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Economic integration and trade deficit: A case of Vietnam

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This paper attempts to present a quantitative analysis in order to figure out the reasons of continuous increase of trade deficit in the last decade in Vietnam. After a long period of unceasing economic growth and macroeconomic stability, Vietnam has become one of the attractive investment destinations for many foreigner investors. However, the country starts to worry about its overall economic situation after overexciting the first half of 2007 when Vietnam officially joined the World Trade Organization (WTO) in January the same year. The study explains output multiplier and power of dispersion on import, based on structure of the economy through input - output tables published by General Statistical Office and the Leontief and Keynes' theories, aiming at helping policy-makers and planners to prioritize the key sectors and appropriate structure for the Vietnam's economy. The study also introduces a comparison between the power of dispersion on import and the effective rate of protection in order to have the most appropriate economic policy with respect to the WTO's commitments.

Key words: Vietnam, trade deficit, output multiplier, import multiplier, protection, input-output analysis.

INTRODUCTION

In the last two decades, Vietnam has achieved the high rates of economic growth. The period of 2000 to 2009 witnessed the remarkable improvements in Vietnam's performance from real aspect to social issues and economic institution with the annual average growth of economy at about 7.3%. However, beside the over-excitement, the country's economy faced with the const-ant increasing of chronic trade deficit that has resulted in the macroeconomic instability Hà Quang and Bùi (2011).

In Vietnam, the chronic trade deficit has continuously increased since 2000. During the period 2000 to 2009, the average trade deficit of commodity was 31 and 35.8%, if it was estimated in US dollars and Vietnamese Dongs respectively (Figure 1). The price of imported goods used in the statistics data should be estimated in insurance and freight (*c.i.f*) price, which means that service, is the proportional part in the price, including freight transport service and insurance. When Vietnam became the official member of the World Trade Organization (WTO) in 2007,

the service sector felt down into the trade deficit induced by deficit in freight transport services and insurance services. In principle, imported goods must be estimated in free on board (FOB) price, while the freight transport service and insurance are included in the service import. Hence, the total value of import will be calculated in *c.i.f* price. These considerations will help balance the macroeconomic and make data analyses much easier. The import demand was mainly used for domestic manufacturing (over 90%) in order to complete the final products' procedure.

This paper attempts to present a quantitative analysis in order to figure out the reasons of continuous increase of trade deficit in the last decade in Vietnam. The analysis has been based on structure of the economy through Input-Output tables published by General Statistical Office and the Leontief and Keynes' theories (Ngoc et al. 2006; Kenichi, 1960).

In the study, we explain the output multiplier and power of dispersion on import so as to recommend policy-makers and planners to prioritize the key economic sectors and appropriate structure for the Vietnam's economy. The study also introduces a comparison

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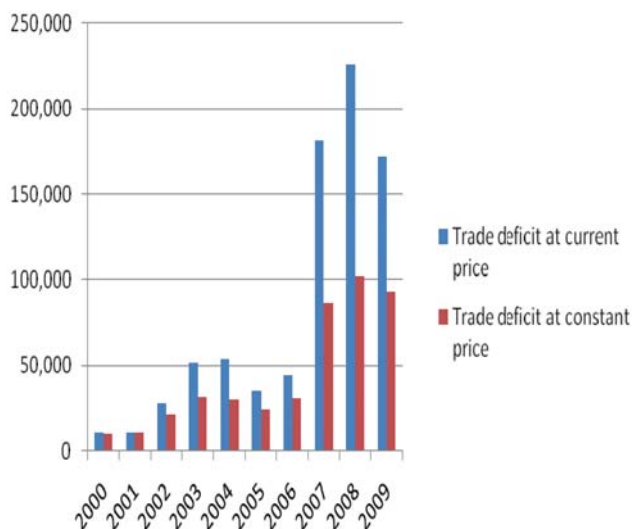*Corresponding author. E-mail: buitrinhcan@gmail.com.

Figure 1. Trade deficit in commodity and service sectors, 2000 to 2009.

between the power of dispersion on import and the effective rate of protection, from which Vietnamese policy makers can consider the most appropriate economic policy with respect to the WTO's commitments.

METHODOLOGY

Output multiplier and power of dispersion on import

That research has been done based on Keynes' theory on the relationship's extension of trade that the Keynesian trade factors used to estimate the import demand in manufacturing for final demand. It led to the confusion because in reality, the domestic final demand often includes final consumptions, investment/saving and export. Input-Output table of Leontief was developed basing on Keynes' theory. An expansion of Keynesian in input-output table of Leontief developed base on each factor's impact of demand.

The Leontief system was estimated as Equation (1):

$$X - AX = C + I + E - M \qquad (1)$$

where X, C, I, E, M are the vectors of gross output, household consumption, gross capital formation, export and import respectively.

Equation (1) can be written as follows:

$$X - AX = C + I + E - M^p - M^c \qquad (2)$$

where M^p is the import for intermediate input and M^c is the import of final products, $M = M^p + M^c$.

Expanding Equation (2):

$$X - A^d X - A^m X = C^d + I^d + E + C^m + I^m - M \qquad (3)$$

where,

$$AX = A^d X - A^m X , \ A^m X = M^p$$

and

$$M^c = C^m + I^m .$$

A^d is matrix of intermediate consumption of domestic products, while C^m, I^m are the final consumption and gross capital formation vectors of domestic products, respectively.

Putting $Y^d = C^d + I^d + E$ where Y^d denotes final demand of domestic products vector, now we can rewrite the Equation (3) as follows:

X= (I-A^d)^{-1}. Y^d = (1+A+A^2+A^3+....) Yd   (4)

where (I-A^d)^{-1} is the Leontief matrix multiplier that shows domestic product requirements for a unit increase in domestic final demand.

A backward linkage is a measure of the relation between an industry and the suppliers of its inputs from the entire production system. It measures the output increase which will occur in industries which supply inputs to the industry concerned. A backward linkage can be computed as the ratio of the sum of the elements of a column of the Leontief inverse to the average of the whole system. This ratio was described by Rasmussen (1957) as the index of the power of dispersion, μ_j, and is defined mathematically as follows:

$$\mu_j = \frac{\sum_{i=1}^{n} \ell_{ij}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n}\ell_{ij}}$$

where ℓ_{ij} is the element of the inter-regional Leontief inverse. The higher the value of μ_j is, the stronger the influence of production sector j as a user of intermediate inputs.

On the other hand, Equation (3) can be formulated as follows:

X - A^m.X= A^d.X +C^d +I^d+E+C^m+I^m-M=TDD -M^p

where total domestic demand includes intermediate expenditure, final consumptions, investment and export (TDD)

TDD = A^d.X +C^d +I^d+E, we obtain:

X = (I-A^m)^{-1}.(TDD- M^p)   (5)

or

X = (I-A^m)^{-1}.(TDD+ C^m+I^m + E- M^p)   (6)

matrix (I-A^m)^{-1} is the import multiplier matrix. Equations (5) and (6) present the demand of import multiplier by domestic demand. The input-output table should be built as non-competitive import type in which intermediate demand and final demand have been separated into domestic products and import. Then the existing input-output table for Vietnam should be mathematically changed to non-competitive import type. A^m and A^d are calculated as follows:

A^mX=Φ.A.X and A^dX = (I-Φ).A.X   (7)

where $m_i = M_i/TDD_i$; M_i is imported good I and TDD_i is the total

Table 1. Output multiplier and power of dispersion on import.

Service	Output multiplier	Power of dispersion on import
Agriculture	1.0293	0.9643
Fishery	1.3505	*1.0276*
Forestry	0.8934	0.9959
Mining and quarrying	*0.7774*	*1.0039*
Food, beverage and tobacco manufactures	1.4492	0.9564
Other consumer goods	1.2093	*1.3754*
Industrial material	1.2644	*1.3595*
Capital goods	1.2475	*1.3279*
Electricity, gas and water	0.7220	0.9011
Construction	1.1949	*1.2884*
Wholesale and retail trade	0.7303	0.9406
Transport services	1.0476	*1.1619*
Post and telecommunication	0.7748	0.9090
Finance, insurance, real estate, business services	0.7577	0.8853
Other private services	0.8133	0.9959
Government services	0.7384	0.9169

Bolded numbers means good, and Italic numbers means not good.

domestic demand of good i excluding export and $m_i \leq 1$, Φ is the diagonal matrix of import coefficient m_i.

M^c can be defined as $M^c = (I-A^m)^{-1}$. C^d and M^c is the import multiplier matrix that is induced by domestic final consumption. $M^e = (I-A^m)^{-1}$. E. Where M^e is the import multiplier matrix induced by export. Meanwhile $M^I = (I-A^m)^{-1}$. I^d, and M^I is the import multiplier matrix induced by the accumulation from domestic products.

Effective rate of protection (ERP)

The effective rate of protection (ERP) is an indicative measure of the effects of tariff on inputs as well as outputs. It gives a percentage increase in domestic value added over the free-trade level, an increase made possible by the country's tariff structure. In other words, ERP of product i is defined as the difference between its value added (per unit of output) at domestic price (that is, inclusion of tariffs on the finished product and the intermediate inputs) and its corresponding value added at world price (that is, price prevailing under free trade).

Normally, a nation imports a raw material free of tax or imposes a lower tariff rate (nominal tariff) on the importation of input, than on importation of the final commodity produced with the imported input. The nation does this in order to protect their domestic producers and to encourage domestic processing and employment. How should the degree of ERP for domestic product be considered then? And what kinds of goods are imposed import tariff in order to provide ERP for those in domestic economy with high multiplier?

The ERP shows the degree of protection through nominal rate of protection (NRP). It is formulated as follows:

$$ej = \frac{V(do)j - V(fo)j}{V(fo)j}$$

where *V(do)j is the value added at domestic price in industry j; V(fo)j is the value added at world price in industry j, and ej is*

effective rate of protection of industry *j*

The comparison between import multiplier, power of dispersion on import and ERP aims at recommending policy-decision makers to define key economic sectors that have higher economic multiplier (more than 1) and lower power of dispersion on import (less than 1). This helps them to issue some appropriate import tariff policy that, at the same time, ensures the process of economic integration and the protection of domestic production.

RESULTS

Output multiplier and power of import dispersion

From the calculation aforementioned and using 2007 input-output table of Vietnam published by GSO, Table 1 shows the import multiplier and the power of dispersion on import of 16 aggregative sectors. It is clearly seen that there were only 2 sectors, namely agriculture services and food, beverage and tobacco manufactures whose output multipliers were higher than one and the power of dispersion on import were lower than one. Most of the manufacturing sectors enjoyed the high power of dispersion on import which means the more these sectors developed the greater their dispersion was on import. Meanwhile, the service sectors had both low power of dispersion on import and economic multiplier. A research conducted by The Hanoi National University in 2010 proved that if the efficient of productivity could be improved and 20% of export ratio was shifted from industry sector to services sector, the average economic multiplier would be greater than one and the ratio of service sector would make up 50% of GDP. This has been questioned whether the economic structure with the
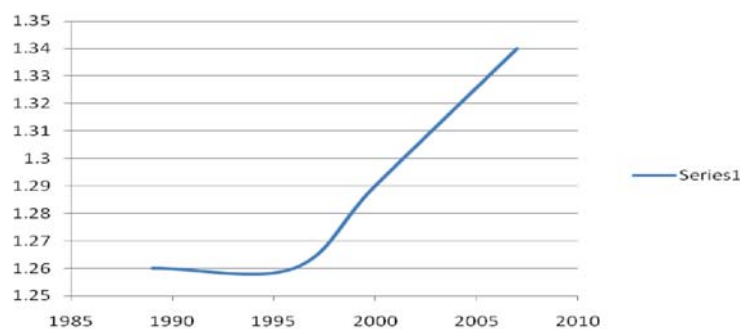
Figure 2. Average import multiplier per one unit of domestic demand 1989 to 2007.

Table 2. Power of dispersion on import of sectors for one unit of final domestic demand from 1989 to 2007.

Service	1989	1996	2000	2007
Agriculture	0.8750	0.9066	0.9035	0.9643
Fishery	1.0141	0.9106	1.0086	1.0276
Forestry	0.8877	0.8687	0.8774	0.9959
Mining and quarrying	1.0110	0.9493	0.8703	1.0039
Food, beverage and tobacco manufactures	0.9264	0.8829	0.9035	0.9564
Other consumer goods	1.0521	1.0513	1.1627	1.3754
Industrial material	1.1066	1.0718	1.2086	1.3595
Capital goods	1.1762	1.3769	1.3556	1.3279
Electricity, gas and water	1.0726	1.0948	0.9596	0.9011
Construction	1.1382	1.1319	1.2584	1.2884
Wholesale and retail trade	0.8394	0.8900	1.0315	0.9406
Transport services	1.1359	1.0940	1.0465	1.1619
Post and telecommunication	0.9833	0.9659	0.9454	0.9090
Finance, insurance, real estate and business services	0.9833	0.8987	0.9327	0.8853
Other private services	0.9232	0.8995	0.9430	0.9959
Government services	0.8750	0.8979	0.9541	0.9169

first priority of industry sector, followed by services and agriculture Sectors is the correct one (Bui et al., 2009; Bui, 2010; Nguyen, 2010).

Figure 2 shows that in the period of 1989 to 2007, the "import multiplier" increased from 1.26 to 1.34. It means that the increase of one unit of domestic demand led to 1.26 unit of import and this went up to 1.34 unit of import for the same increase unit of domestic demand.

The power of dispersion on import of one sector is the average of its import multiplier. The sector has the power of dispersion on import less than unit which implies that means induced impact on import is lower than the average of the whole economy and vice versa.

The result shown in Table 2 indicates that the power of dispersion on import of almost manufacturing, processing and construction industries have increased by time (Kwang et al., 2007). Especially, consumer goods production, material manufacturing industry and machinery manufacturing industry were still currently enjoying the increasing power of dispersion on import.

The results in Figure 3 show the remarkable change in the structure of the import demand amongst proportions of domestic products demand. Currently, the accumulation of locally produced products consumption has the highest stimulation over import, but not the consumption of domestic products. If domestic products accumulation increases by one unit, the import will reach 1.69 units. It means that the ineffective investment will require the greater import. The result from a series of research using ICOR (Incremental Capital Output Ratio) ratio proved that the effectiveness of investment is very low at present. Hence, the low effectiveness of investment is one of the reasons which induce high trade deficit. Besides increasing one unit of the export product, it increased 1.5 units of import which is higher than that of the previous period (17%). Meanwhile, the expenditure
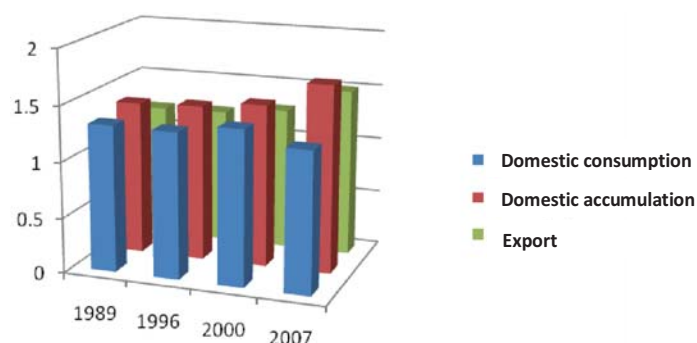
Figure 3. Power of dispersion on import induced by domestic demand factors.

Table 3. Comparison between ERP, economic multiplier and power of dispersion on import of livestocks sectors.

Livestock section	ERP, 2007 (%)	Import multiplier	Power of dispersion on import
Buffalo, cow	-1.8	1.1491	0.72428
Pigs	-18.2	1.7945	0.75176
Poultry	-1.1	1.6159	0.74834
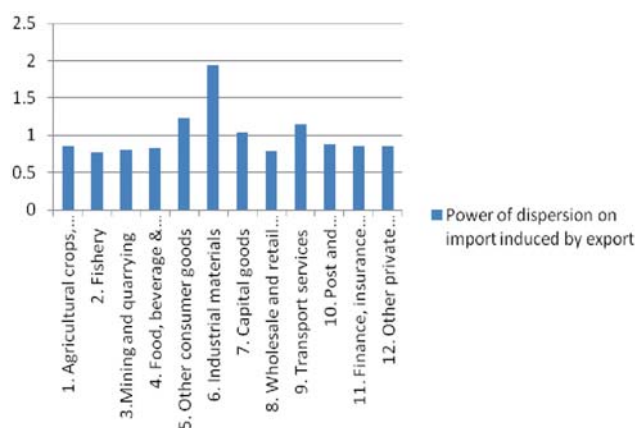
Figure 4. Power of dispersion on import induced by export.

Figure 5. ERP and NRP in the period of 2005 to 2009

for the final consumption of domestic products dispersing on import falls off by 1.26 against 1.4 in the last ten years. It implies that some imported intermediate input of domestic products have been replaced by other domestic intermediate inputs. Comparison between ERP, economic multiplier and power of dispersion on import of livestocks sectors is shown in Table 3.

The aforementioned analysis has proven the considerable increase of power of dispersion on import of export and domestic products accumulation. All of these have made people to carefully consider some solution like "Devaluation of Vietnam dong in order to stimulate export and restraint import". In some cases, this solution will have positive impacts for other economies such as China's but not Vietnam's economy because in reality the
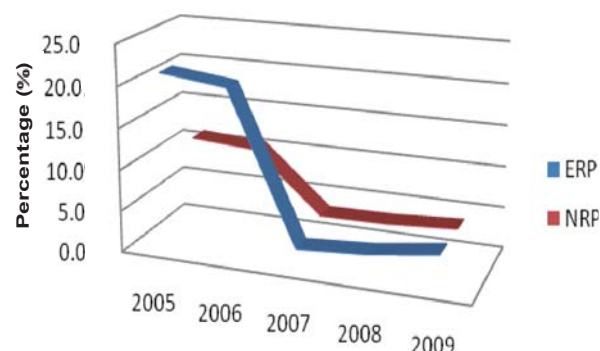
trade deficit of Vietnam is mainly induced by trade balance with China.

Figure 4 show that the export of manufacturing and processing industry stimulated the import quite strongly, of which export of material manufacturing industry products of consumer goods producing and machinery manufacturing industry products had the highest power of dispersion on import. So was the export of transport services.

Effective ratio protection

The results of the study presented the effective ratio protection for manufacturing decreased faster than nominal rate of protection. The ERP decreased from 21.4% in 2005 to 4% in 2009, while the NRP decreased from 10 to 3.88% in the same period of years (Figure 5).
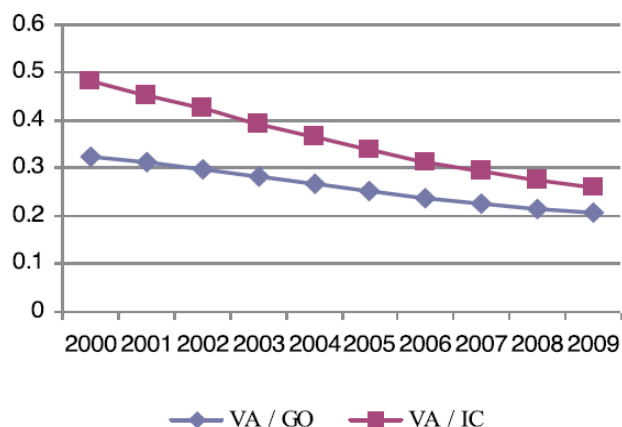
Figure 6. The changes of ratio value added over gross output and intermediate cost. *Source: GSO, CIEM.*
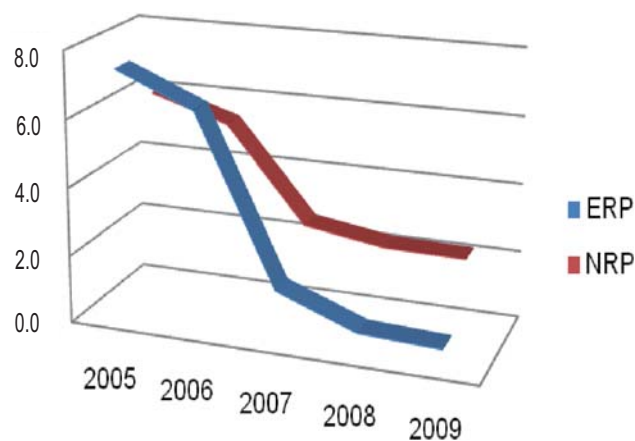
Figure 7. ERP and NRP of agriculture, forestry and fish.

The results previously given showed that Vietnam was integrating into global economy with the haste when the ERP fell off very fast. The reasons might include:

1. The protection of domestic products was not considered when imposing tariff on imported goods.
2. The ratio between value added per gross output and ratio between value added per intermediate consumption was continuously decreasing (Figure 6), through the years while the intermediate inputs were mainly imported.

However, in comparison with other countries in the period of 1995 to 1997, the ERP of Vietnam was higher than Korea's -27%; Malaysia's -13%, Philippines' -10% and Thailand's -72%.

As stated previously, the sectors including agriculture, forestry and fishery sectors have high economic multiplier and low import multiplier. These groups of sector should be considered as priority ones; however, they had ERP decreasing through the years (Figure 7), even some

sectors had minus ERP. It implies that, those competing-sectors were losing their competeveness induced by protection policy of Vietnam, and consequently the high trade deficit was unavoidable.

Especially, livestocks sectors have impressive economic multiplier and power of dispersion on import, but ERP are minus (Table 2).

Conclusion

This study has pointed out both the direct and indirect reasons of trade deficit in Vietnam for the period 2000 to 2009. The main reason discovered was not originated from the final demand which comprised only 10% of total imported commodities of the whole economy. It was because of the degradation of manufacturing industry with low productivity, poor technology and the continuous increase of intermedaite inputs per gross output during this period.

To achieve remarkable improvement on economy, each country needs to do much more than just invest money in building factories and industrial zones. Instead, it requires an entirely different way of developing the economy. The era of assembling products designed by developped countries, with imported technology should be replaced by investing more heavily in R and D on their own and employing highly educated and skilled workers to turn those investments into new products and profits.

The protection policy of Vietnam was arbitrarily implemented creating disadvantages for the competing-sectors, even their ERP were minus. The results of study proved that the sectors including agriculture, forestry and fishery had high economic multiplier and low import multiplier. These groups of sectors should be considered as priority sector enjoying production protection through ERP.

The power of dispersion on import was continuously increasing induced by export. Hence, the suggestion that "strengthen export and restrict import is needed" seems to be a paradox. In order to issue an appropriate and comprehensive development economic policy, policy-makers must be carefully considerate not to take models of the United States or Japan economies' policy for Vietnam such as devaluated Vietnam dong. The results have been presented previously clearly proved that the devaluation of Vietnam dong will have negative impact for the Vietnam's economy.

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