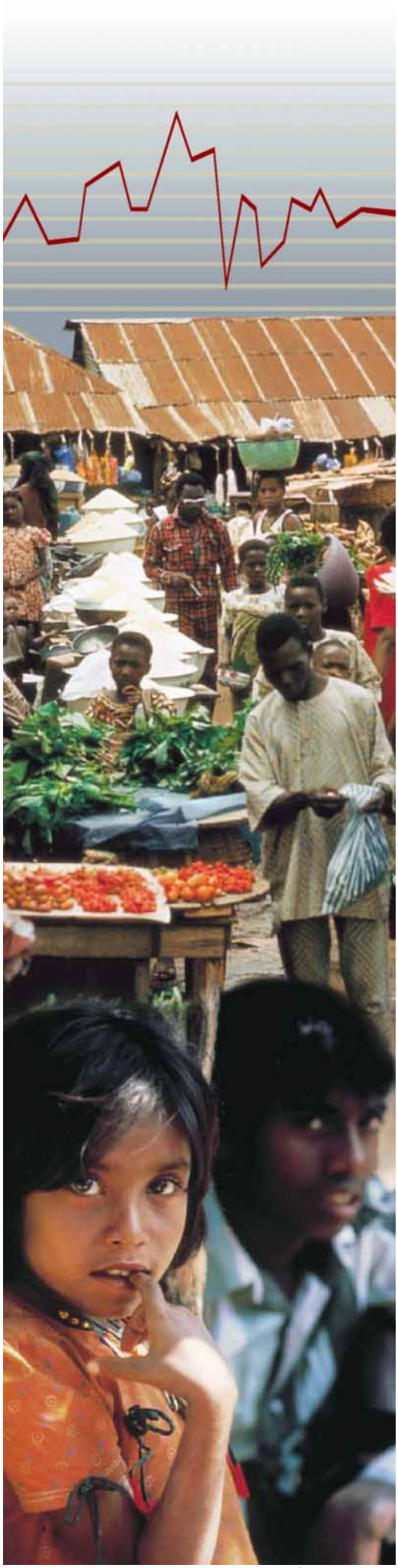


IDRC photo: N. McKee

Politiques Economiques et Pauvreté
Poverty and Economic Policy

MPIA Working Paper

2006-02

The Impact of Trade Liberalization on Household Welfare in Vietnam

Nguyen CHAN
Tran Kim DUNG

February 2006

Nguyen CHAN
nvchan@cfvghn.org.vn
Tran Kim DUNG
dung2367@gmail.com

Abstract

This paper evaluates the efficiency and distributional effects of trade liberalization in the context of fiscal reform in Vietnam. The analysis is performed using a computable general equilibrium (CGE) model of the Vietnamese economy calibrated to late-1990s production and household data. It is a standard small open price taking economy model with CES nested demand and CES production functions.

Results show that the efficiency gains (in term of aggregate welfare measure) from the combined tax and tariff reform are modest, but significant redistribution occurs among rich and poor household groups and between urban and rural populations. Careful analyses show that the sharpness of the redistribution falls as the country moves from only trade liberalization to combined tax and tariff reforms. Finally, additional simulations have been performed to make clearer the transmission mechanisms linking tariff policy to income distribution and household welfare. A key finding is that trade liberalization is pro-rich due essentially to the higher share of imported goods consumed by the rich.

Keywords: CGE model, counterfactual simulations, distributional effects, efficiency, household welfare, tariff, tax reform, trade liberalization, VAT, Vietnam.

JEL code: R13**,** R20**,** C68, D58, D63.

This paper was produced as part of the MIMAP-Vietnam project funded by the International Development Research Centre (IDRC), Canada. Support from the Poverty and Economic Policy (PEP) research network is also gratefully acknowledged.

Introduction

Trade liberalization is an important issue in Vietnam as it works to comply with the requirements for joining the ASEAN Free Trade Agreement (AFTA) and the World Trade Organization (WTO). The objective of this paper is to evaluate the impacts of trade liberalization in Vietnam on economic efficiency (at macro level) as well as on the welfare of households ranked by expenditure group.

The structure of model used is fairly standard along the lines of Dervis, et. al (1985), Devarajan and Lewis (1990), Shoven and Whalley (1992), Harrison, Rutherford and Tarr (1993) and Ghosh, Hutton and Whalley (1999). However, some degree of novelty lies in the use of fixed factors and the application of the Armington (1969) structure both in production and consumption within the small economy assumptions. We use Vietnamese data for 1996 to calibrate the model and to perform a series of counterfactual experiments to analyze the impacts of tariff reductions and VAT reform at the macro and micro levels.

The model is used in counterfactual mode by replacing the existing (1996) Vietnamese tariff structure by a yield preserving VAT. Four VAT rates in the ratio of 0:1:2:4 are endogenously determined. Trade balance conditions hold in both the base and new equilibria.

We have run several additional counterfactual scenarios to highlight the channels of impacts of trade liberalization policy on income distribution and household welfare. The particular channels are via remuneration of specific factors, consumer prices, and household expenditure patterns.

We begin with an overview of trade policy, poverty and inequality in Vietnam, before we proceed to a detailed description of the model. The remainder of paper is devoted to the presentation of counterfactual simulations, discussion of results and concluding remarks.

Trade Policies

Tax reform in Vietnam is ongoing with a value added tax (VAT) introduced in 1999. The key issue is tariff reform, which is necessary as a part of the country's commitments prior to its integration into AFTA and Asia-Pacific Economic Cooperation (APEC) agreement. Tariff liberalization is also an indispensable requirement for joining the WTO in the future[1].

To comply with these requirements the Vietnamese government announced a tariff schedule in early 1998. Vietnam committed to maximize the list of goods with a tariff rate of 5 percent in 2003 and expand the list of goods with 0 percent tariff in 2006. Table 1 provides estimates of current effective rates of protection of Vietnam.

Table 1: Effective rates of protection (ERP), 1996

Model Sector		ERP	Model Sector		ERP
	D1	3.7		D10	2.3
1. Paddy	E1	0.8	10. Chemicals and printing	E10	0.4
	D2	9.8		D11	18.0
2. Other agriculture	E2	2.4	11. Textiles and garments	E11	9.5
	D3	0.7		D12	18.2
3. Forestry.	E3	0.0	12. Electricity, gas and water	E12	3.1
	D4	4.5	13. Construction	D13	0.0
4. Aquatic goods	E4	1.1		D14	0.0
	D5	3.6	14. Hotel and restauration	E14	0.0
5. Mining	E5	0.4	15. Transport and	D15	0.0
	D6	7.6	communication	E15	0.0
6. Alcoholic beverages	E6	1.6		D16	0.0
	D7	7.6	16. Financial services	E16	0.0
7. Food Manufacturing	E7	1.0	17. Non-financial private and	D17	0.0
	D8	7.3	public services	E17	0.0
8. Ceramics and paper	E8	0.9			
	D9	13.4			
9. Construction material	E9	0.2			

Sources: GSO; General Department of Taxes and authors' estimates.
Notes: D: Production for domestic sale; E: Production for export.

Currently, tax revenues are around 20 percent of GDP and constitute more than 90 percent of the State budget. Tariffs, in turn, represent 15-20 percent of total tax revenue (Table 2).

[1] One significant step recently made in this direction, after a prolonged discussion, is the US-Vietnam Trade Agreement signed on July 13, 2000 in Washington, DC.

Table 2: Government revenue 1997-1998

Total revenue from all taxes and fees	100 percent
- Corporate profit	10.1
- Labor use tax	20.5
- Capital use tax	5.4
- Commodity input tax	25.2
- Export tax	5.4
- Import tax	14.3
- Sales tax	17.4
- Household income tax	1.70

Sources: General Department of Taxes, 2000, I/O Table 1996, the SNA 1997 and authors' estimates.

Vietnam expects that the tariffs on ASEAN imports will be removed by 2006 and those on APEC imports by 2020. Following WTO regulations, tariffs should be the last protective barriers removed by states. This implies that tariff reductions should be accompanied by the removal of non–tariff barriers (NTBs), such as import quotas, fixation of the basic import price to determine the tariff, application of higher domestic taxes on imported goods, fees on imported products, and subsidies in the form of tax reduction or tax exemptions for domestically produced goods. We do not include NTBs to avoid undue complexity and instead focus our analysis on the impacts of tariff policy[2].

Poverty and Inequality

Results from the 1997-98 Vietnam Living Standard Survey (VLSS) indicate that, although living standards have generally improved in the last five years, the gap remains very significant between urban and rural populations (see Table 3).

[2] More details on this subject, including the problem of quantitative estimation of tariff equivalents of NTBs can be found in Huy et al. (2000A, 2000B). Recently, Ghosh and Whalley (2001) also arrived at interesting results on the effects of export quotas and price controls for the rice market in Vietnam.

Table 3: Sources of Household Income 1996

Household group	Population share (percent)	Annual per capita income (000 VND)	Share in total income by source (percent)			
			Wage income	Capital income	Government transfers	Foreign transfers
H1U	0.8	926	6.0	3.0	4.8	3.0
H1R	19.2	804	3.8	1.5	3.1	2.0
H2U	1.4	1550	7.5	5.9	6.5	6.0
H2R	18.6	1487	5.5	2.1	4.8	2.0
H3U	2.5	2235	8.3	7.5	7.2	7.0
H3R	17.5	2173	7.1	4.7	6.5	5.0
H4U	5.2	3360	11.2	7.7	9.3	8.0
H4R	14.9	3257	8.4	10.0	8.3	10.0
H5U	12.6	9617	26.7	29.7	32.8	30.0
H5R	7.4	6625	15.6	27.9	16.8	27.0
Total	**100.0**		**100.0**	**100.0**	**100.0**	**100.0**

Sources: Vietnam I/O Table 1996 (GSO, 1999); VLSS 1997-1998, GSO (2000); General Department of Taxes. *Notes*: H1: poorest quintile, H5: richest quintile, U = urban, R = rural.

According to the survey, the annual income per capita of the top quintile is 7,905 thousand VND (roughly $US 680), or 10.5 times higher than that of the bottom quintile. If the top and bottom deciles are compared, this gap is doubled. We also note that the gaps vary according to the source of household income. Consumption patterns are also very different between the poor and rich household groups (Table 4).

Table 4: Household consumption patterns 1996

Model Sector		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
Paddy	D1	0.03	0.05	0.03	0.04	0.02	0.03	0.03	0.02	0.02	0.02
Other agriculture	D2	0.05	0.07	0.06	0.06	0.06	0.05	0.07	0.07	0.06	0.07
Forestry.	D3	0.05	0.08	0.06	0.08	0.07	0.07	0.13	0.13	0.09	0.11
Aquatic goods	D4	0.04	0.04	0.04	0.04	0.04	0.04	0.13	0.12	0.16	0.14
Agriculture		**0.17**	**0.24**	**0.19**	**0.22**	**0.19**	**0.19**	**0.36**	**0.34**	**0.33**	**0.34**
Mining	D5	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.06	0.04	0.05
Alcoholic beverages	D6	0.08	0.08	0.09	0.08	0.09	0.08	0.17	0.12	0.19	0.18
Food Manufacturing	D7	0.13	0.13	0.19	0.15	0.17	0.14	0.08	0.08	0.09	0.07
Ceramics and paper	D8	0.04	0.05	0.06	0.06	0.07	0.08	0.01	0.01	0.02	0.02
Construction material	D9	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01
Chemicals and printing	D10	0.03	0.04	0.05	0.05	0.04	0.05	0.13	0.14	0.15	0.14
Textiles and garments	D11	0.03	0.05	0.04	0.05	0.04	0.04	0.01	0.02	0.01	0.01
Electricity, gas and water	D12	0.01	0.00	0.02	0.00	0.02	0.01	0.06	0.05	0.05	0.04
Construction	D13	0.21	0.19	0.09	0.14	0.08	0.16	0.06	0.07	0.05	0.06
Industry		**0.57**	**0.59**	**0.58**	**0.58**	**0.55**	**0.61**	**0.57**	**0.56**	**0.61**	**0.58**
Hotel and restoration	D14	0.06	0.04	0.07	0.06	0.08	0.07	0.03	0.03	0.02	0.02
Transport and communication	D15	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Financial services	D16	0.01	0.00	0.02	0.00	0.01	0.01	0.03	0.04	0.02	0.03
Non-financial private and public services	D17	0.17	0.13	0.15	0.14	0.15	0.13	0.02	0.01	0.02	0.02
Services		**0.24**	**0.18**	**0.24**	**0.20**	**0.25**	**0.22**	**0.09**	**0.09**	**0.07**	**0.08**
	Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

Source: Computed from the Social Accounting Matrix (SAM) prepared by the authors.

Description of the Model

The model structure and specifications

The CGE model provided in this paper is a small, price-taking open economy model. Before entering into the details of different blocks of the model, its general features are described through a circular flow relation in Figure 1.

There are 4 blocks that form the economy; Households (10 household groups), Production (33 goods and services sectors, among which 17 are for domestic sale and 16 for export), Government and the rest of the World (ROW). The benchmark data set used in model calibration is for the base year 1996. A detailed social accounting matrix (SAM) prepared using the latest I/O Table (1996) and the 1997-98 VLSS serve as the main data sources.

Production

The model incorporates 33 production sectors (17 for domestic sale and 16 for export) aggregated from the 97 sectors identified in the Vietnam I/O Table 1996. Production market characteristics used in model calibration are reported in Table 5. There is only one non-traded sector (Sector G13: Construction). All other sectors are traded and decomposed into production for domestic sale (D_i) and production for export (E_i).

The choice of sectoral aggregation aims to capture the key characteristics of the Vietnamese economy. Lack of data limits further disaggregation. Each sector of the model produces goods using both primary factors (including capital, labor, foreign capital and sector-specific factors) and intermediate (domestically produced or imported) inputs.

Figure 1: An overview of transactions

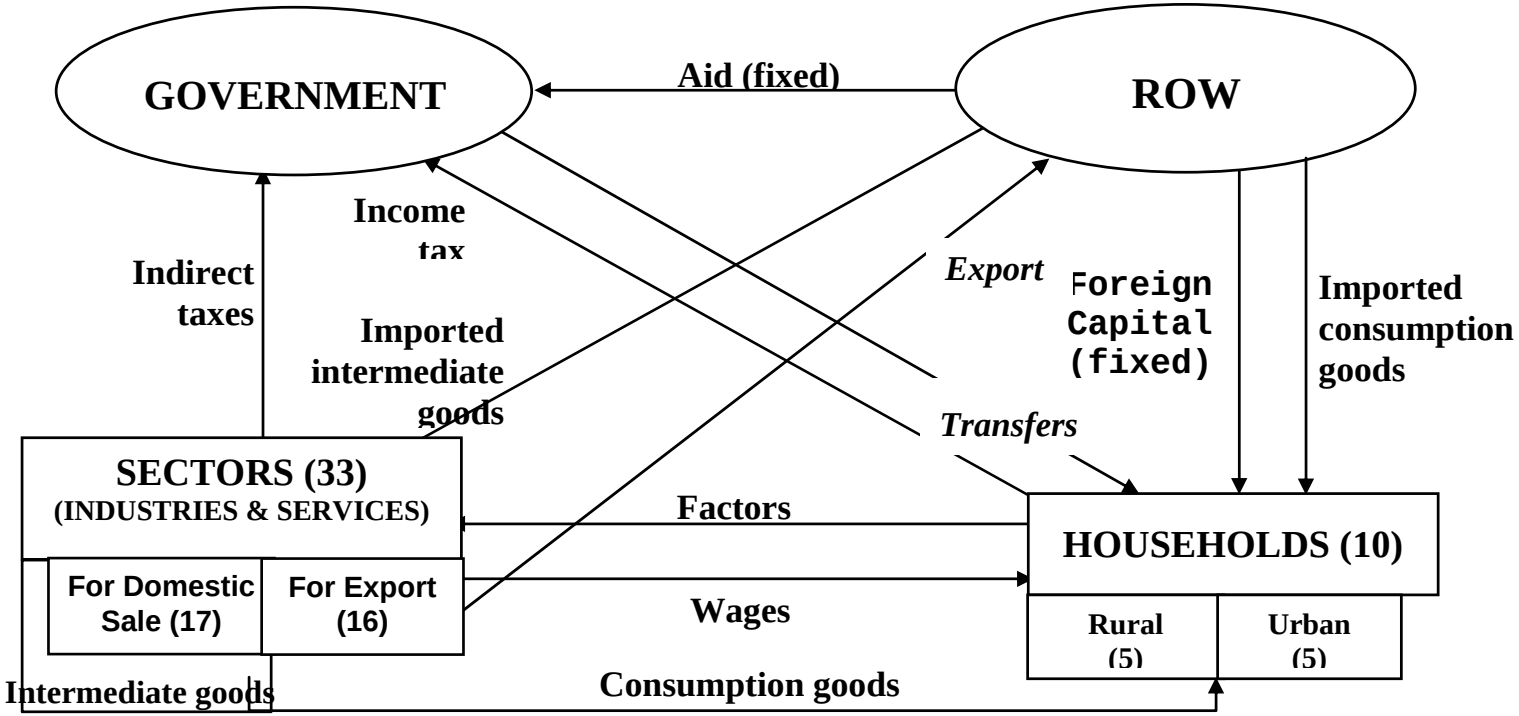


Table 5: Production and factor markets 1996

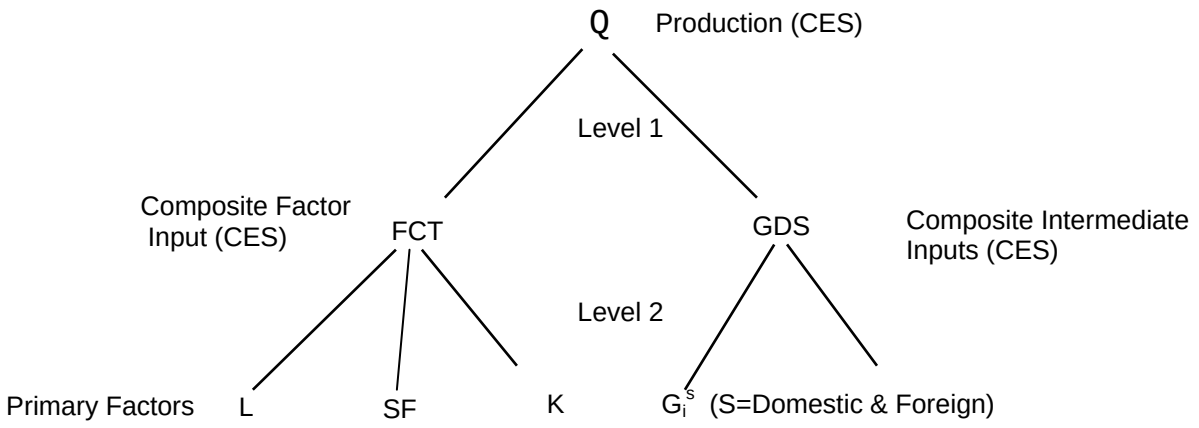
Model Sector		Value added		Capital VA	Labor VA	Output	
		Rate (VA/XS)	Share	Share	Share	Share	Value
	D1	59.3	11.1	1.3	14.1	8.3	48959
Paddy	E1	59.3	0.2	0.0	0.2	0.1	834
	D2	71.4	4.8	1.2	6.6	3.0	17728
Other agriculture	E2	71.2	3.8	1.0	5.3	2.4	14070
	D3	59.2	6.3	1.8	7.8	4.7	28042
Forestry.	E3	58.9	0.3	0.1	0.4	0.3	1513
	D4	61.1	3.5	1.3	4.4	2.5	15031
Aquatic goods	E4	60.6	0.7	0.3	0.9	0.5	2998
	D5	51.9	2.1	5.1	0.7	1.8	10712
Mining	E5	54.5	4.3	9.5	1.3	3.4	20439
	D6	31.9	3.3	4.0	2.3	4.6	27411
Alcoholic beverages	E6	25.9	1.0	1.6	1.0	1.8	10416
	D7	10.7	1.7	1.9	1.6	6.8	40338
Food Manufacturing	E7	10.2	0.5	0.6	0.5	2.1	12462
	D8	17.6	2.5	3.0	2.3	6.2	37013
Ceramics and paper	E8	19.0	0.7	0.8	0.6	1.6	9386
	D9	26.8	1.7	3.5	0.8	2.8	16602
Construction material	E9	26.6	0.1	0.2	0.0	0.1	741
	D10	21.4	2.3	2.8	1.8	4.7	27699
Chemicals and printing	E10	20.0	0.3	0.4	0.3	0.7	3848
	D11	23.8	1.0	1.1	1.0	1.8	10758
Textiles and garments	E11	23.5	1.8	2.1	1.9	3.4	20329
	D12	43.7	2.4	2.2	2.6	2.4	14483
Electricity, gas and water	E12	47.6	0.0	0.0	0.0	0.0	30
Construction	D13	31.2	6.4	8.3	6.3	9.1	53710
	D14	69.7	16.5	31.0	11.9	10.5	62057
Hotel and restauration	E14	69.1	1.5	3.0	1.2	1.0	5768
Transport and	D15	54.7	4.3	5.5	2.8	3.5	20477
communication	E15	54.5	0.4	0.5	0.3	0.3	1789
	D16	70.2	0.9	1.4	0.9	0.6	3298
Financial services	E16	70.7	0.8	1.3	0.8	0.5	3034
Non-financial private and	D17	65.1	12.1	3.2	16.4	8.2	48838
public services	E17	64.6	0.6	0.2	0.9	0.4	2575
	Total		**100.0**	**100.0**	**100.0**	**100.0**	**593388**

Sources: GSO; General Department of Taxes and authors' estimates.

Notes: D: Production for domestic sale; E: Production for export.

The production functions used are of the double nested constant elasticity of substitution (CES) form (Figure 2). At the bottom level, primary factors are aggregated by CES function into composite factor inputs. Similarly, all intermediate goods including imported goods are nested into composite intermediate goods inputs by a CES function. Intermediate goods and factor inputs are then aggregated at the upper level of the production function to obtain final output. Factor and intermediate good demands are determined from the first order conditions of cost minimization (see Shoven and Whalley, 1992). Note that for both the supply and demand sides of the model, we adopt the small country assumption.

Figure 2: Nesting structure of production functions



The parameters of the model are calibrated. There are no elasticity estimates available for the Vietnamese economy. Thus, the production side elasticity values used are based on Chia, Wahba and Whalley (1992), which they adopted in their work on the Cote d'Ivoire Model. These values are shown in Table 8. On the production side, the elasticities of substitution between composite inputs (factor input and good input) are naturally lower than the elasticities of substitution between factors or between inputs. We assume that the bottom level elasticities are 1.5 times greater than the upper level elasticities.

Households

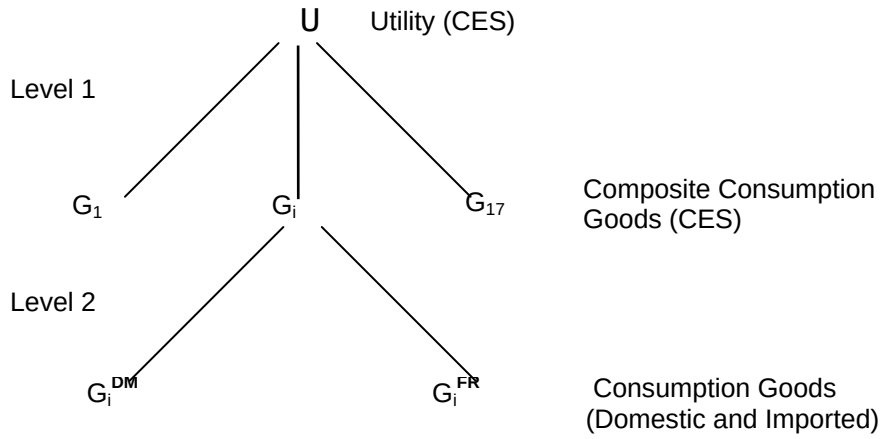
In the model, 10 household groups are identified according to their classification (by level of expenditure) in the VLSS. The survey data indicates five household quintiles. These quintile groups are decomposed into urban and rural households using information from the GSO survey data.

Households receive income in the form of wages and returns from other factors they hold as well as transfers from the government. The model remains static and considers neither savings nor investment. Thus, household disposable income is entirely spent on consumption.

Each household has a double nested CES utility function to be maximized subject to the household budget constraint (Figure 3). At the lower level, Armington differentiation between domestically produced and imported consumption goods is used. At the upper level,

composites of domestic and imports are aggregated to determine the level of utility. In the model, final demands of composite goods by source (imported or domestic) for each household group are derived from the first order conditions of utility maximization.

Figure 3: Nesting structure of utility functions



Elasticity values used for the upper level of the nests are based on our assumptions and in line with central tendency estimates available in Shoven and Whalley (1992), Piggot and Whalley (1985), Marques (1990) and Orcutt (1950). The convention is again followed that the lower level elasticities are 1.5 times that of the upper level ones (Perroni and Whalley, 1996). Upper level elasticities are presented in Table 6. Several sensitivity tests were undertaken on the elasticity parameters used in the central case model specification and showed that the results were robust.

Table 6: Consumption side elasticities of substitution

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Urban	0.94	0.94	1.26	1.56	1.56
Rural	0.75	0.75	1.01	1.25	1.25

Sources: Authors assumption based on Shoven and Whalley (1992), Piggot and Whalley (1985), Marques (1990) and Orcutt (1950).

Equilibrium conditions

Equilibrium is attained by endogenously determining prices of factors and domestic goods and assuming full market clearing and zero profit conditions for each of 33 sectors.

Simulation Results

Base case

In the base case, we simulate trade reforms to comply with the AFTA and WTO requirements that no tariff be higher than 5 percent. The simulation exercise is performed by reducing all tariffs that are higher than 5 percent, to 5 percent and keeping other tariffs unchanged.

We also replace existing sales taxes by four yield-preserving VAT rates in the ratio (0:1:2:4) applicable to commodities classified into four groups, where the rates are endogenously determined by the equal yield condition. The four groups are, in increasing order of VAT rates, basic agricultural activities (0), other agriculture and mining (1), manufacturing and services (2) and hotel, restauration, tourism, wine and other luxuries (4). This captures the fact that Vietnam introduced a VAT system in 1999 with rates of 0, 5, 10 and 20 percent applicable to the four groups of commodities identified.

The combined effects of the VAT (sales tax reform) and tariff reductions are evaluated using money metric measures of utility, namely Hicksian Equivalent Variations (EVs) and Compensating Variations (CVs). The results indicate a modest welfare gain of 0.28 percent of national income from the combined tariff and sales tax reform for the economy as a whole (Table 7).

However, these are accompanied by a sharp redistribution effect both between the rural and urban population and between the poor and the rich. The rich groups (H4 and H5) benefit in both the rural and urban populations. Moreover, the richest groups (H5) have the largest gain at 0.43 percent of income. For the second richest groups (H4), the urban population gains much more than the rural population. The poorest groups (H1) also gain, but by half as much as the richest groups (0.2 versus 0.4 percent). The second poorest groups (H2) lose out in both urban and rural areas: 0.02 percent and 0.08 percent of income, respectively.

Table 7: Welfare impacts from sale tax and tariff reform in Vietnam (1997)

Household Groups by Consumption Expenditure	Base Case	ASB	AS1	AS2	AS3	AS4	AS5	AS6-1	AS6-2
H1U (poorest)	0.19	-0.25	0.30	0.30	0.16	0.13	-0.02	0.21	0.10
H1R (poorest)	0.21	-0.11	0.31	0.31	0.17	0.23	0.05	0.21	0.11
H2U	-0.02	-0.47	-0.04	0.00	-0.06	-0.12	-0.14	0.04	-0.04
H2R	-0.08	-0.53	0.02	0.02	-0.12	-0.15	-0.39	-0.06	-0.15
H3U	0.20	0.03	0.16	0.11	0.17	0.23	0.38	0.22	0.06
H3R	-0.01	-0.32	0.06	0.10	-0.06	-0.03	-0.07	0.01	-0.08
H4U	0.34	0.59	0.19	0.21	0.31	0.88	1.19	0.32	0.19
H4R	0.21	0.41	0.24	0.17	0.19	0.46	0.65	0.21	0.00
H5U (richest)	0.43	0.82	0.43	0.44	0.44	0.94	1.31	0.40	0.27
H5R (richest)	0.43	0.83	0.42	0.42	0.41	0.86	1.22	0.39	0.23
Aggregate Welfare Measure									
Sum of EV over household as percent of base income	0.28	0.39	0.28	0.28	0.26	0.57	0.77	0.27	0.14
Sum of CV over household as percent of base income	0.28	0.39	0.28	0.28	0.26	0.58	0.79	0.27	0.14
VAT Rate by commodity groups									
Basic agricultural activities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other agriculture and mining	2.40	3.51	2.40	2.40	2.45	3.17	3.57	2.42	2.49
Manufacturing and services	4.90	7.02	4.90	4.90	4.90	6.34	7.13	4.84	4.97
Hotel, restaurant, tourism, wine, etc…	9.80	14.05	9.80	9.80	9.80	12.67	14.26	9.68	9.94

Base Case: All tariffs above 5 percent set to 5 percent, tariffs below 5 percent remain unchanged and endogenous yield preserving VAT.

Additional simulations (AS) (Note: Simulations AS1 – AS5 are with hypothetical benchmark)

ASB (base case): Elimination of **all** tariffs and yield preserving endogenous VAT applicable to four groups of commodities in the ratio (0:1:2:4).

AS1: Average import ratios in consumption applied to all households.

AS2: AS1 plus average sector-specific to total factor endowments applied to all households.

AS3: The same consumption structure by sector for all household groups.

AS4: The ratio in endowment between labor & capital is the same for all households.

AS5: Doubling initial tariffs in benchmark.

AS6-1: Capital of domestic sectors is immobile; AS6-2: Capital of all sectors is immobile.

The changes in consumer prices (Table 8) due to the tariff and tax reforms affect the consumption behavior of households and, consequently, their utility and welfare. As an example, consider the two poorest urban household groups H1U and H2U (Table 7), which primarily consume domestically produced goods. They have the same elasticities of substitution in consumption. Reviewing tables 4 and 7, we see that 34 percent of total consumption by the poorest group (H1U) is of goods for which prices have fallen[3] while 54 percent is of goods for which prices increased by more than one percent[4]. For the second poorest urban household group (H2U), the figures are 22 and 53 percent, respectively. Thus the poorest urban household group benefits more from price reductions and suffers less from price increases, which explains the result (Table 7-Base

[3] Mining (D5), alcoholic beverages (D6), construction (D13) and transport and communication (D15).

case) that they have a positive EV (0.19 percent), whereas the next poorest household group has a negative EV (-0.02 percent).

Similarly, the model can also explain the differences in welfare effects from trade and tax reforms between the two poorest rural household groups namely: H1R (+0.21 percent) and H2R (-0.08 percent). In the middle income group (H3), urban households gain by +0.20 percent while their rural counterparts lose marginally by -0.01 percent.

Table 8 also shows changes in prices of domestically produced and imported goods as well as in total demand of commodities. After tariff removal, even if the consumer prices of imported goods fall, the prices of domestically produced substitutes can rise because of higher sales taxes. This is true in the case of other agriculture (D2), Construction material (D9), Textiles and garments (D11) and Electricity, gas and water (D12)[5]

There is another group of commodities for which the tariffs remain unchanged, but the consumer prices (both of imported and of domestically produced goods) increase, again due to the combined tariff and VAT reform. This group includes chemicals, printing and other industrial products (D10), financial services (D16) and public services (D17).

In response to the increasing relative price of domestic versus imported goods, consumers, notably rich households who consume a larger share of imported goods, shift their demand toward imports. In industries where tariffs are reduced, import volumes increase. However, imports also increase in sectors for which tariffs do not change, but where the VAT rate falls and consequently demand increases. Note, for example, that in the mining sector (D5), which has a constant tariff rate of 3.6 percent, the consumer price of imported products falls by 9.8 percent and imports increase by 6.7 percent.

[4] In percentage terms, price increases are generally not as important as price reductions: the greatest increase is less than 5% for Finance, banking and insurance (D16), and Public services (D17).
[5] Note that sales taxes double, even triple for D11.

Table 8: Effect of trade liberalization on sectoral production (percent)

		Initial	Elasticities		Sectoral shares				Volume changes (percent)					Price changes (percent)		
Industry		tariff	e_f	e_i	VA_i/VA	M_i/M	EX_i/EX	M_i/Q_i	VA_i	M_i	D_i	EX_i	XS_i	P_i	PD_i	PM_i
	D1	3.7	0.30	0.40	10.6	0.1		1.3	-3.4	0.1	0.7		-3.4	0.60	0.60	
Paddy	E1	0.8	0.30	0.40	0.2	0.4	0.7		-1.3	-3.5		1.3	-1.3			
	D2	9.8	0.30	0.40	4.9	1.6		18.4	-1.0	7.1	0.1		-0.9	0.60	2.06	-2.94
Other agriculture	E2	2.4	0.30	0.40	3.9	3.3	12.2		-0.9	2.1		0.9	-0.9			
	D3	0.7	0.30	0.40	6.5	0.3		2.8	0.0	0.7	-0.1		0.1	0.43	1.26	0.83
Forestry.	E3	0.0	0.30	0.40	0.4	0.3	1.3		-0.3	0.8		0.3	-0.3			
	D4	4.5	0.30	0.40	3.6	0.0		0.1	0.7	1.1	1.1		0.8	0.09	0.31	0.22
Aquatic goods	E4	1.1	0.30	0.40	0.7	0.7	2.6		-0.1	0.5		0.0	0.0			
AGRICULTURE					30.7	6.8	16.8									
	D5	3.6	0.45	0.60	2.0	1.0		5.7	10.7	6.7	14.1		11.1	0.70	-9.17	-9.80
Mining	E5	0.4	0.45	0.60	3.0	4.0	13.8		-8.5	1.7		8.4	-8.4			
	D6	7.6	0.68	0.90	2.9	2.0		9.6	0.6	4.7	1.8		1.1	0.05	-0.01	-2.44
Alcoholic beverages	E6	1.6	0.68	0.90	1.2	1.5	9.1		-0.5	-0.1		0.1	-0.1			
	D7	7.6	0.60	0.80	2.1	1.1		3.7	-4.3	0.9	-4.2		-4.1	0.53	4.83	1.78
Food Manufacturing	E7	1.0	0.60	0.80	0.7	0.7	10.5		-2.8	-0.8		3.8	-3.8			
	D8	7.3	0.53	0.70	2.9	27.3		27.3	-1.5	3.2	-1.5		-1.1	-0.50	2.78	1.13
Ceramics and paper	E8	0.9	0.45	0.60	0.9	7.1	10.1		25.4	2.6		26.6	26.6			
	D9	13.4	0.30	0.40	1.8	1.4		6.5	1.5	6.0	-0.7		1.8	-0.18	2.14	-5.24
Construction material	E9	0.2	0.30	0.40	0.1	0.5	0.6		1.8	2.2		2.2	2.2			
	D10	2.3	0.60	0.80	2.3	14.6		25.3	0.8	1.8	-0.4		1.2	-0.12	1.51	1.62
Chemicals and printing	E10	0.4	0.60	0.80	0.4	3.2	3.6		8.4	2.2		9.0	9.0			
	D11	18.0	0.30	0.40	1.2	2.6		7.4	2.3	31.6	1.1		2.7	-2.13	0.84	-8.29
Textiles and garments	E11	9.5	0.30	0.40	3.3	5.8	26.2		45.7	29.5		48.2	48.2			
	D12	18.2	0.30	0.40	2.5	7.7		58.0	1.9	12.3	9.1		2.3	-0.90	0.14	-10.2
Electricity, gas and water	E12	3.1	0.60	0.80	0.0	0.0	0.0		1.5	3.0		2.4	2.4			
Construction	D13	0.00	0.30	0.40	7.1	0.0		0.0	2.5		2.8		2.8	-0.48	-0.98	
INDUSTRY					34.5	80.5	74.0									
	D14	0.00	0.60	0.80	15.7	2.1		13.6	0.1	-0.1	-1.7		0.5	0.80	2.58	1.76
Hotel and restauration	E14	0.00	0.60	0.80	1.4	2.4	4.6		-4.8	2.2		4.7	-4.7			
	D15	0.00	0.30	0.40	3.5	3.0		34.9	3.5	3.9	5.3		3.9	-0.23	-2.59	-2.36
Transport and communication	E15	0.00	0.30	0.40	0.3	1.2	1.4		1.3	3.4		1.5	1.5			
	D16	0.00	0.60	0.80	0.9	1.0		12.0	-3.8	-1.2	-4.3		-3.7	0.996	4.94	3.90
Financial services	E16	0.00	0.60	0.80	0.6	1.3	2.0		-24.9	-0.8		24.9	-24.9			
	D17	0.00	0.30	0.40	12.1	1.7		5.8	-1.3	-0.6	-1.0		-1.0	0.24	1.96	1.71
Non-financial private and public services	E17	0.00	0.30	0.40	0.4	0.2	1.3		-43.1	-1.1		44.9	-44.8			
SERVICES					34.8	12.7	9.2									
					100.0	100.0	100.0									

D_i: domestic sales; E_i: exports; e_f (e_i): elasticities of substitution between factors (inputs); VA: value added; M: import volumes; D: total domestic demand volumes; EX_i: export volumes; Q_i: total consumption; XS_i: output volumes; P_i: producer price; PD_i: consumer price for domestic goods; PM_i: consumer price for imported goods

Details on the sector-wise impacts on output volumes, as well as domestic and import prices, are reported in Table 8. The expanding sectors serving the domestic market are mining (D5; 11.1 percent output growth), transport and communication (D15; 3.9 percent), construction, and textiles and garments (D11; 2.7 percent). On the contrary, other agriculture (D2), ceramics and paper (D8), and non-financial public and private services (D17) contract marginally (-1 percent), while output of paddy (D1), food manufacturing (D6) and financial services (D17) fall by roughly 4 percent. This result is quite consistent with the impacts that the Vietnamese economy is currently experiencing.

Much more dramatic impacts of trade liberalization are noted for export sectors such as textile and garment (E11) and ceramics and paper (E8), where output increases by 48.2 and 26.6 percent, respectively, as a result of exchange rate depreciation.

Simulation with removal of all tariffs

The base case counterfactual experiment presented in the previous section is taken from the Government's policy agenda in the framework of commitments of Vietnam for joining AFTA. In other countries, trade liberalization can signify a complete removal of all tariffs. To facilitate a comparative analysis, the authors have also run such a hypothetical scenario.

The results given in Table 7 (column ASB) show that the whole economy benefits more from a complete removal of tariffs: Welfare increases by 0.39 percent of national income, as compared to 0.28 percent in the base case. However, the redistribution effect becomes sharper: all the poor household groups (H1, H2) lose, whereas all the rich household groups (H4 and H5) gain. The richest group H5 has the largest gain: 0.83 percent, almost double that of the base case.

The main channels of transmission remain the same as in the base case. When all tariffs are removed, the VAT is increased (see four last rows in Tables 7) to compensate lost tariff revenue. In turn, the raising of VAT negatively affects the poorest households (H1, H2 and H3R)

who primarily consume domestic goods and thus do not benefit much from the fall in import prices. On the contrary, complete tariff removal considerably benefits the rich households, who consume much more imports than domestic goods.

Decomposition of impacts

The analysis presented in the previous section leads to preliminary conclusions that the impacts of combined tariff and VAT reform on household welfare are via the remuneration of fixed factors (particularly immobile capital) and consumer prices. In other words, the welfare of each household group depends primarily on differences in its endowment of specific factors and its consumption patterns. To verify the importance of each of these channels, we prepare five alternative hypothetical benchmarks where, as in the base case, all tariffs above five percent are reduced to five percent. In all but the last case, differences between households in one dimension are eliminated in order to then examine how the simulation results are affected:

1. Equal import consumption ratios by sector (AS1)
2. AS1 plus equal ratios of sector-specific to total factor endowments (AS2)
3. AS2 plus equal sectoral consumption ratios (AS3)
4. Equal capital-labor endowment ratios (AS4)
5. Initial tariffs doubled (AS5)

Equal import consumption ratios: In this simulation we apply the average sectoral import ratios in final consumption to all households. In the real benchmark, poor households consume a much smaller share of imported goods than rich households. We can see in Table 7 (column AS1) that the welfare impacts on poor households are considerably improved. The poorest groups (H1U and H1R) now have a welfare gain equivalent to about 0.3 percent of their income instead of 0.2 percent in the base case. The situation of the next poorest household groups (H2 and H3) also improves considerably with the rural households in question going from

a reduction in welfare to an improvement. The welfare gains of the two richest urban and rich household groups decline, as their initial import consumption ratios decline by about 0.4 percent of their income. Overall, the equalization of import ratios almost entirely eliminates the differences in welfare impacts between household groups.

Equal sector-specific to total factor endowments: In the real benchmark, most of the immobile capital belongs to the urban and rich households, while the rural and poor households own only small portions of immobile labor. In this simulation, in addition to imposing equal import consumption ratios, the benchmark is adjusted so that all household groups have the same average sector-specific to total factor endowments. The results of this hypothetical simulation (column AS2) show that the EVs remain almost the same as in the hypothetical simulation AS1[6]. Thus, we conclude that, for the welfare impacts of combined tariff and VAT reform, *the ratio in consumption between imported and domestic goods, and not the endowment of specific immobile factors, plays an essential role.* Note also that, in terms of household income (Table 9), there are no significant differences between the base case and both of the hypothetical simulations AS1 and AS2, indicating that it is the consumer price channel that predominates.

Equal sectoral consumption ratios: In this third simulation, in addition to the previous two adjustments, the same (average) sectoral consumption shares are applied to all households (column AS3). In the real benchmark, for example, the share of non-financial services (G17) in total consumption is much higher for the poorer household groups (Table 10). We observe in Tables 7 and 9 that the welfare and income of all households groups, except the richest urban group H5U, increase less than in the benchmark simulation. In terms of redistribution effects among the households, there is no improvement in comparison with the real benchmark simulation. Thus, combined with the first additional simulation, it can be ascertained that for

[6] We also performed another alternative scenario in which the share of specific factors is equalized, but the sectoral import consumption ratios are as in the real benchmark. In this case the household EVs are almost the same as in the base case simulation.

these effects the ratio in consumption by household between imported and domestic goods is more important than their consumption structure by sector.

Table 9: Sale tax and tariff reform in Vietnam (1997): Welfare and income impacts

Household Groups by Consumption Expenditure)	Percentage change in household income					
	Real benchmark	AS1	AS2	AS3	AS4	AS5
H1U (poorest)	1.06	1.07	1.07	0.99	2.02	2.44
H1R (poorest)	1.05	1.06	1.06	0.97	2.02	2.41
H2U	1.15	1.16	1.19	1.08	2.06	2.59
H2R	1.02	1.03	1.03	0.95	1.99	2.37
H3U	1.26	1.27	1.22	1.20	2.21	2.83
H3R	1.11	1.11	1.15	1.02	2.03	2.51
H4U	1.14	1.14	1.16	1.07	2.20	2.63
H4R	1.39	1.40	1.32	1.34	2.48	3.11
H5U (richest)	1.26	1.26	1.27	1.24	2.34	2.88
H5R (richest)	1.47	1.47	1.47	1.41	2.61	3.27
Percentage change in National income	1.02	1.03	1.03	0.99	1.83	2.22

Equal labor-capital endowments: In this simulation (AS4), the ratio of labor and capital endowments is assumed to be the same for all households. The structure of welfare does not change: those who lost (or gained) in the real benchmark case, here lose (gain, respectively), too (Table 7, column AS4), as the consumption structure of households remains the same as in the real benchmark case. The welfare of richer groups (H4 and H5) increases by double, while that of poorer groups does not change so much. Thus it can be said that the hypothesis of an equal ratio in endowment between labor and capital for all household groups considerably reinforces the sharpness of redistribution effects. This implies that in the real benchmark, the income effect slightly offsets the consumption effect.

Table 10: Change in consumption pattern under trade liberalization

Sectors		Share M/Q	Change in prices			Consumption shares									
			PD	PC	PM	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
1. Paddy	D1	1.3	0.6	0.6		3	4	3	4	2	3	1	2	1	1
2. Other agriculture	D2	18.4	0.6	2.1	-2.9	5	7	6	6	6	5	6	5	5	4
3. Forestry.	D3	2.8	0.4	1.3	0.8	5	7	6	8	7	7	5	7	5	6
4. Aquatic goods	D4	0.1	0.1	0.3	0.2	4	4	4	4	4	4	3	3	2	2
Agriculture						17	22	19	22	19	19	15	17	13	13
5. Mining	D5	5.7	0.7	-9.2	-9.8	4	4	4	4	4	3	3	3	2	2
6. Alcoholic beverages	D6	9.6	0.1	0.0	-2.4	9	9	10	9	10	8	7	8	7	7
7. Food Manufacturing	D7	3.7	0.5	4.8	1.8	13	13	18	14	16	13	12	12	8	11
8. Ceramics and paper	D8	27.3	-0.5	2.8	1.1	4	5	6	6	7	8	13	12	16	14
9. Construction material	D9	6.5	-0.2	2.1	-5.2	0	1	0	1	0	0	1	1	1	1
10. Chemicals and printing	D10	25.3	-0.1	1.5	1.6	3	4	5	5	4	5	3	6	1	1
11. Textiles and garments	D11	7.4	-2.1	0.8	-8.3	3	4	4	5	4	4	3	4	2	3
12. Electricity, gas and water	D12	58.0	-0.9	0.1	-10.2	1	0	2	0	3	1	2	1	3	2
13. Construction	D13	0.0	**-0.5**	**-1.0**		21	19	9	14	8	16	17	12	19	18
Industry						55	59	58	58	56	58	62	59	62	63
14. Hotel and restauration	D14	13.6	0.8	2.6	1.8	6	4	7	6	8	8	8	8	9	7
15. Transport and communication	D15	34.9	**-0.2**	**-2.6**	**-2.4**	0	1	0	0	1	1	1	1	2	2
16. Financial services	D16	12.0	**1.0**	**4.9**	**3.9**	1	0	2	0	1	1	1	1	1	1
17. Non-financial services	D17	5.8	0.2	2.0	1.7	17	13	15	14	15	13	13	14	15	14
Services						24	18	24	20	25	23	23	24	27	24

PD_i: Producer price, PC_i: Consumer price for domestic goods; PM_i: Consumer price for imported goods; M_i/Q_i: Share of import in local consumption

Doubling of all initial tariffs: With the same idea as simulation ASB of analyzing the effects of stronger tariff reduction, we first double the initial tariffs (to obtain a hypothetical benchmark) and then repeat our earlier simulation, i.e. reduce to five percent all tariffs that are higher (column AS5 of Table 7). Results of this simulation indicate that welfare gains are much bigger overall. Only the richer household categories, who consume relatively more imported goods, benefit, whereas the poor households see their welfare decrease with respect to the base case as they are hit by an even larger increase in VAT rates. In general (except the poorest group which is now totally disadvantaged) those who gained before, now gain three times more, and those who lost before, now lose seven times over.

Base case simulations with immobile capital

Capital (except for capital specific factors) has been treated until now as mobile across sectors. It is also interesting to consider the case where sector capital is fixed (at least in the short run). The additional base case simulations AS6-1 and AS6-2 below give some results in

this direction. Thus, in simulation AS6-1 (base case) we assumed that all domestic sectors have capital fixed at their benchmark levels (Table 7). In simulation AS6-2, this immobility of capital factor is assumed for all sectors (domestic and export).

It can be seen from Table 7 that, in comparison with the base case simulation, the welfare effect (both at the national and the household levels) is insignificant (AS6-1). This is because the domestic sectors do not participate in exports, therefore these sectors (and, consequently, household revenue and consumption) are not much affected by the immobility of capital.

As shown in the last column of Table 7, the effect becomes very strong if capital is fixed in all domestic and export sectors (AS6-2). Both household and national welfares decrease at least by half. The problem in simulation AS6-2 is that capital cannot move from the contracting sectors to the expanding ones. Therefore, in the former some stagnation of capital is observed while in the latter there is some capital shortage.

To conclude, the mobility of capital across sectors is a very important determinant of the gains from tariff and tax reforms, as well as of household income and welfare effects. It has strong impacts on exports and imports. In the base case where capital can move from contracting sectors to expanding ones (especially export sectors), there is a rise of 1.02 percent in national income, whereas this figure is only 0.7 percent in the case of capital immobility. The overall household income and welfare gains are also twice as high with capital mobility.

Comparison of alternative tariff and tax reforms

We now decompose the combined effects of VAT and tariff reforms in the original benchmark. Table 11 reports the results of tariff reductions with equal yield revenue and various combinations of tariff and tax reforms. Contrasting columns 3 and 4, we note that almost all of the overall welfare gains are generated by trade liberalization, rather than the introduction of the 4-VAT system. However, the poorest household group benefits substantially from the tax reform, given the less progressive nature of the original sales tax. Indeed, the tax reform somewhat

offsets the regressive impacts of trade liberalization. When we then contrast the effects of a single VAT in the last column, we observe that the economy as a whole marginally gains 0.02 points by going for a single VAT vis-à-vis a 4-VAT system. Interestingly, the 4-VAT system appears to favor rural households over urban households, particularly among the poorest.

Table 11: Decomposition of the welfare (EV) impacts from sales tax (4 VAT) and tariff reform in Vietnam (1997)

Household Groups by Consumption Expenditure	Combined effect of sales tax (4 VAT) and tariff reform	Tariff reform with proportional increase in sales taxes	Only Sales tax reform (4 VAT introduced)	Combined effect of sales tax (single VAT) and tariff reform	Only Sales tax reform (1 VAT introduced)
H1U (poorest)	0.19	-0.22	0.27	-0.02	0.08
H1R (poorest)	0.21	-0.14	0.22	-0.17	-0.10
H2U	-0.02	0.02	-0.05	0.13	0.04
H2R	-0.08	-0.17	0.02	-0.22	-0.11
H3U	0.20	0.20	-0.01	0.41	0.13
H3R	-0.01	-0.03	-0.01	-0.04	-0.06
H4U	0.34	0.36	-0.01	0.31	-0.04
H4R	0.21	0.36	-0.11	0.32	-0.02
H5U (richest)	0.43	0.41	0.01	0.47	0.05
H5R (richest)	0.43	0.50	-0.04	0.46	0.01
Sum over households as percent of base income					
EV	0.28	0.27	0.0024	0.30	0.02
CV	0.28	0.27	0.0023	0.30	0.02
Single VAT				4.80	3.48
Basic agricultural activities	0.00	-	0.00		
Other agriculture and mining	2.40	-	1.78		
Manufacturing and Services	4.90	-	3.56		
Hotel, restaurant, Tourism, wine, etc…	9.80	-	7.12		

Note: VAT rates applied to four commodity groups in the ratio (0:1:2:4) as proposed by the government.

Distribution of sector-specific factors

The sensitivity of the results with respect to the distribution of *specific factors* among sectors is also verified by running different model simulations (not reported here). The shares used in the central case model specification are based on the characteristics of export sectors

and on the authors' estimates resulting from various discussions with experts[7]. Although the magnitude of welfare effects vary somewhat with the different distribution of specific factors among sectors, the main conclusions remain the same as presented above.

Marginal excess burden of raising revenue from taxes

Table 12 presents the estimates of *the marginal social cost* associated with the use of alternative tax financing vehicles available in Vietnam that could potentially be used to raise additional government revenue. In this exercise, we marginally increase government revenue by proportionally raising tax rates in all sectors. The marginal social cost of increasing revenue for each tax instrument is measured in money metric welfare terms calculated in terms of the Hicksian equivalent variation summed across households per extra Dong of revenue raised.

Results indicate significant social cost associated with raising additional funds through tariffs (0.08 Dong per Dong) or commodity input taxes (0.03 Dong per Dong). The social cost of raising additional funds through a corporate tax is negligible (6.4E-5 Dong per Dong), which reflects the uniformity of corporate taxes in the base case equilibrium. The marginal excess burden of raising revenue from sales and factor use taxes is also low: 0.004 Dong per Dong revenue generated in the case of sales tax and 0.001 Dong per Dong in the case of factor use tax.

The results from model analyses thus suggest small gains from trade liberalization for Vietnam as a whole, but with sharp redistributive effects against the poor. The impact of the introduction of the 4-VAT system on the overall efficiency of the Vietnamese economy is small compared to the tariff reform, which indicates the minor role of changes in sales taxes. Data show small variability in the sales tax rates (in the range of 0 to 20 percent)[8]. In general, the rural population suffers more than the urban population, although the poorer households lose out in both rural and urban areas. The sharp distributive impact of the trade reform is due to differences

[7] Useful comments were received from seminar participants at the Institute of Information Technology in August 2000 on an earlier version of the paper.

in the expenditure patterns and ownership of fixed factors between the rural and urban and between the rich and the poor. The regressivity of trade liberalization would be even stronger if the initial tariff levels were higher. Results are somewhat sensitive to elasticity parameters but in a way that is consistent with literature and that do not substantively alter our results.

Table 12: The social cost (marginal excess burden) of alternative financing vehicles for extra government revenue in Vietnam

	Marginal Excess Burden (Welfare cost (sum of Evs) of extra revenue raised) of various tax instruments in percent
Sales tax	0.39
Tariff	8.19
Commodity input tax	2.66
Factor tax	0.08
Corporate tax	0.006

Concluding Remarks

This paper evaluates the impact of trade liberalization using a small open /price taking economy model for Vietnam. The study focuses on welfare impacts on aggregate as well as on different household groups identified in the model. We also analyze the impacts of liberalization on output, export and import by sectors and on producer, consumer and import prices.

The model results provide insights into a series of trade-related issues not often discussed until now in the economic literature on Vietnam, such as the growth opportunities for some sectors and the risks for others, as well as the increasing gap between urban and rural areas, and between the rich and the poor. The results also give - and this is thanks to advantages of CGE modeling techniques - quantitative evaluations of overall and distributional impacts of current and alternative trade liberalization policies. The results show that there is a modest but significant (close to 0.3 percent in terms of national income) efficiency gain to the Vietnamese economy from trade liberalization. This however, is accompanied by redistribution against the rural and poor

[8] Chan, Ghosh and Whalley (1999) estimated a larger impact from VAT reforms because their benchmark

households in general. The richest groups gain, while the middle-income groups generally lose. The poorest households also benefits, but by half as much as the richest households.

This reflects sharp differences in the impacts of the tariff reforms among different household groups and also between rural and urban households. Urban and rural households, even in the same income group, are affected differently. In every group (except the poorest) urban people benefit more from tariff reduction than rural people. In particular, in the middle-income group, urban households gain, while rural ones lose. These differences in the impacts between rural and urban populations and between the rich and the poor are explained in terms of the differences in the expenditure patterns across households and differences in their factor endowments where the former plays the dominant role.

On the expenditure side, rich and urban households benefit from trade liberalization as they buy proportionally more imported goods than poor and rural households. Two likely explanations for the differences in the expenditure patterns between the rural and urban households could be differences in purchasing power and the lack of availability of imported goods in the rural areas. Furthermore, imported goods cost more in rural areas due to the transaction costs involved. Transaction costs are high due to high transportation costs as well as imperfections in the rural market. Thus it is quite obvious that the benefits of trade liberalization to people located at different places are not uniform, particularly in Vietnam.

Our sensitivity analysis confirms these findings. The welfare effects would be considerably stronger if initial tariffs were even higher. These effects also vary according to the allocation of specific factors between sectors and among households, although the main conclusions remain unchanged.

Computations are also made regarding the marginal excess burden of alternative financing vehicles for extra government revenue, which the government might need in the future. The

---

tax and tariff data show higher degree of variability in the range of 4 to 65 % and 0 to 34% respectively.

results show that corporate and factor use taxes are the lowest burden source for additional government revenue, as these are relatively non-distorting compared to other vehicles such as tariffs, input taxes and sales taxes.

The clear policy conclusion that follows from this modeling exercise is that unless tariff liberalization is accompanied by appropriate redistributive measures, the poverty gap in Vietnam is going to increase.

REFERENCES

Armington, P.S. (1969), "A Theory of Demand for Products Distinguished by Place of Production", *International Monetary Fund Staff Papers*, Vol.16, Pp. 159-178.

Chan, Nguyen, T.K.DUNG, M. Ghosh and J. Whalley (2005), Adjustment Costs in Labour Markets and The Distributional Effects of Trade Liberalisation: Analytics and Calculations For Vietnam. *Journal of Policy Modeling, Volume 27, Number 9, 1009-1024.*

Chia, Ngee- Choon, S. Wahba and J. Whalley, (1992), A General Equilibrium Based Social Policy Model for Côte- d'Ivoire. Working papers WPS 925, The World Bank.

Dervis, Kamal, J. de Melo, Jaime, and S. Robinson (1985), General Equilibrium Models for Development Policy, CUP, New York.

Devarajan, Shantayanan and J.D. Lewis (1990), Policy Lessons from Trade Focused Two-Sector Models, *Journal of Policy Modeling*, 12(4): 625-657.

Ghosh, M., E. Hutton and J. Whalley (1999), "Multiple Constraint Relaxation and the Shadow Price of Foreign Exchange", *Journal of Development Economics*, Vol. 60(2), Pp. 577-588.

Ghosh, M and J. Whalley (2001), Are Price Controls Necessarily Bad? The Case of Rice in Vietnam. University of Western Ontario, mimeo.

GSO (2000), Vietnam Living Standards Survey 1997- 1998, Statistical Publishing House, Hanoi.

GSO (1999), Input – Output Table of Vietnam. Statistical Publishing House, Hanoi.

GSO (1997), The System of National Accounts, Statistical Publishing House, Hanoi.

Harrison, Glenn, W.T.F. Rutherford and D.G. Tarr (1993), "Trade Reform in the Partially Liberalized Economy of Turkey", *the World Bank Economic Review*, Vol.7, No.2, Pp. 191-217.

Huy V.Q, N.T.Ha, C.C.Loi and N.Thang (2000A), An Overview of Vietnam's Trade Policy: The Changes and Impacts, mimeo.

Huy V.Q, N.T.Ha, C.C.Loi and N.Thang (2000B), The Nominal and Effective Rates of Protection by Industry in Vietnam (A Tariff – Based Assessment). Mimeo paper.

Marques (1990), "Bilateral Trade Elasticities", *Review of Economics and Statistics*, Vol. 72, Pp. 70-77.

Orcutt, G.H. (1950), "Measurement of Price Elasticities in International Trade", *Review of Economics and Statistics*, Vol. 32, Pp. 117-132.

Perroni C. and J. Whalley (1996) "How Severe is Global Retaliation Risk Under Increasing Regionalism?" *American Economic Review*, May, Pp. 57-61.

Piggott, J. and J. Whalley (1985). UK Tax Policy and Applied General Equilibrium Analysis, Cambridge: Cambridge University Press.

Shoven, J.B. and J. Whalley (1992), Applied General Equilibrium, Cambridge: Cambridge University Press.