

CHANGES IN VIETNAM'S STRUCTURE OF INDUSTRY UNDER INFLUENCES OF CUTS IN IMPORT DUTY

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Based on the Dynamic Computable General Equilibrium (DCGE), the paper aims at calculating and simulating the impacts of cuts in import duty as required by WTO rules on changes in Vietnam's structure of industry in the long term. Simulation results show that labor-intensive industries will have chances to make the best use of their advantages for development while capital-intensive and highly protected industries will encounter difficulties. Sea-farming and aquatic product processing industry with proper care from investors and authorities, can deploy their advantages and are likely to gain the highest growth rate.

Keywords: Dynamic Computable General Equilibrium (DCGE), changes in structure of industry, simulation

1. Introduction

The structure of industry of an economy is the share of sectors in the GDP of the economy. The unequal rises (or falls) of the industries caused by various factors can lead to changes in the structure. The changes in the structure often result from macroeconomic policies. What matters is the trends, speed and rules of the changes as well as the measures to estimate and analyze the factors responsible for the changes.

By lowering the tariff barriers on Vietnam's accession to the WTO, some competitive industries secure more favorable conditions to develop, achieve higher status and expand their market shares locally and internationally. Besides, some other industries are put under so much pressure of fierce competition by imported products that they are forced to reduce output and even go bankrupt. Changes in one industry can affect others directly or indirectly in various respects. Therefore, it can be predicted that by cutting import duties,

the economic structure will undergo significant changes in the coming years. With the application of DCGE, the paper is aimed at estimating the influences of cuts in import duty as required by the WTO rules on changes in the structure of industry based on data from the I/O Table and the Social Accounting Matrix (SAM) of Vietnam in 2009. Rates of import tariff used for the simulation are the ones committed for 2020.

2. Estimating impacts of the WTO membership on changes in the Vietnam's structure of industry in the long term employing the DCGE model

The CGE model is now applied more frequently and extensively to solve macroeconomic problems. The model is usually created on the assumption that in the free-trade economy, the producer relies on the costs of factor inputs and the selling prices to determine output (supply) for maximum profits whereas the consumer's decision on consumption (demand) of each kind of commodity for maximum utility is based on their income

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and buying prices. The prices of goods, capital cost, salary and exchange rates are set on the supply-demand relationship.

In an open economy with complicated relations between production, distribution, exchange, and consumption, producer's and consumer's choices are not just limited to the domestic market but are greatly affected by international markets through international trading activities. Theoretically and practically, foreign trading activities are affected by not only domestic and international prices but also tariff barriers. Those countries which follow protectionist policies tend to impose high duties on imports. Due to trade liberalization in general and the WTO accession in particular, the tariff barriers must be gradually removed as committed. This will bring about an "economic shock" which influences changes in all sectors and the supply and demand on the market in a long run, and transfer the economy from one equilibrium to another.

Table 1 presents average import duty rates by industries in 2009 and 2020. The figures shows that after the WTO accession, most of the industries cut their protection by lowering the tariff barriers at different levels. In addition, foreign trading activities will determine the supply of and demand for foreign exchange, which leads to adjustments to the exchange rates. In a free competition mechanism, the economy operates and

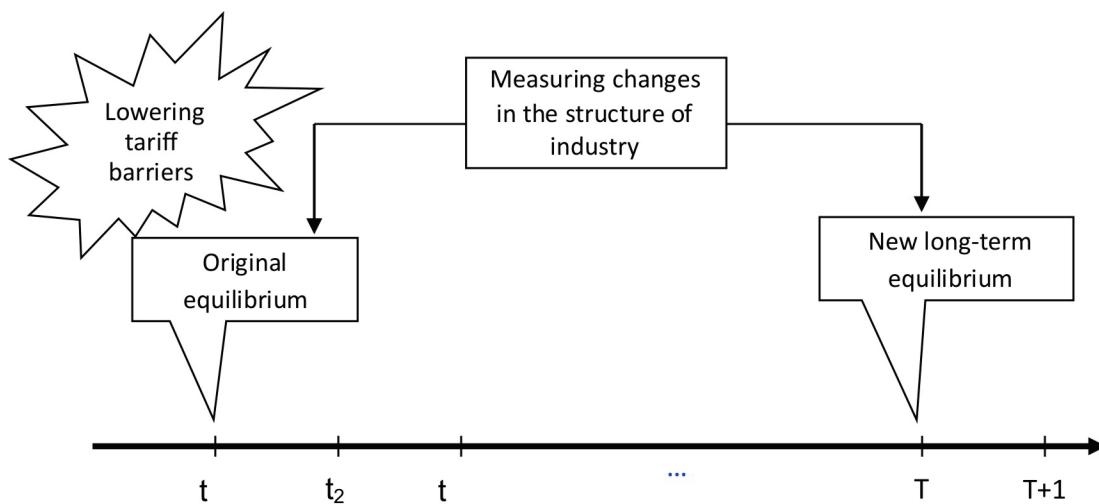
adjusts itself for an equilibrium at which all economic subjects benefit the most.

In the application of the CGE model, the economy is assumed to be in equilibrium meaning that at the current prices, the aggregate supply of all kinds of goods, labor and foreign exchange is equal to that of demand. Through the "shock", the CGE approach helps determine a new equilibrium for the economy, by which means the calculation and comparison of the new equilibrium can reveal changes in each industry and estimate the influences on each industry in particular and the whole economy in general. With the dynamic CGE model, the economy is not only targeted at a short-term equilibrium but it also transforms over time for a long-term equilibrium as shown in the following figure.

The mechanism by which cuts in import duty affect the changes in the structure of industry is very complicated. It took place via various binding and interactive relationships, and various stages and cycles before reaching a new long-term equilibrium. The mechanism is elaborated on in the following aspects:

(1) Cuts in import duty make the prices of imported goods (including consumer goods, raw materials and equipment for domestic production) cheaper, which encourages consumption of imports causes so many difficulties for domestic production that some local companies have to reduce their

Figure 1: Change of the structure of industry to new long-term equilibrium due to lowering tariff barriers



Source: Nguyễn Mạnh Toàn, 2011

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production or get content with lower growth rate.

(2) In addition, as the prices of factor inputs for some manufacturing industries become cheaper, the production costs will drop, which stimulates growth. Due to unequal decreases in the prices, industries benefit unequally from the WTO membership and therefore their growth rates are different.

(3) Cuts in import duty facilitates flows of foreign goods to Vietnam and export of domestic goods into international markets. Therefore, export manufacturers will have more chances to expand their business.

(4) These changes directly or indirectly affect labor supply and demand and cause changes in wages and incomes of workers entailing changes in household incomes. Because of different consumption demand, the income changes influence demand for particular products, which affects the growth of manufacturing industries in both positive and negative ways.

(5) Changes in foreign trading activities have their effects on supply of and demand for foreign exchange, exchange rates, and prices of imports, etc.

(6) Each industry's input comes from many other industries. The input of one industry is the output of another; therefore, changes in one industry's production process can affect other industries.

Table 1: Average import duty by industry committed for 2020

Industry	Average import duty rate in 2009	Average import duty rate committed for 2020
Crop growing	5.64	2.88
Animal husbandry	1.57	1.22
Forestry	0.02	0.02
Aquatic product	14.86	5.95
Mining	2.49	1.83
Seafood processing	16.63	7.54
Beverage	22.06	17.35
Tobacco	52.05	27.35
Other food processing businesses	9.47	5.16
Chemicals	1.69	1.56
Metallurgy	2.80	2.73

Equipment and spare parts	3.49	2.16
Rubber processing	4.42	3.47
Automobile and motorbike	16.69	5.56
Clothing	3.66	3.22
Footwear	4.07	3.36
Wooden product	3.96	3.32
Other manufactured goods	13.51	6.50

Source: GSO (2010)

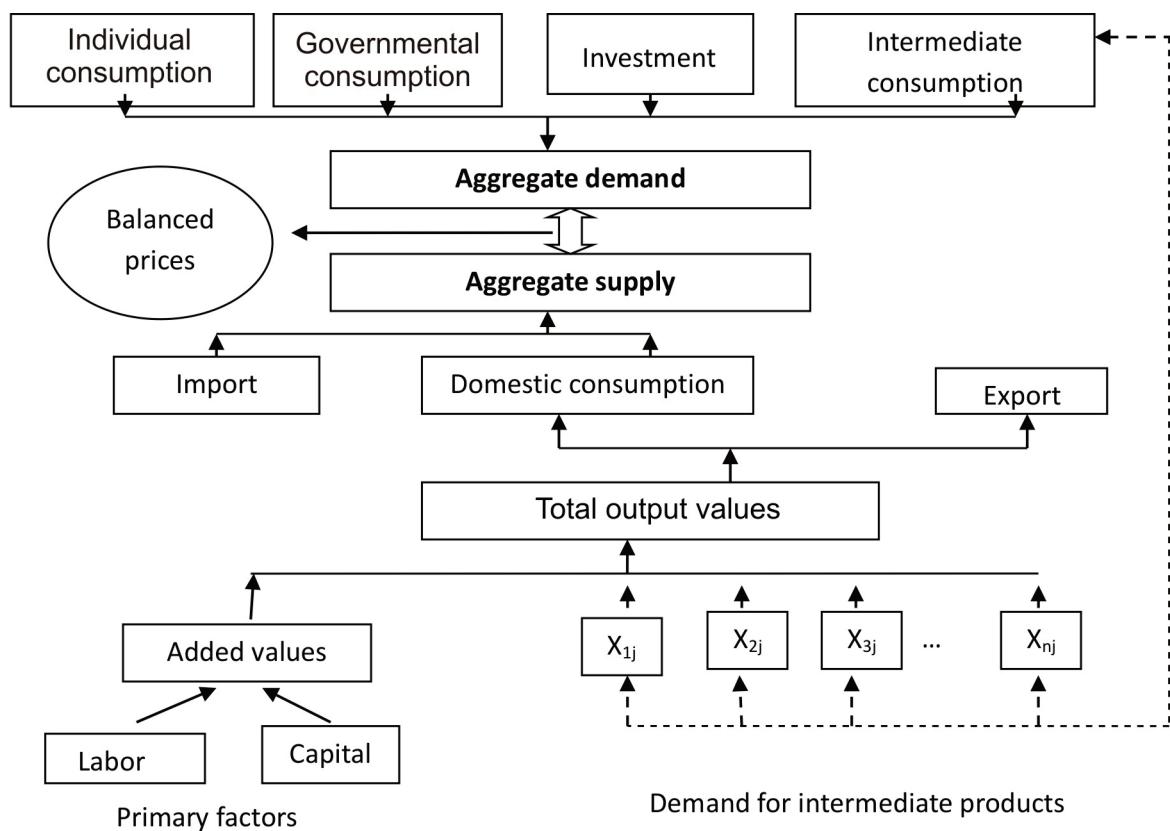
Partial Equilibrium models do not work in measuring and simulating the said multidimensional and complex impacts. So, the General Equilibrium model is applied in measuring changes in the structure of industry caused by a economic shock in general and cuts in import duty in particular. The CGE model used in the research is a dynamic one, suitable for an open, small and price-accepting economy with market-oriented competition. Its theory is based on researches by Kemal Dervis, J. de Melo & S. Robinson (1982); Vargas et al. (1999); Hosoe (2001); Chen (2004); and Toàn (2006, 2010). This method models an economy by means of economic functions and computing devices for doing the processing, calculation and simulation. There are three blocks of equilibrium in DCGE, namely dynamic equilibrium, temporary equilibrium and long-term equilibrium. They allow simulating the activities and long-term relationship of the five primary economic entities, namely businesses, government, households, investment, and the rest of the world (ROW). The relationship is presented in the Figure 2.

a. Businesses:

In the CGE model, the economy comprises n industries, each industry employs labor, capital and semi-finished products. Supply of each class of labor is fixed and mobility of labor is free from restriction. Output of each industry is sold on both domestic and foreign markets. To meet the domestic market demand, certain goods are imported. Producers examine market price of products at home and abroad, price of imports and factor inputs to determine the amount of each product supplied to the market in order to maximize profit. Profit for producer is what remains after all payments for raw materials (intermediate products) and labor are made. Output of each industry is a

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Figure 2: General relations between economic entities



basis for determining intermediate demand.

b. Government:

Government income includes taxes, duties, and foreign aid. Government uses budget income to cover its regular expenditures, pay pensions and make investment. Regular expenditures of the government affect directly its demand for various kinds of goods.

c. Household:

The model includes various groups of households that are usually classified according to their locality (rural and urban areas), householder's occupation, or income (five levels including 20% of households each). The classification of households is a useful tool for examining the distribution of income within an economy. It is assumed that households own various kinds of labor. Each group of households gains income from capital and these kinds of labor, along with some allowance from the government or aid from foreign institutions. With a given income, the household has to try its best to maximize the utility by determining their

demand for each kind of commodity based on its disposable income and market prices.

d. Investment:

The model assumes that investment by households is separate from their saving and spending, and in care of an independent investor. The investor examines current conditions of the economy, determines the optimal portfolio with a view to maximizing the present value of profit from investment, and distributes profit among households. In each period, capital accumulated in each industry is determined by difference between the total investment and amortization in the period.

e. Import and export:

With the assumption about an open, small, and price-accepting economy, prices of exports and imports on the international market do not change but prices on the domestic market are determined by the supply-demand relation. The model also includes a forex market where the supply-demand relation determines the exchange rate, and prices of imports in the domestic currency as well. We

assume that imports and locally-made goods do not replace each other perfectly. Consumers choose between imports and locally-made goods, according to their prices, in order to minimize their expense. Output from each industry is sold on both domestic and foreign markets, and each industry decides what to supply to the markets with a view to maximizing their profits.

f. Clearing on the market and equilibrium price:

In the model, there are 1 labor markets, n (locally-made) commodity markets, and one forex market. Combination of equilibrium price is determined when all markets are in equilibrium. In other words, it is a point of time when excess demand on all markets is equal to zero.

3. Simulation results

As presented above, reduction in tariff barriers will affect various economic activities and changes in the structure of industry as well. Theoretically, industries with advantages will have chances to develop quickly and expand their scope while industries without advantages will meet with difficulties caused by competition with the result that they should reduce or cut investment. Uneven growth rates of industries caused by economic shocks will change the structure of industry.

a. Investment structure:

Simulation results from the model show that changes in customs duty according to commitments will affect investment and prices of factor inputs in all industries. ROE in all industries will change, which leads to changes in investment. Industries that gain increased profitability by making the best use of advantages offered by the WTO member-

ship will increase their investment while others without such advantages should reduce their production and investment. The gross investment in a long run will increase VND19,836 billion, or by 8.39%, a year in comparison with current figure. The long-term capital accumulation will increase VND213,749 billion as compared with current figure. Table 2 shows that the increase in investment is uneven across industries. Industries that witness high increases in investment are seafood processing (54.61%), aquatic product (28.8%), equipment and spare parts (25.42%), clothing (17.38%), footwear (13.92%), and mining (12.28%).

Table 2: Changes in investment and accumulated capital by industry (VND billion)

Industry	Change in investment	Change in accumulated capital	As %
Crop growing	2,584	27,847	5.51
Animal husbandry	509	5,481	6.29
Forestry	171	1,845	7.55
Aquatic product	1,582	17,044	28.80
Mining	3,973	42,816	12.28
Seafood processing	1,193	12,850	54.61
Beverage	79	850	6.14
Tobacco	12	130	4.19
Other food processing businesses	380	4,094	5.64
Chemicals	146	1,573	6.87
Metallurgy	169	1,818	10.62
Equipment and spare parts	603	6,493	25.42
Rubber processing	205	2,207	8.99
Automobile and motorbike	51	545	1.73
Clothing	799	8,607	17.38
Footwear	360	3,877	13.92
Wooden product	99	1,065	6.03
Other manufactured goods	745	8,032	3.19
Electricity, gas, water	726	7,821	8.19
Trading	2,281	24,577	10.21
Tourism, hotel, restaurant	664	7,160	8.08
Transport	690	7,440	12.85
Post – telecommunication	462	4,979	8.20
Finance – banking	267	2,878	6.60
Public and other services	1,112	11,980	4.82
Total	19,836	213,749	8.39

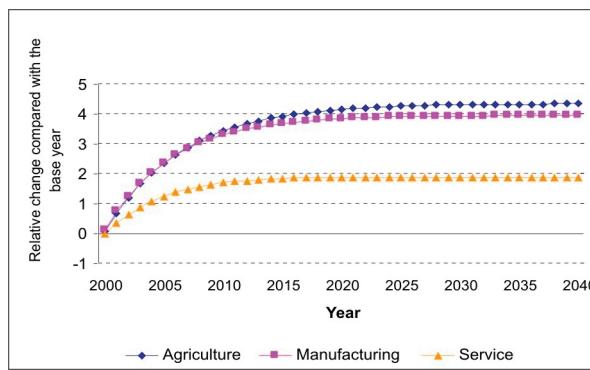
Source: Author's calculations based on the model

b. Output value:

Due to effects of reduction in customs duty, the long-term output value will increase VND59,392.34 billion, or by 4.66%, compared with the base year. The highest increase is found in the seafood processing industry (52.97%) followed by the fishery (22.72%). Both of them gain high growth rates because the latter supplies raw materials to the former. When the former gains a high growth rate due to its advantages, it can stimulate the latter. Similarly, development of the latter serves as a basis for the development of the former. Marine economy is one of Vietnam's strong points and its accession to the WTO produces great and positive effects on its fisheries and seafood processing industry. Other industries, such as mining, equipment and spare parts, clothing, footwear, trading and transport, also enjoy various advantages on their way to development. It is estimated that output values of these industries will rise considerably in a long run. Some others, such as tobacco, automobile and motorbike, other manufactured goods, and public and other services may face various difficulties. Results of the simulation show that output values of these industries fall in a long run.

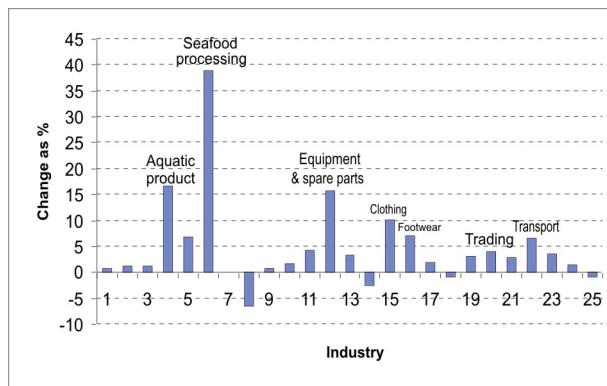
Close examination of each industry shows that agriculture- forestry- fisheries sector witnesses the biggest changes, followed by the manufacturing sector, and then, the service one. With its potentials, advantages and technical facilities, Vietnam can develop the agriculture- forestry- fisheries sector to the fullest, especially the marine economy, in the coming years.

Figure 3: Changes in output values of three sectors



Source: Author's calculations from simulation of the model

Figure 4: Long-term effects on output value by industry

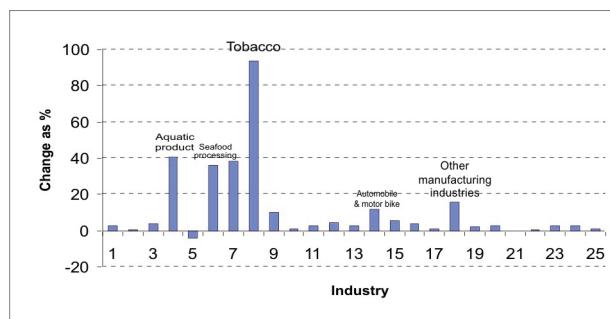


Source: Author's calculations from simulation of the model

c. Import:

Along with falls in output values of such industries as tobacco, automobile & motor-bike, and other manufacturing industries, the simulation results show considerable rises in import values by these industries. Import by clothing, footwear, and equipment & spare parts also increased remarkably because these industries need imported raw materials and spare parts for their products. Thus import of goods needed for consumption and production makes import values by the manufacturing sector in a long run become higher than those realized by agricultural and service sectors. The import value increased VND35,812.16 billion, or by 7.45%, compared with current value.

Figure 5: Long-term effects on import by industry



Source: Author's calculations from simulation of the model

d. Export:

Simulation results show that export by manufacturing industries rose quickly, especially from seafood processing, clothing, equipment & spare

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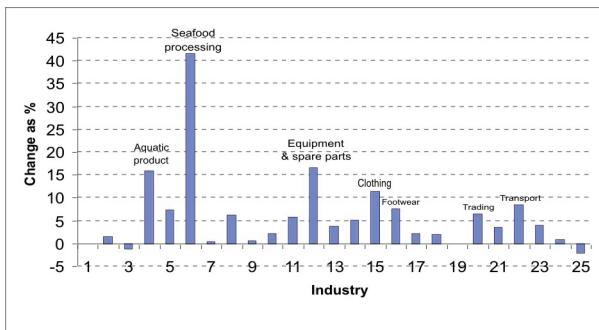
Table 3: Effects of reduction in import duty on output value, import and export by industry

Industry	Output value			Import			Export		
	Proportion	Change	%	Proportion	Change	As %	Proportion	Change	As %
Crop growing	10.88	1,430.94	1.03	1.07	118.77	3.04	7.35	-0.53	0.00
Animal husbandry	2.70	494.63	1.44	0.01	0.37	0.74	0.33	20.88	1.80
Forestry	0.81	162.26	1.58	0.41	74.84	4.97	0.25	-11.70	-1.34
Aquatic product	2.75	7,969.21	22.72	0.03	58.95	50.41	1.95	1,329.09	19.65
Mining	6.26	7,284.12	9.13	0.90	-178.74	-5.48	21.12	6,596.20	8.98
Seafood processing	2.16	14,598.85	52.97	0.21	336.58	44.96	6.95	12,317.83	50.98
Beverage	1.27	14.64	0.09	0.20	332.83	46.81	0.08	1.33	0.47
Tobacco	0.89	-978.22	-8.66	0.74	3,088.97	115.24	0.07	16.83	7.44
Other food processing businesses	9.51	1,151.18	0.95	2.53	1,112.59	12.08	6.62	176.01	0.76
Chemicals	1.03	313.48	2.39	7.86	349.69	1.22	0.35	32.82	2.66
Metallurgy	2.01	1,496.07	5.84	7.43	869.54	3.22	0.95	232.34	7.03
Equipment and spare parts	2.07	5,627.44	21.35	17.88	3,671.97	5.65	6.69	4,680.80	20.14
Rubber processing	1.32	751.62	4.49	4.80	620.59	3.56	0.37	58.95	4.59
Automobile and motorbike	2.35	-991.78	-3.32	8.48	4,319.12	14.01	0.53	115.24	6.27
Clothing	4.75	8,219.13	13.59	9.96	2,509.70	6.93	11.20	5,420.87	13.92
Footwear	3.32	3,988.87	9.44	2.80	435.27	4.27	7.70	2,485.78	9.29
Wooden product	1.09	346.92	2.49	0.44	22.03	1.36	1.99	176.76	2.56
Other manufactured goods	15.60	-2,392.39	-1.20	24.82	17,614.10	19.52	4.40	349.55	2.29
Electricity, gas, water	2.05	1,119.03	4.28	0.20	18.90	2.59	0.00	0.00	0.00
Trading	8.90	6,144.59	5.42	0.03	3.07	3.01	6.63	1,780.24	7.72
Tourism, hotel, restaurant	2.80	1,339.25	3.76	1.70	-12.53	-0.20	5.66	859.87	4.37
Transport	1.91	2,112.18	8.71	1.71	23.69	0.38	3.68	1,325.50	10.36
Post – telecommunication	1.16	692.26	4.70	0.12	13.98	3.27	0.96	159.96	4.81
Finance – banking	1.26	301.21	1.88	2.59	310.26	3.30	2.06	77.71	1.08
Public and other services	11.15	-1,803.15	-1.27	3.09	97.63	0.87	2.13	-193.20	-2.61
Total	100.00	59,392.34	4.66	100.00	35,812.16	7.45	100.00	38,009.13	10.93

Source: Author's calculations from simulation of the model

parts, and transport. This fact is understandable because they are industries with advantages for export in Vietnam.

Figure 6: Effects of WTO membership on long-term export by industry



Source: Author's calculations from simulation of the model

4. Conclusion

Generally, in the first years after Vietnam's accession to the WTO, industries that employ much labor and local raw materials enjoyed more chances to expand their production and export while capital-intensive and highly protected industries met with difficulties and had to reduce their production or be content with low growth rates. It is apparent that marine economy and relevant industries may enjoy the highest growth rates if they receive proper attention. Such labor-intensive industries as clothing, footwear, mining, and equipment and spare parts for assembling, etc. could attract more investment to expand their production and gain higher growth rates in comparison with others. Along with increases in ex-

port by certain industries, import also rises quickly to meet end demand and production■

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