

The Nexus Between International Trade, Financial Development and Economic Growth: The Case of South Korea

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Abstract

International trade and financial sector including derivatives markets are two significant components in terms of macroeconomic factors. In this sense, the financial sector ensures a great variety of services to companies, public institutions and individuals which triggers economic growth. The main research area in the context of academic literature is: how International trade or financial development affects economic growth? The linkage among financial development and economic growth (GDP) has been addressed by many works in economic literature. In methodology part of this paper, the data of international trade, financial development and GDP are derived from worldbank's official website as annual for South Korea. Economic growth variable is determined as GDP which is obtained from worldbank's official website as annual for South Korea from 1977 to 2018. On the other hand, International trade data is acquired from same resource as the total of exports and imports of goods and services. Finally, financial development data is derived as domestic credit to private sector. According to co-integration test results of Table 3. there is a long run stable relationship among GDP, domestic credit to private sector and aggregate exports and imports of goods and services (international trade). The findings indicate that domestic credit to private sector has the strongest effect on economic growth (GDP) compared to the sum of exports and imports of goods and services in South Korea. Empirical results demonstrate that the South Korean government should try to contribute the financial development to construct a durable financial system and to trigger the Gross Domestic Product (GDP) will be beneficial to have sustainable economic development. In this context, removing all trade barriers, a well-developed logistics infrastructure and appropriate macroeconomic environment are definitely required in order to carry out the determined policies. The South Korean government should promote the flow and use of RMB throughout countries and support the private sector, local companies, by supplying incentives. Therefore, constructing a better state bank infrastructure and financial system collaboration of the government is so significant as well.

Keywords: *International Trade, Financial Development, Economic Growth, CCR Model.*

Jel Codes: *F4, G2, O4, R15.*

1. Introduction

The consideration regarding the element that lead economic growth has been a main effort of academicians in both developed and developing economies. There are many macroeconomic components including, financial development, trade openness, FDI and external debt which are covered by researchers to reveal the course of economic growth. In this context, trade liberalization and financial development have taken

into account as theoretical aspect by economists in terms of economic growth recently in the academic literature. For instance, after the Asian economic crisis in 1997, definition of the relationship among economic growth (GDP), financial development and FDI became a main factor in making the long-term fiscal and monetary policy plans which has been the subject of research by economists. For this reason, many economies have concentrated more on the trade liberalization and financial reforms to enhance economic development.

International trade and financial sector

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including derivatives markets are two significant components in terms of macroeconomic factors. In this sense, the financial sector ensures a great variety of services to companies, public institutions and individuals which triggers economic growth. The main research area in the context of academic literature is: how International trade or financial development affects economic growth? One main element that has begun to receive considerable attention more recently is the role of financial market and banking sector in the development of growth process. The linkage among financial development and economic growth has been addressed by a lot of works in literature. The studies conducted demonstrate that there is a long-run linkage among financial development and economic growth (GDP). In addition, there is a powerful impact of financial development on economic growth which is determined by economists. Exceptionally financial development dramatically decreases economic growth for some Latin American countries due to high inflation rates.

2. Literature Review

There are vast numbers of articles regarding the nexus between international trade, financial development and economic growth for several countries in academic literature. Hur, Raj and Riyanto (2006) demonstrate that a rise in the level of financial development has a significant effect on the export volume, particularly in sectors where companies are excessively dependent on the use of domestic funds. Liang and Jian-Zhou (2006) indicate that there is no linkage among GDP and financial development for China. Besides, fund redistribution of the major 4 public banks has no effect on GDP. In addition, they also state that higher bank credit does not affect higher economic growth (GDP) from 1952 to 2001 in China.

Shahbaz, Khan and Tahir (2013) empirically demonstrate that financial development triggers GDP. In addition, enhanced financial infrastructure able to encourage entrepreneurs and increase the economic growth. Omri, Daly, Rault and Chaibi (2015) indicate that there is a short-run one-way causality from financial development to GDP when liquid liabilities are considered in terms of financial development. Finally, these findings are coincide with the supply leading hypothesis. Nyamongo, Misati, Kipyegon and Ndirangu (2012) determine the impact of economic growth on financial development of 36 Sub-Saharan African economies from 1980 to 2009. Actually, if the depth of the financial system has any effect on the remittance-based growth which triggers financial development

through the financial liberalization.

Wolde-Rufael (2009) implements the VAR analysis and Modified Wald test (MWALD) from 1966 to 2005 as annual data for Kenya. According to results there is a two-way causality among financial development and GDP in three out of four measures of financial development. Kar, Nazlıoğlu, Ağır (2011) state that there is no clear unanimity regarding the direction of causality among the financial development and GDP when implementing the six financial indicators for the MENA and Middle East countries. Menyah, Nazlıoğlu and Wolde-Rufael (2014) examine the relationship among economic growth and financial development for twenty-one African countries in terms of international trade. The empirical findings are considered for finance-based and the trade-based growth thesis via the employment of panel bootstrapped approach to granger causality in their article. Bolbol, Fatheldin and Omran (2005) investigate that capital market growth has triggered economic growth of Egypt in between 1974 to 2002.

Ductor and Grechvna (2015) examine the interdependence among real sector output and financial development with regards to influence of GDP based on panel data analysis among several selected developed and developing countries. The article consider that the effect of financial development on GDP is significantly affected through the net credit to the major industries and this effect becomes negative if it is not accompanied by a corresponding growth in the real output. Hassan, Sanchez, Yu (2011) state that the major changes made were in the derivatives market where the contribution for the entry of conventional banks and the main factor was liberalization of interest rates through the ambition of carrying out the financial growth. This idea of financial reform followed the most supported theory that, domestic credit to private sector is an accelerator of GDP via effecting the investment and companies and enhancing resources distribution. Katircioglu, Kahyalar and Benar (2007) investigate the entity of a bidirectional causality among economic growth and financial development, which was measured by financial sector lending activity, and economic growth in Poland. Gokmenoglu, Amin and Taspınar (2015) examine that better financial system will trigger international trade and finally the economic growth (GDP) which is demonstrated empirically for Pakistan. Besides, financial growth may represent an exact degree of comparative advantage for at least those sectors that have a higher dependence on external

financing.

Isik, Kasimati and Ongan (2017) determine the unidirectional and bidirectional relationship among financial development, international trade and GDP for Greece from 1970 to 2017 as annual by using unrestricted error correction model for the ARDL. Soukhakian (2007) ensures additional proof on the positive influence of financial development on GDP concludes that financial development and trade openness have causal effect on GDP. Shan (2005) implements impulse response and variance decomposition analysis for 10 OECD countries including China by taking into account the linkage among economic growth and financial development. Lawal, Nwanji, Asaleye, and Ahmed (2016) use the ARDL model to Nigeria and reveal a negative long-term effect of financial development on GDP. However, a positive growth impact in the short-term. Besides, a bidirectional causality was determined among financial development and economic growth.

Katircioglu (2012) handles the long-term equilibrium linkage and direction of causality among real income growth, international trade and financial development for Sub-Saharan African countries. Findings of the bounds test confirm that long-term equilibrium relationship is revealed among exports, imports, financial development and real income. Lee and Chang (2009) elaborate the role of financial development and economic growth simultaneously considering FSD instrumental to assist FDI to affect positively on GDP. Moreover, majority of the article did not take into account the interactions among financial development and FDI while examining the finance-growth nexus. Furthermore, Lee and Chang (2009) determine that capital and financial development have a statistically crucial and positive effect on income. In addition, there is a positive linkage among GDP and financial development. Rahman, Shahbaz and Farooq (2015) demonstrate the linkage among financial development, international trade, GDP in Australia from 1965 to 2010 and reveal the proof of long-term co-integrated relationship between the GDP, financial development and international trade.

Abidin, Haseeb, Azam and Islam (2015) indicate that there is a long-term linkage among variables including financial development, international trade and GDP for ASEAN countries from 2005 to 2013 by implementing Johansen co-integration test and ARDL. Ghirmay (2004) demonstrates the linkage among economic growth and financial development for 13 sub-Saharan African countries. In this sense, Ghirmay (2004) implements VAR

analysis and the findings ascertain that financial development leads GDP in 8 countries while 6 countries depict a two-way causal connection. Yucel (2009) examines the connection among financial development and economic growth by using Johansen Juselius cointegration test and vector error correction model from 1989 – 2007 which finds long-run stable relationship among variables in Turkey. Ozatac, Gokmenoglu and Taspinar (2017) ascertain the EKC hypothesis by considering the energy consumption, trade openness, urbanisation and financial development as variables from 1960 to 2013 for Turkey. Tang and Tan (2014) investigate the linkage among GDP and financial development by incorporating FDI and relative prices in energy demand function for Malaysia. In addition, Tang and Tan (2014) find bidirectional causality among GDP and financial development both in the short and the long terms. Jenkins and Katircioglu (2010) implement cointegration and causality tests to determine the linkage among economic growth, financial development and international trade in Cyprus. In addition, they do not find any long-term linkage among financial development and international trade except the linkage among exports and money supply in the case of Cyprus.

Bojanic (2012) implements time-series models for data analysis and have found a positive effect of financial development on GDP (economic growth). Kim, Lin and Suen (2012) ascertain the linkage among GDP and financial development for 63 different economies by implementing the trade value in local industries and share of trade as percentage of GDP. According to results, there is an effect of trade liberalization in developed economies, while the negative effect was confirmed for many economies. Kaushal and Pathak (2015) demonstrate that there is a short-term linkage among GDP, trade openness and financial development from 1991 to 2013 in India. According to empirical results, financial development have no impact on GDP which is indicated through causality test and VAR analysis.

3. Methodology and Data Analysis

The data of international trade, financial development and GDP are derived from worldbank's official website as annual for South Korea. Economic growth variable is determined as GDP which is obtained from worldbank's official website as annual for South Korea from 1977 to 2018. On the other hand, International trade data is acquired from same resource as the sum of exports and imports of goods and services. Finally, financial

development data is derived as domestic credit to private sector.

In order to begin co-integration analysis, stationary test should be implemented by using ADF unit root test. According to results of augmented Dickey-Fuller ADF tests all series are not

stationary at $I(0)$ (see Table 1). For this reason, it should be transformed from $I(0)$ to $I(1)$ in order to comprehend whether it is stationary or not by using ADF unit root test. On the other hand, there is no symmetrical distribution in the course of the series from 1977 to 2018 (see Figure 1).



Figure 1. Financial Development, International Trade (the sum of exports and imports of goods and services) and GDP at $I(0)$.

Table 1. ADF Unit Root Test Results, 1977 to 2018 at $I(0)$.

South Korea	Variables	Series at $I(0)$
		t-statistic / crit-val (5%) / p-value
	Economic Growth (GDP)	5.47 / -2.95 / 1.0000
	International Trade	-1.80 / -2.93 / 0.3741
	Domestic Credit to PS	0.06 / -2.93 / 0.9593

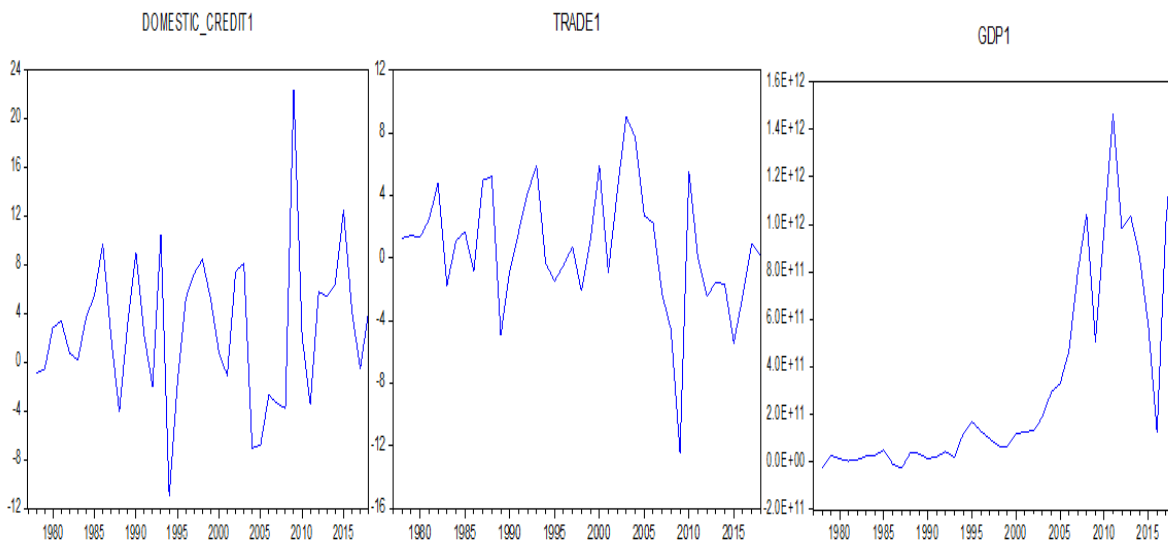


Figure 2. Financial Development, International Trade and Economic Growth at $I(1)$.

After transforming from I (0) to I (1) by taking first difference of variables, all series become stationary according to Augmented Dickey Fuller test results (See Table 2) which is compulsory to

continue Johansen co-integration test. Besides, there is a symmetrical distribution in the course of the series from 1977 to 2018 (see Figure 2).

Table 2. ADF Unit Root Test Results, 1977 to 2018 After Taking First Difference I(I)

South Korea	Variables	Series at I(I)		
		t-statistic	/ crit-val (%5)	/ p-value
	Economic Growth (GDP)	-3.73	/ -2.96	/ 0.0085
	International Trade	-6.97	/ -2.94	/ 0.0000
	Domestic Credit to PS	-5.89	/ -2.93	/ 0.0000

Table 3. Johansen Co-integration Test Results of South Korea 1977-2018

	Hypothesis	Eigenvalue	Trace Statistics	0.05 Critical Value	p-Value
South Korea	r=1, r>=1	0.623005	56.63732	29.79707	0.0000
	r=2, r>=2	0.372198	18.59187	15.49471	0.0165
	r=3, r>=3	0.011121	0.436163	3.841466	0.0090

According to co-integration test results of Table 3. there is a long-run linkage among GDP, domestic credit to private sector and the total of exports and imports of products and services (international trade). After transforming from I (0) to I(1) all series become stationary. The ADF test is applied to International Trade, GDP and Financial Development variables to analyze for stability. In addition, the maximum lag length is selected to be 2 (the AIC Akaike Information Criterion is

considered) as Serena and Perron's (2001) recommendation. The VAR model is implemented to comprehend the linear interdependence among the three variables including International Trade, GDP and Financial Development for South Korea. The lag order is 2. After implementing the inverse roots of the features AR polynomial, all the roots fell within the circle in the figure. Thus, the VAR analysis is stationary (see Figure 3).

Inverse Roots of AR Characteristic Polynomial

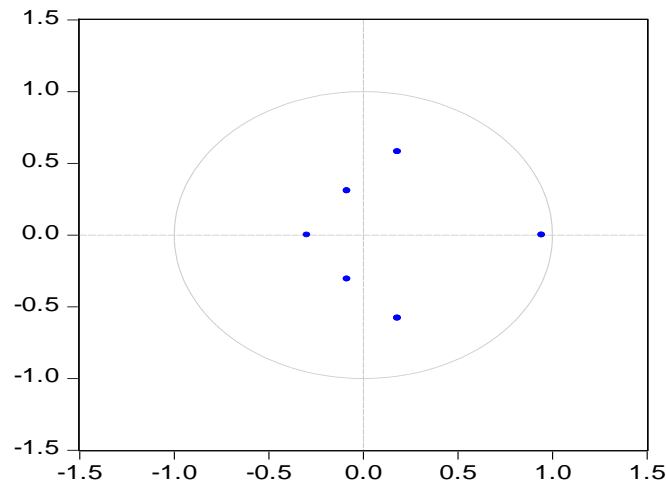


Figure 3. Result of VAR Analysis

Both Impulse response and variance decomposition analysis are used to reveal the impact of trade openness and domestic credit to private sector on economic growth. In this context, two analysis are performed in order to find out the tenor of the relationships among the variables. The findings indicate that domestic credit to private sector has the strongest effect on economic growth (GDP)

compared to total exports and imports of products and services in South Korea (see Table 4 and Figure 4). The results of variance decomposition verify the impulse response results (see Figure 4 and table 4). Thus, empirical results demonstrate that policy of giving incentives to establishment of new local companies trigger economic growth in South Korea.

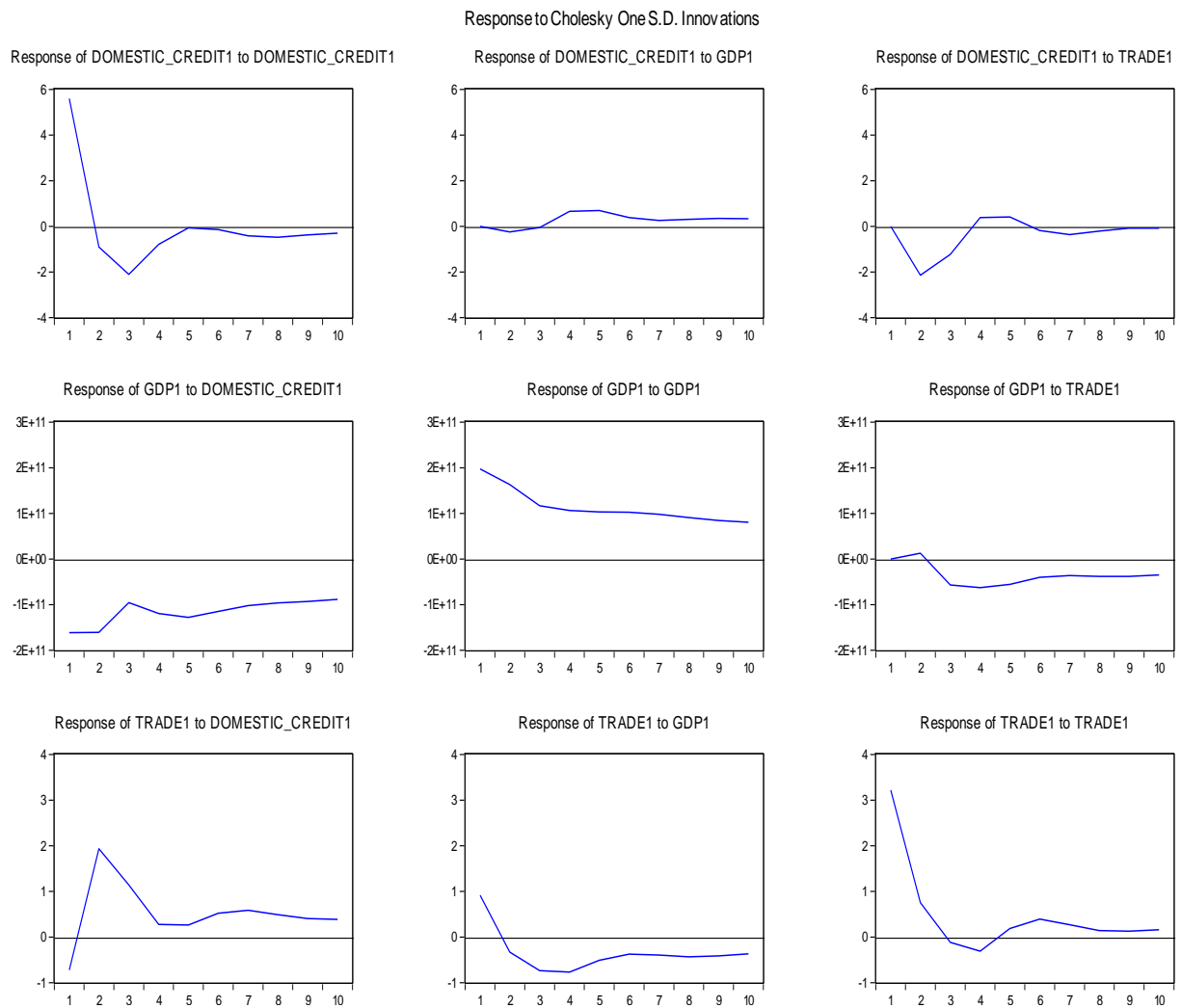


Figure 4. Impulse Response Analysis

Table 4. Variance Decomposition

Period	S.E.	DOMESTIC_CREDIT1	GDP1	TRADE1
1	2.55E+11	40.21116	59.78884	0.000000
2	3.43E+11	44.30442	55.56405	0.131524
3	3.79E+11	42.67145	54.94849	2.380061
4	4.16E+11	43.64432	52.09143	4.264246
5	4.51E+11	45.25353	49.58352	5.162944
6	4.78E+11	46.03406	48.66501	5.300930
7	5.00E+11	46.28591	48.33770	5.376391
8	5.19E+11	46.47522	47.98452	5.540255
9	5.35E+11	46.70113	47.58357	5.715293
10	5.49E+11	46.90991	47.25575	5.834340

In order to implement the FMOLS, DOLS and CCR analysis, the series have to be stationary. In this context, ADF unit root test should be performed. According to findings of ADF unit root test, all variables involving GDP, domestic credit to private sector and the sum of exports and imports of goods and services (international trade) are not stationary (see Table 1). The main problem is p-values of all

variables are not less than critical value and t-statistics scores are less than 1 %, 5 % and 10 % level by assuming absolute value of findings (See Table 1). Afterwards, taking first difference of three variables, ADF unit root test is performed once again to determine the stationarity structure of series. According to results of ADF unit root test, three variables become stationary (See Table 2).

Table 5. FMOLS, DOLS, and CCR Analysis for South Korea (1977 – 2018).

Variables	Dependent variable: Economic Growth (GDP)					
	Fully modified least square		Dynamic least square		Canonical co-integrating regression	
	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value
Trade_lbr	-0.717778*	0.4774	-0.739928*	0.4653	-0.498044*	0.6214
Domestic_cr	-2.131823*	0.0397	-2.553702*	0.0162	-2.065123*	0.0460
C	3.310437*	0.0021	2.742889*	0.0103	2.991811*	0.0049

FMOLS, DOLS and CCR models can be implemented to reveal the long-run linkage among GDP, domestic credit to private sector (financial development) and the sum of exports and imports of goods and services (international trade). According to results of FMOLS, DOLS and CCR models there is long-run stable linkage among variables and financial development (domestic credit to private sector) affects economic growth which is consistent with Johansen co-integration test (see table 3 and table 5). The econometrical models are implemented often in analysis of short and long-run linkage among macroeconomic factors and depending on this issue, Pesaran, Shin and Smith (2001) developed ARDL model. The ARDL method indicates proper results without causing

loss of information in the sample even if the used series are stationary at the level or difference. It can ensure reliable estimates in the case of a small sample as well. To sum up, the traditional co-integration analysis is implemented to demonstrate stable long-run linkage among series. FMOLS is developed by Hansen and Phillips (1990) due to the inherent problem arising in the estimation process and the obtained long-run coefficients cannot be interpreted and left to the DOLS methods which developed by Stock and Watson (1993). In this context, the ARDL equation is demonstrated as econometric symbols, where the determinants of long-term economic growth are investigated in equation (1) below:

$$\Delta \ln GDP_t = a_0 + \sum_{i=1}^{m_1} \sigma_{it} \Delta \ln GDP_{t-i} + \sum_{i=0}^{m_2} \beta_{it} \Delta \ln Domestic_{i,t-i} + \sum_{i=0}^{m_3} \theta_{it} \Delta \ln Trade_{i,t-i} + \delta_{1i} \ln GDP_{t-1} + \delta_{2i} \ln Domestic_{t-1} + \delta_{3i} \ln Trade_{t-1} + \varepsilon_{it} \quad (1)$$

The long-run relationship among economic growth (GDP_t) domestic credit $domestic_t$ and trade liberalization $Trade_{t-1}$ are investigated through f bounds test which is considered the zero hypothesis, see equation (2) below.

$$\begin{aligned} H_0: \delta_1 = \delta_2 = \delta_3 = 0 \\ H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq 0 \end{aligned} \quad (2)$$

Findings from FMOLS, DOLS and CCR models demonstrate that domestic credit and trade liberalization are the determinants of long-term GDP, just as in the results of the ARDL model. It is also noteworthy that the findings obtained from FMOLS, DOLS and CCR models, which are described as new co-integration techniques and allowed the

separation of short and long-run relationships, consistent with the long-run results obtained from the ARDL model in Table 7. In this context, trade relations should be increased by policymakers through permitting more domestic credit and further accelerate their economic growth via research and development.

Table 6. ARDL Bound Test Results of South Korea

Model	Optimal lag length	F-Statistics	Bound Test Critical Value	
			I(0)	I(1)
$f \ln GDP; \ln domestic_cr; \ln Trade_lbr$	(4,1,4,1)	5.0958*	4.04	5.07

Considering the ARDL F-bound test, long-run ARDL estimates were made, respectively, through the revealing long-run co-integration by empirical model which is used among the variables. Long

term ARDL forecast results are given in Table 7. Long-term ARDL forecast results reveal that the main determinants of GDP changes in trade liberalization and domestic credit.

Table 7. Long-Term ARDL Estimation Results of South Korea

Dependent Variable: lnGDP				
Variables	Coefficient	Standard error	t-Statistics	P-Val
Long-run Results				
ln Trade_lbr	-0.0861	0.3264	-0.2982	0.6138
ln Domestic Cr	0.3123	0.0461	4.0157	0.0032*
Constant	2.8965	0.6827	3.0237	0.0046*
Trend	0.0068	0.0041	3.0137	0.0042*

Note: * expression defines the unit root test results of variables used in the estimation process at 1% significance level.

According to the long-run ARDL results summarized in Table 6; If domestic credit increases by 1 percent, GDP increases by 0.3123%. Trade liberalization has no statistically significant effect on GDP. Long-run ARDL results in terms of the relationships between GDP and key economic determinants are similar with short-term ARDL test findings. Short term ARDL estimation results reveal that the main determinants of GDP in the short run are changed in domestic credit at a 1% significance

level. Table 8 summarizes the short-term ARDL results and the findings regarding the error correction model. According to Table 8, error correction model works in order to reach short-run adjustment. In the short term, approximately 72.26 % of shocks in domestic credit and trade liberalization are compensated within a period of time and the system is re-established in the long term.

Table 8. Short Term ARDL Results and Error Correction Model of South Korea

Dependent Variable: lnGDP				
Variables	Coefficient	Standard error	t-Statistics	P-Val
Short-run Results				
D (lnGDP (-1))	0.2233	0.1017	1.2962	0.2231
D (lnGDP (-2))	0.1678	0.0971	1.8914	0.0468**
D (lnGDP (-3))	0.3375	0.1251	2.4265	0.0442**
D (ln Domestic Cr)	0.1766	0.0627	2.9162	0.0000*
D (ln Domestic Cr (-1))	0.0031	0.0563	0.0421	0.8862
D (ln Domestic Cr (-2))	-0.2271	0.0738	-2.3197	0.0458**
D (ln Domestic Cr (-3))	-0.1766	0.0824	-3.2734	0.0412**
D (lnTrade_lbr)	-0.2767	0.2062	-1.8951	0.0987***
Constant	3.1743	0.5120	3.9634	0.0092*
Trend	0.0090	0.0031	4.9854	0.0035*
CointEq(-1)	-0.7226	0.2258	-3.7961	0.0019*

Note: *, ** and *** expressions indicate 1%, 5% and 10% significance levels, respectively.

4. Conclusion

The major goal of this article is to reveal the long-term equilibrium linkage among GDP, domestic credit to private sector (financial development) and the sum of exports and imports of goods and services. In this sense, ADF unit root test is implemented to perform FMOLS, DOLS and CCR analysis. According to findings of ADF unit root test, all variables involving GDP, domestic credit to

private sector and the sum of exports and imports of goods and services (international trade) are not stationary. Afterwards, taking first difference of three variables, ADF unit root test is performed once again to confirm the stationarity structure of series. According to results of ADF unit root test, three variables become stationary. Thus, according to results of FMOLS, DOLS and CCR models there is

long-run stable relationship between variables and financial development (domestic credit to private sector) affects economic growth which is consistent with Johansen co-integration test and ARDL model.

Empirical results demonstrate that the South Korean government should try to contribute the financial development to construct a durable financial system and to trigger the Gross Domestic Product (GDP) will be beneficial to have sustainable economic development. In this context, removing all trade barriers, a well-developed logistics infrastructure and appropriate macroeconomic environment are definitely required in order to carry out the determined policies. The South Korean government should promote the flow and use of RMB throughout countries and support the private sector, local companies, by supplying incentives. Therefore, constructing a better state bank infrastructure and financial system cooperation of the government is so significant as well. Generating a better financial system (providing domestic credit to private sector) will contribute economic growth and export volume. If empirical findings are to be interpreted, this article have demonstrated that the demand-following hypotheses and supply-leading can be inferred for the South Korean economy. The export-led hypothesis can be inferred for the South Korean economy from 1977-2018. In addition, it is significant to state that economic growth, financial development and international trade have taken into account in terms of export-led growth hypothesis for South Korean economy which is demonstrated empirically.

Based on the findings released by this paper, the following policy prescriptions may be recommended: South Korean government should contribute to sustain the reforms by providing competition among institutions. In this sense, incentives should be given by government to companies in order to enlarge market capacity. Besides, greater financial integration with the neighbor economies is so crucial for the broader national interests by providing government-company relationship. Trade barriers should be eliminated within partner economies to increase trade capacity of Asian region. The quality of the product and services must be sustained, and the varieties of products and services should be raised. Consequently, import of capital goods will be more attractive to enhance the production level and export volume. When trade policy is determined, all partner countries' propensities to export and import must be considered completely.

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