



ELIT

Economic Laboratory Transition
Research Podgorica

Montenegrin Journal of Economics

For citation:

Nguyen, T.P. Dinh, T.T.H. Tran, N.T., Nguyen, T.T.H. (2024),
“Exploring the Role of Institutional Quality, Trade Openness, and Financial Development in Driving the Real Exchange Rate: Evidence in Southeast Asia Countries”,
Montenegrin Journal of Economics, Vol. 20, No. 2, pp. 183-194.

Exploring the Role of Institutional Quality, Trade Openness, and Financial Development in Driving the Real Exchange Rate: Evidence in Southeast Asia Countries

THANH PHUC NGUYEN¹, THI THU HONG DINH², NGOC THO TRAN³,
and TRAN THAI HA NGUYEN^{1, *}

- ¹ Faculty of Finance and Banking, Van Lang University, 69/68 Dang Thuy Tram Street, Ward 13, Binh Thanh District, Ho Chi Minh City, Vietnam, e-mail: phuc.nt@vlu.edu.vn; Orcid ID: <https://orcid.org/0000-0001-7137-8236>
 - ² School of Finance, University of Economics Ho Chi Minh City, 59C Nguyen Dinh Chieu Str., Vo Thi Sau Ward, District 3, Ho Chi Minh City, Vietnam, e-mail: hongtcdn@ueh.edu.vn
 - ³ School of Finance, University of Economics Ho Chi Minh City, 59C Nguyen Dinh Chieu Str., Vo Thi Sau Ward, District 3, Ho Chi Minh City, Vietnam, e-mail: thotcdn@ueh.edu.vn
- * Corresponding author: e-mail: ha.nguyentran@vlu.edu.vn, Orcid ID: <https://orcid.org/0000-0003-2598-3720>

ARTICLE INFO

Received April 16, 2023
Revised from May 16, 2023
Accepted June 16, 2023
Available online April 15, 2024

JEL classification: F13 F31 F41

DOI: 10.14254/1800-5845/2024.20-2.15

Keywords:

Real exchange rate,
Southeast Asia countries,
institutional quality,
trade openness,
financial development.

ABSTRACT

This research is focused on investigating the potential factors driving real exchange rates (RER), including institutional quality, trade openness, and financial development. Advanced analysis methods such as Dynamic Ordinary Least Square (DOLS), Fully Modified Ordinary Least Square (FMOLS), Generalized and Simultaneous Quantile Panel Regression (GSQPR), and Granger Causality have been applied to a balanced panel of nine Southeast Asian economies from 2002 to 2020. The empirical results suggest that an improvement in institutional quality leads to the appreciation of the domestic currency compared to foreign currency. Additionally, a high degree of trade openness is associated with the depreciation of the domestic currency, which may be due to fluctuations in capital influx from international trade. These findings are consistent across most RER quantile levels through GSQPR. However, the effect of financial development, as measured by the bank's credit to the private sector, on the domestic currency value is observed only at lower quantile levels of RER. Furthermore, the study finds unidirectional causality relationships running from the identified drivers to RER, using the Granger causality approach. Based on the findings, the research discusses theoretical and policy implications for Southeast Asian economies.

INTRODUCTION

The determinants of the real exchange rate (RER) have been the subject of considerable research. RER is often viewed as a measure of a country's overall price competitiveness (Ayres et al., 2020; Cuestas et al., 2022), indicating how well a country's products and services are priced in international markets

compared to those of other countries (Jaksic et al., 2021). In order to catch up with advanced and developed countries, emerging or frontier economies must improve their currency's purchasing power, as evaluated through RER. These markets have long recognized the importance of RER, despite the fact that its relevance in development and growth has been largely ignored by baseline development economics and growth theories (Stoykova, 2021). It is widely agreed that an RER decrease (increase) may not always result in better (poor) competitiveness (Ayele, 2019) and positive (negative) economic growth (Ibid., 2022). Indeed, the decision to adjust RER in order to increase a country's competitiveness is complex, given the numerous theoretical and empirical factors that influence RER. Thus, this study aims to contribute to the ongoing debate on significant RER determinants in emerging and frontier economies by shedding light on newly identified drivers of RER. RER can be influenced by several emerging factors based on the premise that an increase in domestic demand compared to foreign demand leads to the appreciation of the domestic currency and vice versa (Vaitonis and Masteika, 2021). The literature on RER identifies two categories of variables: external fundamentals and domestic fundamentals. The former include trade barriers and domestic and foreign goods preferences (Guzman et al., 2018; Wanwan et al., 2022; Hossain et al., 2022). Accordingly, the increasing trade barriers cause a country's currency to appreciate, while higher demand for a country's exports drives its currency to appreciate and vice versa. Meanwhile, the latter encompasses productivity in which differences in productivity between traded and non-traded goods sectors can impact the equilibrium real exchange rate in the long run (Mano and Castillo, 2015; Azcona, 2017). However, prior studies have only limitedly addressed several predictors of the RER, while institutional quality, trade openness, and financial development are also considered potential keys (Chaudhry et al., 2022; Xiao et al., 2022; Aliyev et al., 2022; Shevchuk, 2022). These factors lay the foundation for developing the economic environment, promoting trade liberalization, and creating resources for production and business activities (Adeel-Farooq et al., 2017; Conrad and Jagessar, 2018). Indeed, RER has the potential to be influenced by these potential factors, which have unfortunately been overlooked in most previous studies.

In light of these arguments, this study aims to address the gap in the literature by investigating the predictors of RER in Southeast Asian countries. This region is an intriguing case study as its financial markets are developing rapidly, with diverse funding instruments, while its institutions are comparatively weaker than those of newer nations (Albaity et al., 2022; Zhang and Kim, 2022). Additionally, the region has witnessed increased openness to international trade, which could exacerbate the fragility and weak features linked to the rapid economic growth rates (Le et al., 2022; Salgado and Anand, 2022). As a result, because the nature of emerging and frontier economies differs from that of developed industrial economies, this region's unique characteristics necessitate further examination. From this introduction, the rest of this study proceeds as follows. Section 2 reports a brief literature review and develops hypotheses for each link of main concepts. Section 3 displays the methodology and data. Section 4 provides the empirical findings, and Section 6 for the conclusion.

1. LITERATURE REVIEW

This section elaborates on related literature on institutional quality – real exchange rate nexus, trade openness – real exchange rate nexus, and financial development – real exchange rate nexus. Afterward, corresponding hypotheses for each case of these nexuses are developed.

1.1 Institutional quality – real exchange rate nexus

Looking at the theoretical aspect, the impact of institutional quality in international trade operations is significant. Adequate institutions can facilitate contract enforcement, and poorly-functioning institutional quality could discourage traders' willingness to trade abroad due to an increase in costs and risks of trade activities (Feenstra et al., 2013; Dorożyński et al., 2021; Ajide and Soyemi, 2022; Tao et al., 2022). To conduct international trade effectively, traders have a strong desire to obtain information, which is relatively difficult and costly, forming an integral part of transaction costs (Seyoum and Ramirez, 2019). Good institutions could decrease ambiguity and, as a result, boost mutual trust (Nguyen and Wong, 2021; Nguyen et al., 2019). Traders are also initially faced with the problem of moral hazard in an international

trading environment (Abaidoo, 2019). However, there is limited research on the direct impact of institutional quality on RER.

Possible political risks associated with institutional quality include voice and accountability, political stability, government effectiveness, quality of regulation, the rule of law, and corruption (Kaufmann and Kraay, 2002; Gasimov et al., 2023). Such risks negatively affect macroeconomic fundamentals such as RER. Corruption and political risks, on the other hand, create uncertainty in government policies, discourage foreign investors, and lead to capital flight, causing inflation and fluctuated RER (Zeeshan et al., 2022). Given the limited number of studies investigating the relationship between exchange rates and institutional quality in emerging and developing countries, this study revisits the determinants of RER and its relevance to institutional quality, focusing on the augmented Balassa-Samuelson effect. Therefore, the first hypothesis is stated as follows:

H1: Good institutional quality could lead to the appreciation of the domestic currency

1.2 Trade openness – real exchange rate nexus

The relationship between trade openness and RER may be explained by the idea that when RER appreciates, domestic products become more expensive to the rest of the world. This can lead to a reduced demand for domestic goods and services and an increased desire for foreign products. Furthermore, protectionism, such as tariff barriers, quotas, or other measures, may impede imports and contribute to RER appreciation. It should be noted that some have suggested a reverse impact in which a high degree of trade liberalization could cause domestic depreciation (Dornbusch, 1974). Therefore, the relationship between trade openness and RER can be explained by the interaction among trade openness, trade liberalization, influencing the prices and demand for goods and services, and ultimately affecting RER. Other studies, such as those by Zakaria and Shakoor (2011) and Yusoff and Febrina (2014), suggest that economic openness can result in RER devaluation in some emerging nations. However, studies by Romelli et al. (2018) and Calderón and Kubota (2018) have not been able to establish a clear connection between trade openness and RER, possibly due to the various factors involved in trade policies or the unique characteristics of the countries studied. Therefore, based on the indirect evidence and arguments on the trade openness-RER relationship, this study proposes the following second hypothesis:

H2: The increase in trade openness could lead to the depreciation of the domestic currency

1.3 Financial development – real exchange rate nexus

Demir and Dahi (2011) posit that a well-developed financial sector benefits high-value-added exports (i.e., manufacturing products) that primarily rely on external financing. Due to the limited empirical research on the direct impact of financial development on RER, there is a need to draw on the indirect impact via FDI from prior studies. For instance, Saborowski (2009) looks at the importance of financial development in mitigating the effects of FDI on the exchange rate. Additionally, in addition to FDI, volatile non-FDI also shows a bigger appreciation impact; one might predict that financial development is more important in determining the influence of non-FDI on real exchange rates. By lowering communication costs and offering more investment opportunities, a well-functioning financial sector could decrease market friction and efficiently allocate financial resources (Beck and Levine, 2005). An efficient financial system could monitor a business's behavior, promote corporate governance, and control and decrease macroeconomic and production volatility (Easterly and Kraay, 2000). In line with these benefits of financial development, Braun and Raddatz (2007) show that a well-functioning financial system might be associated with risk diversification and prevent directing capital inflows to local consumption, which does not improve the productive potential of domestic economies. This could be an implication for RER in the long run. Therefore, the third hypothesis is proposed as follows:

H3: The financial development could lead to the appreciation of the domestic currency

2. DATA AND METHODOLOGIES

2.1 Data

This study uses a sample of nine countries in Southeast Asia, including Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam over the period of 2002-2020. Due to missing data in the study period, Lao D.P.R. and Timor-Leste are excluded. This creates a strongly balanced sample, providing more robust findings. All studied variables are summarized in Table 1 below.

Table 1. Summary of studied variables

<i>Variables</i>	<i>Explanation</i>	<i>Sources</i>
Real exchange rate (RER)	The real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. It reflects the amount of domestic currency in exchange for that of foreign currency.	WDI (World Bank)
Institutional quality (IQ)	Average calculation based on the means of 06 sub-items including (1) Voice and accountability; (2) Political stability and Absence of Violence and Terrorism; (3) Government effectiveness; (4) Quality of regulation; (5) Rule of law; and (6) Control of Corruption. The estimated value gives the country's score on the aggregate indicator in units of standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.	WGI (World Bank)
Financial development (CREDIT)	Domestic credit to the private sector by banks (% of G.D.P.)	WDI (World Bank)
Trade openness (TRADE)	Trade is the sum of exports and imports of goods and services measured as a share of GDP	WDI (World Bank)

Note: WGI denotes World Governance Indicators, and WDI is World Development Indicators.

2.2 Model

Given previous studies noted in the literature pertaining to the significant potential effect of institutional quality, trade openness, and financial development on RER, this study proposes a model capturing these determinants of RER as follows:

$$RER_{i,t} = \beta_0 + \beta_1 IQ_{i,t} + \beta_2 TRADE_{i,t} + \beta_3 CREDIT_{i,t} + \varepsilon_{i,t} \quad (1)$$

where *i* and *t* denote country and year, respectively. ε is the error term. *RER* is the real exchange rate, showing the amount of domestic currency in exchange to that of foreign currency. *IQ* is institutional quality calculated by taking the average value of six components for institutional quality dimensions. *TRADE* is trade openness computed as the sum of exports and imports divided by G.D.P. *CREDIT* stands for financial development, which is represented by the ratio of a bank's credit to the private sector over G.D.P. The coefficients β_1 , β_2 , and β_3 are the long-term parameters of real exchange rate associated with institutional quality (*IQ*), trade openness (*TRADE*), and financial development (*CREDIT*), respectively. As expected in the above respective hypotheses, the signs of β_1 and β_3 are negative, while that of β_2 is positive.

2.3 Testing procedure

Stationary properties of all variables are examined using a comprehensive array of approaches encompassing the first- and second-difference of unit root test. That former includes Levin-Lin-Chu (LLC) and Im Pesaran and Shin (IPS), whereas the latter consists of Cross-sectional Im Pesaran and Shin (CIPS) and Cross-sectional Augmented Dickey-Fuller (CADF). After confirming the stationarity of the panel time series, the Pedroni-based, Kao-based, Johansen-based, and Westerlund-based co-integration are tested in order

to establish the co-integration linkage among variables. Given this, the long-term relations among variables of interest could be tested by employing OLS., FMOLS, and DOLS to confirm the above hypothesis and hence examine significant predictors of RER. Afterward, the robustness of results is demonstrated through the Quantile Panel Regression (GSQPR) and Granger causality approach (Gujarati *et al.*, 2017).

3. Empirical findings

3.1 Descriptive statistics

The descriptive statistics are performed in Table 2. This study observed that the positive skewness values for all variables greater than zero could display the skewed properties to the right. Moreover, the excess values of kurtosis over zero show the fat-tailed distribution phenomenon of all variables. This could imply the rejection of normally distributed characteristics, again confirmed by the Jarque-Bera test. These phenomena also indicate the use of appropriate econometric models to capture the link between RER and the explanatory factors (i.e., institutional quality, trade openness, and financial development). Hence, this study uses several cutting-edge approaches, such as DOLS, FMOLS, and GSQPR, to examine the above predictors of RER

Table 2. Data statistics summary

<i>Variables</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Skewness</i>	<i>Kurtosis</i>	<i>Jarque-Bera</i>	<i>Prob.</i>
RER	4.570	3.645	0.264	1.446	19.194***	0.000
IQ	-0.171	1.017	1.132	3.642	39.474***	0.000
CREDIT	62.167	42.247	0.223	1.532	16.774***	0.000
TRADE	133.202	98.588	1.366	4.528	69.807***	0.000

Note: *** reports a statistical significance level of 1%.

3.2 Panel unit root test

Table 3 reports panel time series stationarity results using first-difference (LLC and IPS) and second-difference (CIPS and CADF) to test unit roots. Accordingly, a majority of time-series variables have a unit root at the root level, but they are stationary at the first difference, as noted I(1). It is worth noting that the stationarity of all variables is confirmed at least a 5% significance level, indicating that this study may proceed with all variables without any concern and deletion.

Table 3. Unit root test of stationary

<i>Variables</i>	<i>LLC</i>		<i>IPS</i>		<i>CIPS</i>		<i>CADF</i>	
	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>
RER	0.003	-6.435***	1.880	-4.043***	-0.990	-2.528**	-1.421	-2.379**
IQ	-0.207	-10.475***	-0.045	-9.593***	-2.082	-4.473***	-1.677	-2.789***
CREDIT	-0.329	-7.113***	1.288	-5.866***	-1.956	-3.530***	-1.634	-2.728***
TRADE	-0.206	-10.919***	0.705	-10.485***	-1.309	-3.994***	-1.156	-2.779***

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. The null hypothesis implies no stationarity of variables.

3.3 Panel co-integration test

After the stationary test, this study will look at the co-integration test to determine how these factors capture the long-run linkage. This study approach LLC, IPS, and ADF tests to investigate whether panel co-integration exists for all variables of interest. The null hypothesis asserts that no co-integration is evidenced in all tests. By employing the Pedroni and Kao integration test (as reported in Tables 4 and Table 5, respectively), this study finds evidence of the rejection of the null hypothesis, showing a long-run influence among our variables. In addition, the test findings of Johansen-based co-integration in Table 6 also illustrate that the null hypothesis implying no co-integration among variables is rejected.

Table 4. Pedroni-based co-integration test

<i>Test-Statistics</i>	<i>No intercept or trend</i>	<i>Individual intercept</i>	<i>Intercept and Trend</i>
Panel PP-Statistic	-1.105*	-4.570***	-1.979*
Panel ADF-Statistic	-1.673**	-4.678***	-2.075***
Group PP-Statistic	-2.217**	-0.796	-1.994**
Group ADF-Statistic	-3.097***	-1.424*	-2.138**

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively.

Table 5. Kao-based co-integration result

	<i>t-statistic</i>	<i>Prob.</i>
ADF	-1.703**	0.044
Residual variance	0.126	
HAC variance	0.122	

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively.

Table 6. Johansen-based co-integration test

No. of CE(s)	<i>Fisher Stat.</i>		<i>Fisher Stat.</i>	
	<i>Trace test</i>	<i>Prob.</i>	<i>Max-eigen test</i>	<i>Prob.</i>
None	133.2***	0.000	104***	0.000
At most 1	49.48***	0.000	47.34***	0.000

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively.

For more robustness of co-integration, this study approach Westerlund-based co-integration displayed in Table 7 and obtain qualitatively similar findings with a long-term link among studied variables. The long-run relation also suggests the appropriateness of using DOLS and FMOLS to investigate the significant factors driving RER

Table 7. Westerlund-based co-integration tests

Statistic	Value	Z-value
Gt	-3.426***	-3.795***
Ga	-1.432	4.066
Pt	-8.275***	-2.378***
Pa	-6.673	0.36

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively.

3.4 OLS, FMOLS, and DOLS estimations

In addition to standard OLS, FMOLS, and DOLS are approached to estimate a long-term coefficient on RER's determinants for estimating the long-run linkage among studied variables. FMOLS is based on the use of the Newey-West correction to address the autocorrelation of the error term. However, if lagged variables and lead variables are captured in our models to limit autocorrelation of the error term, the preferable option of DOLS is utilized.

Table 8 shows the significant predictors of RER as follows. First, institutional quality is negatively related to RER at a 1% significance level, suggesting that the more institutional quality improves, the more the domestic currency will appreciate. This result supports H1, which implies that the institutional quality of governance could create a favorable climate for private sectors by reducing production costs, guaranteeing property rights, ensuring political stability, facilitating institutional arrangements, and attracting foreign direct investment. In this sense, well-functioning institutions indicate that individual rights are respected, contracts are secured, and property rights are protected. The soundness and efficiency of institutional administration with little corruption have a driving impact on international trade and hence economic development.

Second, trade openness has a positive relationship with RER at the 1% statistical significance level, indicating that the larger the trade openness, the more domestic currency depreciates, which does not support H2. This result can be explained by the fact that openness of trade into the world implies flexibility in capital flows which is important for developing countries mainly depending on international trade. However, the Southeast Asian economies are characterized by an unsustainable high level of growth rate. It is widely accepted that strong fluctuations in capital flows are inevitable, thereby putting pressure on the domestic currency to depreciate.

Third, financial development represented by the bank's credit to the private sector has a negative relationship with RER, showing that when the financial market proceeds, the domestic currency will appreciate. However, this result is not statistically significant, which does not support H3. To take deeper steps, this study applies both generalized and simultaneous panel quantile regression so as to possibly determine any patterns in the credit-exchange rate nexus.

Table 8. OLS., FMOLS, and DOLS estimations (Y= RER)

Variables	OLS. estimations		FMOLS estimations		DOLS estimations	
	Estimated coefficients	t-statistic	Estimated coefficients	t-statistic	Estimated coefficients	t-statistic
IQ	-4.425***	-18.660	-4.147***	-11.168	-3.906***	-12.290
TRADE	0.029***	8.923	0.026***	5.209	0.027***	7.330
CREDIT	-0.005	-0.670	-0.002	-0.233	-0.010	-1.244

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively.

3.5 Quantile panel regression

To provide more insights into the significant determinants of RER above, generalized Quantile Panel Regression was utilized to examine the effects of institutional quality, trade openness, and financial development on the distribution of RER. This approach allows for illustrating the impact of explanatory variables on the conditional distribution of the dependent variable, which is based mainly on the information captured in the studied sample. Therefore, this study could confirm the robustness of OLS, FMOLS, and DOLS regression results and look more at the heterogeneous or homogeneous impact of IQ, TRADE, and CREDIT on different values of RER. The results in Table 9 show that institutional quality and trade openness consistently impact the exchange rate. Accordingly, in most of the RER percentiles, an increase in institutional quality increases the value of the domestic currency (for quantiles 10-75), while a large trade openness is

associated with a decrease in the value of the domestic currency (for quantiles 25-90). Again, this result confirms the results obtained from OLS, FMOLS, and DOLS reported previously.

One interesting point is that financial development stimulates domestic currency appreciation at the low percentile of the exchange rate (quantiles 25-50). This exciting result could be justified by the notion that the private sector of Southeast Asian countries is mainly dependent on financing activities in the banking system, and financial development in terms of banks' credit implies that bank capital plays an increasingly important role in mobilizing financial resources for enterprise in particular and the economy in general. In order to fuel growth, businesses could get access to these banks' credit, thereby improving productivity and operational efficiency. Furthermore, a well-functioning financial sector could eliminate market frictions and efficiently allocate financial resources due to reduced information costs and investment opportunities. Hence, these forces intuitively promote the appreciation of the domestic currency.

Table 9. Generalized quantile panel regressions (Y=RER)

	Q10	q25	q50	q75	q90
IQ	-3.57*** [-2.606]	-4.163*** [-11.523]	-5.871*** [-15.901]	-7.077*** [-10.937]	-7.077 [-14.151]
TRADE	0.005 [1.283]	0.024*** [9.019]	0.028*** [10.931]	0.039*** [4.637]	0.055*** [5.048]
CREDIT	0.004 [0.647]	-0.013*** [-2.663]	-0.010* [-1.782]	-0.001 [-0.062]	-0.016 [-0.744]

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. t-statistics in brackets.

To avoid the sensitivity of results to the selection of the quantile panel regression approach, this study employs a simultaneous quantile regression approach in supplementing the generalized quantile analysis aforementioned. This allows for overcoming the assumption of homoscedasticity and normal distribution. The results can be seen in Table 10, which is qualitatively similar to the findings reported.

Table 10. Simultaneous quantile panel regression (Y=RER)

	Q10	Q25	Q50	Q75	Q90
IQ	-0.915*** [-3.030]	-3.476*** [-5.470]	-3.486*** [-14.070]	-4.018*** [-6.680]	-3.111*** [-4.680]
TRADE	0.004* [1.760]	0.022*** [4.520]	0.022*** [8.560]	0.01 [1.190]	-0.003 [-0.360]
CREDIT	0.004 [1.160]	-0.015** [-2.010]	-0.019*** [-3.330]	0.015 [1.030]	0.016 [1.050]

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively. t-statistics in brackets.

Additionally, this study shows the diagram of the findings illustrated in Figure 1. The dotted line represents the predicted coefficient from the OLS regression and its corresponding confidence interval at 95%. The solid line is the calculated coefficient from the quantile regression. The shaded area denotes the corresponding interval confidence at 90%. If the confidence interval contains a value of zero, the corresponding estimated coefficients could not overcome the significance level test. This study finds the robustness of the results as follows. First, at all quantiles, institutional quality has a negative impact on RER, showing the appreciating effect of the domestic currency. Moreover, coefficients of IQ indicate an overall relatively stable trend from low to high quantile levels. Second, TRADE has a positive effect on RER for a majority of

the quantile level, suggesting the depreciating influence of trade openness on the domestic currency. Third, at low and middle quantiles, CREDIT has a negative marginal impact on RER, in which this effect follows a stable trend and turns out insignificant at large quantiles. Accordingly, financial development significantly impacts domestic currency appreciation at lower quantiles far from middle levels. This result is consistent with those reported in generalized quantile panel regression.

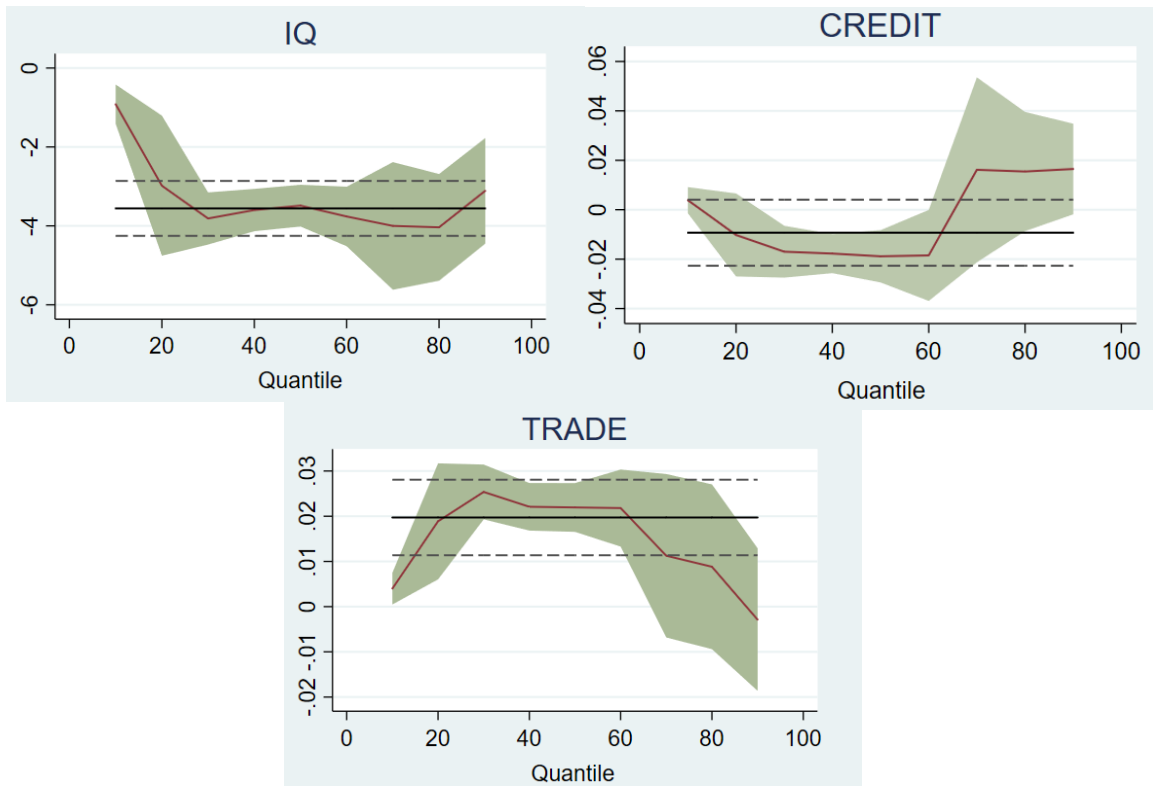


Figure 1. The plot chart for simultaneous quantile panel regression with confidence intervals at 90% for the determinants of RER

3.6 Granger causality

If there is a long-run co-integration among variables of interest, the Granger causality could occur in both directions, such as uni and bidirectional causality between studied variables. The results in Table 11 show that unidirectional causality links run from institutional quality, trade openness, and financial development to RER

Table 11. Granger causality

Null hypothesis	Granger Causality		Conclusion
	F-Statistic	Prob.	
IQ does not Granger Cause RER	5.235**	[0.024]	IQ → RER
CREDIT does not Granger Cause RER	3.100*	[0.080]	CREDIT → RER
TRADE does not Granger Cause RER	3.639*	[0.058]	TRADE → RER

Note: ***, **, and * report statistical significance level at 1%, 5%, and 10%, respectively.

CONCLUSION

The RER plays a crucial role in determining the allocation of domestic production and expenditure between foreign and domestic products. When the RER of a country appreciates, it may become less competitive than other countries (Ayres *et al.*, 2020; Cuestas *et al.*, 2022). Emerging and frontier markets, which are low and middle-income economies in transition to more advanced economies, need to improve their price and non-price competitiveness to catch up with advanced countries. Therefore, RER is a critical factor in the economic growth of these markets. Our study attempts to comprehensively examine potential drivers of RER in Southeast Asian countries, including institutional quality, trade openness, and financial development, using a variety of econometric methods, such as DOLS, FMOLS, GSQPR, and Granger causality, to provide more robust results. Crucial findings could be drawn as follows: (i) The improved institutional quality may lead to an appreciation of domestic currency relative to foreign currency, which is consistent across quantile levels of RER; (ii) A high degree of trade openness may lead to a depreciation of the domestic currency, which may be attributed to fluctuations in capital influx by opening up to international trade. This conclusion is true over most RER quantile levels; and (iii) The appreciating impact of financial development, as measured by bank credit to the private sector, on the value of local currency appears at lower RER quantile levels. These findings are confirmed through significant Granger-cause from predictors such as institutional quality, trade openness, and financial development to RER

Based on these findings, this study suggests several policy implications. Our study demonstrates that an improvement in institutional quality is likely to lead to an appreciation of the domestic currency. A favorable environment created by well-functioning institutional attributes can attract more investors and traders to engage in trade relationships with the host country, increasing the domestic currency's value. Furthermore, financial development can help increase the production capacity of businesses through increased access to credit from the banking sector, ultimately leading to a rise in the value of the local currency. However, opening up to the global market can increase dependence on cross-border trading activities, making the economy more vulnerable. Therefore, strengthening institutional quality, promoting financial market development, and carefully managing exposure resulting from trade openness can improve the value of the domestic currency.

Although this study has endeavored to include new drivers of RER for a comprehensive sample of Southeast Asian countries, there are other potential factors that this study could not address. Moreover, there is a concern related to the small sample size of this study. Future studies can consider replicating the research model by incorporating additional potential predictors of RER or using different scenarios. However, it is essential to note that future research should take into account valid co-integration testing when including additional factors driving RER into the model. Additionally, alternative econometric approaches may be useful for capturing more valid and robust factors.

ACKNOWLEDGMENTS

The first author is grateful for financial support from Van Lang University, Vietnam. The fourth author also thanks Professor Wing-Keung Wong for his ongoing counseling and encouragement. This research is funded by the University of Economics Ho Chi Minh City (UEH), Vietnam. All shortcomings in this study are within our responsibility.

REFERENCES

- Abaidoo, R. (2019), "Policy uncertainty and dynamics of international trade", *Journal of Financial Economic Policy*, Vol. 11, No. 1, pp. 101-120.
- Adeel-Farooq, R.M., Abu Bakar, N.A., Raji, J.O. (2017), "Trade openness, financial liberalization and economic growth", *South Asian Journal of Business Studies*, Vol. 6, No. 3, pp. 229-246.
- Ajide, F.M., Soyemi, K.A. (2022), "Oil rent, entrepreneurial start-ups, and institutional quality: Insights from African oil-rich countries", *Entrepreneurial Business and Economics Review*, Vol. 10, No. 1, pp. 35-49. DOI:10.15678/EBER.2022.100103.

- Albaity, M., Mallek, R.S., Md. Noman, A.H., Al-Tamimi, H.A.H. (2022), "Bank Credit Growth and Trust: Does Institutional Quality Matter? Evidence from the Association of Southeast Asian Nations", *Asian Development Review*, Vol. 39, No. 02, pp. 223-259.
- Aliyev, K., Gasimov, I., Eynalov, H. (2022), "Institutional trust and life satisfaction in selected Post-Soviet countries: The mediating role of 'perceived relative income'", *Economics and Sociology*, Vol. 15, No. 1, pp. 94-108. doi:10.14254/2071-789X.2022/15-1/6.
- Ayele, G.M. (2019), "Does real exchange rate devaluation improve the current account balance of highly indebted low income countries?", *African Journal of Economic and Management Studies*, Vol. 10, No. 2, pp. 212-225.
- Ayele, G.M. (2022), "Real exchange rate misalignment and economic growth in East African least developed countries", *Heliyon*, Vol. 8, No. 11, pp. e11840-e11840.
- Ayres, J., Hevia, C. and Nicolini, J.P. (2020), "Real exchange rates and primary commodity prices", *Journal of International Economics*, Vol. 122, pp. 103261.
- Azcona, N. (2017), "Can Price-Level Targeting Reduce Exchange Rate Volatility?", *Eastern Economic Journal*, Vol. 44, No. 3, pp. 400-436.
- Beck, T., Levine, R. (2005), "Legal Institutions and Financial Development" in *Handbook of New Institutional Economics*. Springer-Verlag.
- Braun, M., Raddatz, C. (2007), "Trade liberalization, capital account liberalization and the real effects of financial development", *Journal of International Money and Finance*, Vol. 26, No. 5, pp. 730-761.
- Calderón, C., Kubota, M. (2018), "Does higher openness cause more real exchange rate volatility?", *Journal of International Economics*, Vol. 110, pp. 176-204.
- Chaudhry, I.S., Nazar, R., Ali, S., Meo, M.S., Faheem, M. (2022), "Impact of environmental quality, real exchange rate and institutional performance on tourism receipts in East-Asia and Pacific region", *Current Issues in Tourism*, Vol. 25, No. 4, pp. 611-631.
- Conrad, D., Jagessar, J. (2018), Real Exchange Rate Misalignment and Economic Growth: The Case of Trinidad and Tobago. *Economies* [Online], 6.
- Cuestas, J.C., Monfort, M., Shimbov, B. (2022), "Has the relationship between the real exchange rate and its fundamentals changed over time?", *Baltic Journal of Economics*, Vol. 22, No. 2, pp. 68-89.
- Demir, F., Dahi, O.S. (2011), "Asymmetric effects of financial development on South-South and South-North trade: Panel data evidence from emerging markets", *Journal of Development Economics*, Vol. 94, No. 1, pp. 139-149.
- Dornbusch, R. (1974), "Tariffs and nontraded goods", *Journal of International Economics*, Vol. 4, No. 2, pp. 177-185.
- Dorożyński, T., Dobrowolska, B., Kuna-Marszałek, A. (2020), "Institutional Quality in Central and East European Countries and Its Impact on FDI Inflow", *Entrepreneurial Business and Economics Review*, Vol. 8, No. 1, pp. 91-110. <https://doi.org/10.15678/EBER.2020.080105>
- Easterly, W. and Kraay, A. (2000), "Small States, Small Problems? Income, Growth, and Volatility in Small States", *World Development*, Vol. 28, No. 11, pp. 2013-2027.
- Feenstra, R.C., Hong, C., Ma, H., Spencer, B.J. (2013), "Contractual versus non-contractual trade: The role of institutions in China", *Journal of Economic Behavior & Organization*, Vol. 94, pp. 281-294.
- Gasimov, I., Asgarzade, G., Jabiyev, F. (2023), "The impact of institutional quality on economic growth: Evidence from post-Soviet countries", *Journal of International Studies*, Vol. 16, No. 1, pp. 71-82. doi:10.14254/2071-8330.2023/16-1/5.
- Gujarati, D., Porter, D., Gunasekar, S. (2017), *Basic Econometrics*, McGraw.
- Guzman, M., Ocampo, J.A., Stiglitz, J.E. (2018), "Real exchange rate policies for economic development", *World Development*, Vol. 110, pp. 51-62.
- Hossain, M.B., Al-Hanakta, R. Y., Hervie, D.M., Nor, M.K., Illes, C.B. (2022), "Exploring the Key Success Factors for Sustainable E-Commerce Adoption in SMEs", *Polish Journal of Management Studies*, Vol. 25, No. 1, pp. 162-178. doi:10.17512/pjms.2022.25.1.10.
- Jaksic, S., Erjavec, N., Cota, B. (2021), "Impact of regulatory trade barriers and controls of the movement of capital and people on international trade of selected Central, Eastern and Southeastern European economies", *Central European Journal of Operations Research*, Vol. 29, No. 3, pp. 891-907.
- Kaufmann, D., Kraay, A. (2002), "Growth without Governance", *Economía*, Vol. 3, No. 1, pp. 169-229.

- Le, T.-H., Bui, M.-T., Uddin, G.S. (2022), "Economic and social impacts of conflict: A cross-country analysis", *Economic Modelling*, Vol. 115, pp. 105980.
- Mano, R., Castillo, M. (2015), "The Level of Productivity in Traded and Non-Traded Sectors for a Large Panel of Countries", *IMF Working Papers*, Vol. 15, No. 48, pp. 1.
- Nguyen, T.T.H., Vo, T.T.V., Phung, A.T., Le, T.H.A. (2019), "Institutional Environment, Government Ownership and Firm Profitability: Empirical Evidence from Vietnam", *Academy of Accounting and Financial Studies Journal*, Vol. 23, No. 3, pp. 1-11.
- Nguyen, T.T.H., Wong, W.-K. (2021), "Do State Ownership and Business Environment Explain Corporate Cash Holdings? Empirical Evidence from an Emerging Country", *Asian Academy of Management Journal of Accounting and Finance*, Vol. 17, No. 1, pp. 1-33.
- Romelli, D., Terra, C., Vasconcelos, E. (2018), "Current account and real exchange rate changes: The impact of trade openness", *European Economic Review*, Vol. 105, pp. 135-158.
- Saborowski, C. (2009), "Capital Inflows and the Real Exchange Rate: Can Financial Development Cure the Dutch Disease?", *IMF Working Papers*, Vol. 09, No. 20, pp. 1.
- Salgado, R., Anand, R. (eds.) (2022), *South Asia's Path to Resilient Growth*, International Monetary Fund.
- Seyoum, B., Ramirez, J. (2019), "Economic freedom and trade flows", *Journal of Economic Studies*, Vol. 46, No. 4, pp. 985-1006.
- Shevchuk, V. (2022), "Price and output effects of long-term exchange rate changes: Central and Eastern European countries in 2002-2019", *Entrepreneurial Business and Economics Review*, Vol. 10, No. 3, pp. 37-50. DOI:10.15678/EBER.2022.100303.
- Stoykova, O.I. (2021), "How to increase the value of bilateral trade? Currency union versus fixed exchange rate regime", *Entrepreneurial Business and Economics Review*, Vol. 9, No. 2, pp. 21-38. <https://doi.org/10.15678/EBER.2021.090202>.
- Tao, X., Yu, S., Qiu, J. (2022), "How does Institutional Distance Affect Binary Margins of Investment? an Empirical Study Based on China's OFDI to Countries along the "Belt and Road", *Transformations in Business & Economics*, Vol. 21, No 2B (56B), pp. 852-872.
- Vaitonis, M., Masteika, S. (2021), "A Method for Testing High Frequency Statistical Arbitrage Trading Strategies in Electronic Exchanges", *Transformations in Business & Economics*, Vol. 20, No 2B (53B), pp. 1024-1052.
- Wanwan, Z., Yanan, Z., Yongliang, Z. (2022), "Temporary trade barriers and enterprise export market changes: evidence from China", *Economic Research-Ekonomska Istrazivanja*, pp. 1-25.
- Xiao, L., Ahmad, M., Waseem, L.A., Ahmad, M.M., Khan, A.A. (2022), "Financial development and real exchange rate misalignments effects on environmental pollution", *Frontiers in Environmental Science*, Vol. 10.
- Yusoff, M.B., Febrina, I. (2014), "Trade Openness, Real Exchange Rate, Gross Domestic Investment and Growth in Indonesia", *Margin: The Journal of Applied Economic Research*, Vol. 8, No. 1, pp. 1-13.
- Zakaria, M., Shakoor, S. (2011), "Relationship Between Government Size and Trade Openness: Evidence from Pakistan", *Transition Studies Review*, Vol. 18, No. 2, pp. 328-341.
- Zeeshan, M., Han, J., Rehman, A., Ullah, I., Hussain, A., Alam Afridi, F.E. (2022), "Exploring symmetric and asymmetric nexus between corruption, political instability, natural resources and economic growth in the context of Pakistan", *Resources Policy*, Vol. 78, pp. 102785.
- Zhang, H., Kim, H. (2022), "Institutional quality and FDI location: A threshold model", *Economic Modelling*, Vol. 114, pp. 105942.