Real Effective Exchange Rate: A Transmission Channel for the Impact of Economic Growth on Exports in Vietnam

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ABSTRACT

This article analyzes the role of real effective exchange rate as a transmission channel for the impact of economic growth on Vietnam's exports. Using quarterly data for the period of 1994–2013, the analysis results show that economic growth, real effective exchange rate (REER), and exports tend to fluctuate in the same direction. Furthermore, according to the results of the VAR model, economic growth impacts on and promotes export growth through increased productivity that improves the competitive advantage of products. The exchange rate, as an important channel, allows for a positive impact of economic growth on exports in Vietnam.

1. Introduction

Exchange rate, in its close relation to macroeconomic outcomes, is considered an important factor to affect the competitiveness of goods in foreign trade as well as other economic variables. The fluctuation in exchange rate may alter the relative prices of goods/services through domestic and foreign currencies and thus significantly affect import-export activities. In reality, an increase in effective exchange rate index leads to VND's real-value depreciation and higher international trade competitiveness, which contributes to export improvement. Conversely, the effective exchange rate index, in its decreasing trend, causes VND's appreciation, weakened competitiveness, and thereby reducing export growth rates. Many studies, in fact, have verified that growth in the economy, boosting the productivity due to higher economies of scale, offers a greater product competitive advantage, thus resulting in a rise in export turnover.

Accordingly, real effective exchange rate can be regarded as a transmission channel for the impact of growth on exporting activities. This paper conducts an in-depth analysis of the management mechanism and exchange rate process in Vietnam over the past years. Qualitative and quantitative methods, in addition, are adopted to demonstrate the role of the real effective exchange rate in transmitting the effects of economic growth on Vietnam's exports.

2. Theoretical bases and research framework

2.1. Review on theoretical and empirical research

Verdoorn's (1949) research on the growth of labor productivity indicated a statistical relation between the growth rates of output and labor productivity, afterward referred to as Verdoorn's law, which postulates that a positive relation exists between these two factors, especially for the manufacturing sector, and can be performed as:

$$P = \alpha + \beta Q + \varepsilon \; \beta > 0 \tag{1}$$

where P and Q are labor productivity and output of the manufacturing sector respectively; β is Verdoorn coefficient, and its positive value indicates a positive relation between the two factors; and ε is an error term.

The Verdoorn's law is set as a basis for most hypotheses on the impact of economic growth on exports. As such, the more rapid growth in output causes an increase in productivity due to higher economies of scale. When an economy flourishes, it also

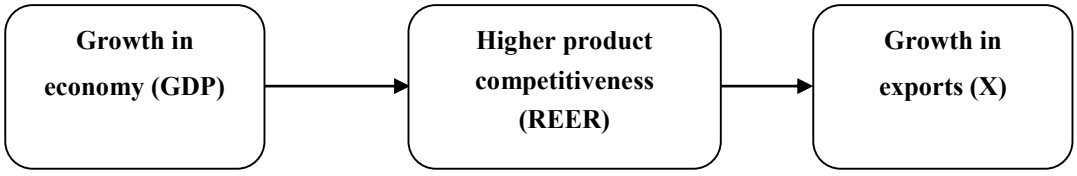
increases productivity. If the growth rate of wages cannot reach that of the productivity, then there should be a drop in prices and thereby an improvement in both competitiveness of exports and exporting activities.

Also, according to Helpman and Krugman (1985), exports can be expanded by higher economies of scale. Due to improved exporting activities, the scale is extended, whereas the costs are lowered, and it is likely to achieve higher productivity. Bhagwati (1988) demonstrated that countries' competitive advantage in the international market and their trade expansion are attributed to economic growth, which could enhance the process of skill formation as well as technology advances and thereby production efficiency. Blecker (2009) adopted the virtuous circle model to represent a positive relationship as a widening circle between exports and economic growth, in which a higher rate of output growth would lead to an increase in productivity, resulting from large economies of scale; thus, greater product competitive advantages can be gained, bringing about export turnover increase.

2.2. Research framework

As shown by prior theoretical and empirical research, economic growth may enhance productivity due to higher economies of scale, thereby giving bigger competitive advantage of products and involving improved export turnover. One of important factors reflecting and also influencing product competitiveness is REER, whose volatility, in reality, is closely associated with macroeconomic outcomes.

An increase (decrease) in the exchange rate also positively (negatively) affects exporting activities as were earlier discussed in this paper. Thus, in light of the impact of economic growth on Vietnam's exports, the following framework can be provided.



3. Research data and methodology

3.1. Method

First, we perform qualitative analysis to evaluate the fluctuations in economic growth, REER, and exports, and then examine certain relations and fluctuation trends revealed by these factors.

Next, to justify the qualitative approach, we employ VAR model considering three quarterly variables, namely logarithm of exports (LNX), logarithm of REER (LNREER), and logarithm of GDP (LNGDP), all of which are tested for stationarity via ADF unit root test. Selection of the optimal lag length of these variables is in accordance with LR, FPE, and AIC standards. We then continue with Granger causality test to determine the relationships among these variables. We also estimate their response to endogenous shocks in addition to variance decomposition intended to measure the impact of economic growth on exports through such a transmission channel as REER.

3.2. Data

3.2.1. Variables and scales

Gross domestic product (GDP): measured by real GDP of Vietnam (VND billion) and shown in 1994 constant prices.

Exports (X): Vietnam's real export value (VND billion), estimated by dividing nominal export value by deflated value.

Real effective exchange rate (REER)[1]*:* exchange rate of VND relative to the currencies of main trade partners. Based on Vietnam's total import-export turnover compared to that of foreign partners, ten top selected exporters consist of Taiwan, Germany, South Korea, America, Japan, France, Singapore, Thailand, China, and Australia.

REER at period *i* ($REER^i$) can be computed as:

$$REER^i = \sum_{j=1}^{n} e^i_j . \frac{CPI^i_j}{CPI^i} . w_j \qquad (2)$$

where $e^i_j = E^i_j/E^0_j$ is nominal exchange rate of *j*th foreign currency at period *i* compared to that at the original period; E^i_j and E^0_j are nominal exchange rates of *j*th foreign currency in foreign currency basket at period *i* and the original period respectively; w_j

is trade proportion of countries whose currency is involved in the foreign currency basket, measured by import-export turnover in trading with partner *j* as a ratio to total import-export turnover in trading with all countries in the foreign currency basket; CPI_j^i and CPI^i are adjusted price indices of partner *j* and of Vietnam at period *i* respectively, standardized at 1994 constant prices.

Thus, in order to estimate REER with Eq. 2, the CPI of Vietnam and ten trade partners has to be considered as average price index compared to that of the original year. Nominal rate (E) is the exchange rate between VND and other currencies in the currency basket, and its average for each term should be taken. For France and Germany in particular, the selected rate is that between VND and Euro. Import-export turnover is measured as value of Vietnnam's import and export compared to that of its trade partners, and uniformly in million US dollars.

Nominal effective exchange rate (NEER): exchange rate between VND and currencies of main trading partners; its measurement is basically the same as that of REER, realized as follows:

$$NEER^i = \sum_{j=1}^{n} e_j^i w_j \tag{3}$$

3.2.2. Data sources

Data on GDP and exports are collected from General Statistics Office of Vietnam (GSO), whereas those used to measure REER and NEER are gathered from the International Financial Statistics (IFS) database of International Monetary Fund (IMF) and also from the GSO. Particularly, data on Taiwan are retrieved from the website of National Statistics, Republic of China (Taiwan) (see more at http://eng.stat.gov.tw).

4. REER as a transmission channel for the impact of growth on Vietnam's exports

4.1. The current state of REER and its role in transmitting the impact of economic growth on exports

In Vietnam many adjustments have been made to exchange rate mechanism by eliminating the centralized, bureaucratic, and State-subsidized mechanism. However, these changes basically involved a pegged exchange rate regime to the USD, whereby the official rate and fluctuation margins were altered periodically to response to different shocks. Additionally, during the stages of sharp fluctuations in the national economy

caused by internal and external impacts the State Bank of Vietnam (SBV) decided to adjust the central rate and margins in order to counteract those effects. Once these factors were controlled, the exchange rate regime returned to fixed or crawling peg (Table 1).

Table 1

Vietnam's exchange rate regimes over time

Period	Exchange rate regime	De facto exchange rate features
Before 1989	Multiple exchange rate arrangements	- Three types of official rates - Floating rates coexisting with state rates (until reporting periods)
1989–1990	Exchange rates within crawling bands	- Official exchange rate (OER) established - OER adjustments based on signals of inflation, interest rates, balance of payments, and floating rates - Exchange rate fluctuations within margins of +/-5% - Strict control over foreign currency use
1991–1993	Pegged exchange rates within horizontal bands	- Stricter control over foreign currency use and restrictions on cross-border money transfer - Forex reserve fund established for exchange rate stabilization - Two forex trading floors in HCMC and Hanoi set up - OER determined on the basis of bid rates from the two floors (encountering forceful intervention by SBV) - Exchange rate fluctuation margin of less than 0.5% of announced OER
1994–1996	Conventional fixed peg arrangements	- Vietnam's interbank forex market established as a replacement for two forex trading floors, also recorded with forceful intervention by SBV - OER announced based on interbank rate - Exchange rate fluctuations within margins of +/-5% of announced OER (by end-1996 extended from less than +/-0.5% to +/-1%) - OER maintained at 11,100 VND/USD

Period	Exchange rate regime	De facto exchange rate features
1997–1998	Exchange rates within crawling bands	- Exchange rate fluctuation margins broadened to +/-5% and +/-10% proposed in Feb 1997 and Oct 1997 respectively, and then narrowed to a 7% band in Aug 1998 - OER revalued to 11,800 VND/USD and 12,998 VND/USD in Feb 1998 and Aug 1998 respectively
1999–2000	Conventional fixed peg arrangements	- Announced OER set to be the average interbank rate of previous trading day (28 Feb, 1999) - Exchange rate fluctuation margin narrowed to a 0.1% band - OER maintained at 14,000 VND/USD
2001–2007	Crawling Pegs	- OER gradually adjusted from 14,000 VND/USD in 2001 to 16,100 VND/USD in 2007 - Exchange rate margins increasing to +/-0.25% (between Jul 1, 2002 and Dec 31, 2006) and to +/-0.5% (2007)
2008–2014	Exchange rates within crawling bands	- OER set differently, in an increasing trend, at 16,100 VND/USD (early 2008); 16,500 VND/USD (Jun 2008–Dec 2008); 17,000 VND/USD (Jan 2009–Nov 2009); 17,940 VND/USD (Dec 2009–Jan 2010); 18,544 VND/USD (Feb 2010–Aug 2010); 18,932 VND/USD (Aug 2010–Feb 2011); and 20,693 VND/USD (from Feb 2011 onward) - OER maintained at 20,828 VND/USD from late 2011 to Jun 28, 2013 and adjusted to 21,036 VND/USD - Exchange rate margins revalued periodically, increasing to +/-0.75% (Dec 23, 2007–Mar 9, 2008), +/-1% (Mar 10, 2008–Jun 25, 2008), +/-2% (May 26, 2008–Nov 5, 2008), +/-3% (Nov 6, 2008–Mar 23, 2009), +/-5% (Mar 24, 2009–Nov 25, 2009) and afterward narrowed to +/-3% (Nov 26, 2009–Feb 11, 2011) and +/-1% (Feb 11, 2011 to end-2014). - OER reaching 21,246 VND/USD (Jun 19, 2014) and 21,458 VND/USD (Jan 7, 2015)

Source: Nguyen et al. (2010) and authors' compilation from SBV statistics

Exchange rate policy was adjusted to curb inflation and attract foreign investments during 1992–1997. Concerning inflation control, it aimed to maintain the stability of nominal VND/USD rate, and maintaining a nearly fixed rate, while Vietnam's inflation rate, despite having been reduced, was still higher than those of the US and its main trade partners, caused the VND to be over-evaluated between 1996 and 1998 (Figure 1). This led to a negative impact on Vietnam's exports, reflected through a decrease in export growth from 36% in 1994 to 1.9% in 1998. The periods of 2001–2007 and 2012–2013 also saw quite stable VND/USD rates. Yet, the de facto rate, in these stages, did not drastically reduce under the impact of pegged exchange rate mechanism; therefore, we could still observe rather significant growth in exports. During the period of 2008–2011, thanks to the country's continuous moves to devalue the VND in order to deal with the global economic crisis and soaring inflation occurring in 2007–2008, an increase in de facto exchange rate in 2010–2011 contributes to a strong rise in exports possibly observed after shocks of its negative growth in 2009 (Figure 1).

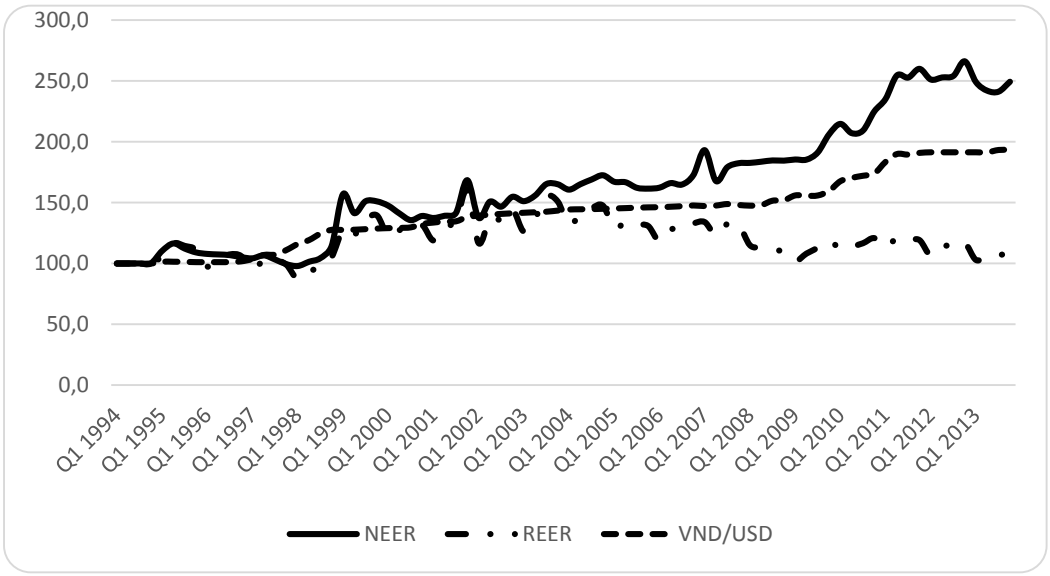


Figure 1. VND/USD rate, NEER, and REER of Vietnam

In general, therefore, the nominal VND/USD rate tends to follow a cycle with two stages. The first stage corresponds to the periods of strong fluctuations, namely: (i) Asian financial crisis during 1997–2000; and (ii) global financial crisis in 2008–2011, with efforts made for macroeconomic stability. In these periods market pressures forced SBV

to broaden exchange rate margins or decide on official devaluation, causing a large increase in NEER compared to the rate of the previous period. The second one coincides the periods of 1993–1996 and 2001–2007 when the economy was in stable development, and the stage, in addition, features the exchange rate regime in which the rate rigidly pegged to the US dollar.

Figure 1 indicates that a correlation exists between NEER and REER in the period of 1994–2004. Both indices show decreasing and increasing trends in 1994–1998 and 1999–2004 respectively, but from 2005 a clear divergence between them is reflected. REER tends to relatively fall, whereas NEER continues to rise, and its rise is caused by a large devaluation of the VND against the USD through SBV's adjustments to exchange rates from 2008 to the first half of 2011. Additionally, the constantly devalued USD compared to other currencies of such Vietnam's major trade partners as Australia, China, Japan, Thailand, etc. also causes Vietnam's NEER to devalue sharply. Meanwhile, the inflation rate of Vietnam is far higher than that of its trade partners, so the REER shows a significant decrease from 2005, especially in the period of 2008–2009, but tends to rise during 2010–2011 and then falls again in 2012–2013. This also partly explains why Vietnam's export growth is negative in 2009 but recovers strongly in the next two years before falling into the decline between 2012 and 2013.

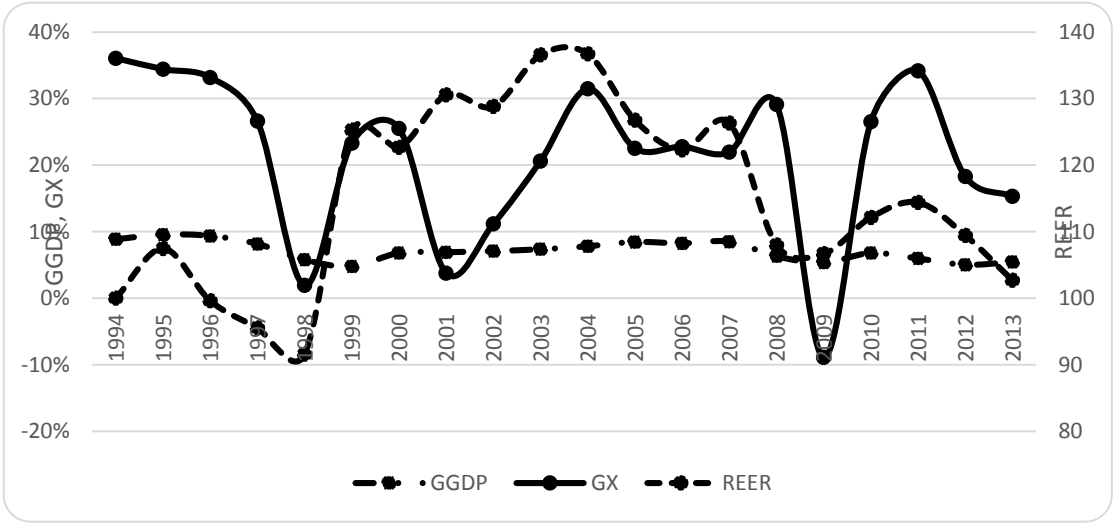


Figure 2. REER, GDP growth (GGDP), and export growth (GX)

Source: GSO and authors' calculations

In addition, Figure 2 suggests that REER, export, and economic growth in Vietnam tend to fluctuate positively during the periods of 1995–1999 and 2002–2012 despite some deviations. This demonstrates the existence of ralations among these three factors over the past few years. In the years of 1996–1998, 2005–2009, and 2012–2013, REER tends to fall, being compatible with a drop in exports during the same periods, while the three factors particularly show significant decreases in the crisis periods of 1997–1998 and 2008–2009. However, the REER reveals an increasing tendency, corresponding to economic growth rate rises in the 2002–2004 and 2010–2011 periods, which, theoretically, results in enhanced Vietnam's international competitiveness. Indeed, another strong increase in export in those years confirms these relations.

4.2. Quantitative analyses of the relations among growth, REER, and exports in Vietnam

This section contributes to empirical analyses of and findings for the relations among growth, REER, and Vietnam's exports. Specifically, REER, a proxy for competitiveness of exports, is used as a mediator and/or transmission channel for the impact of growth on exports. We also take logarithm of the data series including 60 observations with a quarterly frequency over the period of 1999–2013.

Table 2

Stationarity test for the data series

Variable	ADF test statistic	Critical value (at 1% level)
LNGDP	ADF(1) = -1.033887	-3.548208
D(LNGDP)	ADF(1) = -7.504916***	-3.550396
LNX	ADF(0) = -1.832654	-3.546099
D(LNX)	ADF(0) = -8.940892***	-3.548208
LNREER	ADF(1) = -2.193841	-3.548208
D(LNREER)	ADF(1) = -8.406355***	-3.550396

Note: D and (***) denote first difference and 1% significance level respectively.

Source: compiled from estimated results

Results of ADF test for stationarity of the data series are briefly performed in Table 2. As such, the null hypothesis on unit root for all of the variables is not rejected; the series, however, are stationary at the first difference.

Selection of the optimal lag length for the model's variables is based on LR, FPE, and AIC criteria. Table 3 indicates that the optimal lag length of six is suggested.

Table 3

Results of optimal lag selection

Criteria for VAR model lag length selection						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	36.73811	NA	5.62e-05	-1.273136	-1.161610	-1.230249
1	191.2389	285.6807	2.32e-07	-6.763731	-6.317627	-6.592181
2	228.7978	65.19662	7.93e-08	-7.841426	-7.060745	-7.541214
3	364.3487	219.9506	6.75e-10	-12.61693	-11.50167*	-12.18806*
4	369.0375	7.077350	8.07e-10	-12.45424	-11.00441	-11.89671
5	383.7497	20.54162	6.69e-10	-12.66980	-10.88539	-11.98360
6	401.2883	22.50237*	5.05e-10*	-12.99201*	-10.87302	-12.17715

Note: * denotes the selected lag based on the criteria.

Source: compiled from estimated results

Granger causality tests are shown in Table 4 and they indicate that both REER and exports are causally affected by growth, and REER also causally influences exports. This implies that economic growth is conducive to increased productivity and traded-goods competitiveness (realized by a rise in REER), thereby entailing increase in exports. In constrast, economic recession or unfavorable conditions are subject to reduction in real effective exchange rate and adversely affect the country's exports.

Table 4

Results of Granger causality tests

Null hypothesis	Obs.	F-Statistic	Probability
DLNREER has no causal effect on DLNGDP	53	4.14833	0.00248
DLNGDP has no causal effect on DLNREER		2.26311	0.05658

Null hypothesis	Obs.	F-Statistic	Probability
DLNX has no causal effect on DLNGDP	53	1.41122	0.23431
DLNGDP has no causal effect on DLNX		5.52876	0.00030
DLNX has no causal effect on DLNREER	53	2.07721	0.07757
DLNREER has no causal effect on DLNX		5.10214	0.00057

Source: compiled from estimated results

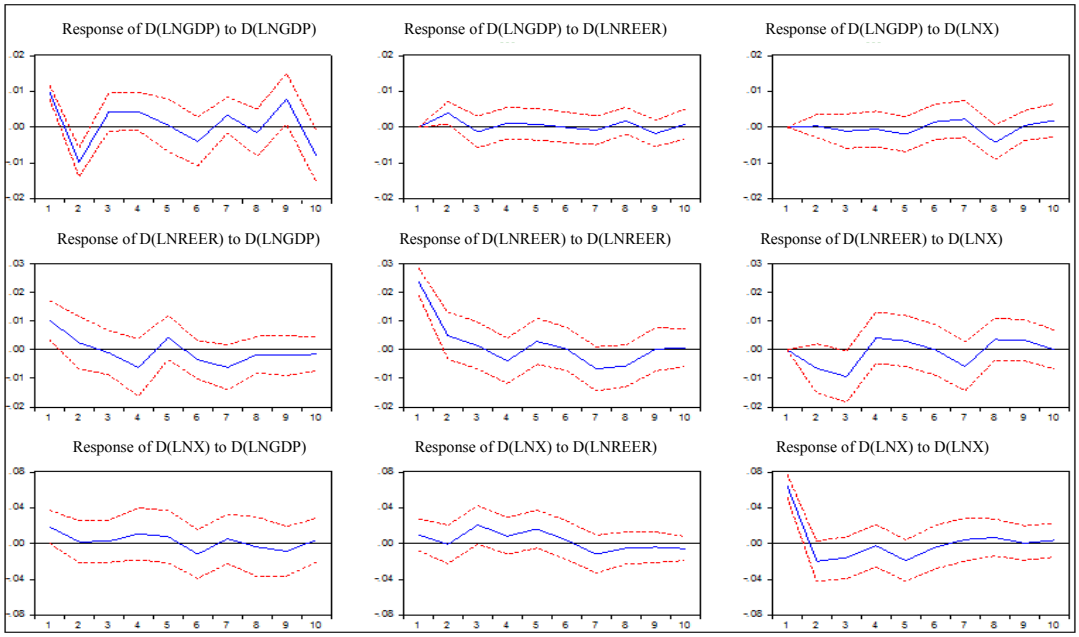


Figure 3. Response of the variables to various shocks

Source: compiled from estimated results

Figure 3 illustrates some response functions over the studied period of ten quarters. Particularly, REER elicits a strong and instant response to GDP shocks, and then the response becomes weaker as is indicated by the solid line of subfigure (a). While the similar case is revealed by export, whose strong response persists until Quarters 4 and 5 (the bottom dotted line of subfigure [a]), subfigure (b) shows that as for REER shocks, exports also produce an instant response, the strongest and most substantial level of which is witnessed in Quarter 3.

Table 5

Results of variance decomposition

Variance decomposition of D(LNGDP)										
Quarter	1	2	3	4	5	6	7	8	9	10
S.E.	0.010	0.014	0.015	0.016	0.016	0.017	0.017	0.018	0.020	0.021
D(LNGDP)	100.000	92.271	91.766	91.810	90.212	89.959	88.483	82.607	84.771	86.060
D(LNREER)	0.000	7.662	7.678	7.580	7.724	7.215	7.028	7.557	7.028	6.156
D(LNX)	0.000	0.067	0.557	0.610	2.063	2.826	4.489	9.836	8.201	7.784
Variance decomposition of D(LNREER)										
Quarter	1	2	3	4	5	6	7	8	9	10
S.E.	0.026	0.027	0.029	0.030	0.031	0.031	0.033	0.034	0.034	0.034
D(LNGDP)	15.776	15.059	13.563	16.733	17.989	19.007	20.475	19.862	19.942	20.102
D(LNREER)	84.224	79.285	70.907	67.020	65.387	64.576	61.736	61.957	61.126	61.013
D(LNX)	0.000	5.656	15.531	16.247	16.625	16.417	17.790	18.181	18.932	18.885
Variance decomposition of D(LNX)										
Quarter	1	2	3	4	5	6	7	8	9	10
S.E.	0.068	0.071	0.076	0.077	0.081	0.082	0.083	0.084	0.084	0.085
D(LNGDP)	7.628	7.124	6.373	8.176	8.215	10.020	10.172	10.248	11.148	11.283
D(LNREER)	2.164	2.007	9.481	10.405	13.376	13.255	14.908	15.070	15.107	15.411
D(LNX)	90.208	90.868	84.146	81.418	78.409	76.725	74.920	74.682	73.745	73.307
Cholesky ordering: D(LNGDP), D(LNREER), D(LNX)										

Source: compiled from estimated results

Next, to analyze the variance of a certain variable caused by its very shock and other endogenous variables' shocks, we use a variance decomposition approach. The results of Table 5 indicate that in Quarter 1 past values of all the variables constitute over 80% of their variance, and importantly, nearly 100% of GDP's variance can be traced back to the shock of its own.

At the same term GDP's shocks account for over 15% of REER fluctuations in both short and long terms, while impact of GDP's shocks on exports is weaker, with an

increase in the estimated coefficient from 7.63% in Quarter 1 to 11.28% in Quarter 10. Likewise, variance of exports is influenced by REER's shocks, especially in a long run with its coefficient of over 15%.

It can be seen through the government's management mechanisms that when Vietnam's economic growth suffers from adverse effects produced by these shocks, without delay, exchange rate is adjusted to a rising trend to stabilize the foreign exchange market, help secure the banking system, and encourage the growth in not only exports but also the national economy. After the shocks cease to take effect, the rate is maintained for fear of inflation pressures, foreign debt insolvency, and market distrust in VND. This also implies that exchange rate, as part of monetary policy, is crucial in moderating macroeconomic cycles. Besides its function as an instrument to control inflation and stabilize purchasing power of the currency, it is an important transmission channel for the impact exerted on exports and balance of payments.

5. Conclusion and policy implications

5.1. Conclusion

In the past years exchange rate regimes of Vietnam have involved those within crawling bands, which are flexibly and rather effectively applied to stabilize the economy. The qualitative analyses have demonstrated a strong correlation among REER, exports, and growth, which is reinforced by the fact that: (i) economic growth, according to the VAR model-based findings, is a contributory factor of export growth through productivity gains, which also help accelerate competitive advantage of exports; and (ii) REER manifests itself as a transmission channel for the impact of Vietnam's economic growth on its exports. Accordingly, not only has a unidimensional relation been developed between exports and growth, but economic growth also exerts positive impact on the exports. For such outcome there is more evidence that Vietnam's export promotion and growth strategies highly feature an overwhelmingly positive synergy, contributing to improve the efficiency of macroeconomic adjustment.

5.2. Implications

To maintain sustainable economic growth along with export promotion and enhancement of REER's transmission efficiency, the following issues shall be contemplated:

First, improve the quality of government policies and mechanisms, and provide favorable business climates for full development of market entities besides competiveness and effectiveness of the economy that have to be boosted: Government make a shift from direct intervention via administrative instruments to indirect method via the market ones. Role of the government should primarily be to target failures of the market and efficiently link its activities with the market's to speed up the economic growth.

Second, be determined to stimulate the development of private sector: It is important for private enterprises to act as suppliers on-site to FDI ones, which enables them to link up with the global supply network and offers better chances to get involved with international standard practices. The growth of local suppliers is a stimulant to a surge of foreign investment in Vietnam, and additionally, the private sector plays a major part in fostering institutional reforms for the progression of business activities. Clearly, dynamic authorities always come to seek for what is economically advantageous to their communities as can be offered by the private sector, which, if being able to call for their right actions, incidentally creates certain incentives to encourage reforms.

Third, raise the quality of human resources and recognize total factor productivity (TFP) as a crucial source in the process of the country's economic growth: the situation requires sound investment in both science/techonology and education/training. Since these kinds of investment should not only bring considerable benefits to individuals themselves but also positively impact on the entire society, they uplift the TFP and quicken the growth pace. Long-run economic growth needs to be contingent upon high quality labor force in conjunction with great creativity and application of new technologies.

Fourth, effectually adopt the exchange rate policy to expand export opportunities and stabilize the macro economy: exchange rates should become a positive aid in improving the trade balance, increase competitiveness in the national exports, and support the economic growth.

In the coming years it is necessary to make a shift to a controlled free-floating exchange rate arrangement, whereby SBV will not pre-announce the central rates; the daily terms of trade are basically set completely in accordance with supply and demand of foreign currency available in the market, and SBV may make such active interventions as foreign currency trading on interbank market and/or control of capital

inflows to and outflows from Vietnam for flexible adjustment of the exchange rate fluctuations. Floating the exchange rates in a controlled fashion—instead of being pegged they are spontaneously adjusted and appropriately responding to the market signals-would result in effective allocation of resources.

To enable the arrangement to take real effect, certain achievements need to be attained: (i) full development and stable operation of financial market besides SBV's relatively independent activities; (ii) modernized foreign exchange market with a variety of foreign exchange-related derivative products incurring reduced risks and attracting interests of various entities; (iii) proper control of dollarization and stabilized inflation rate; and (iv) basic changes in import/export structure in which export of refined (raw) products of high added value are promoted (restricted), and total export values, set up by domestic raw materials■

Notes

[1] Nominal exchange rate in the study is defined as the amount of domestic currency needed to exchange for one unit of foreign currency (E). Hence, an increase in the rate is synonymous with depreciation (appreciation) of the domestic (foreign) currency, and the reverse is also true for a decrease.

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