. However, the major problem is that the banking sector development is difficult to measure accurately. Since it is a wide concept, and has several dimensions. Moreover, previous studies have measured the banking sector's development using different indicators. Therefore, this study has constructed a composite index using more than one proxy measure of banking sector development to assess the level of banking sector development efficiently and accurately, with the support of principal component analysis.



**Figure 1: Conceptual Framework**

Source: Developed by author

Bank efficiency is a bank's ability to produce given outputs by using minimum inputs (Sulaeman et al., 2019). The efficient allocation of resources promotes financial development and also the empirical studies suggested improving the efficiencies of the financial market in Sri Lanka to meet the standards of the international financial markets (Perera & Ichihashi, 2016). To assess the level of bank efficiency, various measures were used in the literature and the most popular and commonly used methods are the stochastic frontier approach and data envelopment approach. However, the stochastic frontier approach is generally used to estimate the cost of production and it has cost, profit, and production measures of bank efficiency. Also, the data envelopment is generally used to estimate the technical efficiency of banks. Therefore, the current study gives more attention to traditional efficiency ratios. According to the results of several previous studies, bank efficiency is assumed to have a positive significant impact on banking sector development.

H<sub>1</sub>: Bank efficiency has a positive significant impact on banking sector development.

The significant association between economic growth and banking sector development is explained by Yu & Gan (2010). Also, Takyi & Obeng (2013); and Anwar et al. (2017) showed a positive significant association between economic growth and financial sector development. According to the results of several previous studies, economic growth is assumed to have a positive significant impact on banking sector development.

H<sub>2</sub>: Economic growth has a positive significant impact on banking sector development.

It is generally defined as an increase in the general price level of goods and services in an economy. Takyi & Obeng (2013); and Anwar et al. (2017) showed a negative and significant association between inflation and banking sector development. According to the results of several previous studies, inflation is expected to be negatively linked with banking sector development.

H<sub>3</sub>: Inflation has a negative significant impact on banking sector development.

It is a proxy for trade liberalization, and it shows the degree to which a country is open to external trade (Aluko & Ajayi, 2018). The positive significant association between trade openness and banking sector development is explained by Abdelaziz Touny (2014). Also, Takyi & Obeng (2013); and Anwar et al. (2017) explained the positive significant association between trade openness and financial sector development. However, Yu & Gan (2010) showed a non-significant association between trade openness and banking sector development. According to the results of several previous studies, trade openness is assumed to have a positive significant impact on banking sector development.

H<sub>4</sub>: Trade openness has a positive significant impact on banking sector development.

It is a proxy for financial liberalization and a financial sector is said to be liberalized when government restrictions on financial activities are relaxed or eliminated, cross-border capital flows are permitted, and the interaction between the forces of demand and supply acts as the mechanism for price determination of financial services (Aluko & Ajayi, 2018). The positive significant association between financial openness and banking sector development is revealed by Yu & Gan (2010); and Abdelaziz Touny (2014). Also, Anwar et al. (2017) explained the positive significant association between financial openness and financial sector development. According to the results of several previous studies, financial openness is assumed to have a positive significant impact on banking sector development.

H<sub>5</sub>: Financial openness has a positive significant impact on banking sector development.

To enhance the outcomes of this study, the required annual data was extracted from the Sri Lankan banking sector over the period from 1977 to 2018. Also, Sri Lanka has introduced various financial sector reforms since 1977 to maximize the use of financial resources. Therefore, the year 1977 is chosen to measure the baseline for banking sector efficiency and banking sector development. The property of all relevant data is time series and the data is extracted from the World Bank's database.

This study has adopted the following ARDL model to investigate the short-run and long-run impact of bank efficiency on banking sector development in Sri Lanka. By



considering previous studies, the following estimated ARDL model is developed for this study.

$$\begin{aligned} \Delta BNKDEV_t = & \beta_0 + \beta_1 BNKDEV_{t-1} + \beta_2 BNKEFFI_{t-1} + \beta_3 GDP_{t-1} \\ & + \beta_4 INFL_{t-1} + \beta_5 TROPEN_{t-1} + \beta_6 FINOPEN_{t-1} \\ & + \sum_{i=1}^p \theta_1 \Delta BNKDEV_{t-1} + \sum_{i=1}^p \theta_2 \Delta BNKEFFI_{t-1} \\ & + \sum_{i=1}^p \theta_3 \Delta GDP_{t-1} + \sum_{i=1}^p \theta_4 \Delta INFL_{t-1} + \sum_{i=1}^p \theta_5 \Delta TROPEN_{t-1} \\ & + \sum_{i=1}^p \theta_6 \Delta FINOPEN_{t-1} + \varepsilon_t \end{aligned}$$

Where,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$  measure the coefficients of selected independent variables.  $BNKDEV$  reflects the composite index of banking sector development which is derived from principal component analysis.  $BNKEFI$  denotes bank efficiency.  $GDP$  stands for economic growth which is measured by GDP per capita.  $TROPEN$  and  $FINOPEN$  represent the trade openness and financial openness of the country, respectively. The inflation rate of the country is denoted by  $INFL$ . The optimal lag length for estimating the model is selected using the Akaike Information Criteria (AIC). The presence of a long-run relationship among variables is examined by using the ARDL bound test approach. Based on the findings of the ARDL bound test, an estimate of the long-run association between bank efficiency and banking sector development is specified as;

$$\begin{aligned} BNKDEV = & \beta_0 + \sum_{i=1}^p \beta_1 BNKDEV_{t-i} + \sum_{i=0}^p \beta_2 BNKDEV_{t-i} + \sum_{i=0}^p \beta_3 GDP_{t-i} \\ & + \sum_{i=0}^p \beta_4 INFL_{t-i} + \sum_{i=0}^p \beta_5 TROPEN_{t-i} + \sum_{i=0}^p \beta_6 FINOPEN_{t-i} \\ & + \varepsilon_t \end{aligned}$$

Finally, an error correction model test was used to establish the short-run dynamics. Based on the findings of the error correction model test, an estimate of the short-run association between bank efficiency and banking sector development is specified as;

$$\begin{aligned} \Delta BNKDEV = & \theta_0 + \sum_{i=1}^p \theta_1 \Delta BNKDEV_{t-i} + \sum_{i=0}^p \theta_2 \Delta BNKEFFI_{t-i} \\ & + \sum_{i=0}^p \theta_3 \Delta GDP_{t-i} + \sum_{i=0}^p \theta_4 \Delta INFL_{t-i} + \sum_{i=0}^p \theta_5 \Delta TROPEN_{t-i} \\ & + \sum_{i=0}^p \theta_6 \Delta FINOPEN_{t-i} \end{aligned}$$

## RESULTS AND DISCUSSION

The prime objective of this study is to investigate the short-run and long-run impact of bank efficiency on banking sector development in Sri Lanka. Apart from that, the study looked at macroeconomic drivers, which can explain the behaviour of the banking sector development in Sri Lanka. The absence of empirical evidence, which was revealed in the empirical review, motivated the researcher to analyze the nexus between bank efficiency and banking sector development in Sri Lanka.

It is inevitable to check stationary for time series data before proceeding with the ARDL approach to confirm the integration order of the time series. In this regard, the study occupied the Augmented Dickey-Fuller (ADF) test to determine the integration order of considered variables. All variables have unit root (non-stationary) at the level series except BNKDEV, BNKEFFI and TROPEN. Subsequently, BNKDEV, BNKEFFI and TROPEN are integrated in the order I (1) and the rest of the variables are integrated in the order I (0) and I (1).

**Table 1: Unit Root Results for the Selected Variables**

Variables	Level series	1 <sup>st</sup> difference	Order of integration
BNKDEV	1.443157	-4.857576 ***	I (1)
BNKEFFI	-0.692491	-6.004002 ***	I (1)
GDP	-4.420490***	-9.331209 ***	I (0)
INFL	-4.726860 ***	-9.303474 ***	I (0)
TROPEN	-1.009851	-5.679778 ***	I (1)
FINOPEN	-4.312015 ***	-5.790909 ***	I (0)

Notes: \*\*\* denotes significant at 1%, 5% and 10% levels respectively.

Source: Developed by author

Also, for the determination of lag length, this study adopts the criterion of Akaike Information Criterion (AIC) and the model which belongs to the lowest AIC value is employed as the fitted ADRL model. Accordingly, the selected numbers of lags are summarized as follows. Furthermore, accordingly, the fitted model shows the optimal number of lags as follows.

Variables	BNKDEV	BNKEFFI	GDP	INFL	TROPEN	FINOPEN
No of lags	1	0	1	0	0	0

Moreover, the AIC criterion graph also verifies that the optimal lag length is 1,0,1,0,0,0 for the fitted ARDL model which is explained the banking sector development.

The presence of cointegration among the series was tested by employing the ARDL bound test approach. The null hypothesis of no cointegration exists among variables was tested against the alternative hypothesis of cointegration exists among variables. The result of the ARDL bound test is summarized in Table 2, which shows the bound test results for the ARDL model to investigate the impact of bank efficiency on banking sector development.

**Table 2: Results of ARDL Bound Test for Banking Sector Development (1977-2018)**

Test statistic	Value	Sig.	I(0)	I(1)
F statistic	30.27526 ***	10%	2.08	3.00
K	5	5%	2.39	3.38
		2.5%	2.70	3.73
		1%	3.06	4.15

Notes: \*\*\* denotes significance at 1% level.

Source: Developed by author

The findings of banking sector development reflect that the calculated F-statistic (30.27526) exceeds the upper bound I (1) at a 1% significance level. Accordingly, rejection of the null hypothesis confirms the existence of cointegration or the long-run association or linear combination among considered variables. In other terms, it confirms the prevalence of long-run combination between banking sector development, bank efficiency, GDP, inflation, trade openness and financial openness. This indeed implies that the bank efficiency, other selected independent variables and banking sector development are bound by a long-run relationship in Sri Lanka which means that the variables included in the model shared long-run relationships among themselves.

Accordingly, the results of the bound test revealed that bank efficiency has a long-run association with banking sector development. Thus, the observed long-run association between bank efficiency and banking sector development verifies that the banking sector development moves together with bank efficiency in the long run. It means that there is a possibility to predict the behaviour of banking sector development by using the behaviour of bank efficiency in the long run. However, the long-run association among the variables can be positive or negative. Thus, the presence of a long-run association confirms the necessity of testing the long-run coefficients of the variables to examine the long-run impact.

After establishing a long-run relationship between all considered variables, the long-run relationship between the variables is evaluated by the OLS, the coefficients derived from the model are significant except for inflation and financial openness and all variables show positive coefficients. The estimated results are illustrated in Table 3.

**Table 3: Estimates of Long-run Coefficients for Banking Sector Development (1977-2018)**

ARDL 1,0,1,0,0,0 Model				
Variables	Coefficient	Std. error	t-statistic	Prob.
BNKEFFI	0.046089	0.005584	8.253356	0.0000 ***
GDP	0.028089	0.011893	2.361802	0.0244 ***
INFL	-0.006147	0.004235	-1.451421	0.1564
TROPEN	0.015612	0.004811	3.244846	0.0028 ***
FNOPEN	0.029477	0.048801	0.604028	0.5501
C	0.089475	0.081070	1.103668	0.2780

Notes: \*\*\* denotes significance at a 5% level.

Source: Developed by author

Table 3 gives the long-run coefficients to examine the long-run impact of bank efficiency on banking sector development in Sri Lanka. Accordingly, the findings depict that only BNKEFFI, GDP and TROPEN are statistically significant at a 5% significance level and other considered variables are statistically insignificant. The probability value of BNKEFFI is less than 0.05. Therefore, there is sufficient evidence to reject the null hypothesis. The coefficient of bank efficiency is 0.046089 which indicates that increasing 1 unit of bank efficiency causes to increase in the development of the banking sector by 0.046089 units. In other terms, a 1 unit increase in bank efficiency will improve 0.046089 units of banking sector development in the country. It also reflects that bank efficiency causes to increase in the profitability and

productivity of the banks. Accordingly, it has improved the development of the banking sector in Sri Lanka.

The probability value of GDP (0.0244) is less than the 5% significance level and it accepts the alternative hypothesis. The coefficient of GDP is 0.028089 and it indicates that increasing 1 unit of GDP causes to increase in the development of the banking sector by 0.028089 units. In other terms, an improvement in GDP enhances access to financial services and leads to upward the individuals' demand to finance in the long run. Similarly, the probability value of trade openness (0.0028) is less than the 5% significance level and it rejects the null hypothesis. The coefficient of TROPEN is 0.015612 indicating that increasing 1 unit of trade openness causes to increase in the development of the banking sector by 0.015612 units. In other terms, because of improvements in trade openness, more foreign currencies enter the domestic financial market. Further, a statistically insignificant long-run positive relationship is revealed between financial openness with banking sector development and a statistically insignificant long-run negative relationship is revealed between inflation and banking sector development.

Following the estimation of the F-Bounds test for establishing the existence of cointegration or long-run relationship between considered variables, the ARDL error correction regression is used to analyze the short-run behaviour of considered variables. The result of the ARDL error correction regression is summarized in Table 4.

**Table 4: Estimates of Short-run Coefficients for Banking Sector Development (1977-2018)**

ARDL 1,0,1,0,0,0 Model				
Variable	Coefficient	Std. error	t-statistic	Prob.
D(GDP)	-0.028443	0.008585	-3.312993	0.0023 ***
CointEq(-1)	-0.835218	0.052649	-15.86389	0.0000 ***
	R-squared			0.870474
	Durbin-Watson stat			1.935121

Notes: \*\*\* denotes significance at a 5% level.

Source: Developed by author

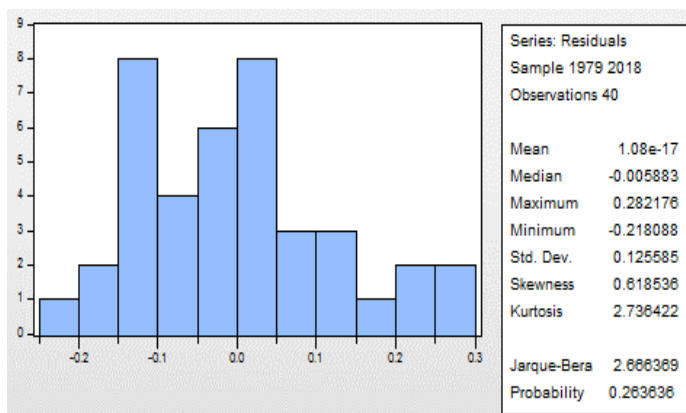
In the short-run, GDP is statistically significant except for other selected macroeconomic drivers which determine the level of banking sector development in Sri Lanka. The probability value of GDP (0.0023) is less than the 5% significance level and it rejects the null hypothesis. The coefficient of GDP is -0.028443 indicating that increasing 1 unit of GDP causes to decline in the development of the banking sector by -0.028443 units. In other terms, an increase in the growth rate of GDP is supposed to boost the earnings of people, but they are not willing to fund their excess monetary resources in the form of bank deposits in the short term. Also, the findings revealed that the coefficient of Error Correction Term (ECT) is negative (-0.835218),

and it is statistically significant at a 5% significant level. Thus, it suggests that the speed of adjustment of banking sector development to change in bank efficiency and other determining variables is about 83.52% within the first year to ensure full convergence to its equilibrium level.

Moreover, the R squared value of the fitted model is 0.870474, indicating that 87.05% of the variance of banking sector development is explained by the bank efficiency, economic growth, inflation, trade openness and financial openness under this study. In addition, the Durbin-Watson statistic is 1.935121 and DW is close to the rule of thumb 2 (between 1.6 to 2.0). This means that there is no autocorrelation among the research variables. Thus, the R-squared value and the Durbin-Watson statistics confirming the estimated model is a significant and very well fit.

This study fitted 1,0,1,0,0,0 to test the impact of bank efficiency on banking sector development. The results were subject to several econometric tests. These included tests for heteroskedasticity, serial correlation, normality, and stability. The econometric tools employed included the Jarque-Bera normality test, the Breusch-Pagan-Godfrey heteroskedasticity test, the Breusch-Godfrey serial correlation LM test, the CUSUM test and the CUSUMQ test. These tests are used to examine whether the fitted models follow normally distributed, homoscedastic, no autocorrelation in residuals and confirm the stability of the fitted model, respectively.

Figure 2 represents the graphical representation of the Jarque-Bera normality test in the shape of a histogram. The probability value of the Jarque-Bera test is applied to test the null hypothesis which is residuals are normally distributed against the alternative hypothesis that residuals are not normally distributed. The corresponding probability value of Jarque-Bera rest (0.264) is greater than a 5% significance level. It rejected the alternative hypothesis and fulfilled the assumption that residuals are normally distributed.



**Figure 2: The Results of the Jarque-Bera Normality Test**  
 Source: Developed by author

The probability value of the Breusch-Pagan-Godfrey heteroskedasticity test is applied to test the null hypothesis of no heteroskedasticity is verified against heteroskedasticity of the residual series. Accordingly, Table 5 demonstrates that the probability value of f-statistic is 0.4285, which exceeds the 5% significance value. Therefore, it rejected the alternative hypothesis and fulfils the assumption of residuals series, which do not have heteroskedasticity issue and it follows homoscedastic in fitted ARDL model.

**Table 5: The Results of the Breusch-Pagan-Godfrey Heteroskedasticity Test**

<b>ARDL 1,0,1,0,0 Model</b>			
F-statistic	1.032126	Prob. F (7,32)	0.4285
Obs*R-squared	7.367649	Prob. Chi-Square (1)	0.3916

Source: Developed by author

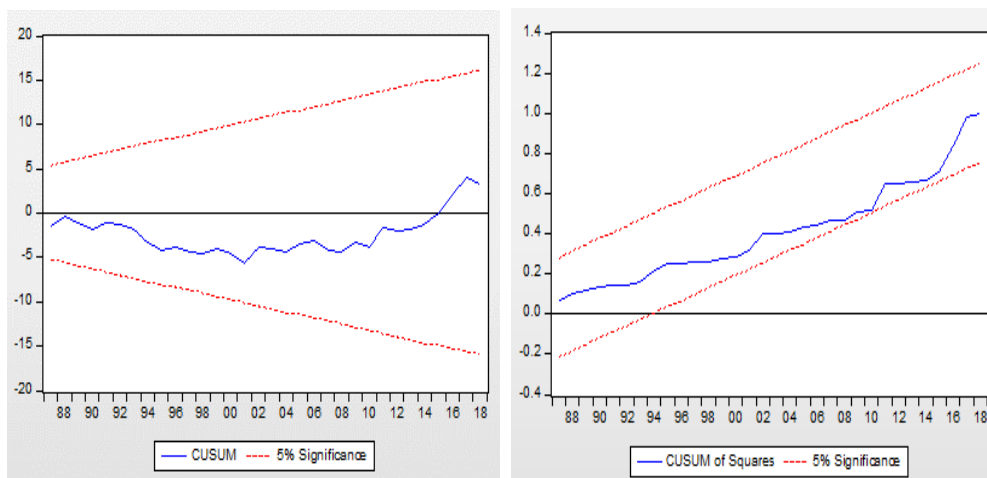
Another important assumption that needs to be examined is the presence of serial correlation or the autocorrelation among residuals tested by using the Breusch-Godfrey serial correlation LM test and Table 6 summarizes the result of the LM (Lagrange multiplier) test for the ARDL model. The probability value of the LM test is applied to test the null hypothesis of no autocorrelation against the alternative hypothesis of autocorrelation among residual series. According to the findings, the alternative hypothesis of autocorrelation among residuals is rejected at a 5 % significance level because the probability value of F-statistics (0.8624) placed a greater value than the significance value. On the contrary, the null hypothesis of no serial correlation is accepted.

**Table 6: The Results of the Breusch-Godfrey Serial Correlation LM Test**

<b>ARDL 1,0,1,0,0 Model</b>			
F-statistic	0.030535	Prob. F (1,31)	0.8624
Obs*R-squared	0.039361	Prob. Chi-Square (1)	0.8427

Source: Developed by author

In general, the stability of long-run and short-run parameter estimates are tested via CUSUM (Cumulative sum) and CUSUMQ (Cumulative sum of squares) tests. The CUSUM and CUSUMQ test plots are presented in Figure 3. The plots of CUSUM and CUSUMQ tests show that both tests plot within two polar bounds at a 5% significant level, confirming that the selected time series analysis is stable over the long run and short run.



**Figure 3: The Results of CUSUM and CUSUMQ Test**

Source: Developed by author

Seelanatha's study (2010) suggested the productivity and efficiency of the banking sector as an important requirement for the development of the banking sector. Besides, Muazaroh et al. (2012) mentioned that the developments in the banking sector have greater attention on bank efficiency and bank efficiency encourages the stability of the financial system. Accordingly, Thao & Thuy (2015) highlighted that the banking sector development has a significant impact on the bank's efficiency. Besides, the findings of Thao & Thuy (2015) also reveal that there is no relationship between banking sector development and bank efficiency. Accordingly, the findings of the present study confirm that the nexus between bank efficiency and banking sector development in the Sri Lankan context is in line with the argument of Seelanatha (2010); and Muazaroh et al. (2012). However, the findings are inconsistent with the findings of Thao & Thuy (2015) in the long run and agreeable in the short run. Furthermore, the outcomes are compatible with the findings of Murthy & Al-Muharrami (2014); and Tran et al. (2018). Moreover, this study also gives a clue to believe that bank efficiency promotes the development of the banking sector in Sri Lanka. The findings also confirm that the efficient use of resources is key to the success of the banks. As same as the findings of the study indicated that there is a long-run positive association between bank efficiency and banking sector development. It implied that an improvement in efficiency of the banks cause to increase the development of the banking sector in long run. It means that the banks and regulators give more effort to acquire new technologies and offer more innovative products to increase profitability, productivity, and efficiency of the banks. Accordingly, the bank efficiency directly causes to improve the development of the banking sector size, stability and access for banking services in Sri Lanka in long run.

Takyi & Obeng (2013); and Anwar et al. (2017) showed a positive significant association between economic growth and financial sector development. Similarly,



Yu & Gan (2010) explained that economic growth is positively and significantly associated with the banking sector development. Conversely, Aluko & Ajayi (2018) noted that economic growth has a negative effect on the stability of the banking sector. Also, AbdelazizTouny (2014) highlighted a long-run negative impact of economic growth on banking sector development and he noted that an average per capita income leads to a decline in individuals' demand for finance, especially in countries that have increased in inflation rates. As same as the current study has applied GDP per capita as a proxy measure of banking sector development and findings of the study highlighted that economic growth has a long-run positive impact on the banking sector development. And, the study found a short-run negative association between economic growth and banking sector development. The outcomes align with the findings of Yu & Gan (2010); Takyi & Obeng (2013); Anwar et al. (2017) in the long run. Also, the findings are compatible with the findings of AbdelazizTouny (2014); and Aluko & Ajayi (2018) in the short run. A higher GDP per capita is assumed to enhance access to financial services. However, it is causing to decrease in the development of the banking sector in the short run due to the high inflation rates in Sri Lanka and the asymmetric information flow of banking products and services for domestic and foreign investors in the short run. In conclusion, the positive coefficient of GDP meets the prior expected result, which is a positive impact on banking sector development.

Takyi and Obeng (2013); and Anwar et al. (2017) showed a significant negative association between inflation and financial sector development. Besides, AbdelazizTouny (2014) pointed out that an increase in inflation rates directly affects the interest rates and also leads to an increase in the cost and risk of borrowings. This consequently results in the reluctance of individuals to finance. As same as the findings of the previous studies, the present findings have proved that improvement in inflation rates causes to decrease in the development of the banking sector. However, there is no long-run or short-run association between inflation and banking sector development in Sri Lanka. In conclusion, the finding does not meet the prior expected result which is significant negative impact on banking sector development. Also, the effect of inflation on banking sector development was caused by to increase in the cost of financial intermediaries and domestic and household savings due to the higher price of goods and services.

Takyi and Obeng (2013); and Anwar et al. (2017) showed a positive significant association between trade openness and financial sector development. Similarly, AbdelazizTouny (2014) highlighted a significant positive impact of trade openness on banking sector development. Moreover, Aluko and Ajayi (2018) found that trade openness has a significant positive impact on the size and stability of the banking sector. Conversely, Yu and Gan (2010) explained a non-significantly association between trade openness and banking sector development. The findings of the present study indicated that trade openness has a significant positive impact on banking sector development in the long run. Also, the findings confirm that there is no association between trade openness and banking sector development in short run. It implied that after the trade liberalization, Sri Lanka moved policies with the expected expansion

of exports and contraction of imports with the depreciation of the domestic currency. However, trade liberalization policies in Sri Lanka lead to a slower growth rate of exports as well as a trade deficit due to unsound macroeconomic policies. Accordingly, the aggregate sum of imports and exports against GDP is insignificantly relate with the banking sector development in Sri Lanka in short run. Also, the trade liberalization caused to improve the banking sector development in long run. In conclusion, the findings compatible with the findings of Takyi & Obeng (2013); AbdelazizTouny (2014); Anwar et al. (2017); Aluko and Ajayi (2018) in the long run and also the findings are agreeable with the outcomes of Yu & Gan (2010) in the short run.

AbdelazizTouny (2014); and Yu and Gan (2010) explained that financial openness is positively and significantly associated with banking sector development. In a similar view, Anwar et al. (2017) showed a positive significant association between financial openness and financial sector development. Conversely, Aluko and Ajayi (2018) found that trade openness has a negative effect on the size and stability of the banking sector. As a result of financial openness, many foreign business entities enter into the domestic market to finance their new investment directly and also it allows foreign banks to operate in the domestic market. Unfortunately, in the Sri Lankan context, an improvement in the deregulations of the financial sector does not cause to increase in the development of the banking sector due to political and economic instability. Moreover, nowadays the capital and money markets are becoming more attractive and investors inject their excess money to other alternatives except bank deposits. And also, lower interest rate for bank deposits and higher inflation rate are the major cause for this. In general, financial openness mainly focused for attracting capital flows and also financial openness in Sri Lanka mainly contributes to the equity market development than banking sector. Moreover, peoples are more willing to finance their excess money through purchasing treasury bills due to the lower risk. In conclusion, the finding confirms that the financial openness did not have any significant impact on banking sector development in short run and long run.

## **CONCLUSION**

The findings of the study identified that bank efficiency has a significant positive impact on banking sector development in the long run. However, there is no association between bank efficiency and banking sector development in the short run. Moreover, this study also gives a clue to believe that bank efficiency promotes the development of the banking sector in the long run. The findings also confirm that the efficient use of resources is key to the success of the banks. Moreover, the Sri Lankan banking sector has not reached the maximum level of efficiency yet. Also, the recent standing of the banking sector efficiency in Sri Lanka indicates that the banks can still reduce input resources and produce the maximum level of output, but the trend over the years shows that the bank efficiency is improving to reach eventually the optimum. Further, the recent standing of the banking sector development in Sri Lanka indicates that the Sri Lankan banking sector has not reached the maximum

level of development yet. But the trend over the years shows that the banking sector is improving to reach eventually the optimum.

Moreover, the identified association between selected macroeconomic drivers and banking sector development are that economic growth and trade openness have a significant positive impact on banking sector development in the long run. Economic growth has a significant negative impact on banking sector development in Sri Lanka in the short run. Besides, inflation and financial openness have shown an insignificant impact on banking sector development in the short term and long term. With the statistical evidence, this study proves that bank efficiency plays a significant role in banking sector development in the Sri Lankan context. When regulators make policies to develop the banking sector, they can pay more attention towards the level of bank efficiency than others.

The findings showed that bank efficiency has a positive significant impact on banking sector development in the long run and it is the most influential determinant of banking sector development. Thus, it recommends that banks and regulators put more effort into the efficient allocation of resources and manage expenses at a satisfactory level. The findings highlight that the Sri Lankan banking sector has not reached the maximum use of resources yet. Therefore, it is suggested to take necessary measures to acquire international standards and new technologies to reach the maximum use of resources. And, in the future, the research recommends applying a qualitative research approach by concerning more qualitative aspects of the bank's efficiency. Furthermore, it is advisable to study a complementary relationship between the capital market and banking sector development in the Asian region. This study recommends researchers conduct a study on the impact of regulatory factors on banking sector efficiency. Moreover, this study suggests studying the role of government intervention in the development of the financial sector as well as studying the relationship between financial sector development and poverty reduction in developing countries.

## REFERENCES

- AbdelazizTouny, M. (2014). Macroeconomic Determinants of Banking Sector Development: A Comparison Study between Egypt and Saudi Arabia. *Advances in Management & Applied Economics*, 4(3), 139–156.
- Aluko, O. A., & Ajayi, M. A. (2018). Determinants of banking sector development: Evidence from Sub-Saharan African countries. *Borsa Istanbul Review*, 18(2), 122–139.
- Anwar, S., Shahzadi, H., & Nasreen, S. (2017). Determinants of Financial Development for Selected SAARC Countries: A Panel Data Analysis. *Journal of Applied Environmental and Biological Sciences*, 7(7), 109–118.

- Arafat, M. Y., Warokka, A., Buchdadi, A. D., & Suherman. (2013). Banking efficiency and performance: A test of banking characteristics in an emerging market. *J. Global Business Advancement*, 6(1), 13–23.
- Awdeh, A. (2012). Banking Sector Development and Economic Growth in Lebanon. *International Research Journal of Finance and Economics*, 100, 53–62.
- Bist, J. P. (2018). Financial development and economic growth: Evidence from a panel of 16 African and non-African low-income countries. *Cogent Economics & Finance*, 6(1), 1-17.
- Guru, B. K., & Yadav, I. S. (2019). Financial development and economic growth: Panel evidence from BRICS. *Journal of Economics, Finance and Administrative Science*, 24(47), 113–126.
- Jayamaha, A., & Mula, J. M. (2010). Financial practices and efficiency of cooperative rural banks in Sri Lanka. *1st International Conference on Business and Information: Researching Realities of Management Phenomenon*, 1(1), 1–25.
- Jung, S. M. (2017). Financial development and economic growth: Evidence from South Korea between 1961 and 2013. *International Journal of Management, Economics and Social Sciences*, 6(2), 89–106.
- Karunaratne, S. A. M. D., & Fernando, K. D. U. D. (2018). Impact of good governance on banking sector development in the Asian region. *3rd Interdisciplinary Conference of Management Researchers – Sabaragamuwa University of Sri Lanka*, 3(1), 90–99.
- Khan, N. A., & Fozia. (2013). Growth and development in the Indian banking sector. *International Journal of Advanced Research in Management and Social Sciences*, 2(2), 197-211.
- Liyanagamage, C. (2021). Bank Competition and Economic Growth: The short-run and long-run effects. *International Journal of Finance & Banking Studies*, 10(1), 20–33.
- Liyanagamage, C. (2016). The Effect of Concentration and Efficiency of State Banking on Bank Competition in Sri Lanka. *IOSR Journal of Economics and Finance (IOSR-JEF)*, 7(6), 52–58.
- Muazaroh, Eduardus, Husnan, & Hanafi. (2012). Determinants of Bank Profit Efficiency: Evidence from Indonesia. *International Journal of Economics and Finance Studies*, 4(2), 163-173.

- Murthy, S. R., & Al-Muharrami, S. (2014). Financial Sector Development and the Determinants of Bank Profitability: A GCC Panel Study. *International Research Journal of Finance and Economics*, 121(1), 1-12.
- Omoruyi, A., & Osawmonyi, I. O. (2013). Banking Sector Development and Economic Growth in Nigeria. *AAU JMS*, 4(1), 15–32.
- Perera, R., & Ichihashi, M. (2016). Financial Development and Economic Growth in Sri Lanka. *IDEA DP-2 Series*, 6(6), 2-23.
- Priya, K., & Velnampy, T. (2013). Efficiency and Profitability: A Case Study of Banking Sector in Sri Lanka. *Global Journal of Management and Business Research Accounting and Auditing*, 13(5), 50-58.
- Seelanatha, L. (2010). Market structure, efficiency and performance of banking industry in Sri Lanka. *Banks and Bank Systems*, 5(1), 20-31.
- Sulaeman, H. S. F., Moelyono, S. M., & Nawir, J. (2019). *Determinants of Banking Efficiency for Commercial Banks in Indonesia*. 13(2), 205–218.
- Takyi, P. O., & Obeng, C. K. (2013). Determinants of financial development in Ghana. *International Journal of Development and Sustainability*, 2(4), 2324–2336.
- Thao, T. P., & Thuy, P. C. (2015). Banking Industry Development and Bank Efficiency in an Emerging Market Economy. *Second Asia-Pacific Conference on Global Business, Economics, Finance and Social Sciences*, 2(546), 1-24.
- Tran, V. T., Walle, Y. M., & Herwartz, H. (2018). Local financial development and firm performance: Evidence from Vietnam. *Handbook of University of Goettingen*, 1(1), 1-34.
- Usman, M., Wang, Z., Mahmood, F., & Shahid, H. (2010). Scale Efficiency in the Banking Sector of Pakistan. *International Journal of Business and Management*, 5(4), 104-116.
- Weerasuriya, J. S. P. D. S. B., Rathnayake, R. M. A. K., & Fernando. (2021). Impact of Non-Interest Income on Bank Efficiency: Evidence from Sri Lanka. *South Asian Journal of Finance*, 1(1)(2021), 16–34.
- Yu, H., & Gan, P.T. (2010). The Determinants of Banking Sector Development: Malaysian Experience. *International Research Journal of Finance and Economics*, 35(1), 29-35.