ECONOMIC DEVELOPMENT
No. 204, August 2011

THE EFFECT OF TRADE LIBERALIZATION ON VIETNAMESE HOUSEHOLD WELFARE WITH DIFFERENT TAX POLICIES

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Using the Dynamic Computable General Equilibrium (DCGE) framework, this study examines and compares the impacts of tariff reduction in association with government tax policy alternatives for satisfying a fixed budget income target. It is found that the effects of trade liberalization on the welfare of each household group depend strongly on the government polices dealing with deficit caused by tariff reduction. Replacing tariff with direct taxes seems to be more desirable than indirect taxes, though it will cause a considerable increase in foreign debt, and the highest improvement of the total national welfare may be obtained if the government can cut expenditure or find some sources of finance without increasing other taxes.

Keywords: Dynamic Computable General Equilibrium, income distribution, tax policies

1. Introduction

Trade liberalization and its impacts on the distribution of income have come to be one of the biggest concerns in Vietnam recently. In general, lowering of barriers to the international trade gives opportunities to accelerate growth, enhance productivity through the process of specialization, promote competition and create incentives for increasing efficiency. In the context of Vietnam, although it is widely proven that trade liberalization policies are likely to positively impact on the economic situation at the national level, their effects at the industry level and on the welfare of various households may be different. In addition, elimination of tariffs may significantly affect government revenue. Toàn (2006) found that the reduction in nominal tariff rates down to 5% will lead to a decline in the government revenue by 7.43% in the short term and 4.92% in the long term. Because the government revenue is needed for maintaining government activities and the national social-economic development, it may be made up in other ways. It is more natural to assume that the government will choose to make up the revenue loss by raising direct or indirect tax rates. With difference tax policies, it is likely to impact each household group's income one way or another.

Using the Dynamic Computable General Equilibrium (DCGE) framework, this study tries to explore the link between trade liberalization and income distribution among Vietnamese household groups in the long term under difference tax policies. The model is simulated for alternative policy scenarios, in which tariffs are reduced to five percent, which is consistent with common WTO commitments, while either direct or indirect tax rates are allowed to adjust endogenously in order to satisfy a fixed government revenue target.

2. Basic structure of the model

The Dynamic CGE model using in this study is a multi-sector, multi-household, competitive, and small/price-taking open economy model. The specification of the model equations and the theoretical structure follow closely those in Dervis, de Melo, and Robinson (1982), Vargas, Schreiner et al (1999), Hosoe (2001), Chen (2004) and Toàn (2011). One of the main differences

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between our study and the others is that this model is a multi-household one, which allows simulating and analyzing the dynamic effect of economic policies on income distribution (and also welfare) among different household groups. This may be seen as a main contribution of the study. In addition, this model is more specific than that of Devarajan & Go (1998), and Diao, Yeldan & Roe (1998), as it is a multi–sector one and labor factor is disaggregated into many sub-categories. Besides, different from the others, the model in this study not only captures the overall level of foreign debt in the economy, but also allows examining adequately foreign debt owed by each household group. In the model, there are five entities forming the economy: producer, government, household, investment and the rest of the world.

The economy in this model comprises of twenty-five production sectors, each of which uses labor, capital and intermediate inputs for production. Factors of production consist of one aggregate capital and twelve types of labor. The criteria used to disaggregate labor are: location (rural / urban), gender (male / female) and skill levels (unskilled / medium-skilled / high-skilled). The amount supplied in each of the labor category is assumed to growth at rate n, which reflects the natural growth rate of population. Within a period of time, the supply of each type of labor is fixed and each is allowed to move freely across sectors. Capital stock is adjusted between periods and is assumed to remain unchanged during the period.

The government income comprises direct taxes on labor, direct taxes on capital, indirect taxes on production, import tariffs, export duties, and transfer received from the rest of the world:

$$T = \sum_l W_l \bar{L}_l t_{Ll}^d + \left(\sum_j \pi_j\right) t_K^d + \sum_j X_j P_j^* t_j^i + \sum_j M_j ER \cdot PW_j^m t_j^m + \sum_j E_j ER \cdot PW_j^e t_j^e + ER \cdot \bar{F}_g$$

where W_l is the wage rate of labor; is the labor supply; $t_{Ll}{}^d$ and $t_K{}^d$ are direct tax rates on labor type l and capital income; π_j is the profit of each sector; t_j^m and t_j^e are the import and export tax rates; M_j and E_j are the imports and exports of commodity j; PW_j^m and PW_j^e are their world prices; ER is the exchange rate; $\bar{F}_g$ is the foreign sources of government income and assumed to be exogenous. Note that in this model indirect and direct tax rates are not always given. They will be allowed to vary endogenously in order to keep government revenue unchanged after tariff cuts.

The model contains three rural and two urban household groups, distinguished by location (rural / urban), and the employment status (farmer / self-employed / wage-worker) of the household head. There are five household groups: rural farmers; rural self-employed, non-farm; rural wage-earners; urban self-employed; and urban wage-earners. The grouping of household groups as these is a critically important feature of the model, which allows investigating the income distribution of the economy. The households are assumed to be able to own all types of labor. Each household group receives income from twelve labor categories, capital, transfers from government and from abroad:

$$Y_r = \sum_l \bar{L}_l W_l (1 - t_{Ll}^d) d_{rl}^L + \left(\sum_j \pi_j\right)(1 - t_K^d) d_r^K + T \cdot tr^p d_r^T + ER \cdot \bar{F}_{pr}$$

where the subscript r represents a particular category of households; d_{rl}^L, d_r^K and d_r^T are distribution rates of labor type l, and capital income and government transfer to household type r respectively ; $\bar{F}_{pr}$ is net transfer from abroad to household type r and assumed to be exogenous. The households then spend all the disposable income on paying interest payments on outstanding foreign debt, consuming and saving.

Figure 1 presents the main factors that impact on the welfare of each household group under trade liberalization process. Theoretically, welfare changes depend on the nature and the level of the initial protection, the role of each

household group in production, their consumption patterns, and the nature and the degree of liberalization. In the production aspect, tariff reduction will lead to changes in the structure of the economy. Some sectors will take this opportunity to expand their production, while the others face difficulties due to international competition. For this reason, some categories of labor become redundant while the others are in shortage. When the supply of each category of labor is fixed, wage rates will change. Changes in factor prices will influence payments for each of the thirteen factors, and in turn affect the nominal income of each household group. In the consumption aspect, trade liberalization undoubtedly has a significant impact on the relative prices of goods. Decrease in the relative prices of some products may favor certain categories of households while increase in the relative prices of some other products may hurt the others. As price-takers, households have to adjust their consumption to the changes. Benefits from trade liberalization will differ across household groups.

Since the model cannot be solved for an infinite number of periods, it is needed to specify the post-terminal conditions. The standard approach is to assume that the economy reaches a steady state in given, T, periods (Selim, 2004). Using the sensitivity test of Devarajan and Go (1998), we found and selected $T = 40$ for our model.

An important task in the implementation of a CGE model is identifying and organizing data into a social accounting matrix (SAM). The SAM provides a closed form, economy-wide accounting of linkage between activities (and/or commodities), factors, households, domestic institutions and foreign institutions in a tabular format. The availability of the 2007 Input-output Table of Vietnam in 2010 has given us an opportunity to update the SAM for calibrating our

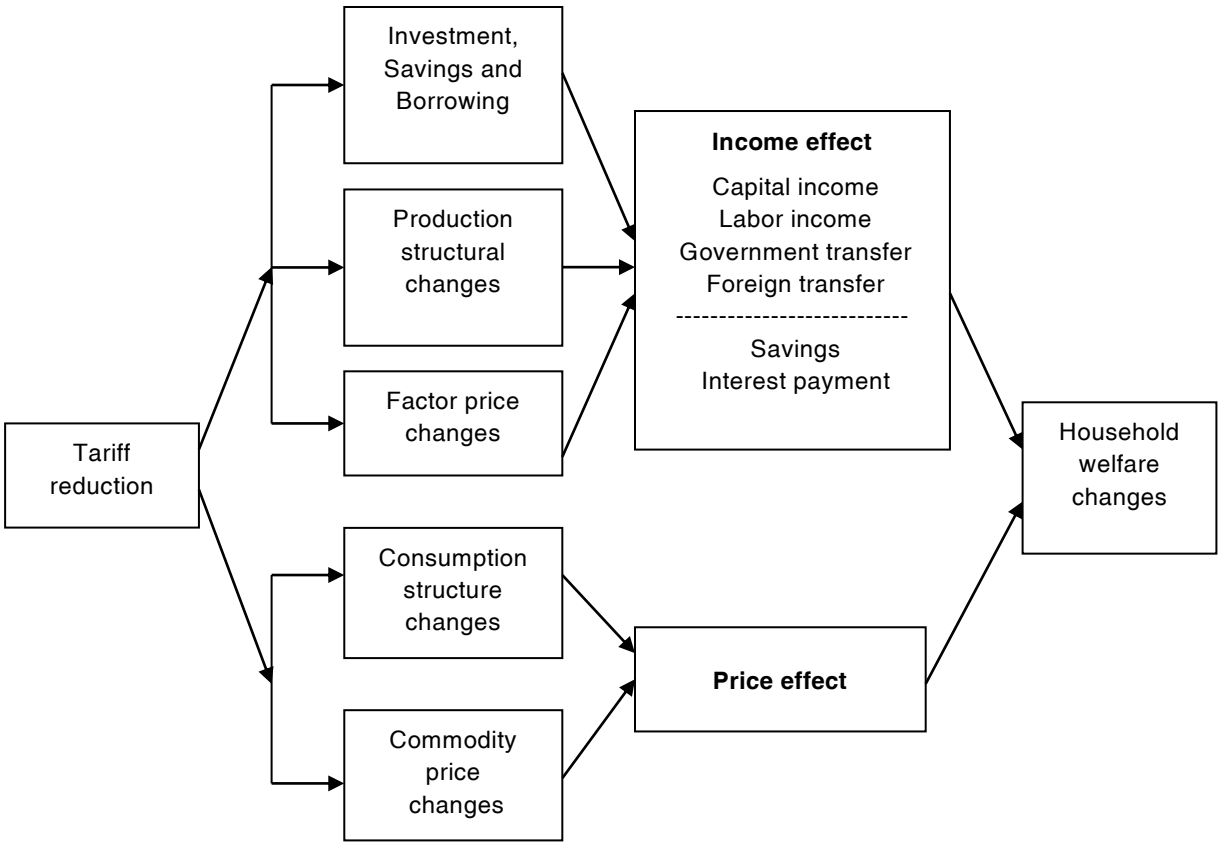


Figure 1: Determinants of welfare under the effect of trade liberalization

CGE models. In the SAM, there are 25 production activities with 25 corresponding commodities; 13 factors of production; 5 household groups; one government account with many types of taxes included; one Investment/saving account; and one account related to foreign trade and capital flows. All of these accounts are combined in a 76 x 76 matrix as summarized in Table 1.

simulation results will reflect more precisely the Vietnamese actual situation.

The DCGE model allows us to estimate these effects quantitatively. To isolate the effect of tariff reduction on household welfare, tariffs of more than 5% are reduced to 5% while all other parameters are kept unchanged. The model is solved using GAMS (The General Algebraic Modeling System is a high-level modeling system

Table 1: Dimension and structure of the SAM

RECEIPTS	EXPENDITURES							
	Activities (25)	**Commodities** (25)	**Factors** (13)	**Households** (5)	**Government** (5)	**Investment** (1)	**ROW** (1)	**Total**
Activities (25)		Marketed production						Marketed production
Commodities (25)	Intermediate consumption			Household consumption	Government consumption	Investment	Exports	Total commodity demand
Factors (13)	Value added							Value added
Households (5)			Allocation of labor and capital income to household		Government transfers to household		Foreign transfers to household	Household income
Government (5)	Indirect taxes	Import tariff	Direct taxes				Foreign transfers to government	Government revenue
Investment/ Saving (1)				Household saving	Government savings		Borrowing for investment	Total savings and borrowing
ROW (1)		Imports		Interest payment				Import and interest payment
Total	Total domestic payment	Total commodity supply	Total factor payment	Allocation of household income	Allocation of government revenue	Total investment	Total foreign exchange receipt	

Applying the maximum entropy approach, the study estimates parameters that cannot be calibrated, i.e. the constant elasticity of substitution (CES) and the constant elasticity of transformation (CET) parameters for twenty-five commodities in the model. This is the first time that these parameters are estimated and used in CGE models of Vietnam. It is expected that the

for mathematical programming problems).

3. Analyzing the simulation result and discussion

In this section, we examine and compare the following scenarios:

Scenario 1: Only the reduction in nominal tariff rates (down to 5%). In this experiment, no adjustments are made to domestic indirect or direct tax rates to bridge the deficit. This is the basic scenario.

Scenario 2: The reduction in nominal tariff rates along with adjustments to direct tax rates on capital to keep the government revenue unchanged.

Scenario 3: The reduction in nominal tariff rates along with adjustments to direct tax rates on labor to keep the government revenue unchanged.

Scenario 4: The reduction in nominal tariff rates along with adjustments to indirect tax rates to keep the government revenue unchanged.

Table 2 compares macroeconomic impacts. In general, Scenarios 1-3 seem to be better in terms of the growth of GDP, output, import, export, investment and capital stock. They, however, will increase foreign debt larger than Scenario 4.

Surprisingly, in the first three scenarios,

Table 2: Macroeconomic impacts of trade liberalization with different tax policies

(Percentage changes compared to the base)

Figures	Scenario 1 (No adjustment to other taxes)	**Scenario 2** (Increase direct tax on capital)	**Scenario 3** (Increase direct tax on labor)	**Scenario 4** (Increase indirect tax)
GDP	3.43	3.38	3.36	1.72
Output	3.95	3.64	3.72	1.54
Imports	9.11	8.65	8.78	6.21
Exports	10.94	10.47	9.86	7.26
Government budget	-4.92	0.00	0.00	0.00
- Tariff	-44.30	-42.52	-43.03	-44.28
- Indirect taxes	2.58	2.44	2.67	15.71
- Direct tax on capital	6.12	34.76	6.21	3.55
- Direct tax on labor	7.49	6.55	348.76	2.75
Savings	5.21	4.18	4.03	1.76
Investment	7.25	7.19	6.78	3.91
Capital stock	7.25	7.19	6.78	3.91
Foreign debt	17.94	17.84	17.84	9.39

Source: Author's calculations from the model simulation

Table 3: Changes in welfare by scenarios

(Percentage change compared to base)

Household group	Scenario 1 (No adjustment on other taxes)		Scenario 2 (Increase direct tax on capital)		Scenario 3 (Increase direct tax on labor)		Scenario 4 (Increase indirect tax)	
	Change	%	Change	%	Change	%	Change	%
Rural farmer	25.384	1,12	907	0,08	56.276	2,43	3.341	0,16
Rural self-employed	14.615	2,26	5.948	0,92	21.851	3,29	2.223	0,43
Rural wage-earner	11.398	2,85	9.078	2,17	13.890	3,51	1.446	0,48
Urban self-employed	7.025	0,73	-13.432	-1,22	704	0,08	2.808	0,25
Urban wage-earner	27.057	2,91	21.326	2,41	-51.971	-5,43	8.251	0,96
Total	85.480		23.827		40.750		18.069	

Source: Author's calculations from the model simulation

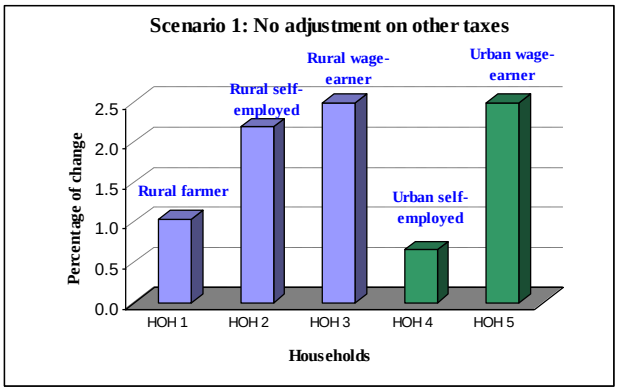
although almost the same movement of the macroeconomic variables can be observed, changes in welfare show different across the household groups. The following is results on changes in welfare by scenarios (Table 3 and Figure 2).

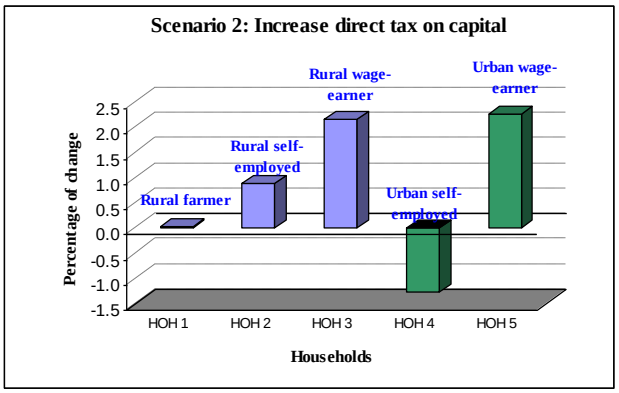
In the first scenario, where adjustment to other taxes are not allowed, most of macroeconomic elements are improved significantly, all household groups are better-off, the national welfare increases most (VND85.480 billion), wage-earners (in both rural and urban areas) and rural self-employed households gain more than the rural farmers and urban self-employed households, income gap between rural and urban areas as well as among households in rural and urban areas become wider, the government deficit increases by 4.92% in the long term, and foreign debt also rises significantly. An implicit assumption was that the government can cut its expenditures flexibly. If it raises money, it seems that the result will be different.

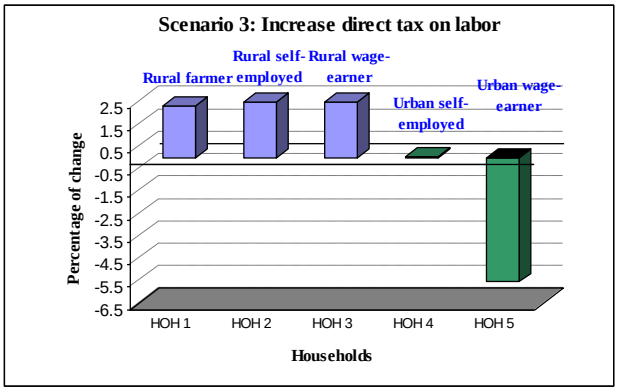
When the increase in direct tax on capital is selected (Scenario 2), however, the outcome is different. Although all macroeconomic figures improves similarly, national welfare increases just slightly (VND23.827 billion), rural farmers' welfare almost remains the same, and urban self-employed households are worse-off while the others are better-off, wage-earner households (in both rural and urban areas) gain the most, income gaps between households are expanded more seriously than in the first scenario, and foreign debt also increases significantly.

The government can choose to raise the direct tax rate on labor instead (Scenario 3). If this happens, all macroeconomic figures are improved similarly, national welfare improvement will relatively large (VND40.750 billion), and all the rural households gain at high level while urban wage-earner households lose (because the current direct labor tax system aims at high skilled laborers who are working in urban area), income gap between urban and rural can be narrowed, and foreign debt increases significantly.

If indirect taxation is selected, prices will be distorted and gains from tariff reduction will be smaller. The total welfare just increases VND18.069 billion, relative changes in welfare among household groups are very similar to the first scenario, and foreign debt increases at the lower level than in the three above scenarios.







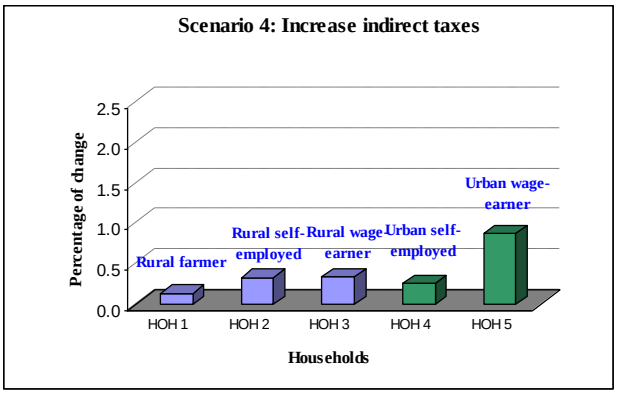


Figure 2: Effect of trade liberalization with different tax policies on household welfare

4. Conclusion

This study also examines and compares the impact of tariff reduction in association with alternative tax policies for satisfying a fixed government revenue target. As expected, the effects of trade liberalization on the welfare of each household group strongly depend on the government polices to deal with deficit caused by tariff reduction. Replacement of tariff by the direct taxes seems to be more desirable than replacement with the indirect taxes, though it will cause a considerable increase in foreign debt. The simulation result shows that the former allows the economy to grow faster and the national welfare to increase at a higher level in comparison with those of the latter. Among direct taxations, the increase in direct tax on labor factor favors all rural households, therefore, the income gap between rural and urban areas may be reduced. The highest improvement in the total national welfare will be obtained if the government can cut expenditures or find some sources of finance without increasing other taxes. The outcomes of the scenarios presented in this study reflect different extremes, in which the four measures are employed separately. In practice, the government should combine different measures in order to obtain an optimum level of economic growth meanwhile the income inequality situation among household groups can be improved■

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