

Intermediate Imports, Imperfect Competition and Sensitivity to Currency Value Fluctuations of Vietnam.

-A Sectoral Approach

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1 . Introduction.

Vietnam's adoption of the Doimoi (renovation) policy in 1986 marked an important turning point for the country from a central planning to a market-oriented economy. This has unquestionably materialized into impressive economic growth. All efforts for such a transition have been continuously and successfully serving to generate better export performances.

Vietnam's commodity export revenues increased almost seven fold in the last decade, from over 2 billion U.S. dollar in 1991 to about 14 billion U.S. dollar in 2000, with a growth rate of more than 24 percent per annum over this period. More importantly, while the average annual growth rate of GDP had been around 7.9 percent in 1991-2000, the ratio of export to GDP rose rapidly from 26 percent in 1991 to 30 percent in 1995 and then 46 percent in 2000.

With respect to such sustained export growth, Vietnam seems to be an unusual case study in that it has experienced a currency appreciation in real terms

throughout the 1990s. Vietnam's real effective exchange rates¹⁾ appreciated sharply from 1992 to 1998, with a rate of 4.9 percent per year²⁾. This fact is graphically illustrated in Figure 1.

In line with the real appreciation of the Vietnamese Dong, Vietnam's commodities import increased on average by more than 27 percent per year during 1991-1998, from about 2.3 billion U.S dollar in 1991 to 11.5 billion in 1998 and then 15.2 billion U.S dollar in 2000. These figures reveal the substantially faster speed of import growth when compared to GDP and export growth. Consequently, the trade balance deficits were 6.9 percent per year during the period of 1991-1998. This occurred before attaining, for the first time, a surplus of 4.5 percent in 1999 and 2.1 percent in 2000, where the real value of Vietnamese dong depreciated by 7.6 percent and 2.8 percent, respectively.

Standard theoretical models³⁾ rule that for a small open economy, an exchange rate appreciation would cause detriment for exports and encourage cheaper imports. Contrary to such models, the above interesting episode addresses, at least two important questions for the Vietnamese economy. The first question is to what extent the real exchange rates would have a significant sensitive impact on trade performances of Vietnam. The second is how one could possibly explain this surprising phenomenon appeared in Vietnam's economic record.

This paper attempts to respond to these questions and to highlight the fact that increasing external trade activities during the period of currency appreciation could have been related to the exclusive and extensive use of foreign imported

1) The real exchange rate index herein is calculated based on 18 currencies, consumer price index and splicing trade weight geometric average process.

2) Specifically, the real exchange rate appreciated 5.5 percent in 1993, 6.7 percent in 1996 and then 7.3 percent in 1998, after a small depreciation of 2.7 percent in 1992.

3) See the well-known Mundel-Fleming model, for instance. It is notable that this standard textbook theory assumes that markets are perfect competition, prices are given by world market and neglected to consider the existence of intermediate imported input of exports

parts for production of exportable goods.

The empirical methodology employed in this paper is stemmed from the obvious perception that a country's export supply and import demand are composed of the aggregation of the export, import of individual sectors - where the characteristics are different across industries. In other words, quantitative analysis of panel data of 20 manufacturing sectors and annual time series of 1991-2000 is conducted in a quite meticulous manner. All data comes from the bilateral trade records between Vietnam and 18 leading traded partners. Within the scope of available data, we intend to examine different sensitive impact of exchange rate fluctuations on the different manufacturing sectors. Furthermore, by using the concentration ratio, which is unquestionably the main industrial characteristic of Vietnam in terms of imperfect competitiveness, the paper briefly investigates the extent to which different concentration levels would influence the sensitivity to currency fluctuations. As for this evidence, Vietnam's state owned enterprises (SOEs) have played a dominant role in economic activities in most of the leading manufacturing sectors. By the end of the year 2000, 66 percent of manufacturing assets were held under the control of the sector of SOEs.⁴⁾

The empirical estimates seem to suggest that the sensitive coefficients to exchange rate changes vary across the sectors. While an appreciation of Vietnamese dong would have increased imports for almost all sectors, it makes export volumes decrease in the case of 4 sectors out of entire 17 sectors. This paper also found that though the concentration ratio has an influence on a significant degree the behavior of export suppliers, this can not be found in that of importers.

Further, the variable of imported input share was added in the empirical model, which was expected to become one of the most vigorous determinants of sensi-

4) In addition, the SOEs contributed 55 percent of turnover in the manufacturing, although the number of SOEs accounted for only 13.6 percent of the total enterprises of the economy

tivity to exchange rate changes. Indeed, the interaction coefficients are found to be significant and remarkably high. This result indicates that the imported input share plays a very important role in generating the response of export volume to exchange rate fluctuations. Therefore, it can safely be stated that the crucial resource in maintaining export competitiveness of Vietnam has been provided by having a high imported inputs. This, consequently, implies that an appreciation of the Vietnamese Dong in the 1990s induced by exchange rate policy did not mean Vietnam has lost export price competitiveness.

Following this section, the remainder of the paper is organized as follows. Section 2 briefly reviews the literature on sensitivity to exchange rate movements. Section 3 explains the theory dealing with sensitivity to exchange rate changes for the case of small open economy. Section 4 describes the empirical methodology and the data issues which are used. Section 5 presents the results of the empirical analysis. The final section concludes the paper.

2 . Brief literature review.

The breakdown of the Breton Woods system of fixed exchange rates in the early 1970s generated a substantial interest on the effects that exchange rate movements have on the exports and on the imports behavior of a country, and as a result, on its trade balance. This was demonstrated by numerous studies. For example, using aggregate data, the following studies have provided estimates of this relationship: Bhagwat and Onitsuka (1974) , Holtman (1994) , Krugman and Baldwin (1987) , Rose and Yellen (1989) , Rose (1990) , Bahmani, Oskooee and Alse (1994) , Demirdent and Pastin (1995) , Anil and Lowinger (2002) .

The main shortcoming associated with these studies is that they all have employed aggregate export, import and trade data, when in fact, a country's export supply and import demand are composed of the aggregation of the export and import of individual sectors in that country. Therefore, to thoroughly un-

derstand the effect of exchange rates changes on a country's trade performances, one should address how such exchange rate changes affect the export supply and import demand of the individual industries where their characteristics are dissimilar.

Many papers have pointed out that the sensitivity of exports and imports in terms of both price and volume to exchange rate fluctuations is not the same across all sectors.⁵⁾ Considering the theoretical models, Donbush (1987) uses industrial organization models to examine the impact that industrial features, such as product substitutability, the relative number of domestic and foreign firms and market structures, have on the sector sensitivity to the exchange rate movements. Supply-side models, by Baldwin and Krugman (1989) and Dixit (1989), postulate that firms face non-recoverable fixed costs (sunk-cost) of entry into foreign markets. Therefore, an exporter of goods wishing to expand sales on the foreign market, following currency appreciation, should enlarge the dealer network and/or launch an advertising campaign. Demand-side models that introduced, for example, by Froot and Klemperer (1989), assume that due to consumer switching costs, a firm's future demand depends on current market shares. In this context, a currency appreciation will not lead to a decrease in exports price unless it is perceived as permanent and the exporter may prefer holding its exports price in foreign currency constant if appreciation is temporary in order to perceive its market share.

The predictions of these types of model received empirical supports, for instance, by studies of Mann (1986), Feinberg (1986, 1989, 1991), Ohno (1989), Feenstra (1989), Marston (1990), Yang and Hang (1994), Menon

5) Changes in exchange rates have two basic effects on trade flows-price and volume effects. With regard to theory, a depreciation of the domestic currency increases the cost (price) of imports in domestic currency unit while exports become less expensive in foreign currency units. Subsequently, the price effect of currency depreciation can lead to an increase in the volume of exports and decrease in the volume of imports.

(1995) and Lee (1997). Hinged on issues of trade price effects, various authors tested and found a significant difference between sectors regarding their sensitivity to exchange rate fluctuations. However, the studies considering the impact on trade volume are still relatively few in number. Recently, for example, Fouquin, Sekkat, Mansour, Mulder and Nayman (2001) investigated the extent to which market structure such as concentration, scale of economy, segmentation, and dynamics play a critical role in explaining different sensitivity to exchange rates changes across sectors of fifteen countries group of EU. The estimation results show that cost considerations and exchange rates are important determinants of trade. The impact of exchange rates changes on trade varies across sectors. The variations are explained by concentration on the supply-side and dynamics on the demand-side.

Almost all of the research was based on the data of developed countries such as Japan, the United States, EU, and new industrialized countries such as Korea, Taiwan. There has been little research on developing transition economies.

3. Sensitivity to exchange rate fluctuation in small open economy: A simple theoretical consideration.

The framework of the analysis is a small open economy in which technical substitution away from an imported production inputs is difficult. Therefore, it is reasonable to assume that elasticity of substitution between domestic inputs and foreign inputs is equal to zero and/or domestic input prices and foreign input prices are independent.

We begin with the monopolist's first order condition and allow the firm's marginal cost to vary with changes in the domestic input prices as well as foreign imported input prices. Consider the behavior of the small open economy's manufacturing firms producing a good i for both domestic and export markets. Therefore, the firms' marginal cost curve can be written as a function of foreign

and domestic factor prices, nominal exchange rate, and output, as follows:

$$C=C(Q_i, W_i, E^*W_i^*) \tag{1}$$

where: Q_i , W_i and W_i^* denote output of good i , domestic input prices in producing good i , and foreign input prices in producing good i (in the importing country's currency), respectively. E is the exchange rate (the units of the exporter's currency for one unit of importer's currency). So, an increase in E implies a depreciation of exporter's currency.

Marginal cost is assumed to increase as output or factor prices increase. It is also assumed to be homogeneous of degree one in domestic factor prices and foreign factor prices, so that Euler's rule holds:

$$C = \frac{\partial C}{\partial W_i} W_i + \frac{\partial C}{\partial E W_i^*} E W_i^* \tag{2}$$

This equation implies that, for the small open economy that satisfies the above mentioned assumptions, the effect of changes in the foreign input prices that are induced by exchange rate changes on firm marginal cost will depend upon only one thing: the importance of foreign inputs in cost.

Besides, the firms producing export goods i face a demand curve of the form:

$$P_i = f(Q_i) \tag{3}$$

in which P_i is the price in the importing country's currency and $f' \leq 0$.

The firms are assumed to set P_i so as to maximize profits by setting marginal revenue equal to marginal cost:

$$E(P_i + Q_i f') = C \quad (4)$$

or

$$E(P_i + Q_i f') = \frac{\partial C}{\partial W_i} W_i + \frac{\partial C}{\partial E W_i^*} E W_i^* \quad (5)$$

In what follows, we in turn discuss the outcome in two cases: perfect competition vs. imperfect competition.

Case 1 : in environment of perfect competitiveness: . Equation (5) reduces to:

$$E P_i = \frac{\partial C}{\partial W_i} W_i + \frac{\partial C}{\partial E W_i^*} E W_i^* \quad (6)$$

Proposition 1 : Consider the producing goods i which use a little or no foreign inputs. Hence, C will alter a very little or not at all as E changes. Consequently, any decrease in E will be compensated by a nearly equal or equal increase of P_i . An appreciation of currencies of exporters with respect to the importers' currencies implies that the importer's currency price of exported goods to importing country will increase. Due to perfect competition between exporters, free entry and exit of producers and price competition will drive profit to zero. Exports to importing country will decrease.

Proposition 2 : For producing goods i that used the considerable portion of foreign imported inputs, any decrease in E will result in a reduction in C . It is notable that a change in C can be smaller or larger than a change in E . This change relies on the importance of foreign inputs in cost. When the former occurs, P_i as a result, will rise by a smaller rate relative to a change in E . Exports to the importing country will fall, but not much as that of proposition 1 of this case. In an in-

dustry where foreign inputs in cost play a pivotal role and are large enough to yield a larger reduction in C induced by a decrease in E , an appreciation of currencies of exporters will even conduce a drop of the importer's currency price of exported goods. So, exports to importing country will increase, conversely.

Case 2 : in environment of imperfect competitiveness: $f' < 0$.

Proposition 1 : If firms employ a little or no foreign inputs in producing exported goods i , a decrease in E will be matched by both increases in P and the induced decrease in Q_i . This happens because a change in E will bring about very little or no change in C . The importers' currency price of exported goods will grow less than in proposition 1 of the first case. Hence, Q_i will also fall more slowly.

Proposition 2 : Regarding exported goods i in which manufacturing is provided by a considerable part of foreign imported inputs, any decrease in E will bring a drop of C . If a change in C is smaller than change in E , P will rise and Q will fall. If a change in C is larger than change in E , or in other words, foreign inputs play a vital role in producing the exported goods, any decrease in E will be compensated by decrease in P and hence induces growth in Q . Note that due to $f' < 0$, any decrease or increase in Q will become slower and smaller than those of proposition 2 of case 1 .

In general, an imperfect competitive condition gives the exporter more freedom to adjust to the changes in currency value. The exporter can keep the price above (under) marginal cost and not match a depreciation (appreciation) one for one without losing all of his/her sales (export market share) . It follows that export volume will react less to exchange rate changes for imperfectly competitive sectors than for perfectly competitive sectors.

4 . Empirical methodology and data issues.

The Fixed Effect Model in panel data analysis is employed to investigate whether exchange rate fluctuations have a differential impact on trade volumes across

6) sectors. The sample combines three dimensions of the data: time, sector and country. A typical issue concerns the dimension according to which coefficients are allowed to vary. The focus of the empirical analysis is on the sensitivity of each sector to each exchange rate change, therefore, the exchange rate coefficients are allowed to vary across sectors, and there are assumed to be similar across countries for a given sector.

Then, at the first step, two following equations are estimated:⁷⁾

$$X_{ijt} = c + \sum_{i=2}^{17} (c_i * d_i) + \sum_{i=1}^{17} a_{1i} (ER_{it} * d_i) + a_2 EV_t + a_3 PDVN_{it} + a_4 PDTP_{ijt} + a_5 PPVN_{it} + a_6 PPTP_{ijt} + u_{1a} \quad (7a)$$

$$M_{ijt} = c + \sum_{i=2}^{18} (c_i * d_i) + \sum_{i=1}^{18} a_{1i} (ER_{it} * d_i) + a_2 EV_t + a_3 PDVN_{it} + a_4 PDTP_{ijt} + a_5 PPVN_{it} + a_6 PPTP_{ijt} + u_{1b} \quad (7b)$$

Where: i, j and t denote sectors, trading partners and annual time (1991:2000), respectively.

X_{ijt} : Exports from Vietnam to trading partner countries.

M_{ijt} : Imports into Vietnam from trading partner countries.

d_i : Dummy variable that take the value 1 for sector i and 0 for otherwise.

ER_{it} : Industry specific real exchange rates.

EV_t : Real effective exchange rates volatility.

$PDVN_{it}$: Total production of Vietnam.

$PDTP_{ijt}$: Total production of trading partner countries.

$PPVN_{it}$: Producer prices of Vietnam.

$PPTP_{ijt}$: Producer prices of trading partner countries.

6) See econometric textbook, for instance, of William Greene (1993).

7) These equations can be derived from a structural model of exporter's behavior: see, for example, Sekkat (1998).

It is notable that the same mark of parameters in different equations does not mean the same magnitude of parameters.

All variables are in natural logarithm.

In the next step, the sectoral characteristic of market concentration is considered in order to examine whether the heterogeneous responses of trade volumes to exchange rate changes can be accounted for by a condition of imperfect competitiveness. The equations to be estimated are the following:

$$X_{ijt} = c + \sum_{i=2}^{17} (c_i * d_i) + a_{1i}ER_{it} + bER_{it} * CON_i + a_2EV_{it} + a_3PDVN_{it} + a_4PDTP_{ijt} + a_5PPVN_{it} + a_6PPTP_{ijt} + u_2a \tag{8 a}$$

$$M_{ijt} = c + \sum_{i=2}^{18} (c_i * d_i) + a_{1i}ER_{it} + bER_{it} * CON_i + a_2EV_{it} + a_3PDVN_{it} + a_4PDTP_{ijt} + a_5PPVN_{it} + a_6PPTP_{ijt} + u_2b \tag{8 b}$$

where, CON_i denotes concentration ratio of sector i . The interaction coefficients associated with $ER_{it} * CON_i$ represent the role played by concentration in generating the response of trade volumes to exchange rate fluctuations. For a given sector i , the sensitivity to actual exchange rate changes is given by $a_{1i} + b * CON_i$, in which the sign of interaction coefficient b is expected to be the opposite of coefficient a_{1i} .

Finally, two export equations that capture the variable of imported input share are considered, as below:

$$X_{ijt} = c + \sum_{i=2}^{17} (c_i * d_i) + a_{1i}ER_{it} + \alpha ER_{it} * IIS_{it} + a_2EV_{it} + a_3PDVN_{it} + a_4PDTP_{ijt} + a_5PPVN_{it} + a_6PPTP_{ijt} + u_3 \tag{9}$$

$$X_{ijt} = c + \sum_{i=2}^{17} (c_i * d_i) + a_{1i}ER_{it} + bER_{it} * CON_i + \alpha ER_{it} * IIS_{it} + a_2EV_{it} + a_3PDVN_{it} + a_4PDTP_{ijt} + a_5PPVN_{it} + a_6PPTP_{ijt} + u_4 \tag{10}$$

where, IIS_{it} denotes the imported input share in sector i . α stands for importance of imported input share in explaining the response of export volume to exchange

rate changes.

Regarding the data issues, bilateral trade flows between Vietnam and 18 leading trading partners in 20 manufacturing sectors are constructed from data of trade values and trade prices. The partners are the twelve OECD countries of Japan, the United States, UK, Germany, France, Canada, Korea, Australia, Italia, Netherlands, Belgium, Spain and six other Asian countries of Taiwan, Singapore, Hong Kong, Thailand, Malaysia and Indonesia. Given the available data, it is not possible to fulfill all the requirements of data on a time series, bilateral and sectoral basic at the finest level of disaggregation. Therefore, the industrial classification is carried out based on correspondingly combining classifications of GTAP v 5.4 (Global Trade Analysis Project) and ISIC v.3 (International Standard Industrial Classification). There are 17 sectors that are considered in the exports equation, and 18 sectors in the imports equation. These are reported in Table 1. Bilateral trade data from 1991 to 1998 are partly taken from GTAP v 5.4 database. The data of Vietnam in trading with Japan, Hong Kong, Malaysia and Indonesia are available in Japanese Foreign Trade White Papers; Hong Kong Merchandise Trade Statistics; annual supplement; Malaysian Foreign Trade Statistics; and Indonesian Foreign Trade Statistics, respectively. The remaining trade data from the 1999 and 2000 years are drawn from Commodities Export and Import Statistics of Vietnamese General Statistic Office (GSO). Trade price indexes are not employed on bilateral basic due to unavailable data, but they are available in Price and Price Index Statistics of GSO in terms of time series and some specific sectors.

The industry specific real exchange rate indexes are measured by spliced trade weighted geometric average process⁸⁾. There are three components that are neces-

8) The computation of real exchange rate index was based on Laspeyres' spliced weighting formula (see, for example, Luci Ellis 2001 for more details) and applying an idea of constructing sector specific exchange rates of Linda Golsberg (2003).

sary to compute these indexes: trade weight, CPIs and nominal exchange rates. Trade weight is calculated from raw data of bilateral trade values as mentioned above. Aggregate CPIs are taken from Price and Price Index Statistics of GSO for Vietnam during the period of 1991 to 1994 year and from IMF's IFS (CD-ROM) for the remaining data and for the trading partners' data. Nominal exchange rate indexes are available in IMF's IFS.

Real exchange rate volatility is measured by moving standard deviation over twelve months of real effective exchange rate changes⁹⁾. To compute this variable, monthly data of exchange rates, CPIs and traded weight rate of Vietnam with 13 trading partners in which trade weighted rates are calculated from raw data published in IMF's DOT (CD-ROM).

To take account of possible demand and supply effects, sectoral production measured in constant price of 1995 are also employed. These data in nominal terms are drawn from Statistic Yearbook of GSO for Vietnam; from Industrial Statistics of Taiwan; UNIDO's International Yearbook of Industrial Statistics (2003) and the OECD Stand Database for Industrial Analysis for trading partners.

As a proxy for other costs, producer price indexes for each country and specific sector are considered. These data of Vietnam are from GSO's Price and Price Indexes and the data of OECD's trading partners are available on the OECD Main Economic Indicators. For the other trading partners, data are taken from ADB's Key Economic Indicators. It is also due to the lack of this type of the data that the manufacturing GDP deflators are chosen as a proxy for the case of Taiwan, Singapore, Thailand and Indonesia; implicit GDP deflator for Hong Kong. The data of whole sales price indexes are available, but manufacturing GDP deflators are preferred because they are price indexes of aggregate production. While

9) The formula measuring real exchange rates volatility can be seen from the study of Aristotelous (2001), for instance.

WPIs are indexes of consumption prices and may include largely imported goods for domestic consumption, they may be distorted by indirect taxes and subsidies. However, the data of these price indexes in terms of detail disaggregate are not available; therefore it seems appropriately to utilize the same indexes for some sectors.

In equations 8 a and 8 b, the imperfect competitive indicator of sectoral concentration is examined. Because of limited data, a proxy of this variable is measured, as follows:

$$CON_i = \frac{x_i * 2000}{y_i} \quad (11)$$

where: x_i denotes the number of enterprises that has employees size of average 2000 persons per one enterprise, in sector i and accounting until the last date of 2000 year.

y_i stands for the total of employees in sector i and accounting until the last date of 2000 year.

The measure based on raw data is taken from GSO's the Real Situation of Enterprises (2004). The reasoning behind the construction of this measure is equality between employees' size and output's size under the assumption that the output values are exclusively distributed in the payroll.

Finally, the imported input shares are computed by the ratio of imported input value over production for each sector and for the three years of 1989, 1997, 2001. The 1989 measure is used for the years 1991 to 1993, the 1997 measure is used for the years of 1994 to 1997, and the 2001 measure is used for the subsequent years 1998 to 2000. The data for 1997 and 2001 are available in GTAP v 5.4 and GTAP v. 6 database, respectively. The 1989 measure is calculated following the formula computing imported input share developed by Campa and Goldberg

(1997). The related raw data are available in Vietnamese Input-Output Table 1989.

The measured results of above two industrial characteristic indicators are presented in Table 2.

5. Sensitive analysis of empirical results.

Estimation results of equation 7 a and 7 b are reported in Table 3 and Table 4, respectively. As can be seen, due to the regressions using various dimensions, the adjusted R^2 become to be of medium level.

Considering the variables exchange rates for exports equation, an appreciation of Vietnamese Dong in real terms helps decrease exports toward the trading partners in the case of 4 sectors. These are: industries of coal, processed rice and other cereal grain products, paper products, publishing, and basic metal. For the other sectors, the coefficients of this variable turn out to have an unexpected sign with high significant level, except the beverage and tobacco industry. For import volume estimation, there seems to be pervasive phenomena as a currency appreciation increases import flows from the trading partners. This occurs in 15 out of 18 sectors. For the industries of food products, paper products, publishing and other transport equipment necessities, an exchange rate appreciation does not significantly influence imports volume. Overall, the exchange rates coefficients are found to be significantly different from 0. This reflects remarkable sensitivity of trade volumes to exchange rate fluctuations. The outcome also reveals that sensitivities are different across sectors in the case of both exports and imports estimations.

The results show that increases in real exchange rates uncertainty reduce international trade. This can be well understood if producers are risk-averse. These coefficients are negative and are seemingly higher for importers' reaction than for that of the exporters.

Regarding the effects of possible demand and supply, coefficients of total production variables become significantly consistent in three out of four cases. Interestingly, changes in total production of Vietnam are not found to affect her import volume. This implies that there apparently has been imperfect substitution between domestic products and foreign products in the Vietnamese commodities market. Finally, with regard to export volume equation, coefficients of producer prices have the correct sign and are meaningful in the case of representative variable for the trading partner countries, but not in the case of that for Vietnam. By contrast, for imports estimation, the effects of Vietnamese producer prices are appropriately significant at high level of 1 percent, while the coefficient of partners' prices turn out to be unexpected in terms of sign. This result seems to be not surprising because all producer prices are not applied in real terms, although the other variables of the estimated equations are considered in real terms¹⁰⁾.

Table 5 and Table 6 display the regression results of further expanded analysis, that is, of equation 8 a and 8 b. The coefficients associated with the production and prices variable have the same sign, significant level and order magnitude, as the results reported in Table 3 and Table 4.

The significant impact of real exchange rates volatility is found only in the imports equation. The exchange rate coefficients have a significant expected sign for imports equation and an unexpected sign for exports equation. It also indicates that the sensitivity is heterogeneous across sectors. Considering the effect of market concentration, the result is significant for exports estimation at a high level, but not for imports estimation. This implies that, in accordance with the above mentioned theory, the more concentrated the sector, the less sensitivity to exchange rate changes.

10) Using relative price of producer price and consumer price index can bring remarkably different results.

From the results in the above four equations, the role of imported input share in different sectors is expected to play an important role in possibly explaining the unexpected relationship between Vietnam's export volume and the movements of the currency value. The estimated results of equation 9 and 10 are represented in Table 7 and Table 8, respectively. Indeed, interestingly, after taking into account the interactive effect of exchange rate changes and imported input share, the coefficients of exchange rate variable turn out to be statistically significant and have the correct sign in all two exports equations. It suggests that an appreciation of Vietnamese Dong unquestionably has made export volume decrease, if the importance of sectoral intermediate imported inputs, which are likely to be influenced by exchange rate changes, is rejected. The coefficients of interaction variables are negative and significantly high in both equations. The other variables appear to have the same sign and significant level as the estimated results presented in export equations 7 a and 8 a, except for the variable of market concentration ratio.

6 . Concluding remarks.

In this paper, the sectoral sensitivity of bilateral trade volumes between Vietnam and 18 leading trading partners as well as currency fluctuations is investigated by applying methodology of quantitative analysis for panel data. The data are collected from 20 manufacturing sectors of Vietnam and span the period of 1991 to 2000. Moreover, in order to take into account the effect of imperfect competitiveness on the degree of sensitivity to the Vietnamese dong fluctuations, the market concentration ratio is briefly examined in the empirical model. Subsequently, the paper highlights the fact that increasing Vietnamese external commodities trading during the period of currency appreciation could be attributed to more extensive use of foreign imported parts in the production of exportable goods.

The empirical outcomes suggest that the sensitive coefficients to exchange

rate changes vary across sectors. An appreciation of Vietnamese Dong helps increase import flows for almost all sectors. There are 3 out of 18 cases in which the result is not found to be statistically significant. Conversely, the exchange rate appreciation in real terms would have decreased export volume in the case of only 4 out of all 17 sectors. In addition, the regression estimates suggest that the market concentration has influenced significantly, in accordance with the theory, to the behavior of export suppliers. This can not be found in that of importers.

As a vigorous result, the paper demonstrates a very pivotal role has been played by the imported input share in generating the response of export volume to exchange rate fluctuations. Therefore, it can be safely stated that the crucial resource in maintaining export competitiveness of Vietnam has been provided by having a high imported inputs. This, consequently, implies that an appreciation of the Vietnamese Dong in the 1990s induced by an exchange rate policy did not mean Vietnam has lost export price competitiveness.

However, in the future, as domestic value-added increases, the role of high import content will diminish. This calls for further efforts to monitor exchange rate changes, besides of raising productivity across industries.

The findings of this paper have important implications for further studies to completely evaluate the relationship of Vietnam's exports and movements in currency value. Additional studies may need to examine the pass-through effect of currency fluctuations on Vietnamese trade goods prices, and also to investigate the causal effect of trade goods prices and the behavior of reducing profit mark-up of exportable goods' producers.

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Figure 1: Real exports, real imports and real exchange rates of Vietnam (1995=100)

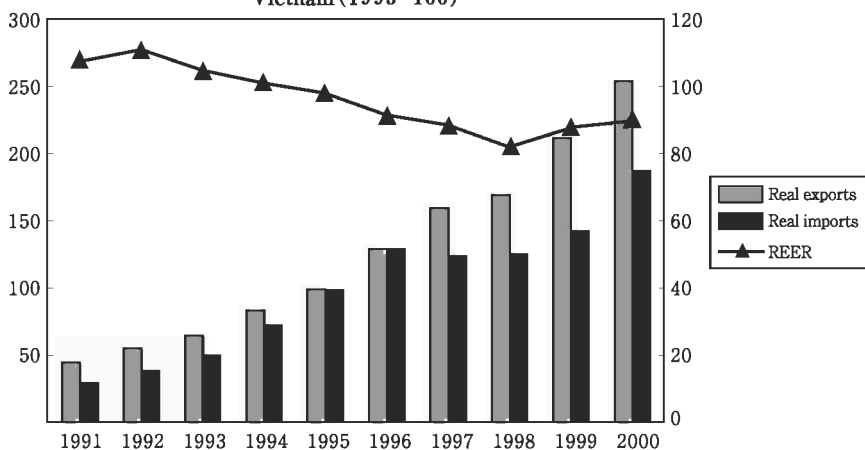


Table 1: List of Manufacturing Industries.

Exports equation	Imports equation
Processed rice and other cereal grain products	Processed rice and other cereal grain products
Coal	Food products
Crude oil	Beverage and tobacco products
Food products	Textiles
Beverage and tobacco products	Wearing apparel
Textiles	Leather products, including footwear
Wearing apparel	Wood and wood products
Leather products, including footwear	Paper products, publishing
Wood and wood products	Petroleum products
Paper products, publishing	Chemical, rubber, plastic products
Chemical, rubber, plastic products	Non-metal mineral products
Non-metal mineral products	Basic metal
Basic metal	Metal products
Metal products	Motor vehicles and parts
Electronic equipments	Other transport equipment necessities
Machinery and equipment necessities	Electronic equipments
Other manufactures necessities	Machinery and equipment necessities
	Other manufactures necessities

Table 2: Industrial Characteristic Indicators

Industry	Concentration	Imported input share
Coal	0.58	0.26
Crude oil	1	0.04
Processed rice and other cereal grain products	0.40	0.02
Food products	0.40	0.19
Beverage and tobacco products	0.58	0.29
Textiles	0.05	0.59
Wearing apparel	0.45	0.68
Leather products, including footwear	0.57	0.52
Wood and wood products	0.25	0.20
Paper products, publishing	0.16	0.33
Petroleum products	0.74	0.05
Chemical, rubber, plastic products	0.24	0.44
Non-metal mineral products	0.18	0.16
Basic metal	0.21	0.24
Metal products	0.07	0.42
Motor vehicles and parts	0.16	0.52
Other transport equipment necessities	0.24	0.48
Electronic equipments	0.20	0.51
Machinery and equipment necessities	0.38	0.44
Other manufactures necessities	0.09	0.47

Note: Authors calculated the concentration ratios from raw data that account by the end of 2000 year. For crude oil industry, the ratio was taken the highest value of 1, because this industry has only two enterprises. For other sectors, these ratios were measured by the formula 5. Imported input shares are of the 1997 year

Table 3: Exports Equation 7a

Industry	Coefficient	t-statistic
Coal	1.75	1.76**
Crude oil	-5.21	-3.14***
Processed rice and other cereal grain products	2.48	4.02***
Food products	-2.57	-2.14**
Beverage and tobacco products	-4.56	-1.15
Textiles	-4.57	-5.12***
Wearing apparel	-2.65	-2.21**
Leather products, including footwear	-3.71	-2.27**
Wood and wood products	-3.73	-3.86***
Paper products, publishing	4.49	2.42**
Chemical, rubber, plastic products	-1.45	-1.65**
Non-metal mineral products	-2.93	-2.39**
Basic metal	3.68	2.37**
Metal products	-8.22	-5.39***
Electronic equipments	-13.91	-7.41***
Machinery and equipment necessities	-6.76	-4.33***
Other manufactures necessities	-6.84	-5.84***
Real exchange rates volatility	-6.98	-2.4**
Total production of Vietnam	0.60	4.81***
Total production of trading partners	-0.14	-2.58**
Producer price of Vietnam	0.92	3.45***
Producer price of trading partners	0.12	2.11**
Intercept	-13.16	-3.69***
Nob: 1670 R ² : 0.45 F(32,1631): 8.17***		

Note: (*) denotes rejection of the null-hypothesis at 10% significant level.

(**) denotes rejection of the null-hypothesis at 5% significant level.

(***) denotes rejection of the null-hypothesis at 1% significant level.

Source: Authors' estimations.

Table 4: Imports Equation 7b

Industry	Coefficient	t-statistic
Processed rice and other cereal grain products	-2.98	-2.35**
Food products	-0.84	-0.58
Beverage and tobacco products	-7.42	-2.71**
Textiles	-4.15	-4.6***
Wearing apparel	-3.41	-1.66**
Leather products, including footwear	-5.31	-3.01**
Wood and wood products	-13.15	-5.32***
Paper products, publishing	-1.01	-1.01
Petroleum products	-5.22	-2.61**
Chemical, rubber, plastic products	-4.22	-4.97***
Non-metal mineral products	-2.95	-2.27**
Basic metal	-4.40	-3.81***
Metal products	-2.95	-2.76**
Motor vehicles and parts	-2.47	-2.12**
Other transport equipment necessities	0.57	0.51
Electronic equipments	-5.14	-3.88***
Machinery and equipment necessities	-1.88	-1.74**
Other manufactures necessities	-1.76	-3.82***
Real exchange rates volatility	-12.3	-3.45***
Total production of Vietnam	-0.09	-0.91
Total production of trading partners	0.17	1.81**
Producer price of Vietnam	1.35	5.12***
Producer price of trading partners	0.56	2.02**
Intercept	8.78	1.37*
Nob:1930 R ² :0.30 F(34,1886): 4.05***		

Note: (*) denotes rejection of the null-hypothesis at 10% significant level.

(**) denotes rejection of the null-hypothesis at 5% significant level.

(***) denotes rejection of the null-hypothesis at 1% significant level.

Source: Authors' estimations.

Table 5: Exports Equation 8a

Industry	Coefficient	t-statistic
Industry specific real exchange rates	-2.09	-3.44***
Concentration	6.49	4.67***
Real exchange rates volatility	-0.92	-0.31
Total production of Vietnam	0.73	9.51***
Total production of trading partners	-0.12	-2.27**
Producer price of Vietnam	1.95	8.41***
Producer price of trading partners	0.12	2.01**
Intercept	-9.77	-3.09**
Nob: 1670		
R ² : 0.38		
F(16,1646): 3.95***		

Note: (*) denotes rejection of the null-hypothesis at 10% significant level.

(**) denotes rejection of the null-hypothesis at 5% significant level.

(***) denotes rejection of the null-hypothesis at 1% significant level.

Source: Authors' estimations

Table 6: Imports Equation 8b

Industry	Coefficient	t-statistic
Industry specific real exchange rates	-2.87	-4.95***
Concentration	-0.61	-0.34
Real exchange rates volatility	-12.9	-3.77***
Total production of Vietnam	-0.07	-0.94
Total production of trading partners	0.18	1.95**
Producer price of Vietnam	1.41	5.86***
Producer price of trading partners	0.68	2.47**
Intercept	8.45	1.94**
Nob: 1930		
R ² : 0.28		
F(17,1905): 3.39***		

Note: (*) denotes rejection of the null-hypothesis at 10% significant level.

(**) denotes rejection of the null-hypothesis at 5% significant level.

(***) denotes rejection of the null-hypothesis at 1% significant level.

Source: Authors' estimations.

Table 7: Exports Equation 9

Industry	Coefficient	t-statistic
Industry specific real exchange rates	1.71	3.24***
Intermediate imported input	-9.89	-8.13***
Real exchange rates volatility	-4.07	-1.4*
Total production of Vietnam	0.37	4.95***
Total production of trading partners	-0.42	-2.15**
Producer price of Vietnam	1.70	7.38***
Producer price of trading partners	0.12	2.01**
Intercept	-11.32	-3.68***
Nob: 1670		
R ² : 0.4		
F(16,1646): 6.78***		

Note: (*) denotes rejection of the null-hypothesis at 10% significant level.

(**) denotes rejection of the null-hypothesis at 5% significant level.

(***) denotes rejection of the null-hypothesis at 1% significant level.

Source: Authors' estimations.

Table 8: Exports Equation 10

Industry	Coefficient	t-statistic
Industry specific real exchange rates	1.09	1.42*
Intermediate imported input	-9.19	-6.7***
Concentration	1.7	1.1
Real exchange rates volatility	-3.74	-1.28*
Total production of Vietnam	0.42	4.77***
Total production of trading partners	-0.12	-2.18**
Producer price of Vietnam	1.71	7.42***
Producer price of trading partners	0.12	2.04**
Intercept	-12.01	-3.82***
Nob: 1670		
R ² : 0.4		
F(16,1645): 6.68***		

Note: (*) denotes rejection of the null-hypothesis at 10% significant level.

(**) denotes rejection of the null-hypothesis at 5% significant level.

(***) denotes rejection of the null-hypothesis at 1% significant level.

Source: Authors' estimations.