The impact of the effective exchange rate volatility on the trade balance of Vietnam

O impacto da volatilidade da taxa de câmbio efetiva na balança comercial do Vietnã

El impacto de la volatilidad del tipo de cambio efectivo en la balanza comercial de Vietnam

DOI:10.34117/bjdv10n4-043

Submitted: Mar 18th, 2024
Approved: Apr 8th, 2024

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ABSTRACT
This paper examines the effect of exchange rate volatility and other factors on trade balance of Vietnam in the period from the first quarter in 2000 to the fourth quarter in 2016. The data of exports, imports, Gross Domestic Product of Vietnam and Gross Domestic Product of partners from International Monetary Fund is used in this research. The results show that a stable long-term equilibrium relationship exists between exports. Exchange rate volatility could increase the export value but Gross Domestic Product of partners had significant negative effect on the export. The Gross Domestic Product of Vietnam increase the import value but the effect of the exchange rate volatility on the import value is found not significant. Finally, the flexible control of State Bank on exchange rate volatility will enhance Trade Balance of Vietnam.

Keywords: exchange rate volatility, trade of balance, Vietnam, supply chain.

RESUMO
Este artigo examina o efeito da volatilidade da taxa de câmbio e outros fatores sobre a balança comercial do Vietnã no período entre o primeiro trimestre de 2000 e o quarto trimestre de 2016. Utilizando os dados de exportações, importações, Produto Interno Bruto do Vietnã e Produto Interno Bruto dos parceiros do Fundo Monetário Internacional. Os resultados mostram que existe uma relação de equilíbrio a longo prazo entre as exportações. A volatilidade cambial poderia aumentar o valor de exportação mas o PIB dos parceiros teve um efeito negativo significativo no exportação. O PIB do Vietnã aumenta o valor de importação mas o efeito da volatilidade cambial sobre o valor de importação não foi significativo. Finalmente, o controle flexível do Banco Central sobre a volatilidade cambial melhorará o Balanço Comercial do Vietnã.

Keywords: volatilidade do tipo de câmbio, balança comercial, Vietnã, cadeia de suprimento.
trimestre de 2016. Os dados de exportações, importações, Produto Interno Bruto do Vietnã e Produto Interno Bruto dos parceiros do Fundo Monetário Internacional são usados nesta pesquisa. Os resultados mostram que existe uma relação de equilíbrio estável de longo prazo entre as exportações. A volatilidade da taxa de câmbio pode aumentar o valor das exportações, mas o Produto Interno Bruto dos parceiros teve um efeito negativo significativo sobre as exportações. O Produto Interno Bruto do Vietnã aumenta o valor das importações, mas o efeito da volatilidade da taxa de câmbio sobre o valor das importações não é significativo. Por fim, o controle flexível do Banco do Estado sobre a volatilidade da taxa de câmbio aumentará a balança comercial do Vietnã.

**Palavras-chave:** volatilidade da taxa de câmbio, balança comercial, Vietnã, cadeia de suprimentos.

**RESUMEN**
Este documento examina el efecto de la volatilidad del tipo de cambio y otros factores en la balanza comercial de Vietnam en el periodo comprendido entre el primer trimestre de 2000 y el cuarto trimestre de 2016. En esta investigación se utilizan los datos de exportaciones, importaciones, Producto Interior Bruto de Vietnam y Producto Interior Bruto de los socios del Fondo Monetario Internacional. Los resultados muestran que existe una relación de equilibrio estable a largo plazo entre las exportaciones. La volatilidad del tipo de cambio puede aumentar el valor de las exportaciones, pero el Producto Interior Bruto de los socios tiene un efecto negativo significativo en las exportaciones. El Producto Interior Bruto de Vietnam aumenta el valor de las importaciones, pero el efecto de la volatilidad del tipo de cambio sobre el valor de las importaciones no es significativo. Por último, el control flexible del Banco del Estado sobre la volatilidad del tipo de cambio mejorará la balança comercial de Vietnam.

**Palabras clave:** volatilidad del tipo de cambio, balança comercial, Vietnam, cadena de suministro.

**1 INTRODUCTION**

Multilateral real exchange rate is one of the important macro indicators of a country. It contributes to creating an economy’s international competitiveness. Therefore, it has a strong influence on a country’s foreign trade developments. Somebody knows that the movements of the real exchange rate have a permanent effect on exports and imports. Most empirical studies on the exchange rate volatility on trade focus only on developed countries, and the literature on transition economies is limited, because of the lack of good data. Therefore, research related to exchange rate management still remains of interest to economists, especially for developing countries. For the Vietnamese economy, Vietnam's Trade Balance has been deficit since 2000. Despite many changes in the exchange rate policy of the State Bank of Vietnam, the level of improvement in the
status of trade balance is still low. Over the past 10 years, there have been many research efforts on exchange rate mechanism in Vietnam. These studies show that Vietnam's exchange rate regime should be sustained. But other side it need more flexible on market signals. Vo Tri Thanh et al. (2000) suggested that Vietnam should follow the mechanism of currency exchange in a basket of currencies (Band-Basket-Crawling). In fact, in the past few years, Vietnam has pursued the adjusted exchange rate as proposed by the two studies. Two recent studies by Nguyen Tran Phuc and Nguyen Phuc Tho (2009) showed that this adjustable anchor mechanism does not function effectively, cause of instability in the financial market. Moreover, it can’t flow the development of the foreign exchange market in Vietnam. A study by Nguyen Thi Thu Hang (2011) also shared Nguyen Tran Phuc (2009) and suggested for Vietnam to move quickly to a controlled floatation mechanism. Therefore, it is necessary to study the real exchange rate volatility and Trade Balance of Vietnam.

2 OVERVIEW OF THE FOREIGN EXCHANGE RATE REGIME IN VIETNAM

There have been many changes in exchange rate policy of Vietnam since 2000.

2.1 PERIOD FROM 2000 TO 2006

Vietnam stock market started operation. This is the period when Asia began to recover after the crisis. In Vietnam, the Vietnamese stock market started to heat up very quickly. Amount of capital from the public and investors are increased rapidly. The State bank of Vietnam apply the exchange rate regime with narrow band, almost fixed. The nominal exchange rate has no volatility fluctuations, the SBV does not suddenly intervened in the exchange rate.

2.2 PERIOD FROM 2006 TO 2011

This is the period when the global economy fell into recession with two crises originating in the two largest centers in the world: the United States (financial crisis) and Europe (debt crisis). In Vietnam, from the end of 2006, the instrument of fluctuation amplitude began to be adjusted with higher frequency and with increasing trend until early 2009. After that, it is reduced to 3% and then 1% in 2011. In addition, a number of
other instruments, both direct and indirect, they were applied by the SBV to solve high and unpredictable inflation such as captive reserve forced in foreign currency: domestic currency depreciation; Maximum deposit interest rate in foreign currency; foreign currency loans; foreign currency exchange with corporations, large corporations... Thus, the current exchange rate regime of Vietnam is still anchored with the adjustment margin. The foreign currency and foreign assets ratio on the SBV’s currency balance sheet has been raised again since 2008. Because of the declining foreign exchange reserves exchange rates is increased. That will have a negative impact to the SBV's solvency.

2.3 PERIOD FROM 2012 TO CURRENT

In 2012, the SBV has pledged to keep the exchange rate fluctuated by no more than 3%. And they focus on the interest rate tool curbing economic decline. However, in the first half of 2012, the lowering of interest rates was not work with the output immediately affected the input. The demand of foreign currency to pay for imports will increase at the end year. As a result, that will inevitably put pressure on VND devaluation, inflation increase, macroeconomic stabilization efforts of the Government and the SBV.

In 2013, the State Bank of Vietnam aims to maintain the exchange rate within the range of 2% -3%. The State Bank of Vietnam wants to control the expectation of depreciation of VND, creating conditions for enterprises to take initiative in production. They closely control the exchange rate on market signals. It conforms to the macro balance and balance of payments. They implements measures to increase their reserves. The gap between the official exchange rate and exchange rates in the free market were narrowed. This is an important factor in maintaining and strengthening investor confidence. Due to the stable exchange rate, enterprises and individuals exchange foreign currencies to Vietnam dong at commercial banks. In addition, the remittance has increased sharply. The amount of remittances to Vietnam in 2013 is about $ 11 billion.

The SBV has a target of stabilizing the exchange rate in 2014 within ± 2%. SBV closely combines exchange rate policy and interest rate policy. At the same time, they closely monitor the developments in the foreign currency market and balance of payment. The State Bank of Vietnam (SBV) continued to reduce interest rates on USD deposits and average interbank rates in line with developments in foreign currency supply and demand in the market.
In 2015, the SBV face to many challenges in managing the exchange rate policy. SBV widened band of exchange rate from +/- 2% to +/- 3%.

The SBV has been limiting dollar speculation on the market by reducing interest rates on the dollar. There force, it increased the attractiveness of VND. As a result, the foreign exchange market was stable. The exchange rate on the market dropped below the SBV’s selling rate. And it more closely reflected the real supply and demand of the economy. Figure 1 shows that exchange rate fluctuations were moderate during the period between 2000-2016 years.

![Figure 1: Exchange rate Dynamics in Vietnam, 2000-2016](image)

Note: “Official rate” is the official exchange rate, “curb rate” is the parallel (curb) market exchange rate, both are shown in nominal values of Vietnam Dong per USD. The horizontal axis represents a period from 2000-2016.


Vietnam is among the world’s most open economies, with trade amounting to about 160 percent of GDP. It has increased world export and import market shares roughly fivefold in the last 15 years. Export growth has been particularly strong in labor-intensive manufacturing of apparel/footwear and, more recently, electronics. Gains in final electronics export market share have been similarly impressive. As a result, Vietnam’s export product mix has shifted from commodities to manufacturing. Geographically, exports are diversified with the U.S., the EU, and other non-East-Asian countries accounting for about 20 percent each, while China and Japan account for just under 10 percent each. Vietnam’s manufacturing export growth is largely driven by FDI with major inflows from Korea, Japan, Singapore, and Taiwan Province of China. FDI inflows accelerated in the run-up to Vietnam’s WTO accession in January 2007 from an
annual average of US $ 2.5 billion from 2000 – 2005 to an annual average of US $ 8.4 billion from 2008 – 2014. The FDI sector’s share in Vietnam’s total exports has reached 70 percent.

Analysis of gross and value added data shows that multinationals tend to use Vietnam for final assembly with comparatively high foreign value added content. Accordingly, imports of intermediate and investment goods have been rising fast in recent years, with China supplying ⅓ of imports. Trade agreements and competitive wages have been key ingredients for Vietnam’s export success. Import tariffs have been gradually reduced, while most quantity restrictions have been removed. Vietnam has entered into a number of bilateral, regional, and multilateral trade agreements.

Nonetheless, the trade increase with neighboring and other countries has also become volatile to the foreign exchange rate. In this analysis, it is assumed that Vietnam’s economy is “small” relatively to the rest of the economies in the world. In this respect, terms of trade shocks and the impact of international trade flows will pass to the country with movements in exchange rates. In this regard, we investigate the impact of exchange rate volatility to trade flows of Vietnam to find out (1) whether exchange rate volatility has changed significantly after implementation of new system reforms in 2011, and (2) if volatility of real exchange rates has a negative or positive relationship with trade flows.
3 LITERATURE REVIEW

Theoretical models that exam the relationship volatility and trade. They show exchange rate volatility may impact in a positive, negative, or ambiguous fashion on trade flows. These theoretical models drive different results depending on the assumptions employed, availability of capital, the time horizon of the trader, etc.

More recent studies, however, provide conditions that lead to either a positive or ambiguous relationship between exchange rate risk and trade flows. The theoretical models prevailing in these areas can broadly be classified in two ways: examples of the general equilibrium analysis are Gonzaga and Terra (1997), and examples of the partial equilibrium framework are (Ethier, 1973), (Viaene and C.G. de Vries, 1992), and (Barkoulas and Caglayan, 2002). Viaene and C.G. de Vries (1992) provide a theoretical explanation for the empirical anomalies regarding the relationship between the volume of trade and exchange rate volatility. Under a partial equilibrium framework they show that in the absence of forward markets, an increase in exchange rate volatility reduces both imports and exports, and the surplus or deficit of the balance of trade is reduced as well. However, with a forward exchange market, one trade flow benefits and the other trade flow necessarily loses from changes in either the expected rate or the volatility of exchange rates. The intuition behind these opposing effects is that exporters and importers are on opposite sides of the forward markets.

Franke (1991) developed a risk neutral firm’s exporting strategy model that provided support for the positive hypothesis. The assumptions of the model are: firms operate in monopolistic competition, firms maximize the net present value of expected cash flows from exports and profits are an increasing function of the real exchange rate. Franke (1991) also analyzed an investment problem. The export strategy was determined by the transaction costs incurred whereby the firm weights the entry (exit) costs associated with entering (abandoning) a foreign market against the profits (losses) created by exports. Where the cash flow is convex in exchange rate, the present value of cash flows grows faster that of entry and exit costs and the firm benefits from increased exchange rate volatility. Therefore, firms will enter a market sooner and exit later when exchange rate risk increases, the number of trading firms will also increase. So, on average, trade benefits from exchange rate risk. Sercu and C. Vanhulle (1992) looked at the same problem in a very different setting. Sercu and C. Vanhulle (1992) argued that friction here is brought about not by entry and exit costs, as stated in Franke’s paper, but by
standard duties and/or transportation costs. Additionally, a short-term “market period” perspective is adapted as risk-neutral firms produce in the current period for sales in the next period. Firms start producing at time zero for sales at time one, and may end up import-competing, exporting, or not trading at all depending on the end-of-period exchange rate. Sercu and C. Vanhulle (1992) showed that under perfect competition and under complete monopoly an increase in exchange rate volatility has similar effects on prices and production as decreased tariffs. For the intermediate market structure, the effect is uncertain. (In this model, exchange rate risk is measured as the conditional standard deviation of the exchange rate.)

By summarizing the studies reviewed above, it can be concluded that high volatility in the exchange rate system may have substantial impact on trade and it may increase foreign trade operations in the export and import operations of the country.

4 TRADE MODEL

The main objective is to investigate the link between real exchange rate volatility and changes in trade flows of a country with abroad. In this respect, we will test the price elasticity functions to measure the responsiveness of export or import values to real exchange rate fluctuations.

A survey of enormous literature on the subject by (Mc Kenzie, 1999) implies that using the standard model with adequate variables will be sufficient for analysis, in spite of some previous studies that have included in their trade functions a number of different explanatory variables. We follow Doroodian (1999) and Pozo (1992) to specify the following trade functions:

\[ X = f(Y_{\text{foreign}}, \text{Vol}) \]  \hspace{1cm} (1)

\[ M = g(Y_{\text{domestic}}, \text{Vol}) \]  \hspace{1cm} (2)

where X, M are real aggregate exports and imports, respectively; \( Y_{\text{foreign}} \) accounts for foreign income of trading countries, \( Y_{\text{domestic}} \) is domestic income, Vol is real effective exchange rate volatility (determined by ARCH approach).

Fundamental economic theory suggests that foreign income has a substantial impact on domestic exports, so that an increase in real foreign income \( (Y_{\text{foreign}}) \) will result
to an increase in the demand for domestic exports. De Grauwe (1988) suggested that risk-averse people may export more because of exchange rate uncertainty (volatility) and it may result in increasing overall trade. If traders are risk-neutral, they can feel that exports are less attractive with exchange rate uncertainty. They may decide to perform fewer export activities, and this will result in declining overall trade. So, the impact of exchange rate volatility on exports can be either positive or negative. On the other hand, exchange rate volatility will have a negative relationship on imports. Variables such as domestic activity ($Y_{domestic}$), which is proxied by the real exchange rate (REER), and volatility will also have a major impact on the import function. To investigate this relationship in our model, trade functions in the simplified model will be changed to the following log–linear equation:

$$\log X_t = \beta_{10} + \beta_{11}\log rGDP_{t,foreign} + \beta_{12}\text{Vol}_t + \epsilon_t, \quad (3)$$

$$\log M_t = \beta_{20} + \beta_{21}\log rGDP_{t,domestic} + \beta_{22}\text{Vol}_t + \epsilon_t, \quad (4)$$

where $\log X_t$ is the logarithm of real exports, $\log M_t$ is the logarithm of real imports, $\log rGDP_{t,foreign}$ is the logarithm of real foreign income, $\log rGDP_{t,domestic}$ is the logarithm of real domestic income, $\text{Vol}_t$ is a measure of exchange rate volatility, and $\epsilon_t$ is a error term. In the reviewed literature, theoretical studies determine that the volume or total amount of exports to a foreign country should increase as long as the real income of the trading partner rises. For this assumption, we expect $\beta_{11} > 0$. Total imports to a domestic country is related to the improvements of domestic economy or activities, hence we also expect $\beta_{21} > 0$. The impact of exchange rate volatility on exports and imports is not clearly defined and empirically investigated, that is why we expect $\beta_{12}$ and $\beta_{22}$ to be either positive, negative or ambiguous.

5 DATA COLLECTION

This study uses data covering the period from the first quarter of 2000 year to the fourth quarter of 2016 (1999:Q1-2016:Q4). For the real foreign income variable, quarterly data is acquired from the International Monetary Fund website. Thus, real foreign income $rGDP_{foreign}$ is computed as the weighted figures of real values of gross domestic product (GDP) for the largest trading countries of Vietnam, namely for USA,
Korea, Australia, Thailand, Singapore, Japan, China, India, France, Germany, Canada, England, Indonesia and Malaysia per quarterly.

Real domestic income $rGDP_{domestic}$ is quarterly real GDP figures for Vietnam. Exports and imports of Vietnam are quarterly figures expressed in their real value. $CPI_{domestic}$ is the domestic consumer price index value, adjusted to the base year of 2010. Data on real exports ($X_i$), real imports ($M_i$), the domestic consumer price index values ($CPI_{2010, domestic}$) and the domestic real GDP figures ($rGDP_{domestic}$) are obtained from the quarterly publications of the General Statistics office of Vietnam. The foreign consumer price index values ($CPI_{2010, foreign}$) are quarterly data for CPI with adjustment for the base year of 2010. They are obtained from the website of IMF. Information regarding exchange rates is obtained from the data published on the website of IMF and adjusted to quarterly values.

6 EMPIRICAL ANALYSIS

Based on the theory of purchasing power parity (PPP), we estimate the real effective exchange rate (REER) with the following formula:

$$REER_j = NEER_j \times \frac{CPI^w_j}{CPI^V_{VN}}$$

$$NEER_j = \sum_{i=1}^{14} \left( Index_{exrate-Country_i-Quarterly_j} \right) \times Weight_{i-Quarterly_j}$$

$$CPI^w_j = \sum_{i=1}^{14} CPI^i_j \times GDP_i$$

$$Weight_{i-Quarterly_j} = \frac{M_i + X_i}{\sum_{i=1}^{14} M_i + \sum_{i=1}^{14} X_i}$$

$$Index_{exrate-Country_i-Quarterly_j} = \frac{Exrate_{Country_i,Quarterly_j}}{Exrate_{Country_i,Quarterly_j/2010}} \times 100$$

$CPI^w_j$ is the average consumer price index of 14 countries: USA, Korea, Australia, Thailand, Singapore, Japan, China, India, France, Germany, Canada, England, Indonesia, Malaysia.

$CPI^V_{VN}$ is the domestic consumer price index of Vietnam.
ARCH-type models include the time-varying conditional variance as a parameter generated from a time-series model of the conditional mean and variance of the growth rate. Therefore, they are very efficient in describing volatility clustering. As the real exchange rate volatility is not directly observable, different statistical measurement methods have been used in the literature to determine volatility. We follow Sauer and Bohara (2001) for the volatility estimation using the conditional variance of a first-order ARCH model with the real effective exchange rate. The equation takes the following form:

\[
DRER_t = \alpha_0 + \alpha_1 DRER_{t-1} + u_t, \text{ whereas, } u_t \sim N(0, \delta_t) \quad (5)
\]

Volatility, \( \delta_t = \beta_0 + \beta_1 u^2_{t-1} \quad (6) \)

Estimating equation (6) gives the following result (standard errors are in parenthesis):

\[
DRER = 0.470309 DRER_{t-1} + u_t \quad u_t \sim N(0, \delta_t)
\]

Prob. \(0.000\)

Volatility, \( \delta_t = 0.000280 + 0.653168 u^2_{t-1} \)

Prob. \(0.0023\) \(0.0490\)

(The critical values are for the 5% level of significance)

(Source: The author auto-regressed using EVIEW software, Table 2)

The result may be interpreted as a prediction of the current period’s real exchange rate variance. This variance is measured as a weighted average of a long-term average (the constant term in equation 6) and the ARCH term. Thus, the predicted values of \(\delta_t\) provide us with a measure of the volatility of the Vietnam’s exchange rate against the group of money included USD, KRW, AUD, THB, SGD, JPY, CNY, IDR, EUR (France and Germany), CAD, GBP and MYR. A graphical representation of the volatility of the real effective exchange rate is presented in Figure 3.
Figure 3: Real Effective Exchange Rate Volatility Measure, 2000-2016

Note: “Official rate” is the official exchange rate, “curb rate” is the parallel (curb) market exchange rate, both are shown in nominal values of Vietnam Dong per USD. The horizontal axis represents a period from 2000-2016. “Volatility” is a trend graph of conditional variance of ARCH, calculated as real effective exchange rate volatility. Vertical axis is nominal values for volatility measure, and the horizontal axis represents quarterly time intervals for the given period.

Source: The author auto-regressed using EVIEW software

Since the analyzed variables are considered as time series variables, this data could change over time and may not have stationary means. The existence of nonstationarity in the data may compromise standard tests used in the final regression, and therefore, it may lead to inaccurate conclusions. To avoid this miscalculation, in the first step, we will examine the property of stationarity in the individual explanatory series by using the augmented Dickey–Fuller (ADF) unit roots test procedure. The results of the ADF unit roots tests (Table 1) show that all variables, except volatility, are not stationary at their level and we get stationarity after the first difference. Engle (1991) state that including a stationary variable in the co-integration relationship should not affect the other remaining coefficients, if this stationary variable is not the dependent variable. Including such a variable should also not affect the critical values of the t-statistics.
Table 1: Augmented Dickey-Fuller Statistics for Unit Root Testing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levels/First Differences</th>
<th>Test Statistics</th>
<th>Critical Value (at 1% level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export, lxk</td>
<td>Level</td>
<td>-0.7702</td>
<td>-3.5315</td>
</tr>
<tr>
<td></td>
<td>First Diff.</td>
<td>-8.4214*</td>
<td>-3.5348</td>
</tr>
<tr>
<td>Import, lnk</td>
<td>Level</td>
<td>-1.3966</td>
<td>-3.5401</td>
</tr>
<tr>
<td></td>
<td>First Diff.</td>
<td>-5.3609*</td>
<td>-3.5401</td>
</tr>
<tr>
<td>Foreign GDP, lgf</td>
<td>Level</td>
<td>-0.1323</td>
<td>-3.5383</td>
</tr>
<tr>
<td></td>
<td>First Diff.</td>
<td>-2.4769</td>
<td>-3.5383</td>
</tr>
<tr>
<td></td>
<td>Second Diff.</td>
<td>-11.9466*</td>
<td>-3.5383</td>
</tr>
<tr>
<td>Domestic GDP, lgd</td>
<td>Level</td>
<td>0.1456</td>
<td>-3.5401</td>
</tr>
<tr>
<td></td>
<td>First Diff.</td>
<td>-4.1958*</td>
<td>-3.5401</td>
</tr>
<tr>
<td>Volatility δ, Vol</td>
<td>Level</td>
<td>-4.6543*</td>
<td>-3.5365</td>
</tr>
</tbody>
</table>

Note: Indicates statistics significance at 1%

Source: The author auto-regressed using EVIEW software, Table 2, 3, 4

Using the OLS estimation we obtain the following regression results

Exports: \( \text{Log}\, X_t = 0.01539 - 0.999371\text{Log}\, r\text{GDP}_{\text{foreign}} + 8.700041\text{Vol} \)

Prob. \( (0.0246)^* \quad (0.0002)^* \quad (0.0337)^* \)

Note *: Indicates statistical significance at 5% level

The estimated equation shows that the coefficients of the real effective exchange rate volatility are positive and sign of the coefficient on real foreign income is negative, and they are statistically significant. This implies that increases in real foreign income negatively affect export demand consistent with our model in the conditions of a long-run relationship. Because the export structure of Vietnam is mainly raw materials and minerals, it is not affected when foreign income increases. On the other hand, volatility measure has a positive impact on exports.

Imports: \( \text{Log}\, M_t = 0.012677 + 0.059662\text{Log}\, r\text{GDP}_{\text{domestic}} + 1.720636\text{Vol} \)

Prob. \( (0.0591)^* \quad (0.0000)^* \quad (0.7437) \)

Note *: Indicates statistical significance at 10% level

The estimated equation shows that the coefficient on the real domestic income is positive, but coefficients for the real effective exchange rate volatility are ambiguous related to the import function. We can observe that increasing of domestic income positively affects import demand. This is true when Vietnamese tastes like foreign goods. More than, as the economy grows, businesses increase their demand for imported machinery. But change of the real effective exchange rate volatility has ambiguous impacted in the long-run dynamics of the import equation consistent with the previous findings.
7 CONCLUSION

This study estimated the impact of real effective exchange rate volatility on aggregate exports and imports of Vietnam, using quarterly data for periods from 2000 to 2016. The results of the cointegration analysis show that there exists a long-run relationship among the variables of the real exports and imports demand functions. The results estimates are consistent with the economic model and theory. But there is a different, an increase in the real foreign has a significant and negative impact on trade flows. Domestic income has a significant and positive impact on trade flows. An increase in real effective exchange rate volatility was also found to adversely affect demands for exports but not for imports. In addition, major changes in the exchange rate policy of Vietnam in 2008-2011 made the fluctuating exchange rate strong but still positively impacted in export activities. This shows that the adjustment of exchange rate policy is absolutely appropriate and in the right direction. Empirical results suggest that export and import activities can be improved further, if the following are utilized:

(1) macro economic policies, which aim to keep a stable competitive real exchange rate, and (2) reasonable policies that avoid overvaluation of the real effective exchange rate to have good effect on Trade Balance. Thence, the policymakers should establish coherent policies that create a transparent exchange rate system. That will provide stabilize of the rates and competitive to increase the trade and growth of Vietnam economy.
REFERENCES


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APPENDIX

Table 2: VOL Nominal value for volatility measure, computed from the ARCH model
Dependent Variable: DRER
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 07/31/18  Time: 16:57
Sample (adjusted): 2000Q2 2016Q4
Included observations: 67 after adjustments
Convergence achieved after 16 iterations
Coefficient covariance computed using outer product of gradients
MA Backcast: 2000Q1
Presample variance: backcast (parameter = 0.7)

\[ \text{GARCH} = C(2) + C(3) \times \text{RESID}(-1)^2 \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>z-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA(1)</td>
<td>0.470309</td>
<td>0.114625</td>
<td>4.103030</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Variance Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.000280</td>
<td>9.20E-05</td>
<td>3.045262</td>
<td>0.0023</td>
</tr>
<tr>
<td>RESID(-1)^2</td>
<td>0.653168</td>
<td>0.331813</td>
<td>1.968458</td>
<td>0.0490</td>
</tr>
</tbody>
</table>

R-squared: 0.153559  Mean dependent var: 0.016865
Adjusted R-squared: 0.153559  S.D. dependent var: 0.030456
S.E. of regression: 0.028020  Akaike info criterion: -4.606626
Sum squared resid: 0.051819  Schwarz criterion: -4.507909
Log likelihood: 157.3220  Hannan-Quinn criter.: -4.567563

Source: The author auto-regressed using EVIEW software

Table 3: Exports estimation
Dependent Variable: DLXK
Method: Least Squares
Date: 02/25/18  Time: 14:02
Sample (adjusted): 2000Q3 2016Q4
Included observations: 66 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.011539</td>
<td>0.005010</td>
<td>2.303501</td>
<td>0.0246</td>
</tr>
<tr>
<td>D2LGF</td>
<td>-0.999371</td>
<td>0.250896</td>
<td>-3.983210</td>
<td>0.0002</td>
</tr>
<tr>
<td>VOL</td>
<td>8.700041</td>
<td>4.006261</td>
<td>2.171611</td>
<td>0.0337</td>
</tr>
</tbody>
</table>

R-squared: 0.234790  Mean dependent var: 0.017273
Adjusted R-squared: 0.210498  S.D. dependent var: 0.039712
S.E. of regression: 0.035286  Akaike info criterion: -3.806277
Sum squared resid: 0.078441  Schwarz criterion: -3.706748
Log likelihood: 128.6072  Hannan-Quinn criter.: -3.766948
F-statistic: 9.665168  Durbin-Watson stat: 2.168648
Prob(F-statistic): 0.000218

Source: The author auto-regressed using EVIEW software
Table 4: Imports Estimation

Dependent Variable: DLNK
Method: Least Squares
Date: 02/26/18   Time: 10:44
Sample (adjusted): 2000Q3 2016Q4
Included observations: 66 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.012677</td>
<td>0.006595</td>
<td>1.922166</td>
<td>0.0591</td>
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<tr>
<td>DLGD</td>
<td>0.059662</td>
<td>0.012310</td>
<td>4.846520</td>
<td>0.0000</td>
</tr>
<tr>
<td>VOL</td>
<td>1.720636</td>
<td>5.238952</td>
<td>0.328431</td>
<td>0.7437</td>
</tr>
</tbody>
</table>

R-squared 0.271910  Mean dependent var 0.016667
Adjusted R-squared 0.248797  S.D. dependent var 0.053388
S.E. of regression 0.046272  Akaike info criterion -3.264159
Sum squared resid 0.134891  Schwarz criterion -3.164629
Log likelihood 110.7172  Hannan-Quinn criter. -3.224830
F-statistic 11.76391  Durbin-Watson stat 2.390636
Prob(F-statistic) 0.000046

Source: The author auto-regressed using EVIEW software