

Trade liberalization and poverty dynamics in Vietnam 2002-2006

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This paper shows the evolution of poverty in Vietnam during the deepening of trade liberalization and examines the impact of trade-related variables at the household level. The study is based on a panel dataset of households followed in 2002, 2004 and 2006. Trade-related variables at the household level are defined as the household specialization in terms of production (for farmers) and employment with respect to the type of jobs (wage-earnings or self-employed activities) and sectors (import-competing, non-traded or export manufacture, services and agriculture). Two methods are used, a discrete approach that focus on the transitions in and out poverty, and a continuous approach which considers the change in the level of household consumption.

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1. Introduction

The impact of trade liberalization on household welfare has been widely debated. Studies based on cross-country data have shown a positive impact of trade on growth and hence, on poverty (Dollar and Kraay, 2004). However, micro evidence shows that trade creates losers as well as winners. Empirical papers on trade and household welfare have often dealt with Latin or Central American countries (see the survey in Goldberg and Pavcnik 2007) and rather examined inequality issues. Here we focus on an Asian country, Vietnam, and on poverty.

Vietnam has been often cited as an example of a successful trade liberalization which managed to improve household welfare. Poverty dropped sharply, from 58% of the population at the start of economic reform to a mere 16% in 2006 (Glewwe, Gragnolati and Zaman 2002). Meanwhile, inequality either decreased or remained stable. Vietnamese experience in that respect contrasts with that of China where inequality increased during economic reform (Wang & al 2007).

Poverty is studied in this paper in a micro-economic perspective, at the household level. A household is deemed poor if his consumption per capita is below some minimum level. Studies on poverty have often dealt with cross sections and focused mostly on counting the number of poor (the headcount). Here we look not only at usual measures of poverty such as the headcount, but also at the severity of poverty. We show that the severity of poverty increased for some households' categories between 2002 and 2006, despite the general drop in the share of the population below the poverty line. Actually, the distribution among the poor mattered. Households who remained poor after 2002 were deeply in poverty (far below the poverty line) and could not easily improve their living conditions. New export opportunities, both in industry and in agriculture and, the rise in formal wages improved the living conditions of the population in general. However, for those who were poor in 2002, other contextual changes mattered. Indeed, non traded services and self-employment in non agricultural activities helped to buffer the shock of liberalization for the very poor.

The theoretical analysis on poverty has always insisted on the crucial role of poverty dynamics. Recent papers on poverty have thus stressed the importance of following poverty mobility, with longitudinal data (Dercon and Shapiro, 2009; see also Fall and Menendez, 2009, for developed countries). It matters indeed to know who escape poverty and who is staying behind, especially in times of overall economic reform. Studying poverty mobility allows distinguishing between transient and chronic (persistent) poverty. Moreover, transition matrices can precise the type of mobility and its correlation with household or contextual characteristics.

We take stock from the existence of repeated household surveys in Vietnam, where a subset of households were interviewed three times, in 2002, 2004 and 2006. Thus, we are able to follow these households over time and relate their fate to change in trade-related characteristics of these households.

Some previous papers looked at poverty in Vietnam during the 90s, using another available panel dataset which stretched over 1993-1998. We update the results of these papers for the period 2002-2006. We argue that the recent period is quite different from the context in the 90s. The bulk of domestic and export liberalization occurred in the 90s. In the 2000s, textile industry soared, major trade agreements were signed and implemented, beginning with the FTA with the US in 2001, and FDI flew in. Some liberalization started on the import side, a policy turn that matters on income distribution as households are different with respect to trade liberalization by the trade orientation of the sector they are working for and the type of factor endowments they have.

In this paper we tried to characterize extensively the nature of the contextual trade related variables that could influence households. Not only have we defined manufacturing wage earners as working or not in an exporting industry. We also took into account self-employed workers. With respect to the trade orientation of the sector where the individuals are working, we have also distinguished import-competing goods and non-traded services. Moreover, we did the same for farmers. We take stock of a previous paper on rural households (Coello 2009) and distinguished agricultural households depending on the market orientation of the crops they produce: import-competing crops, non traded crops, or exported crops. The latter group is further divided between the main export crops (coffee, pepper, cashew nuts, and tea) and other cash crops. Rice producers appear as a separate category, as rice, the main staple in Vietnam, is exported, imported and locally consumed either through domestic markets or auto-consumed.

We take two approaches. We first take a discrete approach, where we regress poverty transitions, using a multinomial logit. However, this approach has been criticized, as it considers being just below or just above the poverty line as opposite states, which could not be the way a real household lives this evolution. Hence, we complement the discrete approach by a continuous method, where we take the change in household expenditure per capita as the dependent variable. In both approaches, we relate the change in poverty or in expenditure to household characteristics, and to trade-related variables.

2. Trade liberalization in Vietnam, 90s versus 00s

Economic reform in Vietnam started in 1986 (the Doi Moi). The process involved domestic liberalization, from a state economy to a market oriented one. Agriculture was also promoted through decollectivisation and land reform (Gallup (2003); Brandt and Benjamin (2002), Minot, and Goletti (2000) Edmonds and Pavcnik (2004).

On the trade side, Vietnam gradually turned from an import-substitution policy to an export-promoting policy. Liberalization occurred in two steps. During the first period, the 1990s, multiple exchange rates were unified, enterprises were allowed to export outside the socialist countries of the Council of Mutual Economic Assistance (CMEA), pro-FDI legislation was passed and a number of regional and multilateral agreements were negotiated.² Vietnam joined the ASEAN, the AFTA and became a member of the GATT in 1995. Export quotas were eliminated in 1995 for all commodities except rice. Import quotas were gradually transferred into tariffs, except for eight categories of goods.³ The transfer from NTB to tariff protection resulted in an increase in the level of tariffs, even though some specific and important inputs, such as fertilizer, or later, industrial machinery, experienced a drop in tariffs. Overall, during this first period, the import tariffs and to a lesser extent, export tax remained complex and subject to temporary rises; import protection of final goods remained at a high level. As a consequence, during this first period, the effects of openness mostly occurred through exports (Niimi et al.(2003), Justino and al (2008), Coello (2008)).

The signing in 2001 of the bilateral trade agreement with the United States can be seen as the start of the second stage of liberalization. In the 2000s, import protection on final goods started

² The overall share of public sector in total employment remained quite stable over the period (it first decreased to 6% and increased again after 1995 back to 10%); however, it was restructured, with a rise in productivity and wages (Imbert, 2009).

³ This is due to the fact that Vietnam makes its first demand of accession to WTO see Figure 3 , Athukorala 2002 and Auffret 2003 for a detailed description of the process of trade liberalization.

to decline, leading to a competition between domestic and imported products. This trend was further exacerbated with the entry of Vietnam into the WTO in 2007. As a result, the share of trade in Vietnam GDP boomed in the 2000s (Table A2). Exports and imports of goods and services represented respectively 55.03% and 57.5% of GDP in 2000, 76% and 90% in 2006. FDI also rose substantially, after the requirement of a joint-venture was suppressed after 2000. Thus, in the 2000s, other transmission channels, notably through imports, played a role.

a. The Data

Our analysis is based on data from the Vietnam Household Living Standards Surveys (VHLSS) in 2002, 2004 and in 2006. The first collects information from 30,000 households sample, the second from 9,000 households and the third 9200 households with all topics. They all include a household and a commune module. The household questionnaire includes information on basic demographic on all household members (age, sex, relationship to head), on household expenditures (by expenditures purposes: food, education, health, etc.), on household income, employment and labor force participation, education of household members (literacy, highest diploma, fee exemption), on health of household members (use of health services, health insurance), on housing (type of housing, electricity, water source, toilet, etc.), on assets and durable goods and on participation in poverty programs.

In this paper we focus on the panel subset of 1947 households which were followed through 2002-2004-2006.⁴ Table 1 shows the representativeness of the panel dataset in terms of poverty, compared to the national numbers and to the entire dataset. Results show that the General Statistic Office measure in 2002 gives 28.9% of poor households in the country, the cross section dataset count 28.4% and the panel dataset 29.4% for the same year. The panel dataset is thus very similar in terms of poverty to the officials' numbers. Table 2 also validates the representativeness of our panel dataset. In 2002, 30.9% of the households' heads in the entire population had no education; this number equals 31% in the panel dataset. If we look at heads with more than primary education, the rates are again very similar (respectively 45.3% and 44.3%).

b. Households' economic activities

We construct a variable that identify the trade orientation of each type of employment. We start with the main activity reported by each individual during the last twelve month. We then sum for each household the number of individuals who report working in different activities. For that purpose, the ISIC code of any activity was (manually) matched with the SITC classification used in trade data (COMTRADE and GSO statistics).⁵ The latter are used to determine if Vietnam is a net importer or exporter for a given product. Table A4 shows the sectors that could not be matched with the SITC classification and that we defined as non-traded sectors that are services.

Household members also report whether they are wage earners or self employed. The latter category will be divided between self-employed working on farm and those working in non-farm activities. Unfortunately due to the questionnaire design, the answers are not exclusive. For instance, among the 133 individuals who worked in aquaculture, 32 reported themselves as wage earners, 84 as self-employed and 17 declared themselves both wage earners and self employed.

⁴ The panel linkage dataset was provided by Brian McCaig as the one provided by the statistical institute (GSO), show some inconsistencies.

⁵ See Table A3.

We thus defined four categories: i) wage earners ii) self-employed on farm iii) self-employed in non-farm activities iv) “other”.⁶ The latter includes all combinations: being a wage earner and self-employed on farm; being a wage earner and self-employed in non-farm activities; being self-employed in farm and non-farm activities, etc. As a robustness check, we try also an alternative grouping where we allow the categories to be non exclusive. (section 7).

At the farm level, as no export data directly related to households are available, it is the type of crops grown by households that identify them as importers, main exporters, other exporters or nontrade producers. Those categories are identified based on the amounts traded internationally, reported in COMTRADE and GSO statistics and the amounts harvested by the farmers. The resulting (main export) cash crops are tea, coffee, rubber, pepper and cashew (see Table A6).⁷ We are quite confident that the households who grow these main export crops are mostly producing for international markets. Coello (2009) has shown that in 2002, cash crop producers sold on markets on average more than 78% of their harvest, while households growing other crops sold only 30% of their harvest, retaining the rest for own consumption. The corresponding share for rice producers is even lower, at 24% on average.

c. Consumer price index (cpi)

We need a deflator for the expenditure data. We use a regional and monthly cost of living index, in order to take into account the spatial as well as the time variation that occurred during the period the survey was conducted.⁸ Moreover, according to the position of a household in the expenditure distribution its share of food and non-food consumption is different and then the inflation it is facing (see Figure A1 and Figure A2). Thus the costs of index also take into account the share of food and non-food consumption by expenditures quintiles. Finally the deflated expenditures are compared to a real poverty line set in January 2002, 2004 and 2006.

3. From trade liberalization to household welfare and poverty

In this paper, we focus on the micro linkages going from trade liberalization to households’ income (surveyed in Hertel and Reimer (2004) and Goldberg and Pavcnik (2004)). We do not consider macro linkages that go through growth and stabilization, which were analyzed in cross-countries studies such as Dollar and Kraay (2004) or Edwards (1998) and discussed in Rodriguez and Rodrik (1999).

We follow and precise the framework described in Winters, McCulloch and Cirera (2001). Trade liberalization hits households through direct and indirect effects (Figure 2). The former go through products (their prices, quantities and number of varieties) and factors markets (wages, employment, and new job opportunities). The indirect effects concern changes in government revenues and social spending.⁹ This framework has been widely applied, and in particular, to Vietnam in the first period of trade liberalization (Justino, Litchfield and Pham (2008); Niimi, Vasudeva Dutta and Winters (2003)). We precise this framework in the case of the second period of Vietnam’s trade liberalization. New elements need indeed to be taken into account.

⁶ We want to thank Nina Pavcnik for suggesting this specification..

⁷ Households share of harvest in the different categories have been computed thanks to the monetization of the production. The harvest is valued in Vietnam Dongs, please refer to Coello (2009) and Brandt, Benjamin and Coello(2009) for details of the methodology.

⁸ The regional and monthly consumer price indices were provided by Loren Brandt.

⁹ The impact of social spending and public transfers is not studied in this paper.

Trade liberalization provides export opportunities that could lead to higher domestic producer prices of exported goods. For both types of goods, households will be differently affected depending on their position as net producers or net consumers. A particularly significant crop in Vietnam is rice (Justino, Litchfield and Pham (2008)). Rice is the main staple and accounts for more than 68% of the average calories intake in 2006, 71% in rural areas, and even 78% for the poor (Glewwe and Vu (2008)). On the other hand, trade liberalization also decreases the price of imports and as a consequence, the price of local import competing goods., it Moreover, agricultural households can take advantage of the liberalization by choosing to specialize in an export crop. Many farmers in Central Highlands have indeed switched to coffee and more recently to cashew (Benjamin and Brandt (2002), Benjamin, Brandt and Coello (2009); Coello (2009)). Hence we take into account crops' specialization. We distinguish crops by their trade orientation: main exported, other exported, imported, non-traded and rice). Regarding trade orientation, rice is both exported and imported, sold in domestic markets and retained for own consumption.

A third transmission channel from trade to households goes through employment. First, trade liberalization could increase the number of hours worked. Second, it may change the employment structure, by sectors and types of jobs: formal vs. informal jobs; wage earners; self employed in non-farm activities vs. self employed in farm activities¹⁰. Households can develop various strategies in order to benefit from these opportunities. For instance, agricultural households may keep some of their members on farm, while other members diversify their activities out of the farm or migrate. Actually, only 11% of households have a majority of their members working for wages (the average household counts 4 adult members). This proportion increases slightly between 2002 and 2006¹¹. Most households in the panel have a majority of their members in self-employed farm activities (33%) even if this proportion is decreasing over time. Households with self-employed in non-farm activities are as numerous as households with wage earners. Last, over 40% of households have no true specialization by types of jobs and this proportion is increasing over time. Typically, this might concern farmers diversifying their activities with petty trading or transport on a part-time basis. Thus, the evolution of self-employment as well as multiple activities, matters for poverty.

Regarding the sectors, Figure 4 and Figure 5 show that despite the rise of industry in GDP from 23% in 2000 to 40% in 2006, its share in employment remained barely the same, at around 20%. Hence, factor earnings might have increased in industry, in accordance with trade theory, when factor supplies are inelastic and factor returns perfectly elastic. However, at the household level, the households were a majority of members are working in export industry are less than 4% of the panel sample, almost the same proportion as those specialized in import industries. Around one household out of four is dependent on (non-traded) services, and this share is increasing. Most households are dependent on agriculture (66%) even if this proportion is decreasing over time. Among farmers, 48% of agricultural households live mostly from rice production, 6% from the main export crops, and 29% from other export crops. 9% of these households are dependent on import-competing crops (such as maize) that could be affected by the import liberalization in the years to come.

¹⁰ Unfortunately we do not have any information on the formality-informality of the jobs

¹¹ See Table 3

4. The method

a. Poverty and inequality

In this paper, we use the concept of absolute poverty. Households are defined as poor if their per capita expenditure is lower than the official poverty line. In 2002 the official poverty line was set at 1,916,000 Dongs, in 2004, at 2,077 000 Dongs and in 2006, at 2,559 000 Dongs. More generally, the headcount is a particular case of the Foster-Greer-Thorbecke (FGT) class of poverty indices:

$$FGT_{\alpha} = \frac{1}{N} \sum_{i=1}^N I(x_i < z) \left[\frac{z - x_i}{z} \right]^{\alpha}$$

where N is the sample size, z is the poverty line, x_i the per capita expenditure of the i th household, I a dummy variable that takes the value of one if the condition is true and zero otherwise and α a poverty aversion parameter.

The headcount ratio represents the share of poor over total population. It does not take into account the degree of poverty, and hence, it will not be affected by a policy that would further impoverish the poor. Thus we compute the severity of poverty (or squared poverty gap) that puts a greater weight on the poorest and is sensitive to the distribution below the poverty line.¹²

We also look at poverty dynamics: a household can be either poor or not poor in 2002 and transit in or out poverty in 2004 and in 2006. We then examine the robustness of our results by considering alternative poverty lines (10% below or above the official line). Moreover, poverty indices are criticized because of their discrete nature. Crossing the poverty line changes the headcount, despite the fact that it could not mean much for the actual household (Ravallion, 1996). Hence, we also adopt a continuous approach and look at household expenditures, first in the full sample and then restricting to poor households in 2002.

b. Econometric analysis of poverty dynamics

The econometric framework relates the variable of interest (poverty transition or per capita expenditures) to households and commune characteristics as well as trade related contextual variables. We use two forms, a discrete one, with poverty transition as the dependent variable and a continuous one, with household per capita expenditure as the dependent variable. Both approaches have their benefits and limits. The discrete form is the most usual in the literature and allows different coefficients depending on the poverty status. However, results may not be robust to a change in the poverty line. Alternatively, the continuous approach allows to study the impact of trade liberalization or household characteristics even without crossing the poverty line; However, it assumes the same coefficients throughout the distribution. Thus, we also run the continuous regression on a sample restricted to poor households in 2002.

i) Continuous form

We estimate a linear regression on panel data. In a reduced form, households' expenditures are related to households and communes characteristics and to trade related variables. We use a

¹² Another usual index is the poverty-gap (P1), which represents the share of income needed in order to bring all poor at the level of the poverty threshold, has been computed but is not shown for presentation purpose as it provided similar results.

panel model as we are interested in understanding how trade liberalization affected households' welfare. This gives:

$$\Delta Y_{i(t)} = \alpha + \rho_i + \beta X_{it} + \gamma Z_{ct} + \delta \Delta(V_{i(t)}) + \varepsilon_{it}$$

where $Y_{i(t)}$ is the level of expenditure per capita of household (i) in year (t), $\Delta Y_{i(t)}$ is the expenditure per capita growth over (t) and (t+1) that is 2002-2004 and 2004-2006. ρ_i is the household fixed effects, X_{it} are household variables (that do not vary over time and control for initial endowment)¹³, Z_{ct} is a vector of commune controls (that can be seen as the endowment in public goods). $V_{i(t)}$ is the contextual variables, that vary over time : household employment (type of occupation, sector and trade orientation), the presence of a migrant in the household, being a rice producer, the agricultural land area.

ii) Discrete form

We use a multinomial logit regression on the probability of staying, exiting or entering into poverty. The multinomial logit model states that the probability that a household i is in state k is given by:

$$P_{ik} = \frac{\exp(\beta_k x_i)}{\sum_{j=1}^4 \exp(\beta_j x_i)}$$

We examine the poverty transitions between 2002 and 2004 as well as between 2004 and 2006. The unordered choices (k) are (1) being poor in each period, (2) being non-poor in the first period and becoming poor in the second, (3) being poor in the first period and becoming non-poor in the second, and (4) being non-poor in both periods. For interpretation easiness, the results are presented as the impact of the variable on the Relative Risk Ratios or RRR (also called the log-odds ratio). The RRR is the probability of a given outcome divided the probability of the base outcome, which is being poor in both periods. When RRR coefficients are lower than one for a given variable x , it implies that a rise in the variable x reduces the probability that a household is in state k compared to the base category. For instance, if a household with a characteristic $x=1$ has an RRR of 0.6 in state k , and another household who is identical except for $x=0$ has an RRR of 0.4, the impact of the variable x on the RRR is 1.5 ($=0.6/0.4$). It means that the variable x raises the probability of being in state k compared to the probability of remaining poor by 50%. Again, we relate the multinomial logit to household and commune characteristics as well as trade-related variables.

Trade-related characteristics might of course be linked to other household characteristics. However, it is not in a linear and simple way. Table 6 shows some descriptive statistics on household education by type of trade orientation. Households with a majority of members earning wages are as expected better educated (53.6% of household head have more than a primary education). However, households specialized in self-employed non-farm activities are not far below (47%). Households in non-traded services are mostly better educated; households

¹³ We want to thank Martin Ravallion and Dominique Van de Walle for their suggestion of doing so.

in import industries and agriculture share the same pattern, they are either educated households (more than primary education) or completely not educated (they have not completed primary education). Finally, households specialized in export industries are mostly non-educated at all. This simple statistics shows that the level of education might be important indeed for household welfare but also the type of jobs and the sector where the household's income mostly come from. But it gives us confident on the fact that looking at trade related factors is different dimension from education.

5. Household consumption and poverty in Vietnam, 2002-2006

Figures 6 to 8 show the distribution of household expenditure per capita in Vietnam, in 2002, 2004 and 2006, for the whole expenditures and separately for food and non food expenditures. The distribution of total expenditures shifted to the right, especially during 2004-2006.

Table 5 shows the FGT poverty indices computed on household expenditures in Vietnam. The first line shows that between 2002 and 2006 the poverty incidence has been divided by two. 15.5% of population are below the poverty line in 2006. They were almost 30% in 2002. Comparable figures for the 90s are 58% in 1993 and 37% in 1998 (Glewwe et al. 2002). The drop in poverty in Vietnam over 20 years is indeed of a significant scale.

During 2002-2006, most of the drop occurred in 2002-2004. A possible explanation is that households who were just below the poverty line in 2002 changed status relatively easily. On the contrary households who remained poor in 2002-2004 were far below the poverty line. The severity of poverty (P2) is the result of these two contradictory forces: there are fewer poor but they are deeper in poverty. Actually, the severity of poverty also drops by half in 2002-2006, down to 1.28% in 2006. Most of the drop also occurred in 2002-2004. The severity of poverty was 7.9% in 1993 and dropped to 3.5% in 1998.

The incidence of poverty is higher in rural areas (18.3% in 2006) than in urban areas (4.7% in 2006).¹⁴ Poverty decreased in both types of areas, more in 2002-2004, and more, in rural areas, especially for the poorest.

Vietnam regions are historically very different: the South has been inhabited by northern pioneers and was deeply influenced by the French and the Americans. Regional differences mattered for economic growth in the 1990s (Brandt and Benjamin (2002); Coello (2008)). As regards poverty incidence, the poorest regions in 2002, were the North West (57% of the population were below the poverty line) and Central Highlands (57.9%) followed by North Central coast (41.4%) and North East (38.9%). In 2006, the North West has still a poverty incidence of 40.2%, but the other regions, and especially, the Central Highlands, have experienced a tremendous drop in poverty. This can be related to the recent specialization of Central Highlands in cash crop production (Coello (2009), Benjamin & al (2009)). The Central Coast in general and North Central Coast in particular is often affected by natural disasters; in 2005 it has been hit by a Typhoon called Kai-Tak.¹⁵ As a result, the headcount decreased only slightly between 2004 and 2006 in North Central Coast and in the North East, and increased slightly in the South east. The severity of poverty even increased in 2004-2006 in the North central coast.

¹⁴ Comparable figures in 1993 are 66.4% in rural areas and 25.5% in urban areas (resp. 45.5% and 9.2% in 1998).

¹⁵ At least 19 people were killed and 10 others were left missing, the damages from the storm were estimated to be at least \$11 million (2005 USD) (Source Emergency Events Database EM-DAT and http://en.wikipedia.org/wiki/List_of_Pacific_typhoon_seasons)

Poverty seems also related to low education, being in a household whose head is a woman, being from an ethnic minority. As regards activity, poverty is linked to being a farmer, growing main export crops (coffee, cashew, nuts, tea, pepper), as well as import-competing crops or rice. Again, poverty drops most among farmers growing export crops. It also dropped hugely for households in non traded services, while it actually increased in 2004-2006 for households involved in import competing industries.

The distribution among the poor matters. Poverty incidence decreased from 19 % in 2002 to 13% in 2006 for households working in export industries. However, the same households saw the severity of poverty increase in the meantime, from 0.6% in 2002 to 1.5% in 2006. Households working in import industries also saw the severity of poverty increase during this period. This was particularly the case during 2004-2006.

Table 6 shows the transitions in and out poverty during 2002-2006 (for the whole period, and separately for 2002-04 and 2004-06). Almost 13% of the population remains poor during the four years under study. At the other extreme, non-poor that stayed non-poor represent more than 71% of the panel households. The share of transitions out of poverty (11.2%) is more than double the share of transition into poverty (4.3%). In the 90s, for the period 1993-98, Glewwe and al. (2002) found that 28.7% of the population was “permanent” poor; 39% were “permanent” non poor, 27.4% exited poverty and 4.8% entered into poverty. The corresponding figures for rural areas (Justino and Lichfield 2003) are respectively, 33.9% (permanent poor), 31.1% (permanent non poor), 29.7% (out of poverty) and 5.4% (into poverty). Hence, in the 2000s, most of the population has escaped poverty “permanently”, at least in a four-year period. However, the share of permanent poor is not negligible, and the share of entry into poverty is quite constant in the 90s and in the 2000s. Again, there is a huge discrepancy between rural and urban areas.

The percentage of households going out of poverty decelerates in 2004-06 (8.4%) compared to 2002-04 (14.1%). The share of poor households staying in poverty dropped also from 15.3% en 2002-04 to 10.7% in 2004-06.

As a sensitivity test, we set the poverty line 10% above and below the official level. With a poverty line higher by 10%, only 11.2% of households exit poverty in 2002-04 instead of 14.1%. The difference is smaller in the 2004-06 transition (6.9% instead of 8.4%). Alternatively, with a poverty lower by 10%, the poverty exit rate is similar, in 2002-04, and increase by two percentage points in 2004-06. These results indicate that between 2002 and 2004 individuals were just above the official poverty line: with a threshold 10% higher, the probability of exit drops significantly while when the threshold is lower by 10% nothing happens. In 2004-2006, on the opposite, households are equally distributed around the poverty line; varying the threshold in one direction or another impacts the poverty exit rate in almost the same proportion.

Figure 9 shows the kernel distribution of the relative distance of the per capita expenditure of the poor (in logarithm) to the poverty line.¹⁶ The distribution has clearly shifted to the right: the poor are moving farther below the poverty line. In other words, and in contradiction with the picture given by the headcount index alone, the poor in 2006 are less well off than the poor in 2002.

¹⁶ The relative distance to the poverty line is constructed exclusively on poor households. Within the poor we measure the absolute difference between the households' expenditure per capita and the official poverty line, divided by the official poverty line.

6. Trade liberalization and poverty mobility

We now turn to the determinants of the expenditure growth in 2002-06. First, we consider time invariant variables concerning households, communes and farms. Then we add trade-related variables in two steps: first, as time invariant variables as well, then, as changes in these trade-related variables. As a control, we run all these estimations on households who were poor in 2002. The same specifications are run in a multinomial logit which explains the probability to exit and enter poverty. Each estimation is run on the entire population and on the subsample of households reporting an agricultural activity (and land) and control for their crop specialization.¹⁷

a. Poverty and household demographic characteristics

The estimation results are in line with the descriptive statistics as well as with previous studies for the period 1993-98. Household size has a negative impact on poverty: *ceteris paribus* a 1% point increase in the size of the household decreases the household expenditure by more than 1.59% (Table 7 column 1). This is the case for adult members (a 10% rise in the share of male adults between 18 and 60 years old increases the average household per capita expenditure by 3.8%). The share of children has an opposite impact, everything else being equal: a 10 percent increase in the share of children under 18 decreases the average household expenditure by 2.7. Higher expenditures seem related to a more educated head who is not belonging to an ethnic minority.¹⁸

Column 2 presents the same estimation for the farmers' subsample, while column 3 adds controls for the type of crops grown. The negative coefficient of North Central Coast seems consistent with the lower decrease in poverty headcount.¹⁹ Among the commune variables, the availability of electricity has a positive effect on households' expenditure.²⁰ Consumption growth is positively related to a larger share of land held with a certificate and a higher specialization in main export crops.²¹ Most results are in line with previous papers on the 1990s such as Niimi and al. (2003) and Justino and Lichfield (2008).

The same estimation is performed on a subsample of households who were poor in 2002.²² Fewer variables are now significant: living in South East, North central Coast; the share of male between 18 and 16, the fact that the household head is a Kinh (the majority ethnic group), having a land certificate, and having access to electricity.

The multinomial logit method gives us more information on poverty dynamics. The base category is the fact that a household is poor in both periods; results are all given relative to this reference category. The probability of falling into poverty (relative of staying poor) is 58% lower for farmers living in Red River Delta relative to those living in Northeast (Table 8). This is in

¹⁷ We ran the same estimations on farmers controlling for the type of crops grown (such as cereals, fruits, annuals, perennials and vegetables). Results are similar and can be provided by the author on request.

¹⁸ In those educational variables, the reference is when the head hasn't completed any diploma or that is not educated see Table A5 for a description of the omitted variables. A positive effect is also found on the second members' education; however results are not shown as not all households report a second member's education.

¹⁹ These results may also be driven by the passage of the Typhoon Kai-tak.

²⁰ Unfortunately, commune questionnaires have only been filled in rural areas.

²¹ The reference group is being specialized in "other export crops". Table A5 describes the variables and the omitted reference category and lists the crops reported in VHLSS.

²² Results are not shown for presentation matters

line with the lower decrease in poverty among the poorest shown in Table 5. Living in Central Highlands or the South East increase farmers' relative probability of escaping poverty by 110% and by 385% respectively, compared to living in the Northeast. Those results are not surprising as it has already been stated that Central Highlands has seen a large growth in expenditures (by 70%, from 2484 thousand to 4273 thousand Vietnam Dong); the poverty headcount has also decreased in the South East region by almost 60%. However the large probability to fall into poverty in South East contradicts somewhat the high probability of exiting poverty. Several factors could explain this non-intuitive result: the Relative Risk ratio (RRR) are relative to being poor in both periods; but very few households actually remained poor in both period in the South East and moreover the South East exhibits more volatility in household expenditure relative to other regions (Table A1)

Regarding household variables in Table 8, a larger size of the household decreases the probability to fall into poverty by 65% (relative of being poor in both periods) as well as a better educated head. On the opposite, a household whose head belongs to an ethnic minority has on average 70 % less chance to exit poverty relative to Kinh households. Crops diversification (proxied by the number of crops) increases the probability of households to escape poverty, while it has no impact on household consumption. Finally farmers living in a village where there is public transportation have almost 85% more chance to exit poverty (relative to the probability of staying poor in both periods).

b. Poverty and trade-related characteristics

Table 9 shows the impact of the initial household demographic and trade-related characteristics, in 2002. Initial characteristics explain little of the subsequent change in expenditure with a R-squared below 10%. Surprisingly, the number of household members working in export industries in 2002 has a negative impact on consumption growth. The same happens for wage earners working in export industries. More in line with intuition, agricultural households are better off if they are more specialized in main export crops. And households whose members worked both for wage and in self-employment in 2002 experienced a decrease in their consumption.

Table 10 is one of the main result tables of the paper. It shows the impact of change in trade-related variables on households' expenditure growth. The rise of household consumption seems to be related to working in any other sector than agriculture: export, import industries or non-traded services. However, being in a household with mostly self-employed on farm seems to be related to a better outcome than living in a household with wage earners, or self-employed in non-farm activities, or in a multi-activity household. The impact of wage earnings and self-employment changes sign however (columns 4-6) when interactions with the sectors are introduced in the regression. When doing so, households with more wage earners over time experience a rise in their consumption. So do households with more self-employed in non-farm activities. However, multi-activity households are still experiencing a decrease in their consumption, as before. Wage earners in export industries have indeed no significant impact on household consumption while wage earners in import industry is negatively correlated with consumption growth for the whole population, For the subsample of farmers, wage earnings change sign again and is negatively related to consumption growth. Living in a household with mostly wage earners working in the import sector or in services compensate this negative impact.

These results are more complex than the scheme presented in section 2 and seems in line with the deepening of trade liberalization in the 2000s compared to the 90s. In the recent period, trade liberalization extends far more than export promotion. It also seems in the case of Vietnam to

affects all sectors of activity, and not only the formal sector, that can be (grossly) proxied by the wage sector.

Among farmers, being more specialized in main export crops leads to a rise in consumption, as expected, but it is also the case for non-traded crops. Being a net producer of rice affects negatively the growth in consumption, but this is alleviated if one owns a large plot. Thus, there is also a distribution effect among rice producers, which differentiates between large and small producers.

When we restrict the analysis to poor households in 2002 and look at their expenditures, results are quite different (Table 11). Poor are not affected anymore by the import industry, but export industries as well as non-traded services have a positive impact on their consumption growth. These results could be seen as more consistent with a simple theory of comparative advantage. However, when these variables are interacted with the type of jobs, the share of wage earners working in export industries has no impact on consumption. This is indeed surprising, as we would have expected that export industries such as clothing and footwear used intensively unskilled (wage) labor.

Poor consumption also rises with the importance of non-farm self-employment or multi-activity households, for the whole population as well as for farmers. For the latter, growing more export, rice, or import crops increases the consumption growth.

Table 12 looks at the behavior of trade related variables on households' poverty dynamics. The number of household members working in services sectors, relative to those working in agriculture, increases the probability of a household to exit poverty, relative to staying poor, by 54%. The share of wage earners in a household decreases the probability of escaping poverty by 20% in the first estimation and by 35% when wage earners are broken up by sectors' trade orientation. Being specialized in export industries increases both the probability of entering into poverty and of staying out of it. Import sector, on the other hand has a positive impact on the probability to escape poverty and to stay out of it. We thus confirm the un-intuitive result already found for expenditure growth. More expectedly, the size of farm plot has a significant positive impact on the probability of escaping poverty. An idiosyncratic shock such as the migration of one household member decreases the probability of a household to fall into poverty, and at the same time increases its probability to exit from poverty.²³

7. Robustness analysis

As a robustness check, we run the previous estimations with an alternative definition of the types of jobs that allow for overlaps (an individual can be counted twice in two different categories). Table 13 and Table 14 can be compared to Table 10 and Table 12. Results are broadly similar. The main differences are that the higher the number of household members involved in wage earning export activities, the higher the rise of consumption (for farmers) The coefficient of wage earners involved in services is also now positive and significant. Thus, services are effective as a complement to other activities, in rising household welfare.

8. Conclusion

Vietnam trade liberalization occurred in two sub-periods. The first stage corresponded to the initial opening of the country in the nineties. It has been crucial for poverty alleviation and

²³ Migration can take place for work, marriage, study, in order to move with the family of in the case of a household split. The variable was not significant in the continuous estimation.

hence, has been extensively studied. However this first stage might be biased in the sense that trade liberalization mostly dealt with the export side, while domestic production and import-competing sectors were still left mostly unaffected. In this paper, we explore the impact of openness in the second stage of trade liberalization, in the 2000's. Vietnam is now constrained by a network of reciprocal trade agreement and opens its frontiers to foreign competition. The end of this period corresponds to the accession of Vietnam into the WTO.

In the second stage, households might be affected by trade liberalization through a wider number of channels. Not only do we examine households working in export industries. We also take into account households working in import-competing industries or in non-traded services. Indeed, households in export and services sectors have seen their expenditure increase more than others (beginning with farmers and this is true even for poor households. However, the import sector played a positive role in household welfare. This could be endangered as import liberalization deepens in the future. The same holds for farmers. We distinguish them by the trade orientation of the crops they are growing. Main export crops, such as coffee, tea, cashew, and rubber, helped to alleviate poverty, but also did imported crops such as maize. Here again, the future liberalization of maize tariffs deserves careful scrutiny. We also take into account the type of jobs and distinguish between self-employed and wage earners. A robust and un-expected result is the negative effect of wage earnings in the household expenditure growth, despite the fact that trade liberalization might have either increased the number of wage earners (taken as a proxy for formal employment) or have raised the level of unskilled wage itself, in line with Vietnam comparative advantage. We have also seen that multi-activity (households who are both earning wages and self-employed) was an effective strategy to alleviate poverty.

In percentage	2002		2004		2006	
	P0	P2	P0	P2	P0	P2
General Statistic Office	28.9		19.5		16.0	
VHLSS database						
Cross section	28.4	2.5	18.8	1.6	15.5	1.3
Panel	29.4	2.5	19.0	1.7	15.6	1.3

Table 1. Representativeness of the dataset in terms of poverty headcount (P0) and poverty severity (P2)
(Source: GSO and VHLSS)

Education of the head		2002	2004	2006
no education	Full sample	30.95	28.55	25.93
	Panel	30.99	29.92	28.12
primary education	Full sample	23.75	24.45	24.89
	Panel	24.75	25.36	25.58
more than primary education	Full sample	45.30	46.99	49.19
	Panel	44.26	44.73	46.31

Table 2. Representativeness of the dataset in terms of head's level of education

Majority of household members are only	2002	2004	2006	total
Wage earners	10.73	11.15	12.79	11.56
Self-employed on farm	36.88	33.59	30.97	33.81
Self-employed in nonfarm activities not specialized (multi-activity)	11.86	11.61	12.12	11.86
	40.52	43.66	44.12	42.77
Majority of household members are in				
Export sector	4.16	4.73	2.67	3.85
Import sector	3.39	2.98	4.67	3.68
Non-traded sector	23.22	26.3	29.17	26.23
Agriculture sector	69.23	66	63.48	66.24
Majority of agricultural production is in				
Main export crops	6.21	6.63	5.8	6.21
Rice	48.38	47	49.46	48.28
Non-traded crops	8.47	8.73	5.29	7.5
Import crops	8.53	9.86	9.19	9.19
Other export crops	28.4	27.79	30.25	28.81

Table 3. Employment and crops' structure shares in the panel dataset

(VHLSS source and author calculation)
Note: See text and tables A3- A6 for variables definition

	no education	primary	more than primary
Majority of members that are in			
Export sector	45.68	24.69	29.63
Import sector	33.33	28.79	37.88
Non-traded services	21.24	22.79	55.97
Agriculture sector	35.61	26.19	38.2
Total	32.61	25.42	41.96
Majority of members that are only			
Wage earners	25.84	20.57	53.59
Self-employed on farm	35.65	27.3	37.05
Self-employed in nonfarm activities not specialized (multi-activity)	28.14	24.68	47.19
Total	32.61	25.42	41.96

Table 4. Household head's level of education by employment characteristics

	2002		2004		2006	
	P0	P2	P0	P2	P0	P2
All	29.38%	2.50%	19.05%	1.61%	15.46%	1.28%
Rural	34.83%	2.97%	22.68%	1.93%	18.32%	1.55%
Urban	8.82%	0.74%	5.39%	0.39%	4.66%	0.27%
Red River Delta	21.77%	1.21%	12.37%	0.57%	8.06%	0.51%
North East	38.95%	3.21%	25.96%	2.16%	24.91%	1.73%
North West	57.32%	9.90%	52.44%	6.43%	40.24%	5.11%
North Central Coast	41.39%	2.75%	26.64%	2.16%	25.00%	2.27%
South Central Coast	22.40%	1.61%	15.10%	1.68%	11.98%	0.88%
Central Highlands	57.94%	7.36%	35.71%	4.21%	25.40%	3.30%
South East	15.42%	1.15%	5.73%	0.56%	6.17%	0.46%
Mekong River Delta	19.33%	1.27%	13.37%	0.64%	8.83%	0.38%
no diploma	40.16%	4.50%	31.34%	3.27%	26.30%	2.42%
primary	30.71%	2.30%	19.60%	1.24%	14.75%	1.32%
secondary and upper	20.20%	1.08%	9.18%	0.54%	7.47%	0.38%
Not ethnic minority (Kinh)	22.69%	1.33%	12.98%	0.70%	10.32%	0.65%
Ethnic minority	67.59%	9.23%	53.79%	6.80%	44.83%	4.92%
Rice net consumer	15.50%	1.20%	10.71%	0.63%	8.75%	0.62%
Rice net producer	38.53%	3.36%	24.91%	2.30%	20.62%	1.80%
Hsld head is a male	23.11%	1.78%	15.33%	1.06%	12.97%	1.25%
Hsld head is a female	31.12%	2.71%	20.09%	1.76%	16.15%	1.29%
Export sector	19.75%	0.83%	11.96%	0.62%	13.46%	1.48%
Import sector	9.09%	0.55%	3.45%	0.40%	7.69%	0.57%
Non-traded services	7.74%	0.46%	4.30%	0.24%	2.99%	0.13%
Agriculture sector	38.20%	3.39%	26.15%	2.28%	21.84%	1.86%
Wage earners	9.57%	0.88%	10.14%	0.40%	9.64%	0.51%
Self-employed on farm	38.58%	3.84%	25.99%	2.38%	19.90%	1.93%
Self-employed in nonfarm activities not specialized (multi-activity)	8.66%	0.37%	3.54%	0.21%	1.27%	0.03%
Main export crops	40.50%	3.57%	20.93%	1.53%	10.62%	0.74%
Rice	38.22%	3.21%	24.15%	2.26%	20.56%	1.62%
Non-traded crops	18.18%	1.70%	14.12%	1.04%	11.65%	0.79%
Import crops	38.55%	3.87%	28.13%	2.41%	22.35%	2.85%
Other export crops	12.48%	0.90%	8.32%	0.42%	6.62%	0.44%

Table 5. Poverty indices by socioeconomic characteristics

	t	always poor	non-poor t poor t+1	poor t non-poor t+1	non-poor t non-poor t+1	Total
Official Poverty Line	2002	15.25 (297)	3.8 (74)	14.12 (275)	66.82 (1301)	100
	2004	10.68 (208)	4.78 (93)	8.37 (163)	76.17 (1483)	100
	Total	12.97	4.29	11.25	71.49	100
Official Poverty Line +10%	2002	10.89 (212)	3.49 (68)	11.09 (216)	74.52 (1451)	100
	2004	7.45 (145)	4.26 (83)	6.93 (135)	81.36 (1584)	100
	Total	9.17	3.88	9.01	77.94	100
Official Poverty Line -10%	2002	20.13 (392)	4.31 (84)	15 (292)	60.55 (1179)	100
	2004	13.97 (272)	5.5 (107)	10.48 (204)	70.06 (1364)	100
	Total	17.05	4.9	12.74	65.31	100
	Rural	15.50	5.01	13.26	66.24	100
	Urban	3.43	1.60	3.68	91.30	100

Table 6. Poverty dynamics

Note: The year reported on the second column shows the first year of the transition. Thus row one shows the transition from year 2002 to year 2004 and row two from year 2004 to year 2006. Numbers in parenthesis indicate the number of households in each category.

		-1	-2	-3
		All population	Farmers	
Households demographics	Red River Delta	0.0148 [0.0333]	-0.00383 [0.0379]	0.0308 [0.0380]
	North West	-0.0574 [0.0498]	0.00297 [0.0555]	-0.00976 [0.0556]
	North Central Coast	-0.129*** [0.0358]	-0.141*** [0.0404]	-0.109*** [0.0406]
	South Central Coast	0.0870** [0.0388]	0.0295 [0.0478]	0.0533 [0.0479]
	Central Highlands	0.00362 [0.0428]	0.0678 [0.0497]	-0.0447 [0.0557]
	South East	0.336*** [0.0370]	0.321*** [0.0539]	0.242*** [0.0562]
	Mekong River Delta	0.231*** [0.0336]	0.313*** [0.0479]	0.329*** [0.0476]
	log hslid size	-0.159*** [0.0321]	-0.152*** [0.0395]	-0.152*** [0.0391]
	log head age	0.258*** [0.0435]	0.246*** [0.0487]	0.253*** [0.0482]
	Share female 18-60	0.143** [0.0595]	0.164** [0.0734]	0.174** [0.0727]
	Share male 18-60	0.387*** [0.0611]	0.417*** [0.0727]	0.433*** [0.0719]
	Share children under 18	-0.273*** [0.0677]	-0.229*** [0.0769]	-0.206*** [0.0762]
	Ethnic minority (=1, 0 otherwise)	-0.283*** [0.0307]	-0.265*** [0.0345]	-0.237*** [0.0345]
	Married (=1, 0 otherwise)	0.132*** [0.0343]	0.0962** [0.0446]	0.0942** [0.0442]
	Head is female (=1, 0 otherwise)	0.106*** [0.0293]	0.0379 [0.0414]	0.0431 [0.0410]
	Urban (=1, 0 otherwise)	0.395*** [0.0232]		
	primary education	0.164*** [0.0250]	0.158*** [0.0283]	0.164*** [0.0280]
	secondary and upper education	0.406*** [0.0252]	0.336*** [0.0292]	0.335*** [0.0289]

(to be followed)

		-1	-2	-3
		All population	Farmers	
Commune infrastructure	Daily market (=1, 0 otherwise)		-0.003 [0.0253]	-0.00149 [0.0251]
	Post office (=1, 0 otherwise)		-0.00393 [0.0242]	0.00221 [0.0240]
	Bus, train water transport (=1, 0 otherwise)		0.0197 [0.0234]	0.0208 [0.0232]
	Electricity (=1, 0 otherwise)		0.136*** [0.0448]	0.112** [0.0445]
Farm characteristics	Share of land with certificate in 04		0.118*** [0.0285]	0.123*** [0.0283]
	log of number of crops		0.0141 [0.0191]	0.0045 [0.0194]
	distance to the agricultural plot		0.0112 [0.00846]	0.0108 [0.00839]
Crops' trade orientation	share of harvest in main export			0.292*** [0.0807]
	share of harvest in rice			-0.0471 [0.0564]
	share of harvest in non-traded			0.160** [0.0814]
	share of harvest in import			0.00356 [0.0795]
	Constant	6.970*** [0.190]	6.705*** [0.220]	6.681*** [0.224]
	Observations	5841	3514	3514
	R-squared	0.499	0.442	0.457
	Number of hhid	1947	1222	1222
Standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1				

Table 7. Per capita of expenditure and households' characteristics'

	all population			farmers			farmers			
	1	2	3	4	5	6	7	8	9	
Households demographics	Red River Delta	0.517* [0.186]	0.925 [0.251]	0.831 [0.195]	0.383** [0.163]	1.088 [0.347]	0.916 [0.258]	0.381** [0.163]	1.19 [0.386]	0.98 [0.279]
	North West	1.083 [0.416]	1.046 [0.303]	0.601* [0.169]	0.891 [0.412]	1.108 [0.376]	0.842 [0.278]	0.969 [0.457]	1.17 [0.406]	0.94 [0.316]
	North Central Coast	0.430** [0.142]	0.517*** [0.129]	0.314*** [0.0673]	0.208*** [0.0862]	0.454*** [0.134]	0.254*** [0.0657]	0.226*** [0.0943]	0.537** [0.162]	0.295*** [0.0775]
	South Central Coast	0.85 [0.339]	1.093 [0.340]	1.602* [0.419]	0.605 [0.298]	1.496 [0.548]	1.431 [0.457]	0.719 [0.359]	1.975* [0.745]	1.818* [0.594]
	Central Highlands	0.361** [0.177]	1.303 [0.347]	0.958 [0.236]	0.4 [0.234]	2.103** [0.703]	1.606 [0.503]	0.77 [0.484]	2.231** [0.840]	1.687 [0.609]
	South East	2.721** [1.266]	3.733*** [1.425]	8.596*** [2.963]	2.113 [1.410]	4.849*** [2.618]	10.63*** [5.111]	2.859 [1.984]	5.330*** [2.990]	11.22*** [5.586]
	Mekong River Delta	1.069 [0.362]	1.626* [0.426]	3.109*** [0.698]	0.946 [0.511]	2.706** [1.131]	5.815*** [2.127]	1.02 [0.555]	3.231*** [1.364]	6.784*** [2.501]
	log hslid size	0.359*** [0.126]	0.983 [0.276]	0.404*** [0.0958]	0.339** [0.152]	0.918 [0.319]	0.435*** [0.130]	0.337** [0.151]	0.893 [0.312]	0.418*** [0.125]
	log head age	1.707 [0.713]	1.206 [0.368]	4.558*** [1.223]	2.183 [1.083]	1.229 [0.443]	4.998*** [1.602]	2.107 [1.047]	1.203 [0.437]	4.874*** [1.572]
	Share female 18-60	0.485 [0.332]	0.368* [0.209]	1.323 [0.611]	0.286 [0.249]	0.203** [0.146]	0.629 [0.373]	0.306 [0.268]	0.200** [0.145]	0.65 [0.385]
	Share male 18-60	6.899** [5.200]	2.705 [1.732]	20.71*** [11.29]	15.83*** [14.36]	6.493** [4.947]	31.10*** [20.72]	15.25*** [13.90]	6.505** [5.004]	31.09*** [20.93]
	Share children under 18	0.369 [0.261]	0.355** [0.185]	0.243*** [0.108]	0.273 [0.232]	0.310* [0.193]	0.228*** [0.123]	0.262 [0.224]	0.309* [0.194]	0.226*** [0.123]
	Ethnic minority (=1, 0 other)	0.289*** [0.0798]	0.352*** [0.0671]	0.145*** [0.0244]	0.284*** [0.0943]	0.337*** [0.0769]	0.169*** [0.0347]	0.286*** [0.0969]	0.351*** [0.0828]	0.179*** [0.0376]
	Married (=1, 0 otherwise)	1.048 [0.385]	1.171 [0.337]	2.189*** [0.537]	1.213 [0.600]	1.047 [0.379]	1.707* [0.542]	1.183 [0.592]	1.034 [0.378]	1.693 [0.543]
	Head is female (=1, 0 other)	0.874 [0.311]	1.185 [0.324]	1.507* [0.350]	0.9 [0.432]	1.132 [0.396]	1.193 [0.364]	0.869 [0.422]	1.122 [0.395]	1.197 [0.368]
	primary education	1.658** [0.395]	1.934*** [0.343]	3.152*** [0.493]	2.165*** [0.635]	2.088*** [0.444]	3.668*** [0.705]	2.097** [0.618]	2.038*** [0.437]	3.651*** [0.708]
	secondary and upper educa	2.265*** [0.595]	3.542*** [0.693]	11.09*** [1.897]	3.342*** [1.058]	4.186*** [0.960]	12.11*** [2.494]	3.164*** [1.006]	3.938*** [0.909]	11.58*** [2.406]
	Urban (=1, 0 otherwise)	1.259 [0.465]	1.061 [0.307]	3.785*** [0.884]						

(to be followed)

		all population			farmers			farmers		
		np p	p np	np np	np p	p np	np np	np p	p np	np np
Commune infrastructure	Daily market (=1, 0 otherwise)				0.953 [0.276]	0.802 [0.169]	0.952 [0.173]	0.881 [0.257]	0.738 [0.157]	0.89 [0.164]
	Post office (=1, 0 otherwise)				0.723 [0.199]	0.862 [0.171]	0.896 [0.154]	0.722 [0.199]	0.881 [0.177]	0.913 [0.159]
	Bus, train water transport (=1, 0 otherwise)				1.431 [0.375]	1.847*** [0.354]	1.383* [0.240]	1.444 [0.379]	1.907*** [0.369]	1.407* [0.247]
	Electricity (=1, 0 otherwise)				1.446 [0.575]	1.415 [0.384]	2.054*** [0.532]	1.524 [0.608]	1.467 [0.403]	2.013*** [0.525]
Farm characteristics	Share of land with certificate in 04				1.081 [0.333]	0.997 [0.216]	1.494** [0.289]	1.03 [0.321]	0.964 [0.211]	1.462* [0.287]
	log of number of crops				0.788 [0.146]	1.264* [0.172]	1.074 [0.126]	0.844 [0.164]	1.411** [0.202]	1.166 [0.144]
	distance to the agricultural plot				0.95 [0.0998]	0.949 [0.0746]	0.933 [0.0649]	0.94 [0.101]	0.924 [0.0734]	0.909 [0.0636]
Crops' trade orientation	share of harvest in main export							0.704 [0.750]	7.187*** [4.459]	5.349*** [2.958]
	share of harvest in rice							2.809* [1.596]	4.686*** [2.111]	3.457*** [1.247]
	share of harvest in non-traded							2.536 [2.424]	3.049 [2.407]	3.693** [2.427]
	share of harvest in import							2.313 [1.768]	5.352*** [3.113]	2.698** [1.354]
	Constant	0.341 [0.615]	0.532 [0.693]	0.00951*** [0.0110]	0.215 [0.480]	0.349 [0.560]	0.00393*** [0.00565]	0.103 [0.237]	0.0943 [0.157]	0.00154*** [0.00228]
	Observations	3894	3894	3894	2338	2338	2338	2338	2338	2338
	R-squared	0.205	0.205	0.205	0.197	0.197	0.197	0.203	0.203	0.203
	Number of hhid	1416	1416	1416	930.1	930.1	930.1	955.8	955.8	955.8

Table 8. Poverty transitions and households characteristics

	1	2	3	4	5	6	7	8
	all population	farmers	farmers	all population	farmers	farmers	farmers	farmers
nbr pers work in export	-0.0423** [0.0198]	-0.0361 [0.0310]	-0.0317 [0.0312]					
nbr pers work in import	-0.0202 [0.0235]	0.00181 [0.0324]	0.00541 [0.0324]					
nbr pers work in nontraded	-0.0217 [0.0173]	-0.0194 [0.0230]	-0.0158 [0.0231]					
nbr pers work only wage	0.0161 [0.0183]	-0.0312 [0.0289]	-0.0317 [0.0288]	0.0257 [0.0242]	-0.0281 [0.0488]	-0.0226 [0.0489]		
nbr pers work only self-employed nonfarm	0.0271 [0.0223]	0.0477 [0.0435]	0.0445 [0.0435]	0.0101 [0.0170]	0.0334 [0.0386]	0.0342 [0.0385]		
not specialized (multi-activity)	-0.0126 [0.0127]	-0.0243* [0.0141]	-0.0238* [0.0141]	-0.0179 [0.0118]	-0.0292** [0.0128]	-0.0277** [0.0128]		
nbr pers work only wage* nbr pers work in export				-0.0304** [0.0137]	-0.0389 [0.0306]	-0.0392 [0.0306]		
nbr pers work only wage* nbr pers work in nontraded				-0.00283 [0.00807]	-0.00978 [0.0272]	-0.0128 [0.0272]		
nbr pers work only wage* nbr pers work in import				-0.0122 [0.00935]	0.0391 [0.0357]	0.0395 [0.0359]		
total area* rice net producer							-0.00108 [0.00667]	-0.00136 [0.00666]
rice net producer							-0.0427 [0.0439]	-0.0285 [0.0568]
log of the agricultural area							-0.0105 [0.0155]	-0.0169 [0.0160]
share of harvest in main export			0.252*** [0.0940]			0.262*** [0.0937]		0.270*** [0.0950]
share of harvest in rice			0.0545 [0.0644]			0.0629 [0.0640]		0.0898 [0.0713]
share of harvest in non-traded			0.0674 [0.0825]			0.0727 [0.0826]		0.0481 [0.0830]
share of harvest in import			0.0997 [0.0850]			0.102 [0.0850]		0.108 [0.0853]
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Commune Controls	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Crops' Orientation	No	No	Yes	No	No	Yes	No	Yes
Observations	1947	1176	1176	1947	1176	1176	1176	1176
R-squared	0.05	0.079	0.085	0.05	0.08	0.086	0.072	0.079

Table 9. Households consumption growth on trade-related variables in 2002

	1	2	3	4	5	6	7	8
	all population	farmers	farmers	all population	farmers	farmers	farmers	farmers
nbr pers work in export	0.0786*** [0.0216]	0.123*** [0.0293]	0.126*** [0.0291]					
nbr pers work in import	0.160*** [0.0253]	0.199*** [0.0302]	0.196*** [0.0299]					
nbr pers work in nontraded	0.209*** [0.0188]	0.192*** [0.0223]	0.193*** [0.0221]					
nbr pers work only wage	-0.103*** [0.0192]	-0.0715** [0.0280]	-0.0746*** [0.0277]	0.0672** [0.0262]	-0.0985** [0.0492]	-0.105** [0.0487]		
nbr pers work only self-employed nonfarm	-0.129*** [0.0245]	-0.0132 [0.0478]	-0.00846 [0.0473]	0.0716*** [0.0181]	0.184*** [0.0429]	0.186*** [0.0425]		
not specialized (multi-activity)	-0.113*** [0.0143]	-0.0695*** [0.0149]	-0.0617*** [0.0149]	-0.0411*** [0.0131]	-0.00427 [0.0134]	0.00405 [0.0134]		
nbr pers work only wage* nbr pers work in export				-0.021 [0.0163]	0.0335 [0.0307]	0.038 [0.0303]		
nbr pers work only wage* nbr pers work in nontraded				0.00487 [0.00890]	0.0776*** [0.0223]	0.0786*** [0.0221]		
nbr pers work only wage* nbr pers work in import				-0.0428*** [0.0133]	0.0836*** [0.0306]	0.0807*** [0.0303]		
total area* rice net producer							0.0269*** [0.00910]	0.0276*** [0.00909]
rice net producer							-0.314*** [0.0393]	-0.267*** [0.0558]
log of the agricultural area							0.0590*** [0.0141]	0.0594*** [0.0146]
share of harvest in main export			0.365*** [0.0774]			0.311*** [0.0795]		0.188** [0.0810]
share of harvest in rice			0.0202 [0.0543]			-0.0393 [0.0556]		0.0265 [0.0682]
share of harvest in non-traded			0.183** [0.0778]			0.149* [0.0802]		0.211*** [0.0799]
share of harvest in import			0.0764 [0.0761]			-0.000881 [0.0783]		-0.0136 [0.0781]
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Commune Controls	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Crops' Orientation	No	No	Yes	No	No	Yes	No	Yes
Observations	5841	3514	3514	5841	3514	3514	3514	3514
Number of hhid	1947	1222	1222	1947	1222	1222	1222	1222
R-squared	0.541	0.495	0.51	0.515	0.465	0.479	0.476	0.482

Table 10. Panel estimation of households expenditure growth on trade-related variables

	1	2	3	4	5	6	7	8
	all population	farmers	farmers	all population	farmers	farmers	farmers	farmers
nbr pers work in export	0.0541* [0.0310]	0.124*** [0.0475]	0.129*** [0.0467]					
nbr pers work in import	0.00471 [0.0389]	0.0122 [0.0447]	0.00455 [0.0437]					
nbr pers work in nontraded	0.101*** [0.0281]	0.0958*** [0.0335]	0.0991*** [0.0326]					
nbr pers work only wage	-0.0483** [0.0238]	-0.0578 [0.0387]	-0.0278 [0.0419]	-0.00875 [0.0326]	-0.107 [0.0779]	-0.0661 [0.0806]		
nbr pers work only self-employed nonfarm	-0.0383 [0.0506]	0.104 [0.0943]	0.109 [0.0921]	0.0877** [0.0387]	0.208** [0.0888]	0.220** [0.0871]		
not specialized (multi-activity)	0.0177 [0.0159]	0.0122 [0.0176]	0.0143 [0.0174]	0.0337** [0.0151]	0.0294* [0.0168]	0.0320* [0.0166]		
nbr pers work only wage* nbr pers work in export				0.0286 [0.0391]	0.0311 [0.0565]	0.0245 [0.0572]		
nbr pers work only wage* nbr pers work in nontraded				-0.00118 [0.0140]	0.0716 [0.0645]	0.0722 [0.0631]		
nbr pers work only wage* nbr pers work in import				-0.0193 [0.0271]	0.0484 [0.0633]	0.0186 [0.0628]		
total area* rice net producer							0.00174 [0.0121]	0.00356 [0.0120]
rice net producer							-0.164*** [0.0584]	-0.140* [0.0786]
log of the agricultural area							0.0773*** [0.0203]	0.0528** [0.0220]
share of harvest in main export			0.401*** [0.100]			0.383*** [0.102]		0.287*** [0.106]
share of harvest in rice			0.121 [0.0761]			0.117 [0.0776]		0.148* [0.0858]
share of harvest in non-traded			-0.142 [0.165]			-0.151 [0.173]		-0.0673 [0.160]
share of harvest in import			0.217** [0.0989]			0.223** [0.100]		0.209** [0.101]
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Commune Controls	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Crops' Orientation	No	No	Yes	No	No	Yes	No	Yes
Observations	1716	1322	1322	1716	1322	1322	1322	1322
Number of hhid	572	450	450	572	450	450	450	450
R-squared	0.331	0.367	0.403	0.315	0.35	0.384	0.36	0.378

Table 11. Panel estimation of poor households' expenditure growth on trade-related variables

	1	2	3	4	5	6	7	8	9
	all population			farmers			farmers		
	np p	p np	np np	np p	p np	np np	np p	p np	np np
nbr pers work in export	1.421* [0.261]	1.151 [0.181]	1.506*** [0.201]	0.805 [0.286]	1.04 [0.243]	1.442* [0.288]	0.809 [0.288]	1.068 [0.251]	1.484** [0.298]
nbr pers work in import	1.26 [0.333]	1.325 [0.256]	2.528*** [0.417]	1.135 [0.351]	1.271 [0.284]	2.144*** [0.409]	1.142 [0.353]	1.289 [0.288]	2.160*** [0.410]
nbr pers work in nontraded	1.496** [0.262]	1.547*** [0.207]	2.464*** [0.294]	1.162 [0.259]	1.312 [0.220]	2.087*** [0.310]	1.167 [0.261]	1.342* [0.226]	2.126*** [0.318]
nbr pers work only wage	0.851 [0.137]	0.806* [0.0972]	0.564*** [0.0606]	1.436 [0.376]	0.999 [0.217]	0.722* [0.140]	1.465 [0.389]	1.015 [0.222]	0.729 [0.143]
nbr pers work only self-employed nonfarm	0.547 [0.213]	0.96 [0.239]	0.975 [0.210]	0.344 [0.367]	0.995 [0.478]	1.414 [0.565]	0.35 [0.373]	1.024 [0.492]	1.436 [0.574]
not specialized (multi-activity)	1.073 [0.112]	1.025 [0.0760]	0.781*** [0.0539]	1.059 [0.136]	1.011 [0.0886]	0.822** [0.0668]	1.043 [0.137]	0.999 [0.0886]	0.814** [0.0672]
R-squared	0.23			0.215			0.221		
Observations	3894			2338			2338		
nbr pers work only wage* nbr pers work in export	1.522** [0.284]	1.203 [0.215]	1.517*** [0.232]	1.686 [0.752]	1.742 [0.681]	2.414** [0.866]	1.682 [0.759]	1.726 [0.683]	2.420** [0.879]
nbr pers work only wage* nbr pers work in nontraded	1.283** [0.162]	1.293*** [0.129]	1.396*** [0.128]	1.897** [0.582]	1.806** [0.521]	2.337*** [0.633]	1.940** [0.598]	1.846** [0.537]	2.384*** [0.652]
nbr pers work only wage* nbr pers work in import	1.371 [0.328]	1.432* [0.281]	1.713*** [0.315]	2.257 [1.129]	2.795** [1.264]	3.090** [1.371]	2.500* [1.318]	3.086** [1.496]	3.377** [1.609]
nbr pers work only wage	0.650* [0.160]	0.652** [0.119]	0.480*** [0.0765]	0.665 [0.284]	0.483** [0.177]	0.308*** [0.101]	0.655 [0.281]	0.483** [0.177]	0.304*** [0.101]
nbr pers work only self-employed nonfarm	0.751 [0.271]	1.341 [0.294]	2.124*** [0.401]	0.374 [0.391]	1.252 [0.569]	2.758*** [1.032]	0.379 [0.397]	1.31 [0.597]	2.814*** [1.056]
not specialized (multi-activity)	1.132 [0.114]	1.083 [0.0769]	0.977 [0.0622]	1.069 [0.131]	1.05 [0.0870]	0.998 [0.0741]	1.053 [0.131]	1.046 [0.0877]	0.996 [0.0752]
R-squared	0.219			0.209			0.214		
Observations	3894			2338			2338		

(to be followed)

	1	2	3	4	5	6	7	8	9
	all population			farmers			farmers		
	np p	p np	np np	np p	p np	np np	np p	p np	np np
total area* rice net producer				1.16 [0.235]	1.055 [0.151]	1.741*** [0.210]	1.168 [0.244]	1.127 [0.165]	1.793*** [0.224]
rice net producer				0.856 [0.387]	0.811 [0.264]	0.235*** [0.0680]	0.593 [0.331]	0.705 [0.286]	0.193*** [0.0695]
log of the agricultural area				1.308* [0.196]	1.431*** [0.164]	1.650*** [0.155]	1.338* [0.222]	1.325** [0.166]	1.648*** [0.174]
R-squared				0.228			0.233		
Observations				2338			2338		
migration	0.615 [0.186]	2.530*** [0.454]	1.372* [0.223]	0.64 [0.232]	2.701*** [0.571]	1.498** [0.292]	0.664 [0.241]	2.874*** [0.617]	1.561** [0.309]
R-squared	0.212			0.204			0.21		
Observations	3894			2338			2338		

Table 12. Poverty transitions and trade related variables

Note: Each estimation is run independently and includes demographic controls. Commune controls are only added for farmers and crops' orientation in columns 7 to 9.

	1	2	3	4	5	6
	all population	farmers	farmers	all population	farmers	farmers
nbr pers work in export	0.0690*** [0.0209]	0.116*** [0.0286]	0.116*** [0.0284]			
nbr pers work in import	0.141*** [0.0244]	0.177*** [0.0298]	0.169*** [0.0295]			
nbr pers work in nontraded	0.186*** [0.0156]	0.182*** [0.0199]	0.179*** [0.0198]			
nbr pers work only wage	-0.102*** [0.0133]	-0.0789*** [0.0146]	-0.0728*** [0.0145]	-0.0715*** [0.0160]	-0.0974*** [0.0172]	-0.0880*** [0.0171]
nbr pers work only self-employed nonfarm	-0.0706*** [0.0155]	-0.0122 [0.0171]	-0.00169 [0.0170]	0.0292** [0.0124]	0.0644*** [0.0144]	0.0731*** [0.0143]
nbr pers work only wage* nbr pers work in export				0.00364 [0.0118]	0.0301** [0.0153]	0.0311** [0.0151]
nbr pers work only wage* nbr pers work in nontraded				-0.00385 [0.00994]	0.0357** [0.0140]	0.0307** [0.0139]
nbr pers work only wage* nbr pers work in import				0.0390*** [0.00606]	0.0729*** [0.00964]	0.0687*** [0.00957]
share of harvest in main export			0.366*** [0.0771]			0.316*** [0.0780]
share of harvest in rice			0.0189 [0.0540]			-0.0221 [0.0543]
share of harvest in non-traded			0.196** [0.0775]			0.169** [0.0785]
share of harvest in import			0.0784 [0.0757]			0.029 [0.0765]
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Commune Controls	No	Yes	Yes	No	Yes	Yes
Crops' Orientation	No	No	Yes	No	No	Yes
Observations	5841	3514	3514	5841	3514	3514
Number of hhid	1947	1222	1222	1947	1222	1222
R-squared	0.539	0.499	0.514	0.515	0.486	0.5

Table 13. Panel estimation of households' 2002-2006 expenditure on trade related variables

	1	2	3	4	5	6	7	8	9
	all population			farmers			farmers		
	np p	p np	np np	np p	p np	np np	np p	p np	np np
nbr pers work in export	1.325 [0.235]	1.1 [0.166]	1.417*** [0.181]	0.86 [0.295]	1.041 [0.233]	1.402* [0.271]	0.87 [0.297]	1.066 [0.240]	1.437* [0.279]
nbr pers work in import	1.15 [0.295]	1.232 [0.229]	2.203*** [0.351]	1.199 [0.349]	1.263 [0.270]	1.958*** [0.359]	1.227 [0.357]	1.291 [0.276]	1.987*** [0.360]
nbr pers work in nontraded	1.256 [0.199]	1.396*** [0.165]	2.168*** [0.230]	1.225 [0.257]	1.322* [0.211]	2.051*** [0.294]	1.237 [0.261]	1.352* [0.217]	2.083*** [0.302]
nbr pers work in wage	0.973 [0.0990]	0.883* [0.0643]	0.638*** [0.0432]	0.978 [0.125]	0.846* [0.0761]	0.647*** [0.0544]	0.967 [0.126]	0.843* [0.0765]	0.644*** [0.0548]
nbr pers work only self-employed nonfarm	1.197 [0.175]	1.348*** [0.140]	1.330*** [0.128]	1.321 [0.245]	1.470*** [0.191]	1.559*** [0.188]	1.318 [0.247]	1.490*** [0.199]	1.574*** [0.195]
R-squared	0.234			0.223			0.228		
Observations	3894			2338			2338		
nbr pers work in wage* nbr pers work in export	1.062 [0.0871]	0.938 [0.0738]	1.086 [0.0593]	0.858 [0.145]	0.923 [0.0892]	1.036 [0.0648]	0.86 [0.146]	0.921 [0.0891]	1.036 [0.0647]
nbr pers work in wage* nbr pers work in import	1.004 [0.106]	1.028 [0.0723]	1.201*** [0.0684]	1 [0.125]	1.058 [0.0795]	1.162** [0.0728]	1.016 [0.126]	1.069 [0.0812]	1.172** [0.0736]
nbr pers work in wage* nbr pers work in nontraded	1.092 [0.0804]	1.138** [0.0631]	1.266*** [0.0641]	1.109 [0.123]	1.159* [0.0990]	1.366*** [0.106]	1.113 [0.124]	1.164* [0.0999]	1.370*** [0.107]
nbr pers work in wage	0.959 [0.114]	0.889 [0.0738]	0.620*** [0.0482]	0.996 [0.143]	0.839* [0.0835]	0.613*** [0.0574]	0.982 [0.143]	0.836* [0.0842]	0.610*** [0.0579]
nbr pers work only self-employed nonfarm	1.241 [0.176]	1.435*** [0.145]	1.729*** [0.157]	1.359* [0.242]	1.542*** [0.193]	1.907*** [0.219]	1.358* [0.245]	1.575*** [0.202]	1.935*** [0.228]
R-squared	0.227			0.219			0.225		
Observations	3894			2338			2338		

Table 14. Poverty transitions and trade related variables

Note: Each estimation is run independently and includes demographic controls. Commune controls are only added for farmers and crops orientation only in columns 7 to 9.

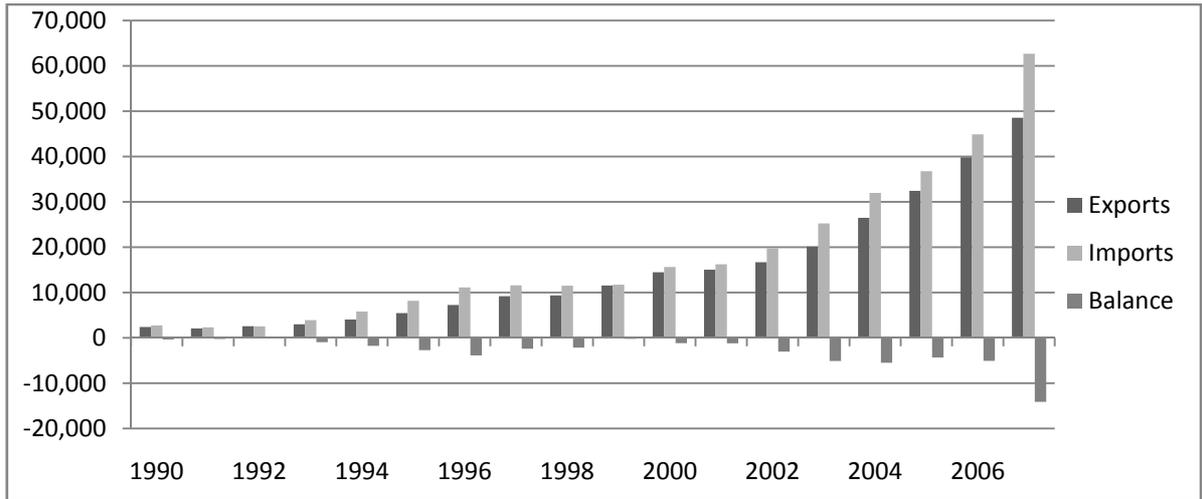


Figure 1. Total Imports and Exports and Balance of trade (GSO source)

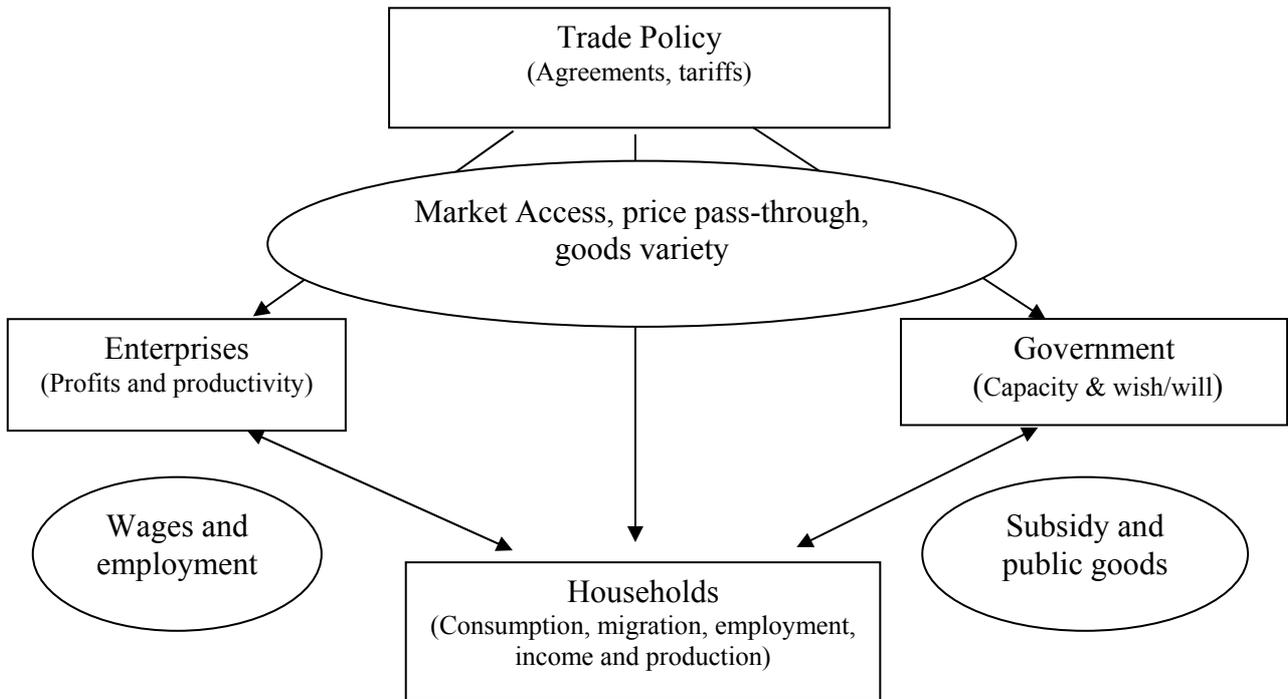


Figure 2. Trade transmission channels to households welfare*

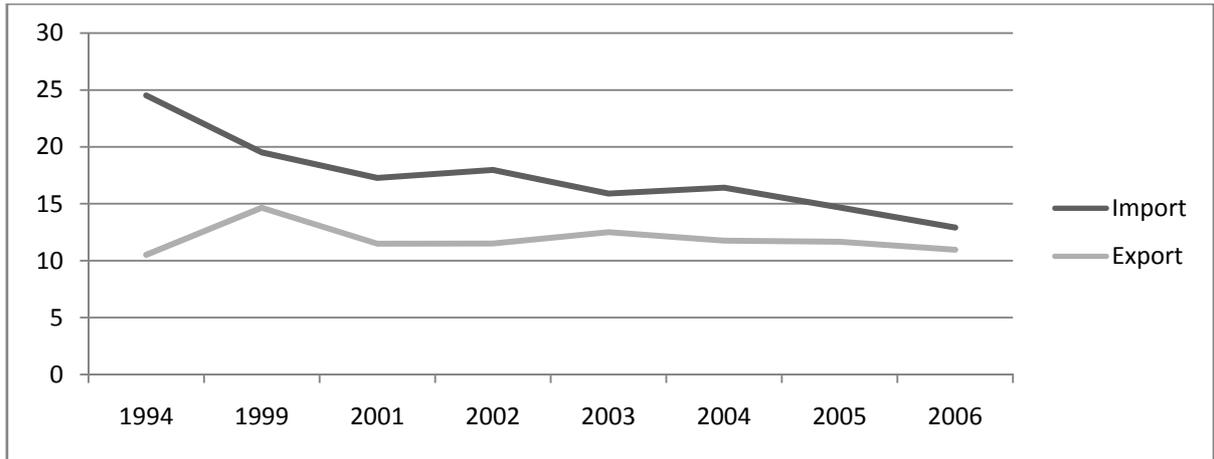


Figure 3. Weighted tariffs by type of products (Source TRAINS)

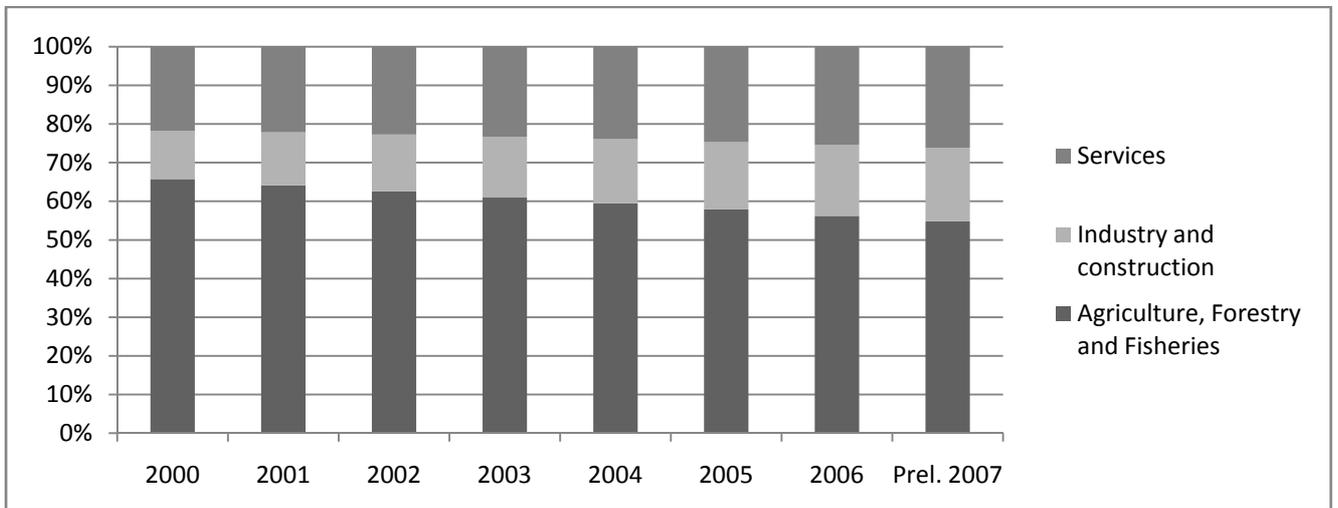


Figure 4. Employment Structure by economic activity (GSO Source)

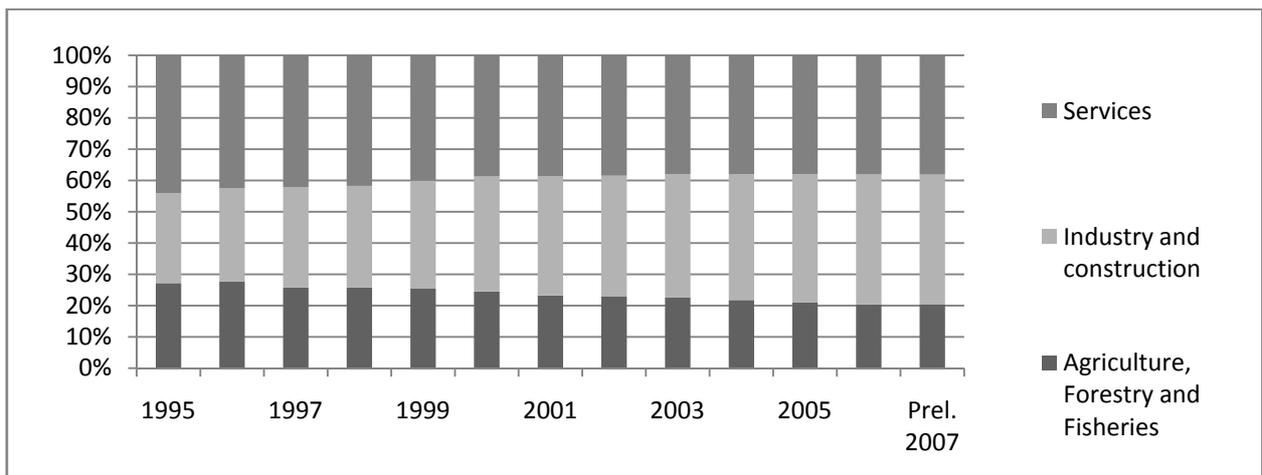


Figure 5. GDP by economic activity (GSO Source)

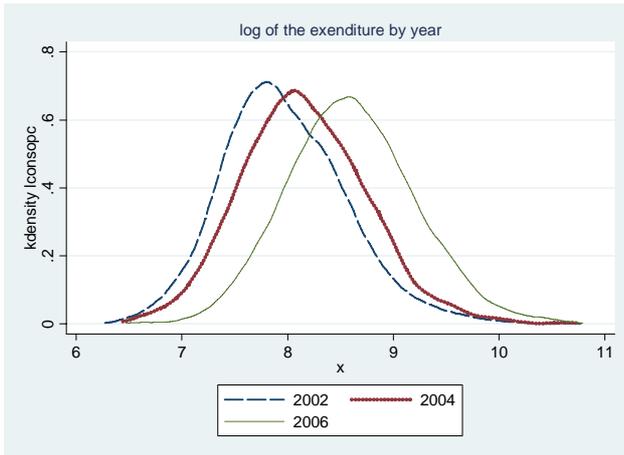


Figure 6. Kernel density function of the expenditure per capita by year

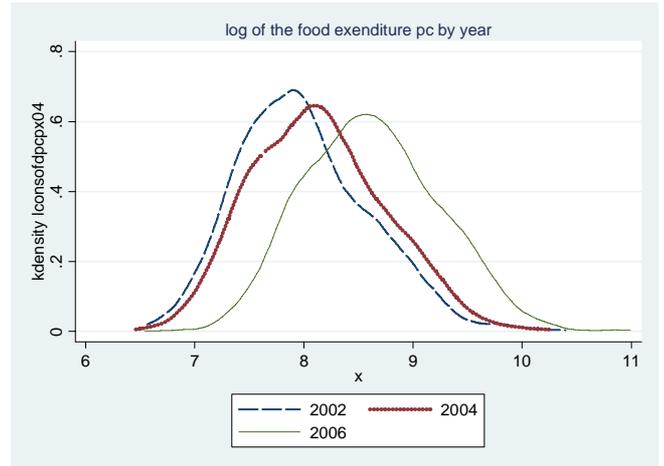


Figure 8. Kernel density function of the food consumption per capita by year

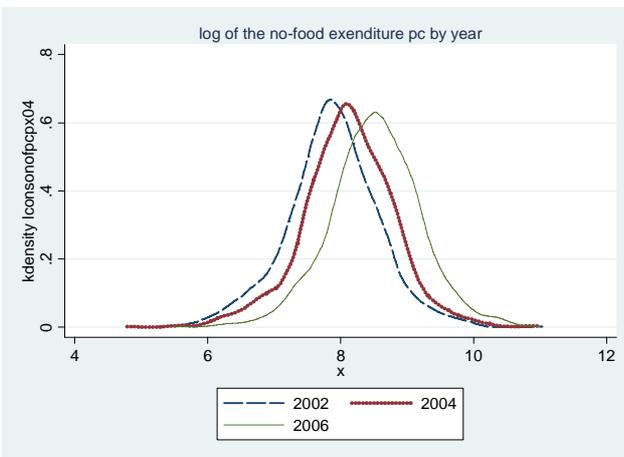


Figure 7. Kernel density function of the no-food consumption per capita by year

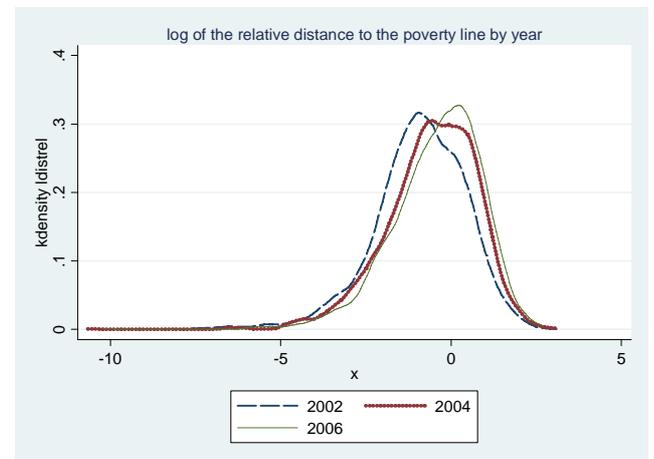


Figure 9. Kernel density function of the relative distance in log to the poverty line by year

Appendix

A1 Measuring inequality

Table A1 shows two inequality indices: the Theil index and the Atkinson. They all satisfy the principle of transfer that is any change in distribution that involves a transfer from rich to poor will decrease the index. First the Theil index is defined as:

$$T = \frac{1}{N} \sum_{i=1}^N \frac{x_i}{\mu} \ln \left(\frac{x_i}{\mu} \right)$$

where x_i is the expenditure of the i th person $\mu = \frac{1}{N} \sum_{i=1}^N x_i$, is the mean expenditure, and N is the number of people. If everyone has the same (i.e. the mean) expenditure, then the index take the value of 0. If one person possesses all the expenditure, then the index is equal to $\ln N$. Thus the index has a higher value if one person in a larger population receives all expenditure compared to if one person in a smaller population receives all expenditure. However, it has the same value for two unequally sized populations if expenditure is distributed with the same proportions in the two populations, that is, they have identical Lorenz curves.

One of the advantages of the Theil index is that it's additively decomposable by population subgroup. We have that total inequality is equal to the weighted sum of the inequalities within each category, plus inequality between categories.

The Atkinson index is a more complex summary statistic. As in the Theil index, it contains a ratio comparison of each person's expenditure with the population mean. But it also requires the user to set a parameter, ϵ , specifying a level of 'inequality aversion'. The mathematical expression is

$$I = 1 - \left(\frac{1}{N} \sum_{i=1}^N (x_i / \mu)^{1-\epsilon} \right)^{1/(1-\epsilon)}$$

The Atkinson index traduces the aversion of the population to inequality, it always has a value between zero and one. An index with a value of $x\%$ means that the population will accept to lose $x\%$ of its current expenditure to allow the distribution to become more equal. We construct the Atkinson index with an inequality aversion equal to two, to be able to capture the movements that are occurring at the bottom of the distribution.

Turning now to the changes in inequality in Table A1, the Theil index measure suggests that overall inequality in Vietnam has decreased somewhat from 0.210 to 0.199 for 2002-2006, decomposable by a decrease of 0.8 and 4.47 for 2002-2004 and 2004-2006 respectively. A different trend is found if we look at Atkinson coefficient, that have a higher inequality aversion than the others inequality index, shows that the 2002's expenditure distribution is more equal than in 2006. The increase is closed to 5% over the period which is again driven by a higher increase of 3.5% in the first period. Thus even if the distribution of the consumption seems to be more equal on general, as shown by the positive evolution of the Theil, this trend seems to be different if we focalize our analysis at the extremes, captured by Atkinson (2) coefficients. Table A1 also shows that rural areas are those where consumption is the most unequally distributed, results are consistent on all indexes. However if we look at the evolution through time, we see that rural areas are experiencing a huge decrease in inequality by almost 20% in the Theil index over the entire period, and by half less if we increase the inequality aversion of the index as the Atkinson(2) does. Looking at the equality of the distribution of expenditure among the regions on Table A1, we note that regions which are densely populated by the presence of a city as South East with Ho Chi Minh or Red River Delta with Hanoi are more unequal. However some combines both high levels of poverty and inequality as for example North West. Finally the last interesting fact is the relative low level of inequality in Central Highlands but the huge increase in the growth of the indexes attaining more than 30% when weighting the bottom of the distribution. Moreover the higher educated households, ethnic minorities' households, consumer household and households headed by a woman have higher levels of inequalities measured by the Theil index. Those

categories have enjoyed the higher decrease over the period. Increasing the inequality aversion, we observe that some categories of households experienced/suffered now of a positive evolution of inequalities.

	Theil (GE(1))			Atkinson (2)		
	2002	2004	2006	2002	2004	2006
All	0.210	0.208	0.199	0.293	0.304	0.308
Rural	0.130	0.154	0.163	0.219	0.250	0.265
Urban	0.213	0.201	0.171	0.327	0.310	0.295
Red River Delta	0.238	0.195	0.195	0.276	0.266	0.279
North East	0.186	0.208	0.170	0.269	0.284	0.280
North West	0.254	0.289	0.244	0.336	0.352	0.355
North Central Coast	0.150	0.147	0.201	0.229	0.255	0.304
South Central Coast	0.170	0.158	0.171	0.254	0.285	0.270
Central Highlands	0.194	0.160	0.236	0.272	0.270	0.362
South East	0.239	0.224	0.182	0.341	0.321	0.297
Mekong River Delta	0.141	0.182	0.171	0.232	0.262	0.253
no diploma	0.162	0.190	0.220	0.262	0.294	0.314
primary	0.183	0.181	0.165	0.257	0.258	0.273
secondary and upper	0.219	0.201	0.179	0.295	0.288	0.279
Not ethnic minority (Kinh)	0.194	0.188	0.183	0.266	0.269	0.279
Ethnic minority	0.197	0.238	0.186	0.258	0.290	0.280
Consumer	0.213	0.210	0.189	0.315	0.316	0.315
Producer	0.128	0.133	0.137	0.210	0.230	0.236
Hsld head is a male	0.197	0.193	0.192	0.277	0.294	0.297
Hsld head is a female	0.226	0.240	0.209	0.326	0.321	0.336
Export sector	0.125	0.159	0.155	0.215	0.256	0.292
Import sector	0.126	0.206	0.132	0.198	0.257	0.243
Non-trade sector	0.197	0.169	0.169	0.290	0.264	0.270
Agriculture sector	0.148	0.178	0.169	0.228	0.259	0.266
Wage earner	0.251	0.227	0.208	0.372	0.332	0.347
Self employed in farm	0.135	0.152	0.155	0.220	0.249	0.256
Self employed in nonfarm	0.170	0.185	0.166	0.252	0.267	0.262
Main export sector	0.1564	0.1548	0.1397	0.2413	0.2477	0.2514
Rice sector	0.1270	0.1319	0.1342	0.2067	0.2286	0.2265
No traded sector	0.1273	0.1622	0.1327	0.2152	0.2753	0.2596
Import sector	0.1686	0.1649	0.1999	0.2515	0.2607	0.3420
Other export sector	0.2083	0.2124	0.1913	0.3158	0.3168	0.3132

Table A1. Inequality by socioeconomic characteristics

	2000	2001	2002	2003	2004	2005	2006	Prel.2007
At current prices								
Gross domestic product - <i>Bill. dong</i> s	441,646	481,295	535,762	613,443	715,307	839,211	974,266	1,144,015
Per capita gross domestic product - <i>Thous. dong</i> s								
Vietnam currency - <i>Thous. dong</i> s	5,689	6,117	6,720	7,583	8,720	10,098	11,580	13,435
Foreign currency - <i>USD</i>								
At average exchange rate	402		440	492	553	639	723	835
Purchasing power parity	1,996		2,300	2,490	2,745	3,071		
Gross capital formation - <i>Bill. dong</i> s	130,771	150,033	177,983	217,434	253,686	298,543	358,629	476,450
Final consumption - <i>Bill. dong</i> s	321,853	342,607	382,137	445,221	511,221	584,793	675,916	811,321
Export of goods and services - <i>Bill. dong</i> s	243,049	262,846	304,262	363,735	470,216	582,069	716,652	878,473
Import of goods and services - <i>Bill. dong</i> s	253,927	273,828	331,946	415,023	524,216	617,157	765,827	1,032,158
Gross national income - <i>Bill. dong</i> s	435,319	474,855	527,056	603,688	701,906	822,432	953,232	1,112,892
At constant 1994 prices								
Gross domestic product - <i>Bill. dong</i> s	273666	292535	313247	336242	362435	393031	425373	461443
Growth rate of GDP (<i>Previous year = 100</i>) - %	6.79	6.89	7.08	7.34	7.79	8.44	8.23	8.48
Compared with GDP (At current prices) - %								
Gross capital formation	29.61	31.17	33.22	35.44	35.47	35.58	36.81	41.65
Gross fixed capital	27.65	29.15	31.14	33.35	33.25	32.87	33.35	37.14
Final consumption	72.87	71.18	71.33	72.58	71.47	69.68	69.38	70.92
Export of goods and services	55.03	54.61	56.79	59.29	65.74	69.36	73.56	76.79
Import of goods and services	57.5	56.89	61.96	67.65	73.29	73.54	78.61	90.22
Gross national income	98.57	98.66	98.38	98.41	98.13	98.00	97.84	97.28

Table A2. Key indicators on National Accounts (GSO source)

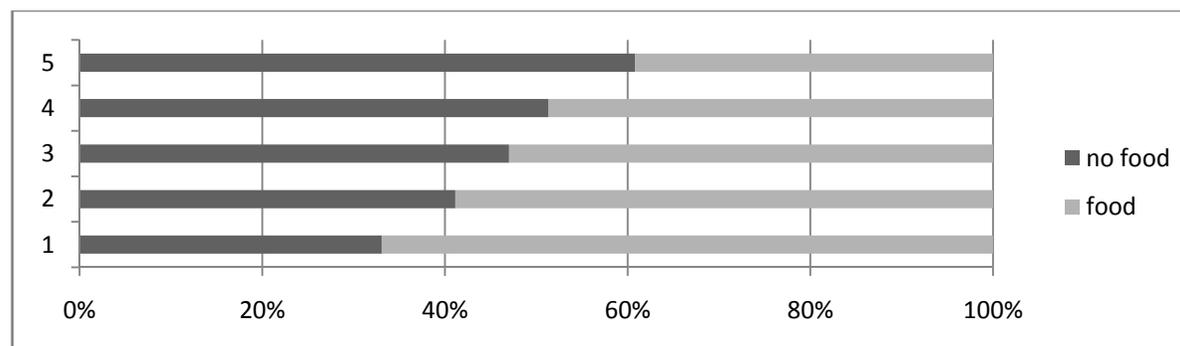


Figure A1. Disaggregation of expenditure shares for rural areas by quintile

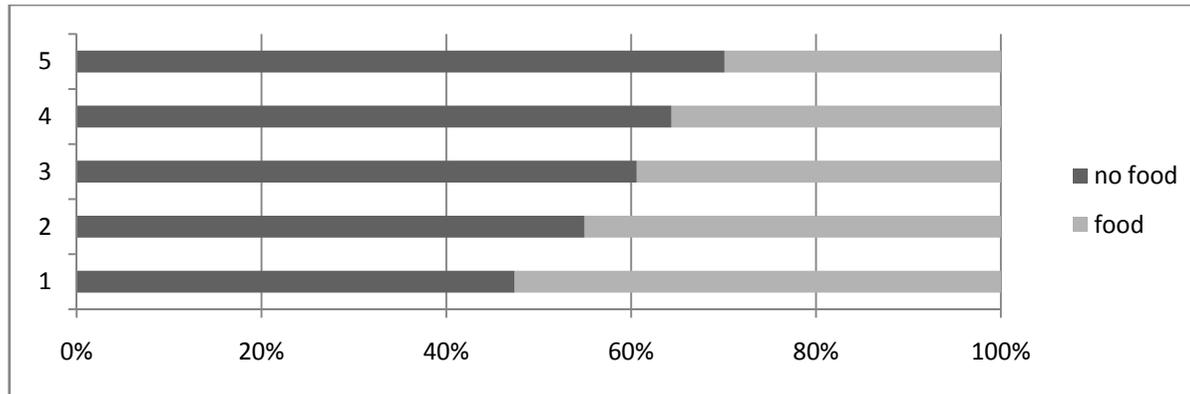


Figure A2. Disaggregation of expenditure shares for urban areas by quintile

period	sitcrev3	isic	comtrade labels	vhls labels	Exports	Imports	Trade Balance	Export
2002	24	2	CORK AND WOOD	Forestry, logging and related service activities	50,369,229	199,300,000	-149,000,000	0
2002	3	5	FISH,CRUSTACEANS,MOLLUSC	Fishing, aquaculture and service activities incidental to fishing	2,031,000,000	92,709,671	1,940,000,000	1
2002	32	10	COAL, COKE, BRIQUETTES	Mining of coal and lignite; extraction of peat	154,200,000	5,285,885	149,000,000	1
2002	333	11	PETROLEUM OILS, CRUDE	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	3,270,000,000	18,838,509	3,250,000,000	1
2002	28	12	METALLIFEROUS ORE,SCRAP	Mining of uranium and thorium ores	44,830,529	60,430,689	-15,600,000	0
2002	43	15	ANIMAL,VEG.FATS,OILS,NES	Manufacture of food products and beverages	919,517	2,952,268	-2,032,751	0
2002	11	15	BEVERAGES	Manufacture of food products and beverages	14,375,827	18,186,542	-3,810,715	0
2002	12	16	TOBACCO,TOBACCO MANUFACT	Manufacture of tobacco products	59,949,717	131,100,000	-71,200,000	0
2002	65	17	TEXTILE YARN,FABRIC,ETC.	Manufacture of textiles	423,500,000	2,071,000,000	-1,650,000,000	0
2002	84	18	CLOTHING AND ACCESSORIES	Manufacture of wearing apparel; dressing and dyeing of fur	2,633,000,000	331,200,000	2,300,000,000	1
2002	85	19	FOOTWEAR	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and	1,913,000,000	281,100,000	1,630,000,000	1
2002	61	19	LEATHER, LEATHER GOODS	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and	18,109,188	373,800,000	-356,000,000	0
2002	63	20	CORK, WOOD MANUFACTURES	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	103,700,000	54,144,777	49,600,000	1
2002	64	21	PAPER,PAPERBOARD,ETC.	Manufacture of paper and paper products	71,138,540	333,100,000	-262,000,000	0
2002	334	23	PETROLEUM PRODUCTS	Manufacture of coke, refined petroleum products and nuclear fuel	121,100,000	2,066,000,000	-1,950,000,000	0
2002	500	24	CHEMICALS,RELTD.PROD.NES	Manufacture of chemicals and chemical products	256,000,000	2,903,000,000	-2,650,000,000	0
2002	62	25	RUBBER MANUFACTURES, NES	Manufacture of rubber and plastics products	52,390,399	100,900,000	-48,500,000	0
2002	66	26	NON-METAL.MINERAL MANFCT	Manufacture of other non-metallic mineral products	208,400,000	227,800,000	-19,400,000	0
2002	67	27	IRON AND STEEL	Manufacture of basic metals	66,364,516	1,490,000,000	-1,420,000,000	0
2002	69	28	METALS MANUFACTURES,NES	Manufacture of fabricated metal products, except machinery and equipment	147,400,000	348,900,000	-202,000,000	0
2002	74	29	GENERAL INDUSTL.MACH.NES	Manufacture of machinery and equipment n.e.c.	40,291,012	758,100,000	-718,000,000	0
2002	73	29	METALWORKING MACHINERY	Manufacture of machinery and equipment n.e.c.	2,214,631	253,300,000	-251,000,000	0
2002	71	29	POWER GENERATNG.MACHINES	Manufacture of machinery and equipment n.e.c.	71,966,004	458,600,000	-387,000,000	0
2002	72	29	SPECIAL INDUST.MACHINERY	Manufacture of machinery and equipment n.e.c.	67,167,271	1,267,000,000	-1,200,000,000	0
2002	75	30	OFFICE MACHINES,ADP MACH	Manufacture of office, accounting and computing machinery	328,400,000	277,300,000	51,100,000	1
2002	77	31	ELEC MCH APPAR,PARTS,NES	Manufacture of electrical machinery and apparatus n.e.c.	413,900,000	937,400,000	-524,000,000	0
2002	76	32	TELECOMM.SOUND EQUIP ETC	Manufacture of radio, television and communication equipment and apparatus	158,600,000	411,000,000	-252,000,000	0
2002	87	33	SCIENTIFIC EQUIPMENT NES	Manufacture of medical, precision and optical instruments, watches and clocks	33,286,420	215,200,000	-182,000,000	0
2002	78	34	ROAD VEHICLES	Manufacture of motor vehicles, trailers and semi	172,200,000	1,137,000,000	-965,000,000	0
2002	89	36	MISC MANUFCTRD GOODS NES	Manufacture of furniture; manufacturing n.e.c.	404,600,000	421,300,000	-16,700,000	0

Table A3. Construction of the Export and Import sectors

isic	Vhss labels
37	Recycling
40	Electricity, gas, steam and hot water supply
41	Collection, purification and distribution of water
45	Construction
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
55	Hotels and restaurants
60	Land transport; transport via pipelines
61	Water transport
62	Air transport
63	Supporting and auxiliary transport activities; activities of travel agencies
64	Post and telecommunications
65	Financial intermediation, except insurance and pension funding
66	Insurance and pension funding, except compulsory social security
67	Activities auxiliary to financial intermediation
70	Real estate activities
71	Renting of machinery and equipment without operator and of personal and household goods
72	Computer and related activities
73	Research and development
74	Other business activities
75	Public administration and defence; compulsory social security
80	Education
85	Health and social work
90	Sewage and refuse disposal, sanitation and similar activities
91	Activities of membership organizations n.e.c.
92	Recreational, cultural and sporting activities
93	Other service activities
95	Activities of private households as employers of domestic staff
99	Extraterritorial organizations and bodies

Table A4. Construction of the nontrade sector

LABELS	Mean	Std. Dev.
Log of expenditure	8.242496	0.6521783
Red River Delta	0.1910632	0.3931724
(North East)	0.146379	0.3535161
North West	0.0421161	0.2008712
North Central Coast	0.125321	0.3311109
South Central Coast	0.0986133	0.2981676
Central Highlands	0.0647149	0.2460433
South East	0.1165896	0.3209581
Mekong River Delta	0.2152029	0.4109982
log hslid size	1.418157	0.4021171
log head age	3.825392	0.2929344
Share female 18-60	0.2819564	0.1616999
Share male 18-60	0.2687725	0.1693332
Share children under 18	0.3716719	0.2292562
Ethnic minority (=1, 0 otherwise)	0.1489471	0.3560668
Married (=1, 0 otherwise)	0.8279404	0.3774645
Head is female (=1, 0 otherwise)	0.2177709	0.4127662
Urban (=1, 0 otherwise)	0.2095532	0.4070246
(No education)	0.3261428	0.4688404
primary education	0.2542373	0.4354689
secondary and upper education	0.4196199	0.493539
Daily market (=1, 0 otherwise)	0.4151436	0.4928004
Post office (=1, 0 otherwise)	0.4190601	0.4934589
Bus, train water transport (=1, 0 otherwise)	0.3955614	0.4890241
Electricity (=1, 0 otherwise)	0.9430809	0.2317081
Share of land with certificate in 04	0.7125779	0.4058061
log of number of crops	1.481833	0.825522
distance to the agricultural plot	6.307657	1.374355
(share of other export of harvest in dong)	0.1419917	0.2175911
share main export of harvest in dong	0.076359	0.2318631
share rice of harvest in dong	0.5446547	0.3693535
share none traded of harvest in dong	0.1145688	0.2073537
share import of harvest in dong	0.1214648	0.2111256
(nbr pers work in agri)	1.501455	1.440619
nbr pers work in export	0.1802773	0.5485298
nbr pers work in import	0.1708612	0.5220285
nbr pers work in nontrade	0.7402842	0.9810718
(nbr pers work only self employed farm)	1.068995	1.275104
nbr pers work only wage	0.4506078	0.8450096
nbr pers work only self employed nonfarm	0.2703304	0.6490441
other	0.8044855	0.9636121
(nbr pers work in self employed farm)	1.847629	1.449515
nbr pers work in wage	0.9784284	1.062377
nbr pers work in self employed nonfarm	0.6041774	0.9127013
(nbr pers work only wage* nbr pers work in agriculture)	0.4002739	1.579847
nbr pers work only wage* nbr pers work in export	0.1609313	0.8513411
nbr pers work only wage* nbr pers work in nontrade	0.7062147	2.106816
nbr pers work only wage* nbr pers work in import	0.1859271	1.100753
(nbr pers work in wage* nbr pers work in agri)	1.479199	3.155711
nbr pers work in wage* nbr pers work in export	0.251498	1.137736
nbr pers work in wage* nbr pers work in import	0.280089	1.347739
nbr pers work in wage* nbr pers work in nontrade	1.055812	2.445985
total area*producer of rice	10644.87	18390.77
=1 if hslid is net producer of rice, 0 otherwise	0.5851738	0.4927342
log of the agricultural area	8.737734	1.327206

Table A5. Description of data

Notraded	Other Exports
Water morning glory	Kohlrabi, cabbage, cauliflower
Litchi, logan, rambutan	Specialty rice
Sapodilla (grosse baie)	Sweet potatoes
Custard apple	Cassava manioc
Imports	Soy beans
Indian Corn	Peanuts
Potatoes	Sesame seeds
Other leafy greens	Cotton
Fresh legumes (beans)	Coconut
Plums	Pineapple
Tomatoes	Bananas
Suger cane	Mango
Tobaco	Papaya
Jute, ramie (fibe textile)	Main Exports
Mulberry	Tea
Oranges, limes, mandarins	Coffee
Apples	Rubber
Grapes	Black pepper
Jackfruit, durian	Cashew
	Rice

Table A6. Description of crops' sub-aggregates²⁴

²⁴ Please refer to Coello (2009) for a motivation of the desegregation of the crops' orientation groups.

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