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Financial Development and Intra-trade Relationships: Evidence from Panel Analysis of Regional Comprehensive Economic Partnership Countries

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Abstract:

This study accounts for the nexus between financial development and intra-trade relationships using nine Regional Comprehensive Economic Partnership (RCEP) countries with the extraction of data from secondary sources spanning between 1990 and 2021. The following are the conclusions drawn from the study: exchange rate, interest rate and inflation rate, which are critical macroeconomic variables, represent unfavourable factors that suppress the intra-trade relationships within the RCEP region. In light of the above, this study recommends that any time the policymakers in RCEP countries desire better intra-trade relationships within RCEP countries, they should implement a unified monetary policy that will stimulate interest rate, exchange rate and inflation rate in such a way that the intra-trade relationships will be enhanced among the RCEP countries.

Keywords: financial development, interest rate, exchange rate, intra-trade, RCEP countries

JEL Codes: B26, F14, F15, G21

1. Introduction

The Regional Comprehensive Economic Partnership (RCEP) has the capacity to influence trade and investment mechanisms in Asia and the Pacific well into the future and to influence the direction of global economic cooperation for the improvement of financial endowments (Park et al., 2021). The influence of financial development has been a policy topic across the globe as well as the subject of debate in the empirical literature. The influence of financial development, that is, its three dimensions (access, utilization, and depth), on intra-trade

relationships in RECP countries has been a subject of exclusion, to the authors' best of knowledge. This study contributes to the extant literature by empirically examining how the three dimensions of financial development (access, utilization, and depth) affect intra-trade relationships among the RCEP countries. In addition, it contributes to the policy dialogue for the actualization of the sustainable development goal of the Partnership (SDG-17). Examining this concept is crucial because trade and investment relationships among countries and regions influence financial patterns. According to Nyiwul and Iqbal (2023), lack of trade relations, otherwise known as divestment, has a negative impact on the economy.

Furthermore, Osabohien et al. (2021) found that trade relations positively and significantly contribute to economic performance in Africa. On the contrary, with respect to the Economic Community of West African States (ECOWAS) trade union, Adegboye et al. (2020) found that trade relationships have no significant influence on the progress of the region. It was found that member countries, their trade relationships notwithstanding, are not better off in terms of financial ability and growth prospects. Given this, financial development influences trade flows and the structure of international trade in the openness. It also found that there is an indirect long-run impact via the interaction terms between financial development and sectoral value added which influence the economy.

Given that previous studies have reported mixed findings and ignored the subject of the influence of financial development on intra-trade relationships in RCEP countries, the purpose of this study is to contribute to the knowledge. The study is structured into five sections. Following this introductory section is a review of the extant literature. The methodology is described in Section 3, results are presented and discussed in Section 4, while the study concludes with Section 5, which is the summary and recommendations for further research.

2. Literature Review

Empirically, Cher et al. (2020) evaluated the relationship between financial development (FD) and economic growth (EG) with a focus on ten emerging Asian markets between 1990 and 2018. Applying the dynamic panel least squares method as well as the Pedroni cointegration and Granger causality, the results revealed a long-run equilibrium relationship between economic growth and the development of the financial sector in those countries. Likewise, Gemma et al. (2010) looked at the relationship between financial sector development and economic growth on the Asian continent. The results of their panel analysis proved that the development of the financial sector contributed to a prominent positive impact on Asia's growth. Another study by Sharma and Sharma (2020) on financial development and economic growth utilized annual panel data for 14 selected Asian economies. Their study centred on the relationship

between the variables of financial development and economic growth. Their panel cointegration suggested that there is a two-way cointegration relationship from GDP to GCF, and BM in the short run as well as in the long run. They found a strong positive long-run relationship among all the selected variables of financial development and economic growth. They also noted that broad money and gross capital formation used as variables are very important for economic growth.

Furthermore, in examining the convergence of financial development that has occurred recently in Asia, Robert and Madhavi (2015) made use of an index of financial development for 23 Asian economies. The findings revealed that economies with weaker financial systems are catching up with the Asian countries. Their construction was based on efficiency of financial institutions and markets. Chinnasamy et al. (2019) utilized a sample of ASEAN-5 countries to investigate the linkage between financial development and economic growth between 1980 and 2011. Their study reports that financial development caused a major advancement in the growth of the selected countries. In a similar study, Duc et al. (2021) investigated how development of both human capital and financial sector motivated economic growth in emerging markets of Asia from 1990 to 2018 with the application of dynamic least squares (DOLS) alongside fully modified least squares (FMOLS). The authors argued that the accumulation of human capital was significantly facilitated by the development of the financial sector. Also, it was recorded in the study that a bidirectional feedback relationship occurred between human capital and financial development in the countries considered for the study.

However, Nguyen (2019) assessed how financial development, inflation and economic growth were networked within five developing economies in Southeast Asia between 1997 and 2016. The findings from the estimated vector autoregressive model established that inflation had a direct influence on both money supply and stock market capitalization. Meanwhile, growth of the economy was positively influenced by domestic credit disbursed to the private sector. A unidirectional feedback relationship runs from GDP per capita to inflation in the study. In another related study focusing on nine emerging economies located in South-East Asia within the period of 25 years, Fasea and Abma (2003) analysed the nexus between financial development and economic growth. The authors concluded that financial sector development leads to economic growth. In the same vein, economic growth is Granger-caused by financial structure of the selected countries.

While examining the relationship between development of the financial sector and trade in Asian economies, Najaf et al. (2019) employed a financial development index alongside a combination of institutional and market factors between 1997 and 2016. The fixed-effect regression outputs of 16 large economies of Asia showed that international trade was significantly and positively driven by overall financial development. Sawyer and Kiril (2010) applied a Tobit

regression model to the investigation of intra-industry trade (IIT) and economic growth across Asia with a view to assessing how rapid growth of Asian economies affected intra-industry trade for 22 countries in East, Southeast, South and Central Asia in 2003. The evidence from the study attested that the ASEAN and the high-income countries located in East Asia possessed the majority of intra-industry trade, closely followed by those of China and India respectively. Similarly, the identified factors that promoted intra-industry trade were spending on research and development, openness of the economy, and a higher share of value-added exports. Meanwhile, variation in the market size and geographical distance were identified as adverse factors that inhibit intra-industry trade among these countries.

Ruhul et al. (2018) estimated the patterns and determinants of horizontal and vertical intra-industry trade using the electrical appliance and automotive industries of six major countries in Southeast Asia. The conclusion of the study was that the volume of intra-industry trade was greater than that of the inter-industry trade in the two sectors. Also, the driving factors of these two types of trade were found to differ in terms of directions and magnitude across the sectors. This is an indication that the importance of sector-specific factors exerts a major influence on the pattern of trade in Asia. Chang and Yu-lan (2020) asserted that owing to the sporadic growth of China, the volume of trade between China, Japan, and South Korea had greatly increased in recent years. It was also observed that the intra-industry trade taking place between Japan and South Korea, which are advanced economies, had a certain degree of reference for China. In another perspective, Jacob et al. (2021) evaluated the connection between the intra-industry trade relationships of China and 20 other Asia-Pacific Economic Cooperation partners from 2000 to 2014. It was evident from the study that China recorded the highest inter-industry trade patronage with Japan, Korea, and Taiwan. Since 2000, this inter-industry trade patronage has geared upwards from both horizontal and vertical inter-industry trade perspectives. Factor endowments, tariff rates and market size were the prominent factors propelling the inter-industry trade among these countries.

The reviewed studies clearly indicate that studies regarding financial development and intra-trade relationships are scarce generally, and specifically within the context of RCEP countries. Thus, the current study is of relevance.

3. Methodology

In considering an appropriate research design for this study, an ex post facto type of research design was utilized due to the focus of this study, which is centred on the investigation of a viable relationship between financial development and intra-trade relationships in RCEP countries. Meanwhile, relevant data from 1990 to 2020 were extracted from the UNCTAD and WDI databases.

3.1 Model specification

In estimating the financial development and intra-trade relationships, the appropriate model was adapted from Zhang et al. (2012), Olanipekun et al. (2022) and Mesagan et al. (2018). As such, we structured the model in connection with the objective of this current, which is formulated as follows:

$$\textit{Intra-trade relationships = f (financial development)} \qquad (1)$$

$$\textit{ITR = f (M2, DCP, EXR, IR)} \qquad (2)$$

However, besides the financial development variables, which are the principal variables, some control variables such as inflation rate, infrastructure (access to the internet and electricity), and policy variables such as ease of doing business were added to the model in order to improve its robustness. These variables have been argued in the extant literature to be strategic catalysts that facilitate both trade and financial sector development in any economy. In the light of the above, model (3) emerges as follows:

$$\textit{ITR = f (M2, DCP, EXR, IR, IFR, IA, EDB)} \qquad (3)$$

In linearizing model (2) in order to conform to econometric modelling, a log form was introduced as follows:

$$ITR_{it} = \alpha_0 + \alpha_1 LogM2_{it} + \alpha_2 EXR_{it} + \alpha_3 IR_{it} + \alpha_4 IFR_{it} + \alpha_5 IA_{it} + \alpha_6 EDB_{it} \qquad (4)$$
$$+ \alpha_7 LogDCP_{it} + u_{it}$$

In addition, in examining the direction of causality among financial development, infrastructures and intra-trade relationships among RCEP countries, we estimated the following model:

$$ITR_{it} = \alpha_0 + \sum_{x=1}^{P1} \alpha_{i1} LM2_{it-i} + \sum_{x=1}^{p2} \beta_j EXR_{it-i} + \sum_{x=1}^{p3} \delta_k IR_{it-i} +$$
$$+ \sum_{x=1}^{p4} \delta_L IFR_{it-i} + \sum_{x=1}^{p5} \delta_k IA_{it-i} + \sum_{x=1}^{p6} \delta_m EDB_{it-i} + \sum_{x=1}^{p7} \alpha_r LDCP_{it-i} + u_{1it} \qquad (5)$$

In Table 1 below, the operational definitions of various variables in the study are discussed.

Table 1: Measurement of variables

Abbreviation	Variable	Operational definition
ITR	Intra-trade relationships	Merchandise exports to low- and middle-income economies within region as percentage of total merchandise exports
M2	Broad money supply	This is in addition of M1, savings and time deposits with banks including foreign-denominated deposits
EXR	Exchange rate	Exchange rate is measured as the value of the local currency vis-à-vis the dollar
IR	Interest rate	Real interest rate
IFR	Inflation rate	Consumer price index
IA	Access to internet	Number of people using internet as percentage of population
EDB	Access to electricity	Number of people using electricity as percentage of population
DCP	Domestic credit to private sector	Total credit disbursed to private sector by financial institutions

Besides, *t* and *i* are used to represent the time frame (1990 to 2021) and the number of the selected countries for the study simultaneously. The following countries are selected: Australia, China, Indonesia, Japan, South Korea, Malaysia, the Philippines, Singapore, and Vietnam. Meanwhile, the inclusion of these nine countries among the 15 countries under the RCEP agreement in the study was largely driven by the availability of data on key variables.

4. Analysis and Discussion of Findings

This section presents the descriptive statistics, pre-estimation tests, regression analysis and finally the Granger causality test.

Table 2: Descriptive statistics of study variables

	ITR	EA	IFR	DCP	EXR	IA	M2	IR
Mean	20.80486	95.05850	3.825789	94.67354	2924.773	36.52922	106.6633	4.047720
Median	16.63140	99.92744	2.774364	102.0139	44.75241	32.33701	105.7846	3.968230
Maximum	53.84103	100.0000	58.45104	217.7609	23208.37	96.50506	281.2991	15.60691
Minimum	0.642450	48.90000	-1.710337	13.65691	0.965801	0.000000	19.56649	-24.60017
Std. dev.	16.65523	9.400465	4.959931	50.55339	5867.920	33.64268	57.18213	4.126477
Skewness	0.607879	-2.306298	5.590591	0.131759	2.017373	0.317907	0.640646	-1.780831
Kurtosis	1.969051	8.043611	54.85187	2.138033	5.902434	1.564578	2.789101	14.51357
Jarque-Bera	30.49109	560.5686	33763.63	9.749150	296.4396	29.57637	20.23427	1742.974
Probability	0.000000	0.000000	0.000000	0.007638	0.000000	0.000000	0.000040	0.000000
Sum	5991.799	27376.85	1101.827	27265.98	842334.6	10520.42	30719.03	1165.743
Sum sq. dev.	79612.82	25361.83	7060.463	733470.0	9.88E+09	324835.1	938431.5	4886.983
Observations	288	288	288	288	288	288	288	288

Source: authors' calculation using E-Views (2022)

In Table 2, efforts were made to present a summary of the various descriptive statistics associated with the variables of this study. This is very important due to the assumption of normal distribution, which usually drives econometric analysis. Meanwhile, ITR, which is used to proxy intra-trade relationships has a mean value of 20.8% and a standard deviation of 16.6%. This variable is moderately dispersed from the mean with positive skewness. Electricity accessibility (EA) had a mean value of 95% and a standard deviation of 9.4%. However, this variable is dispersed moderately from its mean with negative skewness. The mean value of inflation rate (IFR) was 3.8%, which is less than its standard deviation. This shows that the variable is largely dispersed from the mean with positive skewness.

Moreover, exchange rate (EXR) is another variable dispersed largely from the mean. The rest of the variables such as DCP, IA, M2 and IR are moderately dispersed from their means.

Pre-estimation tests

In order to guarantee accurate regression findings, a series of pre-estimation tests must first be conducted. In this research, we use the multicollinearity test, unit root test and co-integration test.

Table 3: Test for multicollinearity using variance inflation factor (VIF)

Variable	Coefficient variance	Uncentered VIF
EA	0.011003	2.976470
IFR	0.047736	2.918714
DCP	0.003962	5.812367
EXR	1.29E-07	2.225221
IA	0.001191	2.785157
M2	0.003172	7.117870
IR	0.057454	3.603556

Source: authors' calculation using E-Views (2022)

The VIF results for the multicollinearity test are shown in Table 3. According to Everitt and Skrondal (2010), substantial multicollinearity is present in the model if the centred VIF value is larger than 10, but not present if it is less than 10. According to the VIF results in Table 3, none of the explanatory variables (AE, IFR, DCP, EXR, AI, M2 and IR) has centred VIF values higher than 10. This suggests that the variables do not have multicollinearity issues and that the regression findings are accurate.

To rule out the presence of variables integrated at second difference I(2), the unit root test developed by Levin, Lin and Chu (2002) was performed. The LLC test is regularly used since it was one of the first unit root tests designed for panel data (Liang, 2017).

Table 4 displays the results of an LLC unit root test, which reveals that four research variables (ITR, EA, IFR and IR) are stationary at level I(0), while the remaining four (DCP, EXR, IA and M2) are stationary at first difference I(1). The LLC stationarity test suggests that the long-run relationship has been lost, but the co-integration test may help restore it. Therefore, the next preliminary test will be the Johansen Fisher co-integration test. A long-term relationship among the variables may then be validated using this method.

Table 4: Levin, Lin & Chu unit root test

LLC result			
Variables	**t-statistic**	**Probability**	**Order**
ITR	−2.03022	0.0212	I(0)
EA	−4.53829	0.0000	I(0)
IFR	−5.66517	0.0000	I(0)
DCP	−10.1839	0.0000	I(1)
EXR	−9.38742	0.0000	I(1)
IA	−2.99700	0.0014	I(1)
M2	−11.5412	0.0000	I(1)
IR	−5.58916	0.0000	I(0)

Notes: (*) (**) indicate significance at the 5% probability level

Source: authors' calculation using E-Views (2022)

Table 5: Johansen Fisher panel co-integration test

Hypothesized no. of CE	**Trace statistic**	**Prob.**	**Max-eigen statistic**	**Prob.**
None	488.4	0.0000	173.6	0.0000
At most 1	240.0	0.0000	120.4	0.0000
At most 2	151.6	0.0000	52.14	0.0000
At most 3	106.9	0.0000	41.51	0.0000
At most 4	72.80	0.0000	32.71	0.0011
At most 5	48.38	0.0000	30.46	0.0024
At most 6	29.20	0.0037	19.99	0.0672
At most 7	31.76	0.0015	31.76	0.0015

Notes: (*) Denotes rejection of the hypothesis at the 0.05 level.

Source: authors' calculation using E-Views (2022)

Table 5 displays the results of a Johannsen Fisher panel co-integration test, which reveals at least seven significant cointegrating equations (with p-values < 0.05) for both the trace and max-eigen statistic. This shows that there is a correlation across time in the data series utilized in this study. Through the process of co-integrating the data series, we have thus restored their long-term connection. The dynamic ordinary least square method is a long-run regression analysis and a viable option for analysing the data gathered. This technique provides an avenue to explore the long-run relationship between the variables of the study.

Firstly, access to the internet had a negative but insignificant relationship with merchandise exports to low- and middle-income economies within the RCEP region. Meanwhile, access to electricity had a positive and insignificant relationship with merchandise exports to low- and middle-income economies within the RCEP region. This is an indication that infrastructural facilities in RCEP countries are not currently strong enough to propel a significant impact on intra-trade relationships among countries in the RCEP.

Table 6: Panel dynamic least squares (DOLS) results of financial development and intra-trade relationships in RCEP countries

Dependent variable: ITR				
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
EA	−0.102719	0.104896	0.979252	0.3342
IFR	−0.760953*	0.218485	3.482855	0.0014
DCP	0.020624	0.062948	0.327631	0.7451
EXR	−0.000450	0.000359	1.255508	0.2176
IA	0.049925	0.034517	1.446408	0.1570
M2	0.010518	0.056321	0.186745	0.8529
IR	−0.810625*	0.239696	3.381890	0.0018
R-squared	0.995602	**Mean dependent var**		13.61333
Adjusted R-squared	0.978261	**S.D. dependent var**		13.62399
S.E. of regression	2.008722	**Sum squared resid**		141.2238
Long-run variance	1.102749			

Notes: (*) indicates significance at the 5% probability level.
The R-squared in the regression outputs in the table above establishes that the variables utilized to proxy financial development alongside other control variables explain about 99% of the variation in intra-trade relationships, which is the dependent variable. However, it should be stressed that the variables EDB, IFR, EXR and IR do not follow a priori expectations.

Source: authors' calculation using E-Views (2022)

In the same vein, real interest rate and merchandise exports to low- and middle-income economies within the RCEP region had a negative but significant relationship with each other. A unit change in real interest rate reduces merchandise exports to low- and middle-income economies within the RCEP region by 0.81%. Similarly, inflation rate and merchandise exports to low- and middle-income economies within the RCEP region had both an inverse and significant relationship with each other. Thus, a unit change in inflation rate in these countries will reduce intra-trade relationships by 0.76%. The case of exchange rate confirmed a negative but insignificant relationship with merchandise exports to low- and middle-income economies within the RCEP region. Therefore, exchange rate, interest rate and inflation rate, which are critical macroeconomic variables, represent unfavourable factors that suppress intra-trade relationships within the RCEP region.

Furthermore, domestic credit to private sector had a positive relationship with merchandise exports to low- and middle-income economies within the RCEP region. Also, broad money supply (M2) and merchandise exports to low- and middle-income economies within the RCEP region had a direct, though insignificant relationship with each other. By and large, this study concludes that the current level of financial development within the RCEP region is not strong enough to propel a noticeable intra-trade relationships among the countries under this arrangement.

In ascertaining the direction of causality among financial development variables and intra-trade relationships among RCEP countries, the pair-wise Granger causality tests were estimated, and their results are shown in the above table. Consequently, the following are the inferences from the estimated results: there is no causal relationship between access to electricity, access to the internet and merchandise exports to low- and middle-income economies within the RCEP region. This implies that infrastructure (internet and electricity) do not have the capacity to propel intra-trade relationships among RCEP countries.

In the same vein, there is no causal relationship among exchange rate, real interest rate and merchandise exports to low- and middle-income economies within the RCEP region. However, a unidirectional causality flows from merchandise exports to low- and middle-income economies to inflation rate within the RCEP region. This implies that intra-trade relationships motivate a rise in inflation rate in RCEP countries.

However, broad money supply, credit to private sector and merchandise exports to low- and middle-income economies within the RCEP region do not have a causal effect relationship.

In a nutshell, it could be inferred from the above that financial development does Granger-cause intra-trade relationships in RCEP countries. This reinforces the argument drawn from the regression results.

Table 7: Pair-wise Granger causality tests of financial development variables and intra-trade relationships among RCEP countries

Null hypothesis:	Obs.	f-statistic	Prob.
EA does not Granger-cause ITR	270	0.46455	0.6289
ITR does not Granger-cause EA		0.08312	0.9203
IFR does not Granger-cause ITR	270	0.83586	0.4346
ITR does not Granger-cause IFR		5.49447	0.0046*
DCP does not Granger-cause ITR	270	0.40750	0.6657
ITR does not Granger-cause DCP		0.92226	0.3989
EXR does not Granger-cause ITR	270	1.75987	0.1741
ITR does not Granger-cause EXR		0.61485	0.5415
AI does not Granger-cause ITR	270	0.47273	0.6238
ITR does not Granger-cause AI		2.33848	0.0985
M2 does not Granger-cause ITR	270	0.42479	0.6544
ITR does not Granger-cause M2		0.30921	0.7343
IR does not Granger-cause ITR	270	1.28627	0.2780
ITR does not Granger-cause IR		0.15092	0.8600

Note: (*) (**) indicate significance at the 5% and 10% level respectively.

Source: authors' calculation using E-Views (2022)

5. Summary, Conclusions and Recommendations

In accounting for the nexus between financial development and intra-trade relationships using nine RCEP countries, this study extracted data from secondary sources spanning between 1990 and 2021. After exploring various econometric techniques to analyse the collected data, the following are the conclusions: access to the internet had a negative but insignificant relationship with merchandise exports to low- and middle-income economies within the RCEP region. Meanwhile, access to electricity had a positive and insignificant relationship with merchandise exports to low- and middle-income economies within the RCEP region. This is an indication that infrastructural facilities in RCEP countries are not currently strong enough to propel a significant impact on intra-trade relationships among countries in the RCEP. Real interest rate and merchandise exports to low- and middle-income economies within the RCEP region had a negative but significant relationship. Inflation rate and merchandise exports to

low- and middle-income economies within the RCEP region had both an inverse and significant relationship with each other. Exchange rate confirmed a negative but an insignificant relationship with merchandise exports to low- and middle-income economies within the RCEP region. This implies that exchange rate, interest rate and inflation rate, which are critical macroeconomic variables, represent unfavourable factors that suppress intra-trade relationships within the RCEP region. Domestic credit to private sector had a positive relationship with merchandise exports to low- and middle-income economies within the RCEP region. Also, broad money supply (M2) and merchandise exports to low- and middle-income economies within the RCEP region had a direct, though insignificant relationship.

In addition, there is no causal relationship between access to electricity, access to the internet and merchandise exports to low- and middle-income economies within the RCEP region. This implies that infrastructures (internet and electricity) do not have the capacity to propel intra-trade relationships among RCEP countries.

In the same vein, there is no causal relationship among exchange rate, real interest rate and merchandise exports to low- and middle-income economies within the RCEP region. However, a unidirectional causality flows from merchandise exports to low- and middle-income economies to inflation rate within the RCEP region. However, broad money supply, credit to private sector and merchandise exports to low- and middle-income economies within the RCEP region did not have causal effect relationship.

In conclusion, the current level of financial development within the RCEP region is not strong enough to propel a noticeable intra-trade relationships among the countries under this arrangement. Similarly, the current level of infrastructure (electricity and internet) does not have a strong capacity to propel intra-trade relationships among RCEP countries. In light of the above, this study recommends that any time the policymakers in RCEP countries desire better intra-trade relationships within RCEP countries, the following policies should be engaged: firstly, a unified monetary policy that will stimulate interest rate, exchange rate and inflation rate in such a way that intra-trade relationships will be enhanced among RCEP countries. Secondly, policymakers in RCEP countries should embark on expansionary monetary policy by increasing both domestic credit to private sector and broad money supply in their respective economies. This policy will stimulate intra-trade relationships within this region. Finally, the policymakers should invest in infrastructures such as adequate power supply and internet facilities in order to drive intra-trade relationships among the RCEP countries.

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