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The Impact of the Exchange Rate on the Trade Balance in Vietnam During the Period 2005-2021 and Some Policy Implications

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Abstract

The article studies the impact of the exchange rate on the trade balance in Vietnam during the period 2005-2021. The relationship between the exchange rate and the trade balance has been mentioned in many theories and empirical studies in different countries and during different periods. To explain the impact of the exchange rate on the trade balance of Vietnam, the research team collected data on import and export turnover, real exchange rate, and net export value during the period 2005 - 2021. The team used EViews 8 software to analyze time series data and to build a linear regression model to consider the relationship between the real exchange rate and net exports during the research period. The model results show that when the real exchange rate increases by 1%, the net export value increases by 37570.76 million USD. This shows that the real exchange rate in Vietnam during the research period has a positive relationship with the balance of trade. The study also shows that when the value of export turnover increases by 1%, the net export value increases by USD 84738.12 million, and when the value of import turnover increases by 1%, the net export decreases by 83429.05 million USD. This shows that Vietnam's trade balance in the research period is affected by the real exchange rate and the value of import and export turnover. From the research results, the team suggests policies to promote exports, improve the trade balance, stabilize Vietnam's macro-economy, and support economic growth and development.

Keywords: Exchange Rate, Exchange Rate Policy, The Trade Balance, Vietnam

1. Introduction

Export and exchange rate policy are two important factors contributing to the economic development of each country in the process of international economic integration, including Vietnam. The exchange rate policy affects import and export activities; trade balance in each period of the economy. Vietnam's exports have grown impressively during the period 2005-2021, helping the country earn a large amount of foreign currency, serving the import of equipment, machinery, and technology in the world in the process of industrialization. Vietnam's trade balance had fluctuations in the research period; From 2005 to 2011, the trade balance was negative (trade

deficit); During the period 2012-2014, the trade balance was positive (trade surplus), but the net export value was not high; In 2015, the trade balance turned into a deficit; During the period 2016-2021, the trade balance achieved a continuous surplus, reaching an impressive level in 2020 despite facing many difficulties due to the impact of the Covid-19 pandemic. In this research, the authors review the impact of the real exchange rate ER (VND/USD) on the trade balance of Vietnam during the period 2005-2021. The research results are the basis for conclusions about the role of exchange rate policy on the trade balance, stabilizing the macro-economy, and promoting economic growth. In order to solve the objectives of the study, the research team has collected data on the value of imports and exports; Nominal exchange rate and real exchange rate; Trade balance; Data has been collected annually from the period 2005 - 2021 and has been analyzed through Excel, EViews 8 software.

2. Research Overview

Empirical studies have shown the impact of the exchange rate on the trade balance. Thanh, P.T (2018) studied the impact of the exchange rate (E) on Vietnam's trade balance and pointed out the advantages and disadvantages of devaluation on the trade balance. Thom, D.T.X (2018) evaluated the impact of the exchange rate (E) on Vietnam's trade balance over time series in the short and long term by using an Autoregressive Distributed Lag model (ARDL), which shows that, in the short term, there is no relationship between the exchange rate and the trade balance, but in the long term the exchange rate has impact on the trade balance. Research by Hoan, P.T & Hao, N.D (2007), using the cointegration method on data from the first quarter of 1995 to the fourth quarter of 2005, has shown that the real exchange rate (ER) has a rather significant impact on Vietnam's trade balance in the long term: a 1% real depreciation of the local currency will increase the trade balance by 0.7%. The study by Anh, N.P (2021) using the ARDL model, showed the impact of the multilateral real exchange rate on the Vietnamese trade balance, instead of just using the bilateral real exchange rate as in other studies. Anh, D.T.H (2012) considered studying the impact of the real exchange rate on export and import activities of Vietnam during the period 1992 - 2012; Nga, N.T.V (2021) calculated the specific value of the multilateral real exchange rate fluctuation by AutoRegressive Conditional Heteroskedasticity model (ARCH), thereby concluding the impact of the real exchange rate on Vietnam's trade balance during the period 2000-2019. Besides, some studies denied that an increase in the exchange rate (E) is always beneficial to the trade balance. Upadhyaya & Dhakal (1997) examined the impact of local currency devaluation on the trade balance of eight developing economies (Colombia, Cyprus, Greece, Guatemala, Mexico, Morocco, Singapore, and Thailand). The study results only find the trade balance improvement effect in the case of Mexico. Tihomir (2004), using the ARDL cointegration method, has shown the relationship between the exchange rate and the Croatian trade balance in the short and long term. Devaluation of local currency by 1% in the short term makes the trade balance worse off by 2.0-3.3%, but in the long term, it improves the trade balance by 0.9-1.3%. In a research on the Serbian economy, Pavle & Mirjana (2010), using the error correction model (ECM), also shown that devaluation causes the trade balance to worsen in the short run and improve in the long run. Trinh, P.T.T (2014) studied the impact of the real exchange rate on the trade balance in the short and long term using ARDL and ECM models and found out that the real exchange rate has a positive impact on the trade balance in the long term.

3. Research Methodology

To examine the impact of the exchange rate on Vietnam's trade balance during the period 2005 - 2021, the research team used desk research methods and descriptive statistics, inductive interpretation, and descriptive statistical methods. In addition, the research team also used quantitative analysis to build a linear regression model to assess the impact of the real exchange rate on the trade balance of Vietnam from the period 2005-2021.

Desk research method: The research team reviewed the literature and synthesizes economic theories on the impact of exchange rates on the trade balance and considered a number of relevant empirical studies on the impact of exchange rates on the trade balance.

Data collection method: The data will be aggregated and analyzed from the General Statistics Office (GSO) of Vietnam, Annual Report over the years of the State Bank of Vietnam, Ministry of Finance (MOF), and

International Finance (IFS-IMF). Collected data will be aggregated and processed using Excel software to consider the impact of exchange rates on the trade balance during the period 2005 - 2021.

Data processing and analysis method: The research team uses a linear regression model to evaluate the impact of the real exchange rate on the trade balance of Vietnam from the period 2005-2021. The built model has the form:

$$NX = C(1)*LER + C(2)*LX + C(3)*LIM + C(4) + e$$

With: ER: Real exchange rate (VND/USD); LER is logarized by ER
 X: Export value; LX is logarized by X
 IM: Import value; LIM is logarized by IM
 NX: Net export value (NX = X – IM)
 With e as a random noise

The procedure is taken as follows:

Step 1: Use EViews 8 software to run the model with collected secondary data.

Step 2: Check the statistical significance of the regression coefficients with the explanatory variables and the statistical significance of the regression model with significance level $\alpha=0.05$.

A regression coefficient is statistically significant if:

- Prob < $\alpha=0.05$
- Prob(F-statistic) < $\alpha=0.05$

Step 3: Check the explainability of the model through the coefficients R-squared and Adjusted R-squared

A model is explanatory (fit) if:

- R-squared > 0.6
- Adjusted R-squared > 0.6

Step 4: Check the model's defects with $\alpha=0.05$.

A model is considered valid (*can be used for analysis*) when the regression coefficients in the model are statistically significant, and the R-squared, Adjusted R-squared should not have autocorrelation and heteroskedasticity. At the same time, the residuals of the model should follow the standard normal distribution.

In the study, the authors used tools on EViews 8 to check for these defects. Specifically:

- Breusch-Godfrey test to check autocorrelation. The model does not have an autocorrelation defect at some level p if Prob (F-statistic) and Prob (Obs *R-squared) > $\alpha=0.05$.
- Breusch-Pagan-Godfrey to test heteroskedasticity. The model is not subject to heteroskedasticity if Prob (F-statistic) and Prob (Obs*Chi-squared) > $\alpha=0.05$.
- Jarque - Bera to check if the residuals of the model follow the standard normal distribution. The residuals of the model are normally distributed if Prob (Jarque - Bera) > 0.05.

When the above conditions are satisfied, the model results are estimated and analyzed.

4. Theoretical Basis for the Impact of Exchange Rate on the Trade Balance

Exchange rate. An exchange rate is the price of one currency expressed in terms of another. The nominal exchange rate is the price of 1 unit of a country's currency in terms of another country's currency. The real exchange rate is the relative price of two countries' goods. The real exchange rate indicates the rate at which the goods of one country are exchanged for the goods of another. (Tung, H.T, Duong, L.X, 2019)

The trade balance is a part of the current account of the balance of payments. It represents the difference between the value of a country's exports and the value of a country's imports during a given period. (Tung, H.T, Duong, L.X, 2019)

Impact of net export value on the trade balance

Net export value (NX) reflects the difference between the value of exports (X) and the value of imports (IM), which reflects the state of the trade balance.

$$NX = X - IM$$

With:

$NX > 0$ the trade balance surplus

$NX < 0$ the trade balance deficit

$NX = 0$ the trade balance equal

Net exports (NX) are a function of the real exchange rate (ER). The relationship between the exchange rate and net exports can be expressed as follows:

$$NX = NX(ER)$$

According to *international trade theory*, when the real exchange rate (ER) rises (local currency depreciates), domestic goods will become relatively cheap (all other things are constant), thereby increasing the competitiveness of the country's exports, thus improving the balance of trade. On the other hand, an increase in the exchange rate has the effect of encouraging exports because for the same amount of foreign currency earned from exports, more domestic currency can be exchanged. In the short term, an increase in the E effect will stimulate an increase in export volume and a decrease in imports. But it is also important to consider *the long-term impact*: *Firstly*, when the cost of producing exported goods increases due to the increase in raw material price effect, the cost increase effect may occur later due to the effect of raw material stockpiling; *Secondly*, when the local currency depreciates, it can stimulate exports in the short term, but according to the law of averaging profits in the economy, there will be a shift in market structure from production to serve the domestic market to export-oriented production. This increases the competitiveness of both inputs and outputs for export production; *Thirdly*, after the domestic currency depreciates, inflation tends to increase. When inflation increases, the real wages of workers decrease, this forces domestic enterprises to increase nominal wages, which increases the production costs of exporting enterprises.

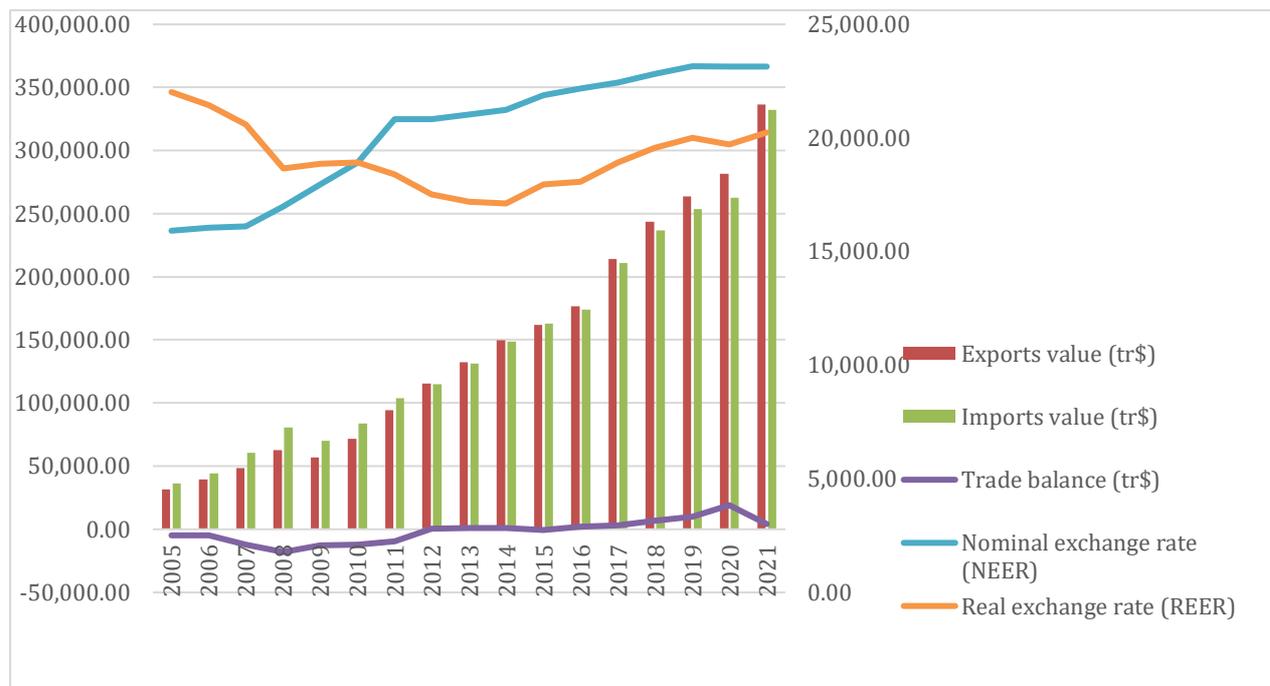
Meanwhile, according to *Marshall Lerner condition*, whether the trade balance improves or deteriorates depends on the dominance of the volume effect or the price effect: (i) *If the price effect is dominant*, after devaluation, the increase in export volume and the decrease in import volume are not enough to compensate for the decrease in the value of exports in foreign currency and the increase in the value of imports. As a result, the trade balance deteriorated; (ii) *If the price and volume effect are equal*, after devaluation, the export volume increased, and the import volume decreased just enough to compensate for the decrease in the value of exports in foreign currency and the increase in the value of imports in terms of the domestic currency. As a result, the equilibrium of the trade balance is maintained. (iii) *If the volume effect is dominant*, after devaluation, the export volume increases, and the decrease in import volume is more than enough to compensate for the price effect. As a result, the trade balance improves. Based on the elasticity approach, *the J-curve theory*, introduced by Magee (1973), investigated the impact of a country's currency devaluation on the trade balance over time. The dynamic response of the trade balance represents a short-term decline and a long-term recovery forming a J-shaped curve. Besides, according to Keynes's consumption approach: devaluation of the domestic currency, which causes consumers to switch to domestic goods, promotes output more strongly than domestic consumption, and the trade balance of commerce is improved. In addition, it is also necessary to see that the exchange rate with net exports has a two-way relationship, the exchange rate has an impact on the price, volume, and cost of inputs to produce exports; conversely, when a country's exports increase, the amount of foreign currency it earns (*all other things are constant*) will affect the exchange rate. Suppose if Vietnam's exports to the US increase, then the supply of USD and the demand for VND increase in the foreign exchange market and the exchange rate E decreases, the VND tends to appreciate again.

5. Exchange Rate and Trade Balance of Vietnam During the Period 2005-2021

5.1. The period 2005-2011

During the period 2005 - 2007, the nominal exchange rate (NEER) increased slightly. Import and export turnover in this period increased quite evenly, in which exports increased on average by more than 23%. The movement of the nominal exchange rate (NEER) tended to increase strongly during the period 2008 - 2011. However, with the reversal of investment capital flows and the fluctuation of inflation in 2008 and the impact of the global economic recession in 2009, the real exchange rate (REER) in this period fluctuated complicatedly. In 2008, the trade deficit reached 18 billion USD. In 2009, the real exchange rate increased but the export turnover was low, the export decrease was 8.8% compared to 2008. (Figure 1)

Figure 1: Nominal exchange rate (NEER), the real exchange rate (REER), import-export value, and the trade balance of Vietnam during the period 2005 – 2021



Source: International Financial Statistic (IFS)

5.2. The period 2012-2015

The period 2012-2014 shows a slight upward trend of the nominal exchange rate (NEER), however, the real exchange rate (REER) has a slight downward trend, except in 2015, the real exchange rate (REER) increased 4% more than in 2014 (Figure 1). Import and export values have increased gradually over the years. Exports are larger than imports, the trade balance is in surplus. 2012 is the first year that marks a surplus in the trade balance in the study period. After 3 years from 2012 to 2014, the trade balance was surplus, in 2015, the trade balance reversed to a deficit of 764 million USD, the main reason can be mentioned because the exchange rate fluctuated in August 2015 before the Fed raised interest rates and when the renminbi (CNY) depreciated.

5.3. The period 2016-2021

The government regulated the exchange rate according to the managed floating mechanism. The nominal exchange rate (NEER) and the real exchange rate (REER) moved in the same direction, increases along with the increased value of import and export; Except in 2019 and 2020, the nominal exchange rate tended to increase while the real exchange rate tended to decrease. However, this period shows that the trade balance has achieved a continuous surplus, the total import and export value is high and tended to increase compared to the previous year.

In the two years 2020 and 2021, Vietnam's economy was seriously affected by the Covid-19 pandemic, but this was the period when Vietnam achieved a new record in terms of import and export turnover. The total import-export value of the whole country in 2020 reached 545.36 billion USD, more than 5.4% compared to 2019. The

country's trade balance at the end of 2020 reached a surplus-value of 19, 95 billion USD, the highest level in 5 consecutive years of trade surplus since 2016 (General Department of Customs 2020). Entering 2021, the trade balance still maintained a surplus of 4 billion USD, and import and export turnover maintained a high growth rate.

6. The Impact of Exchange Rate on Trade Balance: View from Quantitative Analysis

6.1. Data series

To examine the relationship between real exchange rate and trade balance, the research team carried out data collecting on the real exchange rate (ER), import-export value (X, IM), and net exports value (NX). Data collected annually from 2005 to 2021, the total of observations are 17.

In the model, X, IM, and ER are logarithmized and coded LX, LIM, and LER. The collected and logarithmized data, using EViews 8 software, the study team has a statistic description in Table 1

Table 1: Descriptive statistics of variables

	NX	LX	LIM	LER	IM	ER
Mean	-1639.06	11.66154	11.72037	9.856267	147536.3	19126.2
Median	357	11.79417	11.78494	9.848594	131260	18931.71
Maximum	19064.12	12.72561	12.71364	9.999659	332250	22018.95
Minimum	-18029	10.36489	10.50254	9.747763	36408	17115.9
Std. Dev.	9422.61	0.734995	0.649022	0.073328	86517.45	1417.691
Skewness	0.204322	-0.2572	-0.29094	0.300919	0.569693	0.429054
Kurtosis	2.744949	1.830249	2.076795	2.283243	2.304447	2.398202
Jarque-Bera	0.164363	1.156661	0.843547	0.620463	1.262245	0.778112
Probability	0.921105	0.560834	0.655883	0.733277	0.531994	0.677696
Sum	-27864.1	198.2462	199.2462	167.5565	2508118	325145.4
Sum Sq. Dev.	1.42E+09	8.643491	6.739676	0.086031	1.20E+11	32157557
Observations	17	17	17	17	17	17

Source: The model testing result

6.2. Testing the impact of the exchange rate on the trade balance of Vietnam during the period 2005-2021

The econometric model is used to explain the impact of the exchange rate on the trade balance in Vietnam during the period 2005-2021, the data is collected annually, and logarized. The results are shown in Table 2.

Table 2: The impact of the exchange rate on the trade balance of Vietnam during the period 2005-2021

Dependent Variable: NX
Method: Least Squares
Date: 08/21/22 Time: 16:40
Sample: 2005 2021
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LER	37570.76	10298.08	3.648327	0.0029
LX	84738.12	11602.38	7.303512	0.0000
LIM	-83429.05	13131.85	-6.353183	0.0000
C	-382304.5	107681.4	-3.550329	0.0036
R-squared	0.925574	Mean dependent var		-1639.063
Adjusted R-squared	0.908399	S.D. dependent var		9422.610
S.E. of regression	2851.812	Akaike info criterion		18.95162
Sum squared resid	1.06E+08	Schwarz criterion		19.14767
Log likelihood	-157.0888	Hannan-Quinn criter.		18.97111
F-statistic	53.89032	Durbin-Watson stat		2.182292
Prob(F-statistic)	0.000000			

Source: The model testing result

Testing model fit

The results in Table 2 show that the regression coefficients are all statistically significant because Prob (LER) = 0.0029 < 0.05; Prob (LX) = 0.0000 < 0.05; Prob (LIM)=0.0000 < 0.05. The regression model is fit because Prob (F-statistic) = 0.000000 < 0.05; The coefficient of determination R-squared = 0.925574 > 0.6; Adjusted R-squared = 0.908399 > 0.6. The model is fit.

Table 3: Breusch- Godfrey Serial Correlation LM Test (lags = 2)

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.758587	Prob. F(2,11)	0.4913
Obs*R-squared	2.060525	Prob. Chi-Square(2)	0.3569

Source: The model testing result

According to table 3, Prob. F(2.11) = 0,4913 > 0,05; Prob. Chi-Square(2) = 0,3569 > 0,05. The model does not have autocorrelation defects.

Table 4: Heteroskedasticity Test (white)

Heteroskedasticity Test: White			
F-statistic	1.510861	Prob. F(6,10)	0.2687
Obs*R-squared	8.083214	Prob. Chi-Square(6)	0.2321
Scaled explained SS	10.66168	Prob. Chi-Square(6)	0.0994

Source: The model testing result

The result of Table 4 shows that Prob. F(6,10)=0.2687 > 0.05; Prob. Chi-Square(6) = 0.2321 > 0.05; Prob. Chi-Square(6) = 0.0994 > 0.05. The model has no variable variance.

Regression model and analysis of the model's results

The results of data analysis using EViews 8 in Table 2 show the impact of the exchange rate on the trade balance of Vietnam during the period 2005-2021 with annual re

$$NX = 37570,76*LER + 84738,12*LX - 83429,05*LIM - 382304,5$$

The results of the regression model present:

The trade balance is affected by the real exchange rate. Specifically, the coefficient C(1) = 37570.76 > 0, thereby showing that holding all other factors constant, when the real exchange rate increases, the value of net exports (NX) increases. When the real exchange rate increased by 1%, NX increased by 37570.76 million USD. Thus, the real exchange rate is proportional to the trade balance, which is consistent with economic theory and the results of some empirical studies mentioned previously by the research team and with the specific case. Vietnam's economy during the period 2005-2021.

Besides, the trade balance is also affected by exports and imports. According to Table 2, the coefficient C(2)= 84738.12 > 0. The results show that an increase in exports (X) causes an increase in net exports (NX). When the export turnover increased by 1%, the net export value increased by 84738.12 million USD. The coefficient C(3)= - 83429.05 < 0 shows that imports (IM) increase net exports (NX) decrease and vice versa. When the import turnover increased by 1%, the net export value decreased by 83429.05 million USD. This is consistent with the theory of the impact of import and export turnover on the trade balance.

The significance of the coefficient R- squared = 0.925574 shows that the regression model explains 92,5574% of the fluctuations in the trade balance.

The model results support the view that an appreciation of the real exchange rate has a positive effect on net export value. The model also shows that the trade balance is affected by import and export turnover in the research period.

7. Some Policy Implications

Through analyzing and assessing the impact of the exchange rate on the trade balance in the period 2005-2021, the research team suggests some implications for Vietnam's exchange rate policy in the context of international economic integration in order to improve the country's economy, trade balance and macroeconomic stability as follows:

First, the exchange rate should continue to be managed flexibly. Vietnam has converted to a managed floating exchange rate system; therefore, it is necessary to gradually increase the degree of floating and the development of the foreign exchange market. In the context of international integration, exchange rate management needs to be done more flexibly. Pegging to a basket of currencies helps to keep the exchange rate stable and ensures policy flexibility. Due to the large openness of Vietnam's economy, anchoring in a basket of currencies helps Vietnam avoid adverse shocks from the world currency and commodity markets.

Second, the government needs to closely coordinate with relevant ministries and sectors in adjusting fiscal and monetary policies and developing the market for derivatives to help prevent exchange rate risks. Narrowing the gap between real and nominal exchange rates, limiting the operation of the "black market" foreign exchange market.

Third, the government needs to strictly handle acts of foreign currency speculation. Actively coordinate with police agencies in anti-smuggling, detecting and dealing with illegal business and foreign currency exchange...

Fourth, according to the State's current regulated floating exchange rate policy, exchange rate movements are also referenced to macroeconomic and monetary balances. This implies that the imbalance in The State budget will affect the exchange rate of VND in the market. Therefore, it is necessary to limit the exchange rate's impacts on the State budget.

Fifth, it is necessary to strengthen the international competitiveness of Vietnam's exports. The Government needs to innovate the export-oriented export growth model in depth, based on exploiting competitive advantages to improve export productivity, quality, and efficiency. Reducing the proportion of imported inputs in the value of exported goods, and at the same time, supporting export enterprises to improve their competitiveness in import and export activities to promote Vietnam's trade balance in the upcoming years.

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