New Economic Structure for Vietnam Toward Sustainable Economic Growth in 2020

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NEW ECONOMIC STRUCTURE FOR VIETNAM TOWARD SUSTAINABLE ECONOMIC GROWTH IN 2020

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I. Introduction

In 1758, Francois Quesnay, an economist of Physiocrats published the "Tableou Economique" [1]. It was the first work to attempt to describe the inter-industrial relationships of the economy in an analytical way, and his work can be viewed as one of the first important contributions to economic thought. According to Marx 1867 [2], in a capitalist economy, technological improvement and its consequent increased production augment the amount of material wealth in society, whilst simultaneously diminishing the economic value of the same wealth, thereby diminishing the rate of profit — a paradox characteristic of economic crisis in a capitalist economy; "poverty in the midst of plenty" consequent to over-production and under-consumption. Keynes 1936 [3] introduced many innovations which still continue to be a central of macroeconomic. He spearheaded a revolution in economic thinking about recession which led to great change of the economists whose prior used GDP as the only way to judge the national economy. In 1941, Leontief [4] constructed input-output (I-O) table for the American economy and its analysis considers inter-industry relations in an economy, depicting how the output of one industry goes to another industry where it serves as an input, and thereby makes one industry dependent on other both as customer of output and as supplier of inputs.

Inherited from previous researches' including Marx's, Leontief [5] mathematically formulated a perfect supply-demand relationship of the entire economy. In this research, he assumed production technology (in short-term for instance in one year) is linear algebra relationship between produced output and input such as materials, services and other costs. These relationships were presented through a system of linear functions with the technical coefficients.

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 WTO in January the same year [6]. The debating over the final goal of economies re-structures as well as the selection of growth model still rising in Vietnam nowadays. This paper attempts to present a quantitative analysis aims to carry out a new economic structure toward sustainable economic growth and avoid/reduce chronic trade deficit base on input-output systems which is originated from W. Leontief's research.

II. Methodology

Within system national accounting includes two types of I-O tables: competitive-imports I-O table and non-competitive I-O table. The first type contains its limitation due to the lack of distinction is made between local and foreign imported inputs. While the second type, the non-competitive imports I-O table, intermediate demand and final demand have been separated into domestic output. Two columns of import and import tax are eliminated and two rows of import and import taxes have been extracted. Hence, when analyzing economic structure through the index of power of dispersion and/or the index of sensitivity, the policy makers can not distinguish which sector to be the "real key sector" in the entire economy.

Currently, Vietnam has launched number of I-O table, and the development of SNA for the country can be presented as follow :

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Table 1 : Development of I-O tables compilation.

Type of I-O table	Based year of compilation	Size of sector	Compiler
National competitive I-O table	1989	55 x 54	National Accounts Systems Department, General Statiscal Office
National competitive I-O table	1996	97 x 97	National Accounts Systems Department, General Statiscal Office
National competitive I-O table	2000	112 x 112	National Accounts Systems Department, General Statiscal Office
National competitive and non-competitve I-O tables*	2005	112 x 112	Ministry of Finance
National competitive and non-competitve I-O tables	2007	138 x 138	National Accounts Systems Department, General Statiscal Office
Other inter-regional I-O tables			Private research groups with financial supported from Japan

Note: *) This I-O tables were extended and developed to obtain SAM with 112 sectors and 5 institutions including household, government, state enterprises, non-state enterprises and FDI enterprises.

a) Basic relationships

Competitive import I-O table type: $X = (I-A)^{-1}.Y$ (1)

Non-competitive import I-O table type: $X = (I-A^d)^{-1}. Y^d$(2)

Where: X is the vector of gross output, I is the unit matrix, A is the intermediate input matrix, A^d is the matrix of intermediate consumption of domestic products, Y and Y^d denote final demand and final demand of domestic products vector matrix.

Within input-output framework, there are two kinds of economic linkages between sectors. These linkages are used as the tools to measure relation between an industry and the rest of industries of the entire economy. The analysis of the strengths of backward and forward linkages allows identifying the most important sectors in the economy.

b) A backward linkage

A backward linkage is referred as a demand relationship. It presents the relationship between an industry and the suppliers of its inputs from the entire production system. If one sector increases its output, then there is increased demand on the sectors whose products are used as inputs to production in the mentioned sector above. 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 called the index of the power of dispersion and it is defined mathematically as follows:

$BLi = \sum r_{ij}$ (summing of the elements of a column of the Leontief)

And the index of the power of dispersion equal to $n.BLi / \sum Bli$

In which rij are the elements of Leontief matrix, and n is the number of sectors in the model.

The higher the value of this ratio is, the stronger backward linkages. It meant that the rapid increasing output of this sector leads to high growth's speed of intermediate inputs (commodities and services) of the entire economy. This index plays an important role and it can be used by policy makers/planners in decision-making process with highly consideration. It meant that if the backward linkage of sector i is higher than that of sector j then an expansion of its output is more beneficial to the economy, in terms of causing other productive activities, than an equal expansion in sector j's output.

c) A forward linkage

A forward linkage is referred as a supply relationship. Increased output in sector i also means that additional amounts of product i are available to be used as inputs to production in the other sectors. If the forward linkage of sector i is higher than that of sector j, then an expansion of its output is more essential to the economy, in terms of productive activity that it would support, than an equal expansion in sector j's output. A forward linkage can be computed as the ratio of the sum of the elements of a row of the Leontief inverse to the average of the whole system. This ratio was called index of sensitivity and it is defined mathematically as follows:

$FLi = \sum r_{ij}$ (summing of the elements of a row of the Leontief)

And index of sensitivity equal to $n. FLi/\sum FLi$

In equation (3), the income multiplier is calculated as follows:

$$V = v.(I-A^d)^{-1}.Y^d \qquad (3)$$

$$\Delta V = v.(I-A^d)^{-1}.\Delta Y^d \qquad (4)$$

In which, V is total income; v is the coefficient matrix of value added.

The above relationship presents the change of income depends on change of domestic demand.

The relationships in Leontief system also allows to identify capital and labour requirements:

$$\Delta K = k.(I-A^d)^{-1}.\Delta Y^d \qquad (5)$$

And

$$\Delta L = l.(I-A^d)^{-1}.\Delta Y^d \qquad (6)$$

In which, k and l are the ratios between capital and labour over output, respectively. K and L are the capital and labour demands for final output.

Assuming that GCF is investment (accumulation) the year then :

$$\Delta K = GCF$$

Hence, equation (5) can be re-write as follows:

$$GCF = k(I-A^d)^{-1}.\Delta Y^d \qquad (7)$$

This relationship play an important role to use for qualitatively measuring the investment demand for the change of final domestic demand.

Notice that: $\sum Y^d$ + Tax on product = GDP.

III.   Empirical Study

a) Current structure of the economy and situation of demand and supply

The I-O tables compiled in the years 2000 and 2007 represents for economy's structure in the period of 2000-2005 and 2007-2012, respectively. (Note that Vietnam became a member of WTO since 2007).

In the 2007 I-O table, total commodities and services supply are accounted at about 3,934 billion VND, in which includes domestic produced commodities accounted at 73.82% while 26.18% came from imports. Domestic produced commodities decreased 5.43% while imported of that increased 5.43% compare to the year 2000.

On demand side, the ratios of the intermediate consumption and the total demand slightly increased from 42.99% to 45.32% from the year 2000 to 2007. On the other hand, the ratios of the final demands decreased from 57.01% in the year 2000 to 54.68% in the year 2007, this change due to the big decreasing of final consumption.

Despite the increasing of the service sectors from 2000 to 2007 at 0.23%, the total percentage of the entire economy is remarkable changed. The ratio between the intermediate input per gross output of the whole economy in the year 2000 was 0.55% while in the year 2007 it was accounted at 0.62%. The reasons for these changes may come from: industry structural change, and inefficient in production process.

Table 1 : Supply and demand in 2007 and 2000. Unit: Bil. VND.

	2000		2007	
	Amount	%	Amount	%
Total supply	1,219	100	3,934	100
Domestic produced goods	966	79.25	2,904	73.82
Imports	253	20.75	1.030	26,18
Total demand	1,219	100	3,934	100
Intermediate consumption	524	42.99	*1,783*	45.32
Final demands	695	57.01	2,151	54.68
Final consumption	322	26.42	837	21.28
Total investment	131	10.75	482	12.25
Export	242	19.85	832	21.15

Table 2 : Ratio between intermediate inputs and value added by the year 2007 and 2000.

No.	Gross output	2000 (percentage)		2007 (percentage)	
		Intermediate input	Value added	Intermediate input	Value added
1	Wholesales and retails trade	0.46	0.54	0.32	0.68
2	Transportation and communication	0.4	0.6	0.56	0.44

3	Finance, insurance, real estate services	0.35	0.65	0.37	0.63
4	Administrative, defense, security	0.46	0.54	0.36	0.64
5	Private and public services, other uncategorized services	0.37	0.63	0.4	0.6
	Total	40.32%	59.68%	40.09%	59.91%

Our study found that during the past ten years, within Vietnam's economy there have no index of power of dispersion of any specific sectors that greater than the average index of the whole economy, there have no change and/or not meets proportional with their share in GDP.

Hence, it seemed meaningless if the government intends to drive the economic structure of the country that considering with high priority on the group sectors III. Because, these sectors contained greater share in GDP than the others do but their index of power of dispersions are not higher than that of other sectors, then an expansion of its output is less essential to the economy. The greater shares in GDP of these sectors are only presents in term of quantity form; not for the economic structural changes.

Academically speaking, economic re-structure must come along with change of the index of the power of dispersion, for those sectors with their higher the index of the power of dispersion than that of average in the entire economy, their share in term of GDP should be increased. From those points, the economic re-structure will provide the positives stimulate to the economy. In addition, the ratio between intermediate inputs of those sectors and the output still keep increasing from 2000 to 2009, while their index of power dispersion are small, it proved that these sectors are performing under inefficient production process(see Figure 1 below). Bright signal for the economy, the index of sensitivity of transportation and communication sectors in this period is higher than that of average of the entire economy.
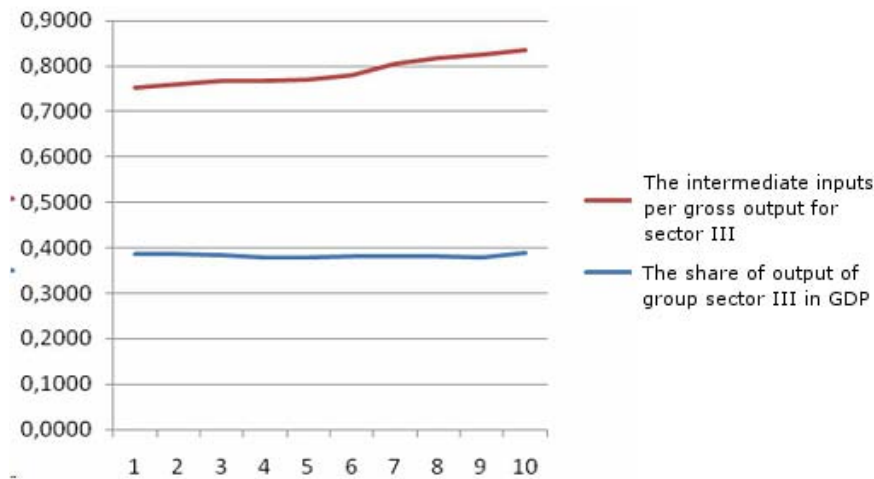

Figure 1 : The ratio between intermediate input and gross output of the group sectors III.

b) Scenarios for economic re-structure

i. Scenario 1

Assuming that the economic structure in the year 2020 would be changed.

A basic equation will be applied for this scenario as presented follows :

$$V = \nu.(I-A^d)^{-1}.Y^d \qquad (8)$$

Where ν is a diagonal matrix of value added coefficients, the diagonal matrixes are the elements of

the value added by sectors.

The equation 8 can be re-write as follows:

$$\Delta V = \nu.(I-A^d)^{-1}. \Delta Y^d \qquad (9)$$

Or

$$\Delta Y = y.(I-A'^d)^{-1}. \Delta(VA) \qquad (10)$$

In which, A'^d is a transposed matrix of A^d. and y is coefficient vector of domestic final demand (Y^d)

In the period of the years 2000 – 2009, investment proportion in GDP of Vietnam almost highest compare to that of over the world.
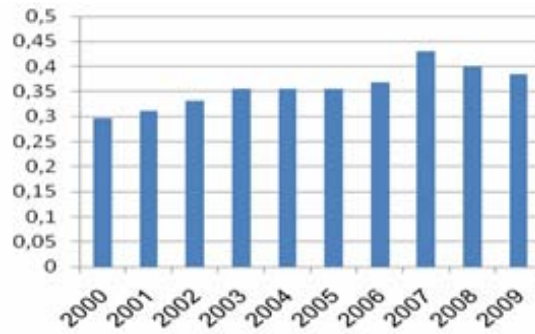
Figure 2 : Investment proportion in GDP of Vietnam

In general, investment means the purchases made by industry in new productive facilities or for production process in reality. However, the investment ratio in the **GDP** of Vietnam is greater than other countries cause by the country lacks of the appropriate understanding about definition of the investment.

According to Sachs-Larrain 1993 [6], investment is the accumulated output aim to increase future production capacity of the economy. Capital, at certain period of time, is defined as summation of total investment through the years. In general, current capital can be calculated by summing up all the previous investments subtract to the annual permanent asset depreciation. Alternatively, investment can be calculated based on the current actual value of at market price of these assets. However, the difficulties of this method were raised; the second method only can be calculated base on the inventories all over the country.

Both definitions above have not been applied in Vietnam. Currently, General Statistical Office (**GSO**) introduced an investment norm, it is not actual investment, it was the amount of money purchased by industries for investing in single year, however, this amount of money seems do not goes to production process, and this matter can be seen in the Table 3 below :

Table 3 : Investment and asset accumulation (1994 price).

Unit : thousand billion VND

	2000	2001	2002	2003	2004	2005	2006	2007
Investment	*115.1*	*129.4*	*148.0*	*166.8*	*189.3*	*213.9*	*243.3*	*306.1*
Asset Accumulation	83.5	92.5	104.3	116.6	128.9	143.3	160.2	199.0
Change	72.5%	71.5%	70.4%	69.9%	68.1%	67.0%	65.9%	65.0%

Source : Statistical Handbook.

ii. *Scenario 2*

Concept of overinvestment is defined as the comparison between capital incomes of the economy and net investments (excluding permanent asset depreciation), if income keeps smaller than the net investment then the economy is under overinvestment, or inefficient investing. This is because of the total benefits could not been compensated for the total investments. Figure 3 illustrated for this problem in Vietnam :
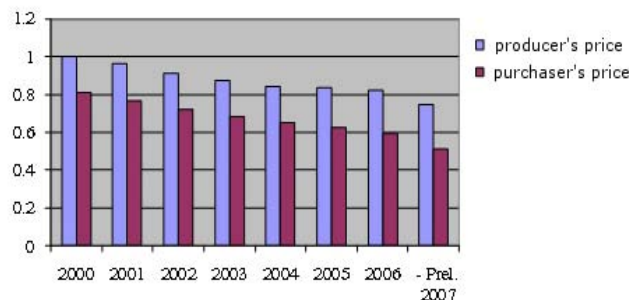

Figure 3 : Efficiency of investment in Vietnam.

Hence, if the government keeps strengthening investment on the service sectors (the group sectors III), this could be led to an unsecured economy of the country. However, the investment for manufacturing sectors (the group sectors II) moves to service sectors but not greater than 15%, to remain growth in group II, under scenario of strengthen the investment for the III group until the year 2020. This will keep the index of

power of dispersion and the index of sensitivity unchanged as well as the share of service sectors in GDP only takes slightly change.

Moreover, the index of power of dispersion in the group I is quite high at the same time their share in GDP is too low, this leads to stimulate import in order to response to demand in group sectors II.

Table 4 : Scenario for moving investment from group sectors II to group sectors III.

	Structure of 2009	Move 15% investment from group II to group III	Index of dispersion of power (BL)	Sensitivity (FL)
Group I	0.2100	0.128889194	1.05519709	0.8320961
Group II	0.4024	0.456908175	1.076400812	1.259212519
Group III	0.3876	0.414202631	0.868402098	0.908691381

If all of the three groups have achieved more efficient production process when their rates VA/GO change in the year 2020 (see Table 5) then the structure

and the index of power of dispersion of three groups would be changed as a result (see Table 6).

Table 5 : The I-O coefficient of 2007 and 2020.

Group	I-O coefficient in the year 2007	I-O coefficient in the year 2020
Group I	0.3936	0.54056
Group II	0.2717	0.35188
Group III	0.5638	0.62428

Table 6 : The structure and the index of dispersion of power of three groups.

	Proportion in economy's structure in 2009	Structure with assumption of more efficient production process	The index of dispersion of power
Group I	0,2100	0,15464	0,9505
Group II	0,4024	0,40998	1,0459
Group III	0,3876	0,43538	1,0036

Thus, under the more efficient production process proved that the proportion of service sectors in the economic structure also increased. An important finding from this study was that the real structure of service sectors in the economy through index of dispersion of power is greater than 1. This proved that in recent years, Vietnam's economy have been affected from the inappropriate structure economic policies that incompatible with the development trend.

In order to the group sectors III acquire 50% GDP and the index of power of dispersion greater than 1, the following problems must be solved simultaneously :

- The country's economy must performs more efficient than recent years.
- Assuming that exports in service sectors account at 20% instead of export in the group sectors II. Because, the export in the group sectors II reported are imaginary numbers, especially, in foreign direct investment and state-owned enterprises including garment and leather industries. Hence, if a "shock" at this moment to be conducted, it will make a remarkable change in the proportion of the group sectors III in GDP and at the same time it does not affect to the index of power of dispersion in these sectors. (greater than 1).

- Substitute domestic goods for final expenditure instead of imported goods. (Accounts for 3% to 5% in total final expenditure).

- Substitute domestic goods for asset accumulation. (Accounts for 6% to 8% in total investment).

This is actually as a computable general equilibrium model with function formulated as follows :

$$\Delta V = \mu . v . (I - \alpha . A^d)^{-1} . \delta . Y^d \qquad (11)$$

In which

ΔV denotes the change of value added coefficients; μ. Is coefficients matrix of value added change, α is technical change coefficients matrix

δ is the matrixis of structure final demand coeficient of domestic goods and imported goods consumption and export.

$$\mu . = F(k, l, t) \qquad (12)$$
$$\delta = F(C^d, C^m, I^d, I^m, E^d, E^m) \qquad (13)$$

Table 7 : Scenario for economic structure in year 2020.

	Structure in 2009	Structure with above assumptions for 2020	Index of dispersion of power (BL)	Index of sensitivity (FL)
Group I	0.2100	0.12632	0.9505	0.830982788
Group II	0.4024	0.37049	1.0459	1.047308452
Group III	0.3876	0.50319	1.0036	1.121708760

iii. *Scenario 3*

Capital and labour demand in the above scenario for the year 2020.

Capital and labour demand

$$L = l.(I - A'^d)^{-1}.(V) \qquad (14)$$
$$K = k. .(I - A'^d)^{-1}.(V) \qquad (15)$$

Assuming that **GDP** growth of the year 2012, 2011 in the period 2016-2020 are 6.5% , 7.5% and 7%, respectively.

In which l and k are the capital and labour coefficient matrixes.

Table 8 : Labor and capital demand changes in Vietnam's economy year 2007 - 2020.

	Labour demand in 2020	Labour increase compare to 2007	Capital demand in 2020	Capital increase compare to 2007
Group I	30,265	1.271	371,061,354	1.606948636
Group II	23,751	2.691	1,450,024,547	0.878209549
Group III	30,071	2.607	2,214,982,293	3.300116749
	84,086	1.904	4,036,068,194	3.841305033

Note : Capital value at 2007 price.

IV. Conclusion and Recommendations

a) Conclusion

Currently, exports in manufacture sectors mainly come from minerals resources and processing industries. In order to achieve sustainable development, the country needs to decrease exports from natural resources. In addition, there have existing studies and surveys shown that the exports in manufacture sectors reported are imaginary numbers, especially, in foreign direct investment and state-owned enterprises including garment and leather industries. The exports of those industries not only contribute non-beneficial for the country's economy but also stimulate imports. Moreover, those industries are also reimbursed by current export promotion policy.

The assumptions in the model reflected the reality that decrease export in manufacture sectors and increase export in service sectors . An important assumption in the model is the substitution of export in manufacture sectors to service sectors in order to satisfy expectation in service sectors. I-O table analyses since 1989 up to present have shown that the commercial fee of Vietnam is the lowest in the world about 9-10%. Thus, in order to obtain higher proportion of commercial fee, it needs to increase to equal with that in middle-income countries, about 20% to 30%.

The development of manufacture sectors in Vietnam recognized as a "factory of the world", the more developing of this sector, the bigger of imaginary number and the higher of imports stimulating. The

products from manufacture sector are branded as "Made in Vietnam" and even they are sale in domestic markets but in fact all the parts of the product were imported, it is a kind of disguised import, and Vietnam is only received small income including transaction fee and labor in production processing. In order to achieve service sector's proportion accounts at 50% in GDP and the index of dispersion of power greater than 1, it is necessary to reduce investing in the manufacture sectors. This might be shocked to many people; however, it is a reality of the country's economy that must be accepted.

b) *Recommendations*

- In term of total final expenditures including final expenditure of household, government and asset accumulation need to shift from imported commodities to domestic produced goods.
- Enhance the more efficient production process in all three groups of sectors.

Hence, the proportions of three sectors in the economy's structure for the year 2020 are appropriate, the concentration must targeted on the key sectors with the high index of dispersion of power such as agriculture processing sectors. The results from our study also recommends that industrial sectors are not the key sectors in Vietnam's economy, in the other words, the government should not pay attention too much on how to attract investments in industrial development by any means.

The group sectors I (Agriculture, forestry and fisheries) is the most important sector in the economy of Vietnam then it should not to be too shrunken. It plays an important role as a fulcrum for the other sectors to develop. The products of this sector used as inputs for the group sectors II and more important, it aim to guarantee food security, settled life for two third of the people in the whole country.

The above conclusions are strongly supported by import analysis through I-O table model.

The chronic trade deficit has continuously increased since 2000 until present (Figure 4). The numbers of reasons come from both objective and subjective, this study refers to one of them and point out that some of sectors contain high import demand and which part in final domestic expenditures, including the demand for final consumption, the demand for investment/accumulation and export, cause to stimulate the most import.
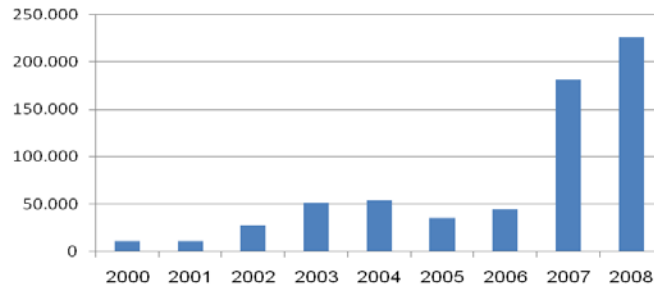

Figure 4 : The chronic trade since 2000 to 2008.

The analysis has been originated from Keynes, Leontief and Miyazawa [8] when conducting analysis on trade coefficient. Import is divided in to import as intermediate inputs and for final demand. The basic equation of Keynes-Leontief is formulated as follows :

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

In which :

X is output vector,
$A^d.X$ is domestic intermediate input,
$A^m.X$ is imported intermediate input
C^d is the domestic goods for final consumption,
I^d is the domestic investment/accumulation
E is export,
C^m is the imported goods for final consumption,
I^m is the imported investment/accumulation,
M is import.

The production process shows the total effect on import for a unit of final output. Total effect, or, total import demand, is understood as direct effect or indirect effect. It meant that to produce a unit of final output not only requires imported intermediate input but also spill over effect this requirement to other sectors in the entire economy.

This study also found that the sectors have *the index of power of dispersion* on import greater than the average of that on total import demand of the country's economy. The entire economy shows that in order to produce a unit of final output, it will stimulate 1.44 unit of import. The group sectors II (including mining, processing and construction) is the strongest stimulate import and the chronic trade deficit occurred during last decade basically caused by this sector.

The study also considered to effects of domestic final demand (consumption, investment/accumulation and export) on import. The results shown that the import demand disseminated by domestic production investment/accumulation, export and intermediate input. Although the domestic productions are more increasing, especially the domestic goods used for investment/accumulation stimulate the most import. This supports and proves for above conclusion about the products from manufacture sector are branded as "Made in Vietnam" and even they are sale in domestic markets but in fact all the parts of the product were imported, it is a kind of disguised import, and Vietnam is only received small income including transaction fee and labor in production processing. This judgment against the idea in which convinces that Vietnam needs to strengthen supporting industries, because all the processing industries in Vietnam are actually the supporting industries.

Whilst, among the total output of garment industry's exports (supply size), the value added contribute for the economy accounts as small income from processing, more over, this stage always contain quite low ratio value added in output. At the same time, export in service sectors and agriculture are real export and services sectors require less amount of imported input for one unit of final output. A question is raising that: is it the country should restructured by this direction?

V. Acknowledgements

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