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TRADE LIBERALISATION AND POVERTY DYNAMICS IN VIETNAM.

YOKO NIIMI, PUJA VASUDEVA-DUTTA AND ALAN WINTERS

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Poverty Research Unit at Sussex
University of Sussex
Falmer, Brighton
BN1 9SJ
Tel: 01273 678739
Email:pru@sussex.ac.uk
Website: http://www.sussex.ac.uk/Users/PRU

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1. Introduction

The link between trade liberalisation and poverty is one of the most contentious areas of debate within the development community. Some see the link as positive, with liberalisation begetting growth which in turn promotes poverty reduction, while others see the two as antithetical, pointing to the inevitable disruptions of rapid change. Both sides of the debate, however, rely more on theory, rhetoric and anecdote than on solid empirical research. This paper starts to redress the balance through a study of the recent trade liberalisation in Vietnam.

Winters (2000, 2002a) develops a conceptual framework for exploring the links between trade and poverty. In addition to the long-run effects operating through economic growth, he considers the static effects of trade shocks on households, directly via product and factor markets, and indirectly through changes in government revenues and social spending. The framework is intended not only to analyse past liberalisations, but also to permit economists and policy-makers to think through the possible effects of future ones. The current paper is intended to extend that process by exploring the poverty effects of Vietnam's trade liberalisation over the 1990s and asking, in particular, how well the framework would have performed if it had been applied to this case at the outset.

Vietnam is an ideal candidate for such a test in the sense that it has two surveys of substantially the same households in 1992-3 and 1997-8 – the Vietnam Living Standards Surveys.[1] Hence throughout the paper we focus on this five year period. In another sense, however, Vietnam is less than ideal. Since the start of the *doi moi* reforms in 1989 the Vietnamese economy has been undergoing a more or less continuous transition from a centrally planned socialist to a market-oriented economy. This process has, at times, been halting and confused and is certainly not yet complete - see, for example, van Donge, White and Nghia (1999). On the other hand, it seems to have had quite marked effects, being accompanied by high growth, macroeconomic stability and significant structural change. Thus a major challenge for research of this kind is to identify the international trade reforms that have actually occurred, separate them from other shocks and plot their transmission through to poor households.

[1] These surveys were carried out by the General Statistical Office and the Ministry of Planning and Investment, with financial assistance from the United Nations Development Programme (UNDP) and the Swedish International Development Agency (SIDA) and technical assistance from the World Bank.

Ultimately the most significant link quantitatively is the impact of openness on economic growth and hence on poverty. There is a strong presumption that liberalisation results in higher growth (see Winters (2002b) on this debate) and that economic growth relieves poverty (Dollar and Kraay, 2001). The practical problem in the present study is that a five year period is not long enough to distinguish between the various contributors to economic growth. Moreover, most of the critics of openness focus on the static effects felt via prices, wages and transfers, e.g. the lost livelihoods, so it is worth exploring these directly to see how significant they are.

The remainder of the paper reviews the reforms undertaken in Vietnam during the 1990s and analyses their impact on the Vietnamese economy. The next section describes the main reforms, especially with respect to trade and foreign investment, undertaken during the 1990s. Section 3 deals with the impact of these reforms on various macroeconomic indicators. In section 4, the mechanisms through which these macro-level reforms impact households are analysed using the framework provided by Winters. Section 5 explores the effect of trade liberalisation on poverty using the household survey data, estimating a multinomial logit model of the transition between poverty and non-poverty and certain related models. Section 6 concludes by asking how liberalisation appears to have affected poverty and, more directly, whether the maintained framework provides insight on the links between trade liberalisation and poverty.

2. The Reform Process: Trade and Investment Policy[2]

The process of 'economic renovation' or *doi moi* was set in motion in 1986 and gathered momentum in the early 1990s with the objective of transforming Vietnam from a centrally planned to a market economy. The core principles of this gradualist reform process were the provision of a legal and institutional framework for and encouragement of the private sector, movement towards an outward-oriented external policy, the replacement of administrative controls with economic incentives, and the promotion of agriculture through de-collectivisation and land reform (CIE, 1998, Kumssa, 1997).

An important facet of the renovation process was the complete turnaround of external sector policy from inward-oriented import substitution to outward-orientation. Before *doi moi* Vietnam's international trade was primarily with the CMEA countries[3] and was heavily regulated through

[2] This review draws on CIE (1998), Andersen (1994), Martin (2000) and CIEM (2001).

[3] The Council of Mutual Economic Assistance consisting of the former Soviet Union, Eastern European socialist countries and Cuba.

shipment-by-shipment licenses and import and export quotas; simultaneously the existence of multiple exchange rates implied that prices in Vietnam were often far removed from international prices (IMF, 1998).

Vietnam's major external sector reforms were in the following areas:

- The removal of constraints on trade outside the CMEA: By 1989 enterprises were allowed to export to the convertible area without necessarily having first to meet their export targets to the CMEA, and by 1993 all foreign transactions were in convertible currency.
- The rationalisation and unification of the exchange rate,
- The relaxation of import and export controls and a move towards a tariff based system of trade management,
- The relaxation of controls on entry into foreign trading activity and simplification of the licensing procedure,
- The initiation of an 'open door policy' to promote foreign investment and the creation of a legal framework to approve and regulate foreign direct investment (FDI), and
- Integration with the world economy via regional and multilateral trading agreements.

The multiple exchange rate system was unified in 1989 and successive devaluations generated a realistic exchange rate until the Asian crisis in 1997, which re-created the wedge between the official and market determined rate. Further changes included the opening of foreign exchange trading floors at the newly established State Bank of Viet Nam, the establishment of an inter-bank foreign exchange market in 1994, elimination of inward foreign exchange remittance tax in 1996, authorisation of forward and swap foreign exchange transactions in 1998, the lowering of foreign exchange surrender requirements from 80% to 50% in 1999 and further in 2000.

Trade policy reforms were a very important part of the Vietnamese renovation process. These included export promotion, the replacement of quotas by tariffs and the reduction of trade barriers. Export processing zones (EPZs) were established in 1990-91 and export incentives in the form of duty drawback schemes were extended between 1990 and 1994. There was a move away from quantitative barriers towards a tariff-based system in the 1990s. In 1995 export quotas were eliminated for all commodities except rice (for policy changes in the rice sector, see Niimi et al, 2003a) and import quota coverage was reduced to 6 goods (including petroleum products, fertilisers, cement, sugar, and steel). However, export taxes were raised on 11 products (including rice) in the same year. Temporary prohibitions were imposed between May and July 1997 on

imports of a wide range of consumer goods and an import stamp system was introduced as an anti-smuggling measure. By 1998 the management of imports of most consumer goods had shifted to tariffs rather than quotas or licensing although eight categories of goods remained under quantitative restrictions.

Customs tariffs were introduced in 1988 for the first time. A major reform was the introduction of the Harmonised System (HS) in 1992 and the publication of annual tariff schedules. The effective rate of protection for some industries is quite high since tariffs on inputs and capital goods tend to be quite low while tariffs on consumer goods are high. Though the maximum and average tariff rates have remained high to date (see Table 1)[4], and although the average tariff rates do not seem out of line with those in other developing countries, most of the items imported are in the high tariff bracket (between 30 and 60%), which generates the bulk of the state tariff revenues (CIEM, 2001).[5]

Similarly, the export tax structure is complex and suffers from frequent changes. In 1999 there were 12 rates of tax ranging from 0% to 45% with an average rate of 14%. The export tax on rice was reduced from 10% to 1% in 1991 but was changed a number of times before it was finally reduced to 0% in 1998. In addition, there have been several retrogressive measures in the form of rising export taxes, temporary prohibitions on imports of consumer goods, and other barriers introduced as anti-smuggling measures. Overall, both the import tariff and export tax systems are complex and suffer from frequent changes (CIEM, 2001), so that despite all the reforms, Vietnam's trade regime must be considered to remain quite restrictive and interventionist (International Monetary Fund, 1999).

[4] The increase in the tariff in 1999 and 2000, however, was primarily due to the conversion of some quantitative barriers into tariffs.

[5] These items include automobiles, home electric appliances, cement, plastics, rubber, paper, petroleum, steel, chemical products, livestock, meat products, seafood, dairy products, plants and plant products, edible vegetables and fruits, coffee, tea, cereal (including rice), edible oils, processed foods, beverages, tobacco, and cotton (CIEM, 2001).

Table 1: Indicators of Nominal Tariff in Vietnam, 1992-2000

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Share of tariff lines									
0 – 10%	68	66	66	66	64	63	63	59	60
Above 10 – 20%	15	14	13	13	12	13	12	10	9
Above 20 – 40%	15	15	16	16	18	18	19	21	21
Above 40%	2	5	5	5	6	6	6	10	10
(No. of tariff lines)	(2813)	(2967)	(2934)	(3023)	(3180)	(3126)	(3163)	(6056)	(6341)
Average rate [a)]	10.7	11.8	12.3	12.3	12.9	13.4	13.6	16.3	16.2
Maximum rate	120	150	200	200	100	200	60	100	100
Standard deviation	14.8	16.7	17.5	17.3	16.1	17.0	15.9	18.7	19.1
CIE standard deviation [b)]	138	141	142	140	124	128	117	115	118
Number of rates	26	31	35	34	30	35	28	12	19

Source: Extract from CIEM (2001:17).
Note: a) Simple average; b) The standard deviation of tariff rates as percentage of the mean of those tariff rates.

Private companies were first allowed to engage directly in external trade in 1990-91 and the licensing procedure for enterprises to engage in trade was progressively simplified during the decade. In 1998 the Ministry of Trade eliminated the requirement of licensing. This allowed foreign invested enterprises to export goods not specified in their investment license and domestic enterprises to export their production directly without an export/import license; however, companies' ranges of goods remained limited by the scope of the activities recorded on their business registration certificates.

Foreign direct investment has been actively encouraged ever since the adoption of the 'open door policy' in 1987. In 1992 the foreign investment law was amended to reduce the bias against joint ventures with respect to fully foreign owned enterprises and to introduce the build-operate-transfer concept for infrastructure projects. In 1995 all approval and regulation of FDI was placed under the control of the Ministry of Planning and Investment. For certain projects this decision was decentralised to selected peoples' committees and industrial zones in 1997. The publication of a guide to FDI regulations in 1998 introduced greater transparency into the system. At the same time various controls on the operation of foreign contracts in industries like textiles and garments were phased out.

Vietnam entered into a number of regional and multilateral trading arrangements during the 1990s. A trade agreement with the European Union (EU) in 1992 established an export quota on Vietnamese textiles and clothing in the EU market. Vietnam joined the Association of South East Asian Nations (ASEAN) and the economic Free Trade Area (AFTA) and became a GATT

observer in 1994. The lifting of the US embargo in the same year opened up the American market, traditionally the biggest market for most of Vietnam's neighbours when they were industrialising rapidly. Vietnam signed a Most Favoured Nation (MFN) agreement with Japan in 1999 and a similar bilateral trade agreement with the United States in 2000. By April 25 2000, Vietnam had concluded trade agreements with 57 countries and had further agreements for MFN treatment with about 72 countries and territories (VNER, 2000).

The trade and investment reforms were supplemented by far-reaching institutional changes that provided the foundation for a market economy. These included the encouragement of the private sector and establishment of legal basis for contract, banking and financial sector reforms, taxation reforms (introduction of value added tax (VAT) and company tax in 1999), the formulation of a labour code, establishment of economic courts, consolidation of property rights, land reform (allowing longer land leases to individual farmers and transfer rights on the leased land), and the rationalisation of state-owned enterprises (SOEs).

To summarise, Vietnam's engagement with the world economy increased strongly over the 1990s. At the same time it undertook dramatic reforms of both domestic and external policies. In principle it would be nice if we could unambiguously separate the effects of these two sets of policies. However, Baldwin (2002) for example, argues that it makes little historical or practical sense to consider trade reform without corresponding domestic reforms, and in this case we must admit considerable uncertainty about any attribution. In addition, the complexity of Vietnam's trade policy regime makes it very difficult to trace the effects of tariff and other policy changes on households, for one can never be completely sure what the binding constraints are. Hence for this paper we are thrown back on analysing outcomes - prices and quantities - rather than policies directly, in order to identify the impact of the trade liberalisation. Measures such as the openness of the Vietnamese economy have changed quite dramatically over the 1990s, so there is a reasonable presumption that the external sector will have had significant effects on poverty. Moreover, although we cannot trace precise chains, it seems reasonable to assume that the many changes in policy noted above have influenced the outcomes significantly. In what follows we clearly identify significant trade effects and it is perfectly reasonable to assume that at least a significant proportion of the trade shock originated in trade policy changes.

3. The Macroeconomic Impact of the Reforms Process

Despite their incompleteness, the impact of these reforms on the Vietnamese economy has been tremendous. The economy grew rapidly at approximately 7-8% p.a. between 1990 and 2000 (see Table 2), and over 5% even following the Asian crisis in 1997 (CIEM, 2001). Firm domestic credit policies, tight monetary policies and interest rate reforms stabilised the hyperinflation of the 1980s. The exchange rate has remained relatively stable after the rationalisation of the multiple exchange rate system and successive devaluations. By 1992, the margin between official and free market rate was virtually eliminated, although anecdotal evidence suggests the re-emergence of a 'grey' market in foreign exchange after the Asian crisis in 1997 (CIE, 1998).

Table 2: Selected Indicators of the Vietnamese economy

Indicator	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
GDP at constant 1994 prices (trillion.VND)	125.6	132.0	139.6	151.8	164.0	178.5	195.6	213.8	231.3	244.6	256.3	273.6
GDP growth (%)	4.7	5.1	5.8	8.7	8.1	8.8	9.5	9.3	8.2	5.8	4.8	6.8
Exchange rate (period average) (VND/USD)[1]	..	..	10,037	11,202	10,641	10,966	11,038	11,033	11,683	13,268	13,943	14,167
Exports (mn. USD)	1946	2404	2087	2581	2985	4054	5449	7256	9185	9360	11540	14308
Imports (mn. USD)	2566	2752	2338	2541	3924	5826	8155	11144	11592	11499	11622	15200
Trade balance	-620	-348	-251	40	-939	-1772	-2706	-3888	-2407	-2139	-82	892
Trade as % of GDP	..	63.1	50.9	51.9	52.4	60.6	65.4	74.7	73.9	70.5	79.9	..
CPI Inflation	..	67.1	67.6	17.5	5.2	14.5	12.7	4.6	3.6	9.2	0.1	-0.6
GDP Deflator annual%	82.57	42.10	72.55	32.63	14.33	14.54	19.48	6.14	12.13	8.94	..	..

Source: Calculations from GSO statistics; CIEM (2001); IMF IFS (2001) for exchange rate
Note: 1) We checked figures for the exchange rate against other sources, including official exchange rate data locally; the data in 1998 begins to show discrepancy between sources (as in 1991).

The reform process slowed down somewhat in the late 1990s. The largely demand-led growth in the early 1990s, in which the dominant force was the expansion of state-owned import substituting and non-tradable industries, proved unsustainable. The weaknesses in the Vietnamese economy, mainly in the large and inefficient SOEs and the financial sectors (CIEM, 2001), were beginning to become evident in the mid-1990s, and were compounded by the Asian crisis in 1997.

3.1. International Trade

The external sector reforms stimulated strong export growth for a number of commodities in which Vietnam apparently has a comparative advantage.[6] The share of trade in GDP increased from about 52% in 1992 to 71% in 1998 (GSO statistics).[7] Throughout the decade, imports were

[6] See Table 1 and 2 in Appendix I
[7] There are discrepancies in trade data between various sources, possibly due to the treatment of transit centres like Singapore, North Korea and Hong Kong (Apoteker, 1998). See Table 3 in Appendix I. IMF (1998, 2000), for example,

dominated by machinery and intermediate goods, which accounted for approximately 70% of total imports. This partly reflects the industrialisation of the Vietnamese economy, but also the structure of protection and the bias against imports of consumer goods (IMF, 1998, 2000).

The export commodity structure changed significantly over the 1990s. The contribution of agriculture, forestry and fisheries[8] to total exports fell steadily as did that of petroleum, being off-set by an increase in the share of handicrafts and light industrial goods (IMF, 1998, 2000). One of the most dramatic changes was in the opposite direction, however: pre-*doi moi* Vietnam was a net importer of rice, but by 1997 she was the world's second largest exporter of rice by volume (Minot, 1998), see below.

Despite the limited market access for its exports during most of the 1990s the textiles and garments sector was also one of the fastest growing export sectors with its share in total exports rising from 7.7% in 1992 to 15.5% in 1998 (IMF, 1998, 2000). By 2000, the combined exports of the textile and garments industry and the footwear industry were higher than those of the four chief agricultural exports – rice, coffee, rubber and marine products (CIEM, 2001). However, due to the backwardness of the textile industry and the weak resource base for raw materials, Vietnam's garment industry is highly import-intensive and Vietnam is a large net importer of textiles. The industry's average net trade ratio (NTR)[9] was broadly consistent throughout the period at approximately –0.75 for textiles and 0.89 for garments between 1990 and 1996 (Hill, 1998).

Various studies (Hill, 2000, Minot, 1998) suggest that the export success of the textiles and garments and food processing sectors was due to the broad *doi moi* reforms, not any industry-specific policies.

3.2. The Rice Sector

Since it figures prominently in the subsequent analysis, we briefly consider the rice market here. Niimi, Vasudeva-Dutta and Winters (2003a) discusses the sector in more detail. As in China, the shift from communal to household level decision-taking introduced by Resolution 10 of 1988 greatly increased the incentives to produce rice. At least some of incremental output appears to

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gives different figures from the GSO, although they tell the same sort of story in percentage terms of an increase in openness (from 60% to 90%).

[8] The chief agricultural exports in Vietnam are rice, coffee, rubber and marine products.

[9] The net trade ratio or NTR refers to the ratio of net exports to total trade (i.e., [X-M]/[X+M]).

have been used for home consumption and to have significantly improved child nutrition (Koch and Nguyen 2001), but much was also traded. Domestic prices were liberalised in 1989. Simultaneously, international trade in rice was liberalised with the result that exports boomed and prices rose.

It is difficult to divide credit for the improvement in the rice economy between the domestic and the trade policy reforms. Arguably, both were necessary. The domestic reforms clearly impinged more directly on farmers than did the trade reforms, but in the absence of the latter, which allowed Vietnam to operate in world markets, it is inconceivable that prices and quantities could both have increased so much. The existing distortions in 1988 may have held rice consumption off the demand curve, so that domestic liberalisation may have initially seen both prices and quantities rising, but eventually, if the domestic demand curve had not been supplemented by highly elastic foreign demand, price and quantity changes would have become negatively related.

An important related market is that for fertiliser – mainly urea, nearly all of which is imported. Vietnam maintained a regime of import quotas on fertiliser throughout the 1990s, varying them to preserve price stability rather than to protect producers (Nielsen, 2002). In this it was fairly successful. Over 1993-8, quotas varied between 1.3 and 1.85 million tons and the variance of the nominal Dong price of fertiliser (Mekong) was reduced to about 35% of that of the world price.[10] Nielsen notes, however, that average prices were significantly higher in Vietnam than on world markets, and so we interpret the19% fall in real fertiliser prices (i.e. relative to the CPI) between 1993 and 1998 as a significant and conscious trade liberalisation of the fertiliser market. Benjamin and Brandt (2002) make the same attribution.

3.3. Foreign Direct Investment

Vietnam's adoption of an 'open door' policy in 1987 led to large FDI inflows averaging 9% p.a. of GDP between 1993 and 1997. However, this inflow declined after the Asian crisis in 1997 as the bulk of it was from Asian countries and also, arguably, due to weaknesses in Vietnam's investment environment (IMF, 1999).

The data on FDI are weak, but the broad picture is that FDI is concentrated in high-cost, capital- and import-intensive industries where Vietnam has no comparative advantage and the majority is in the form of joint ventures with SOEs. There is, thus, a distinct import-substitution bias. 90% of

[10] Even in dollar terms Vietnamese prices varied only by about 40% of world prices.

exports of the enterprises established through FDI came from two sectors - oil & gas and food industry - where Vietnam has a comparative advantage, but the potential of footwear, garments and textiles, and the agricultural sector has not been tapped by foreign investment. In addition, the employment impact of these enterprises is low - the average FDI project in 1998 employed just 112 workers (IMF, 1999).

To summarise, "the foundation for Vietnam's success - and the core of the *doi moi* program - has been a combination of liberalization, stabilization, institutional changes, and some structural reform" (Kokko, 1997:1). The economic reforms generated high growth during the 1990s characterised by increasing exports and foreign investment, expanding private sector as well as state enterprise activity, and declining inflation. The relatively egalitarian distribution of land, the stress on agriculture during *doi moi* and the subsequent high growth of the economy suggest that the restructuring of the economy might have had a favourable impact on the poor in Vietnam. Glewwe, Gragnolati and Zaman (2000) find that, based on the World Bank poverty line, absolute poverty incidence declined during the 1990s from 58.1% to 37.4% between 1992-93 and 1997-98.[11] The next section traces the channels through which the trade reforms might impact poor households.

4. Trade Liberalisation and Poverty: An Empirical Application

Winters (2002a) develops a framework for exploring the links between trade liberalisation and poverty by considering its effect on the prices of tradable goods and then of these changes on household and individual welfare. In this framework, trade reforms and shocks trickle down to households via their direct effects on product and factor markets, and indirectly through changes in government revenues and social spending, all of which have implications for poverty.

This section looks at the microeconomic effect of the *doi moi* reforms in Vietnam discussed in the previous section in terms of the three channels of transmission – prices, employment and wages, and the fiscal channel (Winters, 2002a). The analysis focuses on changes between 1992-93 and 1997-98 because these are the two years that representative Vietnam Living Standard Measurement Surveys (VLSS) are available.[12]

[11]Justino and Litchfield (2002a) find that alternative poverty lines also imply strong declines in poverty.

[12] Both surveys are nationally representative and rich in data for the analysis of poverty and other microeconomic issues. While 4,800 and 6,000 households were surveyed in 1992-93 and 1997-98 respectively, over 4,300 households were covered in both surveys, which forms a panel data set. A study by Glewwe and Nguyen (2000) find that the panel

4.1. The Price Channel

Trade-induced price changes in product markets affect both the nominal and real incomes of households in their capacity as producers as well as consumers. The lowering of tariff barriers is likely to reduce the price of imported goods in the domestic market, and at the same time export liberalisation may lead to higher prices for exported goods. The direction and strength of these effects on real incomes depends on whether households are net buyers or net sellers of the products concerned (Winters, 2002a).

Vietnam's economy remains primarily agrarian, with 70% of employment still found there. Thus agriculture is a key sector for poverty analysis. Price liberalisation, de-collectivisation in agriculture and currency devaluation have had a huge impact on agricultural households and consumers since 1986. Even between 1993 and 1998, when the exchange rate was stable, the huge policy-induced development of Vietnam's export sector and import liberalisation would lead one to expect significant changes in the prices of some tradable commodities. Table 3 reports the proportionate changes in the real retail prices of the selected consumer goods and services that are available from GSO statistics.[13]

households also seem to be nationally representative. 89.6% of households from VLSS92-93 are questioned in VLSS97-98 as well and the remainder are randomly selected households.

[13] These figures need to be treated with some caution as most of the individual prices increase. The nominal prices were deflated by the CPI obtained from GSO, but the information on how the CPI was constructed is not available and needs further investigation.

Table 3: Price Movements 1993-1998 (Real Prices in Dong)

Consumer Goods/Services	*Change*
Mackerel	76.87
Vitamin C	40.40
Permanent wave	35.49
Sea shrimps	33.31
Fish sauce	32.53
Paddy	26.15
Spring rice	26.05
Salt	21.55
Beef topside	21.30
Glutinous rice	20.68
Haircut	16.50
Cotton fabrics	13.75
Supply water	13.65
Chicken carcass	11.80
Duck's eggs	10.76
Petrol	10.39
Papers	3.46
Fresh carp	0.90
Shelled nuts	0.37
Black beans	-0.69
Green beans	-1.95
Soya curd	-1.99
Glutamate	-3.24
Soya beans	-3.66
Pork	-4.03
Kerosene	-4.44
White sugar	-6.29
Electricity	-17.78
Vitamin B1	-18.17
Beer	-22.45
Photograph	-25.23
Woollens	-37.97
CPI (% Change)	**48.5**

Source: Calculations based on GSO statistics (provided by CIEM). Nominal prices deflated by official CPI index.

It is clear that Vietnam's leading export products such as rice and marine products saw relatively higher price increases during this period than did other products. Rice is the most important single source of income for the majority of Vietnamese households, accounting for about 30% of household income in 1998 (World Bank, 1999). As a result, changes in rice prices following liberalisation would have a significant impact on Vietnamese households.[14] Without further analysis, it would not be possible to insist that these price increases were due solely to trade liberalisation, but there seems very likely to be a strong trade component.

Although the price data are not available for coffee, which is another leading export commodity in Vietnam, secondary sources - e.g. Minot (1998) - support the favourable effect of liberalisation-induced price changes on producers. The increase in the number of coffee

[14] The welfare effects of these rice price changes are evaluated in Niimi et al (2003a).

processors and traders reduced coffee-marketing margins and improved the prices received by farmers. A survey of coffee farmers in the Central Highlands (the main coffee producing area in Vietnam) revealed that the average income of these farmers was about US$ 225 per capita which is about 25% higher than the national average income and 50% higher than the average rural income according to the GSO survey of households of 1994. However, these households are vulnerable to the considerable volatility of international coffee prices so some care must be taken about inference based on relatively short runs of data.

In contrast to their benefits for producers, price increases in consumer goods, especially rice, are bound to generate adverse effects on net consumers. According to our calculations based on the VLSS 92-93, rice on its own accounted for a 44% share in total food expenditure. The figure is even higher for poor households who appeared to spend 53% of their food expenditure on rice. In addition, rice alone comprises about 75% of the total calorific intake of the typical Vietnamese household (Minot and Goletti, 1998). Clearly rice prices will be a major determinant of poverty and deserve close attention.

Our work provides some of this, but because of the way in which, following the World Bank, we measure poverty we cannot provide an exhaustive study here. Poverty is officially defined relative to the cost of a standard consumption basket - 2,100 calories per day per head plus minimal non-food expenditures – so our categorisation of poverty status shows no variation according to household consumption patterns. Thus households that are for some reason atypically dependent on rice purchases (after, of course, allowing for household size and composition) are not represented as suffering any more from rice price increases than others. It is also worth reporting that the VLSS data on rice production, consumption, purchase and sale throw up a number of inconsistencies which make the identification of households' net and gross rice positions a little problematic. One of the major problems was that while a clear distinction was made between paddy and rice in the production and sales data in the VLSS 97-98, this was not the case for the VLSS 92-93. We therefore had to make a number of assumptions when using these data. Thus some caution is required in interpreting the results on rice. Finally, Irvin (1995) has suggested that the VLSS in 1992-93 was carried out during a period of abnormally low rice prices, so that net rice producers appear to be poorer in the initial position than they perhaps were according to permanent income.

4.2. The Employment and Wage Channel

The other major channel through which foreign shocks are transmitted to poverty is through the activities of enterprises, where we loosely think of enterprise as any organisation that employs non-family labour. The changes in product prices that accompany trade reform could lead to changes in the composition of output, and hence in the bundle of factors used in production. There are two ways that trade-induced changes in the factor market can affect households – through employment changes or through wage changes. If the labour supply is taken as fixed, as in standard trade theory, changes in the demand for factors will result in changes in factor returns, including wages. On the other hand, if the labour supply is perfectly flexible, as would be the case in a dual economy, factor market changes would result in changes in factor quantities, i.e. employment (Winters, 2002a).

In order to assess the impact of trade liberalisation on the labour market we first analyse trends in employment and wages in Vietnam. Then, we explore how trade shocks have been transmitted through the labour market.

4.2.1. Employment structure and trends

The *doi moi* reforms had a substantial impact on the sectoral composition of output. The industrial and service sectors grew rapidly, outpacing the growth in the agricultural sector so that the share of the agricultural sector in GDP declined during the 1990s. Despite the high output growth, however, total employment apparently grew by only about 2-3% in this entire period (IMF, 1998, 2000) and did not reflect the changes in the output structure of the economy.[15] While the employment share of agriculture and related sectors fell between 1990 and 2000 and that of the service sector increased, the industrial employment share was basically stable at about 12.5% of total employment (MOLISA statistics provided by CIEM).[16] Thus, one of the main trends in Vietnam's employment structure seems to be the absence of job creation in the industrial sector despite its being the fastest growing sector.

Probably related is the fact that the state sector is still predominant in the Vietnamese economy, especially in the industrial and service sectors. Throughout the decade the output share of the state sector is reported to have remained more or less stable at around 40% of the GDP (GSO

[15] See Table 4 and 5 in Appendix I.

[16] There is some debate about employment trends according to different sources. All sources, except the World Bank (1999), indicate that industrial employment remained a constant share of total employment during this period. This paper uses data from MOLISA (unless otherwise indicated).

statistics).[17] Surprisingly, this large output share did not seem to translate into employment – the share of the state sector in total employment is only about 10%. Although the state sector is certainly relatively capital intensive, this discrepancy between 40% of national output and 10% of employment is sufficiently large to raise concerns that the two sources of data (GSO and MOLISA, respectively) are incompatible. Moreover, if we take these relative sizes seriously it tends to undercut the more obvious explanation for the stability of industrial employment- viz. that increasing output absorbed chronically underemployed labour in the SOE-sector. These output and employment trends remain something of a mystery.

Unemployment declined until the Asian crisis hit Vietnam in 1997 and was about 6.9% in urban areas in 1998, although with considerable regional variations (CIEM, 2000, World Bank, 1999).[18] However, open unemployment statistics for a family-oriented economy such as Vietnam can be misleading as a substantial number of workers are actually seriously underemployed.[19] Both underemployment and severe underemployment declined between 1993 and 1998. Underemployment is a predominantly rural problem and is worst in agriculture where the median hours worked per week are as low as 33 compared to 44 in urban areas (World Bank, 1999). As a result, underemployed or unemployed rural workers seek work in the cities. The government policy of permitting only planned rural-urban migration results in the majority of these migrants living in extreme poverty as they do not have access to basic utilities without a legal residence permit. Urban poverty is, thus, more complex than rural poverty due to this lack of safety nets and community support. Since the VLSS ignores those migrants who do not have a legal right to permanent residence in the city the data on urban poverty are possibly underestimated (World Bank, 1999).

4.2.2. Wage trends

There are very few data on and a good deal of disagreement about wages, so we are fairly much in the dark. Chandrasiri and de Silva (1996) use ILO data to argue that real wages fell following liberalisation, while the IMF (1998, 2000) seems to suggest that real earnings (covering all cash income including payments in kind, bonus payments, and social security contributions) increased strongly.

[17] See Table 4 in Appendix I.
[18] See Table 6 in Appendix I.

The wage data in the VLSS household surveys are of poor quality at the household level. However, wage data from the commune questionnaires (a part of the VLSSs) provide the changes in agricultural wages between 1992-93 and 1997-98 in the rural sector. Our calculations show that the real wage rates for male and female labour increased by about 39% and 36% respectively.[20] In addition we found in the previous exercise that the real price of haircuts increased by 16.5% between 1993 and 1998. All of this can be taken as indicating increases in wages over this period.

There are considerable earnings differentials depending on sector of employment (state or non-state), education, and region. Salaries in the non-state sector are about two to four times higher than in the state sector (Chandrasiri and de Silva, 1996). The earnings differential by levels of education, though small initially, is increasing with the growth of the private sector and of foreign-invested enterprises due to the increased demand for educated workers. There are persistent inter-regional inequalities in wage rates between the north and south, perhaps due to the limited geographical labour mobility arising out of difficulties in changing residence (O'Connor, 1996).

Minimum wage regulations provide a safety net for workers at the lowest end of the earnings distribution if they are actually applied and do not force these workers into the informal sector by biasing employers against hiring them. The government prescribed minimum wage levels for foreign-invested enterprises in 1992 and (at a lower rate) for domestic enterprises that employed 10 or more workers in 1994. The minimum wage is also used as the base on which actual salaries are calculated in the public sector. The minimum wage for domestic enterprises in 1995 was approximately VND 144,000 (or $10.90) per month and $30-35 in 1995 in major urban centres for foreign-invested enterprises. Average unskilled wages are about three times higher than the minimum in all forms of employment, and exceed the minimum even in small household enterprises (Belser, 2000).

4.2.3. The Trade-Labour Link

The forgoing discussion suggests the absence of any significant employment effect at the macroeconomic level. In order to analyse whether this is because trade effects are minor or because they have been off-set by other factors, we attempt to assess more formally how trade

[19] 'Underemployed' defined as working less than 40 hours per week, and 'severely underemployed' as working less than 15 hours per week.

shocks have been transmitted through the labour market. This exercise is analysed in greater detail in Niimi et al (2003b).

A useful starting point is to identify export and import industries that have gone through notable changes over the years. We use mirror statistics from the UN Comtrade system[21,22] in order to identify export and import industries that showed the biggest absolute increase between 1993 and 1998 at the Standard International Trade Classification (SITC-R2) 2 digit level.[23] In the case of exports, light industrial products such as footwear, garments, electrical parts, and primary commodities including rice, coffee, seafood and petroleum are found to be the main export growth commodities. In contrast, the import sector appears to be dominated by capital and intermediate products. This seems to accord with a factor endowment view of comparative advantage.

For such changes in trade patterns to have a positive poverty impact, however, they must actually be reflected in the labour market. We approach this in two ways. First, we identify the sectors of major export and import growth to check whether output or employment in them has identifiable consequences for poverty dynamics. We consider the trade data for this exercise here but postpone the poverty analysis until section 5 below. Second, we calculate the consequences of the trade changes for net labour demand in a standard factor content of trade analysis.[24]

The first exercise suggests that there were indeed identifiable employment effects of trade reforms in Vietnam. Tables 9 and 10 in Appendix I report key data for the export and import industries with the largest absolute change between 1992-93 and 1997-98.[25] Apart from primary products, the main exports have relatively low ratios of value added to gross output.[26] Within value added,

[20] The commune questionnaires were conducted only in rural areas. These are the average figures for the wage for preparation, planting, caring for crops and harvesting.
[21] We thank Azita Amjadi of the World Bank for assistance with these data.
[22] Partner data is used as Vietnamese data are not available in sufficient detail. These data account for approximately 90% of Vietnam's total exports and imports (GSO statistics) for each year. The list of partners used includes Australia, Austria, Belgium, Canada, China, Czech Republic, Germany, Denmark, Finland, France, Hong Kong, Hungary, Indonesia, India, Italy, Japan, South Korea, Sri Lanka, Madagascar, Malaysia, the Netherlands, the Philippines, Poland, Romania, Russia, Senegal, Singapore, Sweden, Thailand, Taiwan, the UK, the USA and Venezuela. We preferred to use a defined set of partners rather than requesting data on "all partners", because the Comtrade database from which the data derive tends to show considerable variation through time in the set of countries included in such a category. See Niimi et al. (2003b) for further details about the trade data used.
[23] We repeated the exercise for the SITC 4 and 5 digit level to obtain the more detailed description of commodities where necessary. See Tables 7 and 8 in Appendix I.
[24] A serious complication with these exercise is that trade, input-output table, and employment data each follow different classification systems; we have matched them as precisely as possible from their textual descriptions. See Niimi et al. (2003b) for details.
[25] We are grateful to Chantal Nielsen and IFPRI for supplying the complete 1997 Social Accounting Matrix (SAM) for Vietnam on which these calculations are based.
[26] The apparent stability of the value-added shares is a possible cause of concern (Minot, 1998).; however, one must be realistic about the feasible speed with which imported inputs can be replaced by local ones.

however, the share of labour costs seems to be relatively high in most export industries, indicating that export expansion will have had material employment effects. In these tables the trade changes are traced back to their originating industries on the basis of direct labour coefficients to estimate increases in labour income and employment arising from growth in exports. On this basis the top ten export growth commodities generated 4.4% more jobs (for the economy as a whole), while the top ten growing imports subtracted about 1.7%. However, these figures are not representative of the total effects of trade change, for they partly reflect the greater commodity concentration of exports than imports.

In the second exercise a traditional factor content analysis was conducted on the whole trade vector using both direct and total labour coefficients; it is discussed in detail in Niimi et al (2003b). Two sets of trade data are used: those using our own mapping between trade and the I-O table's classification and those adjusted to reflect, so far as possible, the trade data in the SAM we were using. The data are normalised by total exports or imports in order to calculate the labour demands of, say, a typical $1 of exports and $1 of imports. In the absence of adequate wage data we can do this only for labour income rather than employment per se.

Table 11 in Appendix I reports the direct and total labour requirements for producing a $1 worth of exports spread across sectors in the adjusted proportions observed in total exports, and for replacing a $1 worth of imports (allocated as in the total) in 1993 and 1998 using both adjusted and unadjusted trade data.

Direct labour coefficients assume that labour demand increases only in the final producing sector of an export, all the material inputs it requires being imported. This is not an inappropriate assumption for Vietnam's manufacturing exports, since cloth for garments and parts for electronics are substantially imported. The direct labour coefficients suggest that the net effect of a balanced increase of $1 in both exports and imports - theoretically the consequence of trade liberalisation – would have been to increase the payments to labour by about 5c in 1993 and by about 2c in 1998. This dramatic decrease in the apparent employment effects of trade is potentially rather alarming, for Vietnam remains a very poor country. It is very largely due, however, to changes in trade in the category "other crops n.e.s." which is very highly unskilled labour intensive, but subject to some data concerns. We are researching further the status of the data on "other crops n.e.s.". The unadjusted trade data, however, suggests that the net trade effects for both unskilled and skilled labour remain more or less the same in both years, implying that trade continues to have strong pro-labour effects.

Total labour coefficients are constructed on the (questionable) assumption that no extra intermediates are imported when a sector increases its exports. The adjusted data continue to suggest that exports are more labour intensive than imports and that there are no large changes over the decade. The unadjusted data suggest that imports are more labour intensive, but decreasingly so, so that the increase in trade has a distinctly benign effect.

Table 4 combines the 'per-dollar' coefficients from Table 11 (Appendix I) with the aggregate visible trade data to estimate the actual impact of trade on employment income. As noted above, however, these aggregates reflect macro-economic factors more than trade-policy ones. The overall message is that, given the rapid growth of imports, trade has, if the model is to be believed, destroyed jobs. Of course, 'belief' is a critical issue: the assumptions of factor content analysis – fixed input coefficients and the precise equivalence of domestic and foreign varieties of every good – are heroic, to say the least, for a dynamic transition economy. Niimi et al (2003b) explore the effects of relaxing them and reach much more favourable conclusions about the benefits of trade expansion for employment.

Table 4: The Effects of Actual Trade on Employment Income

	1993	**1998**
Aggregate Trade Flows ($millions)		
Exports	2985	9360
Imports	3924	11499
Net	-939	-2139
Labour Income – Direct Coefficients ($millions)		
From exports	512	1460
From imports	477	1551
Net	35	-91
Labour Income – Total Coefficients ($millions)		
From exports	1500	5042
From imports	1823	5856
Net	-323	-814

Source: Calculations based on the SAM 1997.

Even if we believe the results of labour income, translating them into poverty impacts is not straight-forward. Even assuming that employment levels were unchanged and that all the changes in demand were converted into wage changes, the net effects would depend on household composition. However, in fact it is likely that some of these changes would be reflected in employment (see Winters, 2000), where-upon it becomes important to know not only household

composition, but also the relative sizes of wages and the poverty line and the wages that workers earned before taking these "trade-related" jobs or after losing them. Overall, however, it is difficult to believe on the basis of these data that trade changes have contributed strongly to real wage increases or wage bill increases in Vietnam.

4.3. The Fiscal Channel

The last static channel through which trade can affect the incomes of poor households is through its effect on government revenues and expenditure. If there is a fall in government revenue following the reduction of tariff barriers, the government might cut social expenditure on education, health and social security, thereby adversely affecting poor households (Winters, 2002a). On the other hand, trade reform such as the tariffication of non-tariff barriers might actually generate higher revenues even post-reform (Winters, McCulloch and McKay 2002).

In Vietnam the share of trade taxes in total revenue increased after the reforms. The thrust of Vietnam's trade liberalisation was the conversion of quantitative restrictions into tariffs and the subsequent lowering of these tariff barriers. These reforms increased the tax base of the government and despite the falling rates, government revenues from trade as a proportion of total revenues steadily increased from 11% to 20% between 1991 and 2000.[27]

The provision of basic social services has been a priority for the Vietnamese government. As a result, the share of total social spending on education, health and other services, and the provision of safety nets and social relief in the government's current expenditure increased from 32% to 45% between 1992 and 2000 (IMF, 1998, 2000). However, the quality as well as the quantity of these social services has deteriorated since the late 1980s. Both education and health expenditure seem to be inefficient and ineffective in targeting the poor (see World Bank, 1999 for details).

There is an extensive system of social protection in Vietnam in the form of social security, pensions and regular social relief for certain target groups (the elderly, orphans and disabled) as well as emergency, starvation and social evils relief funds. Over 80% of the government's transfer payments are on social security, the majority of which goes to government employees in the form of pensions. State subsidies for social security declined after 1994 and enterprises were expected to take responsibility for their employees (Belser, 2000). In 1998 most of these programs (except

[27] See Table 12 in Appendix I.

social security) were integrated into the national Hunger Elimination and Poverty Eradication program (HEPR) (World Bank, 1999).

Thus, in Vietnam's case, although both the share of trade taxes in GDP and the share of social expenditure in GDP rose post liberalisation, this social expenditure was not well targeted and may even have had an anti-poor bias, implying that the impressive poverty reduction that has accompanied Vietnam's reforms may not be due to active redistribution policies followed by the government (World Bank, 1999).

5. The Econometric Analysis of Household Poverty

The previous section has tried to identify the possible poverty impacts of trade reforms on the basis of descriptive statistics. This section assesses whether the observable dimensions of liberalisation have influenced household outcomes and contributed to poverty alleviation using the formal analysis of household data - mainly by means of a multinomial logit model. In essence we estimate a model describing the probabilities of a household staying in or escaping from poverty – along the lines of Glewwe et al (2000) – and then ask whether the trade links identified above contribute to the explanation. If they do, the framework advanced above is useful analytically and we can start to explore whether the policy changes have helped or hindered poverty reduction.

5.1. The Multinominal Logit Model and the Data

The modelling in this section is related to that in Glewwe et al (2000) and Justino and Litchfield (2002b), but differs in a number of important respects. First our work is more closely focussed on the trade effects than the general dynamics of poverty in Vietnam. Second, we explore both urban and rural populations: although the rice story is a rural one, the growth of light manufactured exports is essentially urban. Third, with one exception, we limit ourselves to pre-determined variables as regressors, and so avoid any hint of simultaneity; this is a strict discipline, for it expressly excludes the effects of changes in activity in response to trade reform. However, since our purpose is to test whether trade has identifiable poverty impacts and to see how good the framework of Winters (2002a) is at identifying them a priori, the fact that our approach tends to lead us to underestimate the role of trade seems constructive. We discuss this more fully below. Finally there are small differences in the sets of included demographic variables.

The VLSS contains two waves of data: 4800 households in 150 communes surveyed over October 1992 to October 1993 and 6000 households in 194 communes surveyed over December 1997 to December 1998.[28] The samples are believed to be representative and, critically, over 4,300 households are identifiably surveyed in both waves. This panel dimension allows us a much better view of the dynamics of poverty than would two similar-sized unrelated cross-sections.

The poverty line used in this work is the official poverty line, which is based on calorie intake - see World Bank (1999) or Glewwe et al (2000). Based on the consumption basket of the third quintile of households in 1992-93, the poverty line is the cost of purchasing 2,100 calories per head per day plus an allowance for non-food costs, valued at national prices. Its value is 1.160 million dong in 1992-93 and 1.790 million dong in 1997-98. Because it is based on national prices, reported consumption or expenditures in the VLSS have to be deflated by regional price indices - constructed from CPI data disaggregated by region and rural/urban sector - before the poverty line is applied (World Bank, 2001). Glewwe et al (2000) argue that the VLSS data on incomes are too unreliable for analysis, so we follow them and measure poverty in terms of aggregate consumption. For simplicity, we opt for consumption per capita based on Burgess et al's (2000) argument that using adult equivalent scales makes little difference to this kind of analysis.[29]

One consequence of the definition of poverty adopted is that households' actual consumption baskets do not affect our estimates of their poverty status, thus short-circuiting one of the links from trade reform to poverty discussed in section 4.1. In this respect our results are quite different from those of, say, Minot and Goletti (1998) or Benjamin and Brandt (2002) who consider households' net positions in rice as a way of predicting the poverty effects of rice reform, but, of course, have no means of testing their predictions. We leave for a later paper the exploration of the importance of differences in consumption baskets.

The MultiNomial Logit (MNL) model analyses the probability of being in a particular state out of several unordered alternatives. We examine the poverty transition between 1992-93 and 1997-98 in terms of multiple (unordered) choices - specifically (1) being poor in both periods (P→P), (2) being non-poor in the first period and becoming poor in the second period (NP→P), (3) being poor in the first period and becoming non-poor in the second period (P→NP), and (4) being non-poor in both periods (NP→NP). The probability that household *i* experiences outcome *j* is expressed as:

[28] Justino and Litchfield (2002a) give more detail.

$$\text{Prob}(Y_i = j) = \frac{e^{\beta_j' x_i}}{\sum_{k=1}^{4} e^{\beta_k' x_i}}, \qquad j = 1, 2, 3, 4.$$

where Y_i is the outcome experienced by household i, x_i is the (n x 1) vector of characteristics for household i, and β_j is the (n x 1) vector of coefficients on x_i applicable to households in state j. The model is identified only up to an additive vector since adding, say, vector m to each β_k leads to the same probabilities of $Y = 1$, $Y = 2$, $Y = 3$ and $Y = 4$. Thus, one β_k must be chosen as the base category and set to zero. All other sets are then estimated in relation to this benchmark. In most of our work outcome 1 (the household is poor in both periods) is set to zero, since we are primarily interested in whether trade helps households to escape from poverty.

The multinomial is a common formulation for poverty work and was, as we noted, used by Glewwe et al (2000) in their pioneering work on Vietnam. However, it is not without its problems. One possible problem is the dichotomous nature of the poor/non-poor classification, which places arbitrary poverty lines at the heart of the analysis. This can be a particular problem given the inevitable errors of measurement in household expenditures (Deaton, 1997). However, the data reveal that households are not particularly heavily clustered around the poverty line, so we are not unduly sensitive to such errors. Nonetheless, in one set of experiments we truncate our sample around the poverty line to reduce the importance of random errors and also briefly discuss alternatives to the MNL. Moreover, in compensation we note that by seeking to explain a categorical variable the MNL avoids measurement problems at the extremes of the distribution, where, arguably, they are likely to be at their worst.

Table 5: Poverty Transition Matrix (1992-93 and 1997-98): Sample Sizes

	Rural		***Urban***	
1997/8	***Poor***	***Non-Poor***	***Poor***	***Non-Poor***
1992/93				
(A) Full Sample				
Poor	1184	1037	52	139
Non-Poor	187	1086	17	600

[29] Per adult equivalent scales may deal better with differences in the intra-household allocation of goods and household economies of scale (White and Masset, 2001), but we do not believe that latter are likely to be very important, as food, the main expenditure of poor households, is not generally prone to large economies of scale..

(B) Sample excluding households within 10% of the poverty line in either survey				
Poor	872	637	30	96
Non-Poor	66	850	8	559
(C) Sample of households in 2nd – 6th deciles of 1992/93 survey				
Poor	864	950	42	126
Non-Poor	39	109	2	20

Source: Calculations based on the VLSS 92-93 and 97-98.

Table 5 reports sample sizes for the four groups defined by poverty status in 1992-93 and 1997-98. The rural sample is sizeable, although, even here, the numbers slipping into poverty are small. The urban sample is smaller - certainly too small to permit independent estimation. Block (B) reports the corresponding numbers if we delete any household within the range ± 10% of the poverty line in either year. As expected, this adjustment has its largest proportionate effect on the "movement", cells but does not really affect the fundamental suitability of the sample. Sample (C) which comprises the half of the sample in the second to sixth deciles in 1992-95, focuses on households judged a priori most likely to record changes in status between 1992-93 and 1997-98. It is asymmetric about the poverty line (which falls in the 56th percentile) to allow for the strong average growth over the period.

5.2. Modelling the Economics of Liberalisation

A household is considered to be poor in the VLSS if $c'p \leq \bar{c}\,'p$, where c is its consumption basket, p the vector of prices and $\bar{c}$ the 'poverty' basket. Aggregate consumption can be expressed as aggregate income less savings:

$$c'p \equiv q'p+f'w+m-s \qquad (5.2.1.)$$

where q is the production vector (negative for inputs), f is a vector of holdings of income generating assets or household characteristics, w the related vector of returns, m 'non-produced' income and s savings. Assuming that s comprises a constant plus a random error we essentially use a regression framework to explain changes in the sign $(c'p - \bar{c}\,'p)$ in terms of changes in income, $(q'p+f'w+m)$, i.e.

$$d(q'p+m) = [q'dp+(dq)'p+f'dw+(df)'w] + dm \qquad (5.2.2.)$$

Since we are focussing only on predetermined assets or characteristics, this expression reduces to:

$$d(q'p+m) = [q'dp+f'dw] + dm \qquad (5.2.3.)$$

where q and w are data, and, because they are basically unknown, dp and dw are to be estimated from the coefficients of the regression model. In fact, this 'change in price interpretation' of the coefficients of our estimated functions is too strict given all the missing variables and specification difficulties we face, but the basic idea follows through: we are asking how well can we predict changes in poverty status given households' initial (pre-reform) sets of outputs/inputs characteristicsand activities.

We start from equations that are similar to those of Glewwe *et al*. (2000), and add a number of variables to reflect the trade links: rice production, coffee production, land and fertiliser use, and the ratio of household members working in the leading export industries (seafood, food processing, garments, and shoes) to the number of adults in the household.[30] The inclusion of the output data in 1992-93 is designed to capture the benefits for self-employed workers of prior specialisation in a booming export sector. The inclusion of variables on land is an attempt to see whether liberalisation affected the poor via (implicit) land rents, while the inclusion of fertiliser is to capture the benefits of the latter's significant price decline. The larger a household's use of fertilizer, the larger its net income gain as the price falls. In addition, there may be benefits to having an initial crop-mix that could take advantage of the decline in price and increased availability of fertilisers. For rice, part of the effects of land and fertiliser usage should be captured by the production variable - gross income from a kilo of rice is the same no matter how you produce it. However, as noted, fertiliser usage also has direct effects via the input vector, and land or irrigation may have asset-type advantages or reflect the availability of technologies that allow stronger or weaker than average responses to price shocks. Given the centrality of rice to our story of Vietnamese poverty, it is at least worth checking these things. The benefits of being employed in the export sectors initially are represented by the employment variables.

In a few cases we measure certain demographic variables differently from Glewwe et al (2000), and in addition we also consider two timing variables because the VLSS interviews were spread over twelve month periods in both waves. If households were sampled in the same order in both

[30] We also measure various non-trade effects in slightly different ways from Glewwe et al.

waves, there is a likelihood that seasonal variations would occur in the data.[31] If they were sampled randomly, households could have anything between 49 to 73 months between their sample dates, and so have varying amounts of time to escape from poverty. With a growth rate of 8% p.a., the range could be up to 16% of income! In the event, there are signs of both seasonality and period effects and so we keep the dummy variables for the interview quarter in VLSS 92-93 and the period between surveys.

Also, of course, particular dates could reflect idiosyncratic shocks. We attempted to exploit this to identify the effects of the Asia crisis of 1997. Vietnam was not directly affected to the extent that some other countries were but it lost export markets in 1998 and suffered a 20% depreciation over 1997-98. We did so by including the variables for the date of interviews for the VLSS 97-98. Although there appeared to be signs of the negative effects of the crisis in the later months of VLSS 97-98, none was significantly different from zero. Hence we do not include these results in this paper. Presumably the explanation for this is that the adverse effects took longer to be felt at the household level than in aggregate, although it could, of course, be that the shock had been fully felt by December 1997, especially given that there was also a typhoon in the Mekong in 1997.

5.3. The Estimates

Appendix II reports the "basic" equation with no trade variables, which explains poverty dynamics as a function of region, ethnicity, demography, human capital (education), occupation, health, infrastructure and seasonality.[32] We report results for all three categories (P→P i.e. being poor in both years is treated as base): being non-poor in 1992-93 and poor in 1997-98 (NP→P), being poor in 1992-93 and non-poor in 1997-98 (P→NP) and being non-poor in both years (NP→NP). The table gives the impacts of each explanatory variable on the relative risk ratios (RRR) rather than the actual coefficients. The relative risk ratios are the ratio of the probability of each outcome relative to the probability of the base category. If we set $Y = 1$ as our base category, the relative risk ratio for $Y = 2$ for a change in each variable x is given by:

[31] The 1992-93 survey started in October and the 1997-98 survey in December. We include dates from the former by quarters, with 'first quarter' referring to October-December 1992.

[32] The 1992-93 data on infrastructure are available only for rural communes. We used data for 1997-98 to identify urban communes which did not have these facilities in 1997-98 and assumed they did not have them in 1992-93 either. We experimented with an alternative assumption of universal urban provision since even if the facilities are not available in a commune, they are likely to be much more readily available than in rural communes without them. This hardly changed the results except for the coefficient on the urban dummy.

$$\frac{\text{Prob}(Y=2)}{\text{Prob}(Y=1)} = e^{\beta_2' x}$$

where $e^{\beta^{(2)}}$ is the relative risk ratio for a unit change in the variable x. Since all continuous variables have been standardised, the coefficients represent the impact of a one standard deviation change in each explanatory variable on the relative risk ratios of the household being in each outcome. Any coefficient less than one implies that the variable reduces the probability of the household being in the nominated category. The percentage change in the probability is given by the coefficient minus one, multiplied by one hundred. This rule applies to both dummy and continuous variables.

The multinomial logit is most easily interpreted as giving conditional probabilities. Given that poor→poor is the base category, the coefficients for poor→non-poor (outcome 3) tell us the probabilities of moving out of poverty relative to being poor in both years. Similarly, the differences in the coefficients for non-poor→non-poor and those for non-poor→poor (or the ratio of the relative risk ratios) give us probabilities of falling into poverty relative to being non-poor in both years. These latter are most easily calculated by re-estimating the equation with non-poor→non-poor as base and examining the coefficients for non-poor→poor.[33]

The basic model is not our principal concern, but Table 6 summarises the significant determinants for moving out of and into poverty in our sample. It will be recalled that the sample for the latter is small. Glewwe et al (2000) report their urban and rural results separately and Justino and Litchfield (2002b) consider only the latter, so precise comparisons are not feasible. However, with the exception of access to electricity (which has a significantly negative effect on escaping poverty in Glewwe's rural sample), they seem to tell a pretty consistent story. The burden of having children may be exaggerated in our sample because we define our poverty line in terms of per capita, not per equivalent adult, expenditure.

Table 6: Summary of significant (5%) non-trade related results

The following factors ***increase the probability of escaping poverty*** *relative to being poor in both years:*	*The following factors* ***increase the probability of falling into poverty*** *relative to being non-poor in both years:*
• Residing in the urban sector • Residing in Red River Delta, Central Highlands, South East or Mekong River Delta • Household head being older • Education of household head	• Non-Kinh, non-Chinese ethnicity • The household head being ill and being out of work for more than 7 days

[33] The results of this regression are not reported as they mirror the first model.

• Spouse educated to Technical level • Occupation of household head is white collar • Access to electricity • Access to road • Access to food shops • Access to a clinic • Longer period between the two surveys • Interviewed in the 3rd or 4th quarter of survey	
*The following factors **decrease the probability of escaping poverty** relative to being poor in both years:*	*The following factors **decrease the probability of falling into poverty** relative to being non-poor in both years:*
• Non-Kinh, non-Chinese ethnicity • Having children aged below 14 • Unemployment of household head • Access to a post office	• Residing in the urban sector • Residing in Central Highlands or South East • Household head being older • Having children aged between 6 and 14 • Education of household head (apart from primary) • Spouse educated to university level • Access to electricity • Longer period between the two surveys • Interviewed in the 3rd or 4th quarter of survey

We now turn to the effects of the various trade effects. They are largely orthogonal to the "basic" effects and so, although Appendix II reports our final trade-inclusive equation in full, in the text we report only the coefficients on the various trade variables as they affect the chance of escaping from poverty.

Table 7 starts with our basic 'trade-inclusive' model (column A). From above we identify rice, coffee, seafood and light manufactures as the principal areas of export growth and so we include among the regressors the household's initial production of rice and coffee and the proportion of workers initially holding jobs in export sectors (seafood, food processing – to allow for any processing of the primary exports – clothing and footwear). All have positive effects, the first two are strongly significant, both in the system as a whole and in explaining just the escape from poverty, whereas the last is strongly significant for the system as a whole and only at 10% for escape from poverty alone. For example, ceteris paribus, a one standard deviation increase in a household's production of coffee more than doubles its chances of escaping from poverty in 1998, while a one standard deviation increase in rice output increases it by over 50%. Adding these three variables increases the pseudo-R^2 of the system from 0.23 to 0.26.

One important refinement to the rice result is its regional dimension. The production effect is weaker in the Mekong Delta than elsewhere.[34] As well as being the major producing region for

[34] The rice production effect in the Mekong in column (B), Table 7 is an increase of 35% in the chance of escaping = 100*(2.289*0.593-1)]

rice exports, the Mekong is also characterised by larger farms and a much greater use of hired labour (Minot, 1998). Thus, as production increases less accrues to the householder as a producer and more to the labour he hires; correspondingly, household income owes more to wages deriving from others' rice production than it does elsewhere in Vietnam. We tried to test this last effect by including in the equation the proportion of household members reported to be working on someone else's farm (we can not isolate rice farms, however). Its effect was positive but not statistically significant. A similar, but weaker, extenuation is also evident in the other major rice area, the Red River Delta. Here, although co-efficient is significant only at 10% in the escape from poverty equation, it is strongly significant (χ^2 at 3 degrees of freedom = 33.1) in the system as a whole. Once these two regional variants are permitted the rice production effect elsewhere in the country increases to above two.

Table 7: Relative Risk Ratios for Escaping from Poverty (Results for Trade variables)
Model I (columns A-G): Base category – poor in both years
Model II (column H): Base category – non poor in both years (i.e. RRR for falling into poverty)

	Model I							Model II
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Agricultural variables								
Quantity of rice production	***1.56	***2.29	**1.67	**1.69		***1.75	***1.77	*0.51
In Mekong River Delta		***0.59	**0.63	**0.63		**0.60	**0.60	1.51
In Red River Delta		*0.87	*0.86	*0.86		**0.85	**0.85	1.15
Quantity of coffee production	***3.00	***3.02	***2.32	***2.32	***2.35	***2.32	***2.31	1.00
Expected quantity of rice production(4)					0.65			
In Mekong River Delta					**0.69			
In Red River Delta					**0.85			
Residuals					*1.19			
Qty. of fertiliser - rice			***1.41	***1.41	***3.32	***1.46	***1.46	1.13
Qty. of fertiliser - non-rice			*1.60	*1.62	*1.61	*1.70	*1.71	*0.79
Land rights				0.94				
Area of irrigated land p.c.				1.01				
Trade variables								
Ratio of household members working in export	*1.11					***1.25	***1.23	*1.19
Change in the ratio (export)						**1.17	*1.14	1.06
Ratio of household members working in import							1.12	1.09
Change in the ratio (import)							1.07	0.95
Ratio of household members working in manufacturing							1.06	*0.80
Change in the ratio (manufacturing)							1.04	0.87
Pseudo R2	0.26	0.26	0.26	0.26	0.26	0.27	0.27	0.27

Note: *** significant at 1% level; ** significant at 5% level; * significant at 10% level in the equation for 'escape from poverty'.
(1) The export sector includes seafood, food processing, garment and shoes (+rubber and plastic products).
(2) The categories for occupation slightly differ between the VLSS 92-93 and the VLSS 97-98.
(3) The import sector includes textile, machinery, leather, chemical and metal.
(4) The variable "expected quantity of rice production" was constructed from the following regression:
Q = f (labour, land, irrigated land per capita, fertiliser for rice)

	Coefficient	Robust S.D.
Labour (no. of household members aged 6 or above)	***112.06	13.91
Land rights	*168.87	99.74
Irrigated land per capita	*0.24	0.14
Quantity of fertiliser used for rice	***3.92	0.43
Constant	***-247.03	96.09

Note: $R^2 = 0.584$ This regression was run only over those households who produced rice (3088 households). For those who did not produce any rice, the expected quantity of rice and residuals are "0" in the regressions above.

Column (C) of Table 7 adds variables for the initial use of fertiliser. Fertiliser prices fell by 19% in real terms between 1993 and 1998 (essentially as a result of trade policy – see section 3.2.) and so heavy users could sustain material increases in real consumption. This is verified by estimation. In the table, however, we further refine the variable by distinguishing between rice and non-rice fertiliser effects. The logic is that non-rice use may reflect greater opportunities for exploiting the fall in price because farmers can switch between crops rather than just increase use for a single crop. Large initial users for non-rice crops may grow crops or farm under circumstances which respond to fertiliser usage and thus have greater opportunities for substitution than those who use little fertiliser to start with.[35] The table shows strong positive effects from fertiliser use although non-rice use is significant only at 10%.

To explore the role of rice further we also explored whether fixed inputs into agriculture had effects additional to those of the main outputs and inputs – column D. Adding a dummy for land rights (land for 'long-run' use) and the per capita availability of irrigated land produced insignificant coefficients of the wrong sign (reducing the probability of escaping poverty). Their inclusion slightly raised the positive effects from rice production and fertiliser use but changed nothing else fundamentally.

In addition, we experimented to see if households with exceptional rice productivity fared better than others. For this purpose we created an instrumental estimate of rice production from a regression of output on labour (above six years of age), land rights, irrigated land per capita and fertiliser use for rice, and then included in column (E) both the instrumental estimate and the residual from the instrumental equation (see note 4 to Table 7). All the instruments were significant in the first stage and in the second stage the residual was significant at 10% while the expected rice output was not.

In fact the expected rice effect is negative – the higher expected output the lower the chance of escaping poverty – but its effect on the fitted value is off-set by a huge increase in the coefficient on fertiliser use. This outcome reflects the strong effects of fertiliser on rice output and hence on poverty and the perverse or negligible effect of measured land rights and irrigation on poverty dynamics in column D. The just-significant effect from the residual of the instrumental equation suggests that unexplained factors behind rice output (i.e. yield) correlate with improved poverty

[35] We do not include the change in fertiliser use because of the obvious danger of endogeneity.

dynamics. Overall, columns (D) and (E) suggest that once we have included rice output and fertiliser use in the logit equation there is no role for the determinants of that output. This is as it should be: fertiliser has a direct income effect, while a kilo of rice yields the same net income whether you grow it on land to which you have firm rights or not.

The second major dimension of the trade liberalisation operates via the employment market. In column (A) of Table 7 we explore the benefits of working (initially) in the major export sectors by including the proportion of adults (15 years and older) holding a job in an export sector – seafood, food processing (because some seafood and rice exports are processed), clothing and footwear. The effects is benign – an 11% increase in the chance of escaping from poverty from a one standard deviation increase in the proportion of export workers (mean 0.046, standard deviation 0.156) – but it is not highly significant. When we sought separate effects for each export industry, they were mostly positive and that for seafood was significant, but there was no significant improvement relative to the combined variable shown in Table 7.

There are at least three ways of making a link between initial employment in an export sector and the escape from poverty. Existing workers could get real wage increases, which is a straight-forward Heckscher-Ohlin or Ricardo-Viner-Jones result (coupled with an auxiliary assumption minimising churning in employment). Existing workers may be able to work longer hours (i.e. a reduction in hidden unemployment or underemployment), as one might expect in transitional economies rationalising the state-owned sector. And finally, it may be that initial employment indicates a location close to exporting firms and hence better chances of the household obtaining more jobs as the firms expand.

In order to explore these possibilities more closely, we break our rule of using only initial values as explanatory variables, and add the change in the proportion of adults with employment in export sectors. This captures the third hypothesis above and also is consistent with a Lewis view of the economy whereby an export boom generates more jobs but at constant real wages. Given the stock of workers in agriculture and the state-owned enterprises the reserve army model is plausible and, given the relatively low skills required for most manufacturing export jobs, there is little reason to expect that new workers will be less productive than incumbents over the 5 years between our surveys.

Including the change in employment has negligible effects on all the other coefficients and their significance but quite strong effects on that on initial employment. It increases from 1.11* to

1.19**, while the change in employment gets a co-efficient of 1.14** (regression not reported). When the change in export employment is added to the model with agriculture modelled more fully (column C), the effects are even stronger – see column (F). Thus incumbency does have advantages in escaping poverty (via wages or hours presumably, neither of which we can test because the data are so noisy), but so does a household's ability to supply new workers.

Methodologically the lesson here is that for predicting the poverty effects of trade liberalisation, agricultural shocks may be well captured by initial activity in the affected sector because mobility is relatively low in these sectors.[36] For manufacturing, however, although initial employment captures some of the likely effects, some will be less predictable because mobility into manufacturing jobs is high.

If the labour market is reasonably well integrated, wage changes will not be restricted to the booming export sectors (as in Ricardo-Viner), but will spillover to other sectors, as under Heckscher-Ohlin. We test this by including in the equation the proportions of workers in import-competing sectors (textiles, leather, chemical, metals and machinery) and in all manufacturing and changes in the ratios between the two years (column G). From the former we might also detect job losses as imports destroy jobs. The effects of employment in manufacturing are all positive, whatever the sector, but largest in exports, followed by imports and then by manufacturing in general. None of the import or manufacturing effects is significant, however, so we drop them.[37] In interpreting column (G), it should be noted that both export and import industries are included in the general manufacturing set, so the gross effects are given by the products of two coefficients (e.g. 1.23*1.06=1.30 for export employment). Also, difficulties of classifying sector of occupation in 1997/8 mean that the change in employment variables for exports and imports both include workers classified to the textiles and garments sectors.

The sample for descent into poverty is small and so the results in column (H) of Table 7 are poorly defined. In an economy growing at an 8% p.a. descent into poverty is likely to be mainly an idiosyncratic event. Nonetheless, the results are broadly consistent with the analysis of escape from poverty even if they are not very significant statistically. The chances of falling back into poverty are reduced by higher rice output (in the Mekong and Red River Deltas as well), higher non-rice fertiliser use and prior employment in manufacturing. The last effect appears to be

[36] By the same token negative shocks will hit hard in agriculture, as, for example, the decline in coffee prices since 1997 is reported to have done in Vietnam's Central Highlands.

weaker in exporting (1.19*0.80=0.95) than in other sectors, but is nonetheless still negative. Overall, we would not make much of this set of results for falling into poverty, but they clearly lend some further support to our model of the poverty consequences of trade liberalisation.

While the trade effects appear to be estimated sufficiently precisely to reject the hypothesis that they have arisen by chance, we have not yet discussed their overall contribution to explaining poverty dynamics. We now ask how much better the fit is for equation (F) of Table 7 (our preferred equation) than for the base equation with no trade component. The increase in the pseudo-R^2 from 0.234 to 0.266 suggests that trade adds a further 3.2% to the explained variation in poverty experience but that much of the latter remains unexplained. The proportions of correct predictions from the MNL model tell a similar story – Table 8. The basic model classifies 59.90% of households correctly, over-predicting no-change outcomes (P→P and NP→NP) and under-predicting the changes – see block A. Its inability to pick up descent into poverty is palpable but hardly surprising, but it also misses a significant number of 'escapees': indeed only 36.9% of actual escapees are correctly identified. Adding the trade variables improves the overall success rate by about 1.5 percentage points or 2.5% - see block (B). In particular, we correctly identify more of the escapees from poverty increasing the success rate to 39.60%.

These are modest improvements, to be sure, but let us re-iterate that they are statistically significant and that poverty dynamics are always difficult to model. In terms of targeting compensatory policies even a 2% improvement is worth achieving.

[37] Their insignificance persists even if the new variables are added one by one, except for import sector employment which is once significant at 10%.

Table 8: Goodness of Fit with and without Trade Variables

(A) Mulitnomial logit model without trade variables

The poverty status of about 59.90% of households was correctly predicted.

	Prediction				
Actual	**P→P**	**NP→P**	**P→NP**	**NP→NP**	
P→P	844	0	208	184	1236
	(68.28)	(0.00)	(16.83)	(14.89)	(100.00)
NP→P	61	0	30	113	204
	(29.90)	(0.00)	(14.71)	(55.39)	(100.00)
P→NP	324	1	434	417	1176
	(27.55)	(0.09)	(36.90)	(35.46)	(100.00)
NP→NP	145	2	240	1299	1686
	(8.60)	(0.12)	(14.23)	(77.05)	(100.00)
	1374	3	912	2013	4302

(B) Multinomial logit model with trade variables (equation F- table 7)

The poverty status of about 61.46% of households was correctly predicted.

	Prediction				
Actual	**P→P**	**NP→P**	**P→NP**	**NP→NP**	
P→P	861	1	215	159	1236
	(69.66)	(0.08)	(17.39)	(12.86)	(100.00)
NP→P	61	2	31	110	204
	(29.90)	(0.98)	(15.20)	(53.92)	(100.00)
P→NP	317	1	468	390	1176
	(26.96)	(0.09)	(39.80)	(33.16)	(100.00)
NP→NP	127	4	242	1313	1686
	(7.53)	(0.24)	(14.35)	(77.88)	(100.00)
	1366	8	956	1972	4302

Note: The predicted probabilities of falling into the 4 different categories were first calculated and each household was allocated to the category for which the probability was the highest.

5.4. The Effect on Poverty

The results so far offer convincing evidence that international trade reform has affected individual household poverty dynamics in Vietnam, and that by taking it into account we are better able to predict which households prosper and which do not. This lends considerable weight to the analytical approach proposed and to the view that 'trade matters'. It does not, however, tell us directly whether trade reform reduced poverty. For that, we need to create a counterfactual – '1998 without trade reform' – and it is here that the uncertain division of responsibility between trade policy, other policies and exogenous shocks really takes its toll.

As noted above we use initial household characteristics as variables and infer the change in their value between 1993 and 1998 from the coefficients. Hence, we can estimate the effects of trade reform on overall poverty by setting the 'trade-related' coefficients to zero (the corresponding

RRR to unity) and recalculating the predicted changes in poverty[38]. For some effects, however, the change in the value of a characteristic is due to things other then trade, so the appropriate reduction for this exercise may be less than 100%. For the sake of illustration we also consider reductions of one-half in these coefficients.

Table 9: Poverty Reductions due to Trade Reforms

	A: Coefficients wholly due to trade reforms		B: Coefficients half due to trade reforms	
	Escape from Poverty	**1998 Poverty**	**Escape from Poverty**	**1998 Poverty**
Rice	-1	-226	-1	-113
Coffee	+8	-12	+5	-7
Fertilisers	+186	-292	+87	-141
Export employment	-12	-61	-11	-31
All	+250	-668	+96	-296

Notes: For rice, the coefficients of the quantity of rice production, and the quantity of rice production in the Mekong River Delta and in the Red River Delta are controlled.
For fertilisers, the coefficients of the quantity of fertilisers used for rice and for non-rice are controlled.
For export employment, the coefficients of the ratio of household members working in the export sector to the total number of household members and of the change in the ratio are controlled.

Table 9 summarises the effects of setting various 'trade' coefficients in the MNL model to zero [RRR'=1] and to one half of their estimated value [RRR' ≈ 1+½(RRR-1)], in the equation from column (F) of Table 7. The predicted numbers of households in each category from equation (F) are given at the foot of Table 8 block B. These figures were then recalculated with various combinations of trade coefficients set to zero to isolate the contribution of trade.[39] Thus, for example, if none of the trade effects had applied, about 250 fewer households would have escaped from poverty and 668 more would have been in poverty in 1998. Out of 4302 households in total, these are considerable contributions. The table also reports the figures for individual trade effects and reveals that the critical variable appears to be fertiliser use. The small negative figures for rice and export employment arise because, although these variables have a positive partial effect on the chances of escaping from poverty, they also affect the predictions of the household's chances of being in another category and the prediction is made by choosing the category with the highest predicted probability. In both cases the suppression of the trade effects switches households from P→NP to P→P, as we would predict, but this is dominated numerically by the number who are switched from NP→NP to P→NP. If trade effects are set to half the estimated coefficients (block

[38] Because we standardised the variables in the regression equation, we also need to subtract $\beta\bar{x}/s$ from the constant to ensure that the equations go through the same mean point as before, where $\bar{x}$ is the mean value of the trade variable, s its standard deviation and β the trade co-efficient set to zero.
[39] This exercise is essentially a simulation. We are comparing predictions under two sets of conditions, not actual and predicted values. Thus the results are predicated on the relevance of the estimated model.

B), the contribution of trade reform is still large – nearly 100 additional household escaping from poverty (about 10% of those that did) and nearly 300 fewer households in poverty (about 10% again).

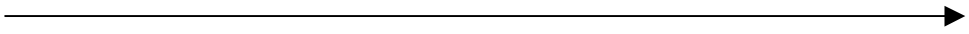
5.5. Sensitivity Tests

The results just described allow some confidence that we have located the effects of trade reform in the dynamics of individual households. The effects chosen accord well with the shocks identified in the discussion of trade policy (although not all those identified could be included), and given that we use only initial variables we are free from worries about endogeneity. Indeed the predictive power of the initial variables gives strong support to their use in *ex-ante* predictions of the effects of liberalisation as made by, for example, Ravallion and van de Walle (1991) for Indonesia and Minot and Goletti (1998) for Vietnam. Nonetheless, it is desirable to push the model a little harder to test its sensitivity. We have conducted three such tests.

First, errors of observation for households around the poverty line mean that some of the recorded changes in poverty status are spurious, while other random shocks to income flows can change status for reasons actually quite independent of our explanatory variables. If either set of errors is correlated with our independent data we have a problem. One way of checking this is to widen the band which households must cross to be recorded as changing status. Re-estimating equation (F) in Table 7 excluding any household that was within ± 10% of the poverty line in either year (sample B from Table 5) leaves the results largely unscathed. Among the trade variables, the results on falling back into poverty are even less significant, while for escaping from poverty the most notable differences are the insignificance of rice production in the Mekong River Delta, the smaller and less significant effects of coffee production, and the larger effects of fertiliser use. Among non-trade variables, the major change is the decline into insignificance of the household head having university education.

Second, the multinomial logit is most appropriate for categories that are wholly unordered. However, in our case, if we think of the dependent variable as being the change in income relative to the (changing) poverty line, our four categories admit a natural ordering:

worsening	unidentified	improving
NP→P	P→P ; NP→NP	P→NP



change in real income

This allows us to experiment with an ordered logit (OL) model.[40] Where the MNL estimates a set of coefficients for every state (except the base), the OL estimates just one set applicable to all households plus two thresholds at which the model's prediction flips from one class to the next. This is attractive in the sense that the beneficial income effects of producing *x* kilos of rice when the price increases should be invariant with respect to poverty status - you get *xdp* dong more. Thus the OL appears to promise greater efficiency. However, the response to variables may differ by status: for example, the returns to education or to living in Hanoi may be quite different between the rich (well-informed, well-connected, etc.) and the poor. Hence characteristics that correlate with increasing real income among the poor may imply falling income for the rich and vice versa.

Appendix III presents the trade effects from a selection of OL models. The reported figures are the marginal effects of each variable on the probability of escaping from poverty. They are calculated household by household and averaged for the table. The significance indicators, however, refer to the statistical significance of the coefficients of the OL. Model 1 sample A reports those for the ordering just discussed estimated on the full sample. They are very disappointing. The pseudo-R^2 falls to 0.05, and very few effects are significant although the trade variables are significant as a group. Among trade variables, rice production in the Red River Delta boosts the chances of improvement, while rice output in general, fertiliser use and export employment appear to harm them. These are pretty surprising results.

One explanation may be the excessive homogeneity in responses that the OL imposes across income levels. To alleviate this, we truncate the sample at its extremes, so that the single set of parameters refers to households starting off from more similar positions. Hence we re-estimated the model on half the full sample comprising the second to sixth deciles in 1992-93 (sample C of Table 5). About one-tenth of this reduced sample lies above the poverty line and nine-tenths below. Of course, truncating in this way increases the relative importance of unwarranted changes in status due to observation and random errors. The results reported as 'Model 1 sample C' are rather better in terms of signs – e.g. positive effects from rice production, fertiliser use and export employment, and also in terms of fit. They are not strong, however.

[40] We are grateful to Barry Reilly for suggesting this.

A further refinement is to combine our two sample truncations and use sample (C) subject to a household not being within ±10% of the poverty line in either year. We call this sample B/C. Sample B/C eliminates the (NP→P and NP→NP) categories (since the poverty line lies at the 56th percentile in 1992-93 in our panel sample), and so turns the model into a simple logit of 'persistent poverty' (P→P) vs. 'improvement' (P→NP). This is reported as Model 2 sample B/C in Appendix III. This serves to bring the results further back towards expectations: the initial quantity of rice and coffee have positive effects and the employment variables and rice fertiliser have positive and significant effects. To test whether it is the exclusion of the small idiosyncratic (NP→P) category that lies behind this improvement, we also estimate a simple logit of 'no-change' vs. 'improvement', i.e. [(P→P) and (NP→NP)] vs. (P→NP) on the larger samples A and C. This is reported as Model 3. It is a small advance on Model 1.

Another approach, theoretically unattractive, but informative if only as a diagnostic, is to order households via an "extended" view of their status. Being poor twice (P→P) is worst, being poor once is next worst, with NP→P (decline despite the general growth) worse than P→NP, and never being poor (NP→NP) is the most desirable state. Reported as Model 4, this re-ordering "restores" the model's fit in the full sample, with a pseudo-R^2 of 0.22, and the signs of its coefficients. The reduced sample, tells much the same story, but less precisely. This version of the OL model is rather like a "correlates of poverty" exercise with better observation of poverty status than the usual single cross-section provides. Its success relative to the other OL models might suggest that our data contain more information about status than about transitions, but its evident fragility is a source of weakness. Given the concerns above about the appropriateness of the ordered logit (OL) model, we register our disappointment that it does not behave 'better', but conclude that it does not invalidate our basic approach.

The final sensitivity test continues the stream of thought that led to the OL and asks, quite independent of poverty lines, what determines changes in income? It is a simple regression of changes in total household expenditure on the various determinants discussed so far. Given the absence of any information about poverty all, this approach is even more vulnerable to concerns that it is dominated by the experiences of the relatively rich and so it is essential to consider truncating the sample. Appendix IV reports a simple version of the regression model on the full sample (A) and the half sample located, as before, around the poverty line (C).

The results differ very significantly between the samples. For example, the effect of university education is positive and strongly significant in the full sample, but larger and insignificant among poorer households. The Mekong shows smaller income increases than average in the full sample, but higher average increases in the reduced one, quite possibly reflecting the increases in rice prices and exports. Overall, the trade variables are jointly significant at the 5% level even if they are not individually, but their signs are not plausible. It is worth re-iterating, however, that all our independent data refer to initial conditions, so this is a far tougher test than, say, the decompositions used by Dercon (2000) for Ethiopia, in which expenditure changes are related to initial characteristics and changes in them. These results are again disappointing for our maintained view that trade policy has affected poverty directly, but they are not entirely nugatory. Since poverty is our focus we draw comfort from the MNL model over the more sensitive OL and linear regression approaches.

6. Conclusion

This paper makes two contributions. For the first time it implements and tests empirically a conceptual framework linking trade liberalisation and extreme poverty. While clearly not explaining anything like the full extent of Vietnam's poverty dynamics, it shows that the framework is plausible and adds significantly to our understanding of and ability to predict the poverty impact of trade reform. Substantively, the paper has shown that despite its incompleteness and hesitancy, trade reform in Vietnam over the 1990s reduced poverty. Exports and imports boomed and the prices of some tradable goods increased strongly. We find signs of these effects in the household data, with the real incomes of the poor tending to increase via their engagement in the rice, coffee and light manufactures sectors. These last results are significant both statistically and economically, and although they are not entirely secure, they represent, we think, the first time that trade variables have been formally traced through into households poverty statistics *ex post*.

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APPENDIX I

Table 1: Share of selected commodities in total imports, 1992-98

Commodity	1992	1993	1994	1995	1996	1997	1998
Fuels and raw materials, *of which*	55.8	60.9	52.7	56.2	51.9	67.1	..
Fuel (gasoline, diesel, etc)	24.2	15.6	11.9	8.6	9.3	9.3	9.5
Machinery and equipment	19.4	23.5	29.5	25.0	32.6	19.9	..
Fertilizer	12.6	4.8	4.2	6.6	5.4	3.6	5.5
Steel and iron	4.1	5.4	3.5	4.6	4.5	4.1	6.0
Cement	..	..	..	1.0	0.7	0.4	0.0
Motorcycles	..	..	..	5.0	3.7	2.1	4.0
Textile yarn	..	..	..	1.4	1.4	1.4	1.8
Cars	..	..	..	1.8	1.3	1.2	1.5
Consumer goods	14.9	15.6	17.8	16.1	11.2	8.9	..
Total imports (mn. USD)	2,817	3,924	5,827	8,381	11,644	11,592	11,527

Source: IMF Statistical Appendix (1998, 2000), Primary source: Ministry of Trade statistics

Table 2: Share of selected commodities in total exports, 1992-98

Commodity	1992	1993	1994	1995	1996	1997	1998
Crude oil	30.5	28.3	21.4	19.7	18.3	15.5	13.2
Rice	12.1	12.2	10.5	9.5	11.7	9.5	10.9
Coal	1.9	2.3	1.9	1.7	1.6	1.2	1.1
Rubber	2.2	2.5	3.3	3.1	2.2	2.1	1.4
Coffee	3.5	3.7	8.1	10.9	4.6	5.4	6.3
Marine products	12.2	14.3	13.6	8.3	8.9	8.5	9.2
Garments	7.7	8	11.7	8.3	15.7	14.8	15.5
Footwear	0.2	2.3	3	3.8	7.2	10.6	11
Total exports (mn. USD)	2,475	2,985	4,054	5,198	7,337	9,145	9,365

Source: IMF Statistical Appendix (1998, 2000), Primary source: Ministry of Trade statistics
Note: Trade data from the GSO and the Ministry of Trade (used by the IMF above) differ slightly.

Table 3: Trade data from various sources

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Exports (mn. USD)												
GSO	1,946	2,404	2,087	2,581	2,985	4,054	5,449	7,256	9,185	9,360	1,540	14,308
UNCTAD	1,946	2,404	2,087	2,581	2,985	4,054	5,449	7,256	9,185	9,360	11,540	14,308
EIU		1,306	1,999	2,475	2,850	4,054	5,449	7,256	9,185	9,361	11,523	14,449
IMF						4,054	5,198	7,337	9,145	9,365		
IMF DOTS	2,471	2,524	2,189	2,918	2,985	4,054	5,723	7,156	8,722	8,779	10,018	
WBMS		1,876	2,731	3,460	4,101	5,268	6,912	7,266	9,142	9,419	10,261	
Imports (mn. USD)												
GSO	2,566	2,752	2,338	2,541	3,924	5,826	8,155	11,144	11,592	11,499	11,622	15,200
UNCTAD	2,566	2,752	2,338	2,541	3,924	5,826	8,155	11,144	11,592	11,499	11,622	15,200
EIU		1,208	1,846	2,535	3,505	5,245	8,155	11,144	11,592	11,495	11,636	15,635
IMF						5,827	8,381	11,644	11,744	8,703		
IMF DOTS	3,031	2,841	2,483	3,027	3,924	4,826	11,803	13,919	14,165	12,383	13,063	
WBMS		1,714	1,309	2,814	4,650	6,348	9,370	11,150	10,882	10,329	10,290	

Notes: Economist Intelligence Unit - Primary source: GSO and World Bank. Data for 1990-91 excludes exports to the non-convertible area. IMF Statistical Appendix - Primary source: Ministry of Trade, Customs office and staff estimates. Based on MOT data for 1992-94 and Customs data for 1995-98. IMF DOTS (Direction of Trade Statistics)- Most data after 1994 seems to be estimated from partner records instead of Vietnam's own records.

Table 4: Output structure of the economy, 1991-2000

Sector	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP structure by economic sector (%)												
Agriculture, Forestry and Fisheries	33.1	31.8	30.7	30.2	28.9	27.4	26.2	25.1	24.2	23.7	23.8	23.2
State sector	3.7	3.7	4.0	4.1	4.3	4.5	4.1	4.2	4.3	4.2	3.8	..
Non-state sector	96.3	96.3	96.0	95.9	95.7	95.5	95.9	95.8	95.7	95.7	96.1	..
Foreign investment sector	..	..	..	..	..	0.0	0.0	0.0	0.0	0.2	0.1	..
Industry and Construction*	25.9	25.2	25.6	26.6	27.7	28.9	29.9	31.3	32.6	33.4	34.4	35.4
State sector	54.0	50.7	49.6	51.4	51.3	50.9	50.6	49.7	49.4	48.6	47.4	..
Non-state sector	46.0	49.3	50.4	48.6	48.7	29.5	29.8	29.6	28.2	26.4	25.4	..
Foreign investment sector	..	..	..	..	..	19.5	19.6	20.7	22.5	24.9	27.2	..
Services	41.0	43.0	43.6	43.2	43.4	43.7	43.8	43.6	43.2	42.9	41.9	41.4
State sector	64.0	56.1	55.9	55.8	55.5	55.4	54.4	55.4	56.1	56.0	55.4	..
Non-state sector	36.0	43.9	44.1	44.2	44.5	42.9	43.6	42.6	41.9	42.0	42.2	..
Foreign investment sector	..	..	..	..	..	1.8	2.0	2.0	2.0	2.0	2.4	..
GDP growth rate by economic sector (%)												
Agriculture, Forestry and Fisheries	..	..	1.7	6.9	3.3	3.9	5.1	4.4	4.0	2.7	5.2[a]	4.0[b]
Industry and Construction*	..	..	12.3	9.9	12.6	14.0	13.9	14.4	13.5	10.3	7.7[a]	8.2[b]
Services	..	..	5.5	9.1	8.6	9.2	10.2	10.6	10.0	8.9	4.2[a]	3.7[b]
Total GDP growth	4.7	5.1	6.0	8.7	8.1	8.8	9.5	9.3	8.1	5.8	4.8[a]	5.5[b]
GDP structure by ownership (%)												
State sector	41.5	38.1	38.4	39.0	39.6	40.1	40.1	40.8	41.4	41.3	40.4	40.6
Non-state sector	58.5	61.9	61.6	61.0	60.4	53.5	53.2	51.9	50.4	49.5	49.2	48.7
Foreign investment						6.4	6.7	7.3	8.2	9.2	10.4	10.7

Source: calculated from GSO statistics provided by CIEM; GDP growth rates by economic sector (%) - CIEM (1999, 2000).
Notes: There is a slight discrepancy in sectoral growth rates (especially in Services) between the two CIEM series.
* This sector includes mining & quarrying, and electricity, gas and water supply; a) estimates; b) provisional.
Non-state sector includes collective, private, household, and mixed. Till 1993 figures for the non-state sector also included the foreign investment sector.

Table 5: Employment structure of the economy, 1990 – 2000

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Employment structure by economic sector (%)											
Agriculture, Forestry and Fisheries	72.3	72.6	72.9	73	71.7	69.7	70.7	65.8	63.5	63.7	62.6
State sector	1.96	1.71	1.46	1.39	1.26	1.21	1.03	0.91	1.11	0.95	0.82
Non-state sector	98.04	98.29	98.54	98.61	98.74	98.79	49.94	98.92	98.80	98.88	98.90
Mixed	..	..	..	..	..	..	49.02	0.17	0.06	0.16	0.27
Foreign investment sector	..	..	..	..	..	..	0.02	0.00	0.03	0.01	0.01
Industry and Construction*	13.9	13.6	13.4	13.4	12.9	13.2	10.4	12.4	11.9	12.5	13.1
State sector	28.28	23.88	22.55	22.80	23.25	22.93	20.60	19.10	19.89	21.00	19.87
Non-state sector	71.72	76.12	77.45	77.20	76.75	77.07	18.85	75.26	74.39	71.94	72.54
Mixed	..	..	..	..	..	..	58.56	3.02	2.46	3.48	3.64
Foreign investment sector	..	..	..	..	..	..	1.98	2.62	3.27	3.58	3.95
Services	13.3	13.3	13.1	13.1	15.4	17	18.9	21.8	24.6	24	23.6
State sector	42.98	40.94	38.56	36.50	31.61	29.07	26.13	26.40	26.93	28.69	29.34
Non-state sector	57.02	59.06	61.44	63.50	68.39	70.93	8.25	72.76	71.90	70.11	69.44
Mixed	..	..	..	..	..	..	65.27	0.59	0.73	0.87	0.89
Foreign investment sector	..	..	..	..	..	..	0.33	0.25	0.44	0.33	0.33
Employment structure by ownership (%)											
State sector	11.30	10.15	9.35	9.05	8.78	8.83	8.75	9.01	10.15	10.11	10.06
Non-state sector	88.70	89.85	90.65	90.95	91.23	91.17	38.43	90.00	88.81	88.62	88.48
Mixed	..	..	..	..	..	..	52.54	0.61	0.51	0.74	0.86
Foreign investment sector	..	..	..	..	..	..	0.28	0.38	0.53	0.53	0.60

Source: calculated from MOLISA statistics provided by CIEM
Note: The non-state sector includes collective, private, household, mixed and foreign investment sector till 1995.

Table 6: Labour force participation rates, 1990-2000

(*in '000 persons*)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Population *	65610.9	66893.8	68189.2	69509.7	70771.7	71985.5	73166.6	74346	75526.3	76596.8	77685.5
Total employment	30,004.2	30,571.6	31,262.0	32,022.4	32,856.9	33,666.8	33,978.3	34,352.7	34,800.1	35,679.5	36,205.8
Employment growth	..	2	2	2	3	2	1	1	1	3	1
Employed population as % total population	46	46	46	46	46	47	46	46	46	47	47
Unemployment rate in urban areas (%)	..	..	8.3	7.3	6.1	6.4	5.9	6	6.9		

Source: Unemployment rates from CIEM (1999); rest from MOLISA statistics provided by CIEM
Note: There is some debate about trends in employment - the IMF estimates this ratio was 49% for this period (IMF, 1998, 2000). * The population data is adjusted to 1-4-1999.

Table 7: Export Products with the Biggest Increase between 1993 and 1998 (US$ million)

SITC		1992	1993	1994	1995	1996	1997	1998	Change
85	Footwear	30	139	300	511	782	1149	1212	1073
85102	Footwear with outer soles of leather	23	81	174	351	515	754	796	715
85101	Footwear with outer soles & uppers, rubber/plastic	6	56	110	158	265	391	412	356
84	Articles of apparel and clothing accessories	344	502	657	857	1142	1313	1275	773
8439	Other outer garments of textile fabrics	109	127	137	171	216	254	259	132
8429	Other outer garments of textile fabrics	111	130	132	170	247	262	239	109
07	Coffee, tea, cocoa, spices, and manufactures thereof	98	150	402	673	452	578	687	537
0711	Coffee, whether or not roasted or freed of caffeine	76	113	351	614	375	469	603	490
04	Cereals and cereal preparations	169	122	161	279	402	328	646	524
0422	Rice semi-milled or wholly milled, broken rice	150	103	132	259	329	269	620	517
77	Electrical machinery, apparatus and appliances, N.E.S., and electrical parts thereof	4	6	9	18	104	385	509	503
7722	Printed circuits and parts thereof	0	0	0	1	27	136	193	193
7721	Elect.app. such as switches, relays, fuses, plugs etc.	0	1	1	2	14	150	192	191
33	Petroleum, petroleum products and related materials	727	879	903	1040	1362	1520	1217	338
3330	Petroleum oils and crude oils obt. From bitumin. Minerals	727	879	902	1040	1361	1516	1211	332
03	Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	329	415	544	575	607	713	707	292
0360	Crustaceans and molluscs, fresh, chilled, frozen etc.	274	336	438	440	446	513	537	201
0372	Crustaceans and molluscs, prepared or preserved	21	22	34	47	51	67	60	38
82	Furniture and parts, thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	13	35	74	116	178	234	220	185
8219	Other furniture and parts	9	19	32	55	86	124	125	106
8211	Chairs and other seats and parts	4	12	29	40	67	84	74	62
89	Miscellaneous manufactured articles, N.E.S.	11	25	41	84	128	163	189	164
8942	Children's toys, indoor games, etc.	1	7	11	19	28	37	46	39
8973	Jewellery of gold, silver or platinum	0	0	2	9	12	16	21	21
65	Textile yarn, fabrics, made-up articles, N.E.S., and related products	37	63	104	150	177	220	210	147
6584	Bed linen, table linen, toilet & kitchen linen etc.	15	27	41	55	52	61	57	30
6514	Yarn contain. 85% by wgt. Of synth. Fibres, not for sale.	0	0	4	5	2	26	16	16
	Total	2368	3090	4066	5390	6603	8074	8272	5182

Source: Our calculations based on World Bank Mirror Statistics.

Table 8: Import Products with the Biggest Increase between 1993 and 1998 (US$ million)

SITC		1992	1993	1994	1995	1996	1997	1998	Change
65	Textile yarn, fabrics, made-up articles, N.E.S., and related products	298	518	662	943	1169	1263	1151	633
77	Electrical machinery, apparatus and appliances, N.E.S., and electrical parts thereof	65	218	233	354	490	667	740	522
74	General industrial machinery and equipment, N.E.S., and machine parts, N.E.S.	71	191	274	417	509	476	492	301
67	Iron and steel	108	167	246	283	403	417	468	301
58	Plastics in non-primary forms	75	112	204	292	339	403	393	281
72	Machinery specialised for particular industries	143	284	424	551	782	631	552	268
61	Leather, leather manufactures, N.E.S., and dressed furskins	21	56	96	166	237	268	270	214
56	Fertilisers	198	130	205	317	368	339	333	203
84	Articles of apparel and clothing accessories	20	28	34	47	56	184	198	170
59	Chemical materials and products, N.E.S.	24	47	68	103	139	184	208	161
	Total	2494	4400	5841	7720	10426	9574	9477	5077

Source: Our calculations based on World Bank Mirror Statistics.

Table 9: Input-Output Ratios: Major Export Commodities

SITC (Rev. 2)		Change in Exports (US$ m) 1993-98	Input-Output Sector		Exports/ Gross Output	Value Added/ Gross Output	Labour Costs/ Value Added	ISIC (Rev. 3)		Average Wage (US$)[A]	Labour Coefficients[B] (Jobs per US$ m gross output)	Increase in Labour Income[C] (US$ m)	Employment Shock (% of Total Employment)
85102	Footwear with outer soles of leather	715	66	Leather goods	0.83	0.41	0.78	1920	Manuf. of footwear	873.67	380	227	0.80
85101	Footwear with outer soles & uppers, rubber/plastic	356	47	Other plastic products	0.18	0.11	0.37	1920	Manuf. of footwear	873.67	47	10	0.04
			44	Processed rubber and by-products	0.17	0.36	0.54				233	18	0.06
84	Articles of apparel and clothing accessories	773	62	Ready-made clothes, sheets	0.84	0.19	0.70	1810	Manuf. of wearing apparel	772.09	173	103	0.39
0711	Coffee, whether or not roasted or freed of caffeine	490	03	Coffee beans	0.93	0.65	0.78	0113	Growing of fruit, nuts, beverage and spice crops	328.43	1528	245	2.19
			26	Coffee, processed	0.32	0.37	0.77	1549	Manuf. of other food products	922.78	313	1	0.00
0422	Rice semi-milled or wholly milled, broken rice	517	30	Other food manufactures, N.E.S.	0.23	0.10	0.57	1531	Manuf. of grain mill products	852.05	67	29	0.10
77	Electrical machinery, apparatus and appliances, N.E.S., and electrical parts thereof	503	57	Electrical machinery and equipment	0.00	0.25	0.51			1318.10	96	64	0.14
33	Petroleum, petroleum products and related materials	338	17	Crude oil, natural gas	0.99	0.86	0.13	1110	Extraction of crude petroleum and natural gas	1340.28	83	37	0.08
03	Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	292	12	Fishery	0.17	0.72	0.86	0500	Fishing	328.43	1887	12	0.11
			29	Processed seafood and by-products	0.71	0.29	0.79	1512	Processing and preserving of fish and fish products	633.78	361	62	0.29
82	Furniture and parts, thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	185	34	Processed wood and wood products	0.32	0.18	0.62	3610	Manuf. of furniture	689.32	163	21	0.09
89	Miscellaneous manufactured articles, N.E.S.	164	69	Products of other industrial activities	0.17	0.28	0.61			1311.02	131	28	0.06
65	Textile yarn, fabrics, made-up articles, N.E.S. and related products	147	61	Fibres, thread and weaving of cloths	0.12	0.31	0.44	1711	Preparation and spinning of textile fibres; weaving of textiles	814.92	169	8	0.03
			64	Weaving and embroidery of textile-based goods	0.13	0.30	0.57	1721	Manuf. of made-up textile articles except apparel	681.72	247	15	0.06

Source: Calculations based on GSO (1999) Input-Output Table and UNIDO (2002) Industrial Statistics Database

Note: **A/** These are the average annual wage computed from the UNIDO data. As the UNIDO data are only available for the industrial sector, the lowest wage within the industrial sector (ISIC 1722: carpets and rugs) is used for the categories of coffee beans and fishery. For crude oil and natural gas, the average wage for the industrial sector is employed. For the case of electrical goods and miscellaneous manufactured goods, given the great variation of products within these categories, the average wage of the respective category is used. **B/** Labour Coefficients = Labour Coefficient = (Labour Costs/Gross Output) × (1/Average Wage). In order to avoid the double entries of trade values in the cases where we have two sectors in the input-output table, we weighted the change in exports by the trade share of each sector in that category. **C/** Increase in Labour Income = (Labour Income/Gross Output) × (Change in Exports). Employment Shock = (Labour Coefficients × Change in Exports) / (Number of Total Employment in 1996) × 100. The number of total employment (33,978,000) was obtained from the MOLISA statistics provided by the CIEM. In the case of rice, paddy has a low ratio of exports to gross output, presumably because most rice exports are undertaken after being milled in the country rather than as paddy. Because there is no category for milled rice or grain in Vietnam's input-output table, we have added the category of "other food manufactures" which seems to include the sub-sector of milled rice.

Table 10: Input-Output Ratios: Major Import Commodities

SITC		Change in Imports (US$ m) 1993-98	Input-Output Sector		Imports/ Apparent Consumption	Value Added/ Gross Output	Labour Costs/ Value Added	ISIC (Rev. 3)		Average Wage (US$)[A]	Labour Coefficients[B] (Jobs per US$ m gross output)	Increase in Labour Income[C] (US$ m)	Employment Shock (% of Total Employment)
65	Textile yarn, fabrics, made-up articles, N.E.S. and related products	633	61	Fibres, thread and weaving of cloths	0.44	0.31	0.44	1711	Preparation and spinning of textile fibres; weaving of textiles	814.92	169	57	0.21
			64	Weaving and embroidery of textile-based goods	0.54	0.30	0.57	1721	Manuf. of made-up textile articles	681.72	247	37	0.16
77	Electrical machinery, apparatus and appliances, N.E.S., and electrical parts thereof	522	57	Electrical machinery and equipment	0.74	0.25	0.51			1318.10	96	66	0.15
74	General industrial machinery and equipment, N.E.S., and machine parts, N.E.S	301	54	General purpose machinery	0.91	0.35	0.68			680.96	352	72	0.31
67	Iron and steel	301	60	Ferrous metal and products, except machinery and equipment	0.66	0.31	0.65	2710	Manuf. of basic iron and steel	1024.74	197	61	0.17
58	Plastic in non-primary forms	281	46	Plastics (including semi-plastic products)	0.86	0.19	0.51	2520	Plastic products	948.25	103	14	0.04
			47	Other plastic products	0.32	0.11	0.37				42	6	0.02
72	Machinery specialised for particular industries	268	55	Special purpose machinery, accounting and office machines	0.83	0.29	0.70			1012.93	197	53	0.16
61	Leather, leather manufactures, N.E.S., and dressed furskins	214	65	Products of leather tanneries	0.78	0.43	0.74	1911	Tanning and dressing of leather	647.97	497	69	0.31
56	Fertilisers	203	41	Fertiliser	0.80	0.19	0.45	2412	Fertilisers and nitrogen compounds	1334.08	65	18	0.04
84	Articles of apparel and clothing accessories	170	62	Ready-made clothes, sheets	0.18	0.19	0.70	1810	Manuf. of wearing apparel	772.09	173	23	0.09
59	Chemical materials and products, N.E.S.	161	42	Pesticides and veterinary medicine	0.58	0.28	0.71	2421	Pesticides and other agro-chemical products	1460.65	138	16	0.03
			49	Other chemical products	0.15	0.25	0.50	2429	Other chemical products	1059.38	119	10	0.03

Source: Calculations based on GSO (1999) Input-Output Table and UNIDO (2002) Industrial Statistics Database

Note: A/ These are the average annual wage computed from the UNIDO data. For the case of electrical goods, general machinery and special purpose machinery, given the great variation of products within these categories, the average wage of the respective category is used.

B/ Labour Coefficients = Labour Coefficient = (Labour Costs/Gross Output) × (1/Average Wage). In order to avoid the double entries of trade values in the cases where we have two sectors in the input-output table, we weighted the change in exports by the trade share of each sector in that category.

C/ Decrease in Labour Income = (Labour Income/Gross Output) × (Change in Imports).

Employment Shock = (Labour Coefficients × Change in Imports) / (Number of Total Employment in 1996) × 100. The number of total employment (33,978,000) was obtained from the MOLISA statistics provided by the CIEM.

Table 11: Labour Demand per $1 of Trade, 1993, 1998
Direct Labour Coefficients

(A) Direct Labour Coefficients (Direct Labour Demand per $1 of Trade). ADJUSTED DATA

	EX93	IM93	NET93	EX98	IM98	NET98	NET93-98
Unskilled	0.1415	0.0859	0.0556	0.1270	0.1009	0.0261	-0.0295
Medium-Skilled	0.0285	0.0330	-0.0045	0.0275	0.0313	-0.0038	0.0007
Highly-Skilled	0.0015	0.0027	-0.0012	0.0015	0.0027	-0.0012	0.0000
Total	0.1715	0.1216	0.0499	0.1560	0.1349	0.0211	-0.0288

(B) Direct Labour Coefficients (Direct Labour Demand per $1 of Trade). UNADJUSTED DATA

	EX93	IM93	NET93	EX98	IM98	NET98	NET93-98
Unskilled	0.1249	0.0801	0.0448	0.1251	0.0854	0.0397	-0.0051
Medium-Skilled	0.0348	0.0312	0.0036	0.0392	0.0319	0.0073	0.0037
Highly-Skilled	0.0018	0.0028	-0.0010	0.0020	0.0028	-0.0008	0.0002
Total	0.1615	0.1141	0.0474	0.1663	0.1201	0.0462	-0.0012

(C) Total Labour Coefficients (Total Labour Demand per $1 of Trade). ADJUSTED DATA

	EX93	IM93	NET93	EX98	IM98	NET98	NET93-98
Unskilled	0.3950	0.3424	0.0526	0.4263	0.3814	0.0449	-0.0077
Medium-Skilled	0.0937	0.1095	-0.0158	0.0987	0.1145	-0.0158	0.0000
Highly-Skilled	0.0137	0.0127	0.0010	0.0137	0.0134	0.0003	-0.0007
Total	0.5024	0.4646	0.0378	0.5387	0.5093	0.0294	-0.0084

(D) Total Labour Coefficients (Total Labour Demand per $1 of Trade). UNADJUSTED DATA

	EX93	IM93	NET93	EX98	IM98	NET98	NET93-98
Unskilled	0.3665	0.3899	-0.0234	0.4046	0.4090	-0.0044	0.0190
Medium-Skilled	0.1004	0.1245	-0.0241	0.1156	0.1278	-0.0122	0.0119
Highly-Skilled	0.0147	0.0147	0.0000	0.0145	0.0151	-0.0006	-0.0006
Total	0.4816	0.5291	-0.0475	0.5347	0.5519	-0.0172	0.0303

Source: Calculations based on the SAM 1997.

Table 12: Some Selected Items in The Central Government Budget, 1990 – 2000

	1991	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**		**1999**	**2000**
									Budget	*IMF est.*	*Budget*
Revenues from trade taxes (tr. VND)											
Total govt. revenue & grants	..	21	30.5	42.1	53.4	62.4	65.4	73	69.5	74.2	74.3
Taxes on international trade	..	2.2	5.9	10	13.3	15.1	13.5	14.9	15.5	14.5	15
Trade taxes as % of Total revenue	11.11	10.48	19.34	23.75	24.91	24.2	20.64	20.41	22.3	19.54	20.18
Trade taxes as % of total trade	..	2.71	6.35	7.23	7.78	5.99	4.56	4.43	..	..	..
Expenditure (as % of total current expenditure)											
Social services		31.96	36.95	38.97	42.82	42.92	46.2	45.02	51.4	48.57	45.41
Education	..	7.73	9.83	10.6	11.06	11.63	14.04	14.21	15.8	15.3	14.97
Health		5.67	5.76	5.44	5.65	5.92	5.85	5.72	5.8	5.93	5.61
Pensions and social relief	..	12.37	13.9	15.19	17.41	17.34	17.93	16.05	..	..	..
Social subsidies	..	..	..	..	..	..	..	..	17.8	17.4	14.97
Other	..	6.19	7.46	8.02	8.94	8.25	8.38	9.23	10	9.94	9.69

Source: IMF (1998,2000).

APPENDIX II REGRESSION RESULTS OF MULTINOMIAL LOGIT MODELS (Relative Risk Ratios)

Model 1: Without trade variables
Model 2: With trade variables
Sample A: Full sample

	NP → P		P → NP (Escaping Poverty)		NP → NP	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Geographic characteristics						
Urban	0.911	0.998	**1.716	***1.979	***2.442	***3.231
Northern Uplands	1.412	1.726	1.188	1.257	1.155	1.325
Red River Delta	1.082	1.814	**1.445	**1.667	1.261	***2.489
(North Central)						
Central Cost	1.523	1.650	0.986	0.970	***2.658	***2.706
Central Highlands	1.282	0.830	**2.256	1.019	***6.600	**3.177
South East	***3.965	***3.879	***5.423	***4.736	***19.678	***18.482
Mekong River Delta	***5.027	***4.580	***2.126	***2.175	***9.605	***8.213
Ethnicity						
(Kinh)						
Chinese	1.806	1.905	0.765	0.715	*3.952	**4.883
Other ethnicity	0.864	1.006	***0.386	***0.430	***0.359	***0.453
Demographic characteristics						
Female head of household	0.994	1.058	0.984	1.016	1.085	1.197
Age of household head	0.951	0.959	***1.305	***1.316	***1.456	***1.464
No. of males 60+	0.968	0.925	0.918	*0.895	*0.879	***0.829
No. of females 55+	1.122	1.085	1.092	1.074	*1.118	1.076
No. of males 19-59	0.997	0.933	0.993	0.942	0.977	*0.892
No. of females 19-54	1.138	1.070	*1.115	1.073	**1.152	1.073
No. of children 15-18	0.969	0.889	1.029	0.969	**0.893	***0.782
No. of children 6-14	***0.460	***0.411	**0.887	***0.807	***0.631	***0.538
No. of children 3-5	***0.604	***0.560	***0.760	***0.725	***0.520	***0.475
No. of infants 0-2	***0.581	***0.558	***0.784	***0.765	***0.548	***0.515
Education variables						
Head						
(No education)						
Primary school	**1.688	**1.706	***1.835	***1.833	***2.126	***2.066
Lower secondary school	**1.779	**1.836	***2.844	***2.834	***3.455	***3.548
Upper secondary school	1.584	1.764	***3.227	***3.343	***6.734	***7.564
Tech/voc school	1.275	1.383	***1.989	***2.023	***4.696	***5.132
University	***0.000	***0.000	**10.061	***12.707	***46.400	***69.795
Spouse						
(No spouse)						
No education	1.097	1.038	0.938	0.887	1.128	1.083
Primary school	1.061	1.043	1.073	1.087	**1.637	**1.699
Lower secondary school	1.222	1.209	1.061	1.052	1.273	1.294
Upper secondary school	**2.966	**3.096	1.454	1.426	***2.399	***2.447
Tech/voc school	*2.913	**3.230	***2.735	***3.021	***6.234	***7.334
University	***0.000	***0.000	2.409	2.251	***6.413	***6.214

Occupations (Head)						
White collar	***5.733	***6.111	***3.291	***3.528	***7.465	***8.349
Sales/Services	1.657	*2.168	1.498	**1.846	***3.252	***5.065
(Agriculture)						
Production	1.185	1.234	0.966	1.167	1.249	**1.608
Not working	0.678	0.745	***0.604	**0.634	0.783	0.939
Illness shock						
Household head ill for more than a week in past 4 months	**1.828	**1.995	1.221	1.249	1.030	1.090
Infrastructure						
Access to electricity	1.422	1.381	***1.541	***1.446	***3.481	***3.364
Road	0.620	0.733	***1.666	**1.605	**0.680	0.768
Food shop	1.409	1.459	***1.611	***1.766	***2.190	***2.317
Daily market	***2.015	***2.205	1.093	1.208	***1.512	***1.613
Primary school	0.456	0.441	0.782	0.767	*0.496	**0.483
Lower secondary school	1.110	1.030	0.872	0.792	**1.382	1.164
Upper secondary school	1.091	1.175	1.042	1.098	**1.565	***1.736
Post office	***0.566	**0.561	***0.622	***0.619	***0.378	***0.363
Clinic	1.634	1.531	***1.923	***1.756	**1.701	***1.841
Agricultural variables						
Quantity of rice production		1.769		***1.753		***3.445
In Mekong River Delta		0.752		**0.601		***0.505
In Red River Delta		**0.710		**0.845		***0.612
Quantity of coffee production		***2.358		***2.315		***2.359
Quantity of fertiliser for rice		***1.679		***1.460		***1.491
Quantity of fertiliser for non-rice		1.557		*1.696		**1.969
Trade variables						
Ratio of household members working in export [(1)] to no. of adults		***1.649		***1.254		***1.517
Change in the ratio [(2)]		*1.186		**1.173		**1.169
Duration between two surveys	0.932	0.920	***1.500	***1.432	***1.375	***1.394
Seasonality						
(Interviewed 1st quarter)						
Interviewed 2nd quarter	0.626	0.629	1.054	1.065	0.928	0.960
Interviewed 3rd quarter	0.941	1.156	**1.341	***1.594	***1.821	***2.190
Interviewed 4th quarter	0.820	0.788	***1.845	***1.668	***1.965	***1.994
No. of observations	4302	4302	4302	4302	4302	4302
Pseudo R^2	0.234	0.266	0.234	0.266	0.234	0.266

Source: Calculations based on the VLSS 92-93 and 97-98.

Note: *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(1) The export sector includes seafood, food processing, garment, and shoes (+rubber and plastic products).

(2) It should be noted that the categories for occupation slightly differ between the VLSS 92-93 and the VLSS 97-98.

APPENDIX III REGRESSION RESULTS OF ORDERED LOGIT / LOGIT MODELS (Marginal Effects on Escaping from Poverty (P→NP))

Model 1: Outcome 1 (NP→P); Outcome 2 (P→P or NP→NP); Outcome 3 (P→NP)
Model 2: Outcome 1 (P→P); Outcome 2 (P→NP)
Model 3: Outcome 1 (P→P or NP→NP); Outcome 2 (P→NP)
Model 4: Outcome 1 (P→P); Outcome 2 (NP→P); Outcome 3 (P→NP); Outcome 4 (NP→NP)
Sample A: Full sample
Sample C: Only those households whose 1992-93 per capita expenditures are 10% above and 40% below the median
Sample B/C: Excluding those households whose per capita expenditures are ±10% of the poverty line in either year from Sample C

	Model 1		**Model 2**	**Model 3**		**Model 4**	
	Sample A	**Sample C**	**Sample B/C**	**Sample A**	**Sample C**	**Sample A**	**Sample C**
Agricultural variables							
Quantity of rice production	-0.015	0.081	0.028	**-0.055	0.050	***0.156	**0.098
In Mekong River Delta	-0.004	-0.060	-0.042	0.004	-0.059	***-0.071	*-0.068
In Red River Delta	***0.031	-0.022	-0.026	***0.038	-0.023	***-0.052	-0.011
Quantity of coffee production	0.002	-0.006	0.080	0.004	-0.007	0.015	0.037
Quantity of fertiliser for rice	-0.006	0.006	***0.075	0.017	*0.050	0.013	0.033
Quantity of fertiliser for non-rice	-0.001	*0.068	0.065	-0.005	*0.082	***0.054	0.018
Trade variables							
Ratio of household members working in export [(1)] to no. of adults	*-0.016	0.015	*0.027	-0.008	**0.029	***0.037	**0.035
Change in the ratio [(2)]	0.009	0.019	*0.025	0.013	*0.024	*0.012	*0.024
No. of observations	4302	2152	1268	4098	2111	4302	2152
Pseudo R^2	0.052	0.100	0.246	0.074	0.119	0.223	0.122

Source: Calculations based on the VLSS 92-93 and 97-98.
Note: *** significant at 1% level; ** significant at 5% level; * significant at 10% level.
(1) The export sector includes seafood, food processing, garment, and shoes (+rubber and plastic products).
(2) It should be noted that the categories for occupation slightly differ between the VLSS 92-93 and the VLSS 97-98.

APPENDIX IV REGRESSION RESULTS FOR CHANGES IN CONSUMPTION

Dependent variable: Change in per capita consumption expenditures between 1992-93 and 1997-98
Model 1: Sample A: Full sample
Model 2: Sample C: Only those households whose 1992-93 per capita expenditures are 10% above and 40% below the median

	Model 1: Sample A	Model 2: Sample C
Geographic characteristics		
Urban	***518.38	***296.06
Northern Uplands	-104.18	-24.51
Red River Delta	124.74	66.73
(North Central)		
Central Cost	**-192.66	*-157.00
Central Highlands	96.61	**464.22
South East	***700.69	***537.81
Mekong River Delta	-170.59	45.31
Ethnicity		
(Kinh)		
Chinese	-169.25	-179.40
Other ethnicity	***-172.76	***-272.06
Demographic characteristics		
Female head of household	-2.53	123.96
Age of household head	2.79	***6.14
No. of males 60+	-38.13	-14.44
No. of females 55+	77.98	-17.35
No. of males 19-59	-21.06	34.46
No. of females 19-54	***141.92	56.01
No. of children 15-18	56.07	25.83
No. of children 6-14	***46.83	-21.03
No. of children 3-5	-42.92	*-57.96
No. of infants 0-2	*81.36	**-83.54
Education variables		
Head		
(No education)		
Primary school	37.73	***123.82
Lower secondary school	***260.93	***316.88
Upper secondary school	***521.33	***456.86
Tech/voc school	***372.51	***273.23
University	***1486.99	2691.62
Spouse		
(No spouse)		
No education	-72.25	-4.00
Primary school	-14.48	76.86
Lower secondary school	-69.23	22.62
Upper secondary school	-215.34	12.95
Tech/voc school	130.29	268.72
University	469.55	-82.57
Occupations (Head)		
White collar	**354.42	102.48

Sales/Services (Agriculture)	-68.51	158.11
Production	-96.21	53.92
Not working	-8.92	8.90
Illness shock		
Household head ill for more than a week in past 4 months	**-186.61	-18.76
Infrastructure		
Access to electricity	***215.48	***136.26
Road	***275.93	***261.55
Food shop	**145.08	*107.47
Daily market	-44.78	58.51
Primary school	***335.61	54.10
Lower secondary school	**-146.88	-86.47
Upper secondary school	107.52	-57.06
Post office	**-140.97	-79.53
Clinic	108.73	41.91
Agricultural variables		
Quantity of rice production	-0.00	0.04
In Mekong River Delta	0.01	0.01
In Red River Delta	-0.05	-0.01
Quantity of coffee production	0.13	0.03
Quantity of fertiliser for rice	*-0.21	-0.04
Quantity of fertiliser for non-rice	0.03	0.30
Trade variables		
Ratio of household members working in export (1) to no. of adults	***-657.74	-37.82
Change in the ratio (2)	***-446.51	147.42
Duration between two surveys	***27.61	***30.02
Seasonality		
Interviewed 2nd quarter	44.38	33.37
Interviewed 3rd quarter	-61.50	78.76
Interviewed 4th quarter	39.90	111.26
Constant	***-1998.25	***-2018.06
No. of observations	4302	2152
R^2	0.160	0.185

Source: Calculations based on the VLSS 92-93 and 97-98.
Note: *** significant at 1% level; ** significant at 5% level; * significant at 10% level.
(1) The export sector includes seafood, food processing, garment, and shoes (+rubber and plastic products).
(2) It should be noted that the categories for occupation slightly differ between the VLSS 92-93 and the VLSS 97-98.