

**T**he impacts of Vietnam's  
accession to the WTO on  
income distribution using a  
general equilibrium framework

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### Key to symbols used in tables

- n.a. not applicable
- .. not available
- zero
- . insignificant

### Abbreviations

APEC	Asia Pacific Economic Cooperation
ASEAN	Association of South East Asian Nations
CGE	computable general equilibrium
CPI	Consumer Price Index
EU	European Union
EV	equivalent variation
FDI	foreign direct investment
VLSS	Vietnam Living Standards Survey
VND	Vietnamese dong

## The impact of Vietnam's accession to the WTO on income distribution

Vietnam is finally integrating into the world economy. It has established trade agreements with about 60 countries and trade relations with some 150, and foreign direct investment (FDI) from some 60 countries is flowing into it. Vietnam also signed a preferential trade agreement with the European Union (EU) in 1992, and obtained Association of South East Asian Nation (ASEAN) membership in June 1995 and Asia Pacific Economic Cooperation (APEC) membership in 1998. The US–Vietnam bilateral trade agreement signed in July 2000 has been in effect since 2002, and Vietnam has already applied for WTO membership, for which negotiations are expected to intensify from 2002 onwards. One of the government's major concerns, however, is how WTO accession will affect Vietnam's economy and particularly income distribution. This paper addresses this concern by using a computable general equilibrium (CGE) model of the Vietnamese economy to quantify the income distribution impacts of a tariff reduction of up to 5 per cent, which is consistent with common WTO commitments.

Lower tariffs mean cheaper prices for goods, which undoubtedly have a positive impact on real incomes for some households. Removal of price distortions caused by tariff barriers also changes the structure of the economy, resulting in a more efficient allocation of resources. This reallocation influences the activity level of various industries, with some industries expanding production and others contracting. Because industries differ in terms of their cost structure (for example, capital-intensive or labour-intensive—see Appendix Table A3) and employ different combinations of different types of labour, the effects of policy changes on the labour and capital they employ (and ultimately their return to factors) are usually not the same. Tariff reduction thus impinges on household income via factor incomes, and the net effect of tariff reduction on a particular household group is a priori ambiguous.

On the demand side, households adjust their consumption basket according to changes in their total income and in relative commodity prices. Adjustments in household demand for consumption goods and producer demand for intermediate inputs gives rise to second-round effects, which affect the supply side.

Across-the-board tariff reductions would significantly affect government tariff revenue, which presently constitutes a significant proportion of total government revenue: 24.21 per cent in 1996 (World Bank 1998:Table 5.2b). But again the final outcome is ambiguous. Tariff reduction will result in government tariff revenue losses if import volumes remain unchanged, however cheaper prices for imported goods generally lead to higher demand for imports, which leads to additional tariff revenue. The final outcome depends on the net effect. Because around 75 per cent of duty is collected from items attracting tariff rates above 20 per cent (Centre for International Economics 1997), it is more likely that in the short to medium term government revenue associated with the implementation of WTO commitments will decline (Donovan and McCarty 1997; Ministry of Finance 1998).

Government revenues are needed for the provision of public goods, which the private sector is unable or unwilling to supply, but which are essential to national development. Government revenue losses, therefore, may have to be made up in some other way. This is consistent with the government's efforts to reduce or at least keep its fiscal deficit from growing over the past decade (World Bank 1995).

There are several alternatives for the financing of government deficits, such as raising direct or indirect tax rates, domestic non-bank borrowing, money creation, and external borrowing or aid. Direct taxation is reasonably neutral, since its adjustment does not mask the impact of tariff reductions, provided the taxes are broadly based. As in most other developing countries, however, direct taxation in Vietnam faces difficulties, including a very thin base due to generally low personal incomes and the limited administrative capability of taxation authorities, resulting in a negligible contribution to government revenue. Domestic non-bank borrowing is often used to meet 'one-off' financing needs. Money creation may well have complicated implications for investment and output, for the balance of payments, for inflation and for other government revenue (Ahmad and Stern 1989).

This paper examines the impact of tariff reduction in association with government policy alternatives for offsetting the undesirable effects the induced changes in economic activities will have on government deficits. The policy alternatives examined are indirect taxation and external borrowing, since these are the most feasible policies under Vietnamese conditions.

### **Major features of the CGE model for Vietnam**

The CGE model for Vietnam used in this study was developed by Pham Thi Lan Huong (2000). The theoretical structure of the model is very similar to that of the ORANI model of the Australian economy (Dixon, Parmenter, Sutton and Vincent 1982). The model covers 31 single-commodity industries, with its database relying upon a 1996 input-output table (General Statistics Office 1999), data from the Vietnam Living Standards Survey (VLSS), and various other published and unpublished data. The specific features of the current policies and issues examined determine the industry disaggregation adopted. Labour-intensive and protected capital-intensive industries are separated. Agriculture, a significant sector employing 70 per cent of the national workforce, is divided into six industries, with rice cultivation standing as a separate industry because of its importance in the agricultural sector and its significant contribution to exports.

Producers are assumed to be competitive and efficient. Because of the assumption of constant returns to scale and perfect competition, zero pure profit equations imply that the total value of the output of an industry must be equal to the total value of inputs used to produce this output. All markets (except for labour) are cleared in the model by matching supply with demand. A small open economy assumption is adopted for the model, since Vietnam has no power to affect world prices. There are four major agent groups in the economy: producers, households, government and the rest of the world.

The model contains three household categories, distinguished by per capita expenditure with urban and rural separation, forming six household groups. Labour is disaggregated into four types: farm self-employed, non-farm self-employed, wage-earner unskilled labour and wage-earner skilled labour.

Land in Vietnam is state owned. The government, however, has allocated land-use rights on agricultural and forestry land to rural households and, in return, receives land tax revenue, presumably payment for using land, or in other words land income. Tax rates, however, are moderate, at approximately 10 per cent of gross output (Che Tuong Nhu 1997; Socialist Republic of Vietnam 1993), thus farmers can share land income after paying the tax to the government. Land rentals in the model therefore only cover land income accruing to households, while government income from land is included in tax revenues.

Capital in Vietnam is not owned solely by the private sector. The government not only provides public goods but also participates in businesses, which are predominantly in capital-intensive industries and accounted for around 60 per cent of total capital in the national economy in 1994 (General Statistics Office 1998). In the model, capital is supplied from two sources: private households and the government.

## Policy experiment

### Description

Vietnam's 1996 tariff structure explicitly restricts the import of consumer goods and encourages the import of intermediate and investment goods (Table 1). Generally, lower tariffs (less than 10 per cent) apply to raw materials and investment goods, while higher tariffs apply to consumer goods. Further discrimination against final consumption can be seen in tariff differentiation by end use of identical goods.

This special feature of Vietnam's tariff structure clearly benefits import-competing industries by creating higher effective protection rates. The model captures this by introducing two types of tariffs, first a tariff applied to all imported goods notwithstanding destination of use, second a tariff imposed specifically on final consumption goods on top of the first. The distinction between these two types of tariff helps to define the impact of policies better than the use of only one tariff type, which would blur industry protection, especially when it comes to the dismantling of tariff barriers.

In the simulations, tariffs are reduced to 5 per cent for all commodities except tobacco, beverages, and transport vehicle industries, which are subject to exclusion. To simulate the tariff reduction to 5 per cent, the first type of tariff is decreased from its original level to 5 per cent, and the second type of tariff is reduced to 0 per cent, so that tariffs on all goods regardless of their destination of use are 5 per cent. The government may redistribute the deficit arising from the tariff cuts either by an across-the-board increase in indirect tax rates or by an external source.

## Closure and other assumptions

### Macroeconomic closure

Because this paper focuses on the distributional impact of tariff reductions on household income and consumption, and because the model is static, macroeconomic closure has to be chosen so that it allows all the effects to be fully imposed on household income and consumption and does not permit seepage to other areas. Thus, the trade account is assumed to be fixed exogenously to ensure that potential benefits from positive net exports do not go to foreigners, or that the surge in household consumption is not financed by overseas sources. Household savings rates are fixed to ensure that households keep the same pattern of consumption and saving on any additional income, and that households do not borrow from the past or future for current consumption. The change in the nominal government budget is held to zero by either an exogenous across-the-board change in all indirect tax rates, or foreign capital flow. Investment, as defined in the national income accounting identity, equals

$$I = S_h + S_g + S_f,$$

Table 1 Vietnam's tariff structure, 1996 (per cent)

Industry	Nominal rate on consumer goods	Nominal rate on others <sup>a</sup>
Rice	13.36	12.34
Other crops	9.18	8.48
Livestock	6.86	6.33
Agricultural services	-	-
Forestry	24.69	22.81
Fishing	11.55	10.67
Crude oil and natural gas	19.94	42.27
Other mining and quarrying	-	11.53
Tobacco, alcohol, other beverage	44.54	17.47
Sugar	9.11	9.11
Other food processing	10.99	5.20
Textile garment and leather	23.59	3.09
Paper and products	17.37	7.15
Cement	21.36	21.36
Fertiliser and pesticides	12.04	12.04
Other chemical products	12.47	10.98
Petroleum and lubricants	-	9.19
Manufacture of ferrous metal	-	8.83
Transport vehicles	42.11	9.41
Other equipment and machinery	21.21	5.50
Electrical and electronic products	19.58	7.61
Other manufacturing	40.35	4.08
Electricity and gas	7.08	7.08
Water	-	-
Construction	-	-
Trade and freight transport	-	-
Communication	48.36	48.36
Finance, banking insurance	9.48	9.48
Public administration, education and health	7.37	7.37
Personal, household and community services	20.97	20.97
Other services	14.87	14.87

<sup>a</sup>Intermediate inputs and capital goods.

**Source:** Author's calculation from model database, compiled from General Statistical Office (GSO), 1999. *Bang Can Doi Lien Nganh San Xuat Va Su Dung San Pham (I/O) Cua Viet Nam* (Input-Output Table for Vietnam), Statistical Publishing House, Hanoi; State Planning Committee (SPC) and General Statistical Office (GSO), 1994. *Vietnam Living Standards Survey 1992-93*, Hanoi; Centre for International Economics (CIE), 1997. *Vietnam's Trade Policies 1997*, World Bank Trade Policy Mission, Canberra and Sydney:38.

implying that investment is financed by exogenously fixed government savings ( $S_g$ ) and foreign savings ( $S_g$ ), and is consequently determined by household savings ( $S_h$ ). This macroeconomic closure ensures that all the potential benefits from trade liberalisation turn into current household consumption.

### Other closures and assumptions

This paper examines the impact of the tariff reduction after allowing for the full effects of commodities and primary factors on demand, supply and prices, and on production and consumption, such that the economy reaches a new equilibrium. However, it is assumed that the time period involved is too short for the economy to adjust each industry's capital stock. This is the basis for the assumption that industry capital remains unchanged.

The supply of aggregate skilled labour is fixed, but it is perfectly mobile across all the industries. The remaining types of labour are in unrestricted supply at the given nominal wage rates, one of which serves as the numeraire for the model. The exchange rate is endogenised in order to balance the trade account.

### Tariff reduction and associated indirect taxation

This section analyses the potential outcomes of tariff reductions accompanied by across-the-board increases in all indirect taxes on intermediate inputs, capital goods and final consumption (excluding trade taxes). In fact, this is what happened in 1996, when duty rates on some commodities were reduced at the same time as special sales taxes (a type of indirect taxation) were applied (Centre for International Economics 1998; Kokko 1997).

Table 2 Indirect tax rates by commodity (per cent)

Commodity	Base-year tax rate	Increased tax rate
Rice	2.8	3.8
Other crops	0.6	0.9
Livestock	0.1	0.2
Agricultural services	2.2	3.0
Forestry	7.1	9.6
Fishing	2.2	2.9
Crude oil and natural gas	18.5	25.1
Other mining and quarrying	3.9	5.3
Tobacco, alcohol, other beverage	30.1	40.9
Sugar	2.3	3.1
Other food processing	2.7	3.7
Textile garment and leather	3.8	5.2
Paper and products	1.5	2.1
Cement	11.6	15.7
Fertiliser and pesticides	2.1	2.8
Other chemical products	2.8	3.9
Petroleum and lubricants	0.5	0.6
Manufacture of ferrous metal	0.9	1.3
Transport vehicles	1.3	1.7
Other equipment and machinery	1.0	1.4
Electrical and electronic products	2.2	3.1
Other manufacturing	3.7	5.0
Electricity and gas	5.1	6.9
Water	1.5	2.0
Construction	3.0	4.1
Trade and freight transport	0.0	0.0
Communication	35.9	48.8
Finance, banking insurance	5.1	7.0
Public administration, education and health	0.8	1.1
Personal, household and community services	11.2	15.2
Other services	3.6	4.9
Weighted average tax rate	3.5	4.8

**Source:** Author's calculations from model database, compiled from compiled from General Statistical Office (GSO), 1999. *Bang Can Doi Lien Nganh San Xuat Va Su Dung San Pham (I/O) Cua Viet Nam* (Input–Output Table for Vietnam), Statistical Publishing House, Hanoi; State Planning Committee (SPC) and General Statistical Office (GSO), 1994. *Vietnam Living Standards Survey 1992–93*, Hanoi.



Even if all the tax rates are raised by the same proportion (36 per cent), different base-year tax rates will induce changes in commodity prices (Table 2), thus altering demand for goods. An increase in indirect taxation will therefore be conducive to another type of distortion. Dixit (1985), however, has argued that indirect taxes are generally preferred to tariffs because the latter distort the allocation of resources in favour of the domestic production of the good under tariff, whereas the former are neutral in relation to both domestic and imported goods.

Simulation results of the tariff reduction to 5 per cent and across-the-board increases in indirect tax rates are presented in Tables 3–5. The discussion below first focuses on the effects of tariff reduction alone, then looks at the combined effects of tariff reduction and increased indirect taxation.

### **Production impact**

The change in industry output due to tariff reductions is determined by the initial level of protection, the net effect of tariff reduction on industry costs, the destination of sales combined with the price elasticity of demand and expenditure elasticity of consumption, and the capacity of the industry to respond to the change. These factors are related to the output sales structure, expenditure and price elasticities, and export elasticities and industry short-run elasticities, which are given in Table A1 and Table A2 in the appendix.

The tariff reduction leads to lower imported input prices, which are passed on to output prices. Without an increase in indirect taxes, the output prices of all industries fall, though not uniformly, since these prices depend on the cost structure of each industry as well as the overall tariff structure. Less protected industries, for example crops other than rice, livestock, petroleum and lubricants, and other chemical products, are able to expand, having been quite efficient even before the tariff cut. The benefits of cheaper inputs outweigh the adverse effects of a relatively small tariff cut, and that helps these industries make their products more competitive. They are able to expand their production by hiring more farm/non-farm and unskilled labour at the fixed wage rates and to attract additional skilled labour and land from the highly protected industries.

Not all industries benefit from trade liberalisation. Significant tariff reductions tend to cause households and producers to substitute imported goods for domestic goods. Consequently, while the tariff cut in the model leads to real growth of 4.3 per cent (Table 4), it also leads to the contraction of highly-protected households and import-competing industries with aggregate imports such as forestry, communications, electronic goods, cement, steel and equipment (Table 3). These are the industries that suffer most from tariff reduction. The tobacco and beverages industry, though continuing to have high protection, is not able to grow because its products are subject to a high ad valorem tax rate (30.1 per cent), which goes up to 40.9 per cent under government revenue-raising policy. In addition, 86.4 per cent of its outputs are sold for household consumption, which tends to be quite income and price-inelastic with respect to tobacco and beverages.

Industries such as petroleum and lubricants, which used inputs with relatively high tariff rates before trade liberalisation, enjoy substantial reduction of their input costs. Consequently, the output (basic) prices decrease relatively more than for other industries. The output of the petroleum and lubricant industry is an important input for freight transport, agriculture, mining, construction and many other industries, many of which also expand significantly. This relationship helps the petroleum and lubricants industry increase production substantially.



Table 3 **The effects of tariff reduction on domestic production: the indirect taxation experiment**  
(percentage change)

Industry	Domestic		Exports	Imports	Land use	Total	Labour use			
	output	price					Farm	Non-farm	Unskilled	Skilled
Rice	0.2	-0.1	2.8	10.7	-0.6	0.3	0.3	n.a.	0.3	0.3
Other crops	2.9	0.5	9.4	4.8	2.3	3.2	3.2	n.a.	3.2	3.2
Livestock	0.8	0.2	7.9	2.1	n.a.	0.9	0.9	n.a.	0.9	0.9
Agricultural services	0.5	0.5	n.a.	-4.4	n.a.	0.6	0.6	n.a.	0.6	0.6
Forestry	-4.5	-0.7	4.1	37.8	-5.3	-4.6	-4.6	n.a.	-4.6	-4.6
Fishing	0.2	0.5	1.2	10.0	-0.4	0.4	0.4	n.a.	0.4	0.4
Crude oil and natural gas	0.1	1.0	0.4	32.1	n.a.	0.4	n.a.	0.3	0.3	0.4
Other mining and quarrying	0.1	0.3	6.9	8.7	n.a.	0.2	n.a.	0.2	0.2	0.2
Tobacco, alcohol, other beverage	-2.5	-0.2	12.8	-3.2	n.a.	-4.9	n.a.	-4.9	-4.9	-4.9
Sugar	3.2	0.5	11	6.5	n.a.	6.2	n.a.	6.2	6.2	6.2
Other food processing	0.1	0.7	3.1	8.8	n.a.	0.1	n.a.	0.1	0.1	0.1
Textile garment and leather	-1.6	0.8	4.5	13.0	n.a.	-2.3	n.a.	-2.3	-2.3	-2.3
Paper and products	-1.3	0.4	6	2.1	n.a.	-2.0	n.a.	-2.0	-2.0	-2.0
Cement	-3.4	-0.4	14	17.8	n.a.	-6.3	n.a.	-6.3	-6.3	-6.3
Fertiliser and pesticides	-2.8	-1.5	16	2.0	n.a.	-5.2	n.a.	-5.2	-5.2	-5.2
Other chemical products	2.4	-0.7	39	3.0	n.a.	3.6	n.a.	3.6	3.6	3.6
Petroleum and lubricants	9.7	-7.0	n.a.	-	n.a.	30.6	n.a.	30.6	30.6	30.6
Manufacture of ferrous metal	-3.1	-1.2	19	0.1	n.a.	-5.5	n.a.	-5.5	-5.5	-5.5
Transport vehicles	3.1	0.3	7	0.6	n.a.	3.6	n.a.	3.6	3.6	3.6
Other equipment and machinery	-4.4	-0.3	13	3.6	n.a.	-5.6	n.a.	-5.6	-5.6	-5.6
Electrical and electronic products	-6.6	-0.7	14.4	4.5	n.a.	-9.3	n.a.	-9.3	-9.3	-9.2
Other manufacturing	-1.6	0.3	6.6	9.0	n.a.	-2.4	n.a.	-2.4	-2.4	-2.4
Electricity and gas	-0.6	0.0	n.a.	-24	n.a.	-1.2	n.a.	-1.2	-1.2	-1.2
Water	-0.3	0.3	n.a.	-10.9	n.a.	-0.7	n.a.	-0.7	-0.7	-0.7
Construction	-0.7	0.3	n.a.	-17.9	n.a.	-1.0	n.a.	-1.0	-1.0	-1.0
Trade and freight transport	1.6	0.6	n.a.	-0.7	n.a.	2.3	n.a.	2.2	2.2	2.3
Communication	-4.6	1.8	-8.0	-1.3	n.a.	-7.2	n.a.	-7.2	-7.2	-7.2
Finance, banking insurance	0.4	0.7	1	-0.8	n.a.	0.6	n.a.	0.6	0.6	0.6
Public administration, education and health	0.4	0.4	6	-0.3	n.a.	0.4	n.a.	0.4	0.4	0.4
Personal, household and community services	0.3	0.2	8	-1.9	n.a.	0.3	n.a.	0.3	0.3	0.3
Other services	-0.3	0.2	9	13.7	n.a.	-1.0	n.a.	-1.0	-1.0	-1.0
Economy-wide level	-0.1	n.a.	5.1	4.3	-	0.3	1.1	0.1	-0.8	-

**Source:** Author's calculations from model database

Furthermore, because export demand elasticities are considerably higher than domestic demand elasticities, exporting industries have more potential for increasing production. By the same token, the services sector, being non-tradable, has less chance of increasing production. Labour-intensive industries, having a more efficient supply response to changes in their output prices, also have good growth potential.

Among the four land-using industries, cultivation of crops other than rice is able to increase its output most, because it exports a large share of its products. It is more profitable for farmers

to grow crops such as coffee and cashew nuts, thus they tend to shift their land towards cultivation of these crops.

When the increase in indirect taxation is allowed, however, the outcomes are somewhat different. Some commodities bear a relatively higher tax rate than others in the base year (communication—35.9 per cent; tobacco, alcohol and beverages—30.1 per cent; crude oil and natural gas—18.5 per cent; cement—11.6 per cent; and personal, household and community services—11.2 per cent). Other goods are taxed within the range 0–5 per cent. While tobacco and beverages are consumed mainly by households, and crude oil is exported, the other three goods are used mainly for production. The increase in tax rates also turns the outputs of forestry, electricity and gas industries—which are used mostly as intermediate inputs (82 per cent and 86 per cent respectively)—into commodities that are more highly taxed than others. Thus, cascading effects are multiplied, increasing the distorting impact of indirect taxation.

Table 4 **The effects of tariff reduction on macro variables: a comparison between the indirect taxation and external borrowing experiments** (percentage change/billion VND)

Variables	Indirect	External	Gains <sup>a</sup>
Real GDP	0.43	2.80	2.37
Real private consumption	0.54	3.27	2.73
Real investment	0.32	1.71	1.39
Real government consumption	0.54	3.27	2.73
Real exports	5.09	8.09	3.00
Real imports	4.31	7.18	2.87
Aggregate capital stock	-	-	-
Employment	0.29	4.20	3.91
Government nominal tax revenues	1.41	-12.49	-13.90
From taxes on intermediates	34.56	1.31	-33.25
From taxes on investment goods	35.41	-1.77	-37.18
From taxes on consumption goods	32.63	0.96	-31.67
From export taxes	2.75	2.23	-0.52
From tariff of type 1	-35.02	-22.50	12.52
From tariff of type 2	-86.86	-45.67	41.19
CPI	-0.07	-2.24	-2.17
GDP deflator	0.06	-2.07	-2.13
Exchange rate (VND/foreign currency)	1.00	-17.29	-18.29
Aggregate equivalent variation (billion VND)	1251.00	4,508.00	3,257.00
Aggregate real wage	0.07	1.47	1.40
Skilled-labour real wage	-0.01	14.83	14.84
Land price	3.75	12.68	8.93
Agricultural output	0.76	2.85	2.09
Manufacturing output	-0.74	2.65	3.39
Service output	0.44	2.27	1.83
Total domestic output	-0.10	2.60	2.70
External borrowing (billion VND)	-	2,623.00	2,623.00
Tax shifter	36.00	-	-36.00

<sup>a</sup>'External borrowing' minus 'Indirect taxation'.

**Source:** Author's calculations from model database

Indirect taxation distorts prices and, subsequently, demand and supply in a way very similar to tariffs, the only difference being in their incidence. In general, increased taxes cause both producers and consumers to experience a greater dead-weight loss, they lead to reduced production of the taxed goods, and they unfavourably affect other industries that use the output of the highly taxed industries.

Hence, the effects of a tariff reduction are offset to some extent by higher indirect taxation. The tobacco, alcohol and beverages industry is hard hit by high taxes on its output. Other industries (forestry, textiles, garments and leather, cement, and communication) lose from both tariff reduction and indirect taxation. Agriculture and services enjoy growth, while manufacturing output declines because of its generally high levels of tariff protection and indirect tax rates before the tax reduction compared to agriculture and services. Consequently, the overall level of output drops slightly.

### **Impact on macro variables**

In general, trade liberalisation in association with indirect taxation has a positive impact on macroeconomic variables. As Table 4 shows, real GDP increases by 0.43 per cent, mainly thanks to the expansion of export-oriented industries, which are important generators of employment. On both the expenditure side and the income side of GDP, all components increase, with the exception of the exogenously fixed aggregate capital stock. In real terms, export growth (5.09 per cent) exceeds import growth (4.31 per cent). The tariff reduction outweighs the effects of the increase in indirect taxation, resulting in a relatively lower price level, which in turn contributes to an increase in real final consumption of 0.54 per cent. Because economy-wide employment goes up by 0.29 per cent and the aggregate real wage declines slightly, household labour income increases.

In order to maintain a balanced budget, total government revenue must rise to match increased government expenditure by 0.54 per cent. Government tariff revenue, however, the most important source of government revenue, declines by 35.02 per cent. This would adversely affect government revenue if it were not made up for fully by increased sales tax on intermediate inputs (34.56 per cent), capital goods (35.41 per cent) and final consumption (32.63 per cent).

### **Factor market impacts**

Tariff reduction and the associated indirect taxation affect changes in the employment of primary factors through changes in industry production cost structure. Factor market adjustments are based on the assumptions that industry capital stock is fixed, land and skilled labour are perfectly mobile, and supplies of the remaining types of labour are unlimited at fixed nominal wage rates. Expanding industries employ additional farm and non-farm unskilled labour, and withdraw skilled labour and land from the rest of the economy. With increased production, capital—being the only specific factor in the expanding industries—becomes relatively scarce and goes up in price. With contracting industries, on the other hand, labour employment and capital price fall. If an expanding industry is relatively labour-intensive, its expansion requires proportionally more fixed-wage-rate labour and less increasingly-expensive capital, thus its output price is bid up proportionally less than that of capital-intensive industries. That is, labour-intensive industries are able to increase production more than capital-intensive industries, however the modelled restriction on capital (that is, the assumption of its immobility among industries) is the very factor

that impedes labour-intensive industries from expanding further. It is expected that when the economy is able to shift capital stock to industries with the highest returns to capital (that is, when capital is perfectly mobile), the effect of the tariff reduction on labour employment, domestic outputs, exports and GDP will be more favourable.

As skilled labour tends to be employed more in capital-intensive and some service industries—most of which contract under trade liberalisation, while the net effect of tariff reductions and increased taxation on their overall output is slightly negative—the real skilled wage declines by 0.01 per cent. Additional labour employment comes from job creation in agriculture. Land being a perfectly mobile factor among expanding land-using industries, its price rises by 3.75 per cent.

### Distributional impact

Household income is affected by changes in farm, non-farm and unskilled labour employment, changes in the wage rates of skilled labour, and returns to land and capital. Another channel affecting real household income is the Consumer Price Index (CPI), which indicates both household consumption patterns and changes in consumer prices. A decline in the CPI for all household groups helps to improve their real income at a given nominal income.

The simulations project that tariff reduction leads to welfare improvement for most household groups (Table 5). The measure of equivalent variation (EV) per capita reveals that all rural households are better off after trade liberalisation. Income equality within rural household groups also improves, with the real income of the poorer household group rising more than that of the richer household group.

Agricultural industries (with the exception of forestry) enjoy the largest expansion, and this significantly improves farmer income. Manufacturing output, however, declines. Thus, larger gains accrue to the rural population than to urban households, narrowing the rural–urban income gap.

The small decrease in the labour income of the urban poor can be explained by the fact that this group is mainly employed in industries that do not expand (construction), expand slightly but do not require additional labour (unskilled and non-farm), or even weaken (other manufacturing, communication, and other services) because of trade liberalisation. The urban rich, who earn most of their income as skilled labour, suffer from the 0.13 per cent fall in the skilled real wage.

Table 5 **The effects of tariff reduction on household welfare: the indirect taxation experiment** (percentage change)

	Rural poor	Urban poor	Rural middle	Urban middle	Rural rich	Urban rich
Real labour income	0.69	-0.13	0.62	0.17	0.55	-0.07
Real farm	1.20	0.92	1.17	1.18	1.21	1.00
Real non-farm	0.16	-0.12	0.13	0.14	0.17	-0.04
Real unskilled	-0.68	-0.96	-0.71	-0.70	-0.67	-0.87
Real skilled	0.06	-0.21	0.04	0.04	0.08	-0.13
Real total income	1.25	0.13	1.00	0.30	0.76	-0.13
EV (million VND)	0.01	0.00	0.02	0.01	0.03	-0.01
CPI	-0.14	-0.03	-0.12	-0.12	-0.16	-0.05

**Source:** Author's calculations from model database

This fall outweighs increased income from farm labour, land and capital, meaning that the real labour income and total income of the urban rich decline slightly. Rising indirect taxes also adversely affect urban households more than rural households, since the former work mainly in manufacturing and services, which are unfavourably affected by generally higher taxes than in agriculture. The urban consumption pattern, where relatively more is spent on manufactures and luxury goods, also has a negative effect on urban real income, given the indirect tax rate structure. By and large, the urban dwellers benefit less from tariff reduction than rural dwellers in terms of both income and consumption.

The benefits of tariff reduction to households and producers are partially offset by the burden of increased indirect taxation. The 36 per cent across-the-board increase in tax rates redirects some consumers' and producers' surplus to the government. At the same time, however, it puts downward pressure on consumption and production, which to some extent offsets the positive effects of trade liberalisation.

### **Tariff reduction and external debt**

Instead of attempting to increase indirect tax revenue to make up the shortfall in its income, the government may choose to borrow from abroad, as it has already done in recent years (World Bank 1995). Borrowing from abroad does not immediately create distortions in the economy, hence it has a more favourable impact on macro variables, production and welfare. The government should exercise caution in this respect, however, since incurred debts always have to be repaid later, and this is not always easy. The model used here, however, does not address such issues.

Simulation results, outlined in Tables 4, 6 and 7, point to overwhelming overall benefits in the external borrowing experiment, with extra income boosting aggregate demand and bringing the economy to a new, higher level of welfare. The few undesirable effects are falling government revenue and substantially appreciating exchange rates.

### **Production impact**

In order to gain better insight into the effects of a tariff reduction coupled with external borrowing to make up for decreased government revenue, the effects of each are examined separately, then their combined effects are examined.

A tariff reduction by itself allows the economy to allocate its resources more efficiently. As discussed above, assuming capital immobility, unlimited labour supply at fixed real wages, and perfect mobility of skilled labour, the highly protected industries (forestry, cement, other equipment and machinery, electrical and electronic products, and communication) tend to lose. The less protected (petroleum and lubricant, livestock), export-oriented (other crops, textiles, garments and leather) and labour-intensive industries (agriculture, other food processing, textiles garment and leather, services), on the other hand, are likely to benefit. Industries that supply products for expanding industries, such as trade and freight transport, also have an incentive to increase production.

Now consider the effect of external borrowing by itself. External borrowing of 2,623 billion VND (0.9 per cent of the base-year GDP), without debt service, features in the model in a manner similar to that of foreign aid to the country. This phenomenon is referred to as a form of Dutch Disease (Corden and Neary 1982). It leads to a higher level of spending on services

**Table 6 The effects of tariff reduction on domestic production; the external borrowing experiment (percentage change)**

Industry	Domestic		Exports	Imports	Land use	Total	Labour use			
	output	price					Farm	Non-farm	Unskilled	Skilled
Rice	2.8	-0.3	0.8	15.4	0.2	3.7	3.8	n.a.	3.8	3.5
Other crops	3.4	-0.2	7.3	8.0	0.7	4.2	4.2	n.a.	4.2	4.0
Livestock	4.0	-1.7	18.8	2.8	n.a.	4.2	4.2	n.a.	4.2	4.1
Agricultural services	2.9	-1.4	n.a.	-0.1	n.a.	3.6	3.7	n.a.	3.7	3.5
Forestry	-1.1	-0.6	2.8	47.2	-3.5	-0.7	-0.7	n.a.	-0.7	-0.9
Fishing	1.9	0.4A	-0.6	14.3	-0.3	2.6	2.6	n.a.	2.6	2.4
Crude oil and natural gas	0.1	0.2	0.3	34.9	n.a.	0.2	n.a.	2.1	2.2	0.1
Other mining and quarrying	1.9	-0.7	8.3	10.5	n.a.	2.8	n.a.	3.1	3.1	2.7
Tobacco, alcohol, other beverage	2.7	-0.7	7.9	2.4	n.a.	5.6	n.a.	5.6	5.6	5.4
Sugar	4.0	-0.3	7.0	9.6	n.a.	7.7	n.a.	11.5	11.6	7.6
Other food processing	3.1	-0.6	7.3	10.7	n.a.	4.2	n.a.	4.3	4.3	4.1
Textile garment and leather	8.2	-0.7	15.6	19.2	n.a.	11.5	n.a.	11.6	11.6	0.3
Other chemical products	9.0	-2.2	57.0	6.9	n.a.	13.8	n.a.	13.8	13.8	13.6
Petroleum and lubricants	10.7	-7.1	n.a.	2.6	n.a.	33.5	n.a.	38.2	38.3	33.3
Manufacture of ferrous metal	-0.3	-2.5	23.0	2.1	n.a.	-0.6	n.a.	-0.6	-0.6	-0.7
Transport vehicles	6.4	-1.1	12.0	3.0	n.a.	7.6	n.a.	11.4	11.4	7.4
Electrical and electronic products	-2.5	-2.3	23.1	6.6	n.a.	-3.5	n.a.	-3.4	-3.4	-3.6
Other manufacturing	2.7	-1.5	16.2	10.0	n.a.	4.0	n.a.	4.1	4.1	3.9
Electricity and gas	2.7	0.6	n.a.	4.0	n.a.	5.1	n.a.	8.9	8.9	5.0
Water	2.2	0.2	n.a.	2.0	n.a.	4.3	n.a.	8.0	8.1	4.2
Construction	0.1	-1.8	n.a.	-1.8	n.a.	0.1	n.a.	0.7	0.7	-
Trade and freight transport	4.9	-1.1	n.a.	0.3	n.a.	7.0	n.a.	7.1	7.1	6.9
Communication	-2.4	1.5	-13.0	3.8	n.a.	-3.7	n.a.	2.6	2.6	-3.8
Finance, banking insurance	-6.2	3.5	-11.0	4.5	n.a.	-9.3	n.a.	-0.3	-0.3	-9.3
Public administration, education and health	1.2	3.4	-28.0	5.3	n.a.	1.3	n.a.	9.2	9.2	1.2
Personal, household and community services	4.8	-1.6	17.0	0.6	n.a.	5.4	n.a.	5.5	5.5	5.2
Other services	1.3	-0.5	6.0	17.2	n.a.	3.8	n.a.	3.9	3.9	3.6
Economy-wide level	2.6	n.a.	8.1	7.2	-	4.2	3.6	5.8	4.3	-

**Source:** Author's calculations from model database

**Table 7 The effect of a tariff reduction on household welfare; the external borrowing experiment (percentage change)**

	Rural poor	Urban poor	Rural middle	Urban middle	Rural rich	Urban rich
Real labour income	4.19	5.29	5.06	5.42	5.61	6.80
Real farm	3.51	3.19	3.55	3.37	3.64	3.61
Real non-farm	5.73	5.39	5.77	5.58	5.85	5.83
Real unskilled	4.23	3.90	4.26	4.08	4.36	4.33
Real skilled	14.75	14.38	14.79	14.58	14.88	14.86
Real total income	3.45	5.22	4.71	5.29	5.46	6.15
EV (million VND)	0.02	0.04	0.06	0.08	0.17	0.30
CPI	-2.15	-1.92	-2.24	-2.01	-2.23	-2.27

**Source:** Author's calculations from model database



consumed by the government, that is public administration, education, health, and various other services—the so-called spending effect. These government services are essentially non-traded, their price for the most part determined domestically. Increased government demand for non-traded goods raises their prices, causing the real exchange rate—measured by the price of foreign currency in terms of the domestic currency—to appreciate by 17.29 per cent, increasing the current account deficit.

When the effects of both tariff reduction and external borrowing are combined, the appreciation of the exchange rate raises export prices, making Vietnam less competitive internationally and slowing the growth of export-oriented industries. On the other hand, both tariff reduction and external borrowing reinforce the movement of the factors that are mobile across industries, that is skilled labour and agricultural land. Expanding industries hire additional farm, non-farm and unskilled labour at the fixed real wage rates and take skilled labour and land from the rest of the economy. This raises the real wage of skilled labour by 14.83 per cent, rental on land by 12.68 per cent (Table 4), and rental on capital specific to these industries relative to others. However, because of the small share of skilled labour income in economy-wide labour income (10 per cent) and the extremely high concentration of skilled labour in the government spending sector—public administration, education and health (around 70 per cent of total skilled labour)—the adverse impact of the movement of skilled labour on the rest of the economy is negligible. The finance, banking and insurance industry faces the largest contraction caused by this resource movement effect, because it hires 11.55 per cent of total skilled labour (more than one-third of skilled labour outside the public administration sector).

In the external borrowing experiment, with the exception of the finance, banking and insurance industry, all industries grow (whereas in the indirect tax experiment import-competing industries contract)—and grow at higher rates, thanks to the external finance flowing into the economy. Even highly protected industries gain, though to a lesser extent, because the income effect (which increases domestic demand for their products) outweighs the price effect (which causes domestic demand to shift away from domestic products to cheaper imported goods). All three sectors (agriculture, manufacturing and services) keep closer pace with one another than in the indirect tax experiment.

### **Macroeconomic impact**

As outlined in Table 4, all macroeconomic indicators in the external borrowing experiment are more favourable than in the indirect taxation experiment. Increases in household consumption, government consumption, and net exports in real terms result in real GDP growth of 2.8 per cent. The driving force behind GDP growth now, however, is final consumption, induced by a 3.36 per cent increase in aggregate nominal labour income. A tariff reduction without the distortion caused by indirect taxation significantly lowers the GDP deflator and the CPI, by 2.07 per cent and 2.24 per cent respectively, while the aggregate real wage level goes up by 1.47 per cent because of the surge in the skilled labour real wage.

### **Factor market impact**

As Table 6 shows, employment of farm, non-farm and unskilled labour increases by 3.6 per cent, 5.8 per cent and 4.3 per cent respectively. With the economy's overall high growth rate—although skilled labour and land are in fixed supply—their mobility and their intensive use in



expanding industries lead to an increase in the skilled labour real wage of 14.83 per cent and an increase in land price of 12.68 per cent. Because capital stock is fixed, rates of return to capital differ among industries, for example expanding industries enjoy higher rates and so on.

### **Distributional impact**

The extra income flowing to the economy contributes to the improvement of household welfare. The welfare of all household groups, as measured by EV, goes up more than in the indirect tax experiment. The effects on income distribution in this experiment, however, are reversed, because a higher increase in the real wage of skilled labour relative to growth of employment of farm, non-farm and unskilled labour results in a larger gain accruing to households that derive the majority of their income from skilled labour. Although all household groups are better off, the larger gains accruing to the richer household groups (many of whom work as skilled wage earners) and the higher level of employment creation for non-farm income reduce income equality between and within rural and urban households. Current government expenditure policy benefits urban dwellers more than rural dwellers in the sense that urban dwellers enjoy more government services and employment opportunities in the government sector, which is located mainly in cities, however all this comes at the cost of an external debt burden.

The last column in Table 4 summarises the major gains and losses brought about by external borrowing as compared to increased indirect taxation. In the external borrowing experiment, the economy gains significantly in terms of output, employment and final consumption, resulting in a considerably higher welfare level, but at the cost of reduced government revenue, mounting foreign debts, and decreasing national competitiveness through exchange rate appreciation. The indirect taxation experiment secures government revenue in such a way as to not increase the national external debt, but the economy, output, employment and final consumption benefit less from tariff reduction in this case.

### **Conclusion**

This paper has examined the impact of a reduction in all of Vietnam's tariff rates to 5 per cent in association with two alternative instruments to make up for tariff revenue losses, that is an increase in indirect taxation and external borrowing. The simulation results point to overall welfare improvements under both scenarios.

In the first experiment, raising indirect tax rates to make up for government revenue losses resulted in another distortion, though one less discriminating than tariffs. Consequently, the economy grew at a slower rate, and households gained less from trade liberalisation. Some benefits from tariff reduction were transferred within the economy from households and producers to the government in the form of indirect taxes. Rural households gained relatively more than the urban population in terms of both income and price effects, narrowing the gap between urban and rural incomes. Income equity among rural household groups was also improved. The largest adverse impact of indirect taxation was a slight decrease in the real income of the rural rich household group.

In the second experiment, thanks to external sources, the economy and all groups of households reached a higher level of welfare. However, these favourable outcomes should be treated with caution since they did not take into account debt service obligations. Because of the

nature of government funding, urban and richer household groups gained more, thus income equity between and within the rural and urban populations would deteriorate.

The two simulations presented here can be thought of as showing two extremes. On the one hand, distorting tariffs are replaced with distorting taxes. On the other hand, tariff revenue is replaced with essentially free foreign finance. Actual outcomes are likely to lie between the two extremes. While the government should be able to develop efficient ways of collecting taxes, it is unlikely that it will be able to obtain free foreign finance.

## Appendix

Table AI Sales structure of industry output, base year (percentages)

Industries	Sale to intermediate use	Sale to investment	Sale to households and government	Sale to exports	Total
Rice	88.9	-	9.2	1.9	100.0
Other crops	25.3	-	31.9	42.8	100.0
Livestock	10.8	0.5	81.8	7.0	100.0
Agricultural services	100.0	-	-	-	100.0
Forestry	82.0	-	16.3	1.7	100.0
Fishing	40.5	-	42.7	16.8	100.0
Crude oil and natural gas	0.6	-	-	99.4	100.0
Other mining and quarrying	78.9	-	2.5	18.6	100.0
Tobacco, alcohol, other beverage	8.5	-	86.4	5.2	100.0
Sugar	42.7	-	35.6	21.8	100.0
Other food processing	10.1	-	60.5	29.4	100.0
Textiles, garments and leather	20.3	-	12.8	66.9	100.0
Paper and products	70.2	-	14.1	15.7	100.0
Cement	95.3	-	-	4.7	100.0
Fertiliser and pesticides	89.3	-	-	10.7	100.0
Other chemical products	66.3	-	18.4	15.3	100.0
Petroleum and lubricants	76.1	-	23.9	-	100.0
Manufacture of ferrous metal	95.6	-	3.2	1.2	100.0
Transport vehicles	54.7	6.6	-	38.7	100.0
Other equipment and machinery	25.5	29.1	31.0	14.4	100.0
Electrical and electronic products	41.1	18.9	34.9	5.2	100.0
Other manufacturing	67.1	-	16.0	16.9	100.0
Electricity and gas	86.0	-	14.0	-	100.0
Water	63.9	-	36.1	-	100.0
Construction	4.0	96.0	-	-	100.0
Trade and freight transport	53.9	2.2	17.0	26.8	100.0
Communication	60.1	-	15.7	24.2	100.0
Finance, banking and insurance	35.0	-	16.5	48.5	100.0
Public administration, education and health	8.0	-	42.8	1.8	100.0
Personal, household and community services	8.5	-	55.5	13.3	100.0
Other services	29.2	-	50.8	17.6	100.0
Total	36.3	10.4	29.2	20.0	100.0

**Source:** Author's calculation from model database.

Table A2 Model major elasticities, base year

Industries	SR supply elasticities <sup>a</sup>	Income elasticities <sup>b</sup>	Average own-price domestic demand elasticities <sup>c</sup>	Export demand elasticities <sup>d</sup>
Rice	0.36	0.30	-0.19	-2
Other crops	0.42	1.17	-0.57	-10
Livestock	5.26	1.16	-0.61	-10
Agricultural services	2.26	1.11	-0.52	-10
Forestry	1.10	1.11	-0.52	-10
Fishing	0.27	1.16	-0.61	-10
Crude oil and natural gas	0.05	1.42	-0.66	-10
Other mining and quarrying	0.92	1.11	-0.52	-10
Tobacco, alcohol, other beverage	2.17	1.13	-0.57	-10
Sugar	5.40	1.17	-0.57	-10
Other food processing	7.54	1.17	-0.57	-10
Textiles, garments and leather	6.81	1.23	-0.63	-10
Paper and products	1.21	1.11	-0.52	-10
Cement	0.75	1.11	-0.52	-10
Fertiliser and pesticides	0.91	1.11	-0.52	-10
Other chemical products	2.46	1.11	-0.52	-10
Petroleum and lubricants	1.02	1.42	-0.66	-10
Manufacture of ferrous metal	2.69	1.11	-0.52	-10
Transport vehicles	2.05	1.62	-0.73	-10
Other equipment and machinery	1.98	1.37	-0.63	-10
Electrical and electronic products	1.55	1.37	-0.63	-10
Other manufacturing	1.33	1.11	-0.52	-10
Electricity and gas	0.63	1.42	-0.66	-10
Water	0.89	1.42	-0.66	-10
Construction	2.78	1.42	-0.66	-10
Trade and freight transport	1.29	1.62	-0.73	-10
Communication	0.65	1.62	-0.73	-10
Finance, banking and insurance	0.76	1.32	-0.63	-10
Public administration, education and health	18.68	1.32	-0.63	-10
Personal, household and community services	5.89	1.32	-0.63	-10
Other services	0.96	1.32	-0.63	-10

<sup>a</sup> Estimated by author from model database.

<sup>b</sup> Model parameters.

<sup>c</sup> Model parameters.

<sup>d</sup> Model parameters, adopted from other CGE models.

**Source:** Author's calculations from model database

Table A3 Selected cost shares, base year (percentages)

Industries	Domestic share in total intermediate costs	Share of intermediate inputs in total costs	Share of labour in total primary factor costs
Rice	51.54	32.34	78.00
Other crops	38.58	20.50	81.32
Livestock	81.51	40.83	95.05
Agricultural services	65.72	51.40	81.43
Forestry	65.72	21.25	77.35
Fishing	60.98	33.54	75.56
Crude oil and natural gas	84.00	15.38	30.24
Other mining and quarrying	67.77	75.90	69.85
Tobacco, alcohol, other beverage	71.82	61.35	49.52
Sugar	71.09	84.70	52.00
Other food processing	94.44	86.59	72.68
Textiles, garments and leather	55.49	73.71	72.09
Paper and products	66.96	85.68	64.20
Cement	78.91	64.32	53.00
Fertiliser and pesticides	53.50	80.49	54.20
Other chemical products	53.15	81.26	66.68
Petroleum and lubricants	31.58	75.95	34.10
Manufacture of ferrous metal	45.19	70.60	56.20
Transport vehicles	41.56	88.42	85.23
Other equipment and machinery	32.49	75.64	77.19
Electrical and electronic products	47.85	77.64	70.29
Other manufacturing	71.70	76.03	67.55
Electricity and gas	58.54	54.80	53.70
Water	74.63	69.24	50.80
Construction	68.21	70.03	68.38
Trade and freight transport	58.00	31.29	70.20
Communication	70.26	51.05	63.55
Finance, banking and insurance	62.45	28.90	65.08
Public administration, education and health	72.05	35.91	94.04
Personal, household and community services	55.59	31.45	89.07
Other services	72.92	35.29	34.83

**Source:** Author's calculation from model database.

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