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EXPORTING OUT OF POVERTY: PROVINCIAL POVERTY IN VIETNAM AND U.S. MARKET ACCESS*

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Abstract: Can a small, poor country reduce poverty by gaining increased market access to a large, rich country? The 2001 U.S.-Vietnam Bilateral Trade Agreement provides an excellent opportunity to examine this question as, unlike other bilateral trade agreements, the U.S. tariff cuts were not influenced by Vietnamese industries. Between 2002 and 2004, provinces that were more exposed to the U.S. tariff cuts experienced faster decreases in poverty. An increase of one standard deviation in provincial exposure leads to a reduction in the poverty headcount ratio of approximately 11 to 14 percent, but this effect diminishes the further the province is from a major seaport. Three labour market channels from the trade agreement to poverty alleviation are subsequently explored. Provinces that were more exposed to the tariff cuts experienced (1) increases in provincial wage premiums for low-skilled workers, (2) faster movement into wage and salaried jobs for low-skilled workers, and (3) more rapid job growth in formal enterprises.

JEL codes: F14, F16, I32, O11

Keywords: trade liberalization, poverty, Vietnam

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I. INTRODUCTION

Can a small, poor country reduce poverty by gaining increased market access to a large, rich country? A contingent of international policy makers seem to think the answer is yes. For example, the Doha Ministerial Declaration, part of the World Trade Organization's (WTO) most recent round of negotiations, stated "International trade can play a major role in the promotion of economic development and the alleviation of poverty." The WTO's Doha agenda called for developed countries to reduce barriers to trade in agricultural goods and labour-intensive manufacturers. The reductions are predicted to stimulate exports from developing countries as they are thought to have a comparative advantage in the production of these goods. Unfortunately, little *ex post* empirical evidence exists to support this issue. This paper aims to provide such evidence.

The paper uses the United States-Vietnam Bilateral Trade Agreement (BTA) to examine the impact of increased market access on poverty in Vietnam. A key attraction of the BTA is the simplicity and extent of the changes in tariffs faced by Vietnamese exports to the U.S. As discussed in greater detail below, the U.S. committed to granting Vietnam the status of Normal Trade Relations (or Most Favored Nation status) upon entry into force of the agreement. This straightforward reclassification of Vietnamese exports implies that the tariff cuts offered by the U.S. are less susceptible to endogeneity concerns from political lobbying by Vietnamese or American industry groups. Moreover, unlike many other trade agreements, such as the North American Free Trade Agreement, the U.S. tariff cuts were immediate as opposed to being phased in over a number of years.

Since the BTA came into force in December 2001, Vietnamese exports to the U.S. have grown very rapidly. From 2001 to 2002, Vietnamese exports to the U.S. grew by

128 percent followed by an additional 90 percent from 2002 to 2003 (see Table 1). By 2004, the General Statistics Office (GSO) of Vietnam estimates exports to the U.S. accounted for 20.2 percent of Vietnam's total exports or about 13 percent of GDP.[2] By comparison, in 2000, exports to the U.S. represented only 5.1 percent of total exports or 2.8 percent of GDP. Hence, the growth in exports to the U.S. represents a quick and substantial shock to Vietnam's economy. At a more disaggregated level, exports soared in the 2-digit SITC categories of articles of apparel and clothing accessories. This commodity category showed an annual growth of 276.5 percent from 2001 to 2004. Table 2 presents information on the value, growth, and share of exports for Vietnam's top seven commodity exports to the U.S. according to 2004 value. With the exception of petroleum products, Vietnam's top seven exports to the U.S. are all commodities that are conventionally classified as being low-skilled labour intensive. As low-skilled workers are more likely to be poor, this suggests the potential for the increase in exports to have positive impacts on alleviating poverty in Vietnam through increased demand for low-skilled labour.

Following the entry into force of the BTA, the incidence of poverty in Vietnam declined dramatically. Between 2002 and 2004 the national poverty rate fell from to 28.9 to 19.5 percent.[3] While there is clearly a coincident trend in poverty alleviation and U.S. market access, it remains an empirical question whether there is a causal connection running from the cut in U.S. tariffs to the fall in poverty.

The paper measures the immediate short-run impacts of U.S. tariff cuts on provincial poverty in Vietnam. Following Topalova (2007), I construct provincial

[2] According to the GSO, exports of goods and services in 2004 were 65.74 percent of GDP.
[3] There is some concern over the magnitude of the decline, in particular that the national poverty rate in 2002 may be overestimated (see Glewwe (2005)). I address this issue rigorously in Appendix A.

measures of exposure to the U.S. tariff cuts by weighting the tariff cuts by the pre-existing share of employment by industry within each province. I find that provinces that were more heavily exposed to the tariff cuts (i.e., had a greater share of workers in industries with large tariff cuts) experienced more rapid decreases in poverty. The impact on provincial poverty rates between 2002 and 2004 is large. An increase of one standard deviation in provincial exposure leads to a reduction in the incidence of poverty by approximately 14 percent, although the effect diminishes the further the province is from a major seaport. The results are robust to alternative measures of poverty, alternative poverty lines, plausible measurement error in provincial poverty rates, and differential provincial poverty trends induced by variation in observable initial conditions. Regarding transmission mechanisms, I provide evidence that provincial wage premiums increased, low-skilled workers moved into wage and salaried jobs quicker, and employment in formal enterprises grew more rapidly in more exposed provinces.

The paper proceeds by providing an overview of the literature on trade and poverty and a theoretical discussion of the impact of changes in foreign market access when sub-national units vary in their initial industrial structure. Next, the BTA is discussed in detail, followed by an overview of the data and empirical methodology used in the paper. Subsequently, regression results are reported and discussed, before concluding remarks are presented.

II. BACKGROUND

The trade and poverty literature provides little direct empirical evidence about the *ex post* economic impact of changes in trade policy on the poor (see reviews by Winters

et al. (2004) and Goldberg and Pavcnik (2004)). Nonetheless, the associated literature is very large and generally falls into one of two literature strands. The first strand relies on the relationship between growth and openness to trade combined with the relationship between growth and poverty alleviation.[4] The second strand relies on indirect evidence of the impact of changes in trade policy on poverty. This often takes the form of evidence linking labour market correlates of poverty, such as unemployment, employment in the informal sector, and unfavorable changes in wages for unskilled workers, with trade liberalization, often focusing only on urban and or manufacturing workers.[5]

Very recently, however, empirical evidence on trade liberalization and poverty has emerged. These studies fall into two categories of methodologies: the first examines what *did* happen, and the second predicts what *could* happen. Topalova (2007) studies India's unilateral trade liberalization over the late 1980s and early 1990s and the subsequent variation in regional impacts. She finds that rural Indian districts that were more exposed to the import tariff reductions experienced slower declines in poverty than districts that were less exposed. Porto (2003), Porto (2006), and Nicita (2004) predict the impact of changes in trade policy on households. These papers use *ex post* estimates of the impact of tariff changes on prices and *predict* the subsequent impact on household income or expenditures as suggested by initial household production and consumption patterns. This study follows a methodology similar to Topalova (2007) to examine what occurred after the implementation of the BTA in Vietnam.

[4] See Hallack and Levinsohn (2004) for a recent review of the trade and growth literature. Kraay (2006) provides evidence across a panel of developing countries that suggests that most of the long-run variation in changes in poverty can be explained by growth of average incomes. Besley and Burgess (2003) provide evidence of the elasticity of poverty with respect to income per capita.

[5] For recent empirical evidence of the impact of trade on labour markets in developing countries see Attanasio, Goldberg and Pavcnik (2004), Goldberg and Pavcnik (2003), Pavcnik, Blom, Goldberg, and Schady (2004), Galiani and Sanguinetti (2003), and Goldberg and Pavcnik (2005), among others.

Most of the studies on trade and poverty use national trade reforms, such as own country tariff reductions or quota removals, as their source of variation in trade policy. Few papers look at the converse question – can countries use new trade opportunities as a mechanism for poverty reduction? One exception is Porto (2003), which estimates the impact of possible domestic and international trade reform for Argentina. He predicts that the elimination of agricultural subsidies and trade barriers on agricultural manufactures and industrial manufactures in industrialized countries would cause poverty to decline in Argentina.

Hence, this paper makes two main contributions to the literature. The first contribution is the *ex post* analysis of trade impacts on poverty across *all* geographic and economic sectors. This is in contrast to many other papers that focus solely on urban or rural areas or only on manufacturing or agricultural activities. Second, the paper makes use of a large trade shock induced by a trading partner as opposed to domestic trade liberalization. This provides two benefits relative to the existing literature. First, it provides evidence on an important question: can developing countries benefit from improved market access to large foreign market. Second, for establishing a causal relationship the exogeneity of the foreign tariff cuts are more plausible than the exogeneity of domestic tariff cuts.

The empirical section of this paper directly focuses on the impact on poverty of new export opportunities induced by increased market access. The framework addresses whether all provinces in Vietnam derived similar benefits from the decreases in U.S. tariffs. Should one expect variation in impacts at the sub-national level? Traditional theories of international trade do not address this question. As such, I provide a brief

adaptation of the Ricardo-Viner model, also known as the Specific Factors model, to illustrate why one might expect differences in the impact across provinces.[6] The Specific Factors model seems most appropriate as it focuses on short-run impacts and the empirical section concentrates on the first two years immediately following the implementation of the BTA.

In this model labour is assumed to be completely mobile across industries, whereas capital is immobile in the short run. As a simple example, consider a two-province country that moves from international autarky to international free trade. For the current discussion, I abstract away from internal trade between the two provinces and I further assume that the country takes world prices as given. Let $X_i^p = f_i\left(L_i^p, K_i^p\right)$ denote the production of good $i = 1, 2$ in province $p = A, B$, where it is assumed that each province uses the same technology to produce good *i*. Assume that prior to international trade, inter-province labour mobility has equalized the wage rate $w = w^A = w^B$. From the first-order condition with respect to labour demand, this implies that the labour-capital ratio within an industry must be equal across provinces.[7] Consider what happens in the short-run when the country opens up to trade. Suppose that this increases the relative price, *p*, of good 1, where the price of good 2 has been normalized to one. The percentage wage change can be expressed as:

[6] See Feenstra (2004) for a discussion of the Ricardo-Viner model of international trade.
[7] This is a result of f_{iL} being homogenous of degree 0 from assuming constant returns to scale in f_i.

$$\frac{dw}{w} = \frac{f_{2LL}(L_2, K_2)}{f_{2LL}(L_2, K_2) + pf_{1LL}(L_1, K_1)} \frac{dp}{p}$$

$$= \frac{\frac{1}{K_2} f_{2LL}\left(\frac{L_2}{K_2}, 1\right)}{\frac{1}{K_2} f_{2LL}\left(\frac{L_2}{K_2}, 1\right) + p\frac{1}{K_1} f_{1LL}\left(\frac{L_1}{K_1}, 1\right)} \frac{dp}{p}$$

$$= \frac{f_{2LL}\left(\frac{L_2}{K_2}, 1\right)}{f_{2LL}\left(\frac{L_2}{K_2}, 1\right) + \left(\frac{K_2}{K_1}\right) pf_{1LL}\left(\frac{L_1}{K_1}, 1\right)} \frac{dp}{p}$$

where I have suppressed the province superscripts. The second line comes from the assumption of constant returns to scale in the production functions (i.e., they are homogeneous of degree one). This implies the second partial derivatives are homogeneous of degree negative one (Varian, 1992). Since the ratio of labour to capital is constant across provinces within an industry, the percentage change in wages will differ across provinces according to the difference in capital stocks ratios assuming that labour is imperfectly mobile across provinces. Thus, the province with the higher share of its capital invested in good 1, the rising price industry, would expect a greater percentage change in the nominal wage rate. This simple model helps to explain why some provinces might be expected to benefit more than others in the immediate short-run following entry into force of the BTA.

III. OVERVIEW OF THE U.S.-VIETNAM BILATERAL TRADE AGREEMENT

The BTA was signed on 13 July 2000 and came into force on 10 December 2001.[8] The commitments made by the United States and Vietnam are similar to those required by the World Trade Organization (WTO). As such, the principal change for the U.S. was to grant Vietnam Normal Trade Relations (NTR) or Most Favored Nation (MFN) access to the U.S. market immediately upon entry into force of the BTA. The tariff cuts were largest in manufacturing where the average ad valorem equivalent tariff dropped from 31.5 to 3.3 percent. The average ad valorem tariff also fell substantially within agriculture, hunting and forestry as it was cut from 10.6 to 3.2 percent. In contrast, the tariff cuts within both fishing and mining were much smaller. More detail on the U.S. tariff cuts is provided in Section IV.

In contrast, the scope of the commitments made by Vietnam is much larger. The bulk of Vietnam's commitments are scheduled for implementation within three to four years after entry into force, but some commitments are not required until up to ten years after. The majority of Vietnam's commitments lie in the realm of legal and regulatory change as Vietnam had already applied MFN tariffs to U.S. products before the BTA. These commitments include accordance of national treatment to U.S. companies and nationals, customs system and procedures reform, liberalizing and streamlining trading rights, liberalizing trade in services, and liberalizing and safeguarding foreign investment, among others. As for trade policy commitments, the BTA requires Vietnam to cut tariffs on approximately 250 tariff lines out of more than 6,000, typically by 25 to 50 percent,

[8] This section draws heavily on the STAR-Vietnam report "An Assessment of the Economic Impact of the United States – Vietnam Bilateral Trade Agreement."

mostly in agriculture. The overall impact of these cuts on industry level tariffs has been very small. Industry level Vietnamese tariffs have been very stable over the period of 1999 to 2004. Furthermore, the BTA has an extensive list of quantitative import restrictions that must be eliminated, typically four to six years after entry into force. Almost all of these were eliminated well ahead of schedule as part of an IMF/World Bank Agreement. By the beginning of 2003, all import quotas except for those on sugar and petroleum products had been lifted. Quotas on sugar and petroleum products are required to be removed after ten and seven years from entry into force of the BTA.

IV. DATA

This section describes the three principal sources of data used in the subsequent analysis: tariff data from the U.S. International Trade Commission, poverty estimates derived from the 2002 and 2004 Vietnam Household Living Standards Surveys (VHLSS), and employment data from the 1999 Population and Housing Census in Vietnam. I describe each of them in turn.

IV.1 Tariff Data

I use 2001 U.S. tariffs from the U.S. International Trade Commission's online Tariff Information Center. Prior to the BTA, Vietnam was subject to tariffs according to Column 2 of the U.S. tariff schedule. Upon entry into force of the BTA, Vietnam became subject to MFN tariff rates. For both tariff schedules I compute the ad valorem equivalent of any specific tariffs. Details of the procedure can be found in the data appendix. I then

match the tariff lines to industries by the concordance provided by the World Bank via the World Integrated Trade Solution database to construct industry-level tariffs according to 3-digit ISIC nomenclature.

There are 76 3-digit ISIC industries that experienced tariff cuts spread across agriculture and forestry, fishing, mining, manufacturing, and other industries. Table 3 provides some summary statistics on the tariff cuts by major sectors. As mentioned above, the average tariff cut was highest in manufacturing. There is large variation in the tariff cuts, both across and within major sectors. The variation within sectors is highest within manufacturing where the standard deviation of the cut in tariffs is 0.148 percentage points. The variation is shown in more detail in Figure 1, which shows the tariff cut in percentage points by industry. The empirical analysis below is done using 3-digit industry tariffs, but to make the figure easier to read, the tariffs have been aggregated to the 2-digit industry level. Industries 1 and 2 fall within agriculture, hunting & forestry; industry 5 is fishing; industries 10 through 14 are mining; industries 15 through 36 are manufacturing; and industries 40 through 93 are other industries. Clearly the largest tariff cuts were in industry 18 (manufacture of wearing apparel; dressing and dyeing of fur), industry 16 (manufacture of tobacco products), and industry 17 (manufacture of textiles), all within manufacturing. One of the smallest tariff cuts was also within manufacturing, industry 23 (manufacture of coke, refined petroleum products, and nuclear fuel). One thing that is clear from the figure is the variation in tariff cuts across industries, which is important for the identification strategy outlined below.

IV.2 Household surveys

The principal poverty measure used in the empirical analysis is the poverty headcount ratio. It measures the share of the population that falls below the poverty line. As with most studies of poverty in developing countries, this paper focuses on absolute deprivation. Thus, the poverty line used does not change over time as living standards improve or decline, instead it is meant to represent the same absolute level of welfare adjusted for price changes.

The 2002 and 2004 Vietnam Household Living Standards Surveys (VHLSS) are representative at the provincial level and provide information on household expenditures, occupation, employment, and various other household and individual characteristics. Expenditure information is available for approximately 30,000 households in the 2002 VHLSS and 9,000 households in the 2004 VHLSS. The 2002 VHLSS was conducted between January 2002 and December 2002. In contrast, the 2004 VHLSS interviewed households only from May 2004 through November 2004, with the majority of households being interviewed in June and September. For both surveys the recall period for expenditures and employment is the past twelve months. To construct estimates of provincial poverty, I use the official "general poverty line", which includes an estimate of the cost of a basket of food items required to consume 2100 calories per day and essential non-food items such as clothing and housing.[9] The general poverty line is 1,917 thousand VND in 2002 and 2,077 thousand VND in 2004. Glewwe (2005) has reviewed the consistency of the expenditure data and concludes that they are broadly consistent across

[9] See World Bank (1999).

the 2002 and 2004 VHLSS. Details of the expenditure variables and sample weights used can be found in the data appendix.

There is a substantial variation in provincial poverty rates as well as the proportional drop in poverty between 2002 and 2004. The latter is the primary dependent variable of the current study. Table 4 provides summary statistics on the levels of poverty, the rate of poverty reduction, patterns of employment, measures of education, and other provincial data used in the analysis. The 2002 levels of poverty range from a high of 77 percent in Lai Chau to a low of 2 percent in Ho Chi Minh City. For the current study, it is not the level of poverty, but rather its rate of decline that is most interesting. Here too there is considerable variation, as shown in Figure 2. Two provinces experienced measured increases in the incidence of poverty, Khanh Hoa and Bac Lieu, while Ho Chi Minh City eliminated all remaining poverty between 2002 and 2004. The proportional drop in poverty between 2002 and 2004 is negatively correlated with the incidence of poverty in 2002. This suggests that existing trends in economic performance may be an important factor for explaining the decrease in poverty. In the empirical section I attempt to address this concern by controlling for differences in initial provincial characteristics.

IV.3 Employment data

For constructing the measure of provincial exposure to U.S. tariff cuts, I use employment data from the 3 percent sample of the 1999 Population and Housing Census made available through Integrated Public Use Microdata Series – International's webiste. In general, it reports industry of employment at the 3-digit ISIC level, but for some

individuals it is only reported at the 2-digit level.[10] I restrict the sample to individuals 13 years of age and older, as individuals below age 13 were not asked about their employment status.

Finally, between 2002 and 2004 three Vietnamese provinces were split. To be consistent, I recode household observations from the 2004 VHLSS into the original 61 provinces, as in the 1999 census and the 2002 VHLSS.

V. EMPIRICAL METHODOLOGY

Following Topalova (2007), I exploit provincial variation in exposure to the trade agreement based on the structure of employment prior to the trade agreement. I construct provincial measures of the drop in U.S. tariffs as follows:

$$TariffDrop_p = \sum_i \omega_{ip} \Delta\tau_i \quad (1)$$

where p indexes provinces, ω_{ip} is the share of workers in province p in industry i (i.e., $\sum_i \omega_{ip} = 1$), and $\Delta\tau_i$ is the tariff drop in industry i. The employment and tariff data cover over seventy industries across agriculture, aquaculture, mining, and manufacturing. To establish the robustness of the relationship between poverty reduction and exposure, I employ the following regression model:

$$y_p = \alpha + \beta TariffDrop_p + X_p\delta + \varepsilon_p \quad (2)$$

[10] To be exact, the industry codes used in the census do not match exactly with the ISIC nomenclature. There are a small number of industries for which the 3-digit industry assigned to the described industry does not match the ISIC code. I recode these observations according to ISIC nomenclature. This is the same for the 2002 and 2004 VHLSS. See the data appendix for further details.

where y_p is the proportional drop in the poverty headcount ratio in province p and X_p is a vector of control variables intended to help control for underlying trends in poverty reduction that could be correlated with provincial exposure to the U.S. tariff cuts. In most specifications X_p includes the natural logarithm of the poverty headcount ratio in 2002 to control for convergence in poverty rates and regional dummy variables to control for unobserved trends in poverty that vary by region. In other specifications, controls for other trade influences are added as are initial provincial characteristics such as employment patterns.

I use the proportional drop in poverty (which is approximately equal to the difference in the natural logarithm of poverty) as the dependent variable. I have chosen this form for the dependent variable to be consistent with other key papers in the literature, such as Besley and Burgess (2003) and McMillan, Zwane, and Ashraf (2007), which both use the natural logarithm of poverty as their dependent variable.

It is important to understand the source of variation being used to identify β in equation (2). The regression measures the partial correlation between the proportional drop in poverty and exposure to U.S. tariff cuts. This implies that the framework cannot identify the average impact of increased U.S. market access on poverty across provinces. This will be part of the estimated constant term. Hence, the total impact of the trade agreement, which is comprised of the relative impact, as measured by *TariffDrop*, and the average impact, cannot be determined. In the discussion section I add additional assumptions that allow for an admittedly rough estimate of the overall impact.

A second point to address is the weighting of national tariffs at the provincial level to create a measure of provincial exposure to the tariff cuts. I use the industry of

employment to aggregate exposure at the industry level into a provincial measure of exposure. This implicitly assumes that two workers in the same industry, one in the export-oriented manufacturing centre of Ho Chi Minh City and the other working in predominantly rural Son La, for instance, will experience the impact of tariffs cuts on clothing and apparel goods the same way. Ideally, one would like to know whether the individual is involved in the production of goods destined for the domestic or international market, but this information is not available in the census data. One way to address this point is by considering how far away a province is from one of Vietnam's three major seaports, which are located in the provinces of Hai Phong, Da Nang, and Ho Chi Minh City. Thus, I include the distance to the nearest major seaport as well as its interaction with *TariffDrop*. This allows the net impact on a worker within an industry to vary geographically within Vietnam.

Third, weighting national tariffs by industry of employment is not the only plausible aggregation method. One could measure a province's exposure by weighting tariffs with the value of production within an industry by province or the value of exports and imports within an industry by province. Unfortunately, national account estimates at the provincial level in Vietnam are unreliable and thus I cannot check the robustness of my results to these alternative aggregation procedures.

The timing of the tariff cuts and the choice of study period used for identifying the impact of the tariff cuts are important. I use the 2002 VHLSS as my baseline from which to measure changes in poverty. This raises two concerns. First, some of the households were surveyed close to the end of the 2002. Hence, their expenditure and employment data are reported for a period that is almost entirely after the entry into force

of the BTA. Second, to the extent that firms and individuals changed behavior in anticipation of the BTA, this implies that some of the impacts were being felt prior to the date of implementation. Both observations suggest that by focusing on the period of 2002 to 2004 I may be underestimating the impact that that BTA has had as of 2004 on provincial poverty. Unfortunately, due to lack of data, this problem is hard to avoid as the 1998 Vietnam Living Standards Survey (VLSS), unlike the 2002 and 2004 VHLSS, was not designed to be representative at the provincial level. Hence, the results should be interpreted as the impact that the BTA had on the two-year period from 2002 to 2004 and not as the cumulative impact up to 2004.

V.1 Exogeneity of U.S. Tariff Cuts

Since the trade agreement is bilateral, this raises concerns about endogenous protection and endogenous market access through political lobbying by U.S. and Vietnamese industries. In general, one would expect that U.S. industries would lobby for smaller cuts in the U.S. tariffs protecting their industry and that Vietnamese industries would lobby for greater cuts in U.S. tariffs. This concern, however, is unlikely to influence the U.S. tariff cuts in this particular agreement. The U.S. tariff cuts were presented as an all-or-nothing package whereby exports from Vietnam into the U.S. would immediately be covered by MFN tariff rates instead of Column 2 tariff rates. The movement from one pre-existing tariff schedule to a second pre-existing tariff schedule implies that both U.S. and Vietnamese industries did not have an opportunity to influence the tariff cuts faced by their industry. This argument relies on the assumption that both the Column 2 and MFN tariff schedules are exogenous to Vietnam, which I turn to now.

The Column 2 tariff rates are arguably exogenous to Vietnam for a number of reasons. First, the countries subject to Column 2 rates are all former or current communist countries, suggesting that political concerns larger than industry lobbying dominate this category of the U.S. tariff schedule. Table 5 shows the list of countries subject to Column 2 tariff rates from 1996 to 2005. At the time of the U.S.-Vietnam Bilateral Trade Agreement, the only remaining countries were Afghanistan, Cuba, Laos, and North Korea. Second, imports into the U.S. under Column 2 constitute a very small fraction of overall U.S. imports. Between 1996 and 2006, the share of total U.S. imports originating in countries subject to Column 2 rates ranged between 0.00 and 0.09 percent. This implies that the returns to U.S. industries lobbying for protection are very low within the Column 2 section of the U.S. tariff schedule. Third, as suggested by the previous point, both prior and subsequent to the BTA, there has been little change in the prevailing Column 2 rates. Table 6 presents simple correlations at the 4-digit Harmonized System (HS) commodity level of the Column 2 and MFN ad valorem equivalent tariff rates between 1997, 2001, and 2005. Between 1997 and 2005, the correlation of Column 2 rates was 0.978 as compared to only 0.849 for MFN rates. Clearly the Column 2 rates have been very stable and much more so than the MFN rates. These three arguments support the proposition that the Column 2 rates prevailing in 2001 were exogenous to Vietnam.

The major argument for the exogeneity of the *ex post* level of U.S. protection is that overall imports from Vietnam into the U.S. represent a very small fraction of total U.S. imports. By 2006, U.S. imports from Vietnam constituted only 0.46 percent of total

U.S. imports. Hence, it is hard to believe that the U.S. would set its overall trade protection structure based on conditions in Vietnam.

V.2 Underlying trends and contemporary shocks

In the above econometric framework, identification fails if *TariffDrop* is correlated with the error term. In this particular context the primary concern is likely to be omitted variable bias. Since the dependent variable is expressed in terms of rate of poverty reduction, any time constant provincial characteristics that influence the level of poverty are controlled for. Hence, I only need to be concerned with time-varying omitted variables that may be correlated with the measures of exposure. I address this problem by including in the regression various provincial characteristics that might induce differential poverty reduction trends across provinces. Furthermore, I include dummy variables for each of Vietnam's eight geographic regions. This absorbs any differential trends in poverty reduction that are common within a region and hence helps to control for unobserved heterogeneity in provincial trends.

VI. EMPIRICAL RESULTS

The primary regression results are reported in Table 7. Column (1) includes the smallest set of control variables – the natural logarithm of poverty in 2002 and regional dummies. In this specification, the impact of *TariffDrop* is positive and statistically significant. The inclusion of the natural logarithm of poverty in 2002 helps to control for any bias in the estimate of the coefficient of *TariffDrop* introduced by convergence in

poverty rates across provinces, as *TariffDrop* is negatively correlated with poverty in 2002. In column (2) I add the distance to the nearest major seaport. As mentioned above, Vietnam has three major seaports in the provinces of Hai Phong in the north, Da Nang in the centre, and Ho Chi Minh City in the south. Each of these provinces is also a major manufacturing area. Thus, the distance to the nearest major seaport variable will also partially capture spillover effects based on proximity to large manufacturing centres. This additional control variable does not alter the fundamental result of more exposed provinces experiencing more rapid poverty reduction. The coefficient estimate on *TariffDrop* in column (2) is slightly lower than in column (1), but remains positive and statistically significant. Column (3) subsequently adds an interaction term between provincial exposure to the U.S. tariff cuts, *TariffDrop*, and the distance to the nearest major seaport. It yields some interesting results. First, the impact of *TariffDrop* on the proportional drop in poverty remains positive and statistically significant. Second, this positive impact diminishes the further the province is from a major seaport. In this regard, Vietnam is relatively fortunate as the median province is only 180 km from a major seaport. Finally, in column (4) I add the share of employment within agriculture, aquaculture, mining, and manufacturing in 2002. Since the U.S. tariff cuts were, on average, largest within manufacturing, by construction *TariffDrop* is positively correlated with the share of manufacturing employment within each province. Thus, failing to control for differences in initial employment structure means that *TariffDrop* will also be picking up any latent trends in poverty reduction associated with differences in the employment structure. For example, if manufacturing oriented provinces are growing more quickly than other provinces and subsequently experience more rapid reduction in

poverty, then this would introduce an upward bias into the estimate of *TariffDrop*. The results in column (4) suggest that the positive and statistically significant effect of *TariffDrop* is not simply due to underlying poverty reduction trends based on differences in initial employment patterns. The point estimate on *TariffDrop* falls slightly compared to column (3), but remains positive and statistically significant. As expected, provinces with a larger share of workers in manufacturing did experience faster poverty reduction, but conditional on the included regressors this impact is not statistically significant.

In all four specifications the impact of *TariffDrop* is positive and statistically significant. More importantly, the result is meaningful in an economic sense. The bottom of Table 7 reports the proportional drop in poverty associated with a one standard deviation increase in *TariffDrop*. This is approximately equivalent to an increase in exposure from the 25th percentile, the province of Ha Tinh, to the 75th percentile, the province of Tien Giang. The estimated impact ranges between a decrease in poverty of 11.0 to 13.9 percent. To help provide some perspective on this result the average decrease in provincial poverty between 2002 and 2004 was 31.1 percent. Thus, the impact of an increase in exposure is estimated to be very large in comparison to the average percentage decrease in poverty between 2002 and 2004. Alternatively, one can benchmark this prediction against the Millennium Development Goal of reducing poverty by 50 percent in 25 years. This goal requires poverty to drop at an annual rate of 2.7 percent per year or 5.5 percent over a two-year period. Thus, the predicted impact of a one standard deviation increase of provincial exposure to the U.S. tariff cuts implies a rate of poverty reduction about twice as fast as required to meet the aforementioned Millennium Development Goal.

VI.1 Robustness of results

In principal, the variable *TariffDrop* may be correlated with other poverty reduction factors for two reasons: correlation with the employment structure or correlation with the tariff cuts. In the above section I addressed the first of these concerns, which is likely to be the more important of the two concerns. In this section I turn to other possible trade influences that may be correlated with *TariffDrop*.[11]

An additional concern with the measure of exposure is that it may be picking up trade related influences other than the BTA. For example, if U.S. import demand is shifting to the same industries that received the largest tariff cuts then I will be estimating this effect along with the impact of the tariff cuts. I examine this possibility by constructing a measure of provincial exposure to changes in U.S. imports over the period of 1999 to 2004. Specifically, the variable is calculated according to:

$$ImpChanges_p = \ln\left(\sum_i \omega_{ip} Imports_{i,2004}\right) - \ln\left(\sum_i \omega_{ip} Imports_{i,1999}\right)$$

where ω_{ip} is the share of workers in province p in industry i, and $Imports_{i,t}$ is the value of U.S. imports from all countries in industry i in year t=1999, 2004. Hence, provinces with a greater share of workers in industries that experienced larger increases in U.S. import demand will be more exposed to this structural change. Table 8 displays regression results when $ImpChanges_p$ is included as a control variable. I do not include the 2002 employment share variables as they are not jointly significant in the last regression

[11] I have also run regressions controlling for initial education levels, government spending, government transfers, FDI stocks, and measures of the provincial business environment. None of these qualitatively influence the presented results.

reported in Table 7. The coefficient estimate on *TariffDrop* is still statistically significant at the 1 percent level.

Changes in Vietnam's trade policies, aside from the BTA, may also be a source of omitted variable bias. I explore this possibility by constructing a measure of provincial exposure to changes in Vietnam's import tariffs between 1999 and 2004. This is done in an analogous method as for changes in U.S. tariffs. Results are shown in column (2) of Table 8. Similar to Topalova's (2007) results for Indian districts, I find that Vietnamese provinces that were more exposed to Vietnam's tariff cuts experienced slower reductions in poverty, although the estimate is not statistically significant.

One final trade policy change that warrants attention is Vietnam's tariff commitments under the BTA. These are almost exclusively concentrated in crops and food processing. As of 2004, Vietnam had not cut these tariff lines. In addition, the tariff cuts are small in magnitude compared to those made by the U.S. However, firms and farmers may be changing their production patterns in anticipation of the impending tariff cuts. Column (3) shows regression results when provincial exposure to future Vietnamese tariff cuts, as proscribed by the BTA, are included. This exposure does not have a statistically significant impact, nor does it substantially change the coefficient estimate of exposure to U.S. tariffs. Finally, column (4) of Table 8 presents regression results when all three trade influences are included. The results are similar to those presented in the previous columns.

In Appendix A I discuss the possible impacts of measurement error in the initial level of poverty in 2002. The analysis indicates that the previous regression results are not driven by plausible measurement error. Furthermore, I check the robustness of my

results to the poverty line used and alternative measures of poverty. These results are also reported in Appendix A in Table A2. I consider a 25 percent increase in the poverty line, as well as the normalized poverty gap and the normalized poverty severity at the original poverty line.[12] The results are consistent with the primary results presented above.

VII. LABOUR MARKET TRANSMISSION MECHANISMS

This section aims to confirm and to explain the above results. Given the extent of the poverty reductions, intuitively, one would expect to find changes in the labour market that are consistent with this pattern. If contradictory results were found, then this would lead one to be suspicious of the previous results. Furthermore, these same labour market channels help to explain how the tariff cuts led to reductions in poverty.

VII.1 Wages

One channel from tariff cuts to household welfare is the wage labour market. In the 2004 VHLSS, among individuals aged 15 to 64, 82 percent of individuals reported working in the past 12 months. Of these workers, 31 percent reported working for a wage in the past twelve months for their most time-consuming job. In the 2002 VHLSS, 83 percent of individuals between the ages of 15 and 64 reporting working in the past 12 months, while 29 percent of these workers reported working for wages for their most time-consuming job.[13]

[12] The normalized poverty gap is the average difference between actual expenditures and the poverty line for all poor individuals, expressed as a fraction of the poverty line, while the normalized poverty severity gap is the average squared differenced expressed as a fraction of the poverty line.
[13] For both surveys, these are simple averages, unadjusted for sampling weights.

I examine how the drop in U.S. tariffs influenced provincial wage premiums.[14] The provincial wage premium is the variation in individual wages that cannot be explained by individual characteristics, such as age, gender, or industry affiliation, but can be explained by the province of the worker. In essence, it is a conditional average wage by province. If labour is imperfectly mobile across provinces, one would expect to find a relationship between changes in provincial wage premiums and exposure to the tariff cuts. According to the 1999 census, only 3 percent of individuals moved across provinces between 1994 and 1999, suggesting that labour is imperfectly mobile across provinces, at least prior to the BTA.

The empirical analysis follows a two-stage procedure. In the first stage, the log of real hourly wages for worker *i* at time *t* $\left(\ln\left(w_{ijpt}\right)\right)$ is regressed on a vector of individual characteristics $\left(\mathbf{H}_{it}\right)$, a vector of industry dummies $\left(\mathbf{I}_{it}\right)$, and a vector of provincial dummies $\left(\mathbf{P}_{it}\right)$:

$$\ln\left(w_{it}\right) = \alpha + \mathbf{H}_{it}\boldsymbol{\beta}_t' + \mathbf{I}_{it}\mathbf{wp}_{jt}' + \mathbf{P}_{it}\mathbf{wp}_{pt}' + \varepsilon_{ijpt}.$$

The vector of individual characteristics includes a dummy for the individual's gender, a quadratic in age, dummies for the highest level of completed education, dummies for sector of ownership, and the number of months, days per month, and hours per day spent working. The coefficient of the provincial dummy represents the variation in wages that cannot be explained by individual characteristics or industry affiliation, but can be explained by province of residence. Following Krueger and Summers (1988), I normalize the sum of the employment-weighted provincial wage premiums to zero and I express the

[14] Attanasio, Goldberg, and Pavcnik (2004) use a similar framework to examine how industry wage premiums respond to tariff cuts in Columbia.

provincial wage premiums as deviations from zero. In the second stage, the change in the provincial wage premium is regressed on the drop in tariffs by province and the provincial wage premium in 2002:

$$\Delta wp_p = \alpha + \beta TariffDrop_p + \gamma wp_{p,2002} + u_p .$$

Since the dependent variable is an estimate, I use weighted least squares. The weights are the inverse of the variance from the first stage regression, corrected according to Haisken-DeNew and Schmidt (1997). The results are reported in Table 9 for all wage earners and then subsamples of workers based on education and by the level of skill according to occupation. For all wage earners the drop in tariffs is positively associated with provincial wage premiums, but this result is not statistically significant. However, dividing the sample according to education reveals a more nuanced pattern. For workers with at most a primary education the impact of *TariffDrop* on the change in the provincial wage premium is both positive and statistically significant. A one-standard deviation increase in exposure to the U.S. tariff cuts is associated with a 1.9 percent increase in the provincial wage premium for primary educated workers. The results are positive, but statistically insignificant for workers with both a lower secondary and an upper secondary education. Note also that the estimate of the impact of *TariffDrop* drops as the level of education increases. This is consistent with the large increase in exports in low-skilled labour-intensive goods creating a positive labour demand shock for unskilled workers. A similar picture emerges when the sample of workers is divided according to whether or not their job is considered a skilled or unskilled occupation.[15] For unskilled workers, the estimate of *TariffDrop* on the provincial wage premium is positive and statistically

[15] This is based on occupational classifications in the VHLSSs household questionnaires.

significant. A one standard deviation increase in *TariffDrop* is associated with a 1.8 percent increase in the provincial wage premium for unskilled workers. By comparison, the impact is estimated to be negative for skilled workers, although it is not statistically significant.

VII.2 Job Creation

To further explore the labour demand impacts, I investigate the growth of jobs in enterprises and the movement of workers into jobs that pay either a wage or salary. I use data collected annually by the GSO from nationally representative firm surveys to examine the impact on formal enterprise jobs. The firm surveys exclude cooperatives involved in agriculture and forestry as well as household businesses and farms. Hence, the employment estimates essentially cover off-farm employment. Figure 3 displays a scatter plot of the poverty headcount ratio in 2002 versus the natural logarithm of enterprise employment in 2000, while Figure 4 displays a scatter plot of the percentage growth in jobs between 2000 and 2004 versus provincial exposure to the BTA. The figures display a negative correlation between the incidence of poverty and employment in enterprises and a positive correlation between job growth and provincial exposure. The former cross-sectional relationship suggests that enterprise job creation may be an important source of poverty alleviation. To explore the robustness of the positive correlation I employ the following regression model:

$$\ln\left(jobs_p^{04}\right) - \ln\left(jobs_p^{00}\right) = \alpha + \beta TariffDrop_p + \lambda \ln\left(jobs_p^{00}\right) + \mathbf{X}_p\boldsymbol{\gamma}' + \varepsilon_p$$

where $jobs_p^t$ is the number of employees in enterprises in province p at time $t = 2000, 2004$ and $\mathbf{X}_p$ is a vector of regional dummies. The results are shown in Table 10. I find strong evidence of convergence in enterprise employment as provinces with lower levels of enterprise employment experienced more rapid job growth between 2000 and 2004, all else equal. Related to previous results, provincial exposure to the trade agreement is positively and significantly correlated with job growth, even after controlling for regional trends and convergence in employment levels.

I find a similar relationship between the level of poverty and the share of workers working for a wage or salary in 2002, as demonstrated in Figure 5. Moreover, I find provincial exposure to the U.S. tariff cuts is positively associated with the share of workers working for a wage or salary. This is particularly true for workers with only a primary education. These regression results are shown in Table 11. As exhibited in the provincial wage premium regressions, the impact of *TariffDrop* is strongest for workers with a primary level of education and the impact diminishes for higher levels of education. A one standard deviation increase in *TariffDrop* induces a 1.74 percentage point increase in the share of primary-educated workers working for either a wage or salary.

VIII. DISCUSSION OF RESULTS

This study is unusual among most of the trade and development literature as it focuses on a very short time period. This obviously raises questions about the plausibility of the results. Can a trade agreement *really* influence poverty in only two years? Previous

sections of this paper presented additional labour market evidence that confirms the poverty results, while the current section provides a series of simple calculations to demonstrate the magnitude of the increase in export flows relative to the drop in poverty. The calculations are based on estimating the amount of money required to lift individuals out of poverty and comparing this value to a prediction of the increase in value of exports under the BTA relative to a scenario without the BTA. It is meant as an illustrative example only.

Consider the province of Lao Cai, located in northwest Vietnam. Lao Cai is a relatively isolated province with a low level of integration with both the domestic and international economy. As a benchmark, I will assume that the overall impact of the BTA was zero in Lao Cai (recall that the overall impact is the sum of the relative and average impacts across provinces). Conditional on the coefficient estimate on *TariffDrop* presented in column (3) of Table 7, this implies that the average impact of the BTA across provinces was an 8 percent drop in the incidence of poverty. Combining the average and relative effects suggests that approximately 1.6 million Vietnamese, about 2 percent of the population, were lifted out of poverty by the BTA between 2002 and 2004. Recall that the national poverty rate fell by 9.4 percentage points between 2002 and 2004. Furthermore, if I assume that each individual lifted out of poverty was the average distance from the poverty line, then approximately 63.6 billion VND (approximately 4 million USD) must reach these individuals on an annual basis to keep them out of poverty. With an admittedly crude estimate of the amount of money required to lift the individuals out of poverty, this can now be compared to the amount of money flowing into Vietnam due to the rise in exports to the U.S. In 2003, annual exports from Vietnam

to the U.S. totaled about 4.55 billion USD. Based on the three-year trend of growth in exports from 1998 to 2001, in the absence of the BTA exports from Vietnam to the U.S. would have been closer to 2.39 billion USD. This suggests that only 0.6 percent of the estimated growth in export value is required to reach these individuals implying that the above regression results are far from implausible given the growth in exports from Vietnam to the U.S.

IX. CONCLUDING REMARKS

In this paper, I estimate the poverty impacts of a large, developed country lowering import barriers to goods from a small, developing country. Specifically, I examine the effect of the U.S.-Vietnam Bilateral Trade Agreement (BTA), which came into force in December 2001, on the incidence of poverty at the provincial level in Vietnam between 2002 and 2004. The econometric framework establishes that provinces that were more exposed to the BTA (i.e., provinces that had a higher share of workers employed in industries that benefited from larger tariff cuts) experienced greater proportional drops in poverty. I find a large and statistically significant impact. An increase in exposure to the BTA of one standard deviation is estimated to lead to approximately an 11 to 14 percent decrease in the incidence of poverty within a province. By comparison, between 2002 and 2004, the average proportional drop in provincial poverty is 31.1 percent. Moreover, I show that this result is robust to a number of concerns. In particular, I control for possible trends in provincial poverty based on initial provincial characteristics. I also address concerns of potential measurement error and consider alternative measures of poverty.

I demonstrate labour market effects that are consistent with the estimated poverty impacts. I show that provincial wage premiums increased in provinces more exposed to the trade agreement. This effect is strongest for unskilled workers. In addition, more exposed provinces experienced greater rates of job creation within formal enterprises. Finally, provinces that were more exposed experienced an increase in the share of workers working for a wage or salary. Again, this effect is strongest for unskilled workers.

The estimated impacts are consistent with predictions from the Specific Factors, or Ricardo-Viner, model of international trade. In the most frequent interpretation of this model, labour is assumed to be mobile across industries, but capital is immobile in the short-run. With the additional assumption of imperfect mobility of labour between provinces, the model predicts that provinces more exposed to an exogenous increase in prices will experience a greater percentage increase in nominal wages. I find exactly this effect when estimating changes in provincial wage premiums, specifically for unskilled workers. Although the Ricardo-Viner model does not make predictions specifically about poverty, the relative increase in wages is consistent with my empirical finding of more rapid poverty alleviation in provinces more exposed to the tariff cuts.

The paper focuses exclusively on immediate, short-run impacts. While these impacts are important to understand and suggestive of positive impacts of international integration for the poor, the paper does not address the medium- to long-run potential for poverty alleviation via increased exporting opportunities.

APPENDIX A: MEASUREMENT ERROR

One concern that is always present when using household surveys is the consistency of the data. Based on a comparison of the mean per capita consumption in the VHLSS and the national accounts, Glewwe (2005) suggests that the 2002 VHLSS may have underestimated household per capita expenditures relative to the 2004 VHLSS. One possible explanation is problems with the commencement of the 2002 VHLSS, due to its large size and it being the GSO's first time implementing the survey on its own. However, Glewwe finds no evidence of an experience effect. A second plausible explanation is pressure to make the expenditure and income variables match in 2002. However, in both the 2002 and 2004 VHLSS nominal per capita expenditures are about 77 percent of nominal per capita income. This implies that there is no evidence of interviewers systematically doing something to lower consumption in the 2002 VHLSS. Overall, Glewwe concludes that the 2002 and 2004 VHLSS are broadly consistent, although it may be possible that the 2002 survey underestimated household expenditures relative to the 2004 survey. If this is true, then the poverty rates for 2002 may be overestimated.

To explore this issue, consider an example where all households report the same fraction, $\theta < 1$, of true expenditures in 2002. As an example, Figure A1 shows an observed distribution of per capita expenditures where $\theta = 0.8$ and the true, unobserved distribution. It also shows two poverty lines at 1917 and 8000. From the figure, it is clear that the measurement error in the poverty headcount ratio will be most severe when the poverty line is close to the mode of the observed distribution. The difference between the observed and the true incidence of poverty will be greatest at the point of crossing

between the observed and true distributions. In addition, as the poverty line moves past the mode of the distribution the difference between the observed and true poverty headcount ratio will diminish. Finally, if the observed poverty headcount ratio is 0 than the true poverty headcount ratio will also be 0 under the assumption that all households under reported their expenditures.

Let P_{pt} denote the true level of poverty in province *p* at time *t* and let $\tilde{P}_{pt}$ denote the observed level. Given the shape of the distribution, a natural approximation would be to model the measurement error as a quadratic function of the observed incidence of poverty:

$$P_{pt} \cong \tilde{P}_{pt} - \underbrace{\left(a\tilde{P}_{pt} + b\left(\tilde{P}_{pt}\right)^2 \right)}_{\text{measurement error}}$$

with the restrictions $a>0$, $b<0$ and $a+b>0$. Then the true proportional drop in poverty can be approximated as:

$$\begin{aligned} \frac{P_{p2002} - P_{p2004}}{P_{p2002}} &\cong \ln\left(P_{p2002}\right) - \ln\left(P_{p2004}\right) \\ &= \ln\left[\tilde{P}_{p2002} - \tilde{P}_{p2002}\left(a + b\tilde{P}_{p2002}\right)\right] - \ln\left(P_{p2004}\right) \\ &= \ln\left(\tilde{P}_{p2002}\right) + \underbrace{\ln\left(1 - a - b\tilde{P}_{p2002}\right)}_{\text{measurement error}} - \ln\left(P_{p2004}\right). \end{aligned}$$

This suggests including a non-liner function of the initial level of poverty on the right-hand side of the regression:

$$y_p = \alpha + \beta TariffDrop_p + f\left(\tilde{P}_{p2002}\right) + u_p .$$

If this measurement error is correlated with the drop in tariffs, then the previous estimates are biased.

I address possible measurement concerns in three ways. First, optimal first-differencing weights are used to remove the nonparametric component of the regression (Yatchew, 2003). Second, the measurement error is explicitly modeled as a quadratic function of the initial incidence of poverty. Third, the incidence of poverty in 2002 in each province is recalculated based on the assumption that each household under reports their expenditures by the same percentage. Specifically, I follow Glewwe (2005) and rescale household expenditures by the ratio 0.838/0.805, the respective ratios of mean expenditures in the 2004 and 2002 VHLSS to the national accounts estimates. The results are shown in columns (1) through (3), respectively, of Table A1. The coefficient estimates are a similar magnitude as previous results and are statistically significant. This suggests that possible measurement error in the initial incidence of poverty is not driving the results.

APPENDIX B: DATA

Poverty Measures: I use the 2002 and the 2004 Vietnam Households Living Standards Surveys to estimate provincial poverty. From the 2002 VHLSS household expenditure file, **hhexpe02.dta**, I use the real per capita expenditure series **pcexp1rl**, which has been regionally and temporally deflated to national average January 2002 prices. I weight each household observation by household size and the household's associated sample weight. From the 2004 VHLSS household expenditure file, **hhexpe04.dta**, I use the real per capita expenditure series **pcexp1rl**, which has been regionally and temporally deflated to national average January 2004 prices. Again, I weight each household observation by household size and the associated sample weight. These expenditure series and weights

reproduce the national and regional poverty estimates for 2002 reported by the World Bank (2003). I obtained these datasets from the GSO.

Employment Shares: I use the 3 percent sample of the 1999 Vietnam Census, made available by IPUMS International[16], to construct estimates of employment by industry within each province. Individuals are considered employed if the variable **empstat** takes the value 1000. The variable **ind** records the industry affiliation for employed individuals. For the majority of industries, the code and description match with the 3-digit ISIC, revision 3 codes. However, there are a few industries for which the Vietnamese census code differs from the corresponding 3-digit ISIC code. I make the changes documented below.

Old industry code	New industry code	Old industry code	New industry code
701	731	702	732
711	701	712	702
721	711	722	712
723	713	731	721
732	722	733	723
734	724	735	725
739	729	901	921
902	922	903	923
904	924	911	910
913	911	920	900

Finally, I assign individuals based on the province of official residence on the night of the census using **provvn** and weight individuals using **wtper**.

U.S. Tariffs: The 2001 U.S. tariff data from the U.S. International Trade Commission's (USITC) website. I convert specific tariffs to ad valorem equivalents by estimating the

[16] See http://www.ipums.org/international/index.html.

unit value of imports within each 8-digit HTS tariff line using total annual imports from all countries. I calculate the unit value of imports by dividing customs value of total imports by the total quantity by first unit for each 8-digit HTS tariff line that features a specific tariff component.

Concordance from HS to ISIC: The U.S. tariff data is reported according to the 8-digit Harmonized Tariff Schedule (HTS) of the United States. I match the 8-digit HTS codes to 6-digit Harmonized System (HS) codes by dropping the last two digits of the code. I convert the 6-digit HS codes to 3-digit ISIC codes with the concordance supplied by the World Bank. These concordances are also available as part of the WITS software program. I calculate a weighted average of the ad valorem equivalent of all tariff lines within an industry using U.S. imports in each tariff line as the weights.

Hourly wages: For the 2004 VHLSS, nominal hourly wages are estimated by dividing the wage and salary received during the past 12 months for the most time consuming job (variable **m4ac10a** from file **m4a.dta**) by an estimate of annual hours. Annual hours are estimated by multiplying the number of months (**m4ac6**) by the number of days per month (**m4ac7**) and by the number of hours per day (**m4ac8**). I convert the nominal hourly wage series to national average January 2004 prices by regionally and temporally deflating using the series **rcpi** and **mcpi** available in **hhexpe04.dta**.

For the 2002 VHLSS, the wage and hours data comes from the file **muc3.dta**. I take annual wages from **m3c1a** and construct annual hours from months (**m3c9**), days per month (**m3c10**) and hours per day (**m3c11**). As for the 2004 wages, I convert the nominal

hourly wage series to national average January 2002 prices by regionally (**rcpi**) and temporally (**mcpi**) deflating using deflators in the file **hhexpe02.dta**.

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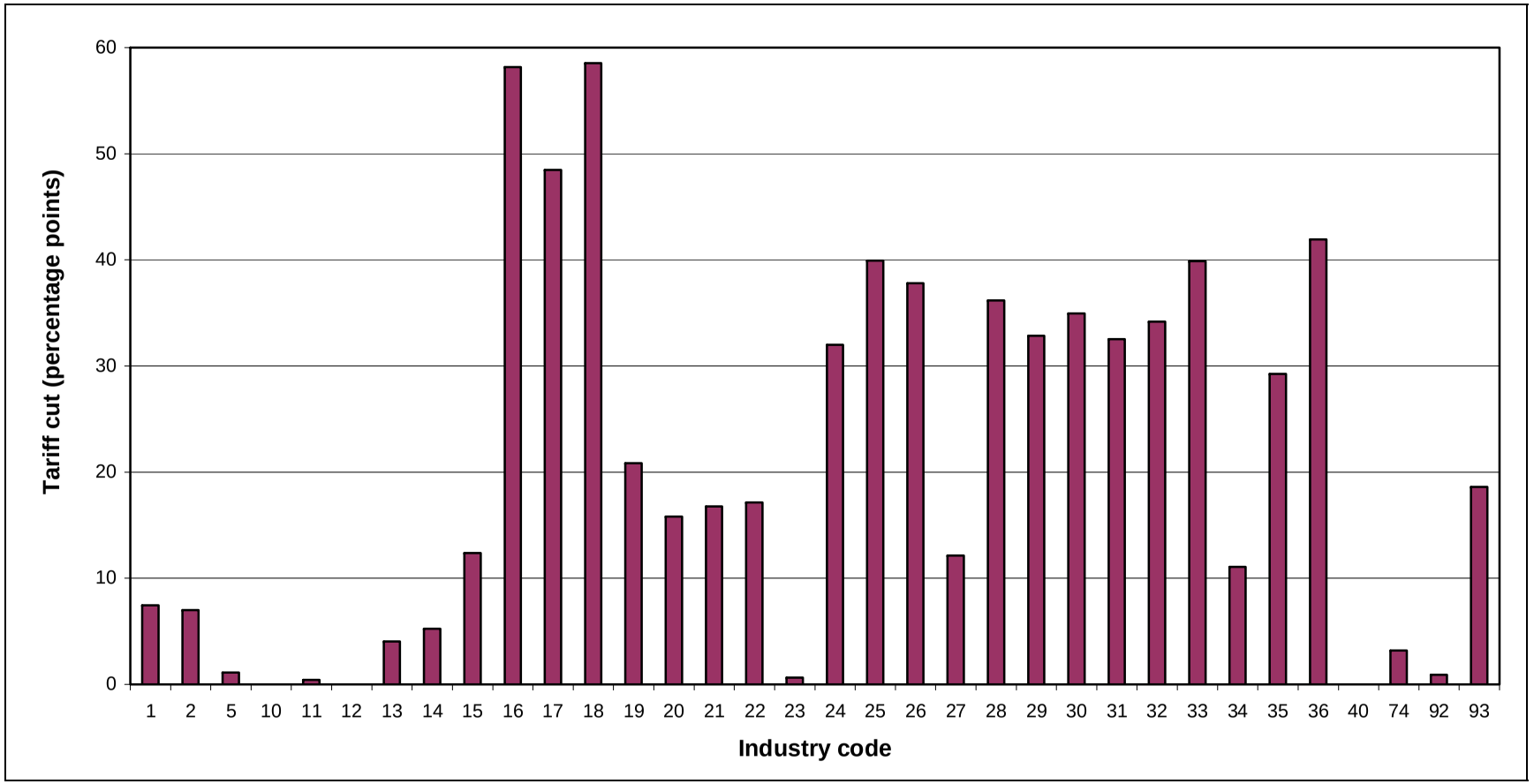

Figure 1 – U.S. tariff cuts by 2-digit ISIC industry

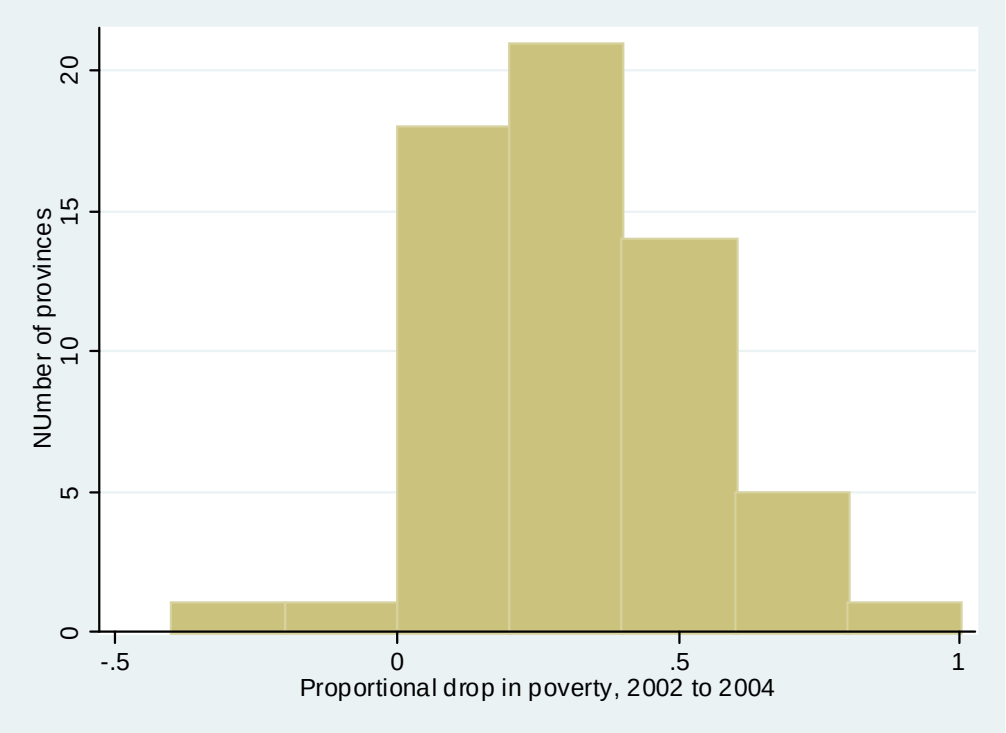

Figure 2 – Histogram of the proportional drop in provincial poverty rates, between 2002 and 2004

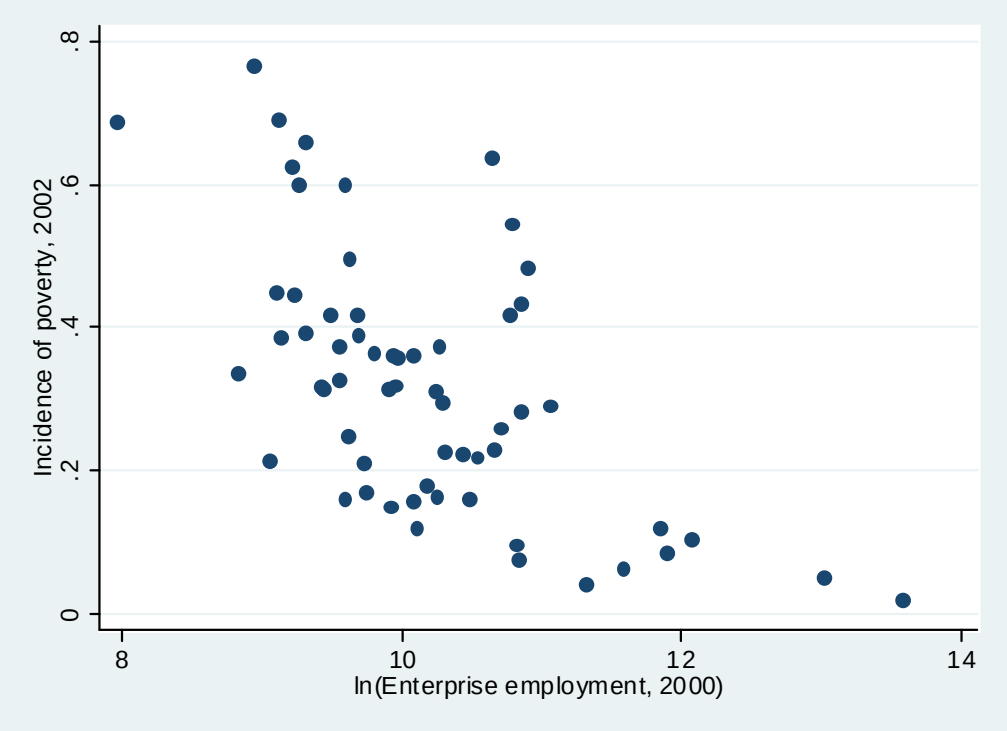

Figure 3 – Relationship between provincial poverty and enterprise employment

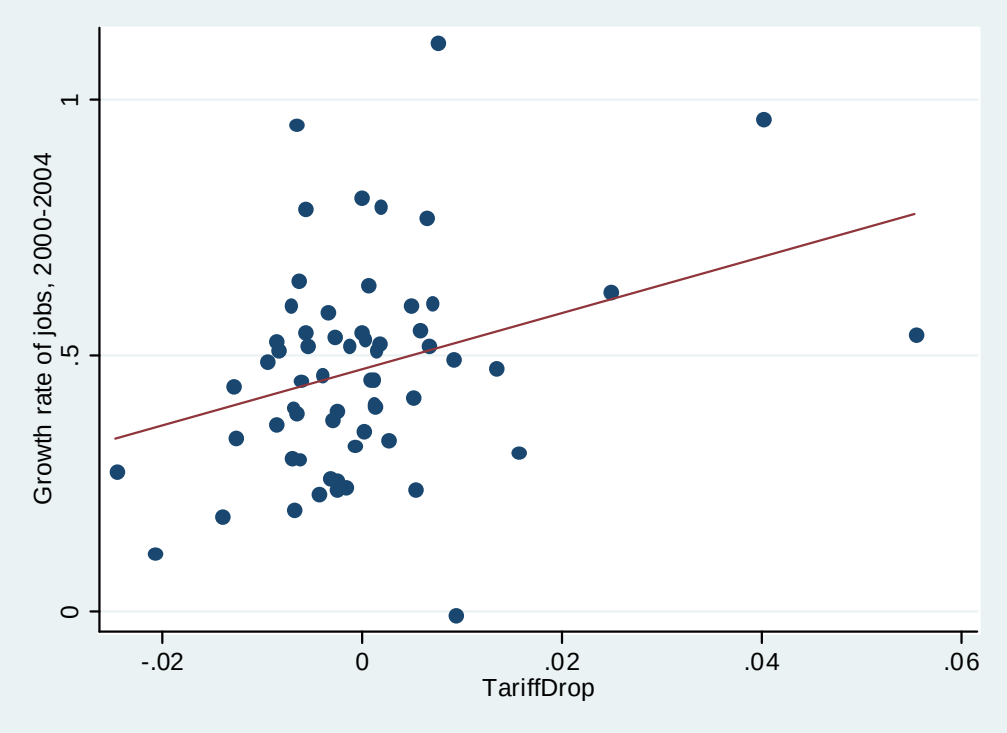

Figure 4 – Relationship between growth in jobs between 2000 and 2004 and provincial exposure to U.S.-Vietnam Bilateral Trade Agreement

Figure 5 – Relationship between provincial poverty and the share of workers working for a wage or salary in 2002

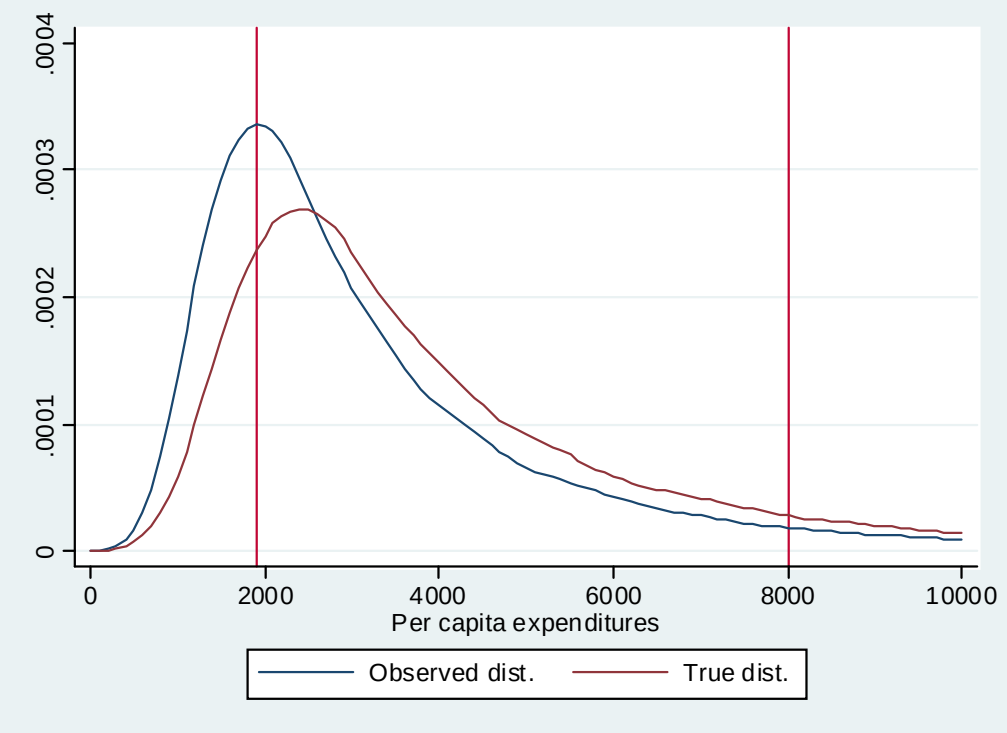

Figure A1 – Difference between an under-reported distribution of per capita expenditures and the true distribution

Table 1 - Vietnamese exports to and imports from the U.S., 1997-2004

	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Value (million USD)								
Exports	388	553	609	822	1053	2395	4555	5276	6630
Imports	278	274	291	368	461	580	1324	1163	1192
	Growth over previous year (%)								
Exports	22	43	10	35	28	128	90	16	26
Imports	-55	-1	6	27	25	26	128	-12	2

Source : U.S. International Trade Commission.
Imports are general imports and exports are FAS exports.

Table 2 - Main commodity exports from Vietnam to the U.S.

SITC Code	SITC Description	2004 Value (million USD)	Annual Growth 2001 to 2004 (%)	Share of exports to U.S. in 2004 (%)
84	Articles of apparel and clothing accessories	2571	276.5	48.7
3	Fish	568	5.9	10.8
85	Footwear	475	53.2	9.0
82	Furniture	386	206.4	7.3
33	Petroleum	349	24.0	6.6
5	Vegetables and fruit	184	54.2	3.5
7	Coffee and tea	144	17.3	2.7

Source: U.S. International Trade Commission.

Table 3 - Summary of U.S. tariffs applied to imports from Vietnam

Industry	Number of industries	Mean pre-BTA tariff (Column 2)	Mean post-BTA tariff (MFN)	Mean tariff cut	Standard deviation of tariff cut
Agriculture, hunting & forestry	3	0.085	0.016	0.069	0.010
Fishing	1	0.013	0.002	0.011	
Mining	9	0.027	0.001	0.026	0.045
Manufacturing	57	0.330	0.034	0.296	0.148
Other	6	0.080	0.002	0.077	0.111

Source: Author's own calculations based on the U.S. International Trade Commission's 2001 tariff schedule.
Note: The tariffs reported are weighted average tariffs. For each commodity-line tariff, its weight is the share of imports within the sector based on 2001 U.S. imports.

Table 4 - Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Poverty Headcount Ratio 2002	0.322	0.182	0.020	0.766
Poverty Headcount Ratio 2004	0.229	0.157	0.000	0.689
Proportional Drop in Poverty, 2002 to 2004	0.311	0.221	-0.210	1.000
Share of workers in:				
Agriculture, 2002	0.599	0.188	0.072	0.909
Aquaculture, 2002	0.034	0.063	0.000	0.428
Mining, 2002	0.008	0.018	0.000	0.136
Manufacturing, 2002	0.097	0.066	0.004	0.293
Number of formal enterprise jobs, 2000	52468	114683	2860	788922
Share of workers working for a wage or salary, 2002	0.287	0.124	0.087	0.602
Share of population with at most:				
Primary education, 1999	0.750	0.089	0.444	0.910
Lower secondary education, 1999	0.139	0.047	0.043	0.270
Upper secondary education, 1999	0.083	0.038	0.030	0.216
Urban share of the population, 1999	0.193	0.150	0.046	0.838
Distance to nearest major seaport (km)	214.295	142.814	0.000	615.000
Regional dummies:				
Red River Delta region	0.180	0.388	0	1
North East region	0.180	0.388	0	1
North Wests region	0.049	0.218	0	1
North Central Coast region	0.098	0.300	0	1
South Central Coast region	0.098	0.300	0	1
Central Highlands region	0.066	0.250	0	1
South East region	0.131	0.340	0	1
Mekong River Delta region	0.197	0.401	0	1

Table 5 - Countries subject to Column 2 U.S. tariffs, 1996 to 2005

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Afghanistan	Afghanistan	Afghanistan	Afghanistan	Afghanistan	Afghanistan	Afghanistan			
Cambodia									
Cuba	Cuba	Cuba	Cuba	Cuba	Cuba	Cuba	Cuba	Cuba	Cuba
Laos	Laos	Laos	Laos	Laos	Laos	Laos	Laos	Laos	Laos
North Korea	North Korea	North Korea	North Korea	North Korea	North Korea	North Korea	North Korea	North Korea	North Korea
Vietnam	Vietnam	Vietnam	Vietnam	Vietnam	Vietnam				

Table 6 - Correlations of U.S. tariffs, 1997, 2001 and 2005

MFN			
	1997	2001	2005
1997	1.000		
2001	0.940	1.000	
2005	0.849	0.912	1.000
Column 2			
	1997	2001	2005
1997	1.000		
2001	0.991	1.000	
2005	0.978	0.984	1.000

Note: The correlations are done at the 4-digit HS level.

Table 7 - Ordinary Least Squares regression results of the impact of provincial exposure (*TariffDrop*) on poverty between 2002 and 2004

Dependent variable: Proportional drop in poverty, 2002 to 2004

	(1)	(2)	(3)	(4)
TariffDrop	9.133	8.037	10.140	8.002
	(4.77)**	(3.78)**	(6.44)**	(2.71)**
Distance to nearest major seaport		-0.000	-0.001	-0.001
		(1.86)	(3.52)**	(3.57)**
TariffDrop x Distance to nearest			-0.042	-0.049
major seaport			(2.26)*	(2.89)**
ln(*Poverty 2002*)	0.074	0.098	0.111	0.184
	(1.67)	(2.20)*	(2.76)**	(2.22)*
Agriculture employment 2002				0.022
				(0.05)
Aquaculture employment 2002				0.151
				(0.23)
Mining employment 2002				0.917
				(0.82)
Manufacturing employment 2002				1.653
				(1.31)
North East	-0.157	-0.113	-0.149	-0.043
	(1.92)	(1.30)	(1.81)	(0.39)
North West	-0.278	-0.198	-0.231	-0.121
	(3.17)**	(2.14)*	(2.77)**	(0.98)
North Central Coast	-0.138	-0.098	-0.125	-0.059
	(1.89)	(1.23)	(1.71)	(0.63)
South Central Coast	-0.203	-0.152	-0.119	-0.064
	(1.87)	(1.39)	(1.06)	(0.57)
Central Highlands	-0.112	-0.040	-0.024	0.096
	(1.01)	(0.33)	(0.18)	(0.66)
South East	0.005	0.037	0.007	0.081
	(0.06)	(0.38)	(0.07)	(0.76)
Mekong River Delta	-0.066	-0.049	-0.089	-0.024
	(0.73)	(0.55)	(1.06)	(0.26)
Constant	0.506	0.589	0.656	0.509
	(5.38)**	(5.92)**	(7.83)**	(1.19)
Observations	61	61	61	61
R^2	0.43	0.46	0.50	0.53
Direct impact of a 1 SD increase in *TariffDrop*	0.125	0.110	0.139	0.110
Indirect impact evaluated at the average distance from port			-0.123	-0.144

Robust t statistics in parentheses.
* significant at 5%; ** significant at 1%

Table 8 - Ordinary Least Squares regression results of the impact of provincial exposure (*TariffDrop*) on poverty between 2002 and 2004, controlling for other trade influences

Dependent variable: Proportional drop in poverty, 2002 to 2004

	(1)	(2)	(3)	(4)
TariffDrop (US)	9.832	10.366	10.294	10.232
	(6.00)**	(7.05)**	(7.16)**	(5.93)**
Distance to nearest major seaport	-0.001	-0.001	-0.001	-0.001
	(3.45)**	(3.40)**	(3.55)**	(3.08)**
TariffDrop x Distance to nearest	-0.041	-0.043	-0.043	-0.042
major seaport	(2.20)*	(2.26)*	(2.34)*	(2.59)*
ImpChanges	1.117			2.155
	(0.64)			(1.10)
TariffDrop (VN 99-04)		-3.830		-22.065
		(0.27)		(0.58)
TariffDrop (VN BTA)			2.804	-11.267
			(0.18)	(0.26)
ln(*Poverty 2002*)	0.132	0.093	0.099	0.097
	(2.19)*	(1.09)	(1.18)	(1.10)
North East	-0.153	-0.142	-0.145	-0.133
	(1.89)	(1.82)	(1.82)	(1.69)
North West	-0.237	-0.221	-0.225	-0.211
	(2.91)**	(2.78)**	(2.75)**	(2.71)**
North Central Coast	-0.135	-0.112	-0.115	-0.108
	(1.91)	(1.55)	(1.50)	(1.40)
South Central Coast	-0.126	-0.106	-0.109	-0.096
	(1.13)	(0.97)	(1.00)	(0.86)
Central Highlands	-0.029	-0.013	-0.017	-0.003
	(0.22)	(0.10)	(0.13)	(0.02)
South East	-0.004	0.018	0.014	0.023
	(0.04)	(0.19)	(0.15)	(0.23)
Mekong River Delta	-0.089	-0.077	-0.083	-0.045
	(1.07)	(1.05)	(1.14)	(0.55)
Constant	0.690	0.622	0.635	0.607
	(7.11)**	(4.33)**	(4.67)**	(4.29)**
Observations	61	61	61	61
R^2	0.50	0.50	0.50	0.51
Direct impact of a 1 SD increase in *TariffDrop*	0.135	0.142	0.141	0.140
Indirect impact evaluated at the average distance from port			-0.126	-0.123

Robust t statistics in parentheses.
* significant at 5%; ** significant at 1%

Table 9 - Provincial wage premiums and provincial exposure

Dependent Variable: Change in provincial wage premium, 2002 to 2004

		Education			Occupation	
	All	Primary	Lower Secondary	Upper Secondary	Unskilled	Skilled
TariffDrop	0.065	1.396	0.708	0.072	1.312	-0.566
	(0.16)	(2.77)**	(1.25)	(0.11)	(2.55)*	(1.06)
Provincial Wage Premium 2002	-0.293	-0.561	-0.352	-0.321	-0.451	-0.255
	(5.87)**	(10.12)**	(5.48)**	(4.35)**	(7.63)**	(4.20)**
Observations	61	61	61	61	61	61
R^2	0.51	0.65	0.38	0.48	0.51	0.52
Impact of a 1 SD increase in *TariffDrop*	0.09	1.91	0.97	0.10	1.80	-0.78

Robust t statistics in parentheses.

* significant at 5%; ** significant at 1%

Table 10 - Enterprise job growth

Dependent variable: Growth in enterprise employment, 2000 to 2004

	(1)
TariffDrop	7.486
	(2.70)**
ln(Jobs 00)	-0.094
	(-2.61)*
Regional dummies	yes
Observations	61
R-squared	0.28

Robust t statistics in parentheses.
* significant at 5%; ** significant at 1%

Table 11 - Impact of provincial exposure (*TariffDrop*) on the share of workers working for a wage or salary

Dependent variable: Change in share of workers working for wage or salary

		Education		
Sample	All (1)	Primary (2)	Lower Secondary (3)	Upper Secondary (4)
TariffDrop	0.800 (1.36)	1.269 (2.67)*	0.873 (1.97)	-0.654 (0.91)
Share worked for wage 2002	-0.230 (1.88)	-0.630 (5.55)**	-0.303 (2.90)**	0.056 (0.45)
Regional dummies	yes	yes	yes	yes
Observations	61	61	61	61
R-squared	0.44	0.64	0.45	0.16
Impact of a 1 SD increase in *TariffDrop*	1.10	1.74	1.20	-0.90

Robust t statisitics in parentheses.
* significant at 5%; ** significant at 1%

Table A1 - Regressions addressing measurement error

Dependent variable: Proportional drop in poverty, 2002 to 2004

	(1)	(2)	(3)
Estimation method	First-Diff.	NLS	OLS
TariffDrop	11.152	11.050	9.139
	(3.12)**	(4.80)**	(3.93)**
North East	-0.136	-0.187	-0.095
	(-1.28)	(-2.07)*	(-1.13)
North West	-0.243	-0.390	-0.146
	(-2.14)*	(-3.16)**	(-1.92)
North Central Coast	-0.117	-0.165	-0.083
	(-1.65)	(-2.20)*	(-1.15)
South Central Coast	-0.070	-0.243	-0.253
	(-0.54)	(-1.99)	(-2.01)*
Central Highlands	-0.077	-0.157	-0.026
	(-0.68)	(-1.13)	(-0.22)
South East	0.094	-0.058	-0.071
	(1.03)	(-0.50)	(-0.57)
Mekong River Delta	-0.039	-0.093	-0.114
	(-0.41)	(-0.93)	(-1.08)
Constant			-0.419
			(-2.01)*
Observations	61	61	61
R-squared		0.42	0.35
Standard deviation of *TariffDrop*	0.0137	0.0137	0.0137
Economic impact	0.153	0.151	0.125

Robust t statistics in parentheses.
* significant at 5%; ** significant at 1%

Table A2 - Regressions with alternative measures of poverty

	(1)	(2)	(3)
Dependent variable	Proportional drop in headcount ratio, 2002 to 2004	Proportional drop in poverty gap ratio, 2002 to 2004	Proportional drop in poverty severity ratio, 2002 to 2004
Poverty line (percentage of overall poverty line)	125	100	100
TariffDrop	6.915	10.502	14.050
	(3.00)**	(3.00)**	(2.38)*
Regional dummies	yes	yes	yes
Observations	61	61	61
R-squared	0.40	0.30	0.25

Robust t statistics in parentheses.
* significant at 5%; ** significant at 1%